

## **Automatic Transmission**

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# Automatic Transmission

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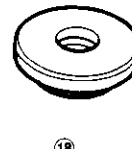
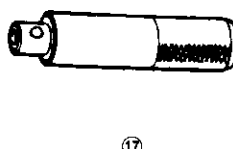
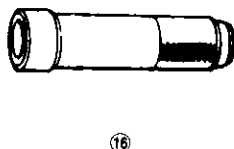
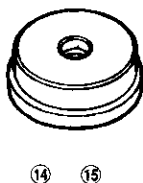
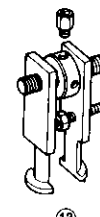
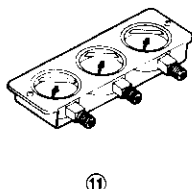
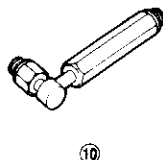
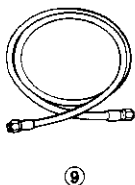
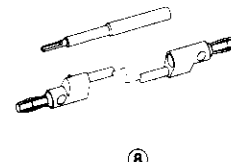
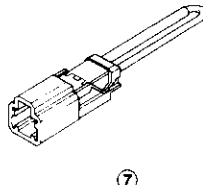
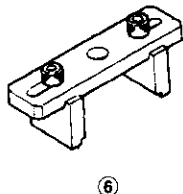
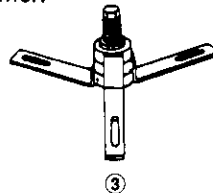
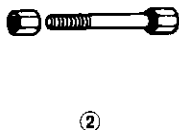
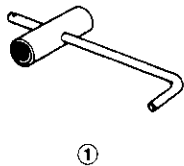


# Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAB - PF50101	Mainshaft Holder	1	14-133, 180
②	07GAE - PG40200 or 07GAE - PG4020A	Clutch Spring Compressor Bolt Assembly	1	14-160, 163
③	07HAC - PK4010A	Housing Puller	1	14-135
④	07JAD - PH80101	Driver Attachment	1	14-171
⑤	07JAD - PH80200	Pilot, 26 x 30 mm	1	14-171
⑥*	07LAE - PX40100	Clutch Spring Compressor Attachment	2	14-160, 163
⑦	07PAZ - 0010100	SCS Service Connector	1	14-49
⑧	07SAZ - 001000A	Backprobe Set	2	14-50, 113
⑨	07MAJ - PY4011A	A/T Oil Pressure Hose, 2210 mm	4	14-119
⑩	07MAJ - PY40120	A/T Oil Pressure Hose, Adapter	4	14-119
⑪	07406 - 0020400	A/T Oil Pressure Gauge Set w/panel	1	14-119
⑫	07406 - 0070300	A/T Low Pressure Gauge w/panel	1	14-119
⑬**	07736 - A01000A	Adjustable Bearing Puller, 25 - 40 mm	1	14-172, 173
⑭	07746 - 0010500	Attachment, 62 x 68 mm	1	14-172, 173, 174
⑮	07746 - 0010600	Attachment, 72 x 75 mm	1	14-172, 174
⑯	07746 - 0030100	Driver 40 mm I.D.	1	14-153, 167, 169, 170
⑰	07749 - 0010000	Driver	1	14-171, 172, 173, 174
⑱	07947 - 611501	Driver Attachment, 68 mm	1	14-171

\*07HAE - PL50101 can be used as a substitute.

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





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

## **Torque Converter, Gears, and Clutches**

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

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

## **Electronic Control**

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

## **Hydraulic Control**

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

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

## **Shift Control Mechanism**

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

## **Lock-up Mechanism**

In **D<sub>4</sub>** position, in 3rd and 4th, and in **D<sub>2</sub>** position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same as the engine crankshaft. Together with hydraulic control, the PCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and linear solenoid. When lock-up control solenoid valves A and B activate, the modulator pressure changes. The lock-up control solenoid valves A and B and the linear solenoid are controlled by the PCM.

(cont'd)



# Description

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## Gear Selection

The shift lever has six positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D<sub>4</sub>** 1st through 4th gear ranges, **D<sub>3</sub>** 1st through 3rd gear ranges, **2** 2nd gear.

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

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

## Automatic Transaxle (A/T) Gear Position Indicator

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

## Clutches

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

### • 1st Clutch

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

### • 2nd Clutch

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

### • 3rd Clutch

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

### • 4th Clutch

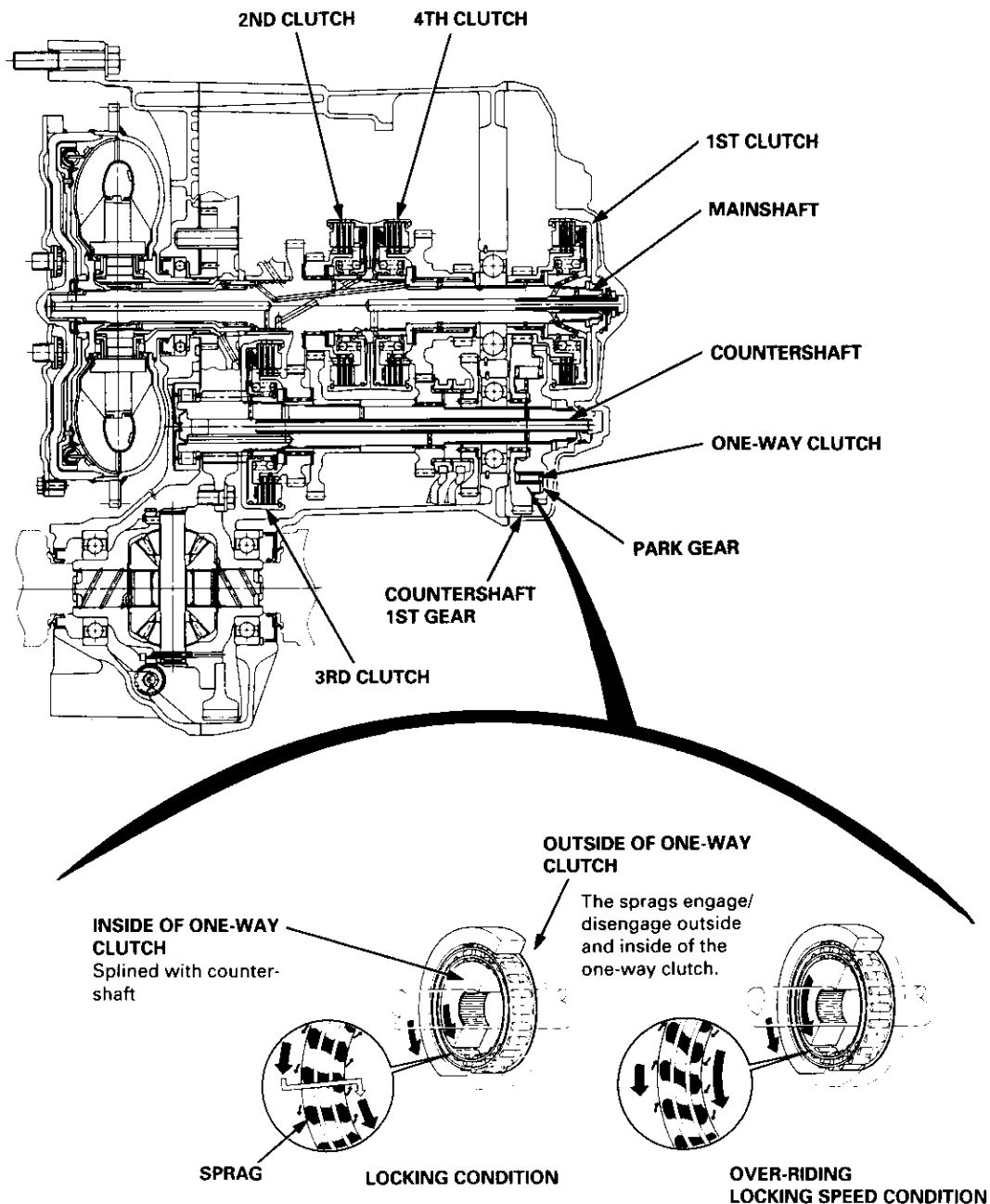
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 2nd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.



### One-way Clutch

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

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



# Description

## Power Flow

PART POSITION	TORQUE CONVERTER	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARK GEAR
					GEAR	CLUTCH		
<b>P</b>	○	×	×	×	×	×	×	○
<b>R</b>	○	×	×	×	×	○	○	×
<b>N</b>	○	×	×	×	×	×	×	×
<b>D<sub>4</sub></b>	1ST	○*2	×	×	×	×	×	×
	2ND	○*1	○	×	×	×	×	×
	3RD	○*1	×	○	×	×	×	×
	4TH	○*1	×	×	○	○	×	×
<b>D<sub>3</sub></b>	1ST	○*2	×	×	×	×	×	×
	2ND	○*1	○	×	×	×	×	×
	3RD	○*1	×	○	×	×	×	×
<b>2</b>	○	○*1	○	×	×	×	×	×

○: Operates, ×: Doesn't operate.

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

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



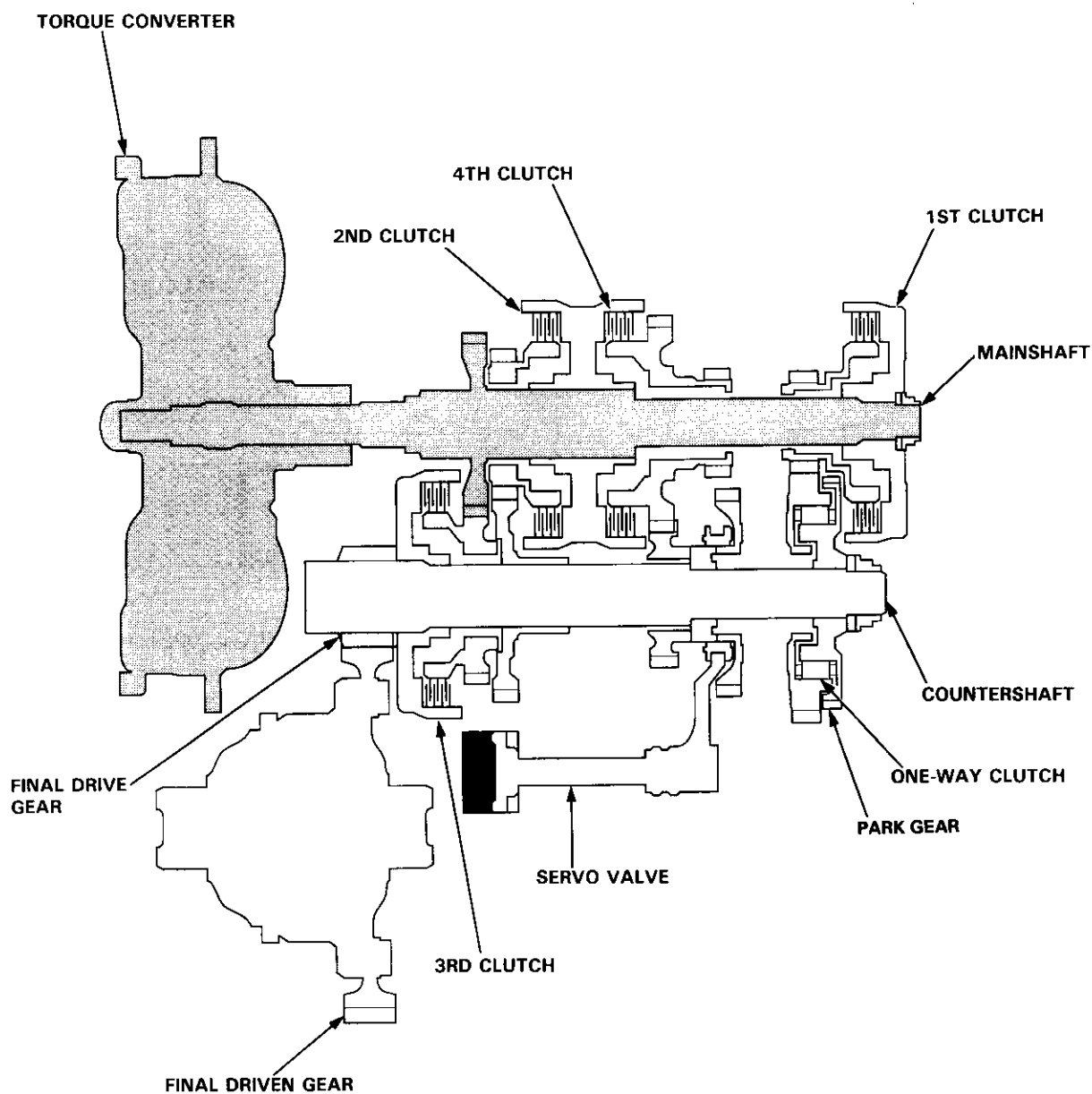
**[N] Position**

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

**[P] Position**

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

The countershaft is locked by the park pawl interlocking the park gear.



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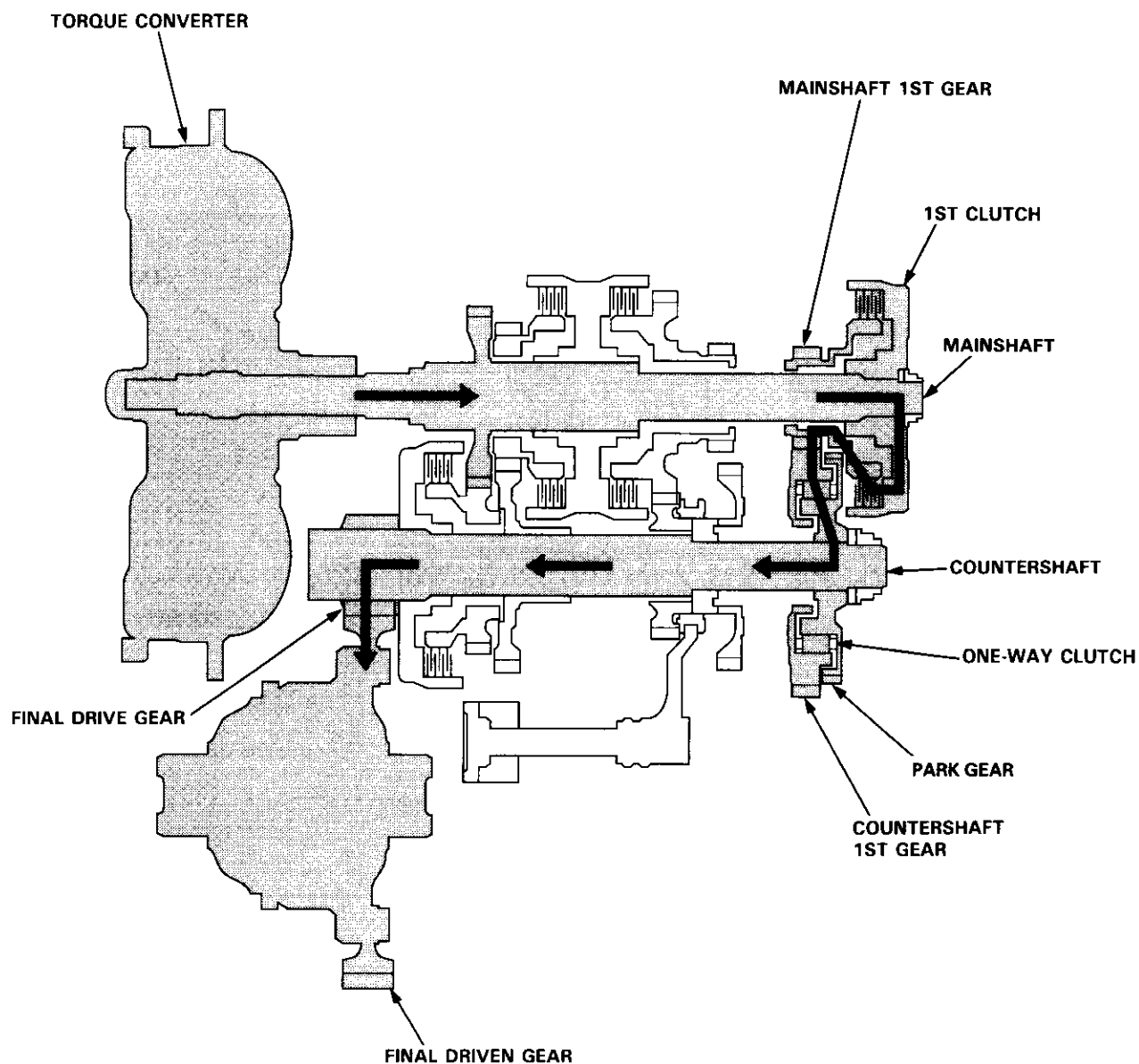
# Description

## Power Flow (cont'd)

### 1st Gear ( $D_4$ or $D_3$ position)

In  $D_4$  or  $D_3$  position, the optimum gear is automatically selected from 1st, 2nd, 3rd and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

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



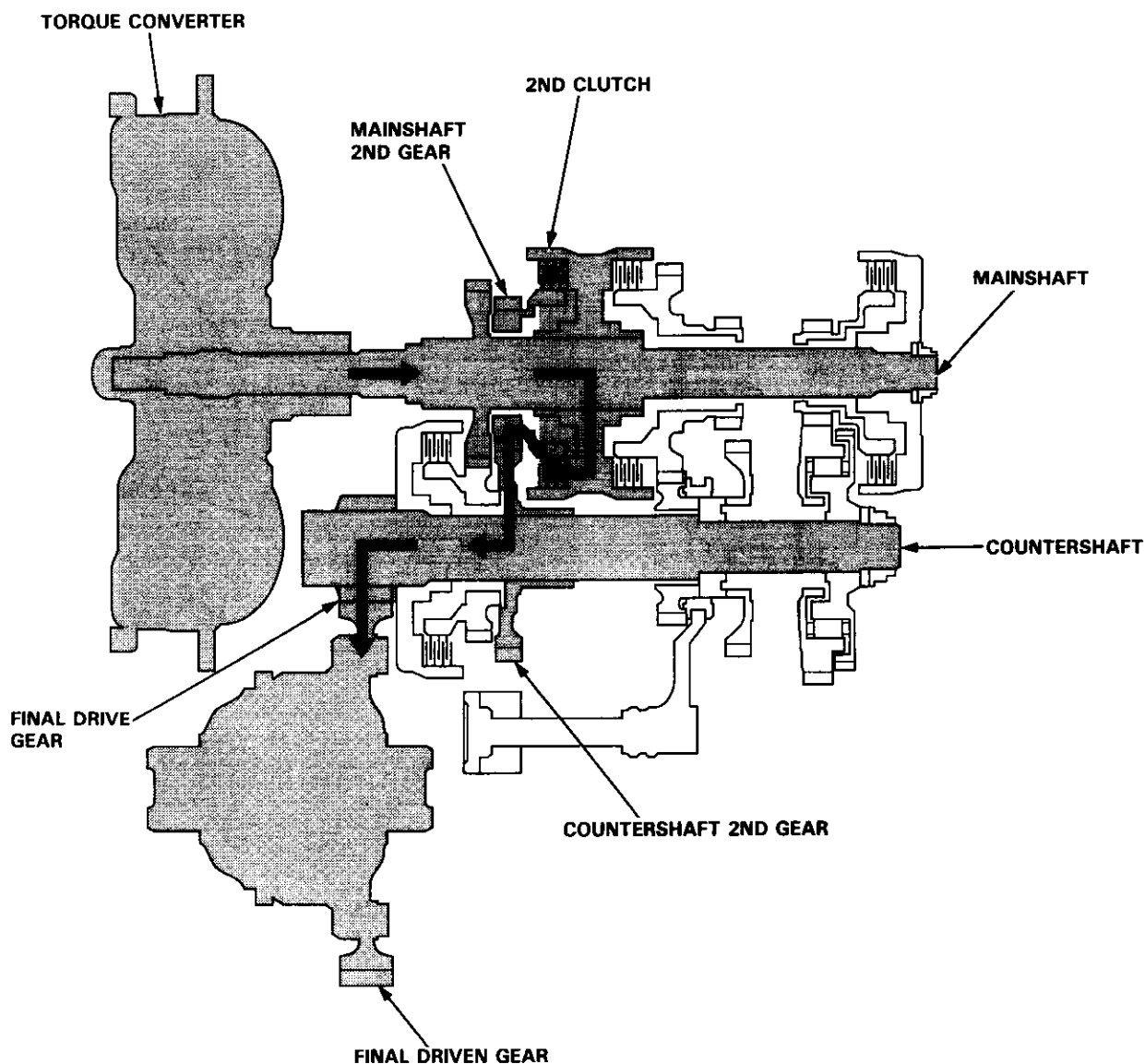


## 2nd Gear (D<sub>4</sub>, D<sub>3</sub> or 2 position)

2 Position is provided to drive only 2nd gear.

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

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



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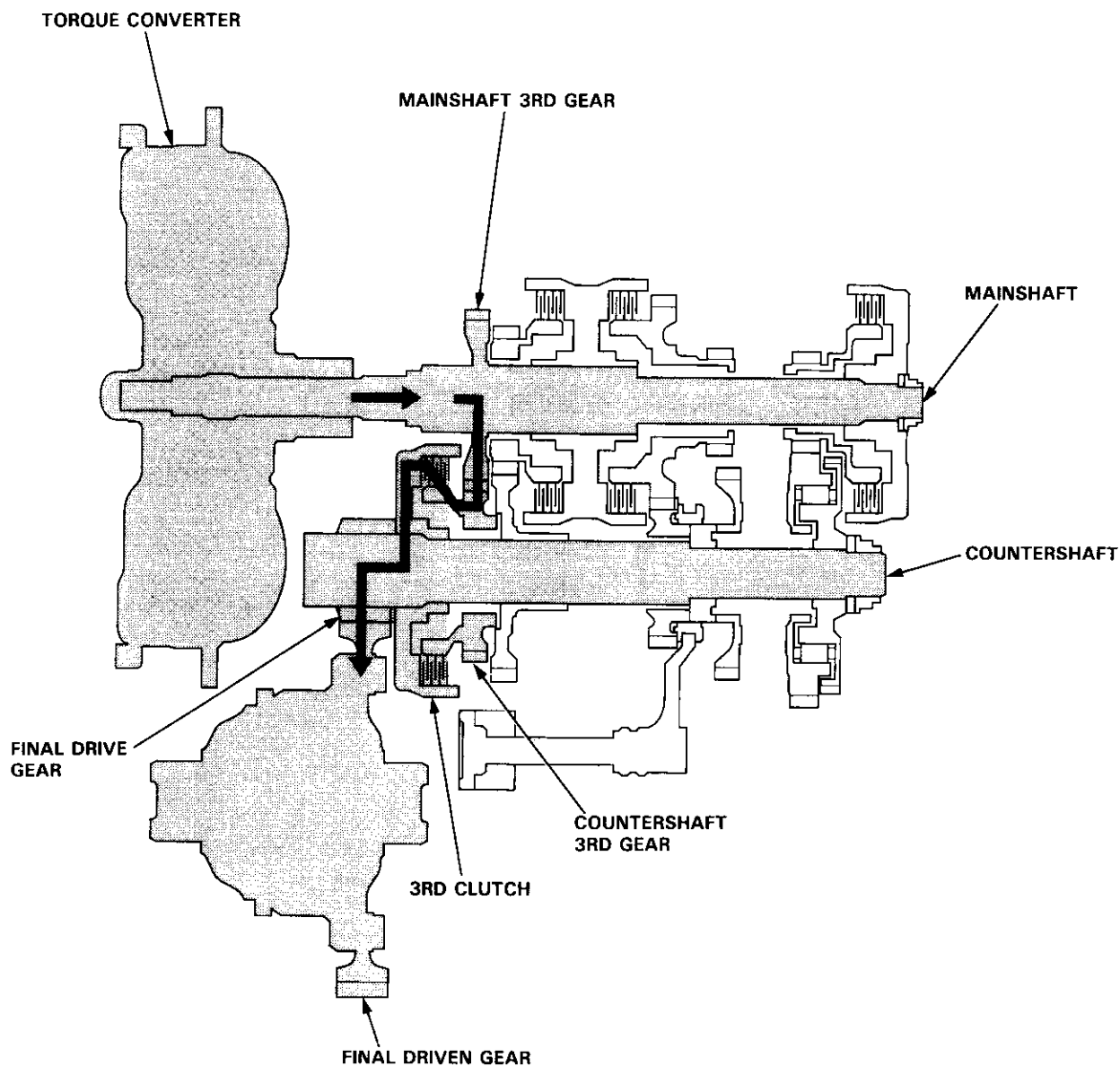
# Description

## Power Flow (cont'd)

### 3rd Gear (D<sub>4</sub> or D<sub>5</sub> position)

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

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

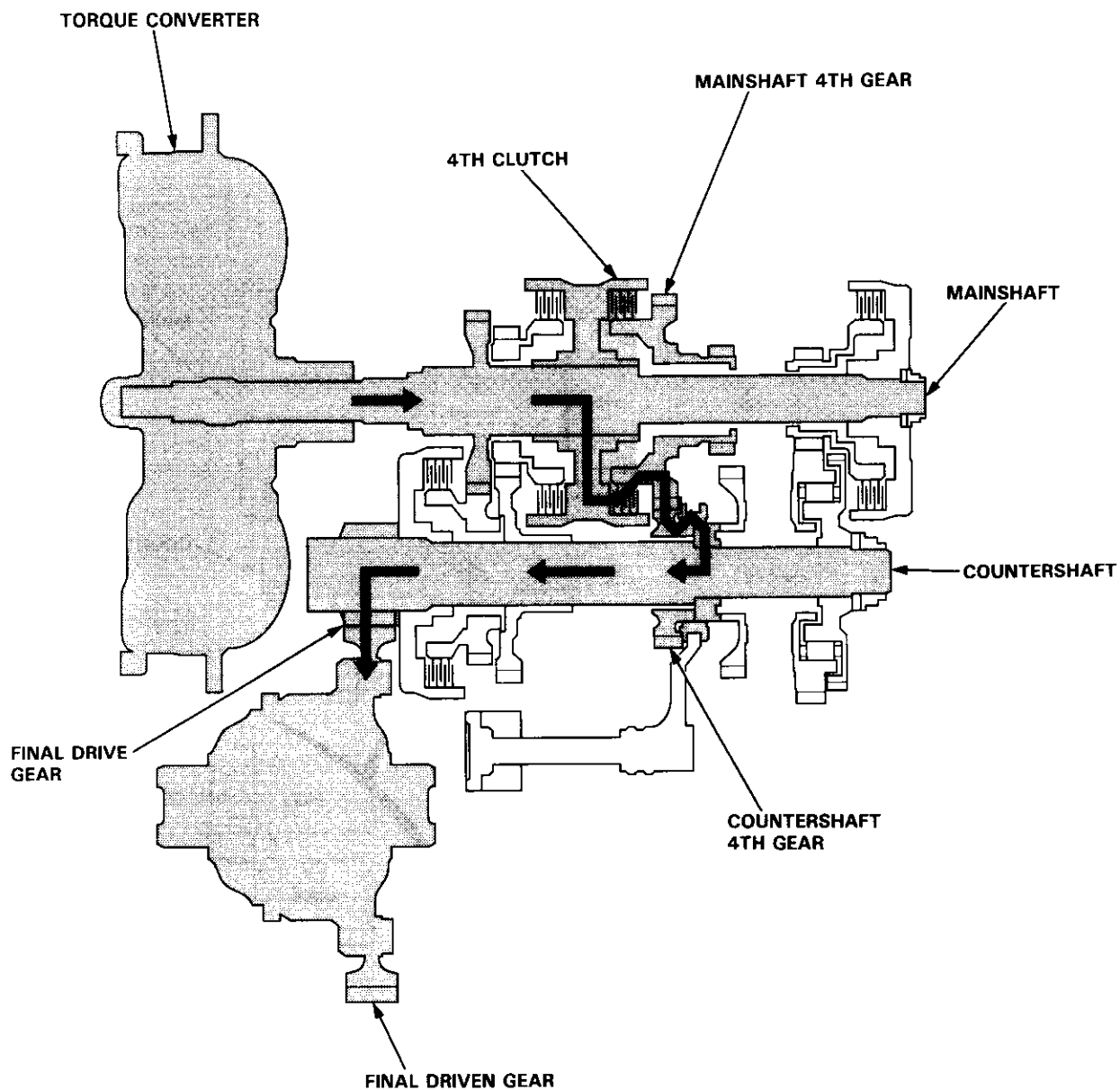




#### 4th Gear (D<sub>4</sub> position)

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

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



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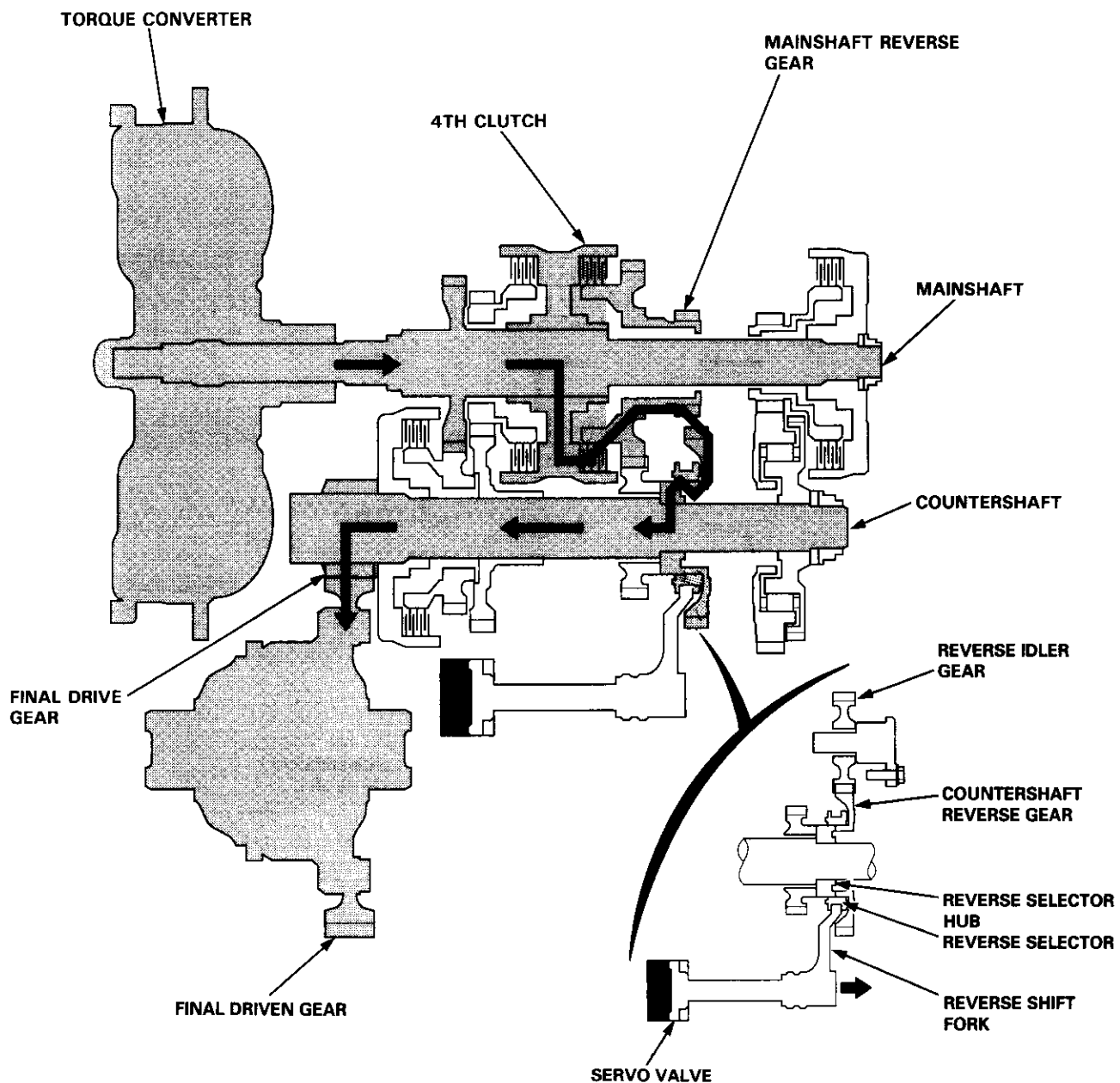


# Description

## Power Flow (cont'd)

### **R** Position

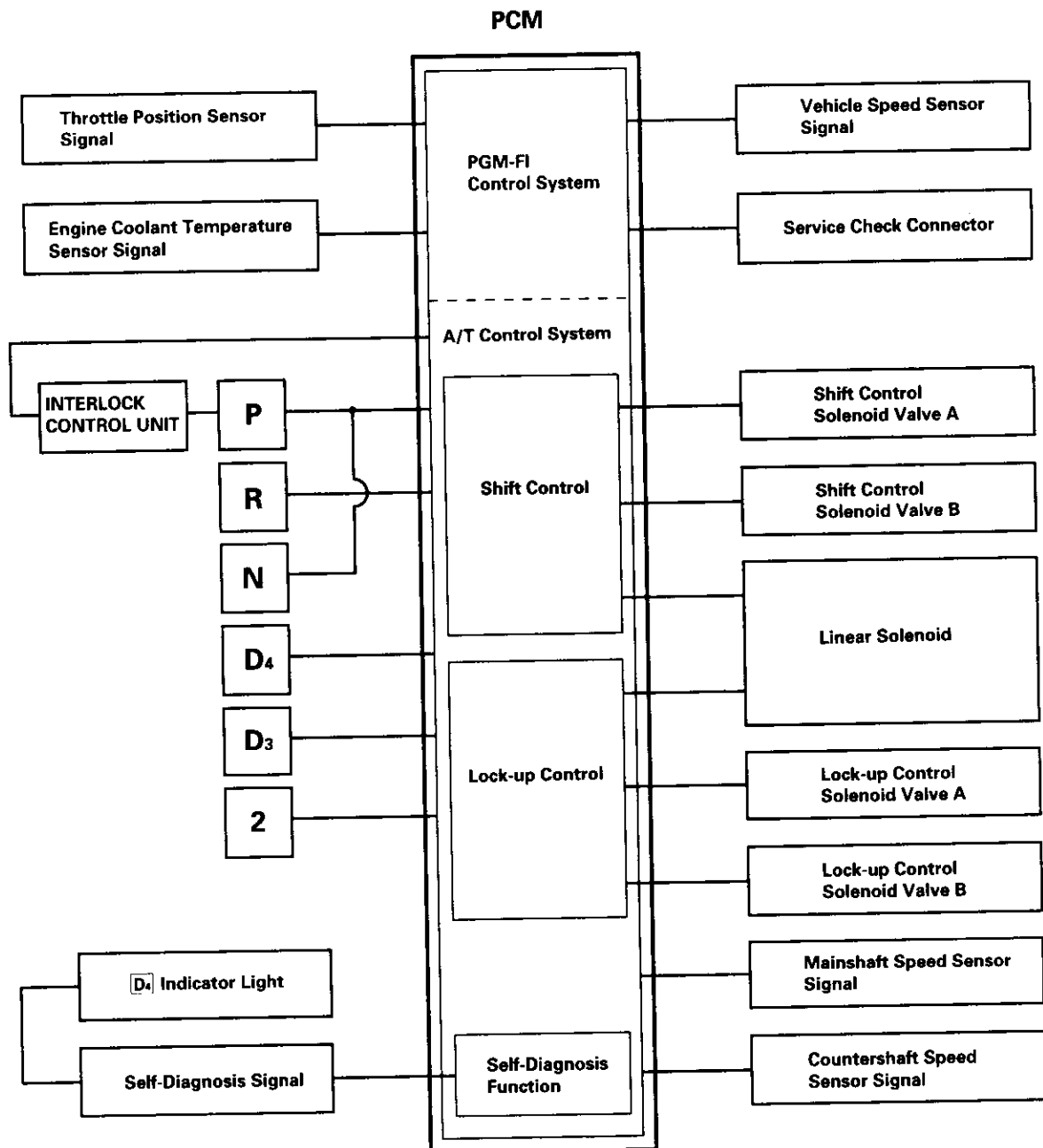
1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, reverse selector hub, and the countershaft reverse gear.
2. Hydraulic pressure is also applied to the 4th clutch.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





## Electronic Control System

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



(cont'd)

# Description

## Electronic Control System (cont'd)

### Shift Control

The PCM instantaneously determines which gear should be selected by various signals sent from sensors, and actuates the shift control solenoid valves A and B to control shifting. Also, a Grade Logic Control System has been adopted to control shifting in **D<sub>4</sub>** position while the vehicle is ascending or descending a slope, or reducing speed.

Position	Gear	Shift Control Solenoid Valve A	Shift Control Solenoid Valve B
<b>D<sub>4</sub></b> , <b>D<sub>3</sub></b>	1st	OFF	ON
	2nd	ON	ON
	3rd	ON	OFF
<b>D<sub>4</sub></b>	4th	OFF	OFF
<b>2</b>	2nd	ON	ON
<b>R</b> *	Reverse	ON	OFF

\*See page 14-31 for reverse inhibitor control description.

### Lock-up Control

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

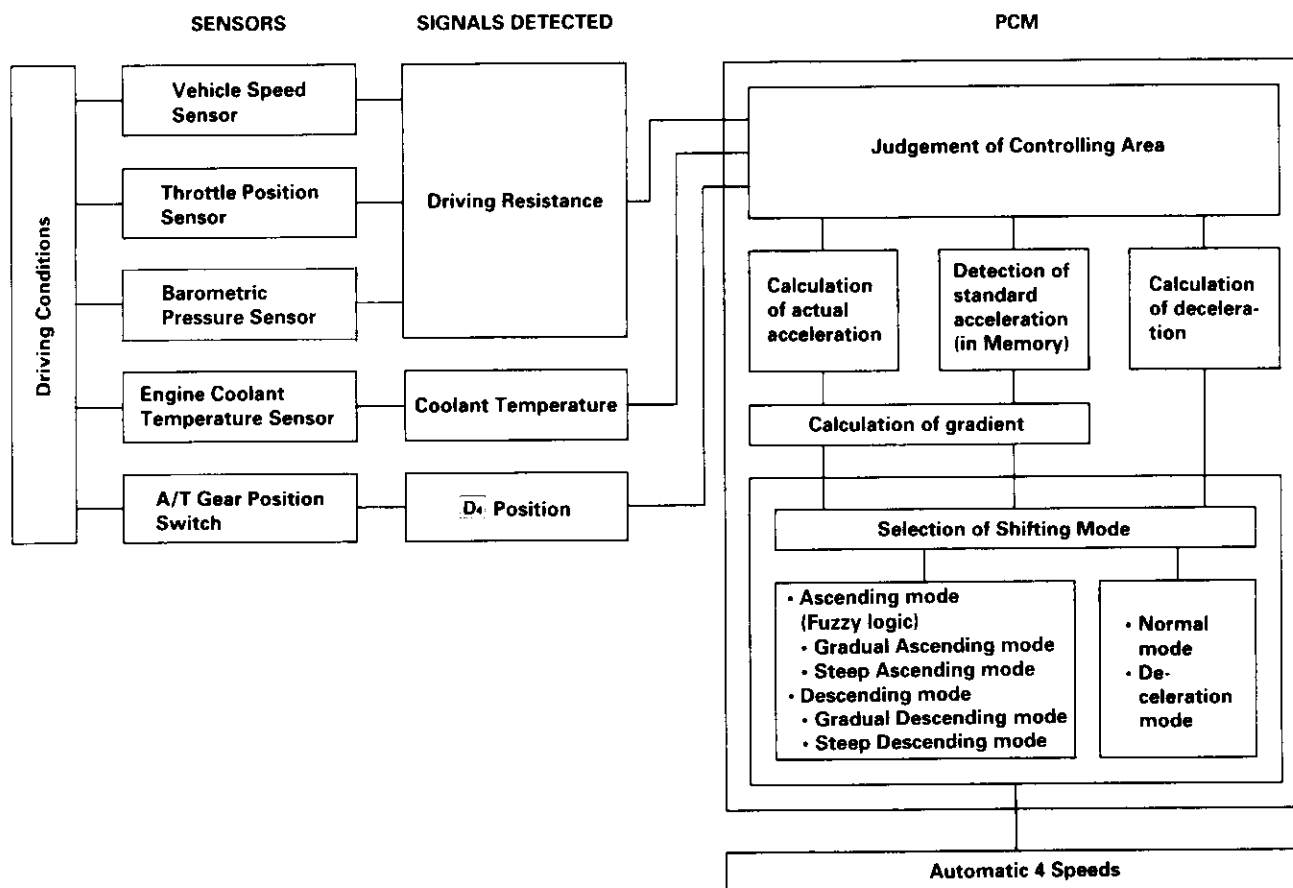
Lock-up Conditions	Lock-up Control Solenoid Valve A	Lock-up Control Solenoid Valve B	Linear Solenoid Pressure
Lock-up OFF	OFF	OFF	High
Lock-up, Half	ON	Duty operation OFF ↔ ON	Low
Lock-up, Full	ON	ON	High
Lock-up during deceleration	ON	Duty operation OFF ↔ ON	Low



## GRADE LOGIC CONTROL SYSTEM

How it works:

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



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# Description

## Electronic Control System (cont'd)

### Ascending Control

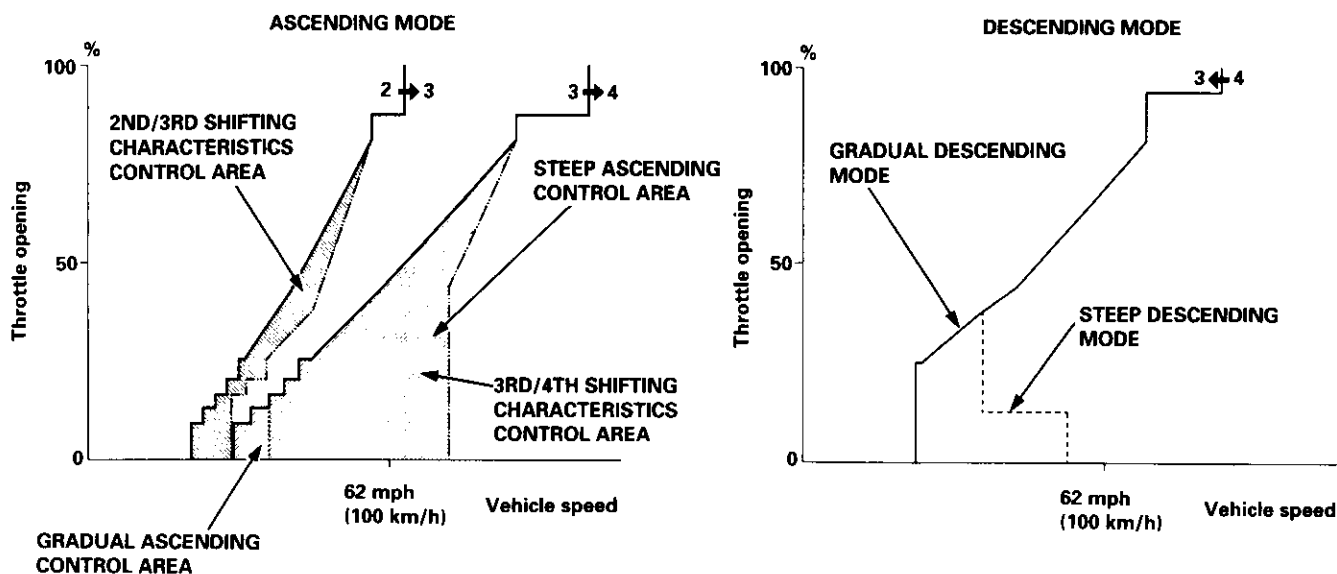
When the PCM determines that the vehicle is climbing a hill in **D<sub>4</sub>** position, the system extends the engagement area of 2nd gear and 3rd gear to prevent the transmission from frequently shifting between 2nd and 3rd gears, and between 3rd and 4th gears, so the vehicle can run smooth and have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

#### NOTE:

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

### Descending Control

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

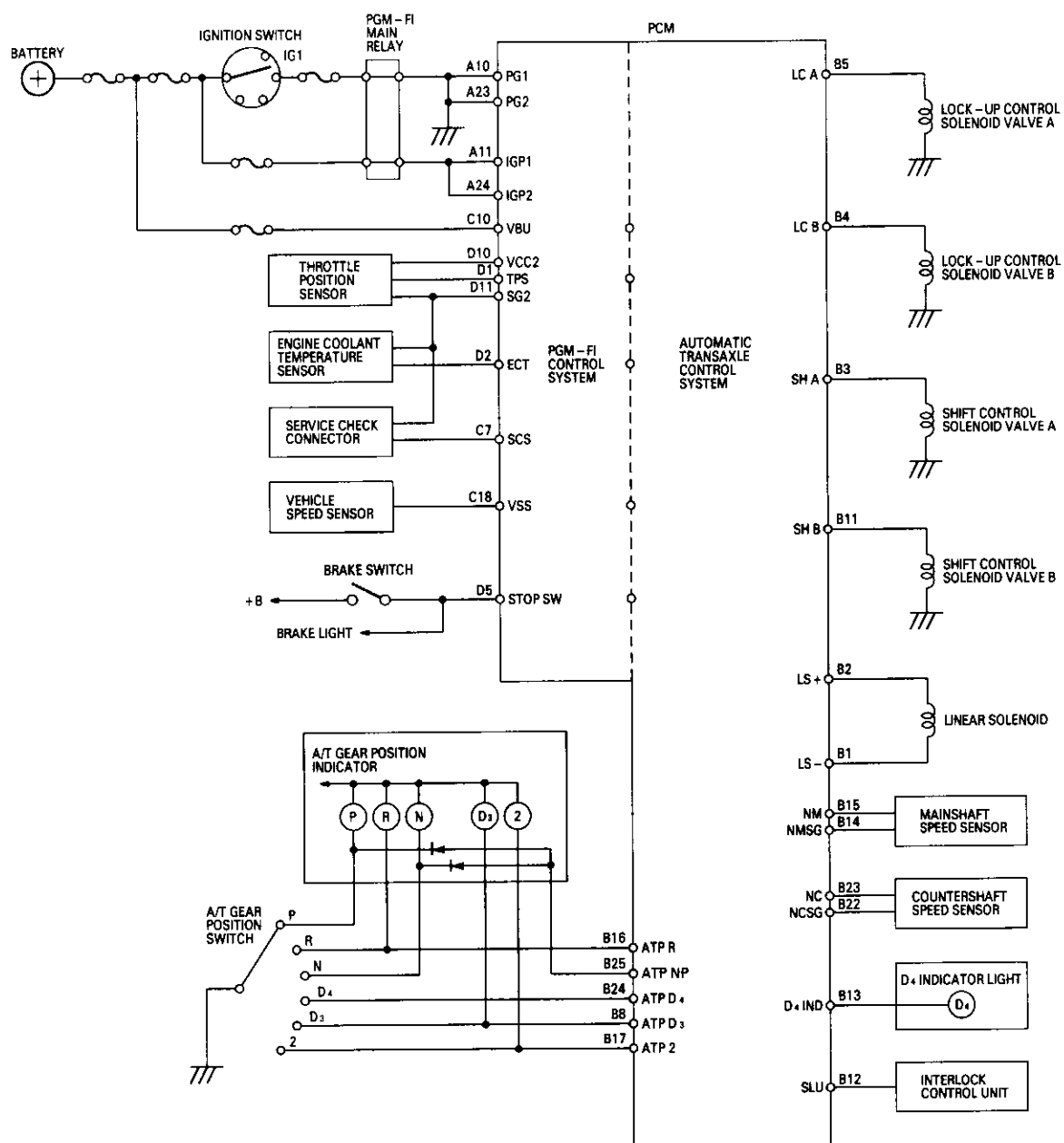


### Deceleration Control

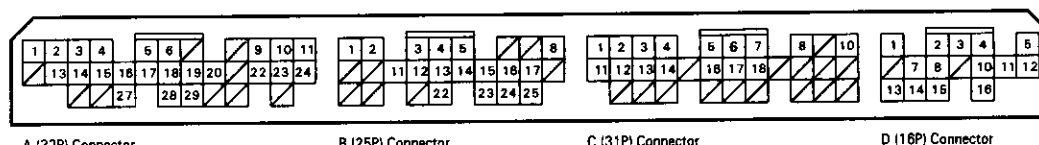
When the vehicle goes around a corner, and needs to first decelerate and then accelerate, the PCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 26 mph (41 km/h), the PCM shifts the transmission from 4th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



## Circuit Diagram and Terminal Locations — '96 - 98 Models



PCM Terminal Locations



A (32P) Connector

B (25P) Connector

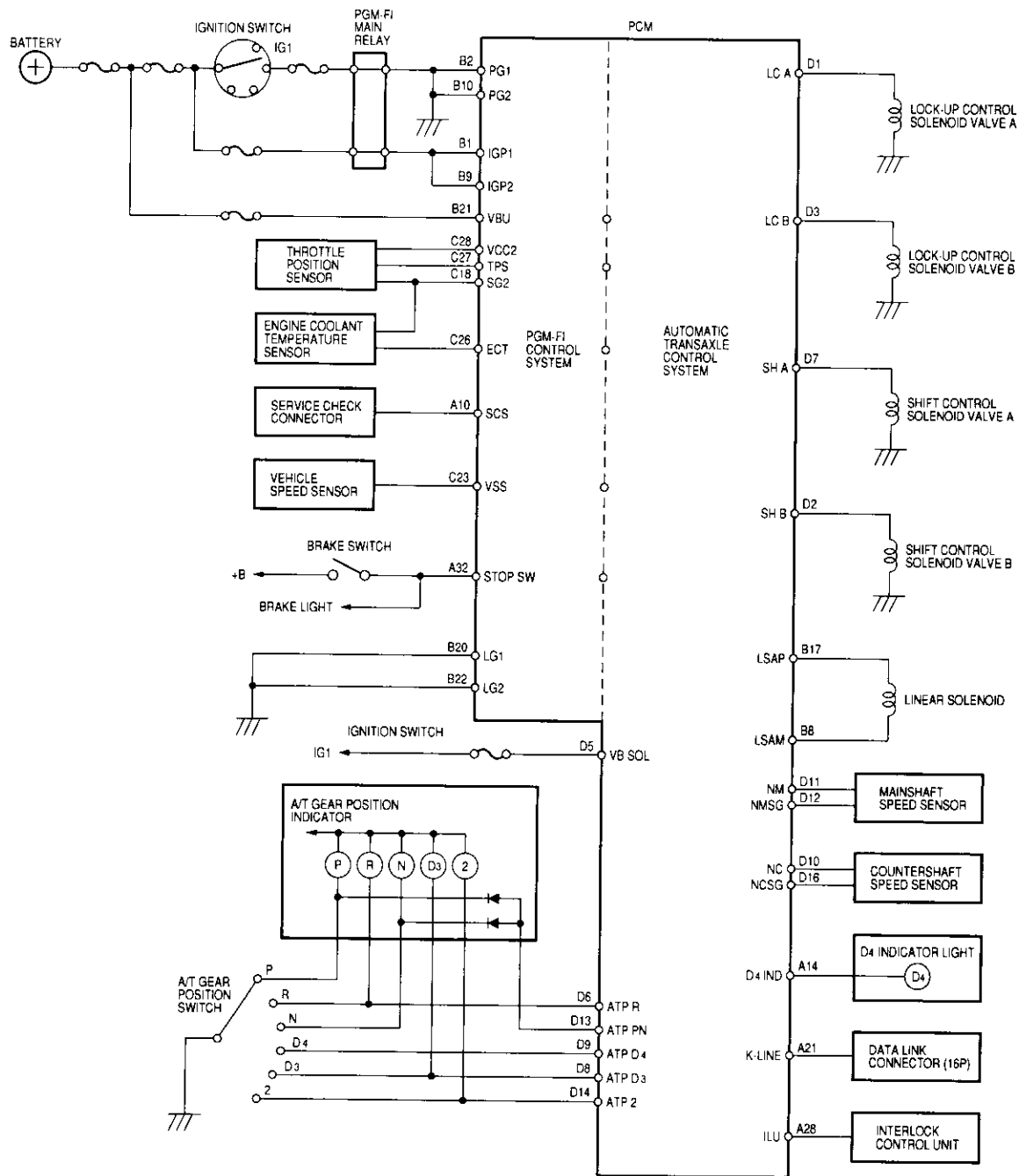
C (31P) Connector

D (16P) Connector

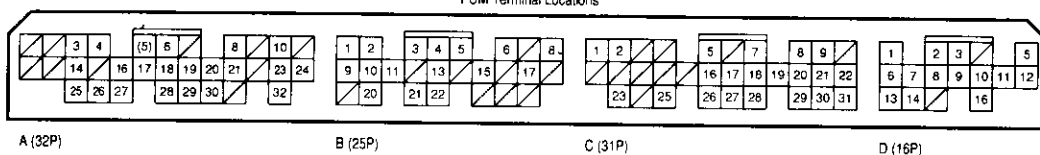
# Description

## Electronic Control System (cont'd)

### Circuit Diagram and Terminal Locations — '99 - 00 Models



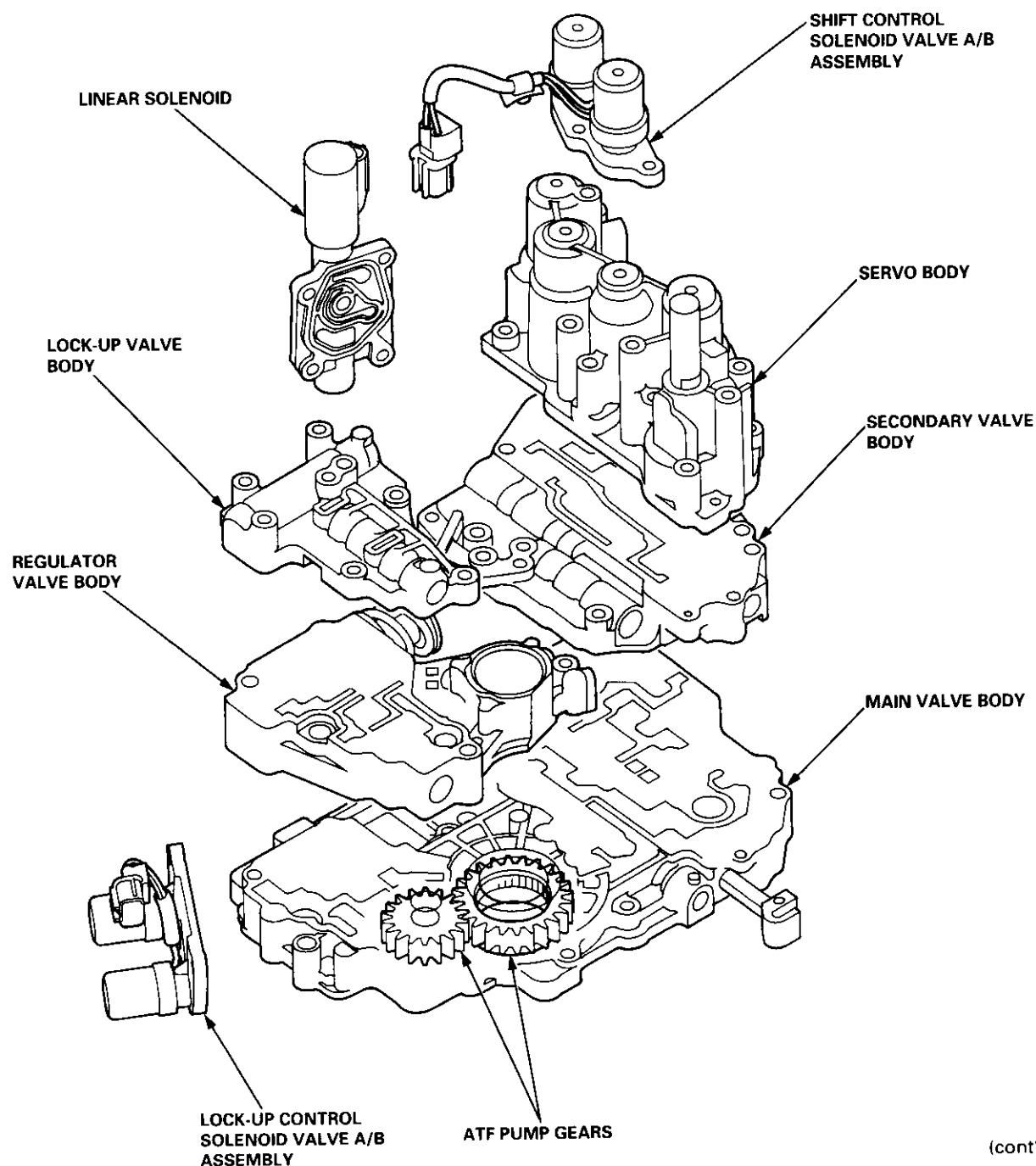
PCM Terminal Locations





## Hydraulic Control

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



(cont'd)

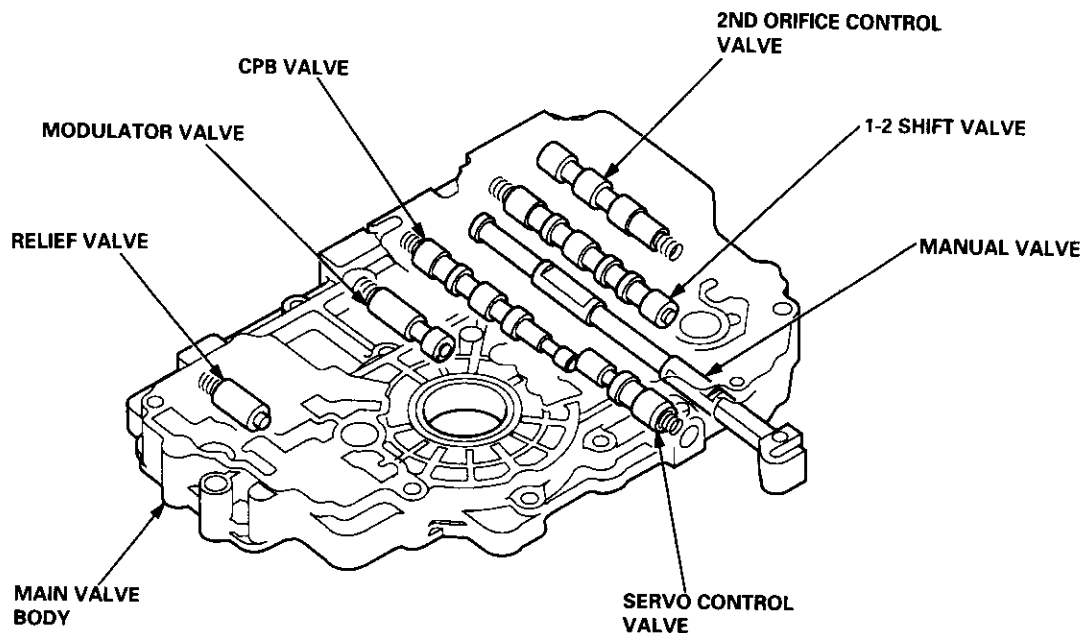


# Description

## Hydraulic Control (cont'd)

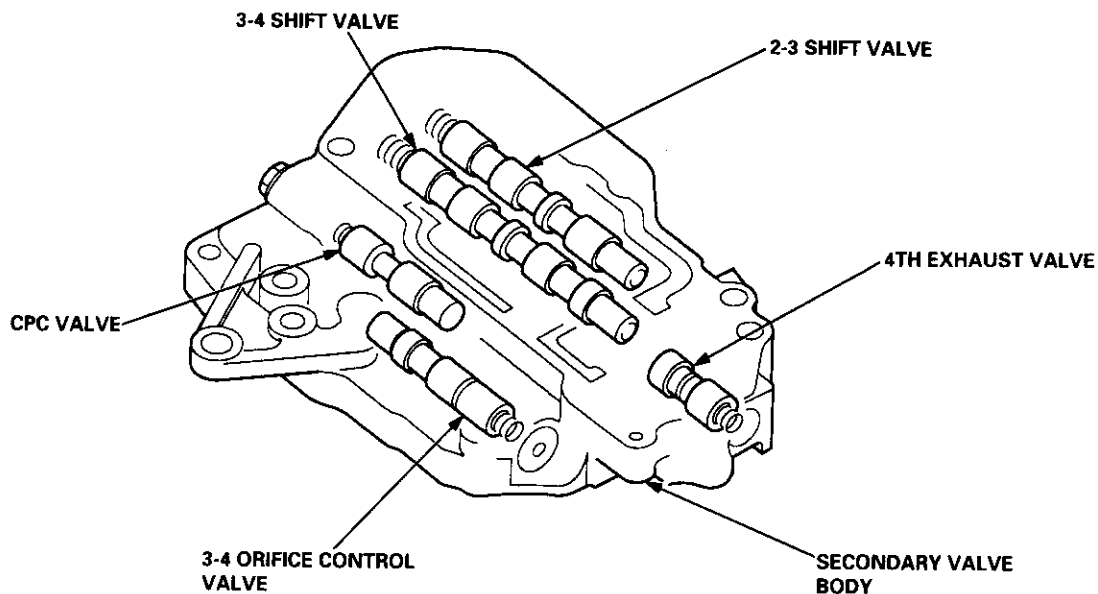
### Main Valve Body

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



### Secondary Valve Body

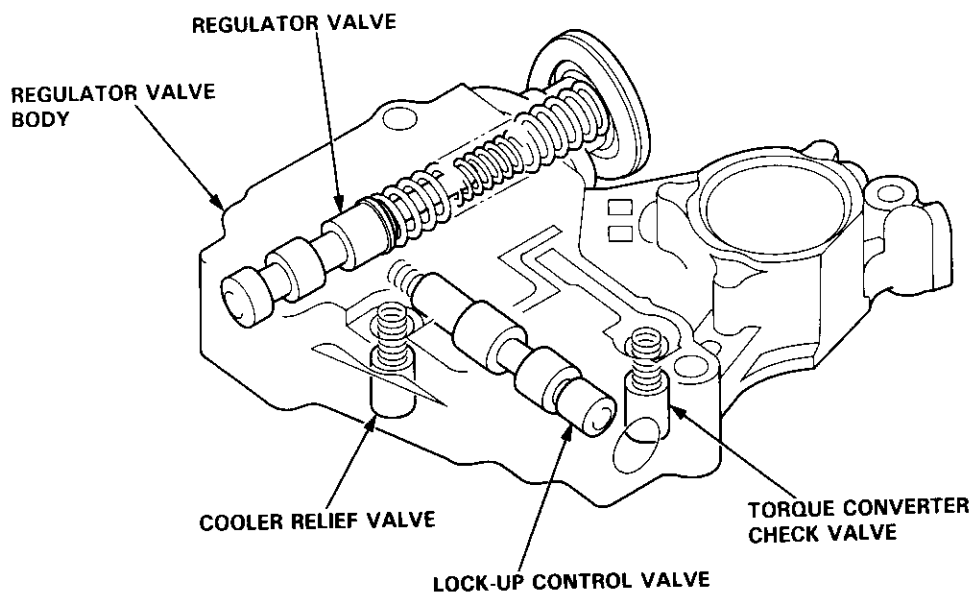
The secondary valve body is located on the main valve body. The secondary valve body houses the 2-3 shift valve, the 3-4 shift valve, the 3-4 orifice control valve, the 4th exhaust valve, and the CPC valve.





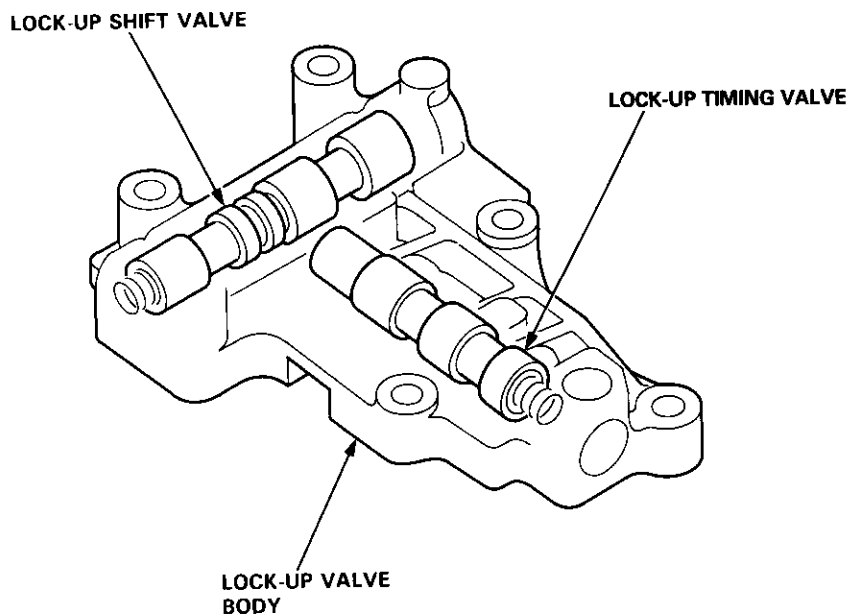
### Regulator Valve Body

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



### Lock-up Valve Body

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



(cont'd)

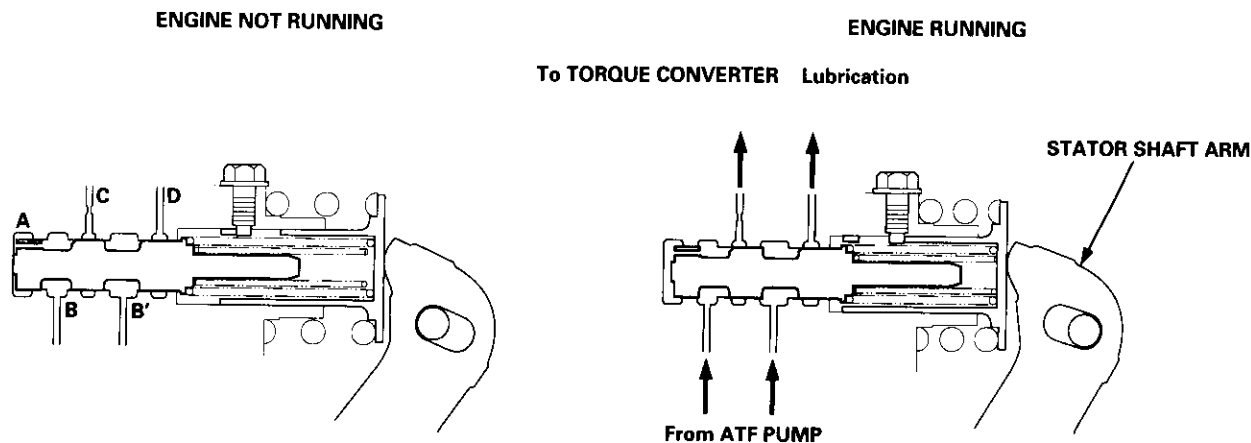
# Description

## Hydraulic Control (cont'd)

### Regulator Valve

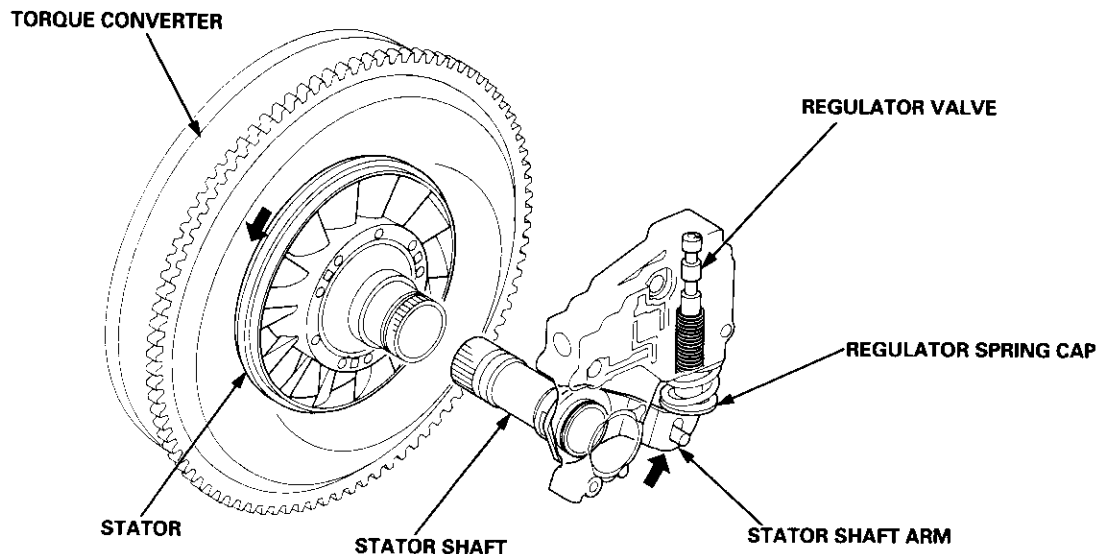
The regulator valve maintains a constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter. The fluid from the ATF pump flows through B and B'. The regulator valve has a valve orifice. The fluid entering from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

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



### Stator Reaction Hydraulic Pressure Control

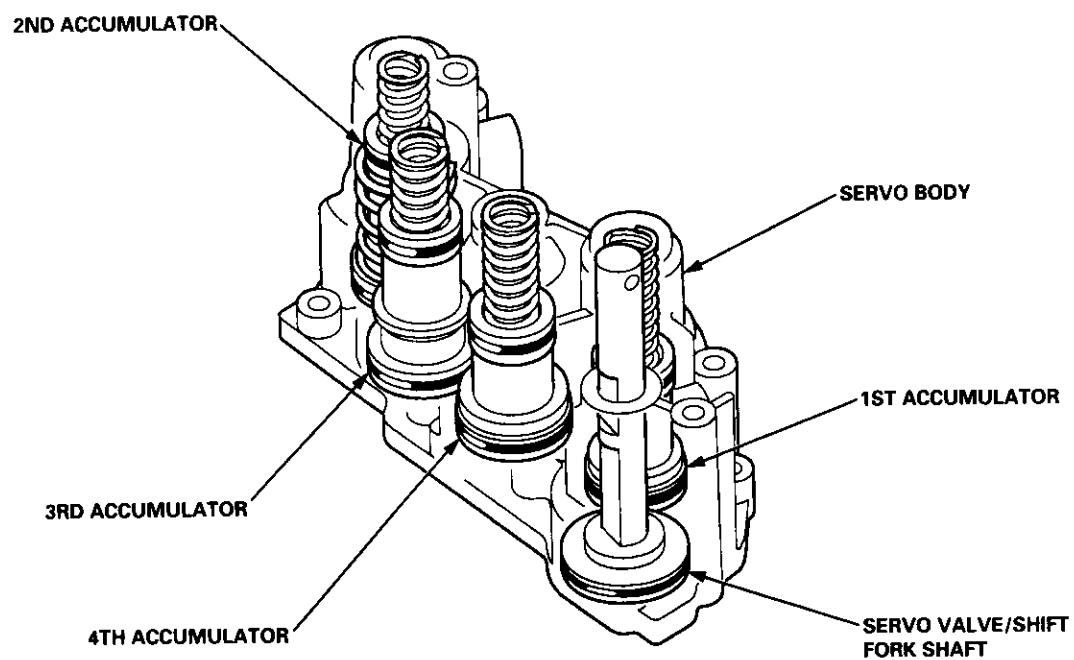
Hydraulic pressure increases according to torque, are performed by the regulator valve using the stator torque reaction. The stator shaft is splined with the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter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





### Servo Body

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

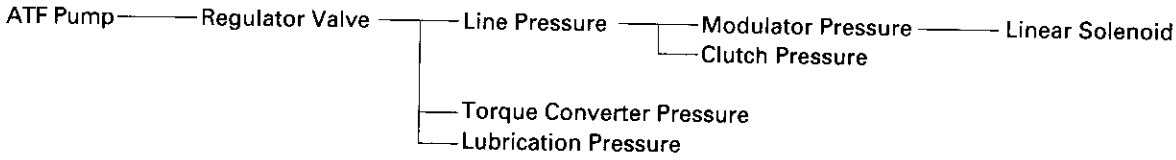


NOTE: The illustration shows the '96 – '98 models; the '99 – 00 models are similar.

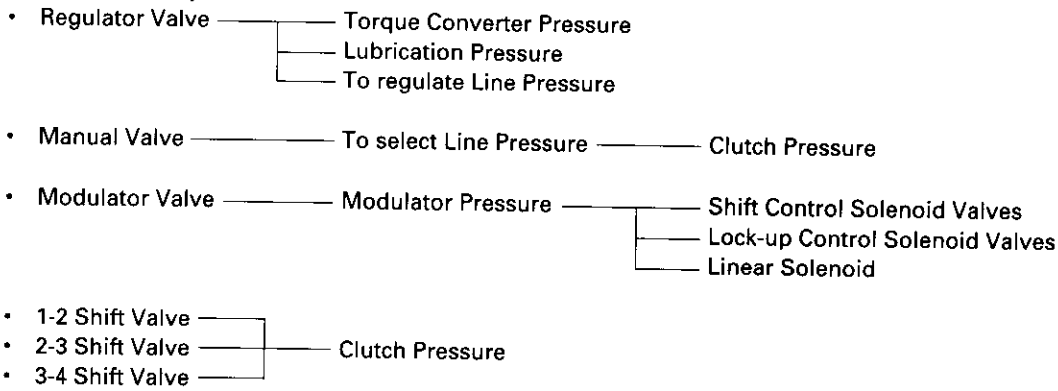
# Description

## Hydraulic Flow

### General Chart of Hydraulic Pressure



### Distribution of Hydraulic Pressure



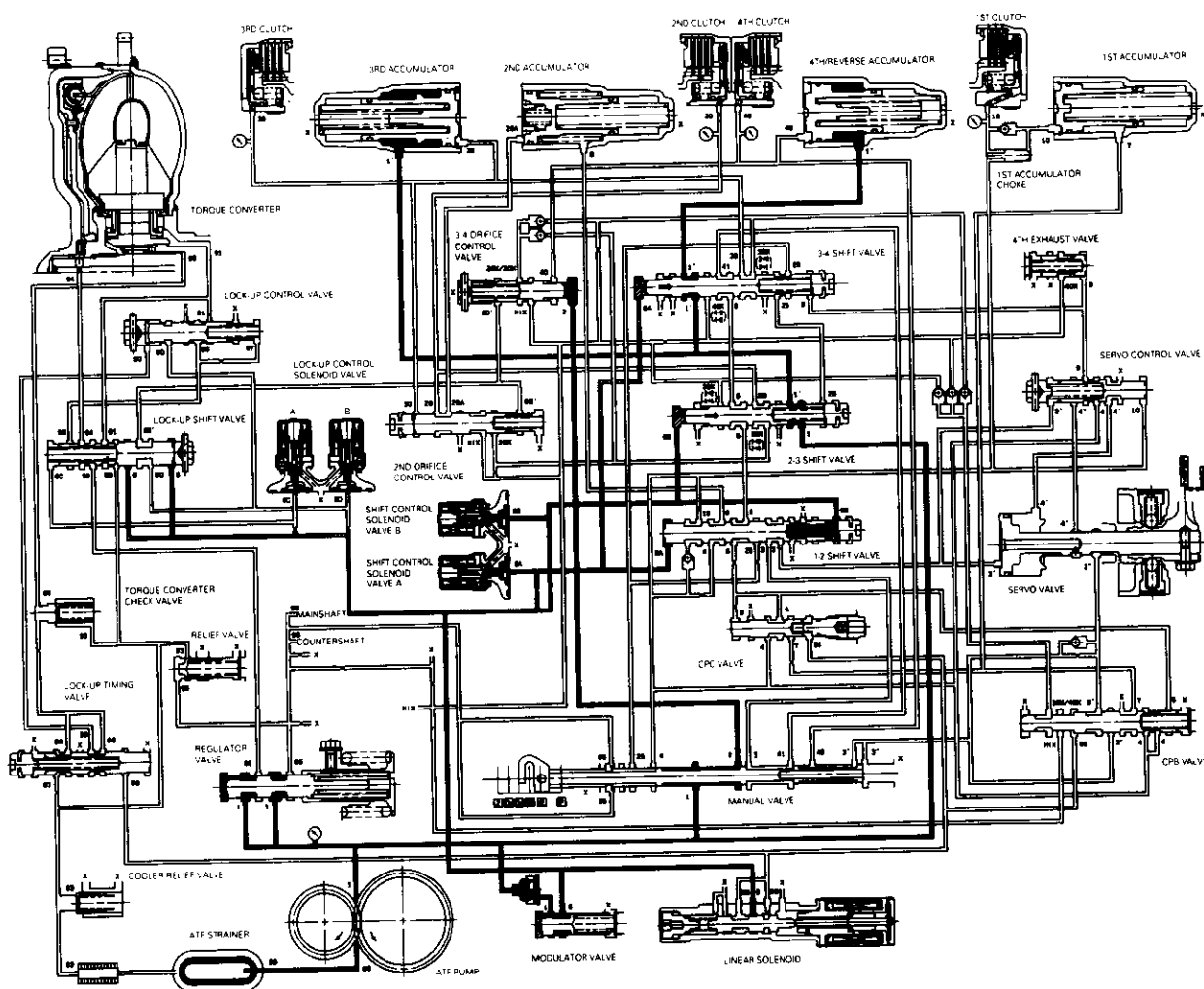
PORT NO.	DESCRIPTION OF PRESSURE	PORT NO.	DESCRIPTION OF PRESSURE	PORT NO.	DESCRIPTION OF PRESSURE
1	LINE	6B	MODULATE (SHIFT CONTROL SOLENOID VALVE B)	41	4TH CLUTCH
1'	LINE	6C	MODULATE (LOCK-UP CONTROL SOLENOID VALVE A)	56	LINEAR SOLENOID
1''	LINE	6D	MODULATE (LOCK-UP CONTROL SOLENOID VALVE B)	90	TORQUE CONVERTER
2	LINE	6D'	MODULATE (LOCK-UP CONTROL SOLENOID VALVE B)	91	TORQUE CONVERTER
3	LINE	7	LINE	92	TORQUE CONVERTER
3'	LINE	8	LINE/CPC	93	ATF COOLER
3''	LINE	9	LINE	94	TORQUE CONVERTER
4	LINE	10	1ST CLUTCH	95	LUBRICATION
4'	LINE	20	2ND CLUTCH	96	TORQUE CONVERTER
4''	LINE	20A	2ND ACCUMULATOR	97	TORQUE CONVERTER
5	CPC	25	LINE	99	SUCTION
6	MODULATE	30	3RD CLUTCH	X	DRAIN
6A	MODULATE (SHIFT CONTROL SOLENOID VALVE A)	40	4TH CLUTCH		



#### **N** Position

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

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



(cont'd)

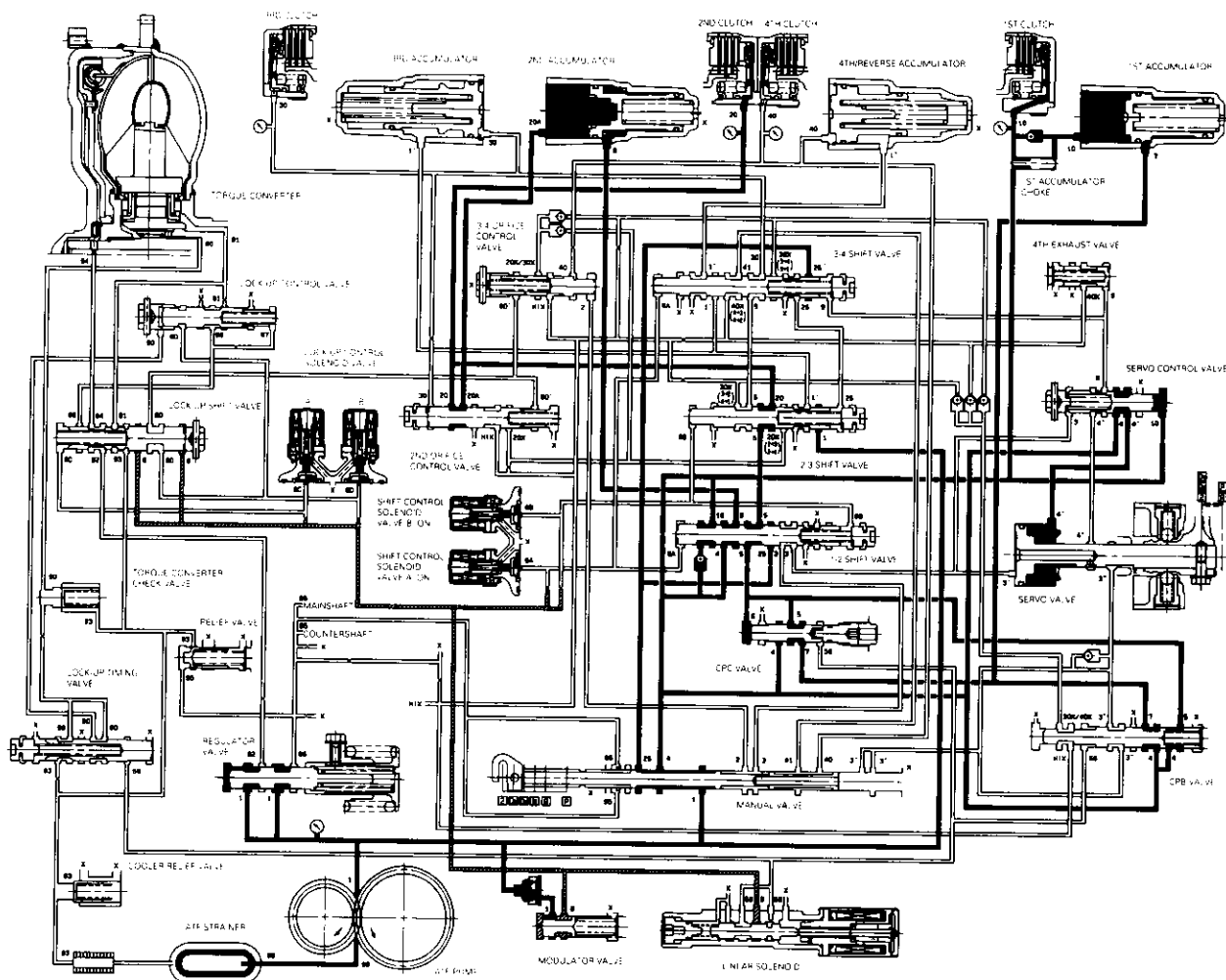
# Description

## Hydraulic Flow (cont'd)

### 2 Position

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

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



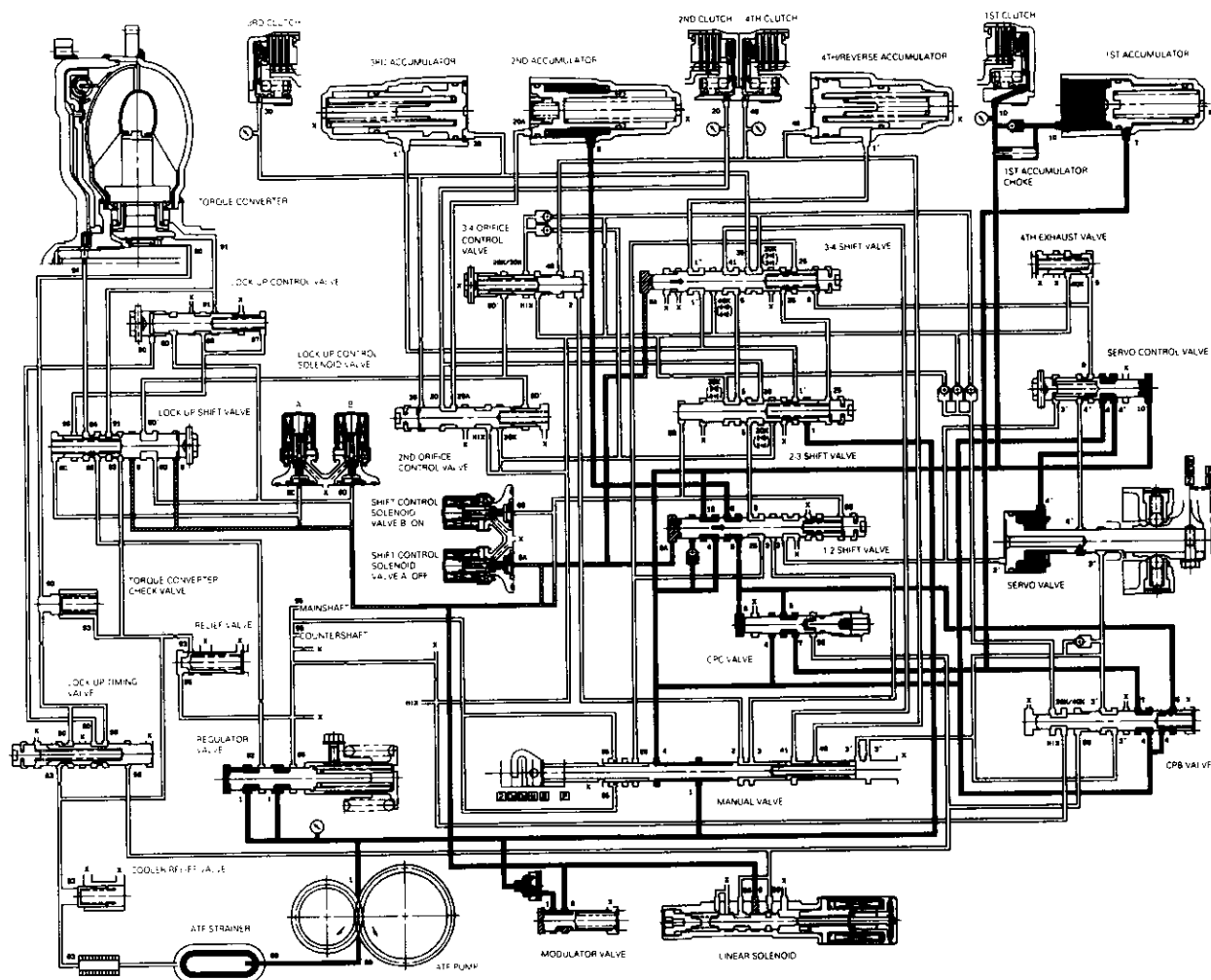


**D<sub>4</sub> or D<sub>5</sub> Position**

**1. 1st Gear**

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

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



(cont'd)



# Description

## Hydraulic Flow (cont'd)

### 2. 2nd Gear

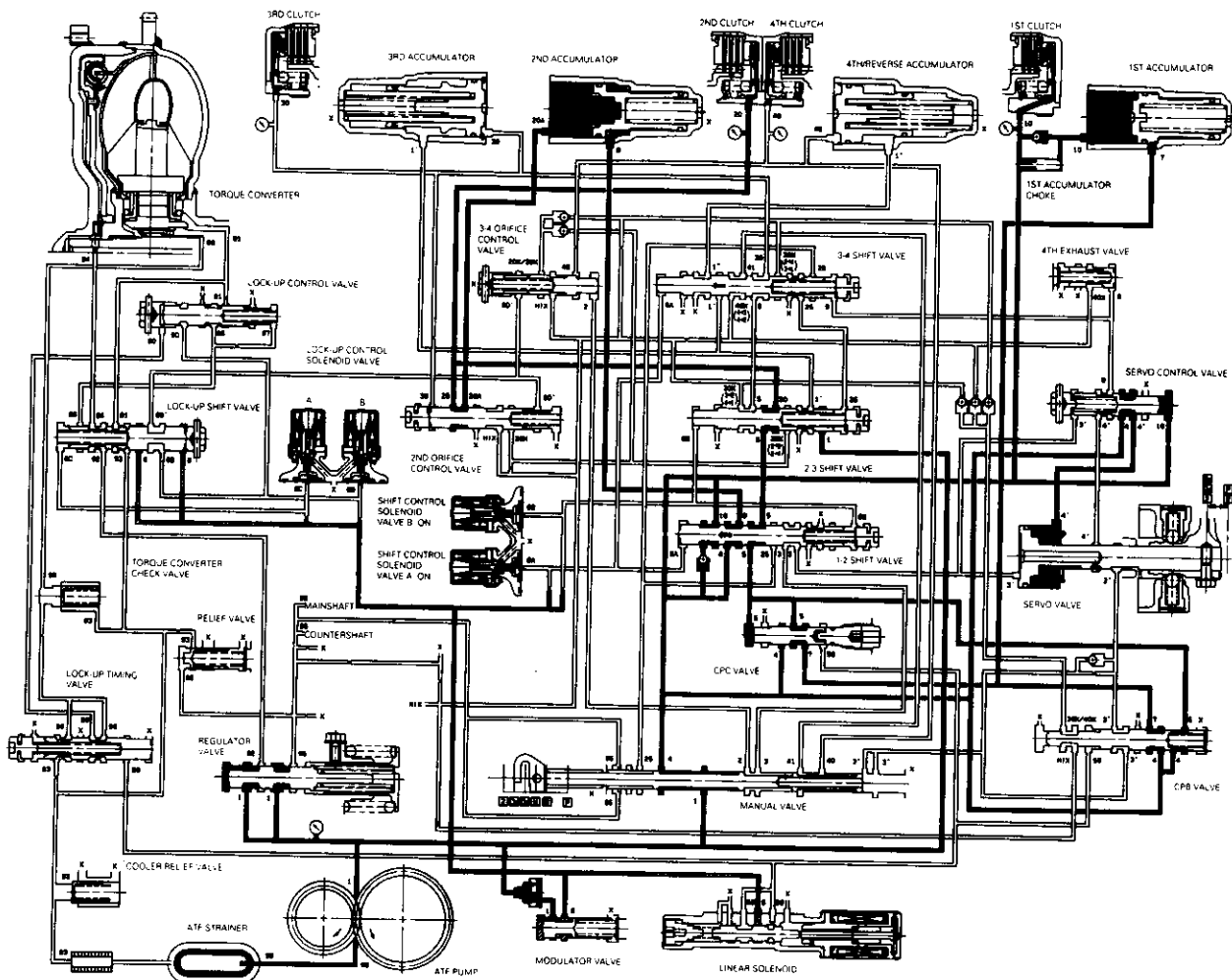
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned ON by means of the PCM. The modulator pressure (6A) in the left end of the 1-2 shift valve is released by turning shift control solenoid valve A ON. The 1-2 shift valve is moved to the left side and uncovers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

Fluid flows by way of:

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

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

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





### 3. 3rd Gear

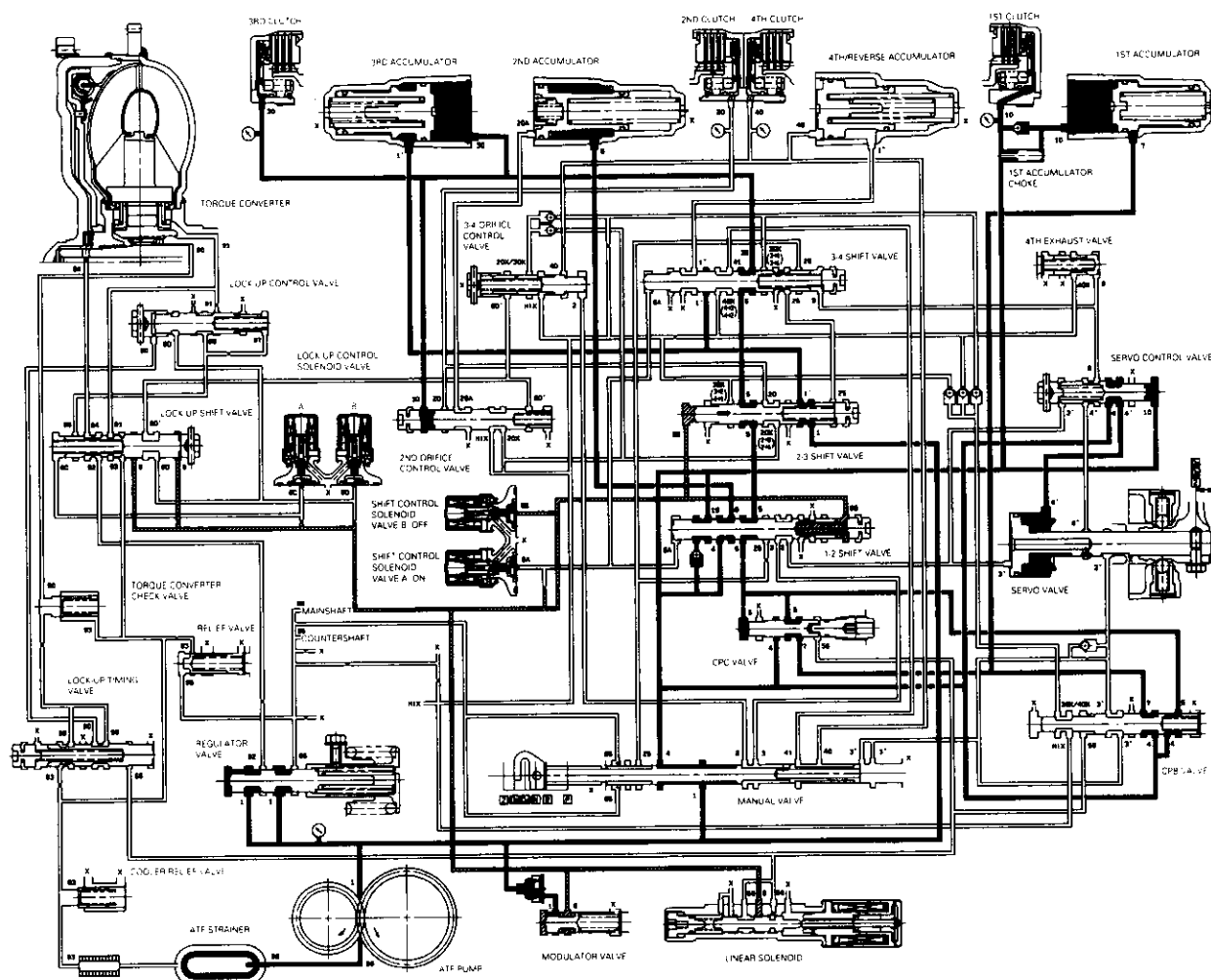
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve B is turned OFF by means of the PCM. Shift control solenoid valve A remains ON. The modulator pressure (6) flows to the right end of the 1-2 shift valve and the left end of the 2-3 shift valve. The 2-3 shift valve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

Fluid flows by way of:

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

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

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



(cont'd)

# Description

## Hydraulic Flow (cont'd)

### 4. 4th Gear (D Position)

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

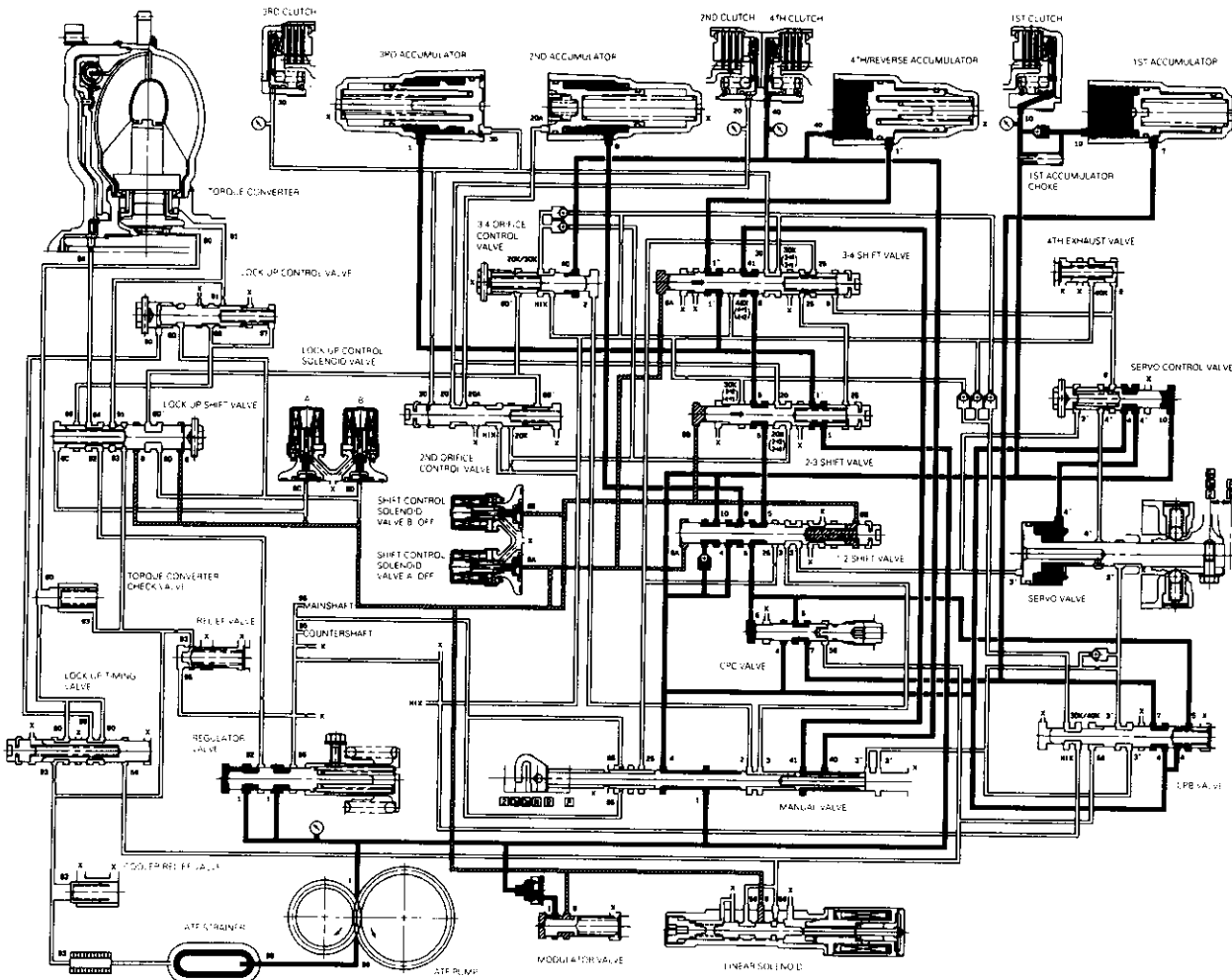
The 3-4 shift valve is moved to the right side by the modulator pressure (6A). The 3-4 shift valve covers the port to the 3rd clutch and uncovers the port to the 4th clutch as this valve is moved to the right side. The 4th clutch pressure (41) from the 3-4 shift valve becomes the 4th clutch pressure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

Fluid flows by way of:

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

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

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





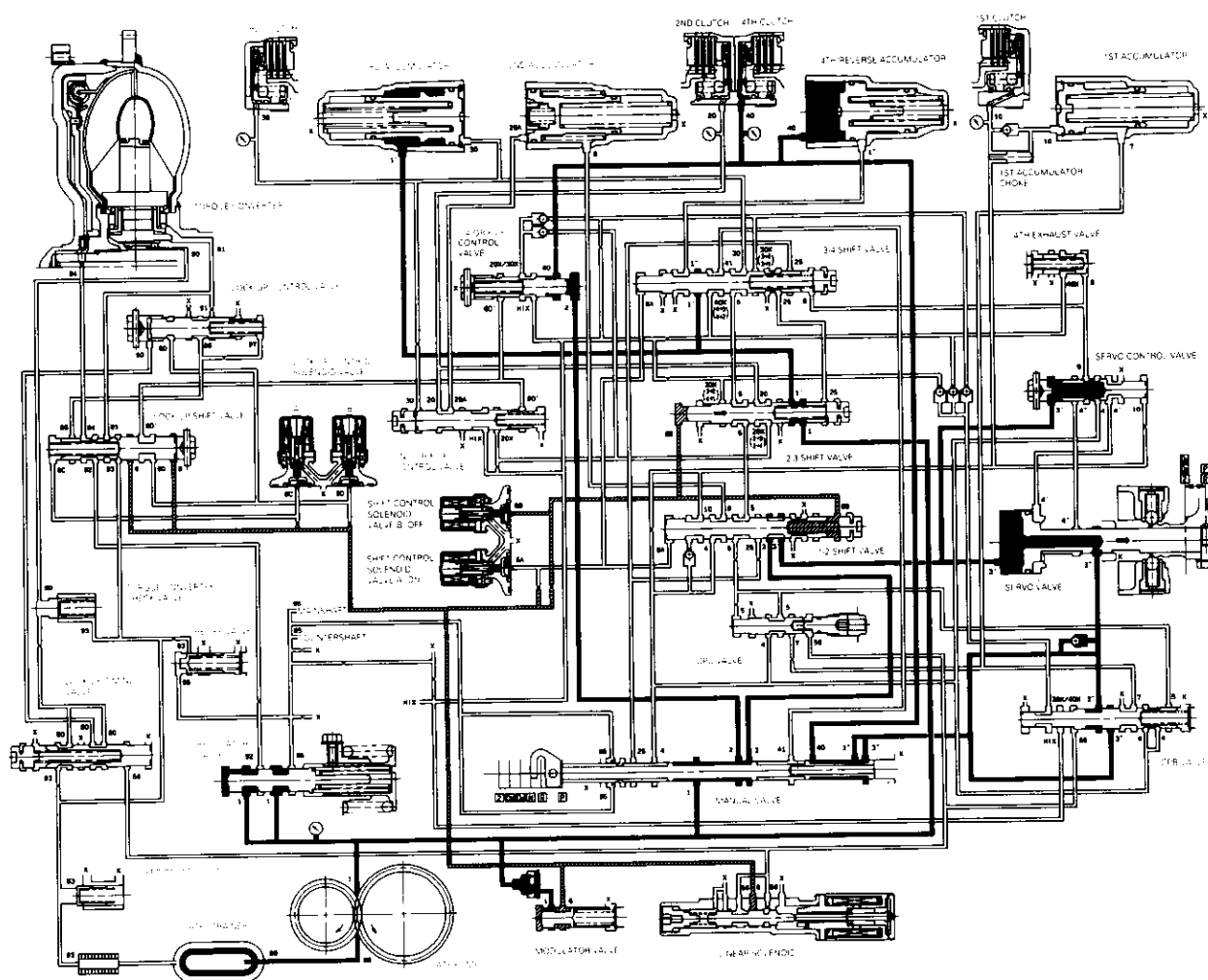
## **[R] Position**

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

## **Reverse Inhibitor Control**

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

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



(cont'd)

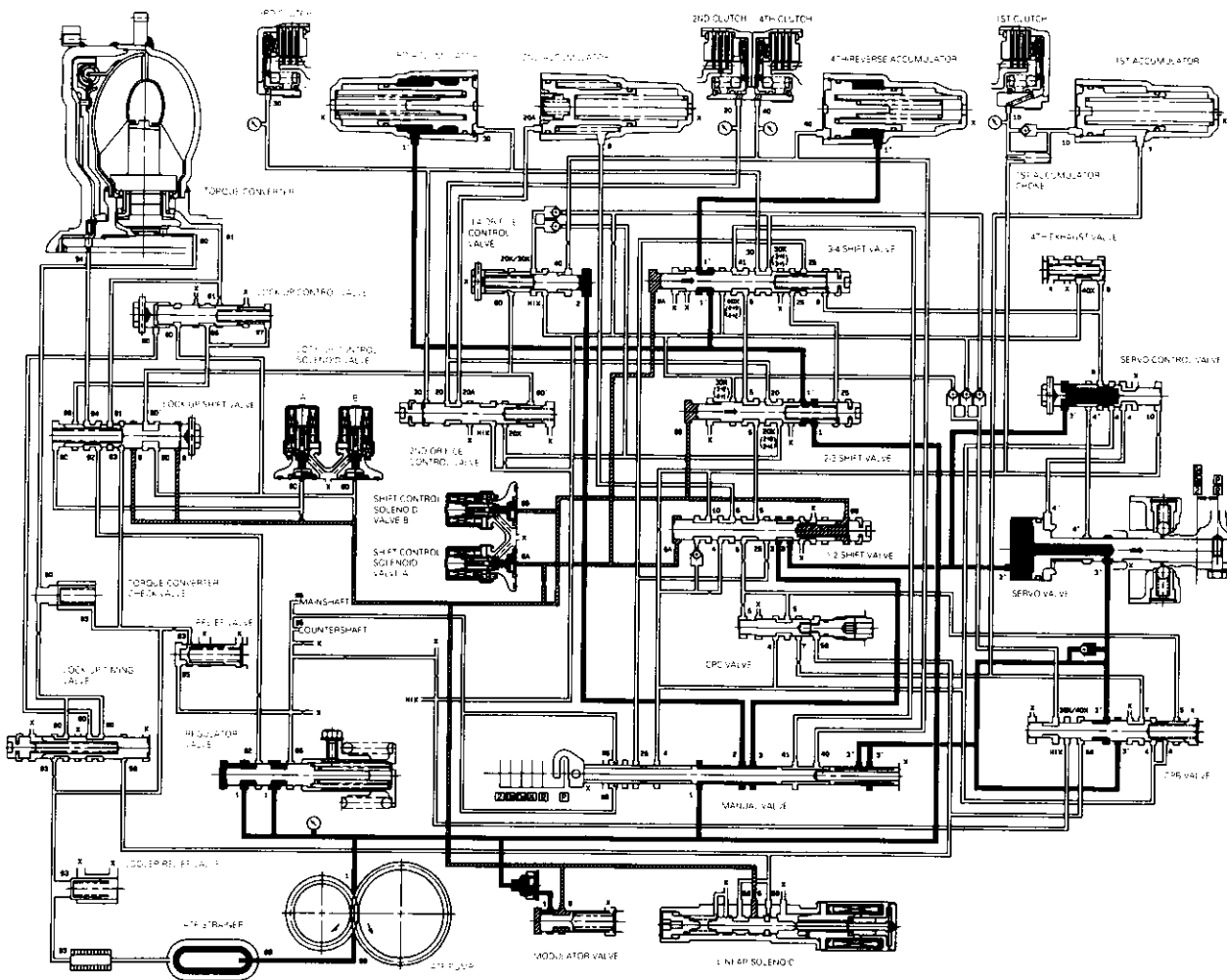
## Description

## Hydraulic Flow (cont'd)

**P Position**

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

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





## Lock-up System

### Lock-up Clutch

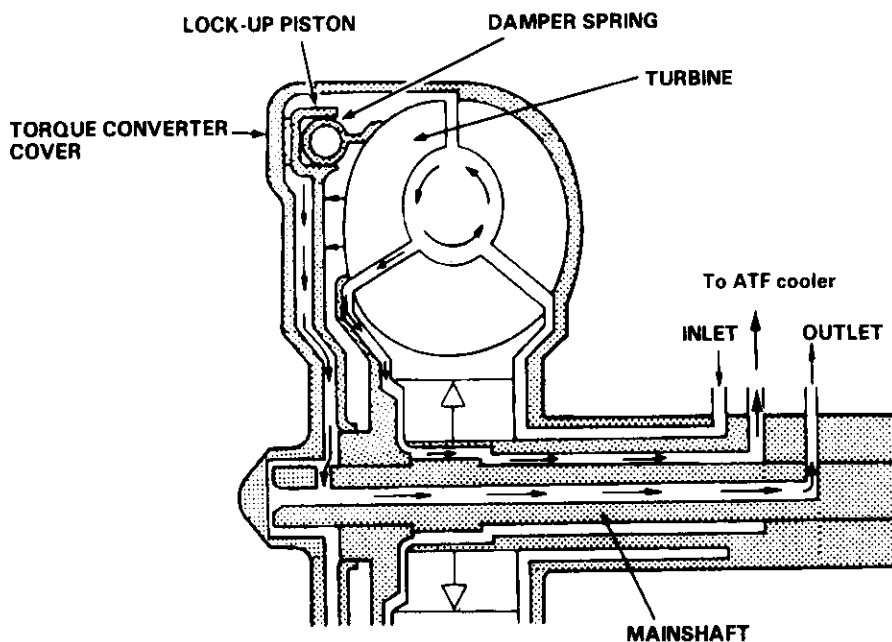
#### 1. Operation (clutch on)

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

##### Power flow

The power flows by way of:

Engine  
↓  
Drive plate  
↓  
Torque converter cover  
↓  
Lock-up piston  
↓  
Damper spring  
↓  
Turbine  
↓  
Mainshaft

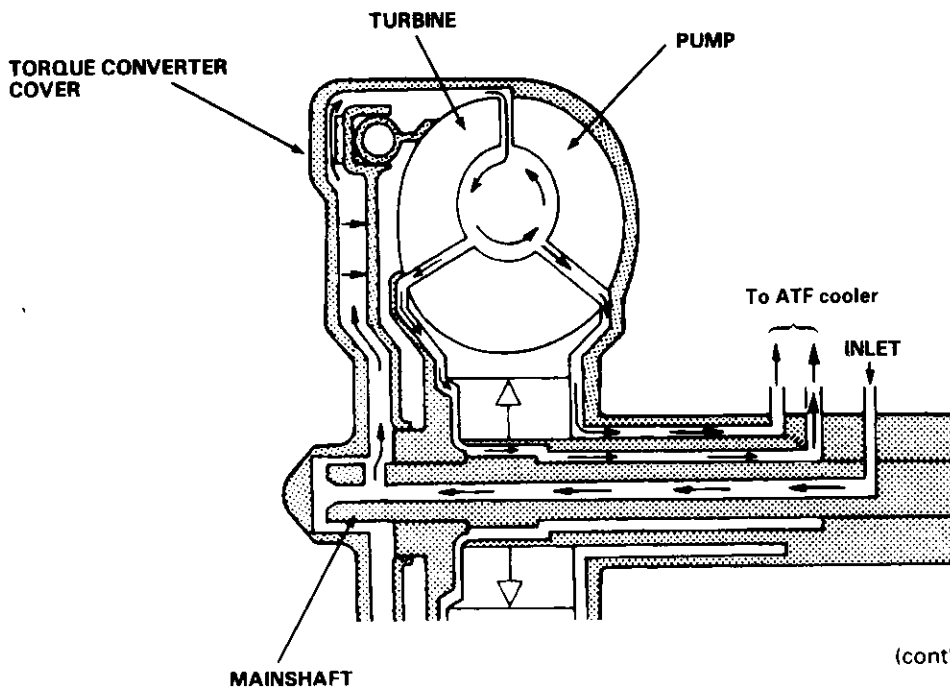


#### 2. Operation (clutch off)

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

##### Power flow

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



(cont'd)

# Description

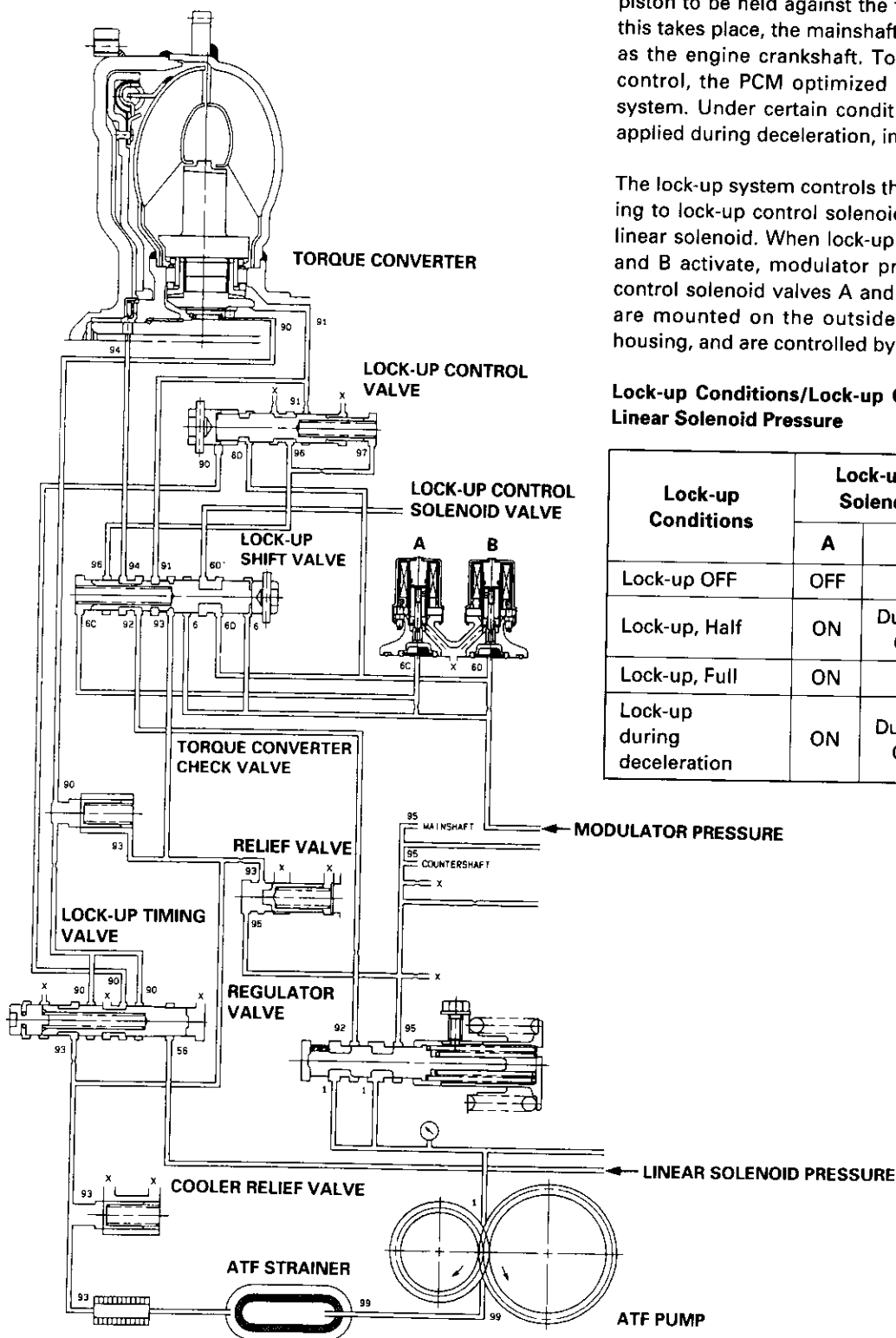
## Lock-up System (cont'd)

In  $D_4$  position, in 3rd and 4th, and  $D_3$  position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with the hydraulic control, the PCM optimized the timing of the lock-up system. Under certain conditions, the lock-up clutch is applied during deceleration, in 3rd and 4th gear.

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

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

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



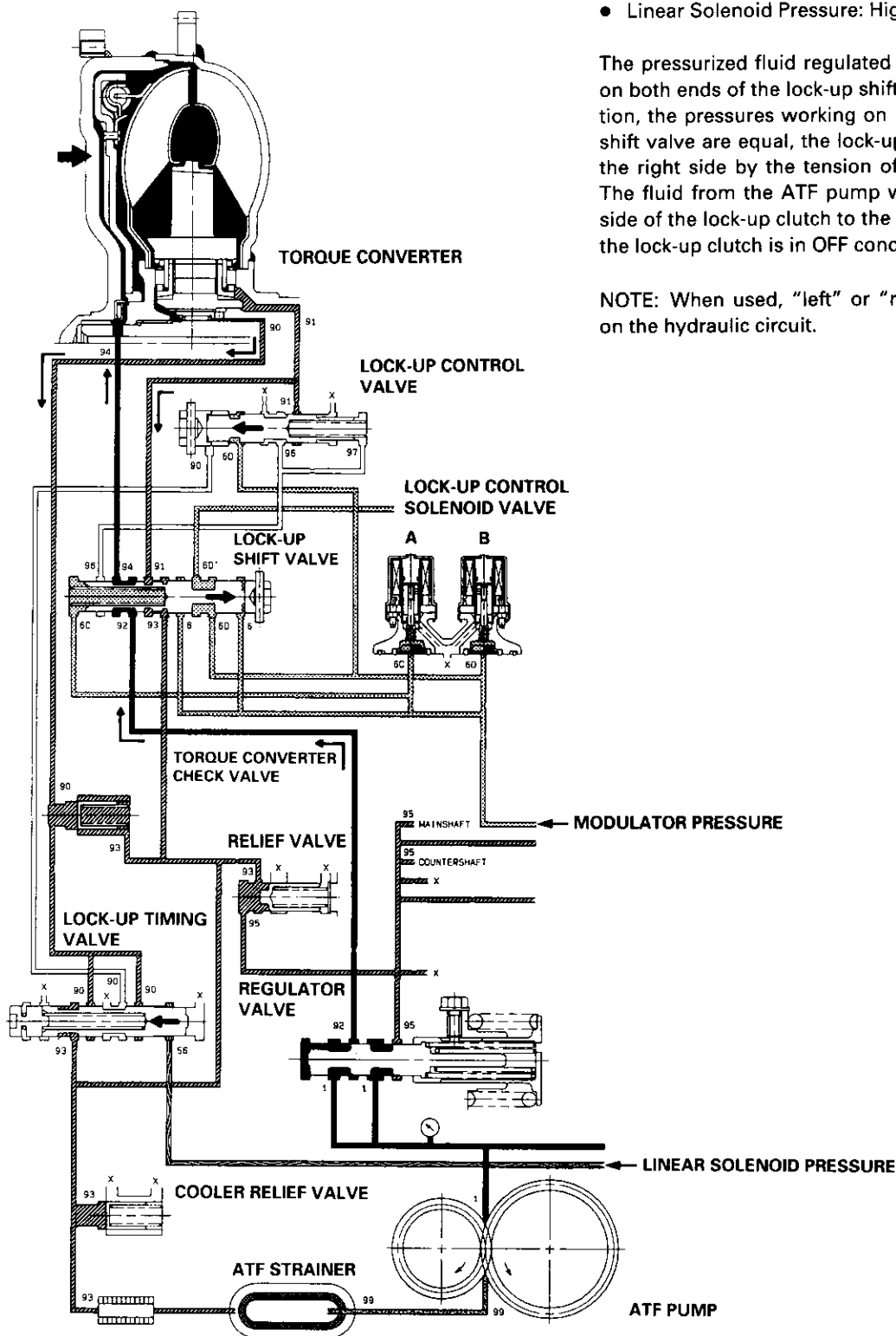


### No Lock-up

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

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

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



(cont'd)



# Description

## Lock-up System (cont'd)

### Half Lock-up

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

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

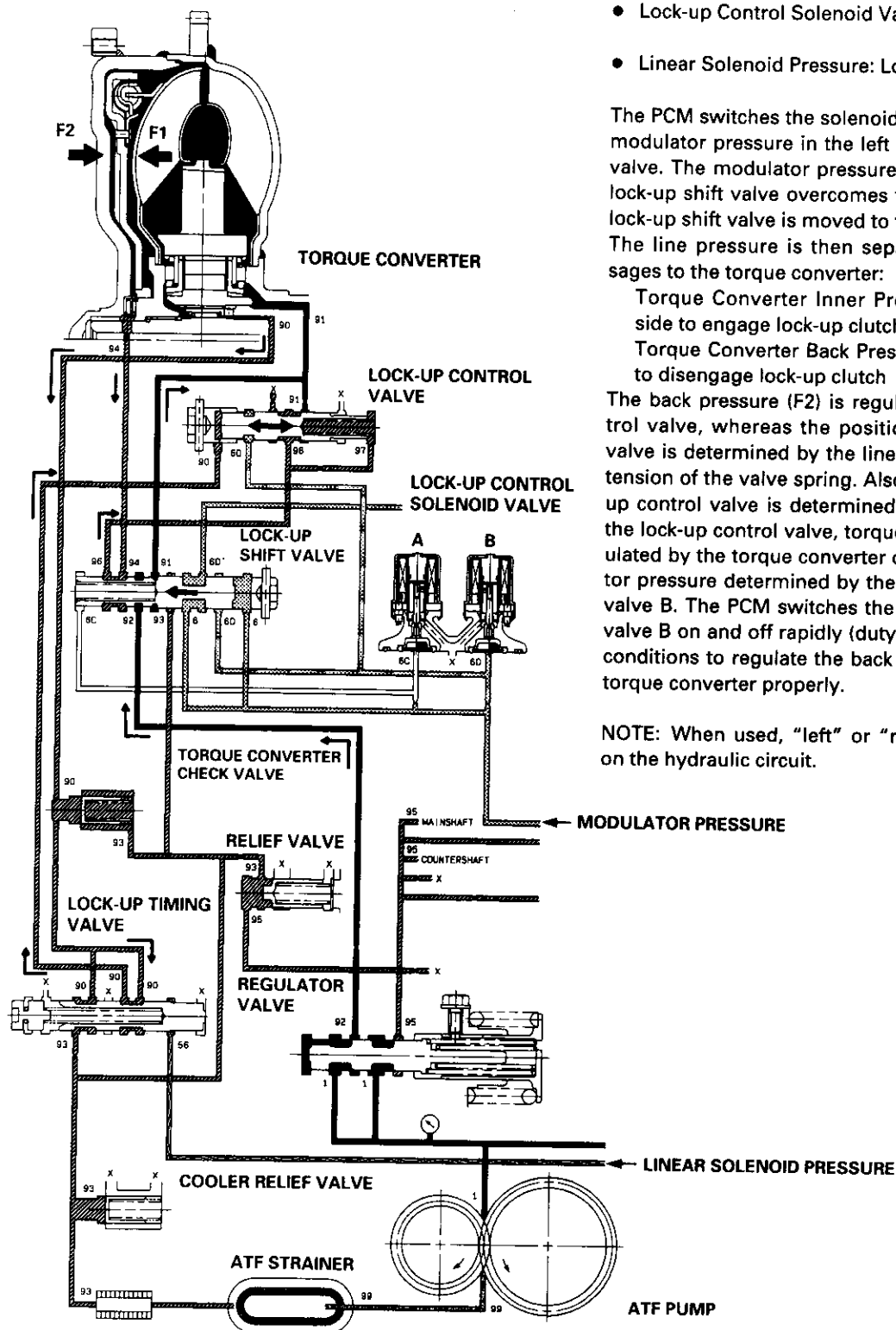
The line pressure is then separated into the two passages to the torque converter:

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

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

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

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





### Full Lock-up

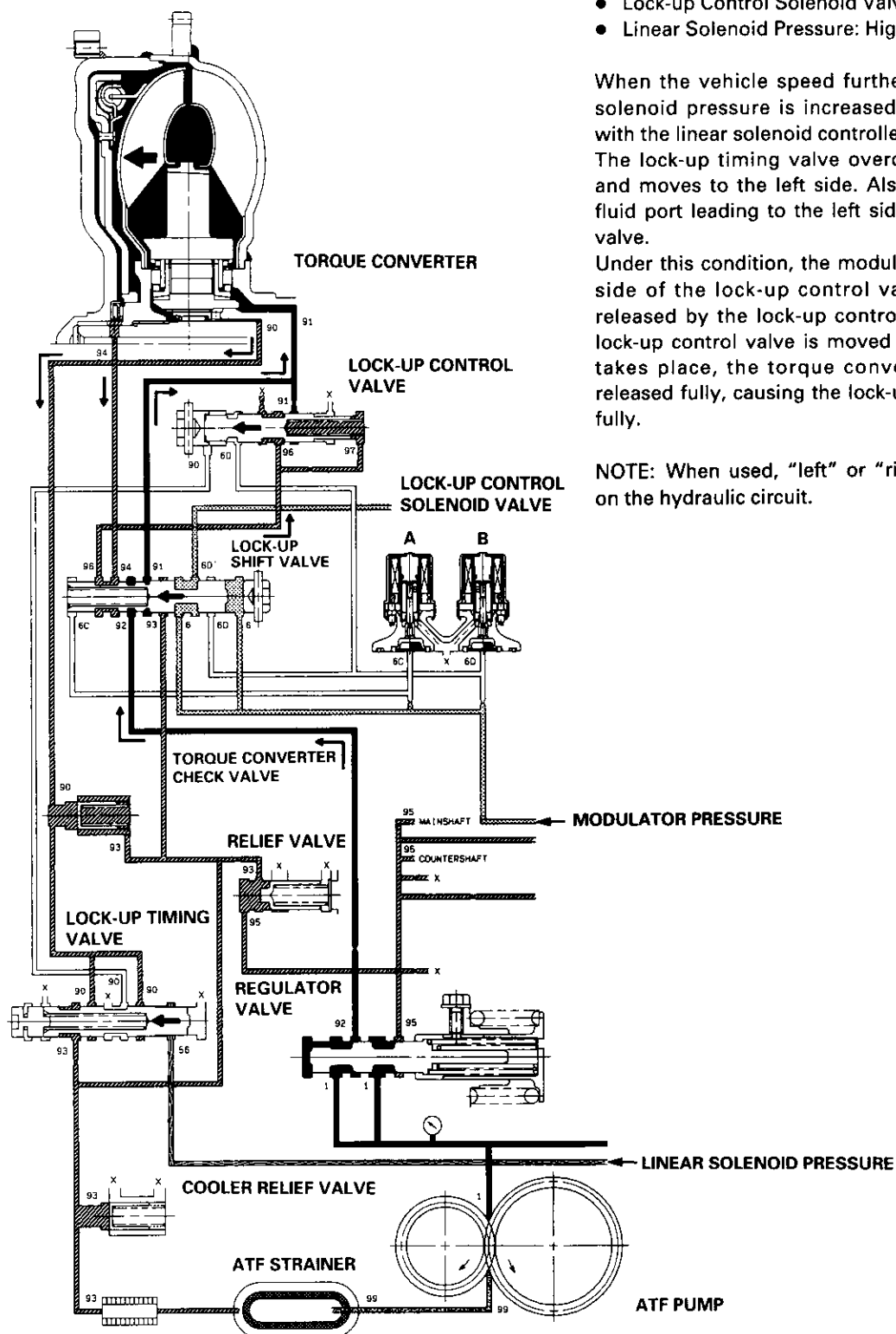
- Lock-up Control Solenoid Valve A: ON
- Lock-up Control Solenoid Valve B: ON
- Linear Solenoid Pressure: High

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

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

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

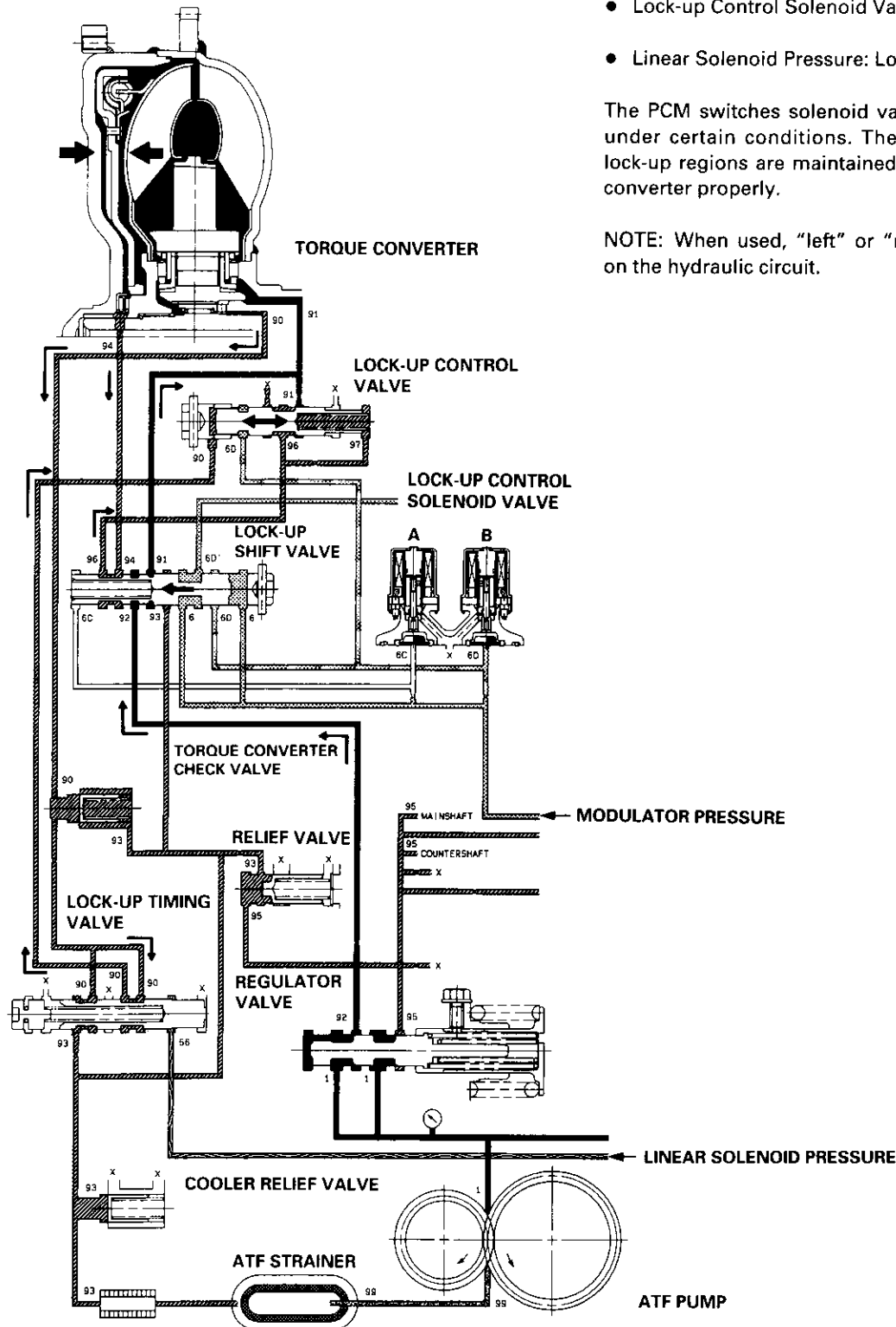
NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

# Description

## Lock-up System (cont'd)



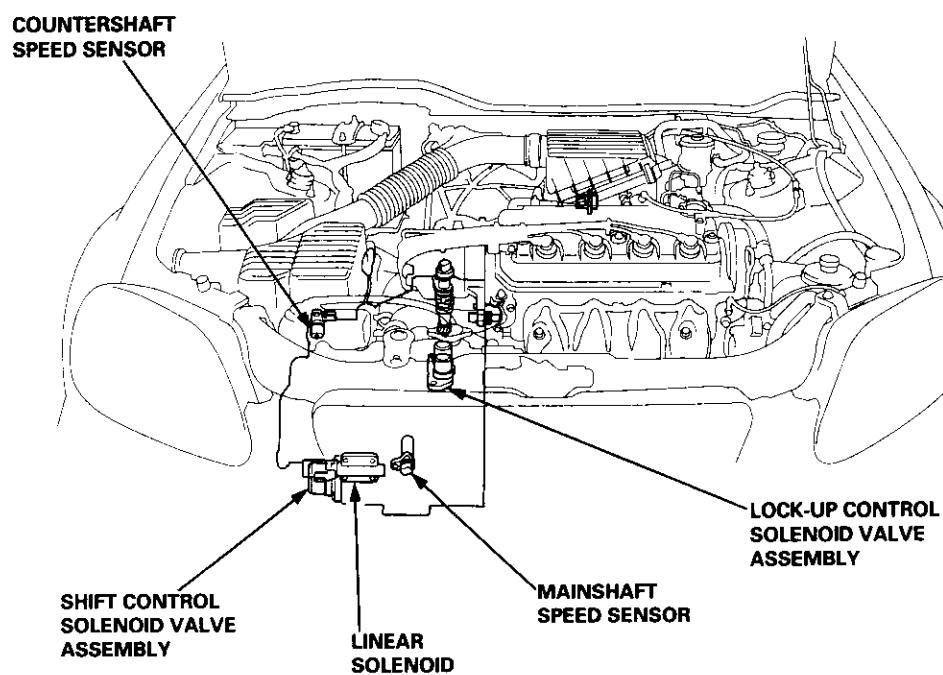
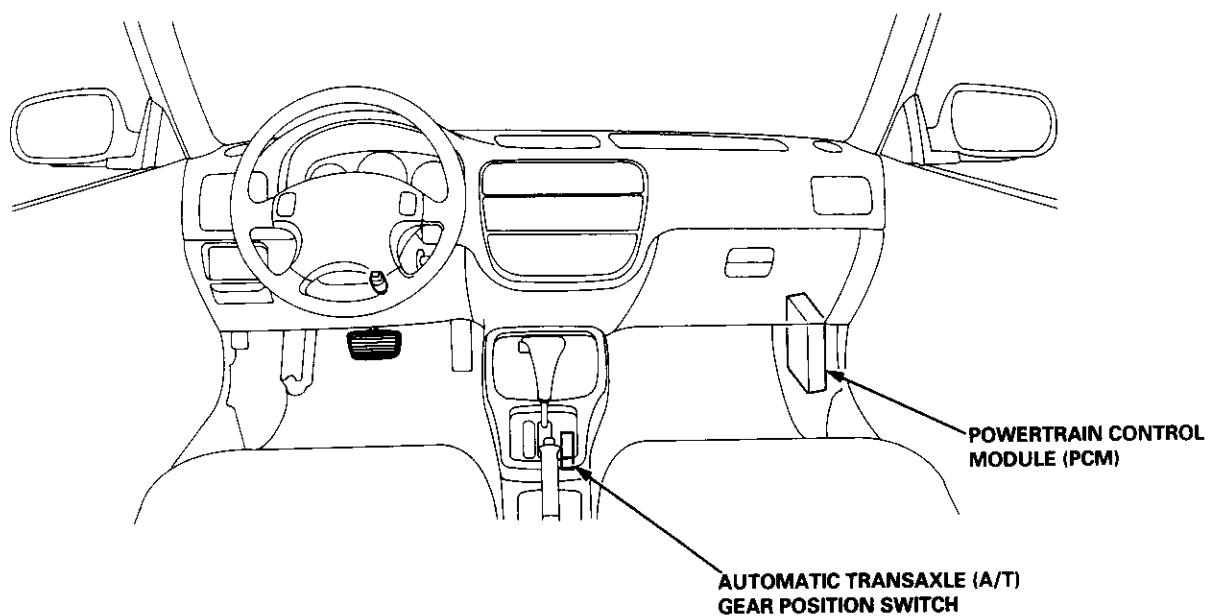
### Deceleration Lock-up

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

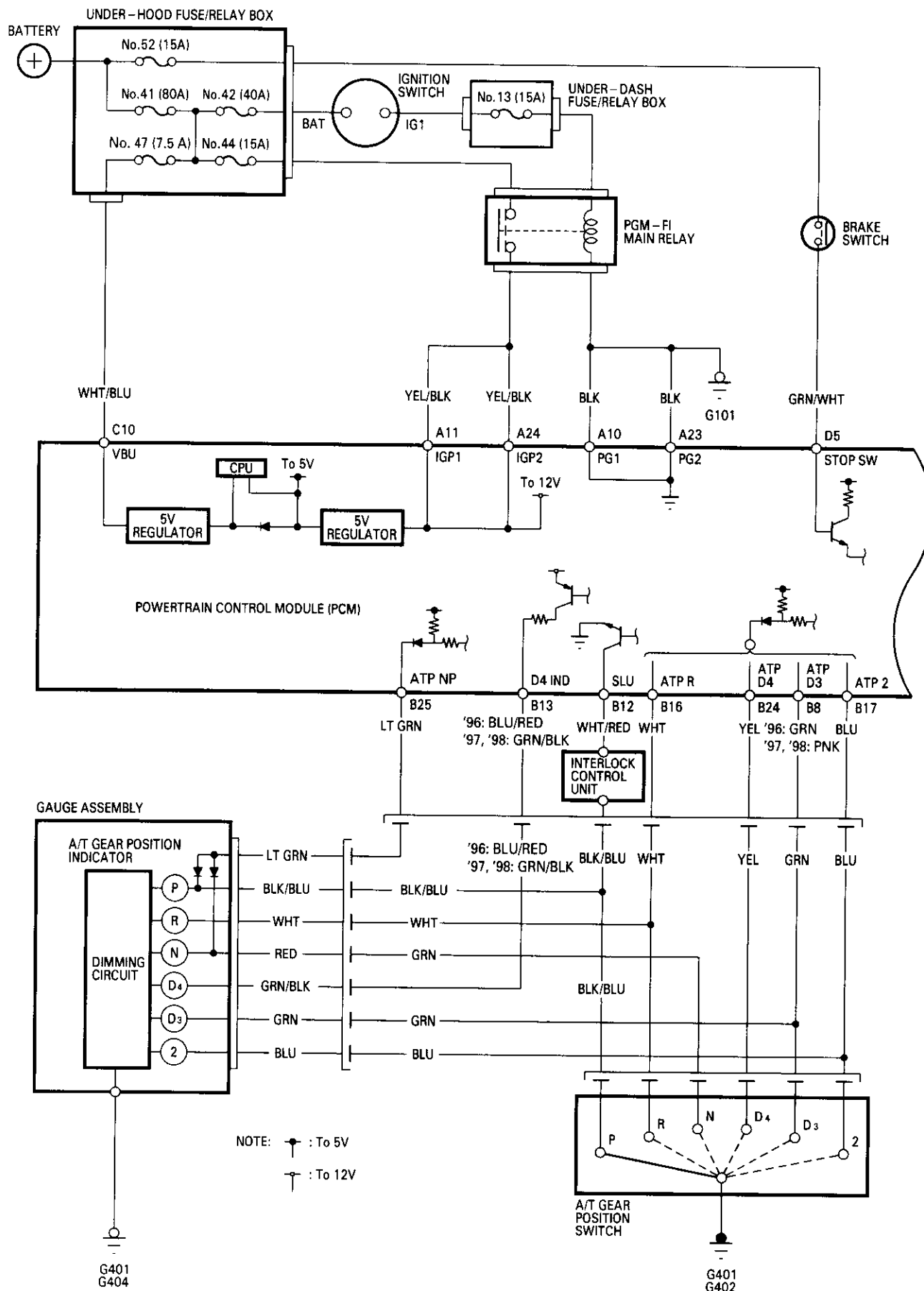
The PCM switches solenoid valve B on and off rapidly under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

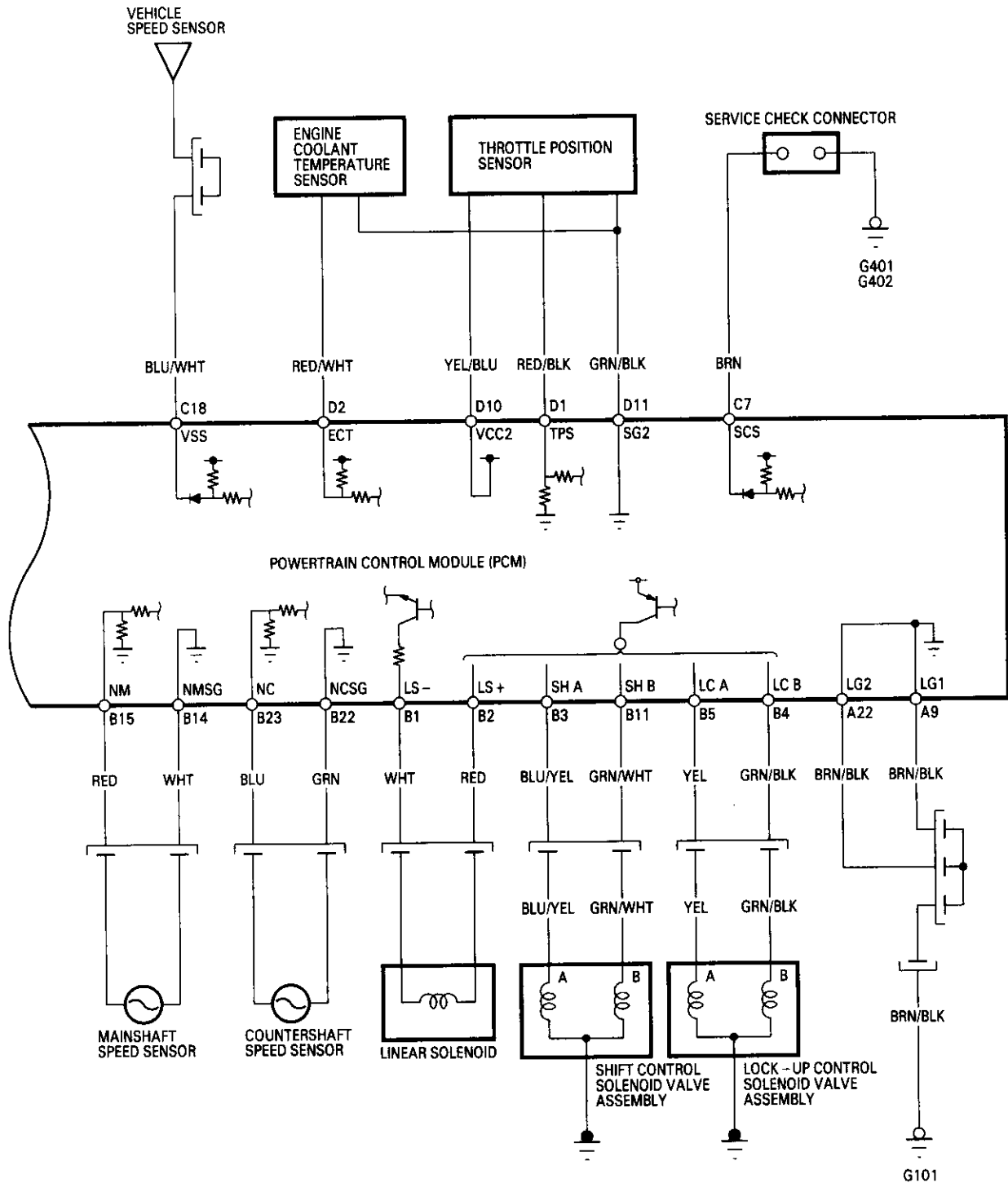
NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

# Component Locations

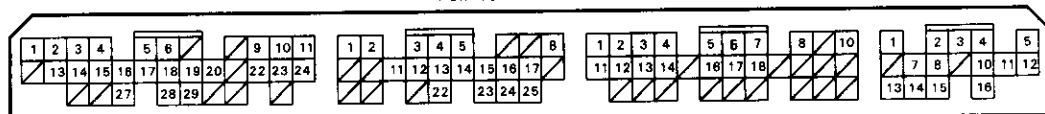


# PCM Circuit Diagram (A/T Control System: '96 - 98 Models)





PCM Terminal Locations



A (32P) Connector

B (25P) Connector

C (31P) Connector

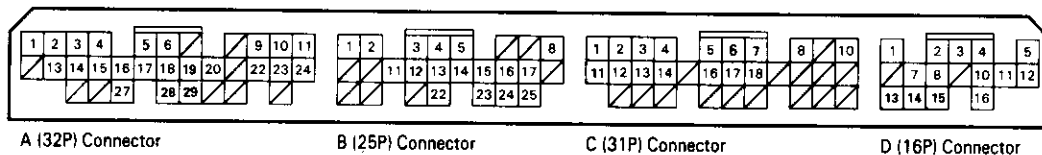
D (16P) Connector

# PCM Terminal Voltage/Measuring Conditions ('96 – 98 Models)

## A/T Control System

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

PCM Terminal Locations



### PCM CONNECTOR A (32P)

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

### PCM CONNECTOR B (25P)

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



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

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

#### PCM CONNECTOR C (31P)

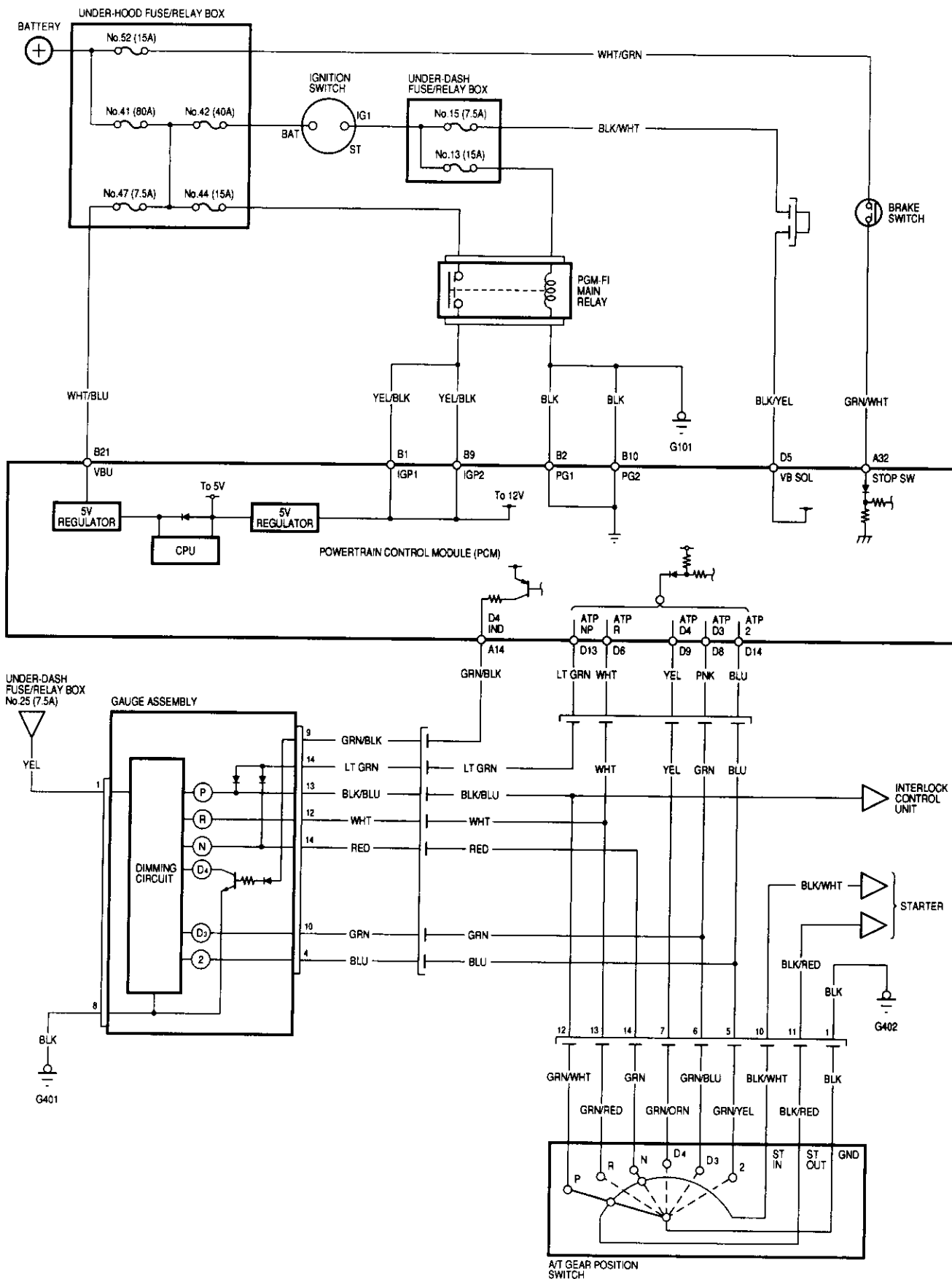
Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
C1 to C6		– see section 11 –	
C7	SCS	Service check signal	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
C8 to C9		– see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

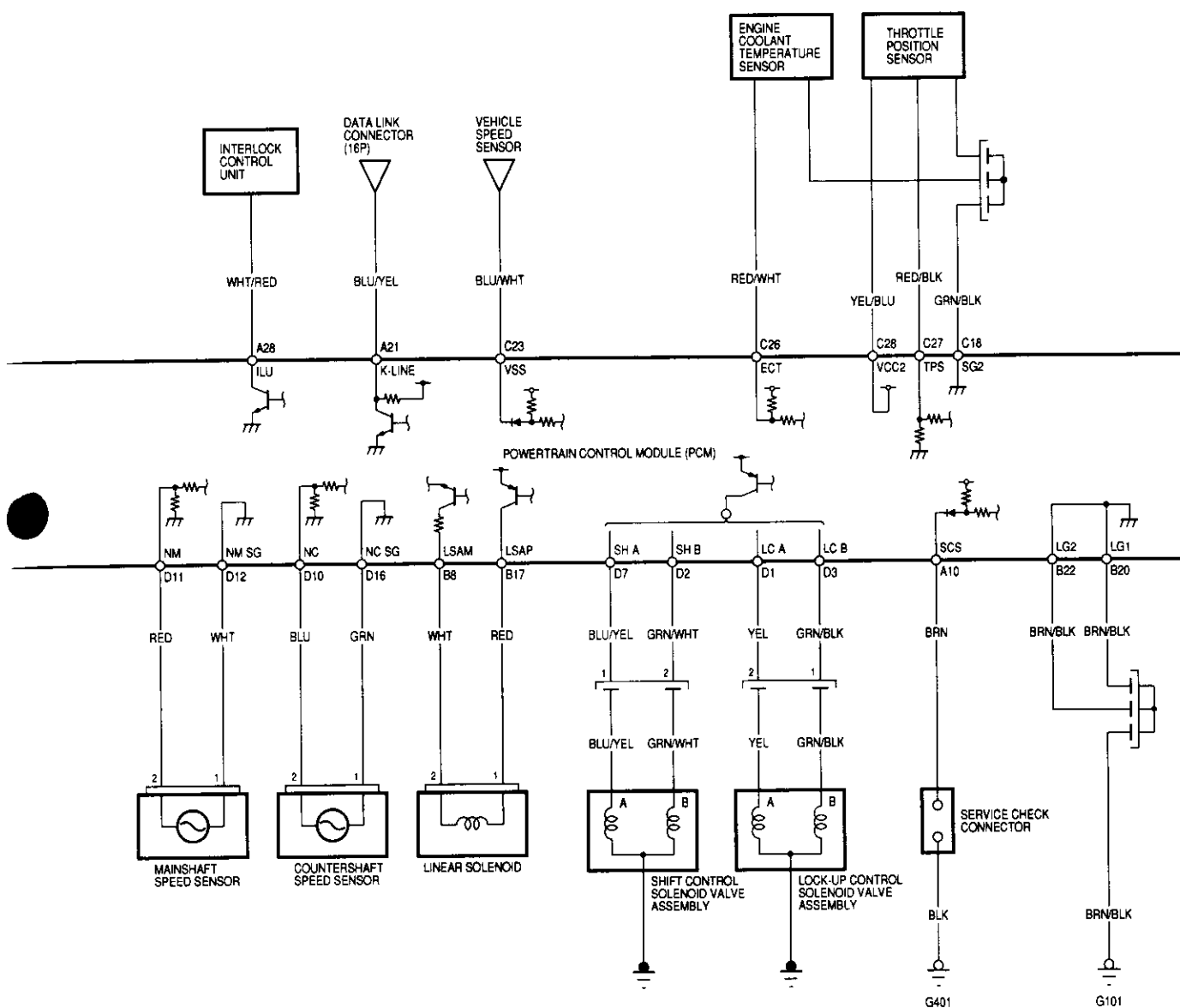
#### PCM CONNECTOR D (16P)

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

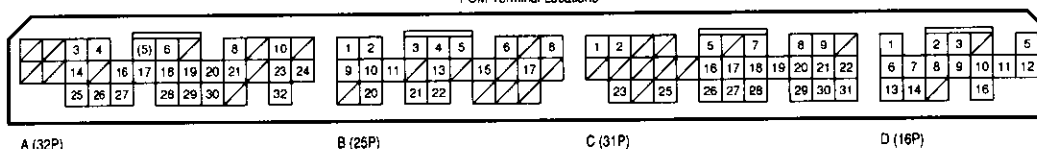


# PCM Circuit Diagram (A/T Control System: '99 – 00 Models)





PCM Terminal Locations

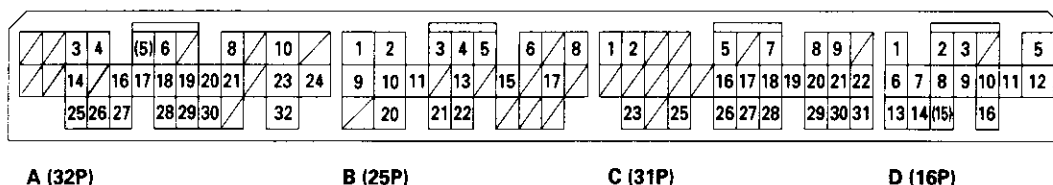


# PCM Terminal Voltage/Measuring Conditions ('99 – 00 Models)

## A/T Control System

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

PCM Connector Terminal Locations



### PCM CONNECTOR A (32P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A10	SCS	Service check signal	With ignition switch ON (II) and service check connector open: Approx. 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
A14	D4 IND	indicator light control	When ignition switch is first turned ON (II): Approx. 10 V for two seconds In  position: Approx. 10 V
A28	ILU	Interlock Control	When ignition switch ON (II), brake pedal depressed, and accelerator pedal released: Battery voltage
A32	STOP SW	Brake switch signal input	Brake pedal depressed: battery voltage Brake pedal released: 0 V

### PCM CONNECTOR B (25P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	IGP1	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B2	PG1	Ground	
B8	LS AM	Linear solenoid power supply negative electrode	With ignition switch ON (II): Pulsing signal
B9	IGP2	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B10	PG2	Ground	
B17	LS AP	Linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal
B20	LG1	Ground	
B21	VBU	Back-up power supply	Always battery voltage
B22	LG2	Ground	



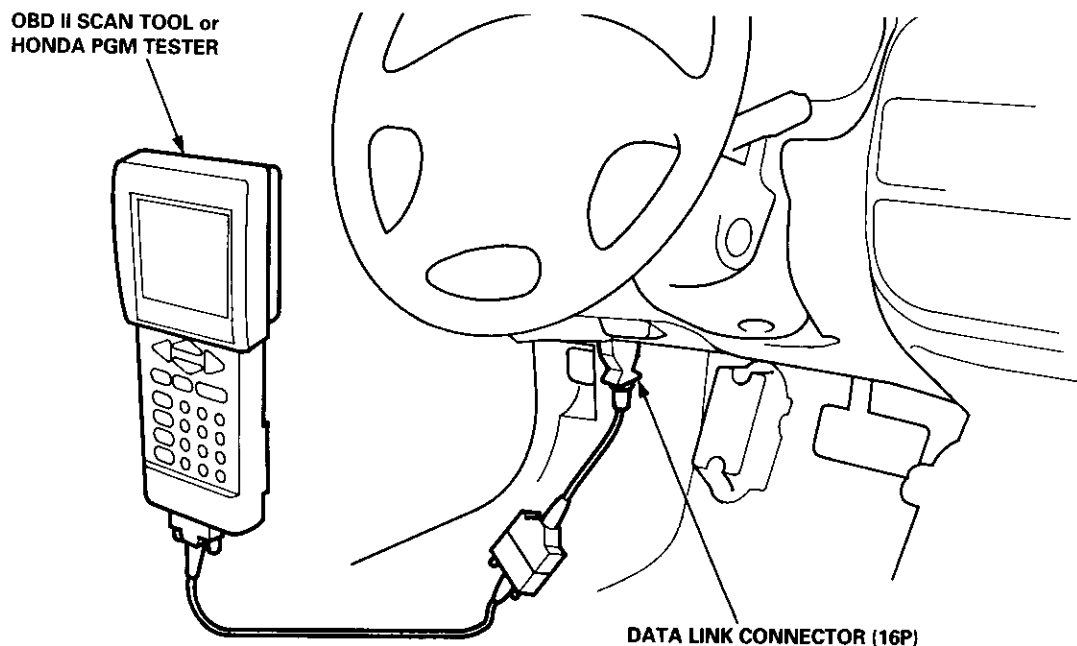
# PCM CONNECTOR D (16P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D1	LCA	Lock-up control solenoid valve A control	When lock-up is ON: Battery voltage With no lock-up: 0 V
D2	SHB	Shift control solenoid valve B control	In <b>[2]</b> position, in 1st and 2nd gear in <b>[D<sub>1</sub>]</b> , <b>[D<sub>2</sub>]</b> position: Battery voltage In 3rd gear in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> , in 4th gear in <b>[D<sub>4</sub>]</b> position: 0 V
D3	LCB	Lock-up control solenoid valve B control	When full lock-up: Battery voltage With half lock-up: Pulsing signal
D4	—	Not used	
D5	VB SOL	Lock-up control solenoids, shift control solenoids and linear solenoid power supply electrode	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
D6	ATP R	A/T gear position switch <b>[R]</b> position input	In <b>[R]</b> position: 0 V In other than <b>[R]</b> position: Approx. 10 V
D7	SHA	Shift control solenoid valve A control	In <b>[2]</b> position, in 2nd and 3rd gear in <b>[D<sub>1</sub>]</b> , <b>[D<sub>2</sub>]</b> position: Battery voltage In 1st gear in <b>[D<sub>1</sub>]</b> , <b>[D<sub>3</sub>]</b> position, in 4th gear in <b>[D<sub>4</sub>]</b> position: 0 V
D8	ATP D3	A/T gear position switch <b>[D<sub>3</sub>]</b> position input	In <b>[D<sub>3</sub>]</b> position: 0 V In other than <b>[D<sub>3</sub>]</b> position: Approx. 10 V
D9	ATP D4	A/T gear position switch <b>[D<sub>4</sub>]</b> position switch	In <b>[D<sub>4</sub>]</b> position: 0 V In other than <b>[D<sub>4</sub>]</b> position: Approx. 5 V
D10	NC	Countershaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: 0 V
D11	NM	Mainshaft speed sensor signal input	Depending on engine speed: Pulsing signal When engine is stopped: 0 V
D12	NMSG	Mainshaft speed sensor ground	
D13	ATP NP	A/T gear position switch <b>[P]</b> and <b>[N]</b> position input	In <b>[P]</b> and <b>[N]</b> positions: 0 V In other than <b>[P]</b> and <b>[N]</b> positions: Approx. 10 V
D14	ATP 2	A/T gear position switch <b>[2]</b> position input	In <b>[2]</b> position: 0 V In other than <b>[2]</b> position: Approx. 10 V
D16	NCSG	Countershaft speed sensor ground	

# Troubleshooting Procedures

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

When the PCM senses an abnormality in the input or output systems, the **D<sub>4</sub>** indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located under the dash on the driver's side) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON(II).



If the **D<sub>4</sub>** indicator light or the MIL has been reported on, or if a driveability problem is suspected, follow this procedure:

1. Connect the OBD II Scan Tool (conforming to SAE J1978) or Honda PGM Tester to the 16P DLC. (See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instructions. If you are using the Honda PGM Tester, make sure it is set to the SAE DTC type.)
2. Turn the ignition switch ON (II), and observe the DTC on the screen.
3. Record all fuel and emission DTCs, A/T DTCs, and freeze data.
4. If there is a fuel and emissions DTC, first check the fuel and emissions system as indicated by the DTC (except for DTC P0700). DTC P0700 means there is one or more A/T DTC, and no problems were detected in the fuel and emissions circuit of the PCM.
5. Write down the radio station presets.
6. Reset the memory with the PGM Tester or by removing the BACK UP fuse in the passenger's under-dash fuse/relay box for more than 10 seconds.
7. Drive the vehicle for several minutes at speeds over 30 mph (50 km/hr), and then recheck for DTCs. If the A/T DTC returns, go to the Symptom-to Component Chart on pages 14-52 and 14-53 for '96 - 98 models, and pages 14-54 and 14-55 for the '99 - 00 models. If the DTC does not return, there was an intermittent problem within the circuit. Make sure all pins and terminals in the circuit are tight, and then go to step 8.
8. Reset the radio preset stations, and set the clock.

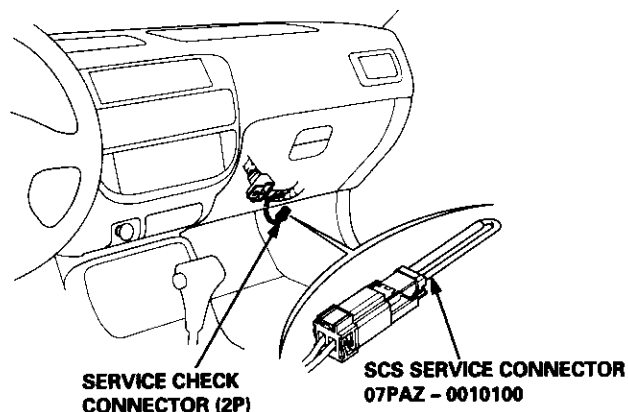
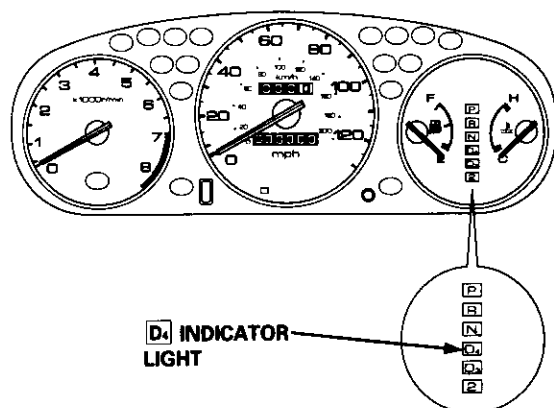


### Checking the Diagnostic Trouble Code (DTC) with the Service Check Connector and Special Tool

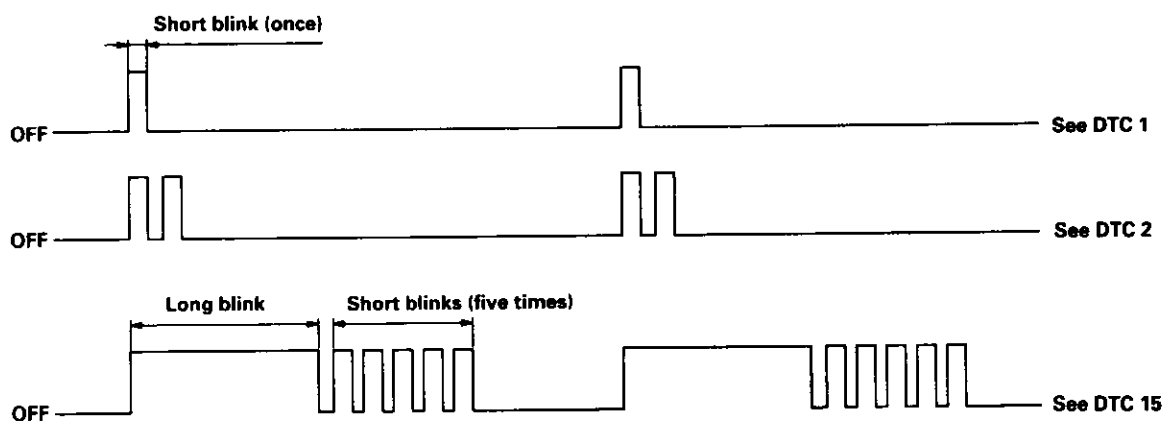
When the PCM senses an abnormality in the input or output systems, the **D<sub>4</sub>** indicator light in the gauge assembly will blink. When the Service Check Connector (located under the dash on the passenger side) is connected with the special tool as shown, the **D<sub>4</sub>** indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON (II).

When the **D<sub>4</sub>** indicator light has been reported on, connect the Service Check Connector with the special tool. Then turn ON (II) the ignition switch and observe the **D<sub>4</sub>** indicator light.

#### GAUGE ASSEMBLY



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to Component Chart on pages 14-52 and 14-53 for '96 - 98 models, and 14-54 and 14-55 for the '99 - 00 models.

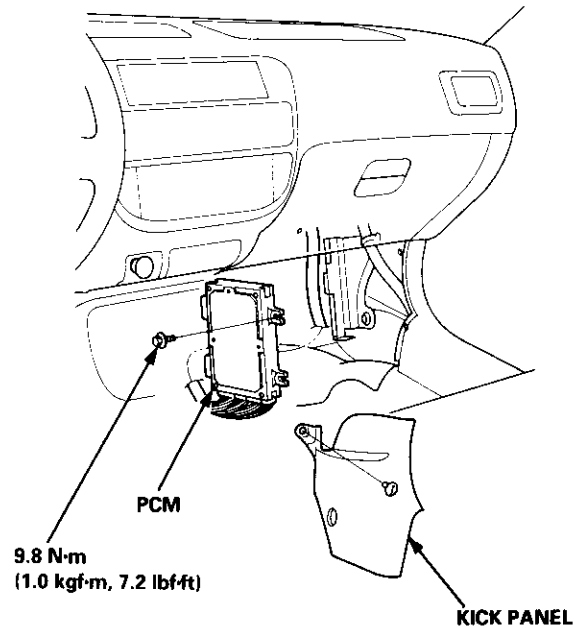


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# Troubleshooting Procedures

(cont'd)

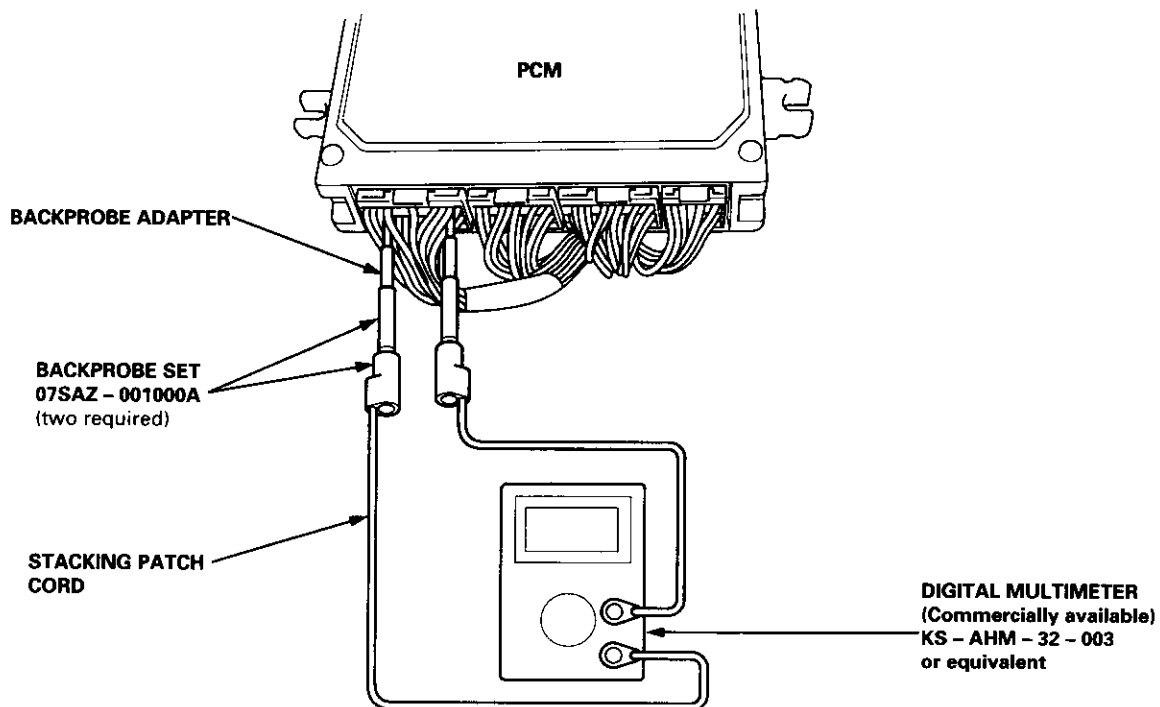
1. Remove the kick panel on the passenger's side (see section 20).
2. Remove the PCM, and turn the PCM over.



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

## How to Use the Backprobe Set

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



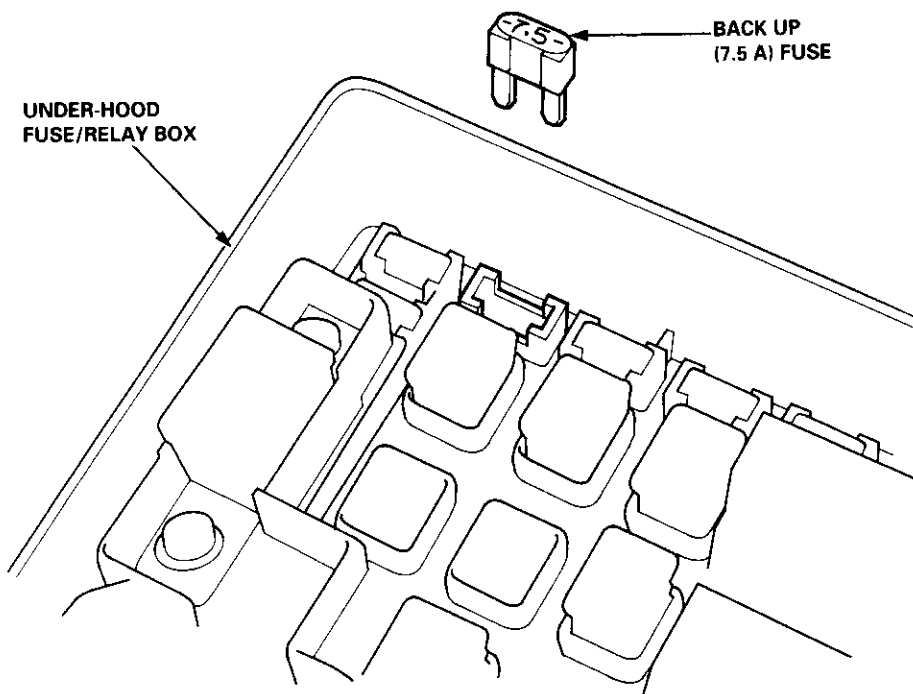


### PCM Reset Procedure

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

#### NOTE:

- Disconnecting the BACK UP fuse also cancels the radio preset stations and clock setting. Make note of the radio presets before removing the fuse so you can reset them.
- The PCM memory can also be cleared by using the OBD II Scan Tool or Honda PGM Tester.



### Final Procedure


NOTE: This procedure must be done after any troubleshooting.


1. Turn the ignition switch OFF.
2. Reset the PCM.
3. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector, or remove the special tool from the Service Check Connector.
4. Turn the ignition switch ON (II), and set the radio presets and clock setting.
5. To verify the problem is repaired, test-drive the vehicle for several minutes at speeds over 30 mph (48 km/h).



# Symptom-to-Component Chart

## Electrical System — '96 – 98 Models

DTC*1	 Indicator Light	MIL	Detection Item	Page
P1753 (1)	Blinks	ON	Lock-up control solenoid valve A	14-56
P1758 (2)	Blinks	ON	Lock-up control solenoid valve B	14-58
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	14-60
P1706 (6)	OFF	ON	A/T gear position switch (open)	14-62
P0753 (7)	Blinks	ON	Shift control solenoid valve A	14-64
P0758 (8)	Blinks	ON	Shift control solenoid valve B	14-66
P0720 (9)	Blinks	ON	Countershaft speed sensor	14-68
P0715 (15)	'96 – 97 models: OFF '98 model: Blinks	ON	Mainshaft speed sensor	14-70
P1768 (16)	Blinks	ON	Linear solenoid	14-72
P0740 (40)	OFF	ON	Lock-up control system	14-74
P0730 (41)	OFF	ON	Shift control system	14-75
P0700*2 (none)	—	OFF	Automatic transmission control system in the PGM-FI control system	—

\*1: The DTC in the parentheses is the code  indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.

\*2: Whenever the Honda PGM Tester or Scan Tool detects an automatic transmission control system DTC, P0700 will be set in the PGM-FI control system.




If the self-diagnostic **D<sub>4</sub>** indicator light does not blink, perform an inspection according to the table below.


Symptom	Inspection	Ref. page
<b>D<sub>4</sub></b> indicator light does not come on for two seconds after ignition switch is first turned ON (II).	_____	14-76
<b>D<sub>4</sub></b> indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).	_____	14-78
Shift lever cannot be moved from <b>P</b> position with the brake pedal depressed.	Inspection	14-79

NOTE: If a customer describes the symptom for code P1706 (6), it will be necessary to recreate the symptom by test-driving, then recheck the DTC.

# Symptom-to-Component Chart

## Electrical System — '99 – 00 Models

DTC*1	 Indicator Light	MIL	Detection Item	Page
P1753 (1)	Blinks	ON	Lock-up control solenoid valve A	14-80
P1758 (2)	Blinks	ON	Lock-up control solenoid valve B	14-82
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	14-84
P1706 (6)	OFF	ON	A/T gear position switch (open)	14-87
P0753 (7)	Blinks	ON	Shift control solenoid valve A	14-89
P0758 (8)	Blinks	ON	Shift control solenoid valve B	14-91
P0720 (9)	Blinks	ON	Countershaft speed sensor	14-93
P0715 (15)	Blinks	ON	Mainshaft speed sensor	14-95
P1768 (16)	Blinks	ON	Linear solenoid	14-97
P0740 (40)	OFF	ON	Lock-up control system	14-99
P0730 (41)	OFF	ON	Shift control system	14-100
P0700*2 (none)	—	OFF	Automatic transmission control system in the PGM-FI control system	—

\*1: The DTC in the parentheses is the code  indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.

\*2: Whenever the Honda PGM Tester or Scan Tool detects an automatic transmission control system DTC, P0700 will be set in the PGM-FI control system.



If the self-diagnostic **D4** indicator light does not blink and following symptoms appear, perform an inspection according to the table below.

Symptom	Reference page
<b>D4</b> indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).	14-101
<b>D4</b> indicator light does not come on for two seconds after ignition switch is first turned ON (II).	14-102
Shift lever cannot be moved from <b>P</b> position with the brake pedal depressed.	14-104

# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Lock-up Control Solenoid Valve A

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1753.
- Self-diagnosis **D<sub>4</sub>** indicator light blinks once.

### Possible Cause

- 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

### Check for a Short to Power:

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

Is there voltage?

YES

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

NO

### Measure Lock-up Control Solenoid Valve A Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the B5 and A9 or A22 terminals.

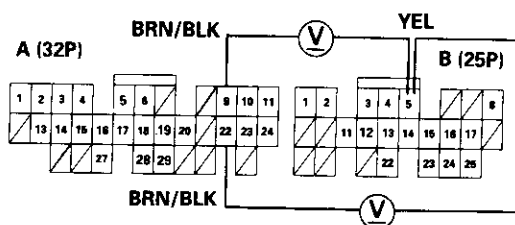
Is the resistance 12 – 25  $\Omega$ ?

YES

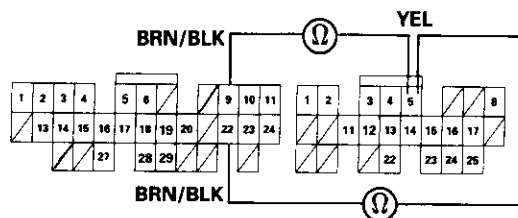
Check for loose PCM connectors. If necessary, substitute a known-good solenoid valve assembly or PCM and recheck.

NO

### PCM CONNECTORS



Wire side of female terminals



To page 14-57



From page 14-56

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

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

Is there continuity?

YES

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

NO

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

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

Is the resistance 12 - 25  $\Omega$ ?

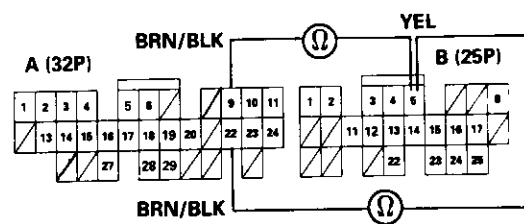
YES

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

NO

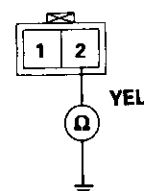
Replace the lock-up control solenoid valve assembly.

**PCM CONNECTORS**



Wire side of female terminals

**LOCK-UP CONTROL SOLENOID CONNECTOR**



Terminal side of male terminals

# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Lock-up Control Solenoid Valve B

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1758.
- Self-diagnosis **D4** indicator light blinks twice.

### Possible Cause

- 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

### Check for a Short to Power:

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

Is there voltage?

YES

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

NO

### Measure Lock-up Control Solenoid Valve B Resistance:

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

Is the resistance 12 – 25  $\Omega$ ?

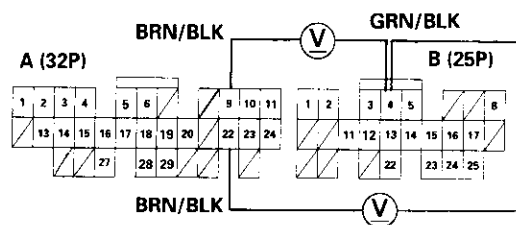
YES

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

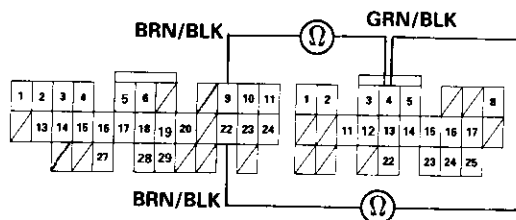
NO

To page 14-59

### PCM CONNECTORS



Wire side of female terminals





From page 14-58

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

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

Is there continuity?

YES

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

NO

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

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

Is the resistance 12 – 25  $\Omega$ ?

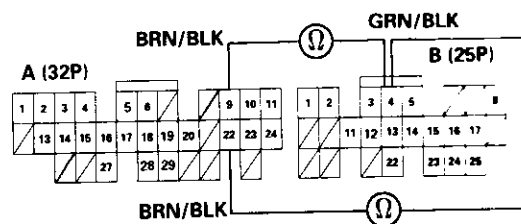
YES

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

NO

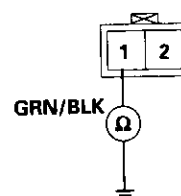
Replace the lock-up control solenoid valve assembly.

**PCM CONNECTORS**



Wire side of female terminals

**LOCK-UP CONTROL SOLENOID CONNECTOR**



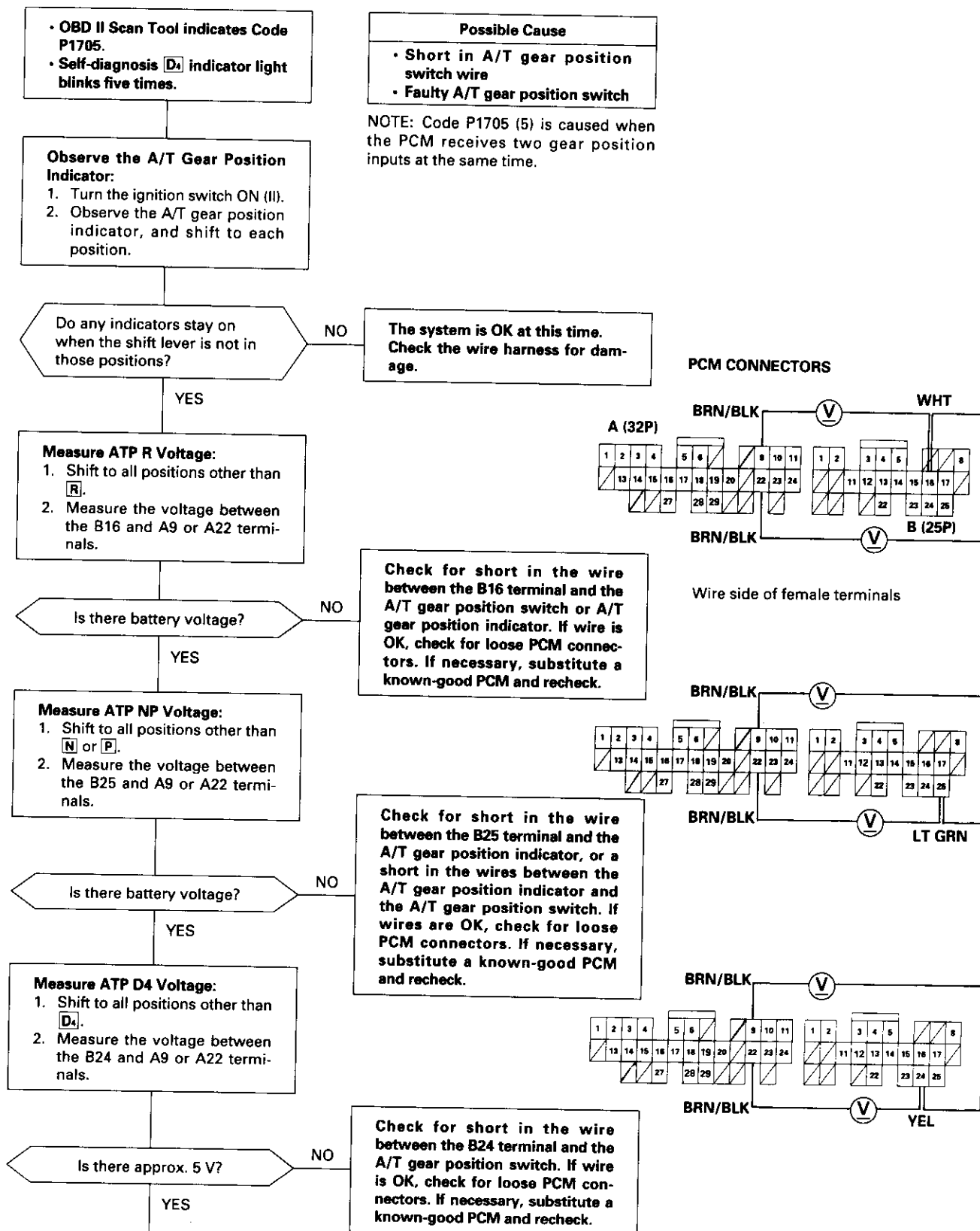
Terminal side of male terminals



# Electrical Troubleshooting ('96 – 98 Models)

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

NOTE: Record all freeze data before you troubleshoot.





From page 14-60

**Measure ATP D3 Voltage:**

1. Shift to all positions other than **D<sub>3</sub>**.
2. Measure the voltage between the B8 and A9 or A22 terminals.

Is there battery voltage?

NO

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

YES

**Measure ATP2 Voltage:**

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

Is there battery voltage?

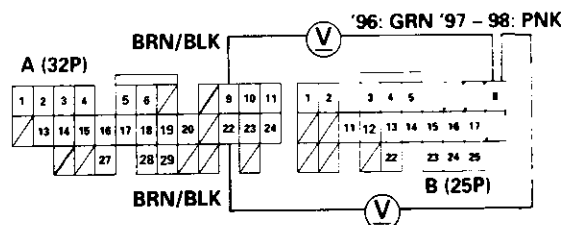
NO

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

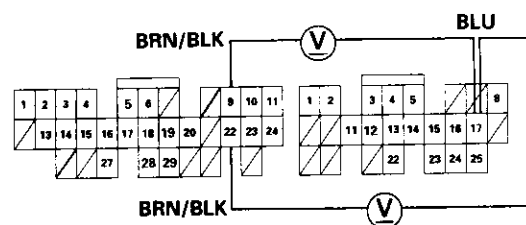
YES

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

**PCM CONNECTORS**



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1706.
- Self-diagnosis **D4** indicator light blinks six times.

### Possible Cause

- Disconnected A/T gear position switch connector
- Open in A/T gear position switch wire
- Faulty A/T gear position switch

### Measure ATP R Voltage:

1. Turn the ignition switch ON (II).
2. Shift to **R** position.
3. Measure the voltage between the B16 and A9 or A22 terminals.

Is there voltage?

YES

Repair open in the wire between the B16 terminal and the A/T gear position switch.

NO

### Measure ATP NP Voltage:

1. Shift to **N** or **P** position.
2. Measure the voltage between the B25 and A9 or A22 terminals.

Is there voltage?

YES

Repair open in the wire between the B25 terminal and the A/T gear position indicator or the A/T gear position switch.

NO

### Measure ATP D4 Voltage:

1. Shift to **D4** position.
2. Measure the voltage between the B24 and A9 or A22 terminals.

Is there voltage?

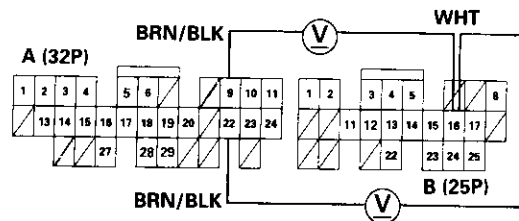
YES

Repair open in the wire between the B24 terminal and the A/T gear position switch.

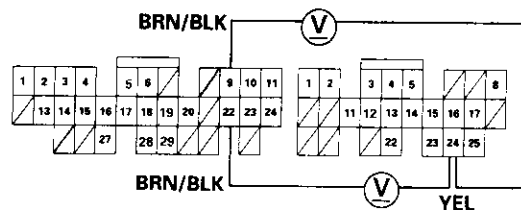
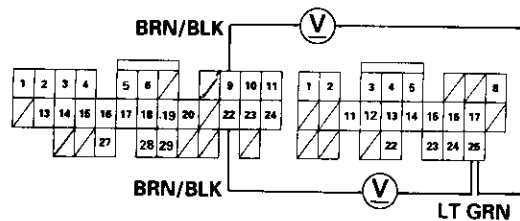
NO

To page 14-63

### PCM CONNECTORS



Wire side of female terminals





From page 14-62

**Measure ATP D3 Voltage:**

1. Shift to **D<sub>3</sub>** position.
2. Measure the voltage between the B8 and A9 or A22 terminals.

Is there voltage?

YES

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

NO

**Measure ATP2 Voltage:**

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

Is there voltage?

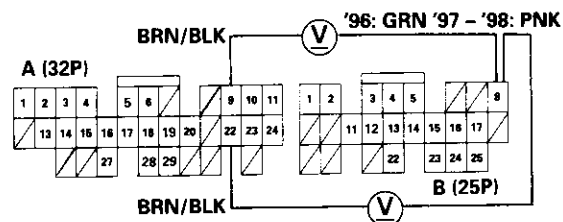
YES

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

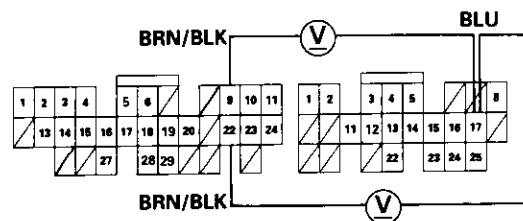
NO

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

**PCM CONNECTORS**



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Shift Control Solenoid Valve A

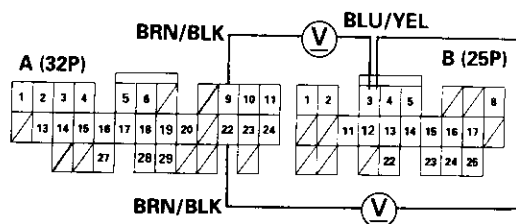
NOTE: Record all freeze data before you troubleshoot.

• OBD II Scan Tool indicates Code P0753.  
• Self-diagnosis **D<sub>5</sub>** indicator light blinks seven times.

**Possible Cause**

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

### PCM CONNECTORS



Wire side of female terminals

**Check for a Short to Power:**

1. Turn the ignition switch OFF.
2. Disconnect the A (32P) and B (25P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B3 and A9 or A22 terminals.

Is there voltage?

YES

NO

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

**Measure Shift Control Solenoid Valve A Resistance:**

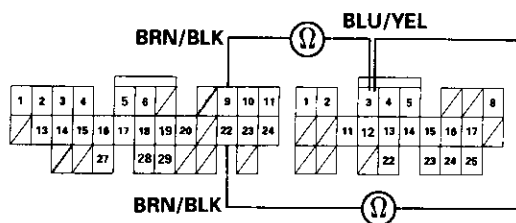
1. Turn the ignition switch OFF.
2. Measure the resistance between the B3 and A9 or A22 terminals.

Is the resistance 12 – 25  $\Omega$ ?

YES

NO

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



To page 14-65



From page 14-64

**Check Shift Control Solenoid Valve A for a Short Circuit:**

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

Is there continuity?

YES

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

NO

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

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

Is the resistance 12 – 25  $\Omega$ ?

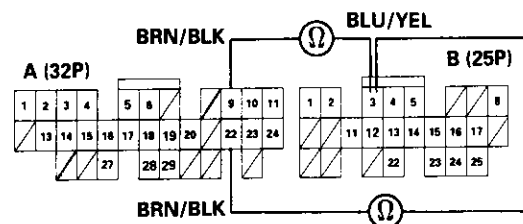
YES

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

NO

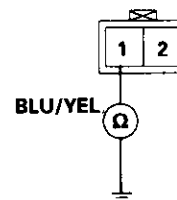
Replace the shift control solenoid valve assembly.

**PCM CONNECTORS**



Wire side of female terminals

**SHIFT CONTROL SOLENOID CONNECTOR**



Terminal side of male terminals

# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Shift Control Solenoid Valve B

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P0758.
- Self-diagnosis **D4** indicator light blinks eight times.

### Possible Cause

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

### Check for a Short to Power:

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

Is there voltage?

YES

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

NO

### Measure Shift Control Solenoid Valve B Resistance:

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

Is the resistance 12 – 25  $\Omega$ ?

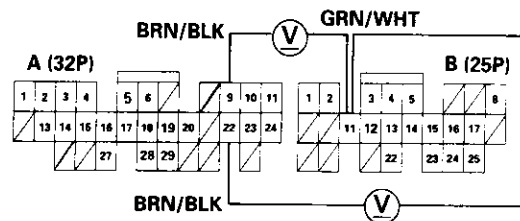
YES

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

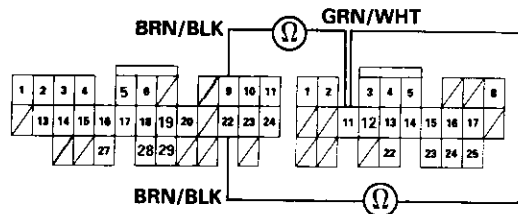
NO

To page 14-67

### PCM CONNECTORS



Wire side of female terminals





From page 14-66

**Check Shift Control Solenoid Valve B for a Short Circuit:**

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

Is there continuity?

YES

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

NO

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

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

Is the resistance 12 – 25  $\Omega$ ?

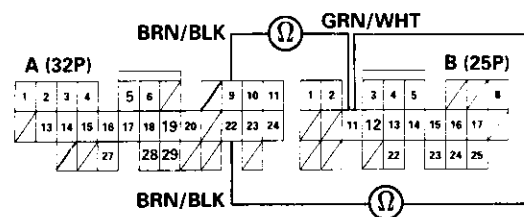
YES

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

NO

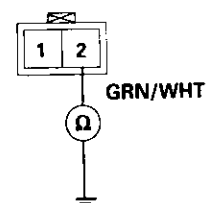
Replace the shift control solenoid valve assembly.

**PCM CONNECTORS**



Wire side of female terminals

**SHIFT CONTROL SOLENOID CONNECTOR**



Terminal side of male terminals



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Countershaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P0720.
- Self-diagnosis **D<sub>+</sub>** indicator light blinks nine times.

**Possible Cause**

- Loose or faulty connection between the PCM and car harness
- Disconnected countershaft speed sensor connector
- Short or open in countershaft speed sensor wire
- Faulty countershaft speed sensor

Check the countershaft speed sensor installation.

Is the countershaft speed sensor installed properly?

NO

Reinstall and recheck.

YES

**Measure Countershaft Speed Sensor Resistance at the Sensor Connector:**

1. Disconnect the 2P connector from the countershaft speed sensor connector.
2. Measure the resistance of the countershaft speed sensor.

Is the resistance 400 – 600  $\Omega$ ?

NO

Replace the countershaft speed sensor.

YES

**Check Countershaft Speed Sensor for a Short Circuit:**

1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between the body ground and the B23 terminal and B22 terminal individually.

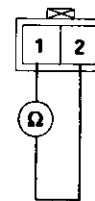
Is there continuity?

YES

Repair short in the wires between the B23 and B22 terminals and the countershaft speed sensor.

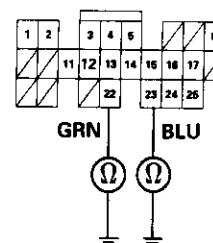
NO

COUNTERSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

PCM CONNECTOR B (25P)



Wire side of female terminals

To page 14-69



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**Measure Countershaft Speed Sensor Resistance:**

1. Connect the countershaft speed sensor 2P connector.
2. Measure the resistance between the B23 and B22 terminals.

Is the resistance 400 – 600  $\Omega$ ?

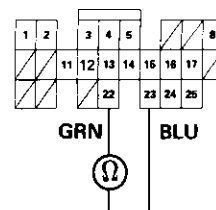
NO

**Repair loose terminal or open in the wires between the B23 and B22 terminals and the countershaft speed sensor.**

YES

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

**PCM CONNECTOR B (25P)**

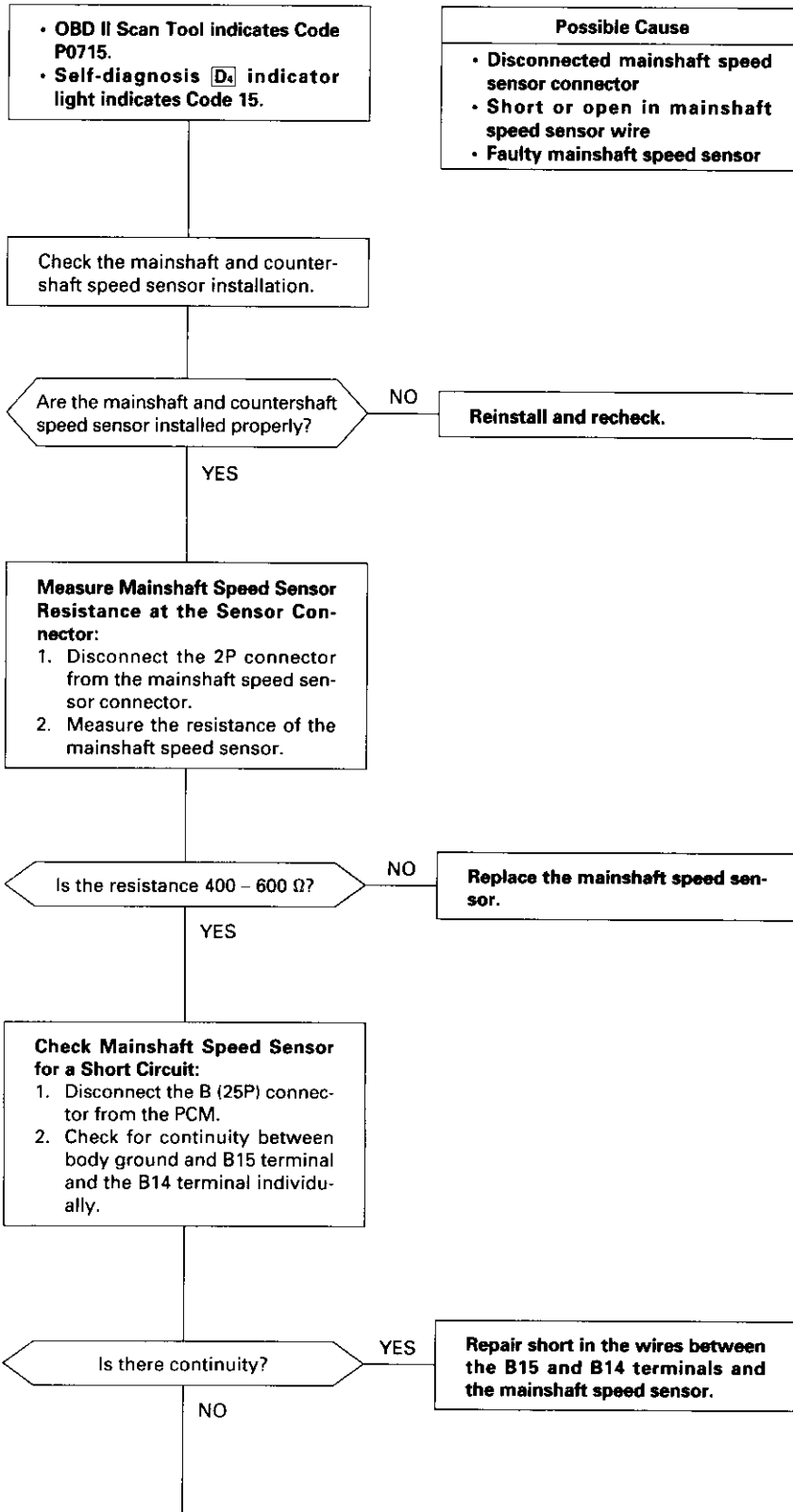


Wire side of female terminals

# Electrical Troubleshooting ('96 – 98 Models)

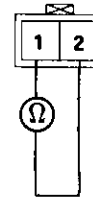
## Troubleshooting Flowchart — Mainshaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.



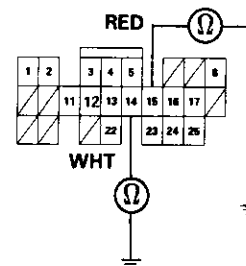
NOTE: Code P0715 (15) on the PCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code P0715 (15) may also indicate a mechanical problem in the transmission.

MAINSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

PCM CONNECTOR B (25P)



Wire side of female terminals



From page 14-70

**Measure Mainshaft Speed Sensor Resistance:**

1. Connect the mainshaft speed sensor 2P connector.
2. Measure the resistance between the B15 and B14 terminals.

Is the resistance 400 – 600  $\Omega$ ?

YES

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

NO

**Check NM Wire Continuity:**

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

Is there continuity?

NO

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

YES

**Check NMSG Wire Continuity:**

Check for continuity between the B14 terminal and the No. 2 terminal of the mainshaft speed sensor connector.

Is there continuity?

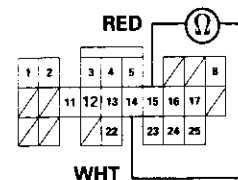
NO

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

YES

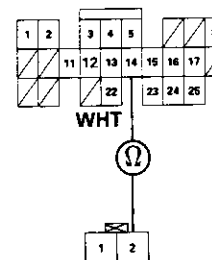
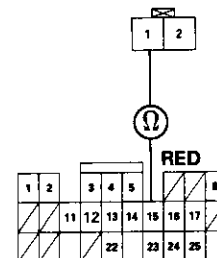
Check for loose PCM connectors. If necessary, substitute a known-good PCM and recheck.

**PCM CONNECTOR B (25P)**



Wire side of female terminals

**MAINSHAFT SPEED SENSOR CONNECTOR**



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1768.
- Self-diagnosis **D4** indicator light indicates Code 16.

### Possible Cause

- Disconnected linear solenoid connector
- Short or open in linear solenoid wire
- Faulty linear solenoid

### Measure Linear Solenoid Resistance at the Solenoid Connector:

1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the linear solenoid connector.
3. Measure the resistance of the linear solenoid.

Is the resistance approx. 5.0  $\Omega$ ?

NO

Replace the linear solenoid assembly.

YES

### Check Linear Solenoid for a Short Circuit:

1. Disconnect the B (25P) connector from the PCM.
2. Check for continuity between the body ground and the B1 terminal and B2 terminal individually.

Is there continuity?

YES

Repair short in the wires between the B1 and B2 terminals and the linear solenoid.

NO

### Measure Linear Solenoid Resistance:

1. Connect the linear solenoid connector.
2. Measure the resistance between the B1 and B2 terminals.

Is the resistance approx. 5.0  $\Omega$ ?

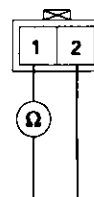
NO

Repair loose terminal or open in the wires between the B1 and B2 terminals and the linear solenoid.

YES

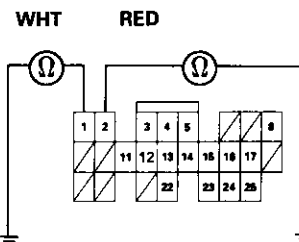
To page 14-73

### LINEAR SOLENOID CONNECTOR

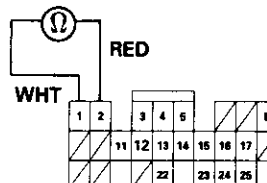


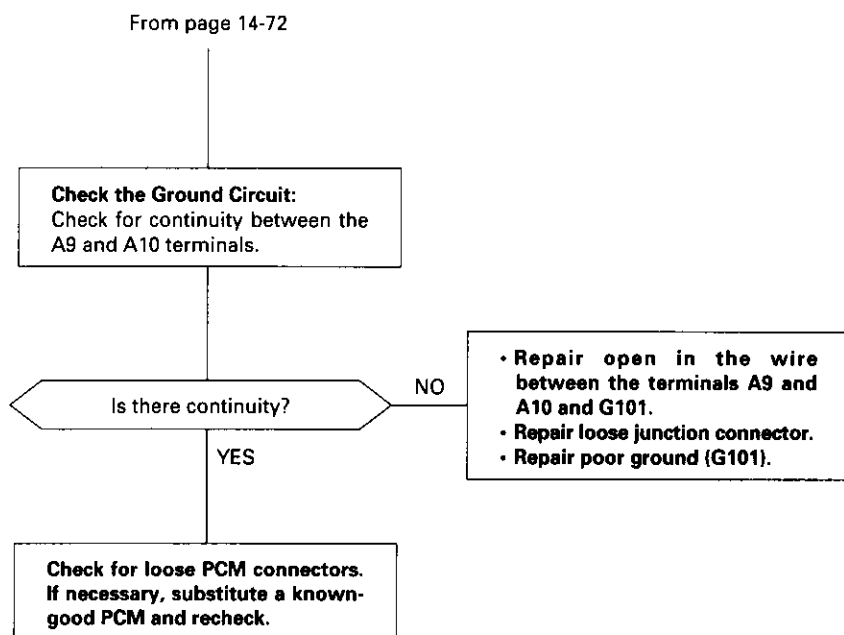
Terminal side of male terminals

### PCM CONNECTOR B (25P)

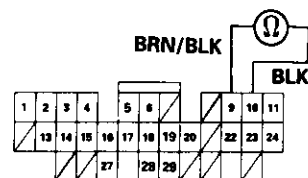


Wire side of female terminals





PCM CONNECTOR A (32P)

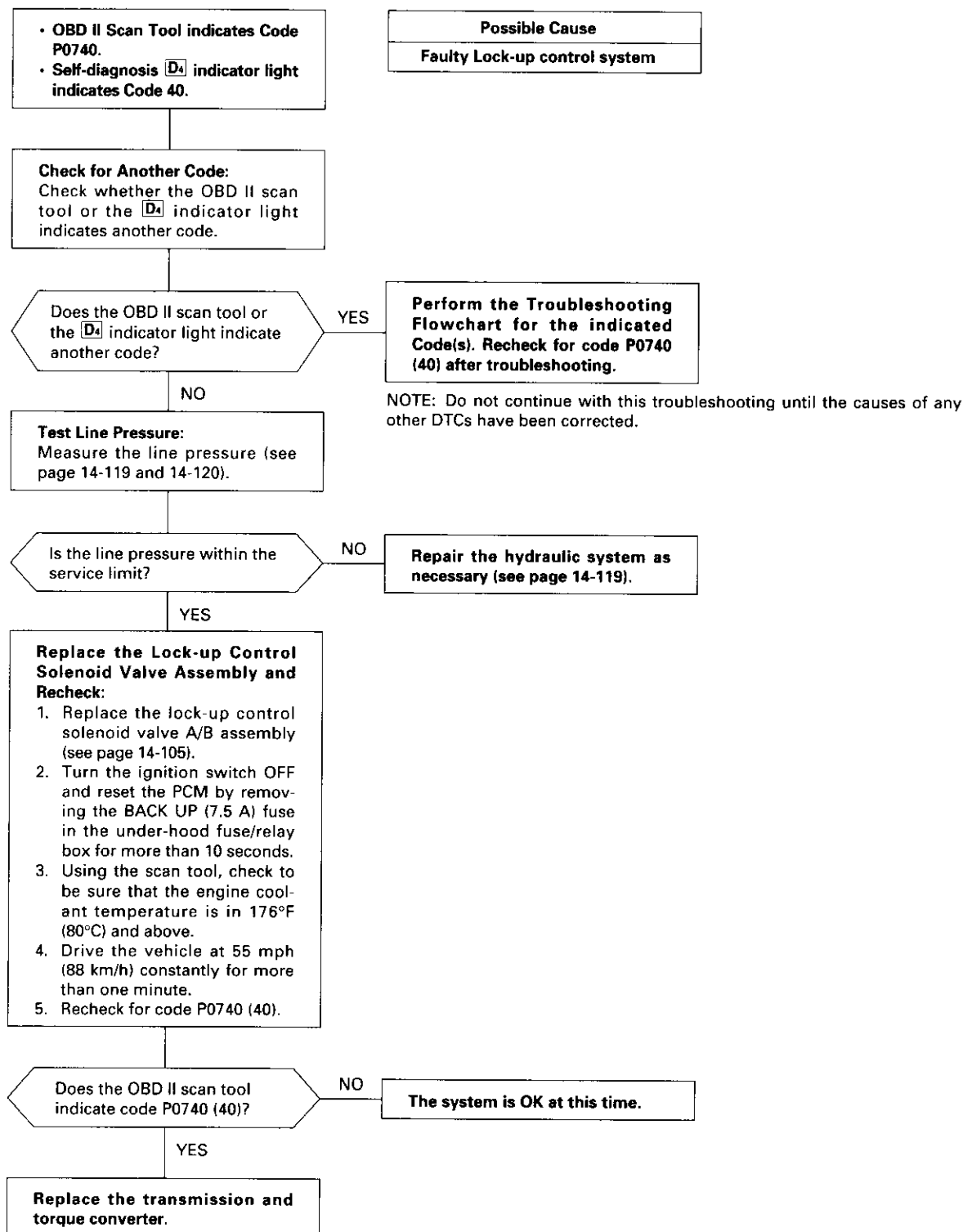


Wire side of female terminals

# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Lock-up Control System

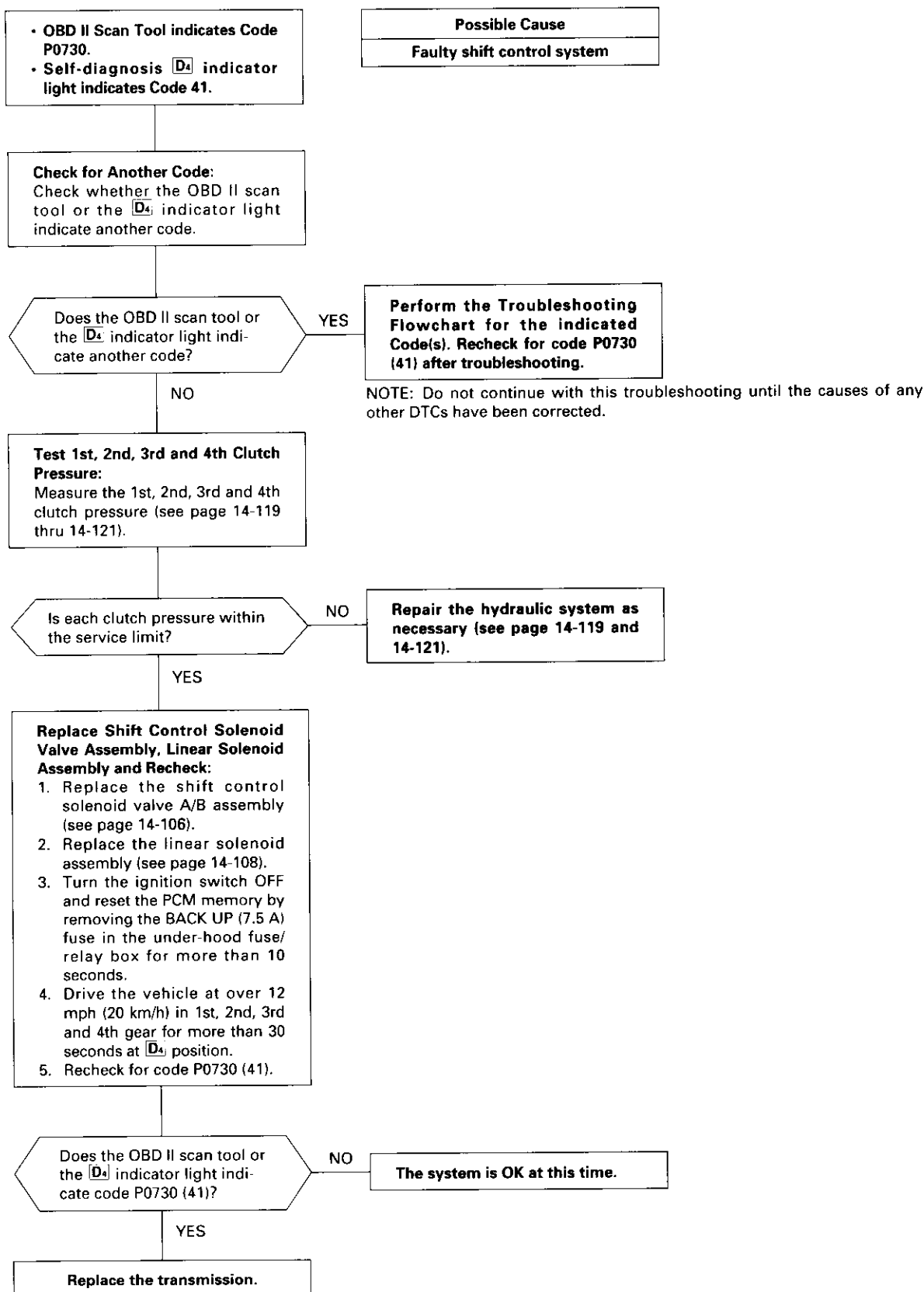
NOTE: Record all freeze data before you troubleshoot.





## Troubleshooting Flowchart — Shift Control System

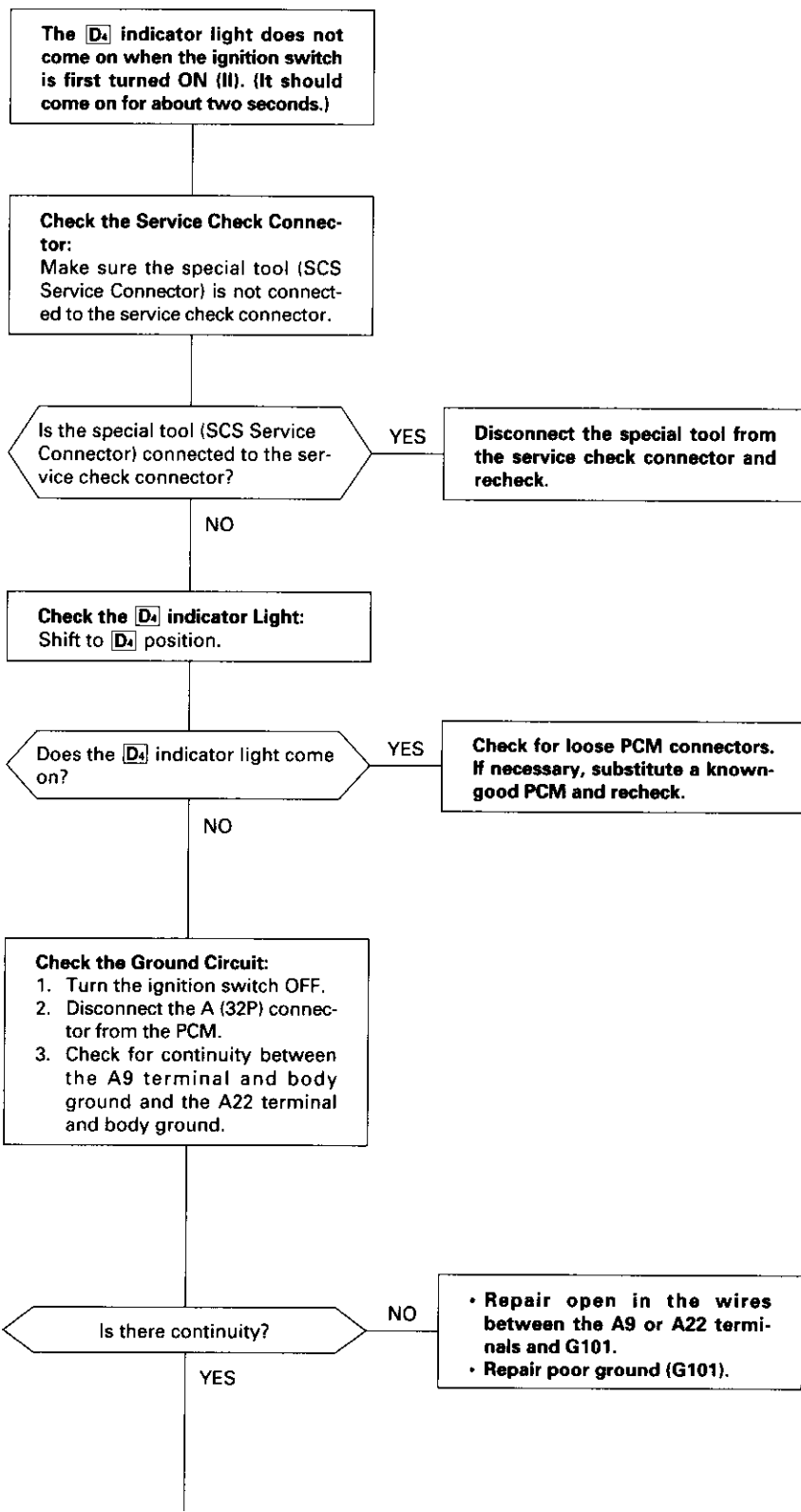
NOTE: Record all freeze data before you troubleshoot.



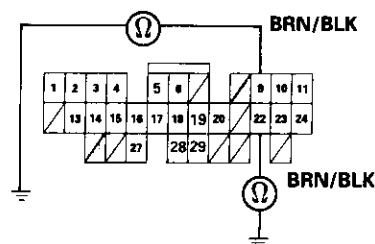


# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — **D<sub>4</sub>** Indicator Light Does Not Come On



PCM CONNECTOR A (32P)



Wire side of female terminals



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**Measure Power Supply Circuit Voltage:**

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

Is there battery voltage?

NO

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

YES

**Measure D4 IND Voltage:**

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

Is there voltage?

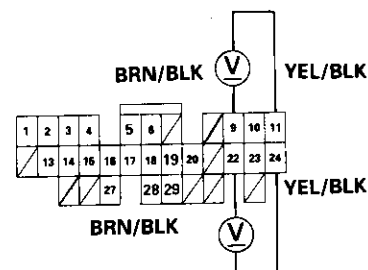
YES

Check for open in the wire between the B13 terminal and the gauge assembly. If wire is OK, check for a faulty **D<sub>4</sub>** indicator light bulb or a faulty gauge assembly printed circuit board.

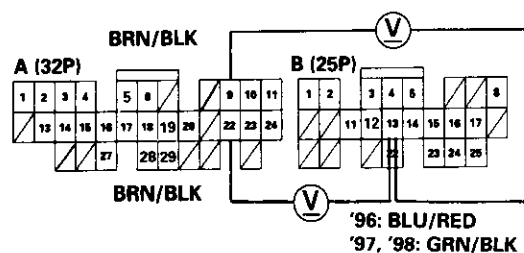
NO

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

PCM CONNECTOR A (32P)



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — **D<sub>4</sub>** Indicator Light On Constantly

The **D<sub>4</sub>** indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

### Measure D4 IND Voltage:

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

Is there voltage?

YES

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

NO

### Measure ATP D4 Voltage:

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

Is there voltage?

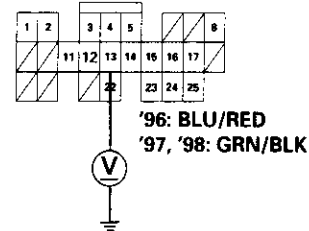
NO

Check for a short to ground on the wire. If wire is OK, replace the A/T gear position indicator.

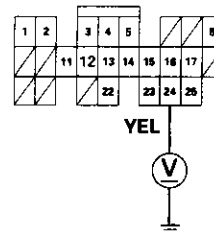
YES

Replace the PCM.

PCM CONNECTOR B (25P)

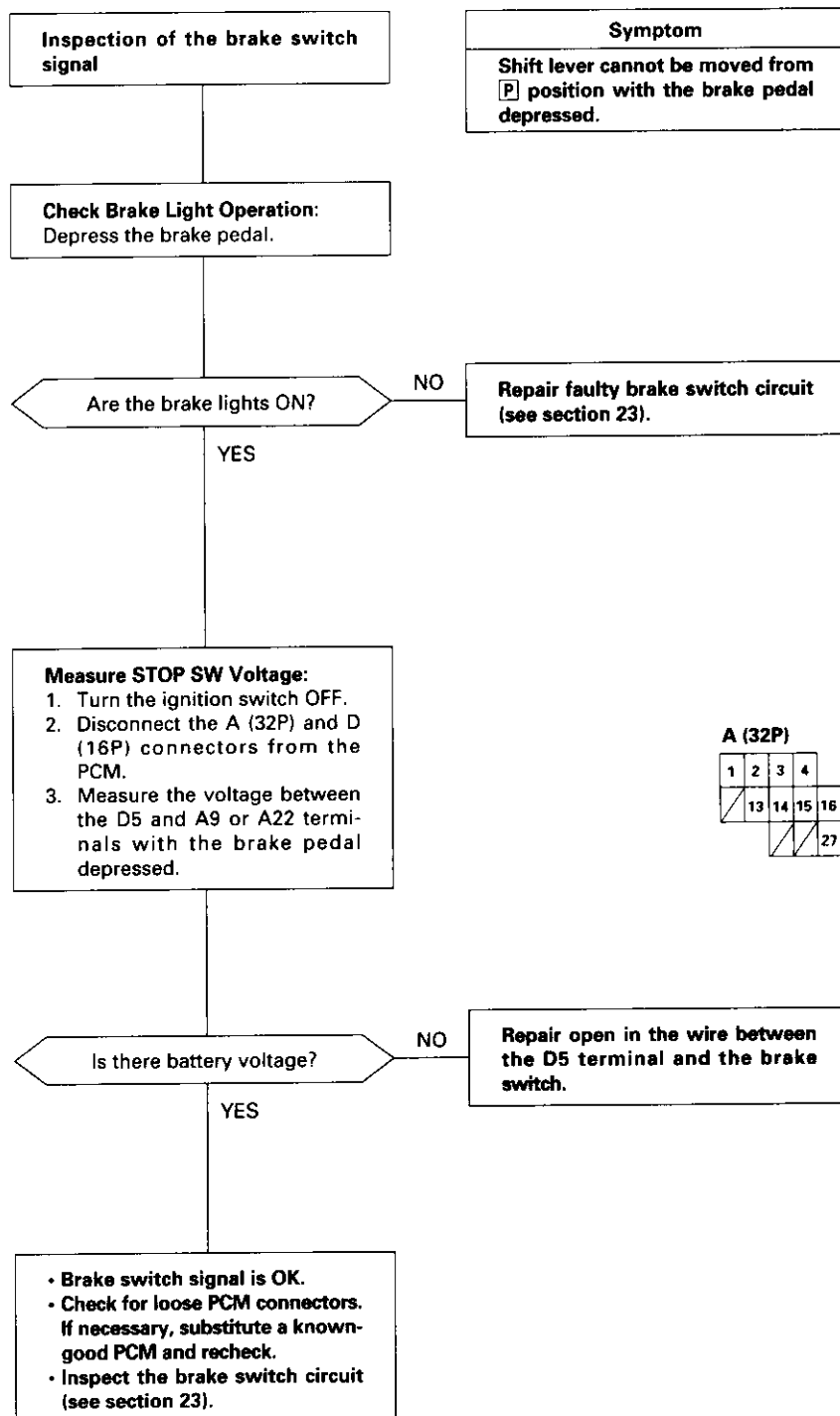


Wire side of female terminals

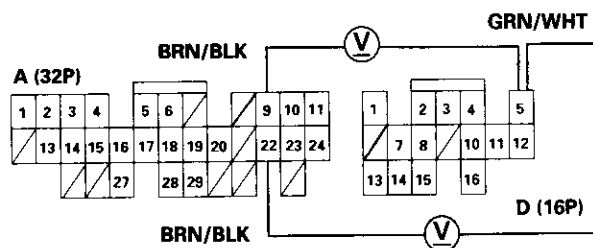




## Troubleshooting Flowchart — Brake Switch Signal



PCM CONNECTORS



Wire side of female terminals

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Lock-up Control Solenoid Valve A

NOTE: Record all freeze data before you troubleshoot.

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

### Possible Cause

- Disconnected lock-up control solenoid valve A/B assembly connector
- Short or open in lock-up control solenoid valve A wire
- Faulty lock-up control solenoid valve A
- Open in VB SOL wire

### Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D1 and B20 or B22 terminals.

Is there voltage?

YES

Repair short to power in the wire between the D1 terminal and the lock-up control solenoid valve A.

NO

### Measure Lock-up Control Solenoid Valve A Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the D1 and B20 or B22 terminals.

Is the resistance 12 – 25  $\Omega$ ?

NO

To page 14-81

YES

### Measure VB SOL Voltage:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.

Is there battery voltage?

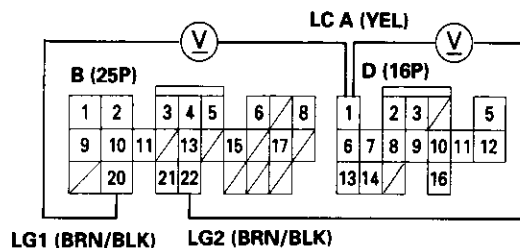
NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

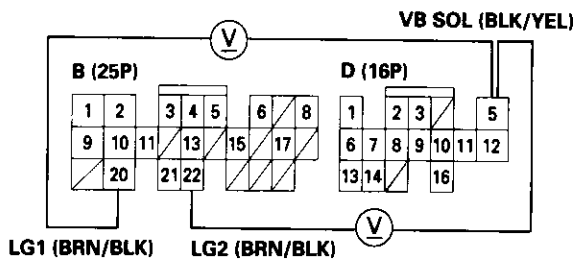
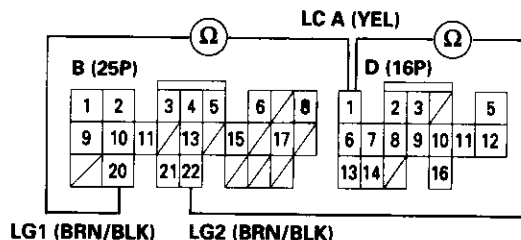
YES

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

### PCM CONNECTORS



Wire side of female terminals





# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Lock-up Control Solenoid Valve B

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1758.
- Self-diagnosis **D4** indicator light blinks twice.

### Possible Cause

- Disconnected lock-up control solenoid valve A/B assembly connector
- Short or open in lock-up control solenoid valve B wire
- Faulty lock-up control solenoid valve B
- Open in VB SOL wire

### Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D3 and B20 or B22 terminals.

Is there voltage?

YES

Repair short to power in the wire between the D3 terminal and the lock-up control solenoid valve B.

NO

### Measure Lock-up Control Solenoid Valve B Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the D3 and B20 or B22 terminals.

Is the resistance 12 – 25  $\Omega$ ?

NO

To page 14-83

YES

### Measure VB SOL Voltage:

1. Turn the ignition switch ON (III).
2. Measure the voltage between the D5 and B20 or B22 terminals.

Is there battery voltage?

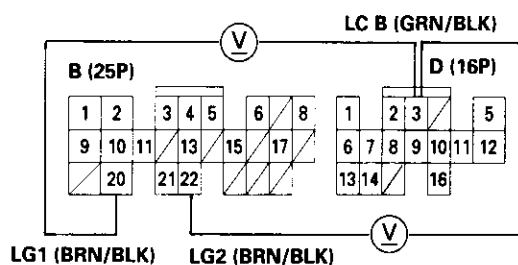
NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

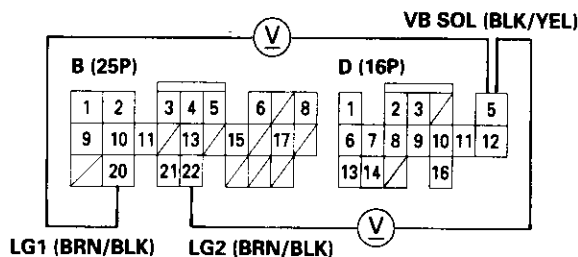
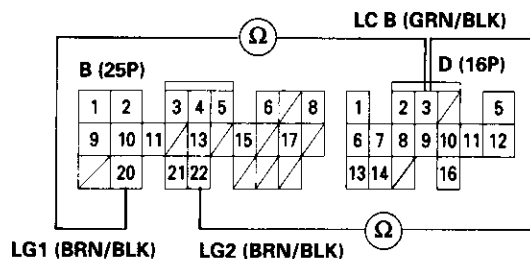
YES

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

### PCM CONNECTORS



Wire side of female terminals





From page 14-82

Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

Is there continuity?

NO

Repair open in the wires between the B20 and B22 terminals and ground (G101), and repair poor ground (G101).

YES

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

1. Disconnect the 2P connector from the lock-up control solenoid valve A/B assembly.
2. Check for continuity between the D3 and B20 or B22 terminals.

Is there continuity?

YES

Repair short to ground in the wire between the D3 terminal and the lock-up control solenoid valve B.

NO

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

Measure the resistance between the No. 1 terminal of the lock-up control solenoid valve A/B assembly connector and body ground.

Is the resistance 12 – 25  $\Omega$ ?

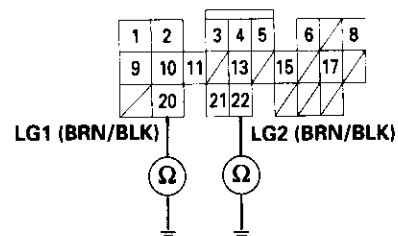
NO

Replace the lock-up control solenoid valve A/B assembly.

YES

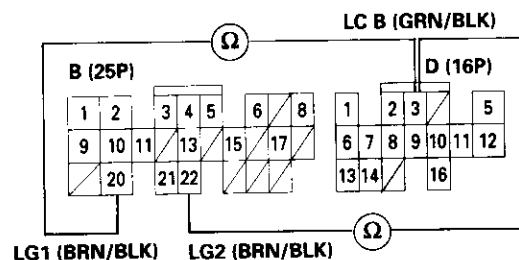
Check for open in the wire between the D3 terminal and the lock-up control solenoid valve B.

PCM CONNECTOR B (25P)



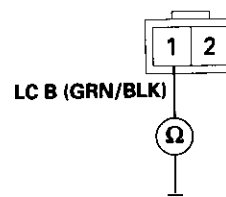
Wire side of female terminals

PCM CONNECTORS



Wire side of female terminals

LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY CONNECTOR (2P)



Terminal side of male terminals



# Electrical Troubleshooting ('99 – 00 Models)

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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1705.
- Self-diagnosis **D4** indicator light blinks five times.

### Possible Cause

- Short in A/T gear position switch wire
- Faulty A/T gear position switch

NOTE: Code P1705 (5) is caused when the PCM received two gear position inputs at the same time.

### Observe the A/T Gear Position Indicator:

1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift each position separately.

Does any indicator stay on when the shift lever is not in that position?

NO

The system is OK at this time. Check the wire harness for damage.

YES

Disconnect the A/T gear position switch connector.

Do all gear position indicators go out?

YES

Replace the A/T gear position switch.

NO

Connect the A/T gear position switch connector.

### Measure ATP R Voltage:

1. Shift to all positions other than **R**.
2. Measure the voltage between the D6 and B20 or B22 terminals.

Is there battery voltage?

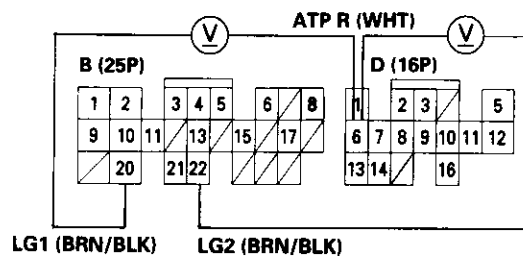
NO

Check for short in the wire between the D6 terminal and the A/T gear position switch or A/T gear position indicator, and check for open in the wires between the B20 and B22 terminals and body ground (G101). If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

To page 14-85

### PCM CONNECTORS





From page 14-84

# **Measure ATP NP Voltage:**

1. Shift to all positions other than **P** or **N**.
2. Measure the voltage between the D13 and B20 or B22 terminals.

Is there battery voltage?

NO

YES

Check for short in the wire between the D13 terminal and the A/T gear position switch, and in the **P** and **N** position signal wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

# **Measure ATP D4 Voltage:**

1. Shift to all positions other than **D4**.
2. Measure the voltage between the D9 and B20 or B22 terminals.

Is there approx. 5 V?

NO

YES

Check for short in the wire between the D9 terminal and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

# **Measure ATP D3 Voltage:**

1. Shift to all positions other than **D3**.
2. Measure the voltage between the D8 and B20 or B22 terminals.

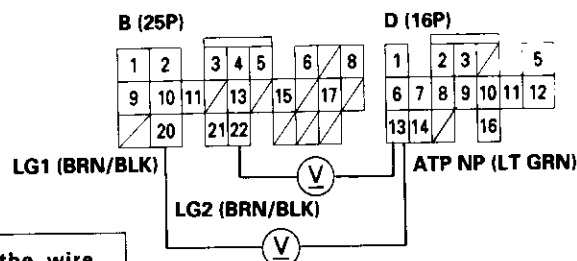
Is there battery voltage?

NO

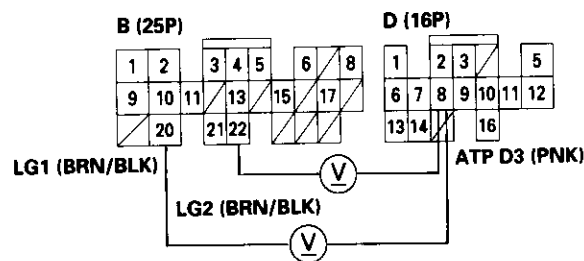
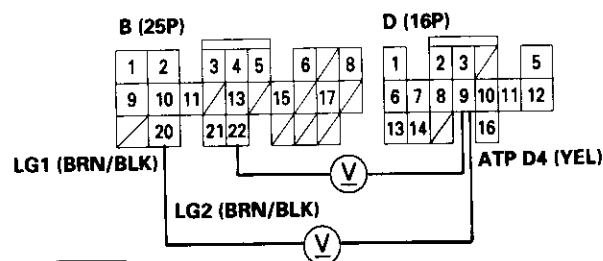
YES

Check for short in the wire between the D8 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

## **PCM CONNECTORS**



Wire side of female terminals



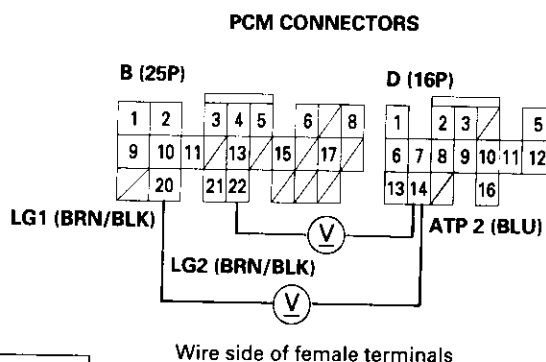
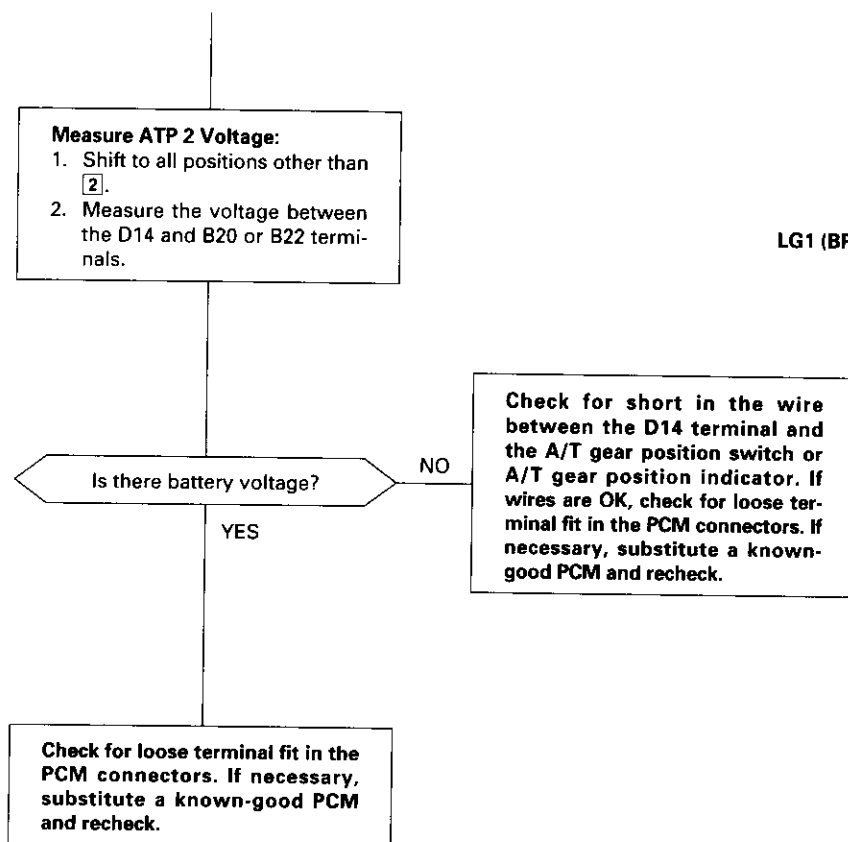
To page 14-86

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — A/T Gear Position Switch (Short) (cont'd)

From page 14-85





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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1706.
- Self-diagnosis **D4** indicator light blinks six times.

### Possible Cause

- Disconnected A/T gear position switch connector
- Open in A/T gear position switch wire
- Faulty A/T gear position switch

Test the A/T gear position switch (see section 23).

Is the switch OK?

NO

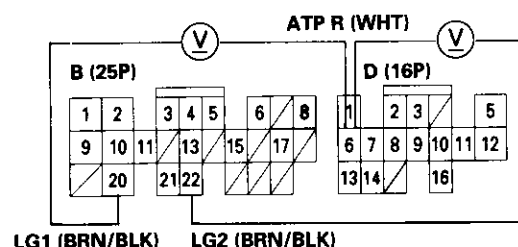
Replace the A/T gear position switch.

YES

### Measure ATP R Voltage:

1. Turn the ignition switch ON (II).
2. Shift to **R** position.
3. Measure the voltage between the D6 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there voltage?

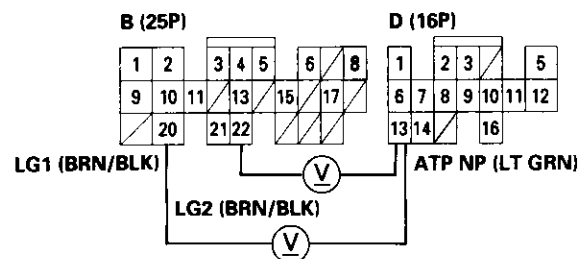
YES

Repair open in the wire between the D6 terminal and the A/T gear position switch.

NO

### Measure ATP NP Voltage:

1. Shift to **P** or **N** position.
2. Measure the voltage between the D13 and B20 or B22 terminals.



Is there voltage?

YES

Repair open in the wire between the D13 terminal and the A/T gear position switch.

NO

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(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — A/T Gear Position Switch Open (cont'd)

From page 14-87

### Measure ATP D4 Voltage:

1. Shift to **D<sub>4</sub>** position.
2. Measure the voltage between the D9 and B20 or B22 terminals.

Is there voltage?

YES

Repair open in the wire between the D9 terminal and the A/T gear position switch.

NO

### Measure ATP D3 Voltage:

1. Shift to **D<sub>3</sub>** position.
2. Measure the voltage between the D8 and B20 or B22 terminals.

Is there voltage?

YES

Repair open in the wire between the D8 terminal and the A/T gear position switch.

NO

### Measure ATP 2 Voltage:

1. Shift to **2** position.
2. Measure the voltage between the D14 and B20 or B22 terminals.

Is there voltage?

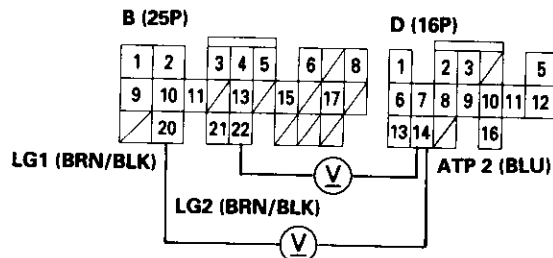
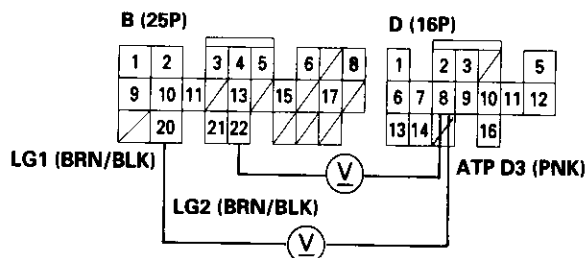
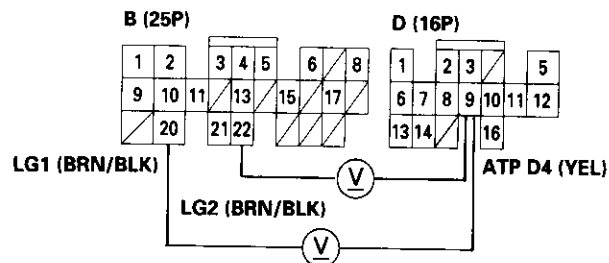
YES

Repair open in the wire between the D14 terminal and the A/T gear position switch.

NO

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

### PCM CONNECTORS





## Troubleshooting Flowchart — Shift Control Solenoid Valve A

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P0753.
- Self-diagnosis **D<sub>4</sub>** indicator light blinks seven times.

### Possible Cause

- Disconnected shift control solenoid valve A/B assembly connector
- Short or open in shift control solenoid valve A wire
- Faulty shift control solenoid valve A
- Open in VB SOL wire

### Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D7 and B20 or B22 terminals.

Is there voltage?

YES

Repair short to power in the wire between the D7 terminal and the shift control solenoid valve A.

NO

### Measure Shift Control Solenoid Valve A Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the D7 and B20 or B22 terminals.

Is the resistance 12 – 25  $\Omega$ ?

NO

To page 14-90

YES

### Measure VB SOL Voltage:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.

Is there battery voltage?

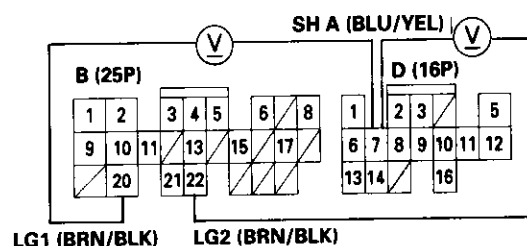
NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

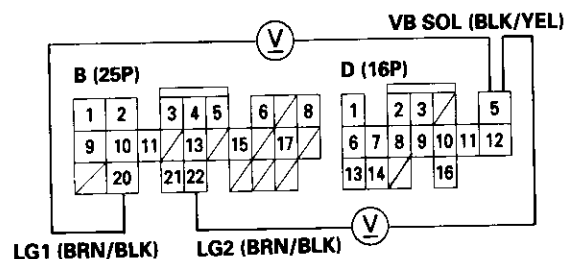
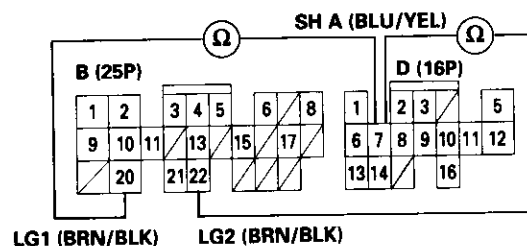
YES

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

### PCM CONNECTORS



Wire side of female terminals

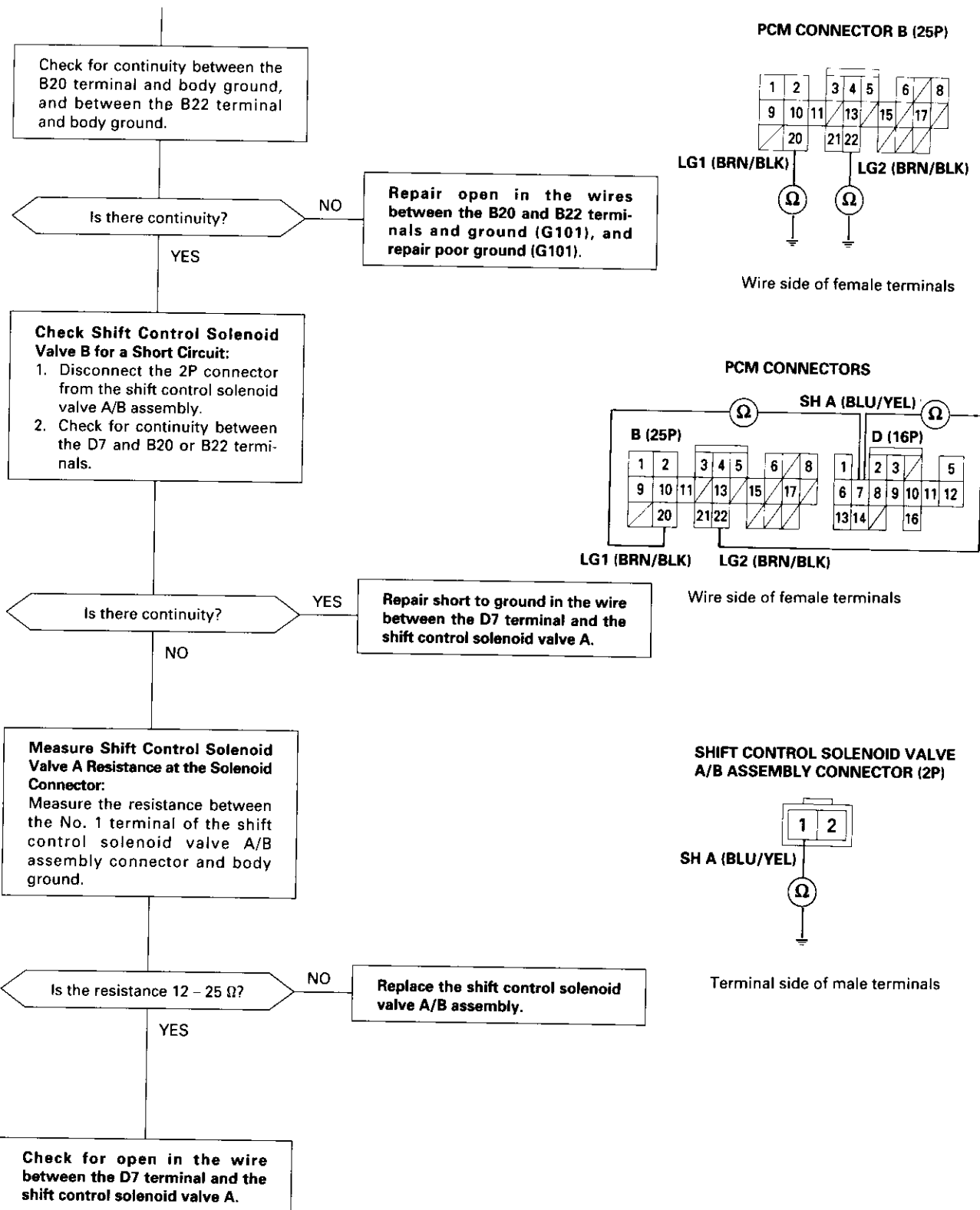


(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Shift Control Solenoid Valve A (cont'd)

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## Troubleshooting Flowchart — Shift Control Solenoid Valve B

NOTE: Record all freeze data before you troubleshoot.

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

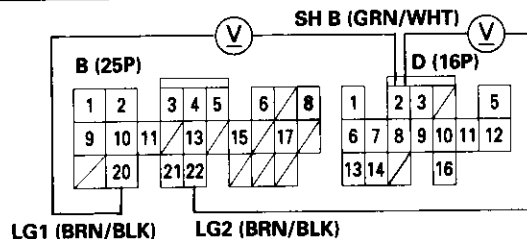
### Possible Cause

- Disconnected shift control solenoid valve A/B connector
- Short or open in shift control solenoid valve B wire
- Faulty shift control solenoid valve B
- Open in VB SOL wire

### Check for a Short to Power:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D2 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there voltage?

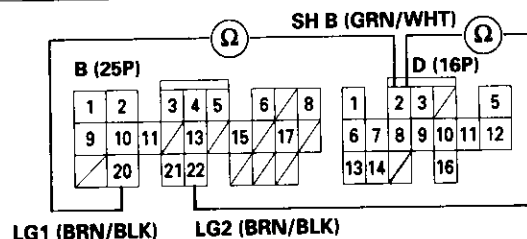
YES

Repair short to power in the wire between the D2 terminal and the shift control solenoid valve B.

NO

### Measure Shift Control Solenoid Valve B Resistance:

1. Turn the ignition switch OFF.
2. Measure the resistance between the D2 and B20 or B22 terminals.



Is the resistance 12 – 25  $\Omega$ ?

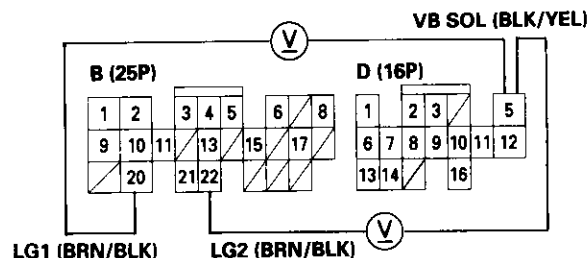
NO

To page 14-92

YES

### Measure VB SOL Voltage:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the D5 and B20 or B22 terminals.



Is there battery voltage?

NO

Check for blown No. 15 (7.5 A) fuse in the under-dash fuse/relay box. If the fuse is OK, repair open in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

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

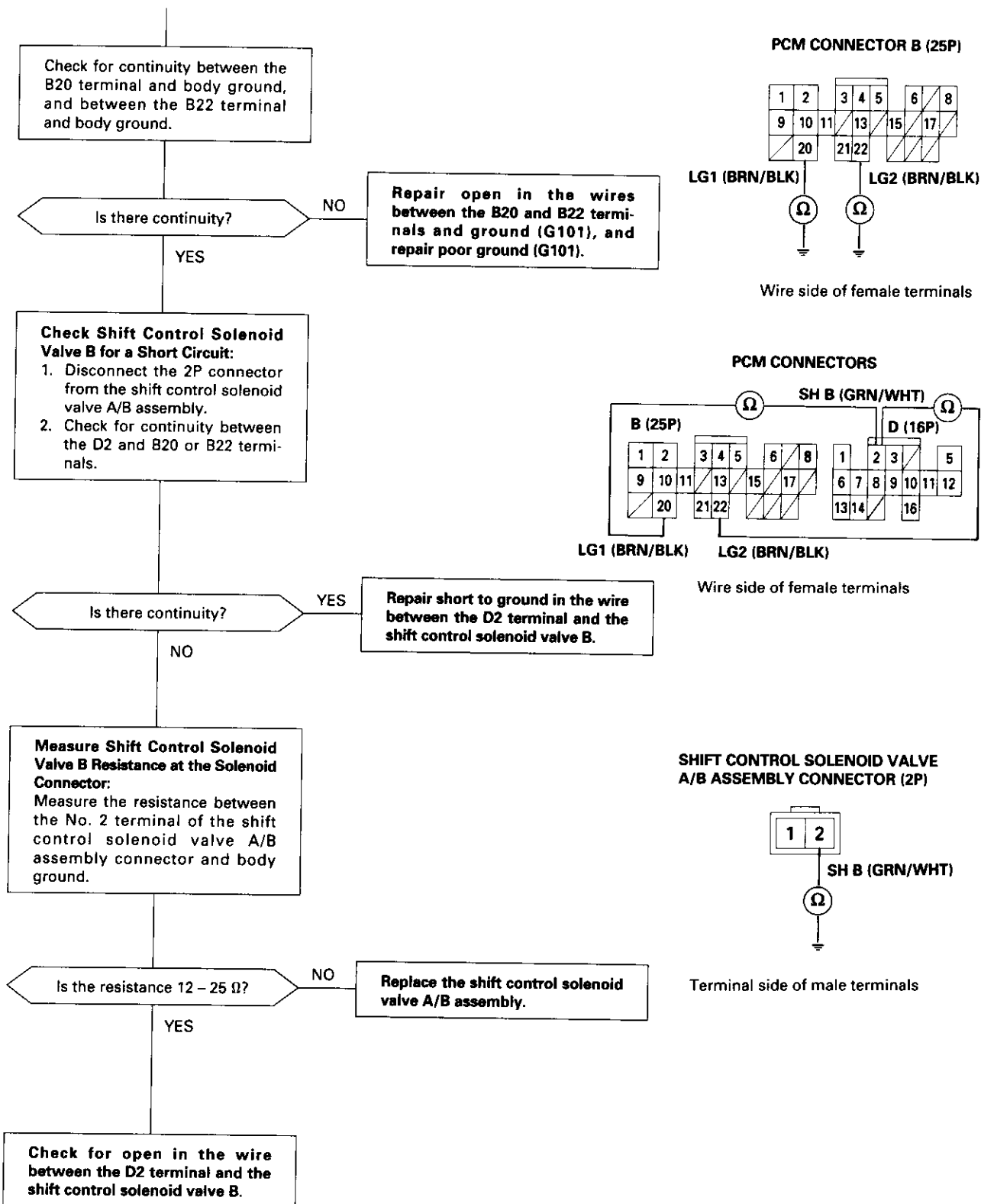
(cont'd)



# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Shift Control Solenoid Valve B (cont'd)

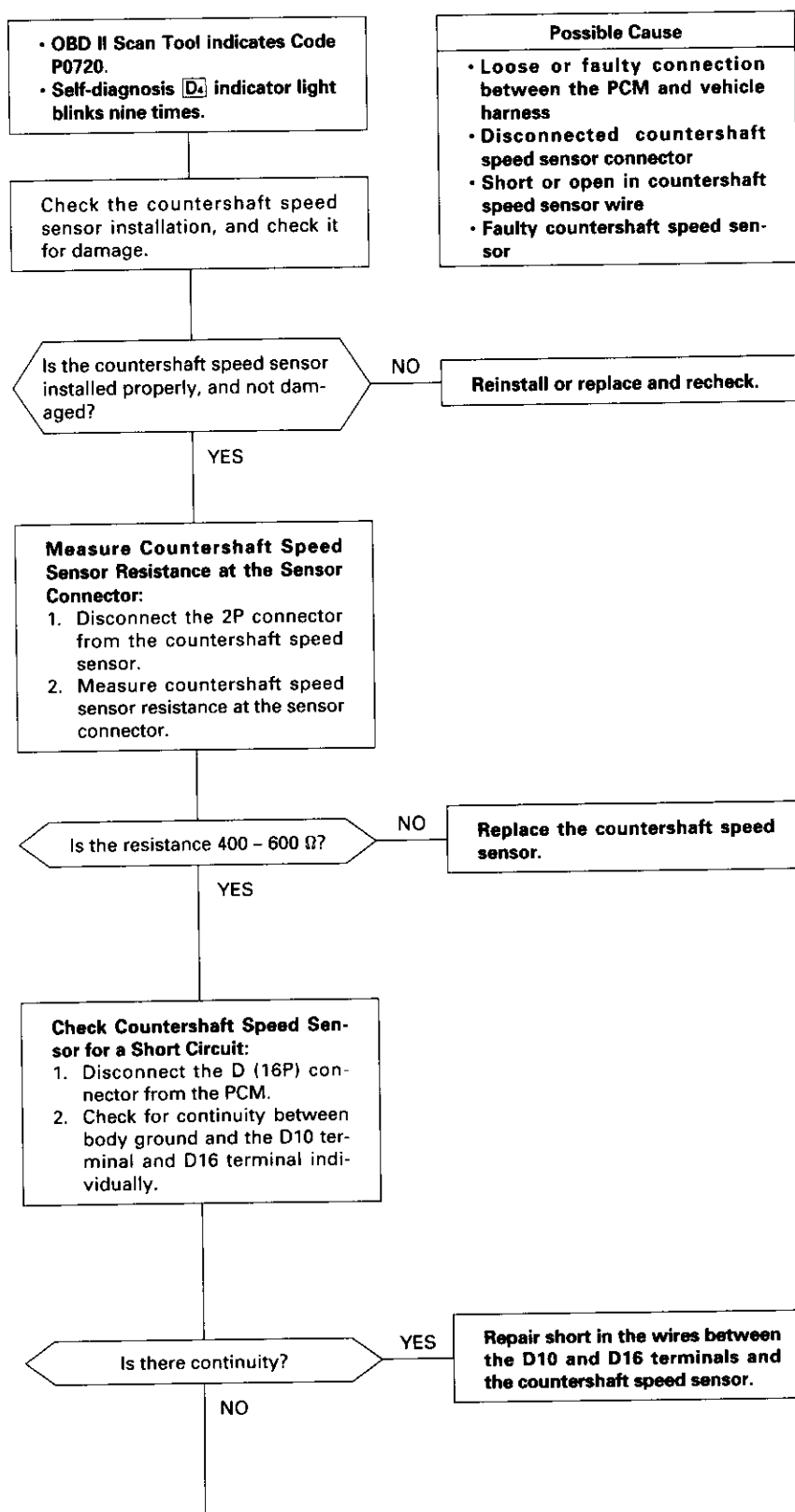
From page 14-91



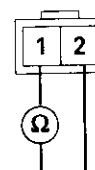


## Troubleshooting Flowchart — Countershaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

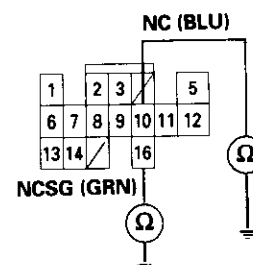


COUNTERSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

PCM CONNECTOR D (16P)



Wire side of female terminals

To page 14-94

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Countershaft Speed Sensor (cont'd)

From page 14-93

### Measure Countershaft Speed Sensor Circuit for an Open:

1. Connect the countershaft speed sensor connector.
2. Measure the resistance between the D10 and D16 terminals.

Is the resistance 400 – 600  $\Omega$ ?

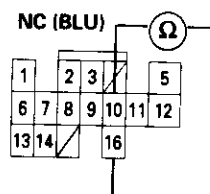
NO

Repair loose terminal or open in the wires between the D10 and D16 terminals and the countershaft speed sensor.

YES

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

PCM CONNECTOR D (16P)



NCSG (GRN)

Wire side of female terminals



## Troubleshooting Flowchart — Mainshaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P0715.
- Self-diagnosis **D4** indicator indicates Code 15.

### Possible Cause

- Disconnected mainshaft speed sensor connector
- Short or open in mainshaft speed sensor wire
- Faulty mainshaft speed sensor

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

Check the mainshaft and countershaft speed sensors installation, and check them for damage.

Are the mainshaft and countershaft speed sensor installed properly, and not damaged?

NO

Reinstall or replace and recheck.

YES

### Measure Mainshaft Speed Sensor Resistance at the Sensor Connector:

1. Disconnect the 2P connector from the mainshaft speed sensor.
2. Measure mainshaft speed sensor resistance at the sensor connector.

Is the resistance 400 – 600  $\Omega$ ?

NO

Replace the mainshaft speed sensor.

YES

### Check Mainshaft Speed Sensor for a Short Circuit:

1. Disconnect the D (16P) connector from the PCM.
2. Check for continuity between body ground and the D11 terminal and D12 terminal individually.

Is there continuity?

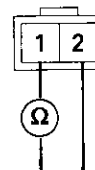
YES

Repair short in the wires between the D11 and D12 terminals and the mainshaft speed sensor.

NO

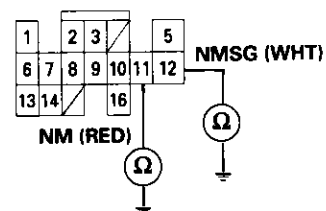
To page 14-96

### MAINSHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

### PCM CONNECTOR D (16P)



Wire side of female terminals

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Mainshaft Speed Sensor (cont'd)

From page 14-95

### Measure Mainshaft Speed Sensor Resistance:

1. Connect the mainshaft speed sensor connector.
2. Measure the resistance between the D11 and D12 terminals.

Is the resistance 400 – 600  $\Omega$ ?

YES

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

NO

### Check NM Wire Continuity:

1. Disconnect the 2P connector from the mainshaft speed sensor.
2. Check for continuity between the D11 terminal and the No. 2 terminal of the mainshaft speed sensor connector.

Is there continuity?

NO

Repair open in the wire between the D11 terminal and the mainshaft speed sensor.

YES

### Check NMSG Wire Continuity:

Check for continuity between the D12 terminal and the No. 1 terminal of the mainshaft speed sensor connector.

Is there continuity?

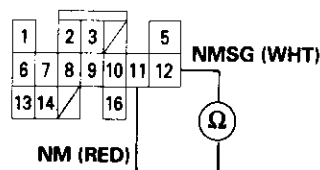
NO

Repair open in the wire between the D12 terminal and the mainshaft speed sensor.

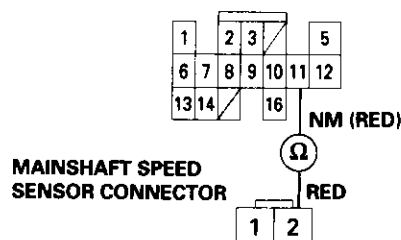
YES

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

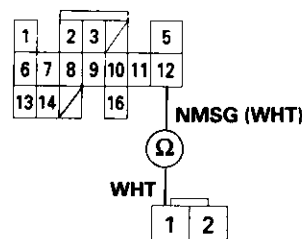
PCM CONNECTOR D (16P)



Wire side of female terminals



Wire side of female terminals





## Troubleshooting Flowchart — Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1768.
- Self-diagnosis **D4** indicator indicates Code 16.

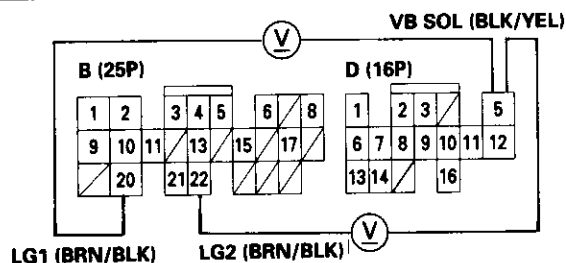
### Possible Cause

- Disconnected linear solenoid connector
- Short or open in linear solenoid wire
- Faulty linear solenoid
- Open in VB SOL wire
- Open in PG line

### Measure VB SOL Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO

Repair open or short in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

### Check the Ground Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the terminals B2 and B22 and between terminals B10 and B20.

Is there continuity?

NO

Repair open in the wire between the terminals B2, B10, B20, and B22 and G101. Repair poor ground (G101).

YES

### Measure Linear Solenoid Resistance at the Solenoid Connector:

1. Disconnect the linear solenoid connector.
2. Measure the resistance of the linear solenoid.

Is the resistance approx. 5  $\Omega$ ?

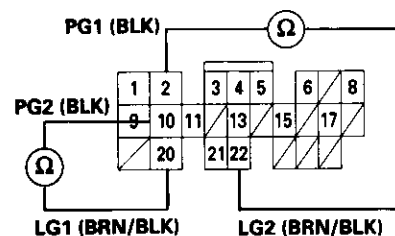
NO

Replace the linear solenoid assembly.

YES

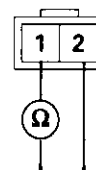
To page 14-98

### PCM CONNECTOR B (25P)



Wire side of female terminals

### LINEAR SOLENOID CONNECTOR



Terminal side of male terminals

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Linear Solenoid (cont'd)

From page 14-97

### Check Linear Solenoid for a Short Circuit:

Check for continuity between the body ground and the B8 terminal and B17 terminal individually.

Is there continuity?

YES

Repair short in the wire between the B8 and B17 terminals and the linear solenoid.

NO

### Measure Linear Solenoid Resistance:

1. Connect the linear solenoid connector.
2. Measure the resistance between the B8 and B17 terminals.

Is the resistance approx. 5.0  $\Omega$ ?

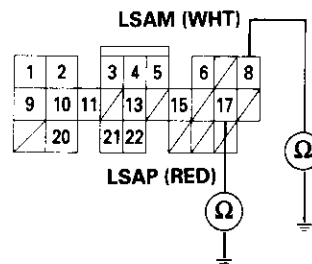
NO

Repair loose terminal or open in the wire between the B8 and B17 terminals and the linear solenoid.

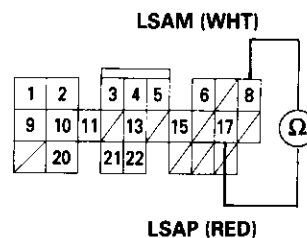
YES

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

PCM CONNECTOR B (25P)



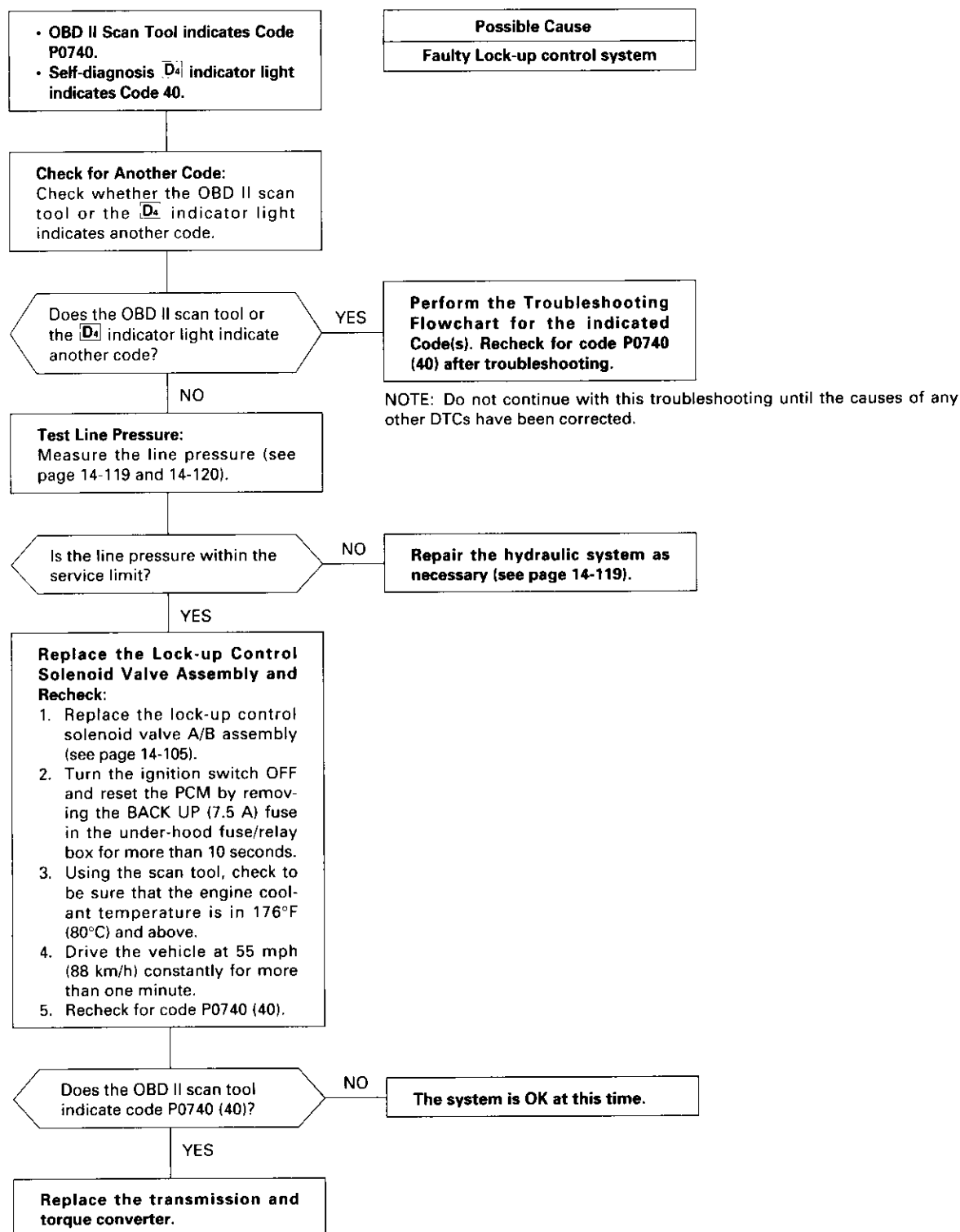
Wire side of female terminals





## Troubleshooting Flowchart — Lock-up Control System

NOTE: Record all freeze data before you troubleshoot.

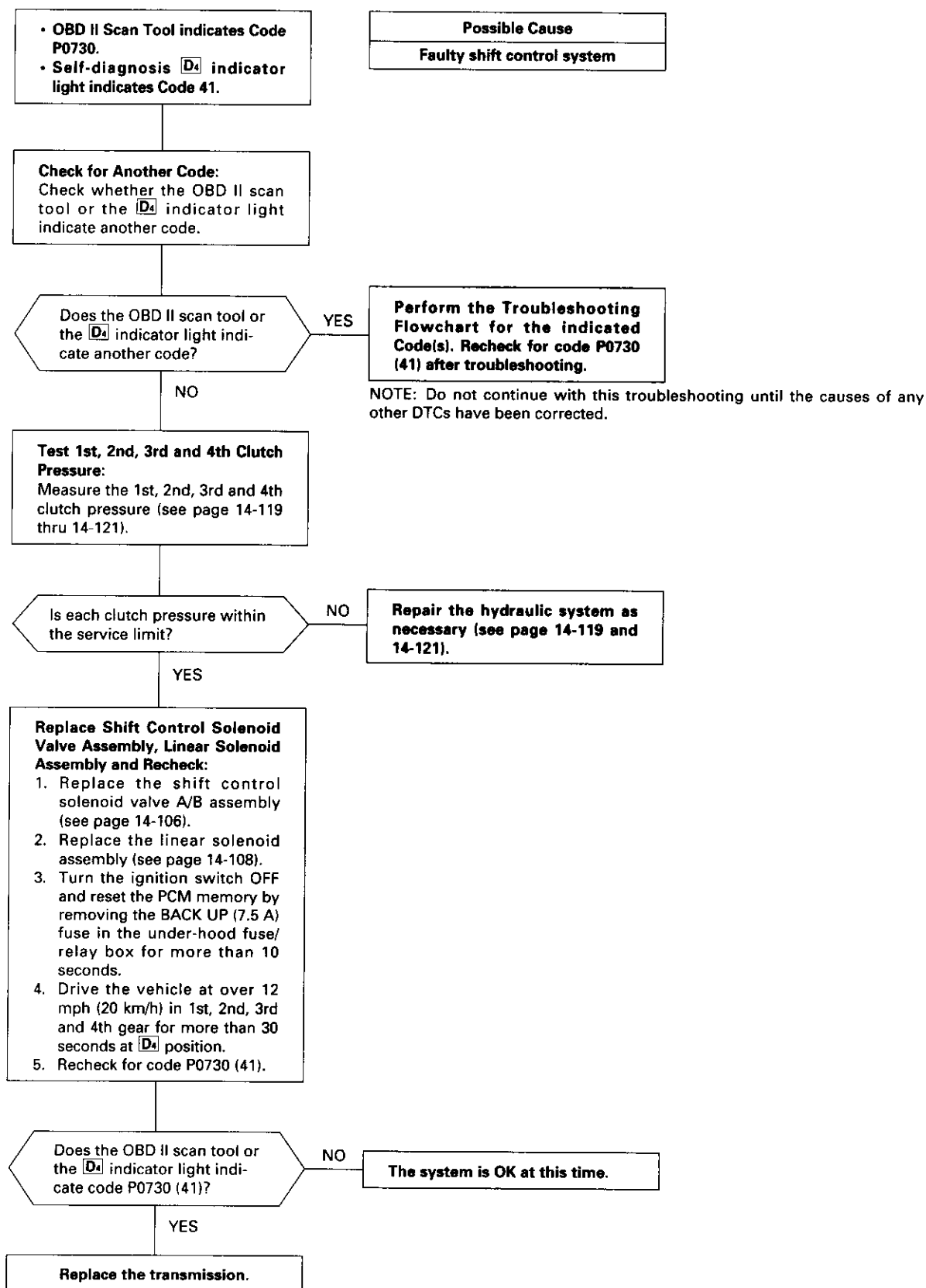




# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Shift Control System

NOTE: Record all freeze data before you troubleshoot.





## Troubleshooting Flowchart — **D<sub>4</sub>** Indicator Light On Constantly

The **D<sub>4</sub>** indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).

### Measure D4 IND Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the A (32P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the A14 terminal and body ground.

Is there voltage?

YES

Repair short to power in the wire between the A14 terminal and the gauge assembly.

NO

### Measure ATP D4 Voltage:

1. Turn the ignition switch OFF.
2. Connect the A (32P) connector to the PCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than **D<sub>4</sub>**.
5. Measure the voltage between the D9 terminal and body ground.

Is there approx. 5 V?

YES

Replace the PCM.

NO

Test the A/T gear position switch (see section 23).

Is the switch OK?

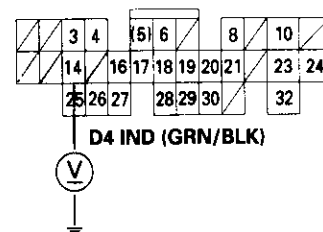
NO

Replace the A/T gear position switch.

YES

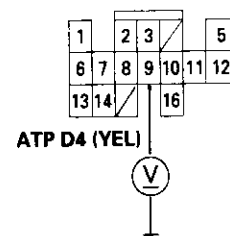
Check for a short to ground in the wire between the D9 terminal and A/T gear position switch. If wire is OK, substitute a known-good PCM and recheck.

PCM CONNECTOR A (32P)



Wire side of female terminals

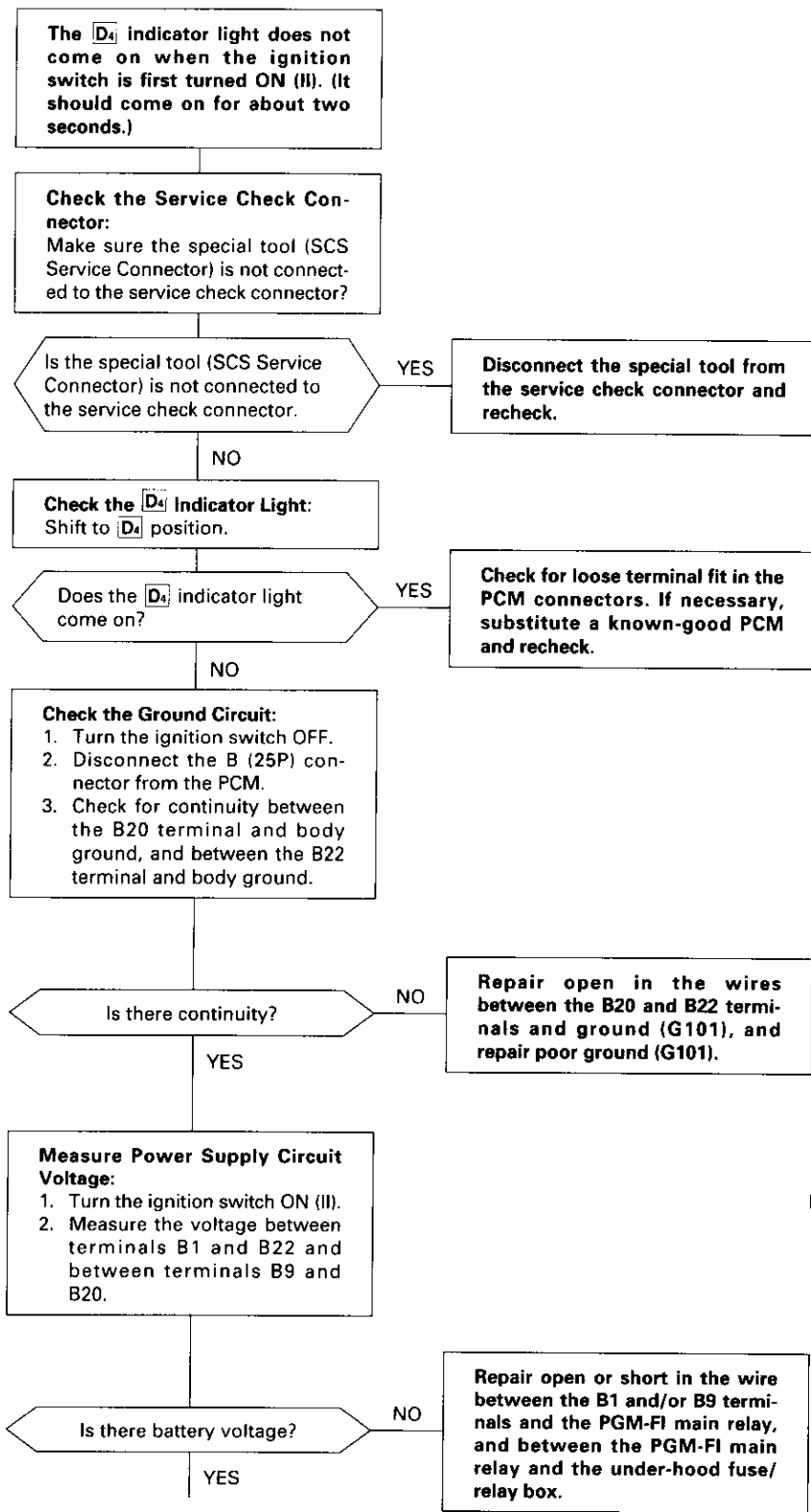
PCM CONNECTOR D (16P)



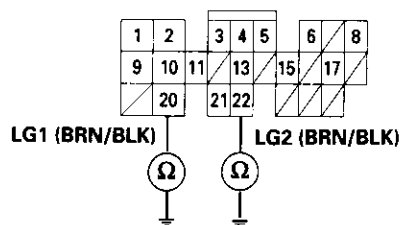
Wire side of female terminals

# Electrical Troubleshooting ('99 – 00 Models)

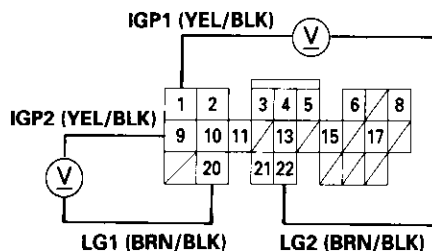
## Troubleshooting Flowchart — **D<sub>4</sub>** Indicator Light Does Not Come On



PCM CONNECTOR B (25P)



Wire side of female terminals





From page 14-102

**Measure D4 IND Voltage:**

1. Turn the ignition switch OFF.
2. Connect the B (25P) connector to the PCM.
3. Connect a digital multimeter to the A14 and B20 or B22 terminals.
4. Turn the ignition switch ON (II), and make sure that voltage is available for two seconds.

Is there voltage?

YES

Check for open in the wire between the A14 terminal and the gauge assembly. If wire is OK, check for a faulty indicator light bulb or a faulty gauge assembly printed circuit board.

NO

**Check D4 IND for a Short Circuit:**  
Check for continuity between the A14 terminal and body ground.

Is there continuity?

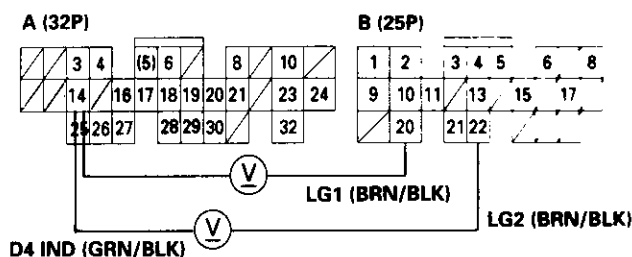
YES

Repair short in the wire between the A14 terminal and the gauge assembly. If wire is OK, check the gauge assembly.

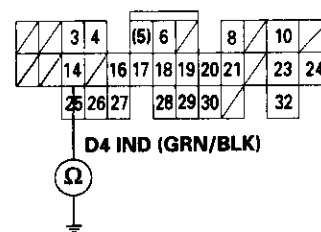
NO

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

**PCM CONNECTORS**

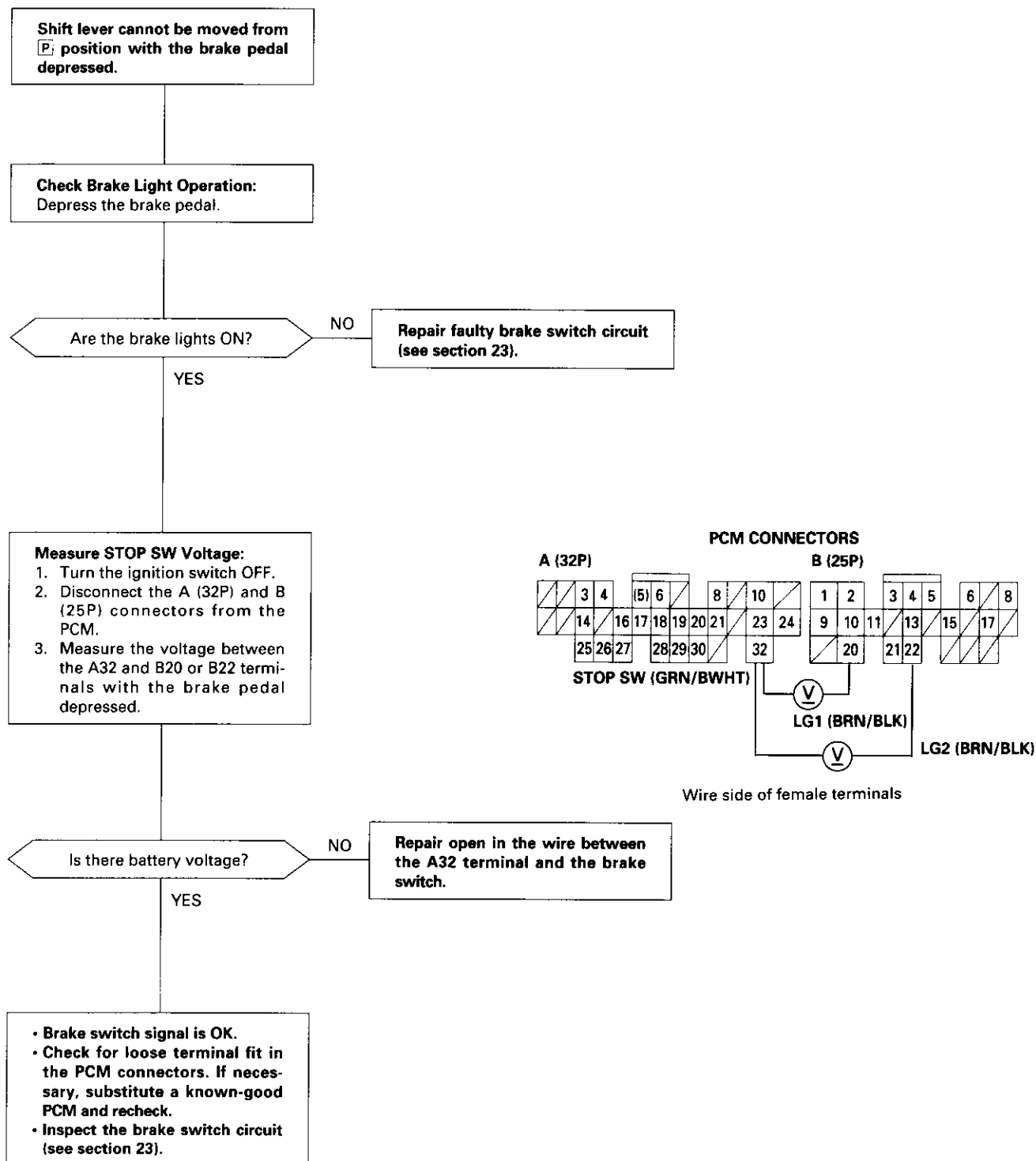


Wire side of female terminals



# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Brake Switch Signal

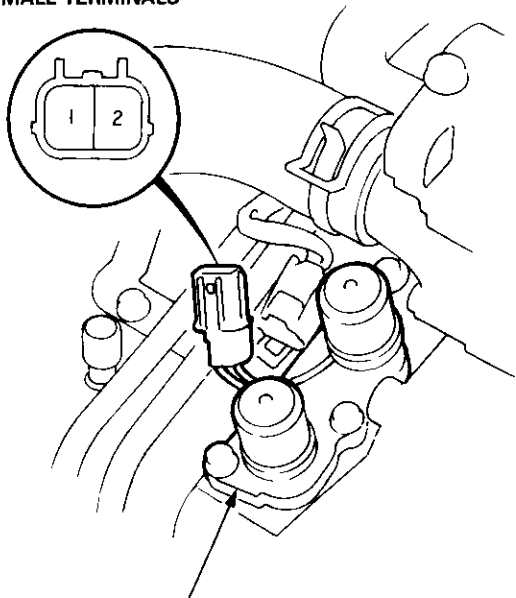




## Test

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

TERMINAL SIDE OF  
MALE TERMINALS



LOCK-UP CONTROL  
SOLENOID VALVE A/B  
ASSEMBLY

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

**STANDARD: 12 – 25  $\Omega$**

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

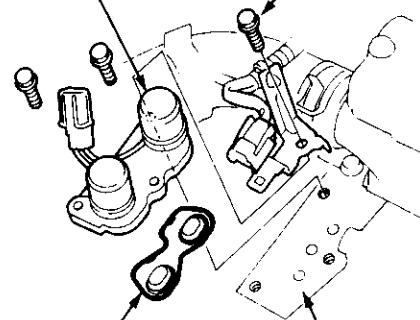
## Replacement

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

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

LOCK-UP CONTROL  
SOLENOID VALVE  
ASSEMBLY

6 x 1.0 mm  
12 N·m (1.2 kgf·m, 8.7 lbf·ft)



FILTER/GASKET  
Replace.

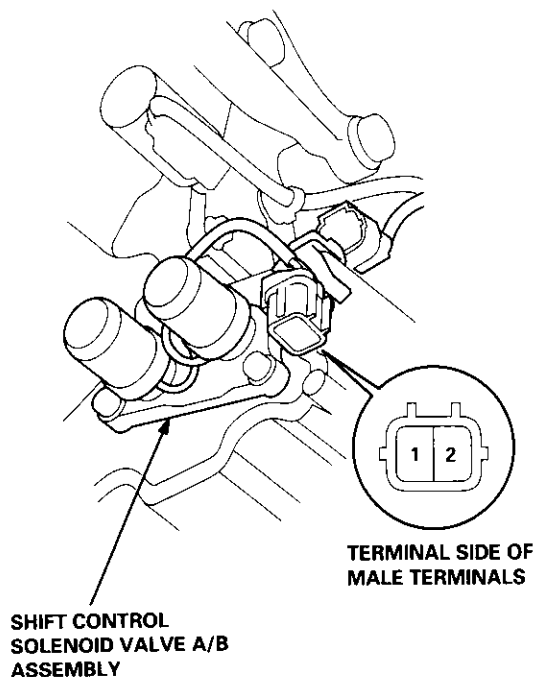
Clean the mounting surface  
and fluid passages.

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

# Shift Control Solenoid Valve A/B Assembly

## Test

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



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

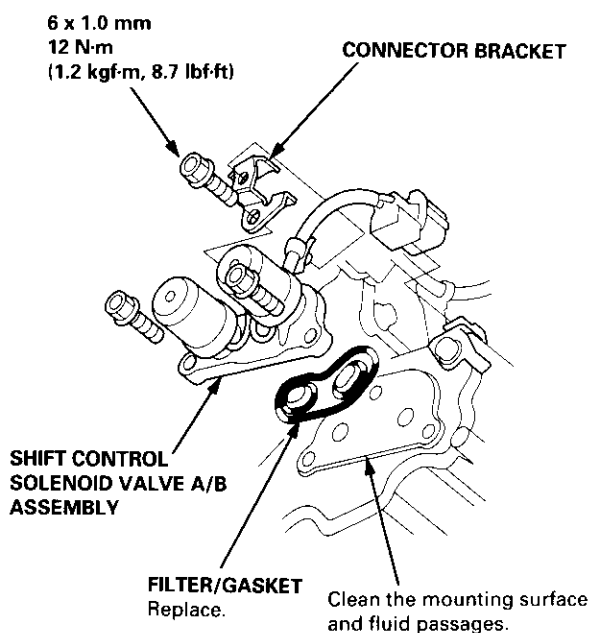
**STANDARD: 12 – 25  $\Omega$**

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

## Replacement

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

1. Remove the mounting bolts and shift control solenoid valve A/B assembly.

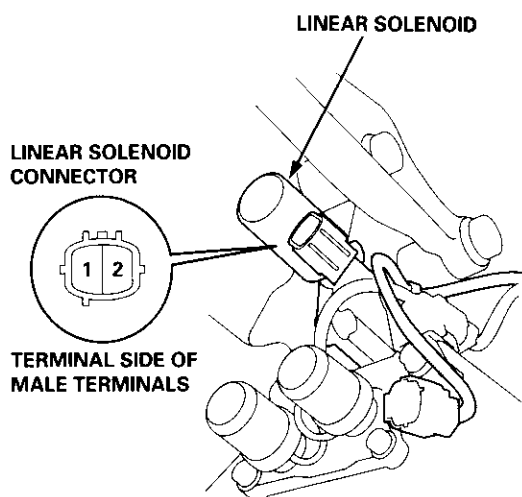


2. Clean the mounting surface and fluid passages of the shift control solenoid valve assembly, and install a new shift control solenoid valve A/B with a new filter/gasket and the clamp bracket.
3. Check the connector for rust, dirt or oil, and reconnect it securely.



## Test

1. Disconnect the linear solenoid connector.



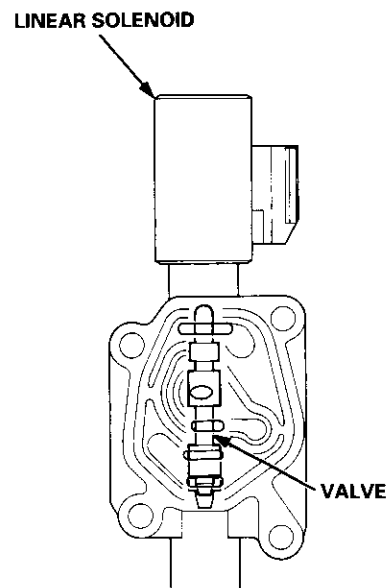
2. Measure the resistance between the No. 1 and the No. 2 terminals of the linear solenoid connector.

**STANDARD:** approx. 5  $\Omega$

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

5. If not, remove the linear solenoid assembly.
6. Check that the linear solenoid fluid passage for dust or dirt.
7. Connect the No. 2 terminal of the linear solenoid connector to the battery positive terminal and connect the No. 1 terminal to the battery negative terminal. Check that the valve moves.
8. Disconnect one of the battery terminals and check that the valve releases.

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



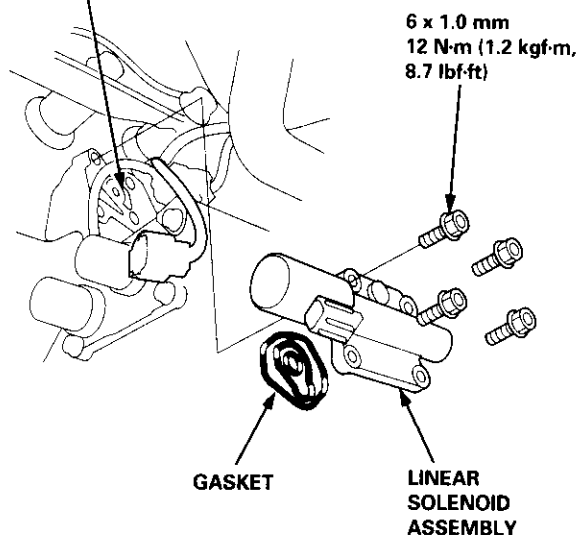
9. If the valve binds, or moves sluggishly, or the linear solenoid does not operate, replace the linear solenoid assembly.



## Replacement

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

Clean the mounting surface and fluid passages.



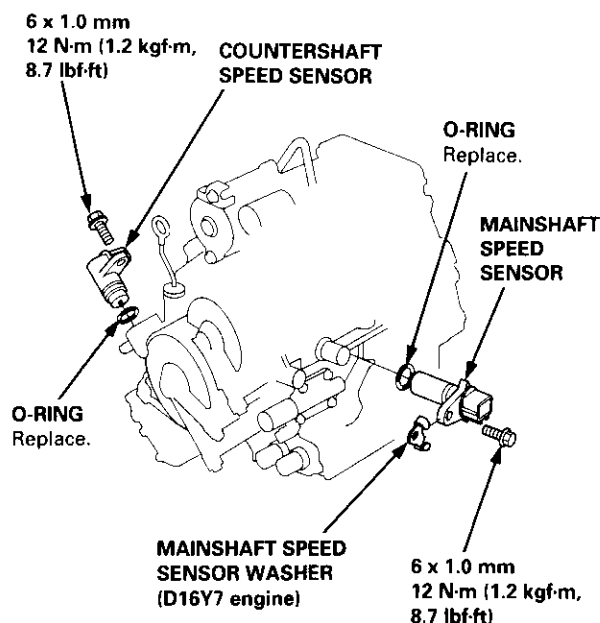
2. Clean the mounting surface and fluid passage of the linear solenoid assembly and transmission housing.
3. Install a new linear solenoid assembly with a new gasket.

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

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

## Replacement

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



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

**NOTE:** Install the mainshaft speed sensor washer on the mainshaft speed sensor. The mainshaft speed sensor washer is used on models with the D16Y7 engine.



# Symptom-to-Component Chart

## Hydraulic System

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

(cont'd)

# Symptom-to-Component Chart

## Hydraulic System (cont'd)

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



The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Vehicle creeps in <b>[N]</b> position.	R1, R2	
Vehicle does not move in <b>[D<sub>3</sub>]</b> or <b>[D<sub>4</sub>]</b> position.	R4	
Transmission locks up in <b>[R]</b> position.	R3, R11	
Excessive drag in transmission.	R6	K, R
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	

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

(cont'd)

# Symptom-to-Component Chart

## Hydraulic System (cont'd)

NOTES	
A.	See flushing procedure, page 14-187 and 188.
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of this manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear, and check the orifice control valves, CPC valve and linear solenoid for free movement.
E.	If the linear solenoid is stuck, inspect the clutches for wear.
G.	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment or main valve body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high-pitched squeak.
L.	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feed pipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably worn.
N.	<ul style="list-style-type: none"> <li>• Replace the mainshaft if the bushing for the 4th feed pipe is loose or damaged. If the 4th feed pipe is damaged or out of round, replace the right side cover.</li> <li>• Replace the mainshaft if the bushing for the 1st feed pipe is loose or damaged. If the 1st feed pipe is damaged or out of round, replace it.</li> </ul>
O.	A worn or damaged sprag clutch is mostly a result of shifting the transmission in <b>D<sub>3</sub></b> or <b>D<sub>4</sub></b> position while the wheels rotate in reverse, such as rocking the vehicle in snow.
P.	Inspect the frame for collision damage.
Q.	<p>Inspect for damage and wear:</p> <ol style="list-style-type: none"> <li>1. Reverse selector gear teeth chamfers.</li> <li>2. Engagement teeth chamfers of countershaft 4th and reverse gear.</li> <li>3. Shift fork for scuff marks in center.</li> <li>4. Differential pinion shaft for wear under pinion gears.</li> <li>5. Bottom of 3rd clutch for swirl marks.</li> </ol> <p>Replace items 1, 2, 3 and 4 if worn or damaged. If transmission makes a clicking, grinding or whirring noise, also replace mainshaft 4th gear, reverse idler gear, and countershaft 4th gear in addition to 1, 2, 3 or 4. If differential pinion shaft is worn, overhaul differential assembly, and replace ATF strainer, and thoroughly clean transmission, flush torque converter, cooler and lines.</p> <p>If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and final driven gear.</p>
R.	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the main valve body. This will result in ATF pump seizure if not detected. Use the proper tools.
S.	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.



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

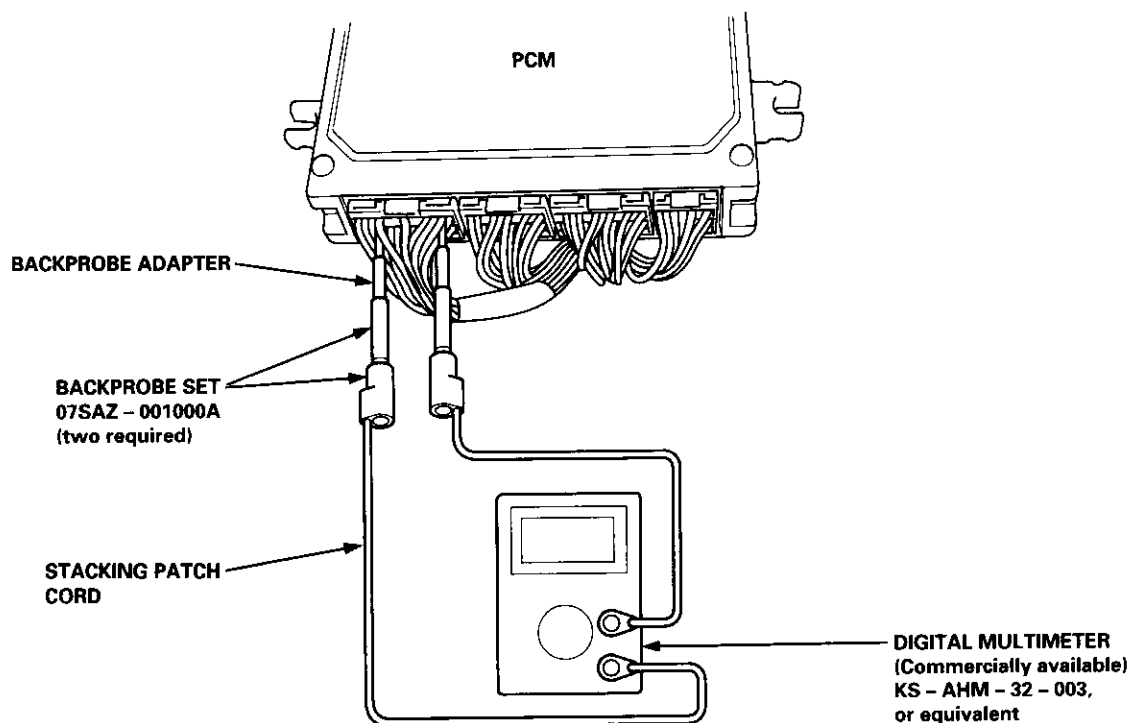
1. Apply parking brake and block the wheels. Start the engine, then shift to **D<sub>4</sub>** position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.
2. Repeat same test in **D<sub>3</sub>** position.
3. Test-drive the vehicle on a flat road in the **D<sub>4</sub>** position. Check that the shift points occur at approximate speeds shown in the table. Also check for abnormal noise and clutch slippage.

NOTE: Throttle position sensor voltage represents the throttle opening.

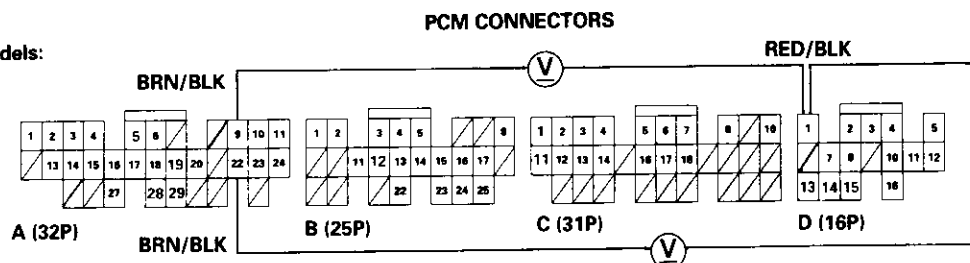
a. Unbolt the PCM for road testing; refer to page 14-50.

b. Set the digital multimeter to check the throttle position sensor voltage between PCM terminals:

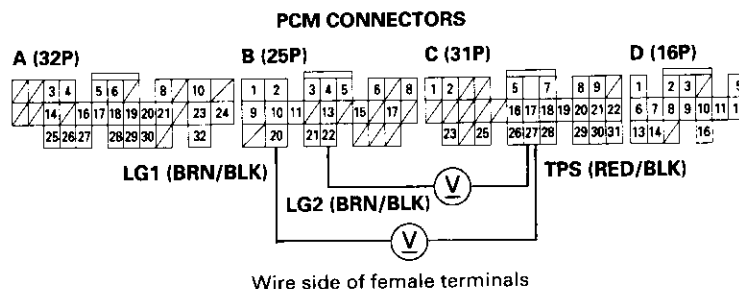
- '96 - 98 models: D1 (+) and A9 (-) or A22 (-).
- '99 - 00 models: C27 (+) and B20 (-) or B22 (-).



'96 - 98 Models:



'99 - 00 Models:



# Road Test

(cont'd)

**D<sub>5</sub> Position: D16Y7 engine**

## • Upshift

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up ON
Throttle position sensor voltage: 0.75 V	mph	9 – 12	20 – 23	28 – 32	21 – 24
	km/h	15 – 19	32 – 37	45 – 52	34 – 39
Throttle position sensor voltage: 2.25 V	mph	21 – 25	40 – 45	59 – 65	62 – 67
	km/h	34 – 40	65 – 73	95 – 104	99 – 108
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	33 – 38	63 – 71	101 – 112	99 – 109
	km/h	53 – 61	102 – 115	163 – 180	159 – 176

## • Downshift

Throttle Opening	Unit of speed	Lock-up OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle Throttle position sensor voltage: 0.5 V	mph	19 – 22	17 – 20	6 – 9 (3rd → 1st)	
	km/h	30 – 35	27 – 32	10 – 15 (3rd → 1st)	
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	95 – 105	85 – 95	54 – 61	25 – 30
	km/h	153 – 169	137 – 153	87 – 98	40 – 48

**D<sub>5</sub> Position: D16Y8 engine**

## • Upshift

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up ON
Throttle position sensor voltage: 0.75 V	mph	9 – 12	20 – 23	28 – 32	21 – 24
	km/h	15 – 19	32 – 37	45 – 52	34 – 39
Throttle position sensor voltage: 2.25 V	mph	21 – 25	40 – 45	59 – 65	62 – 67
	km/h	34 – 40	65 – 73	95 – 104	99 – 108
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	32 – 37	62 – 70	96 – 107	95 – 106
	km/h	52 – 60	100 – 113	155 – 172	153 – 170

## • Downshift

Throttle Opening	Unit of speed	Lock-up OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle Throttle position sensor voltage: 0.5 V	mph	19 – 22	17 – 20	6 – 9 (3rd → 1st)	
	km/h	30 – 35	27 – 32	10 – 15 (3rd → 1st)	
Fully-opened throttle Throttle position sensor voltage: 4.5 V	mph	91 – 101	85 – 95	54 – 61	25 – 30
	km/h	147 – 163	137 – 153	87 – 98	40 – 48

NOTE:

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



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

**CAUTION: Do not shift from **D<sub>4</sub>** or **D<sub>3</sub>** position to **2** position at speeds over 63 mph (100 km/h); you may damage the transmission.**

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

**2** (2nd Gear) Position

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

**R** (Reverse) Position

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

6. Test in **P** (Park) Position

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



# Stall Speed

## Test

### CAUTION:

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

1. Engage the parking brake, and block the front wheels.
2. Connect a tachometer to the engine, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into **[2]** position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow two minutes for cooling, then repeat the test in **[D4]** and **[R]** positions.

### NOTE:

- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in **[D4]**, **[2]** and **[R]** positions.

### Stall Speed RPM:

Specification: 2,700 rpm

Service Limit: 2,550 – 2,850 rpm

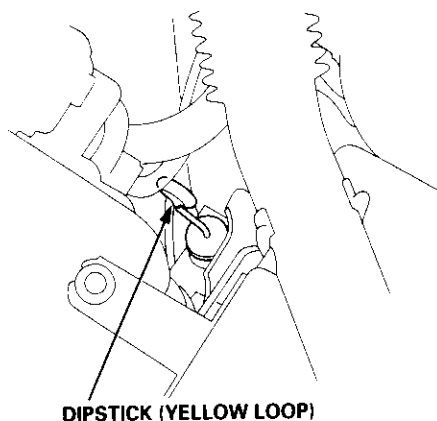
TROUBLE	PROBABLE CAUSE
Stall rpm high in <b>[D4]</b> , <b>[2]</b> and <b>[R]</b> positions	<ul style="list-style-type: none"><li>• Low fluid level or ATF pump output</li><li>• Clogged ATF strainer</li><li>• Pressure regulator valve stuck closed</li><li>• Slipping clutch</li></ul>
Stall rpm high in <b>[R]</b> position	<ul style="list-style-type: none"><li>• Slippage of 4th clutch</li></ul>
Stall rpm high in <b>[2]</b> position	<ul style="list-style-type: none"><li>• Slippage of 2nd clutch</li></ul>
Stall rpm high in <b>[D4]</b> position	<ul style="list-style-type: none"><li>• Slippage of 1st clutch or 1st gear one-way clutch</li></ul>
Stall rpm low in <b>[D4]</b> , <b>[2]</b> and <b>[R]</b> positions	<ul style="list-style-type: none"><li>• Engine output low</li><li>• Torque converter one-way clutch slipping</li></ul>



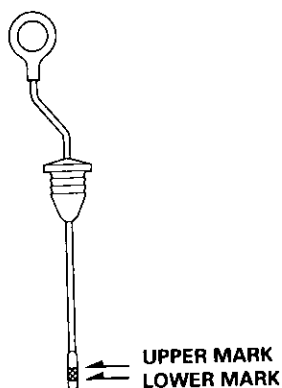
## Checking

NOTE: Keep all foreign particles out of the transmission.

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Park the vehicle on the level ground, then turn off the engine.
3. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.
4. Insert the dipstick into the transmission.

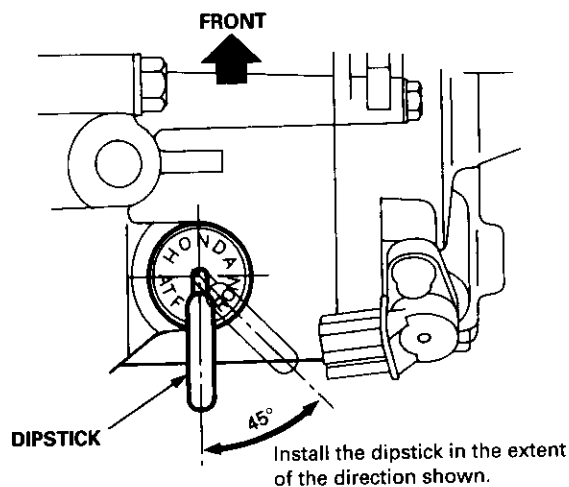


5. Remove the dipstick and check the fluid level. It should be between the upper mark and lower marks.



6. If the level is below the lower mark, pour the recommended fluid into the filler hole to bring it to the upper mark. Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

7. Insert the dipstick back into the transmission in the direction shown.



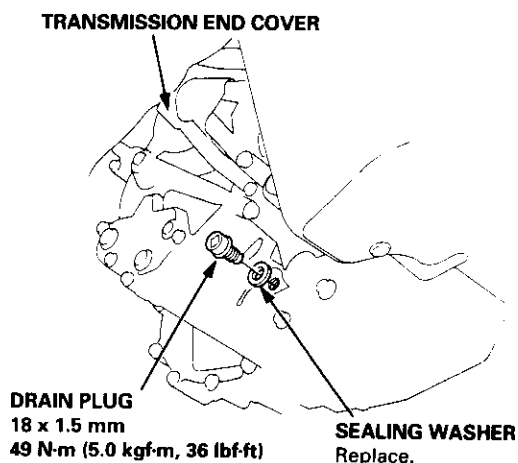
# Fluid Level

## Changing

NOTE: Keep all foreign particles out of the transmission.

1. Bring the transmission up to operating temperature (the radiator fan comes on) by driving the vehicle.
2. Park the vehicle on the level ground, and turn the engine off.
3. Remove the drain plug, and drain the automatic transmission fluid (ATF).

NOTE: If a cooler flusher is to be used, see page 14-187 and 14-188.



4. Reinstall the drain plug with a new sealing washer, then refill the transmission with the recommended fluid into the filler hole to the upper mark on the dipstick. Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

### Automatic Transmission Fluid Capacity:

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

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

# Pressure Testing



## ⚠ WARNING

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

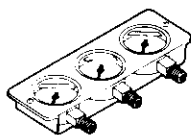
## CAUTION:

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

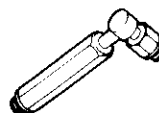
1. Raise the vehicle (see section 1).
2. Warm up the engine, then stop the engine and connect a tachometer.
3. Connect the oil pressure gauges to each inspection hole.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

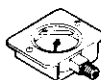
**CAUTION:** Connect the oil pressure gauges securely; be sure not to allow dust and other foreign particles to enter the inspection holes.



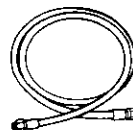
**A/T OIL PRESSURE GAUGE  
SET W/PANEL  
07406 - 0020400**



**A/T OIL PRESSURE HOSE  
ADAPTER  
07MAJ - PY40120  
(4 required)**



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



**A/T OIL PRESSURE HOSE  
2210 mm  
07MAJ - PY4011A  
(4 required)**

4. Start the engine, and measure the respective pressure as follows.
  - Line Pressure
  - 1st Clutch Pressure
  - 2nd, 3rd and 4th Clutch Pressure
5. Install a new washer and the sealing bolt in the inspection hole, and tighten to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

**NOTE:** Do not reuse old sealing washers; always replace washers.

(cont'd)

# Pressure Testing

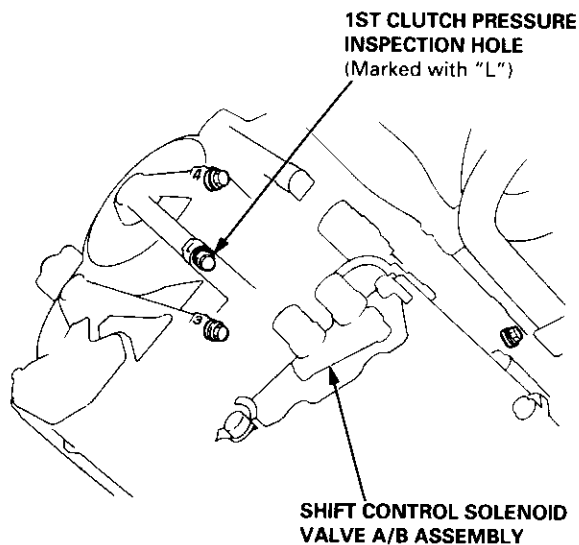
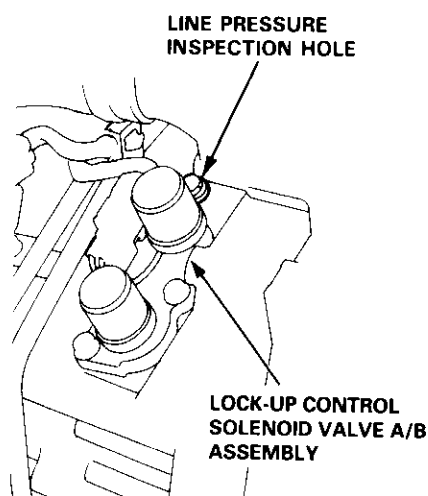
(cont'd)

## Line Pressure/1st Clutch Pressure Measurement

1. Set the parking brake, and block both rear wheels securely.
2. Start the engine, and run it at 2,000 rpm.
3. Shift to **[N]** or **[P]** position, then measure line pressure.

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

4. Shift to **[D<sub>4</sub>]** position, hold the engine at 2,000 rpm, and measure 1st clutch pressure.

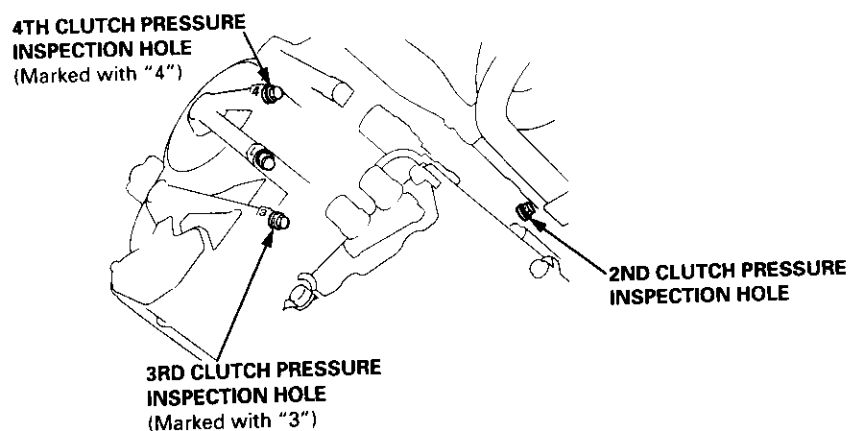


PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	<b>[N]</b> or <b>[P]</b>	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	830 – 880 kPa (8.5 – 9.0 kgf/cm <sup>2</sup> , 120 – 130 psi)	780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi)
1st Clutch	<b>[D<sub>4</sub>]</b>	No or low 1st pressure	1st Clutch		



## 2nd, 3rd and 4th Clutch Pressure Measurement

1. Set the parking brake, and block both rear wheels securely.
2. Start the engine, and run it the engine at 2,000 rpm.
3. Shift to **[2]** position, then measure 2nd clutch pressure.
4. Shift to **[D<sub>3</sub>]** position, then measure 3rd clutch pressure.
5. Shift to **[D<sub>4</sub>]** position, then measure 4th clutch pressure.
6. Shift to **[R]** position, then measure 4th clutch pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	<b>[2]</b>	No or low 2nd pressure	2nd Clutch	800 – 850 kPa (8.2 – 8.7 kgf/cm <sup>2</sup> , 120 – 120 psi)	760 kPa (7.7 kgf/cm <sup>2</sup> , 110 psi)
3rd Clutch	<b>[D<sub>3</sub>]</b>	No or low 3rd pressure	3rd Clutch	810 – 860 kPa (8.3 – 8.8 kgf/cm <sup>2</sup> , 120 – 130 psi)	760 kPa (7.8 kgf/cm <sup>2</sup> , 110 psi)
4th Clutch	<b>[D<sub>4</sub>]</b> <b>[R]</b>	No or low 4th pressure	4th Clutch Servo Valve or 4th Clutch		

# Transmission

## Removal

### ⚠ WARNING

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

**CAUTION:** Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (–) terminal from the battery, then remove the positive (+) terminal.
2. Remove the intake air duct.

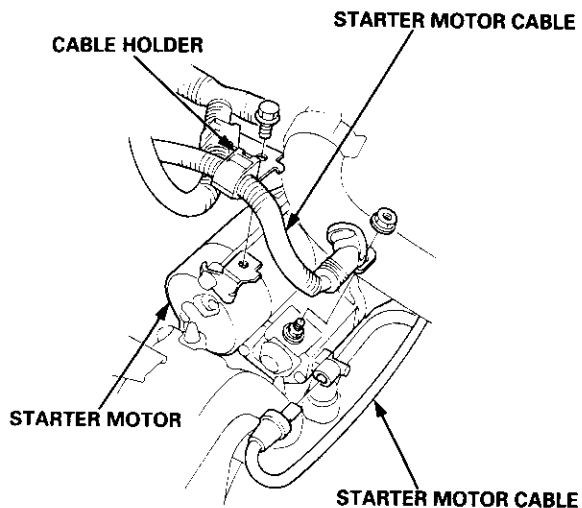
#### **D16Y7 engine:**

Remove the intake air duct and resonator.

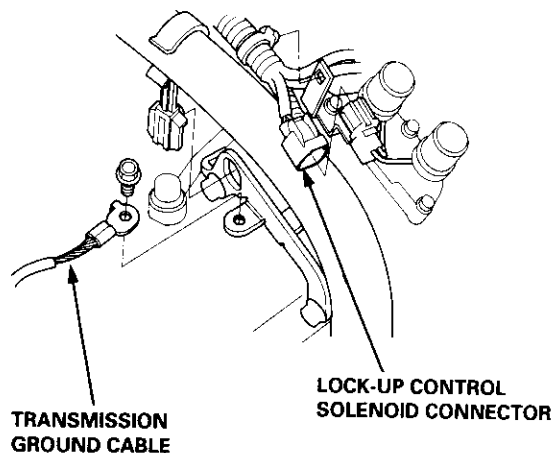
#### **D16Y8 engine:**

Remove the intake air duct and the air cleaner housing assembly.

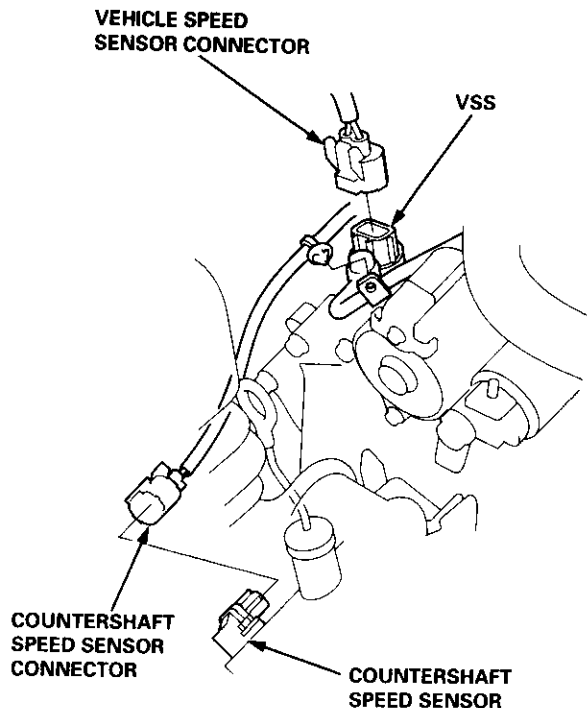
3. Remove the starter cables and cable holder from the starter motor.



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



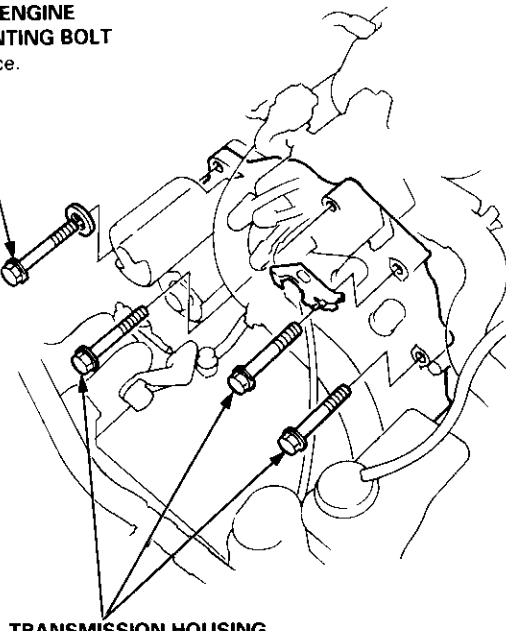
5. Disconnect the vehicle speed sensor (VSS) connector and the countershaft speed sensor connector.





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

**REAR ENGINE  
MOUNTING BOLT**  
Replace.

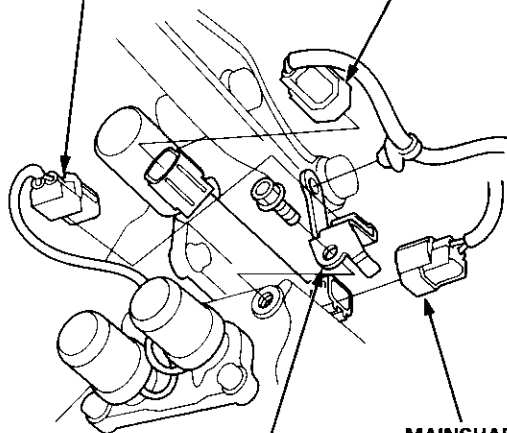


**TRANSMISSION HOUSING  
MOUNTING BOLTS**

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

**SHIFT CONTROL  
SOLENOID CONNECTOR**

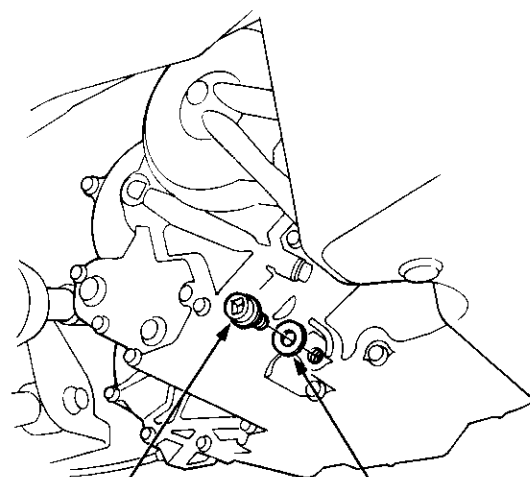
**LINEAR SOLENOID  
CONNECTOR**



**CONNECTOR  
BRACKET**

**MAINSHAFT  
SPEED SENSOR  
CONNECTOR**

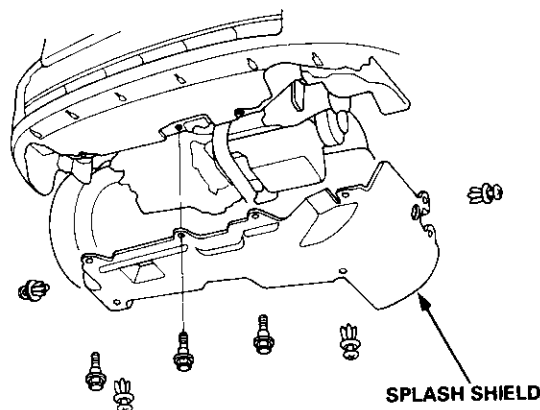
8. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



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

**SEALING WASHER**  
Replace.

9. Remove the splash shield.



**SPLASH SHIELD**

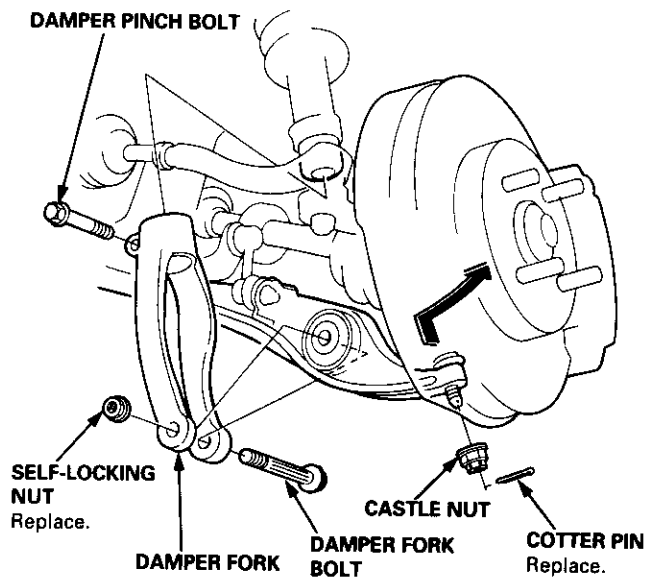
(cont'd)



# Transmission

## Removal (cont'd)

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

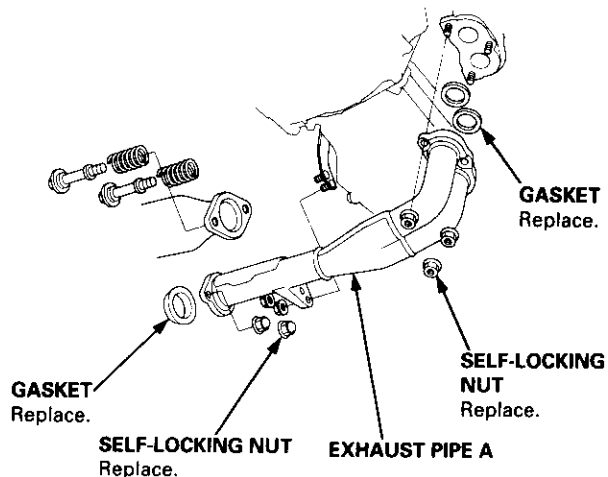


11. Remove the right damper fork bolt, then separate right damper fork and damper.
12. Pry the right and left driveshafts out of the differential.
13. Pull on the inboard joint to remove the right and left driveshafts (see section 16).
14. Tie plastic bags over the driveshaft ends.

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

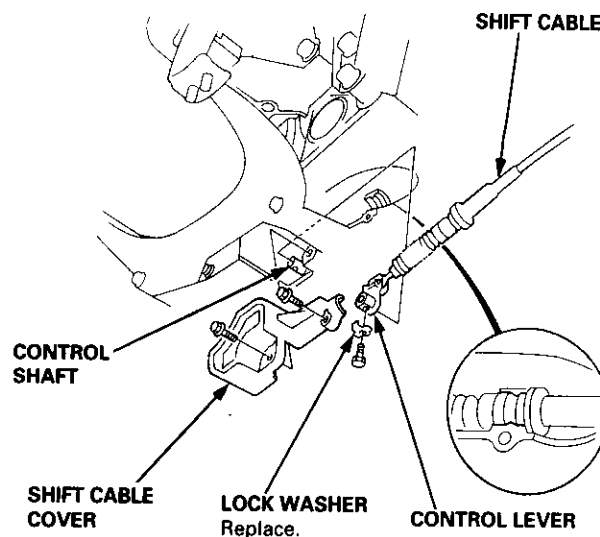
15. Remove the exhaust pipe A.

NOTE: D16Y8 engine is shown; D16Y7 engine is similar.



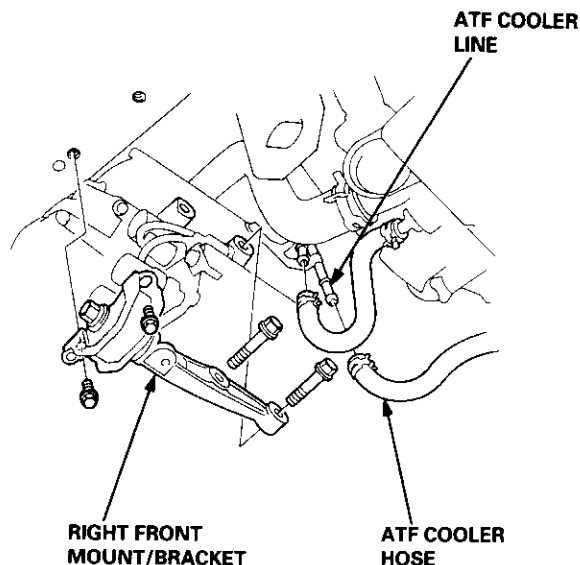
16. Remove the shift cable cover, then remove the shift cable by removing the control lever.

CAUTION: Take care not to bend the shift cable.



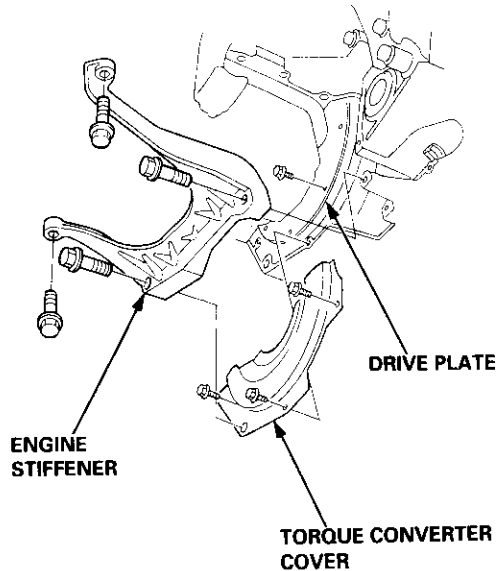
17. Remove the right front mount/bracket.
18. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler hoses and lines.

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

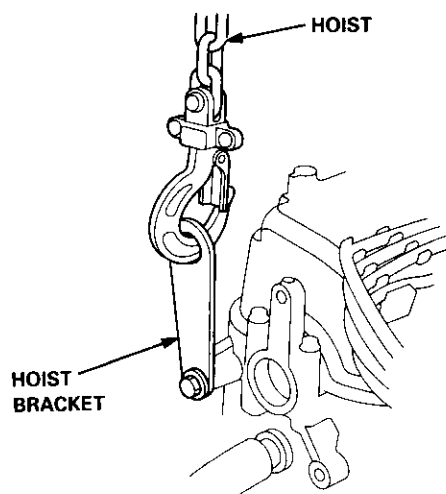




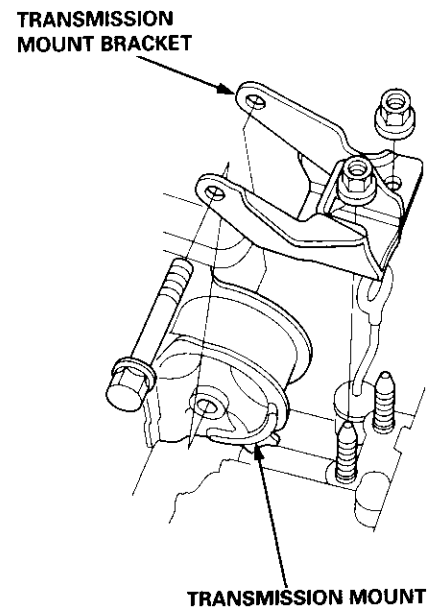
19. Remove the engine stiffener and the torque converter cover.



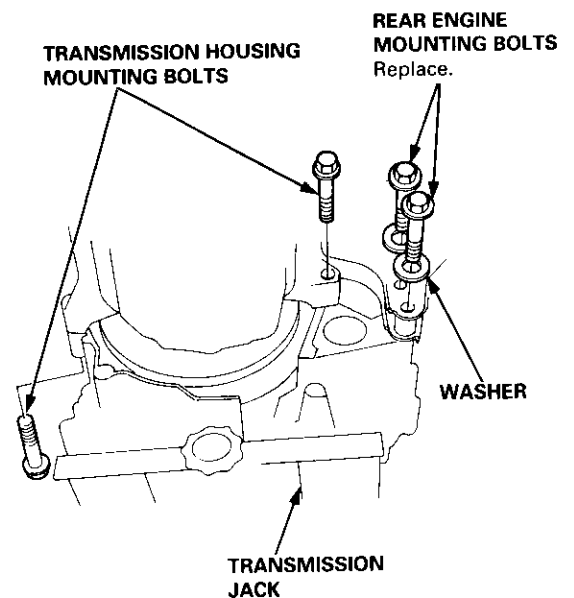
20. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.
21. Remove the distributor.
22. Attach a hoisting bracket to the engine, then lift the engine slightly.



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



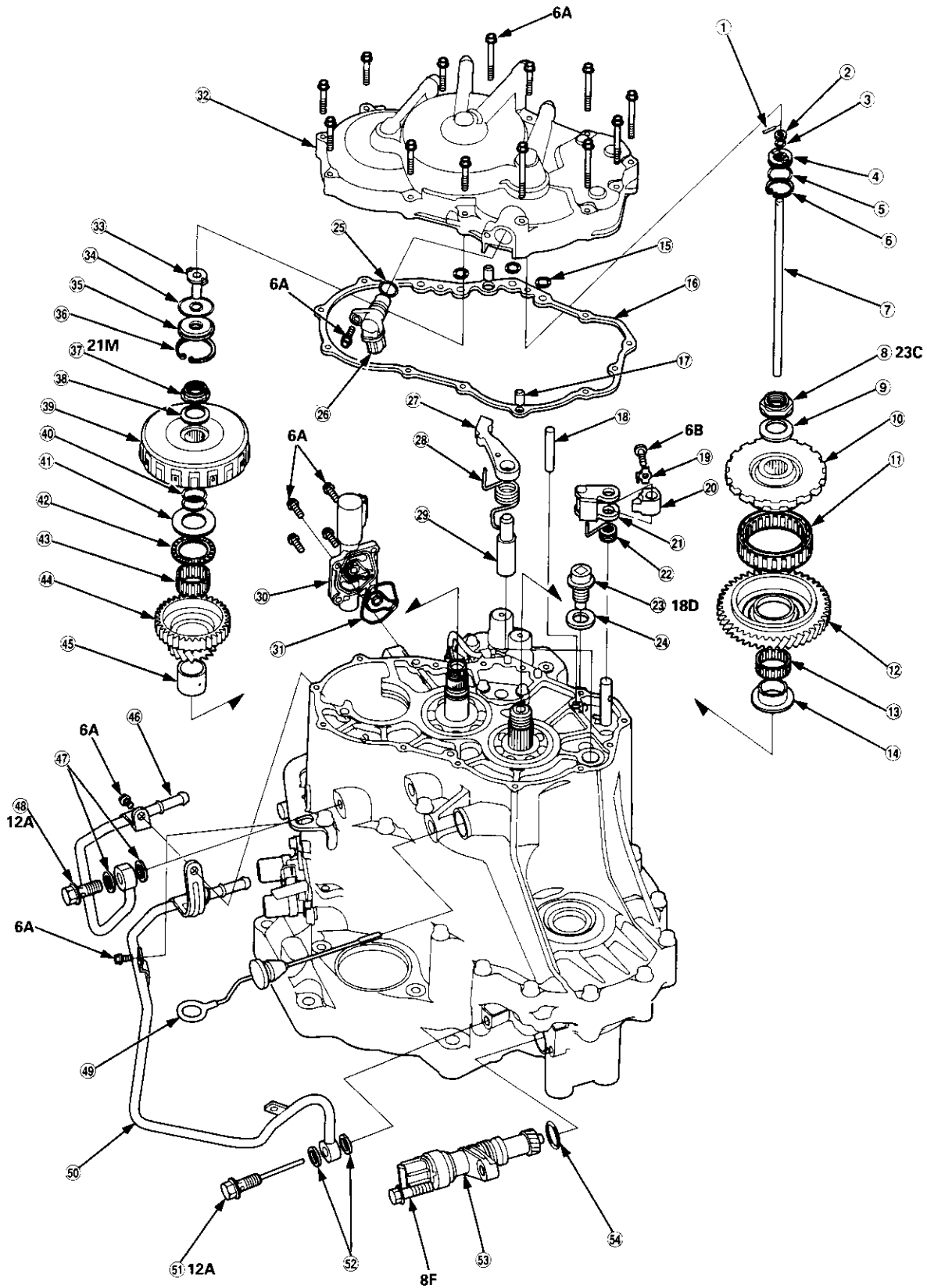
24. Remove the transmission housing mounting bolts and the rear engine mounting bolts.
25. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.



26. If necessary, remove the torque converter and the starter motor.

# Illustrated Index

## Transmission/End Cover





- ① ROLLER
- ② COLLAR
- ③ O-RING Replace.
- ④ FEED PIPE FLANGE
- ⑤ O-RING Replace.
- ⑥ SNAP RING
- ⑦ 3RD CLUTCH FEED PIPE
- ⑧ COUNTERSHAFT LOCKNUT (FLANGE NUT)  
23 x 1.25 mm Replace.
- ⑨ CONICAL SPRING WASHER Replace.
- ⑩ PARK GEAR
- ⑪ ONE-WAY CLUTCH
- ⑫ COUNTERSHAFT 1ST GEAR
- ⑬ NEEDLE BEARING
- ⑭ COUNTERSHAFT 1ST GEAR COLLAR
- ⑮ O-RINGS Replace.
- ⑯ END COVER GASKET Replace.
- ⑰ DOWEL PINS
- ⑱ PARK PAWL STOP
- ⑲ LOCK WASHER Replace.
- ⑳ PARK STOP Selective part
- ㉑ PARK LEVER
- ㉒ PARK LEVER SPRING
- ㉓ DRAIN PLUG
- ㉔ SEALING WASHER Replace.
- ㉕ O-RING Replace.
- ㉖ COUNTERSHAFT SPEED SENSOR
- ㉗ PARK PAWL
- ㉘ PARK PAWL SPRING
- ㉙ PARK PAWL SHAFT
- ㉚ LINEAR SOLENOID ASSEMBLY
- ㉛ LINEAR SOLENOID GASKET Replace.

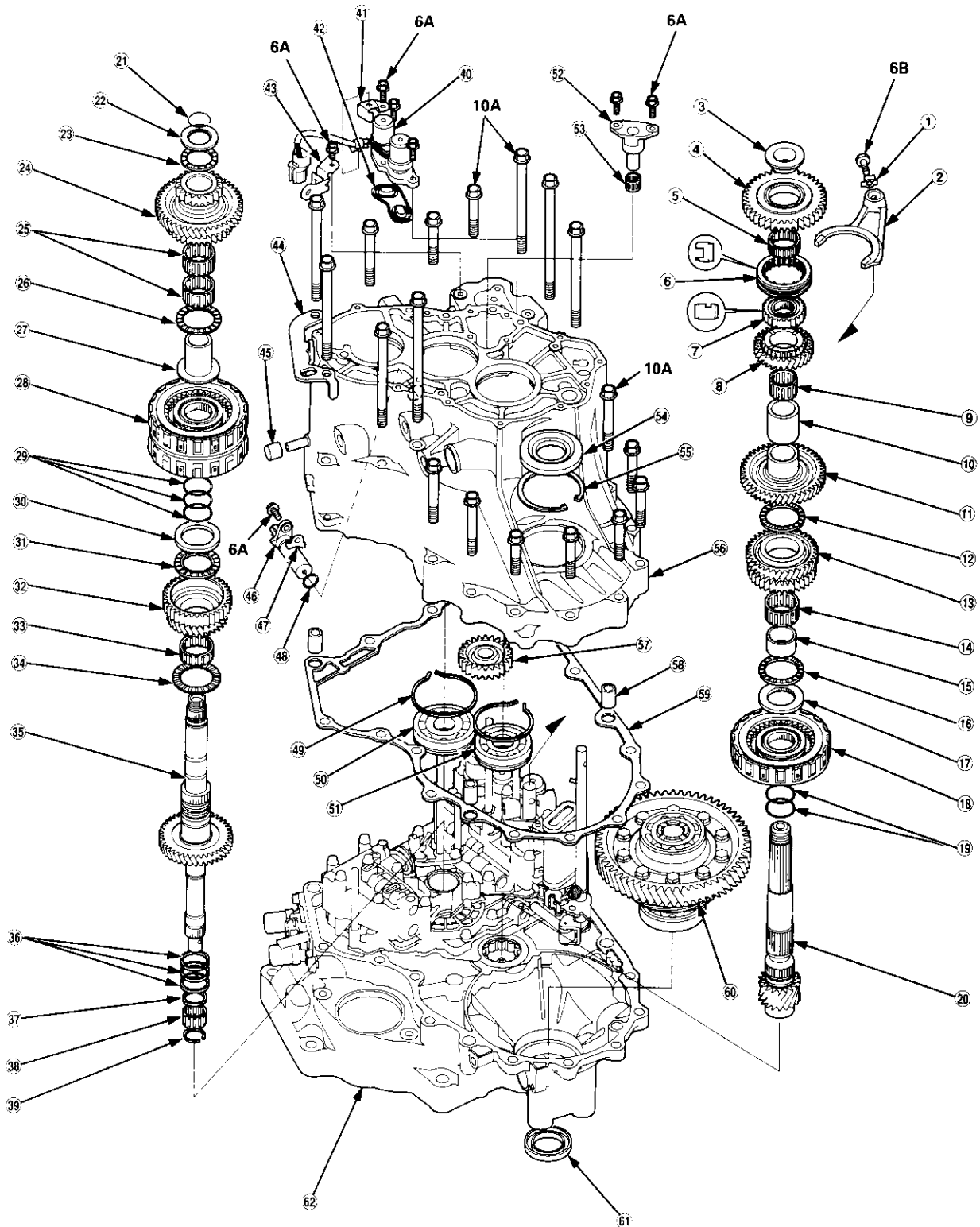
- ㉜ END COVER
- ㉝ 1ST CLUTCH FEED PIPE
- ㉞ O-RINGS Replace.
- ㉟ FEED PIPE FLANGE
- ㊱ SNAP RING
- ㊲ MAINSHAFT LOCKNUT (FLANGE NUT) 21 x 1.25 mm  
Replace.
- ㊳ CONICAL SPRING WASHER Replace.
- ㊴ 1ST CLUTCH ASSEMBLY
- ㊵ O-RINGS Replace.
- ㊶ THRUST WASHER
- ㊷ THRUST NEEDLE BEARING
- ㊸ NEEDLE BEARING
- ㊹ MAINSHAFT 1ST GEAR
- ㊺ MAINSHAFT 1ST GEAR COLLAR
- ㊻ ATF COOLER LINE
- ㊼ SEALING WASHERS Replace.
- ㊽ LINE BOLT
- ㊾ ATF DIPSTICK
- ㊿ ATF COOLER LINE
- ① LINE BOLT
- ② SEALING WASHERS Replace.
- ③ VEHICLE SPEED SENSOR
- ④ O-RING Replace.

#### TORQUE SPECIFICATIONS

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

# Illustrated Index

## Transmission Housing





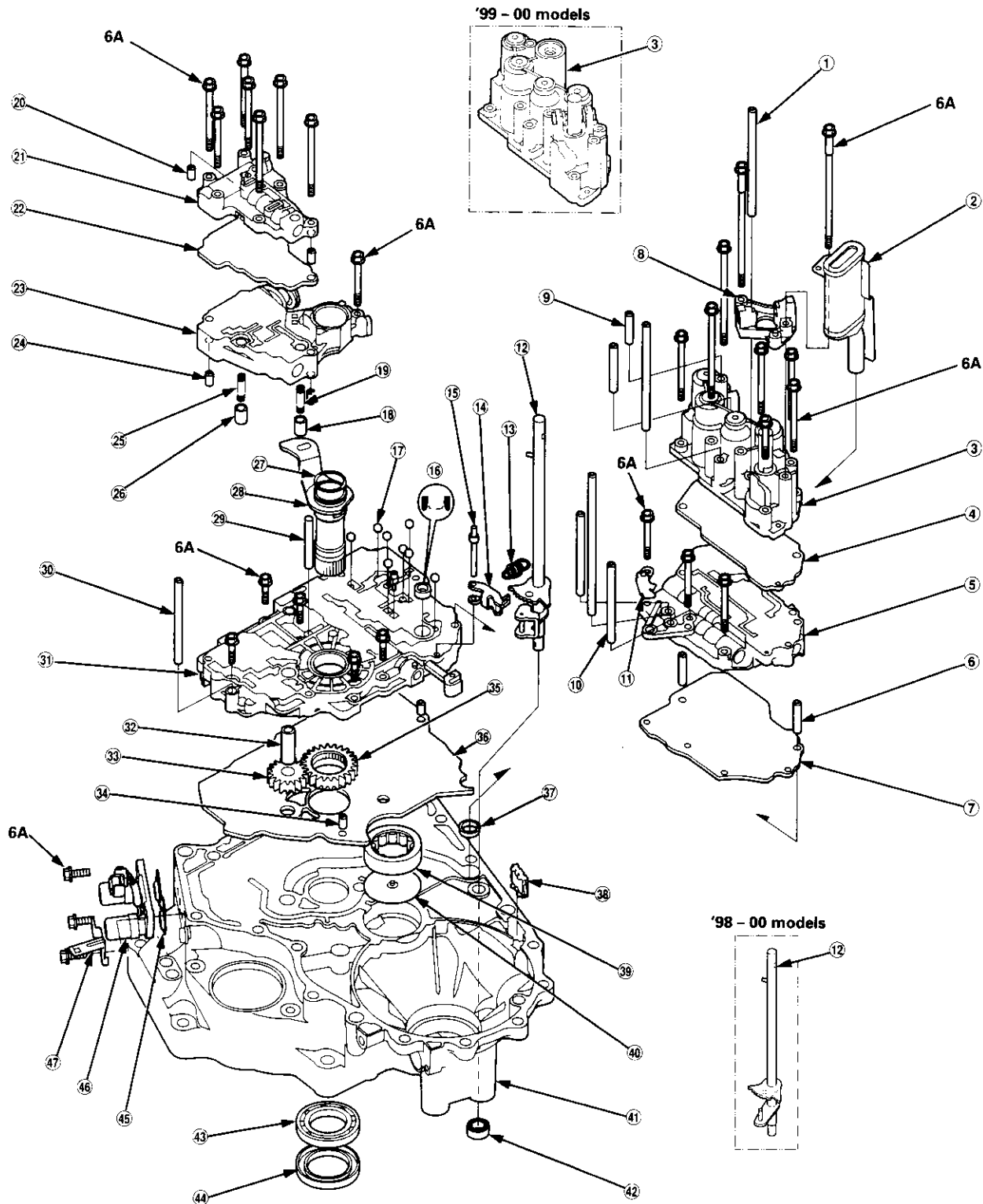
- ① LOCK WASHER Replace.
- ② REVERSE SHIFT FORK
- ③ COUNTERSHAFT REVERSE GEAR COLLAR
- ④ COUNTERSHAFT REVERSE GEAR
- ⑤ NEEDLE BEARING
- ⑥ REVERSE SELECTOR
- ⑦ REVERSE SELECTOR HUB
- ⑧ COUNTERSHAFT 4TH GEAR
- ⑨ NEEDLE BEARING
- ⑩ DISTANCE COLLAR, 28 mm Selective part
- ⑪ COUNTERSHAFT 2ND GEAR
- ⑫ THRUST NEEDLE BEARING
- ⑬ COUNTERSHAFT 3RD GEAR
- ⑭ NEEDLE BEARING
- ⑮ COUNTERSHAFT 3RD GEAR COLLAR
- ⑯ THRUST NEEDLE BEARING
- ⑰ SPLINED WASHER
- ⑱ 3RD CLUTCH ASSEMBLY
- ⑲ O-RINGS Replace.
- ⑳ COUNTERSHAFT
- ㉑ SNAP RING
- ㉒ THRUST WASHER
- ㉓ THRUST NEEDLE BEARING
- ㉔ MAINSHAFT 4TH GEAR/REVERSE GEAR
- ㉕ NEEDLE BEARINGS
- ㉖ THRUST NEEDLE BEARING
- ㉗ MAINSHAFT 4TH GEAR COLLAR
- ㉘ 2ND/4TH CLUTCH ASSEMBLY
- ㉙ O-RINGS Replace.
- ㉚ THRUST WASHER, 36.5 x 55 mm Selective part
- ㉛ THRUST NEEDLE BEARING
- ㉜ MAINSHAFT 2ND GEAR
- ㉝ NEEDLE BEARING
- ㉞ THRUST NEEDLE BEARING
- ㉟ MAINSHAFT
- ㊱ SEALING RINGS, 35 mm
- ㊲ SEALING RING, 29 mm
- ㊳ NEEDLE BEARING
- ㊴ SET RING
- ㊵ SHIFT CONTROL SOLENOID VALVE A/B ASSEMBLY
- ㊶ HARNESS CLAMP BRACKET
- ㊷ SHIFT CONTROL SOLENOID FILTER/GASKET Replace.
- ㊸ CONNECTOR BRACKET
- ㊹ TRANSMISSION HANGER
- ㊺ BREATHER CAP
- ㊻ MAINSHAFT SPEED SENSOR
- ㊼ MAINSHAFT SPEED SENSOR WASHER (D16Y7 engine)
- ㊽ O-RING Replace.
- ㊾ SNAP RING
- ㊿ MAINSHAFT TRANSMISSION HOUSING BEARING
- 1 ㊿ COUNTERSHAFT TRANSMISSION HOUSING BEARING
- 2 REVERSE IDLER GEAR SHAFT HOLDER ASSEMBLY
- 3 NEEDLE BEARING
- 4 OIL SEAL Replace.
- 5 SET RING, 80 mm Selective part
- 6 TRANSMISSION HOUSING
- 7 REVERSE IDLER GEAR
- 8 DOWEL PINS
- 9 TRANSMISSION HOUSING GASKET Replace.
- 0 DIFFERENTIAL ASSEMBLY
- 1 OIL SEAL Replace.
- 2 TORQUE CONVERTER HOUSING

#### TORQUE SPECIFICATIONS

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

# Illustrated Index

## Torque Converter Housing/Valve Body





- ① ATF FEED PIPE
- ② ATF STRAINER
- ③ SERVO BODY  
'99 - 00 models servo body has integrally molded servo detent.
- ④ SERVO SEPARATOR PLATE
- ⑤ SECONDARY VALVE BODY
- ⑥ DOWEL PINS
- ⑦ SECONDARY SEPARATOR PLATE
- ⑧ SERVO DETENT BASE ('96 - '98 models)
- ⑨ ATF FEED PIPES
- ⑩ ATF FEED PIPES
- ⑪ SHAFT STOP
- ⑫ CONTROL SHAFT
- ⑬ DETENT ARM SPRING
- ⑭ DETENT ARM
- ⑮ DETENT ARM SHAFT
- ⑯ FILTER Replace.
- ⑰ CHECK BALLS
- ⑱ TORQUE CONVERTER CHECK VALVE
- ⑲ TORQUE CONVERTER CHECK VALVE SPRING
- ⑳ DOWEL PINS
- ㉑ LOCK-UP VALVE BODY
- ㉒ LOCK-UP SEPARATOR PLATE
- ㉓ REGULATOR VALVE BODY
- ㉔ DOWEL PINS
- ㉕ COOLER RELIEF VALVE SPRING
- ㉖ COOLER RELIEF VALVE
- ㉗ O-RING Replace.
- ㉘ STATOR SHAFT
- ㉙ STOP SHAFT
- ㉚ ATF FEED PIPE
- ㉛ MAIN VALVE BODY
- ㉜ ATF PUMP DRIVEN GEAR SHAFT
- ㉝ ATF PUMP DRIVEN GEAR
- ㉞ DOWEL PINS
- ㉟ ATF PUMP DRIVE GEAR
- ㊱ MAIN SEPARATOR PLATE
- ㊲ SUCTION PIPE COLLAR
- ㊳ ATF MAGNET
- ㊴ COUNTERSHAFT TORQUE CONVERTER HOUSING BEARING
- ㊵ ATF GUIDE PLATE
- ㊶ TORQUE CONVERTER HOUSING
- ㊷ OIL SEAL Replace.
- ㊸ MAINSHAFT TORQUE CONVERTER HOUSING BEARING
- ㊹ OIL SEAL Replace.
- ㊺ LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
- ㊻ LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY
- ㊼ CONNECTOR BRACKET

#### TORQUE SPECIFICATIONS

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

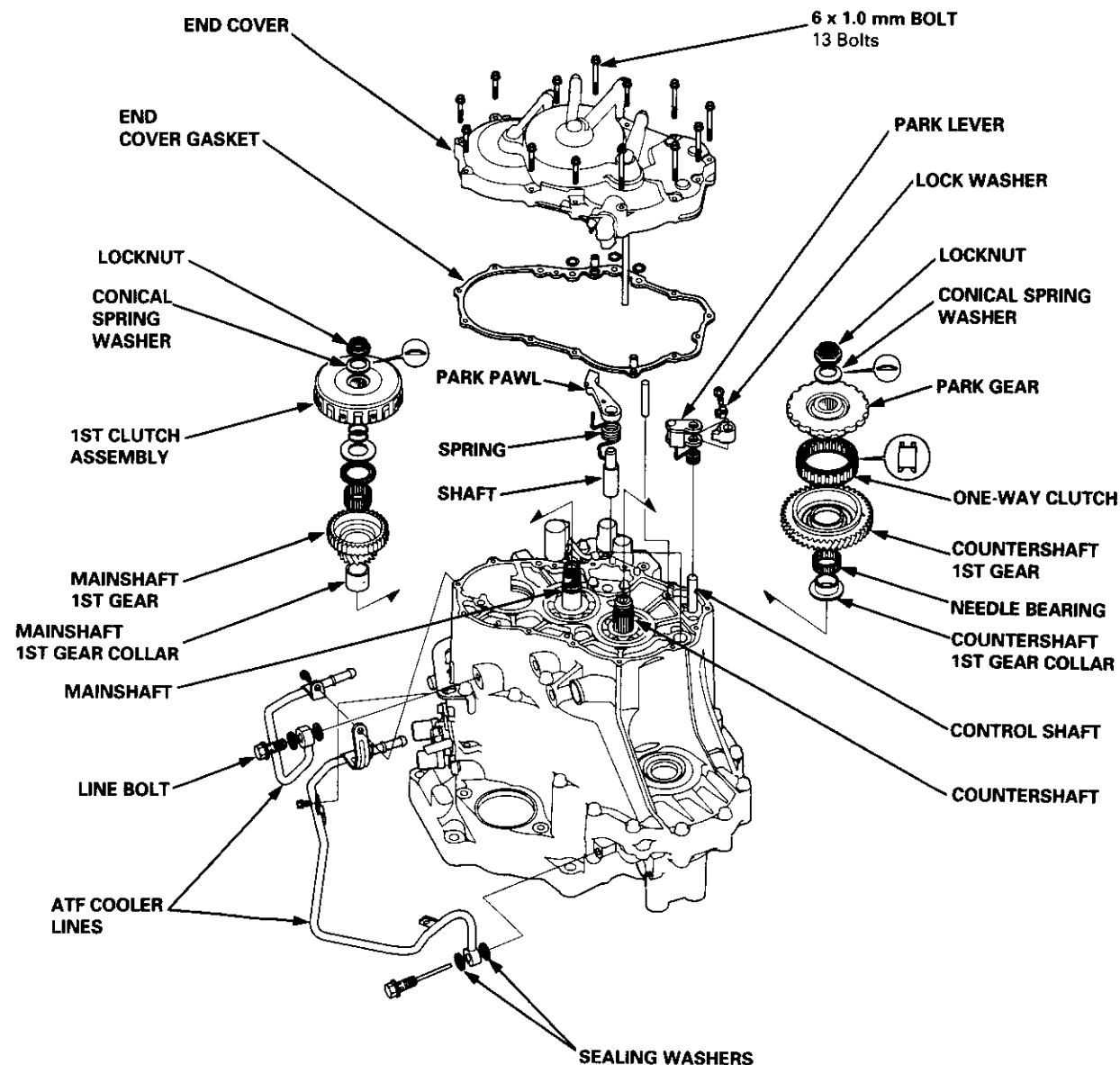


# End Cover

## Removal

### NOTE:

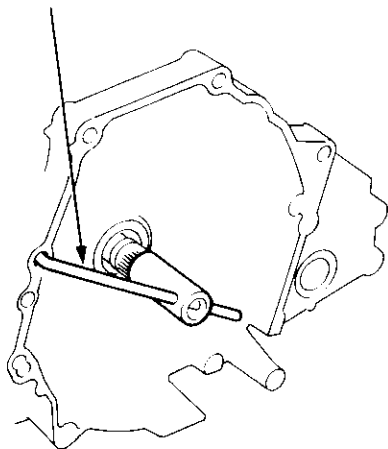
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the right side cover, replace the following:
  - O-rings
  - Mainshaft and countershaft locknuts
  - Conical spring washers
  - End cover gasket
  - Lock washer
  - Sealing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





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

**MAINSHAFT HOLDER**  
07GAB - PF50101

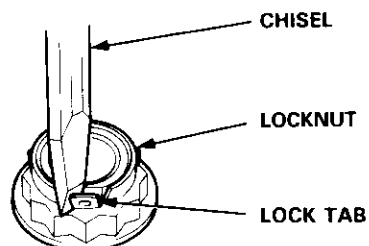


3. Engage the park pawl with the park gear.
4. Cut the lock tabs of the mainshaft and countershaft locknuts using a chisel as shown, then remove the locknuts and conical spring washers.

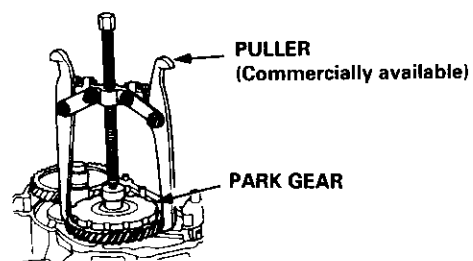
**CAUTION:** Keep all of the chiseled particles out of the transmission.

**NOTE:**

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



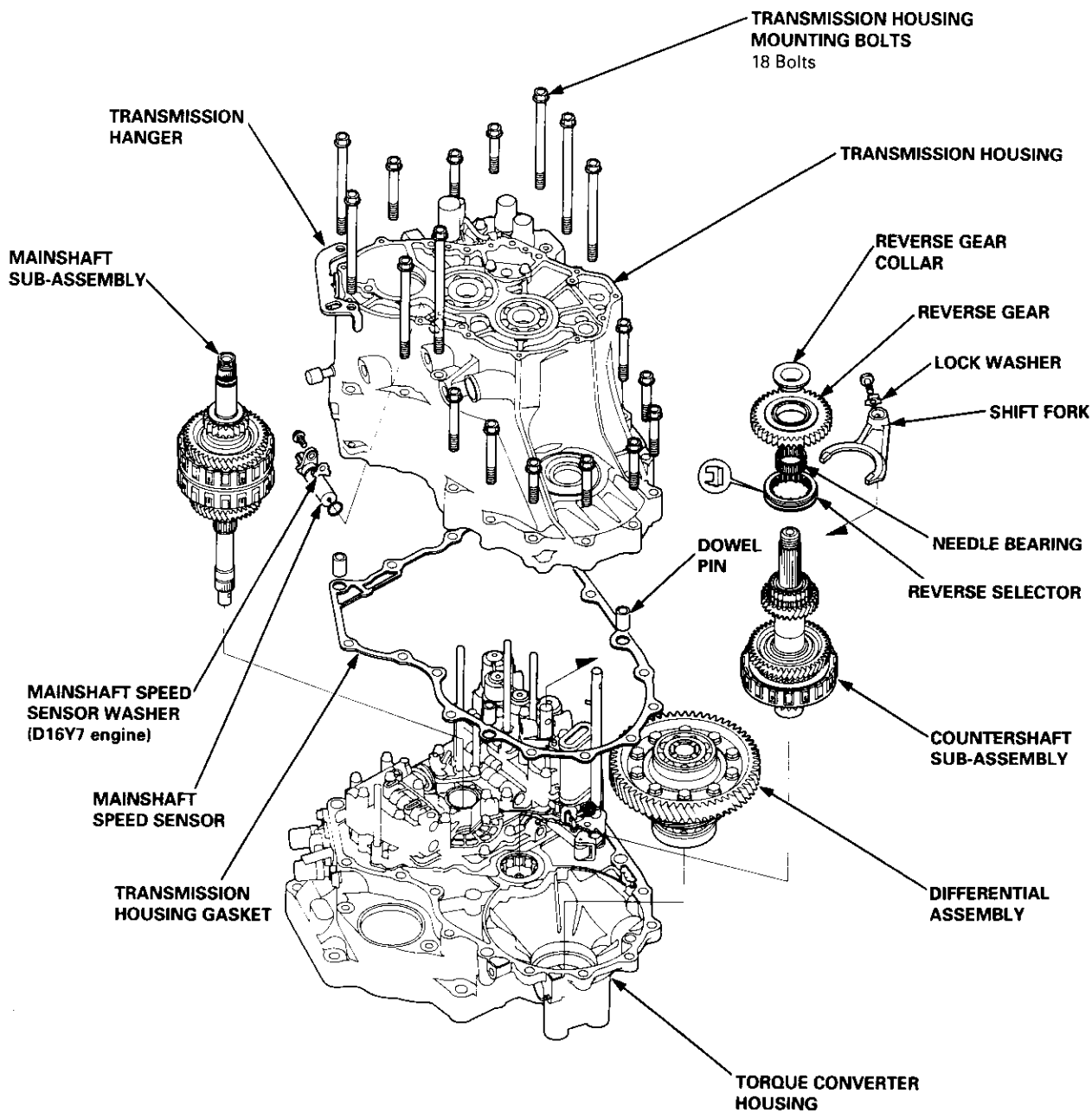
5. Remove the special tool from the mainshaft after removing the locknuts.
6. Remove the 1st clutch and mainshaft 1st gear assembly and mainshaft 1st gear collar from the mainshaft.
7. Remove the park pawl, spring and shaft.
8. Remove the park lever from the control shaft.
9. Using a universal two-jaw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



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

# Transmission Housing

## Removal

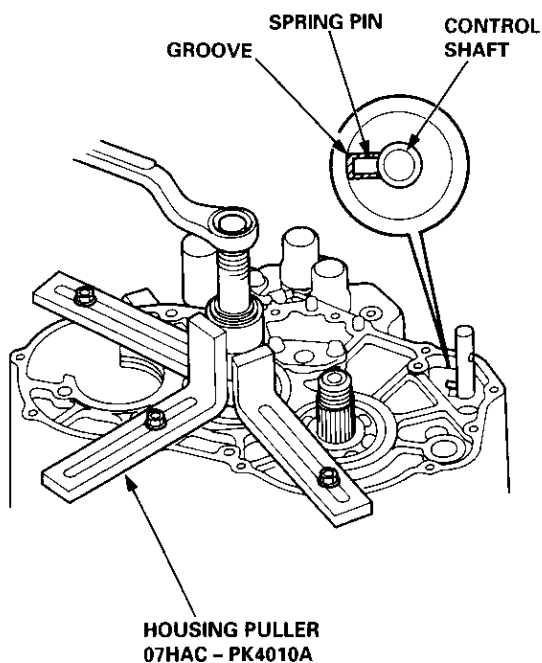




**NOTE:**

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

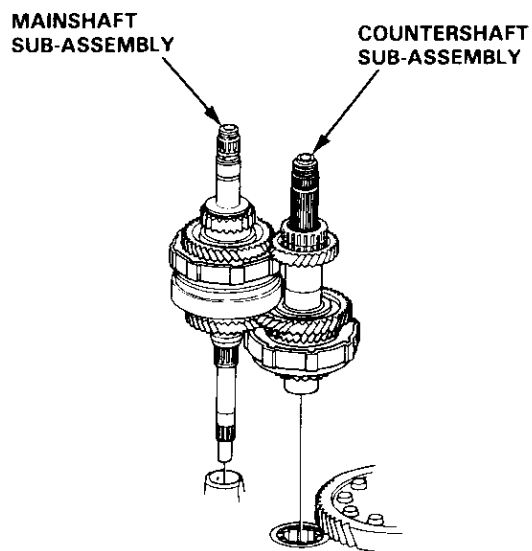
1. Remove the mainshaft speed sensor from the transmission housing.
2. Remove the transmission housing mounting bolts and hanger.
3. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.



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

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

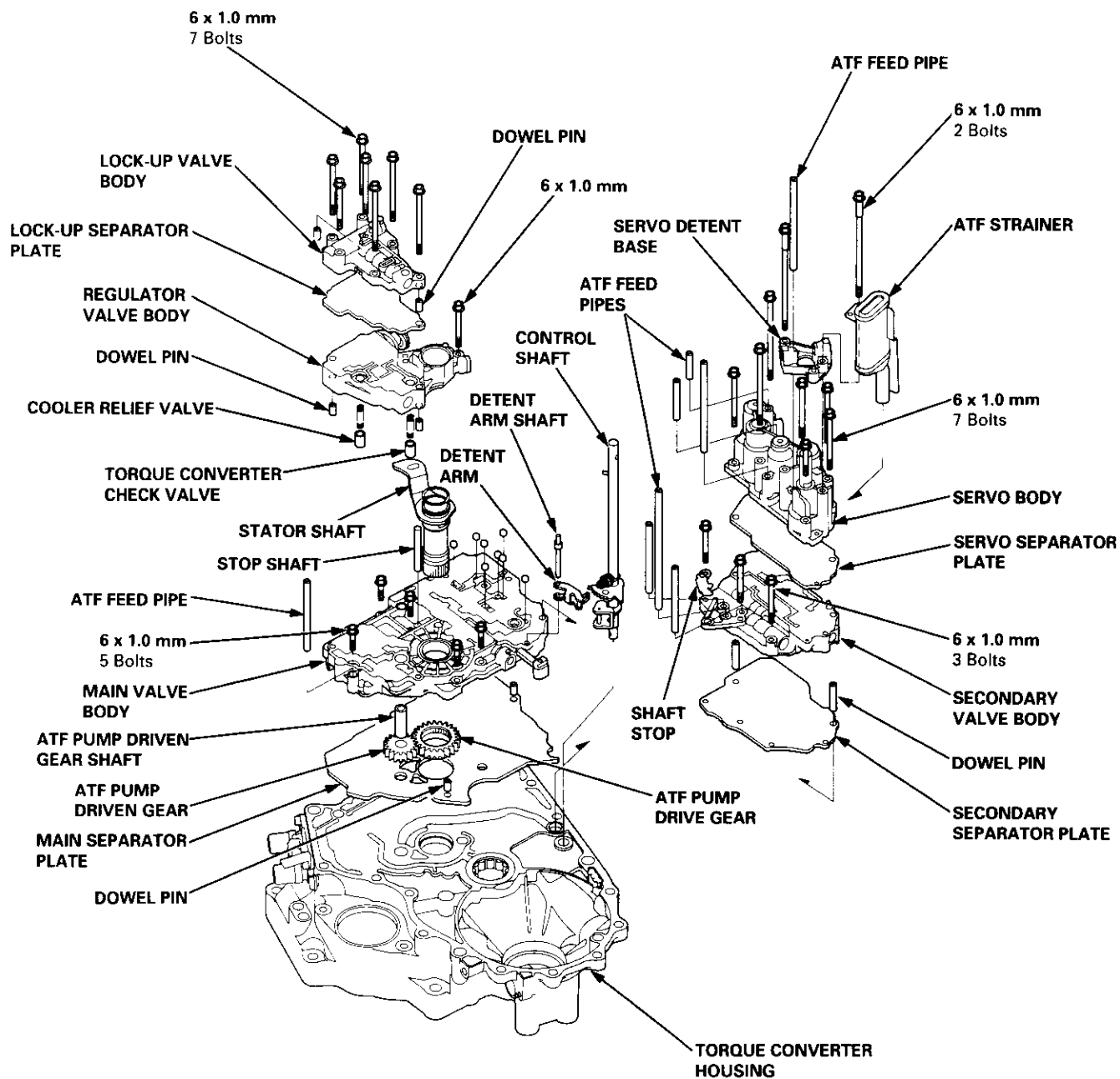
5. Remove the countershaft reverse gear with the collar and needle bearing.
6. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.
7. Remove the countershaft sub-assembly and the mainshaft sub-assembly together.



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

# Torque Converter Housing/Valve Body

## Removal



NOTE: The illustration shows the '96 - 98 models, the '99 - 00 models do not have the servo detent base; the servo detent is integral with the servo body.



**NOTE:**

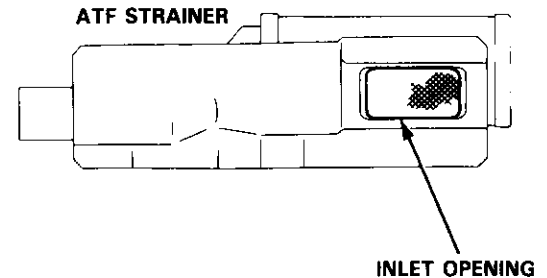
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve body, replace the O-ring.

1. Remove the ATF feed pipes from the servo body, secondary valve body and main valve body.
2. For '96 – 98 models: Remove the ATF strainer and servo detent base (two bolts).  
For '99 – 00 models: Remove the ATF strainer (one bolt).
3. Remove the servo body and servo separator plate ('96 – 98 models: seven bolts, '99 – 00 models: eight bolts).
4. Remove the secondary valve body, shaft stop and secondary separator plate (three bolts).
5. Remove the lock-up valve body and separator plate (seven bolts).
6. Remove the regulator valve body (one bolt).
7. Remove the stator shaft and stop shaft.
8. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.
9. Remove the detent arm and detent arm shaft from the main valve body.
10. Remove the main valve body (five bolts).

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

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

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



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

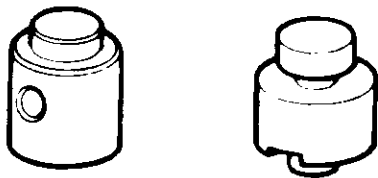
**NOTE:** The ATF strainer can be reused if it is not clogged.

# Valve Caps

## Description

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

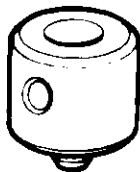
Toward outside of valve body.



Toward inside of valve body.

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

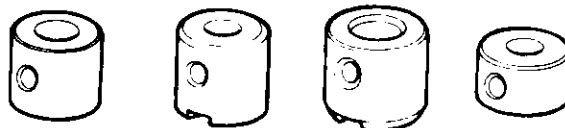
Toward outside of valve body.



Toward inside of valve body.

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

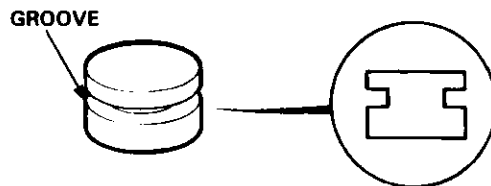
Toward outside of valve body.



Toward inside of valve body.

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

Toward outside of valve body.



Sectional view.

Toward inside of valve body.



## Repair

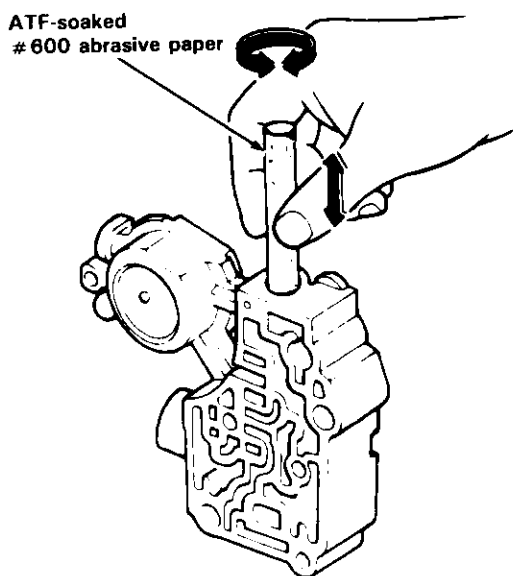
**NOTE:** This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

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

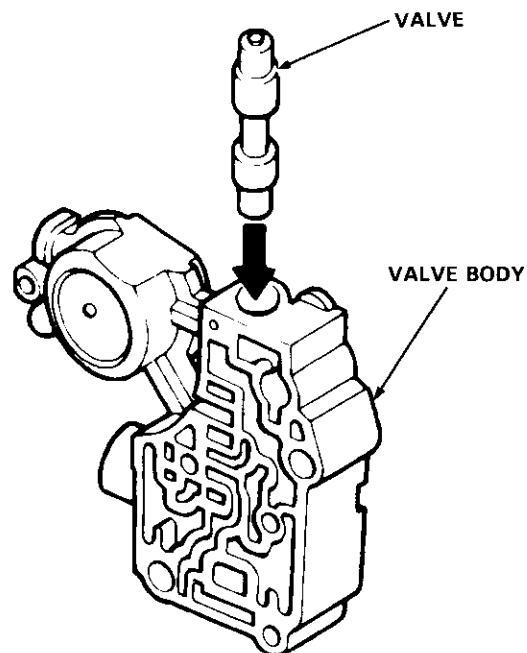
**CAUTION:** It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

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

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



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



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



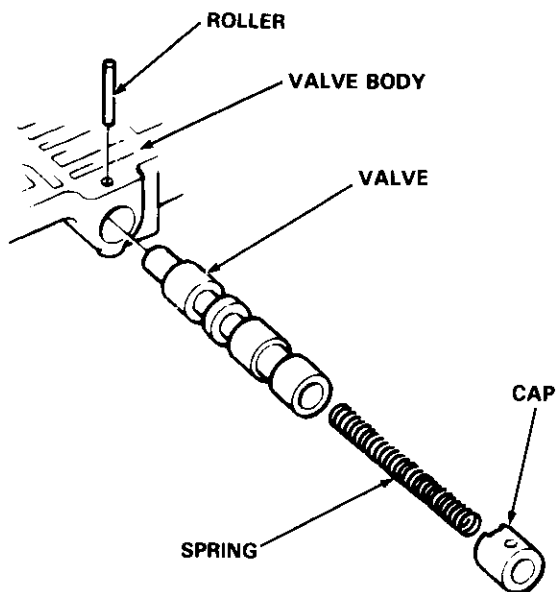
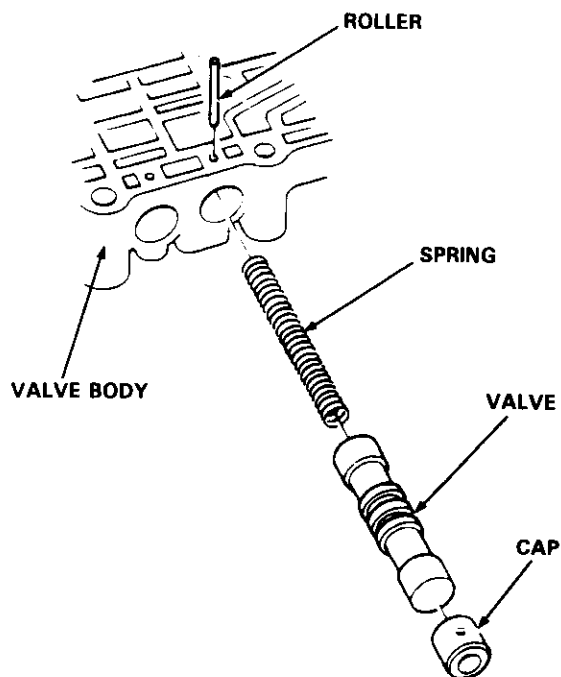
# Valve

## Assembly

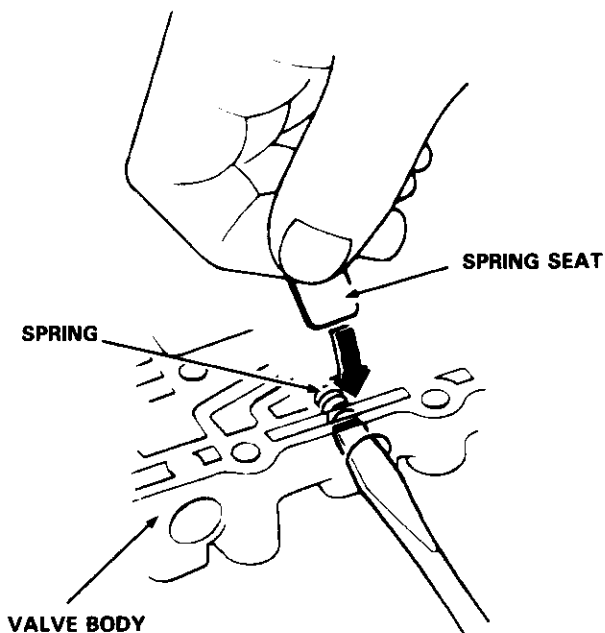
### NOTE:

Coat all parts with ATF before assembly.

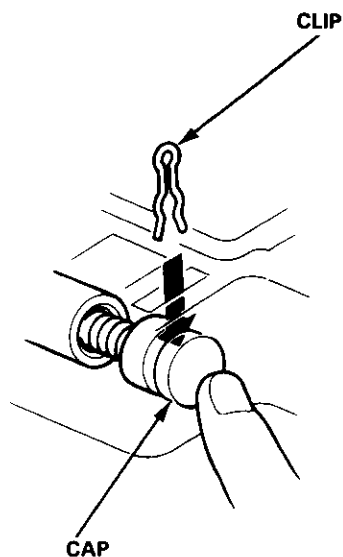
- Install the valve, valve spring and cap in the valve body and secure with the roller.



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



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



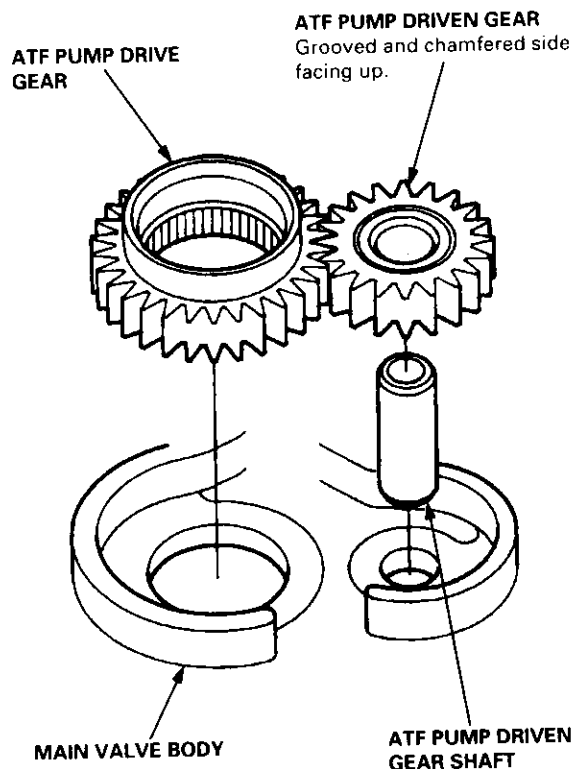


## Inspection

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

### NOTE:

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



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

### ATF Pump Gears Side (Radial) Clearance:

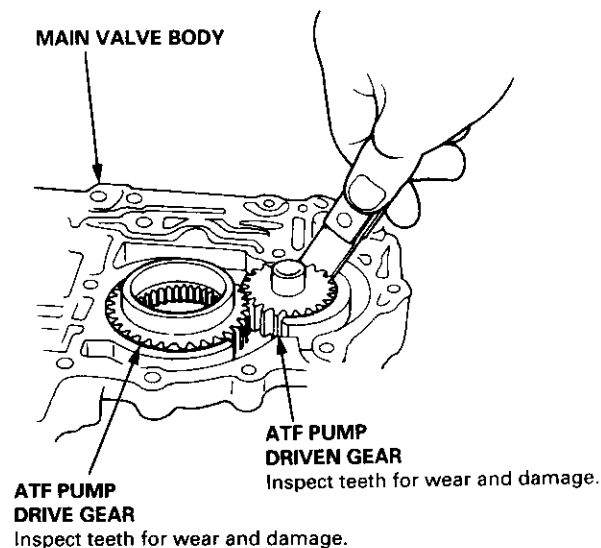
#### Standard (New):

#### ATF Pump Drive Gear

0.105 – 0.1325 mm (0.004 – 0.005 in)

#### ATF Pump Driven Gear

0.035 – 0.0625 mm (0.0014 – 0.0025 in)

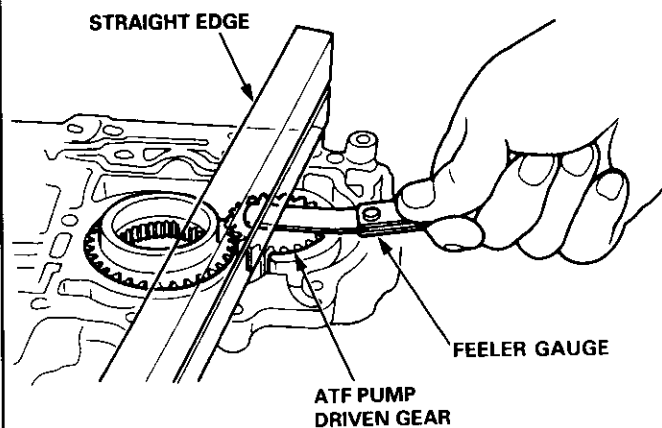


3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body.

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

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

Service Limit: 0.07 mm (0.003 in)



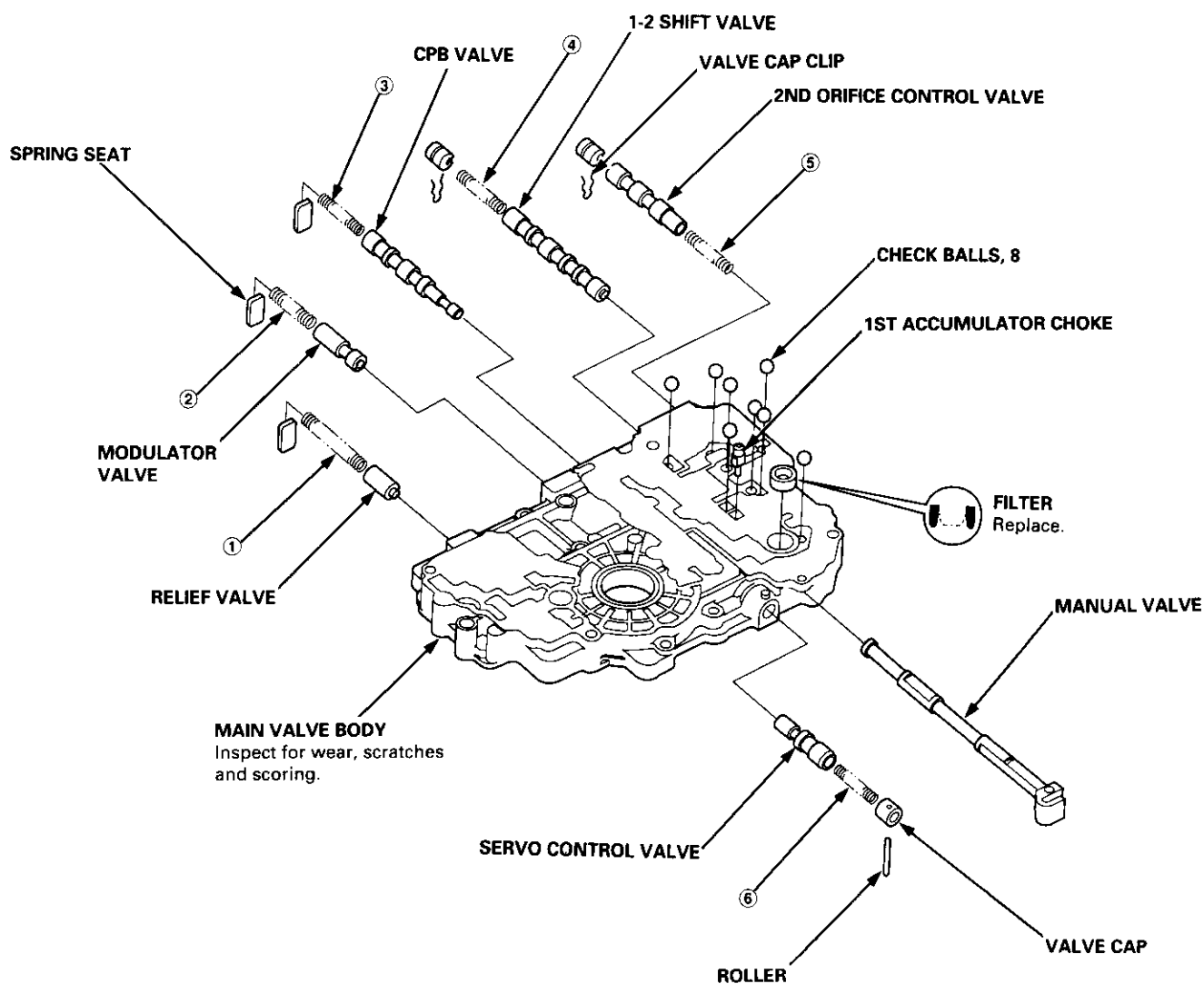
# Main Valve Body

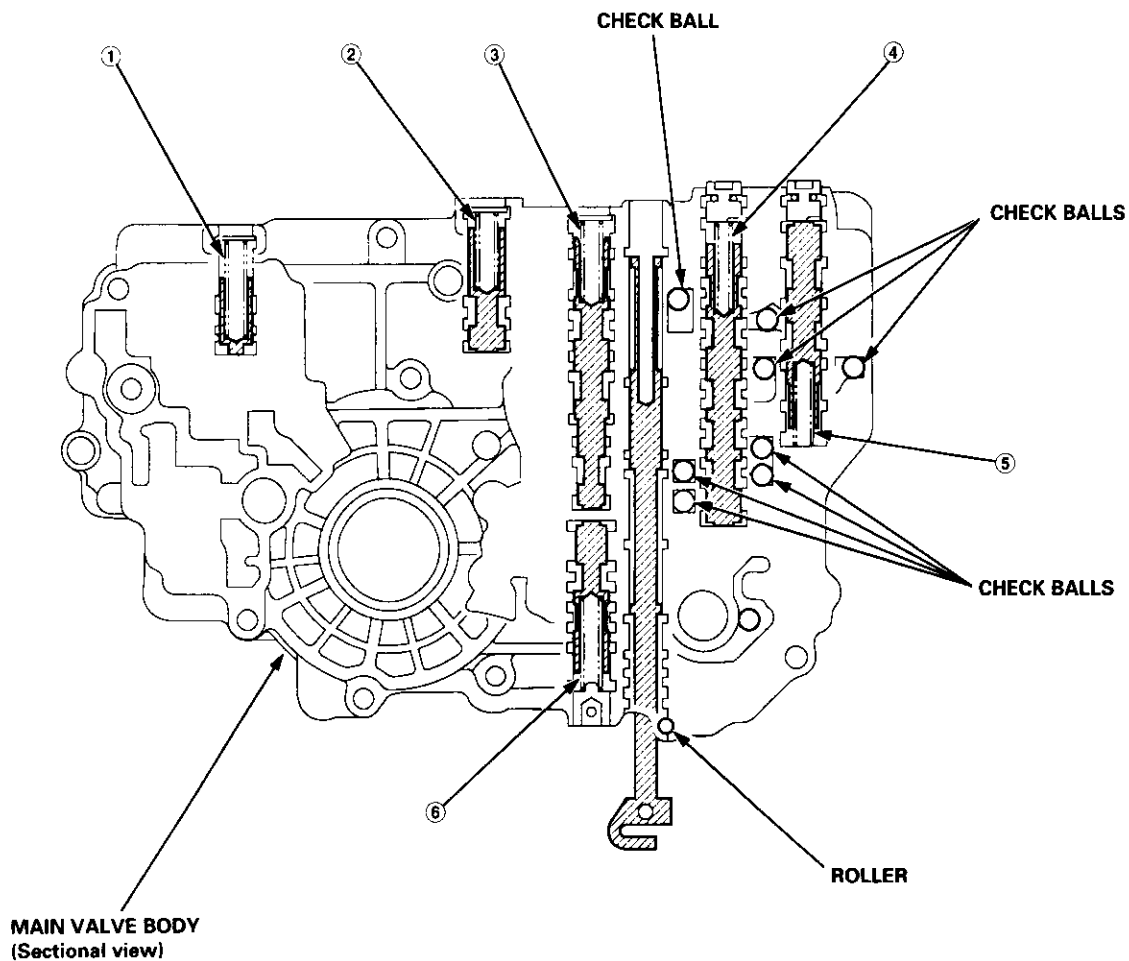
## Disassembly/Inspection/Reassembly

### NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-139.
- Coat all parts with ATF during assembly.

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





#### SPRING SPECIFICATIONS

Unit: mm (in)

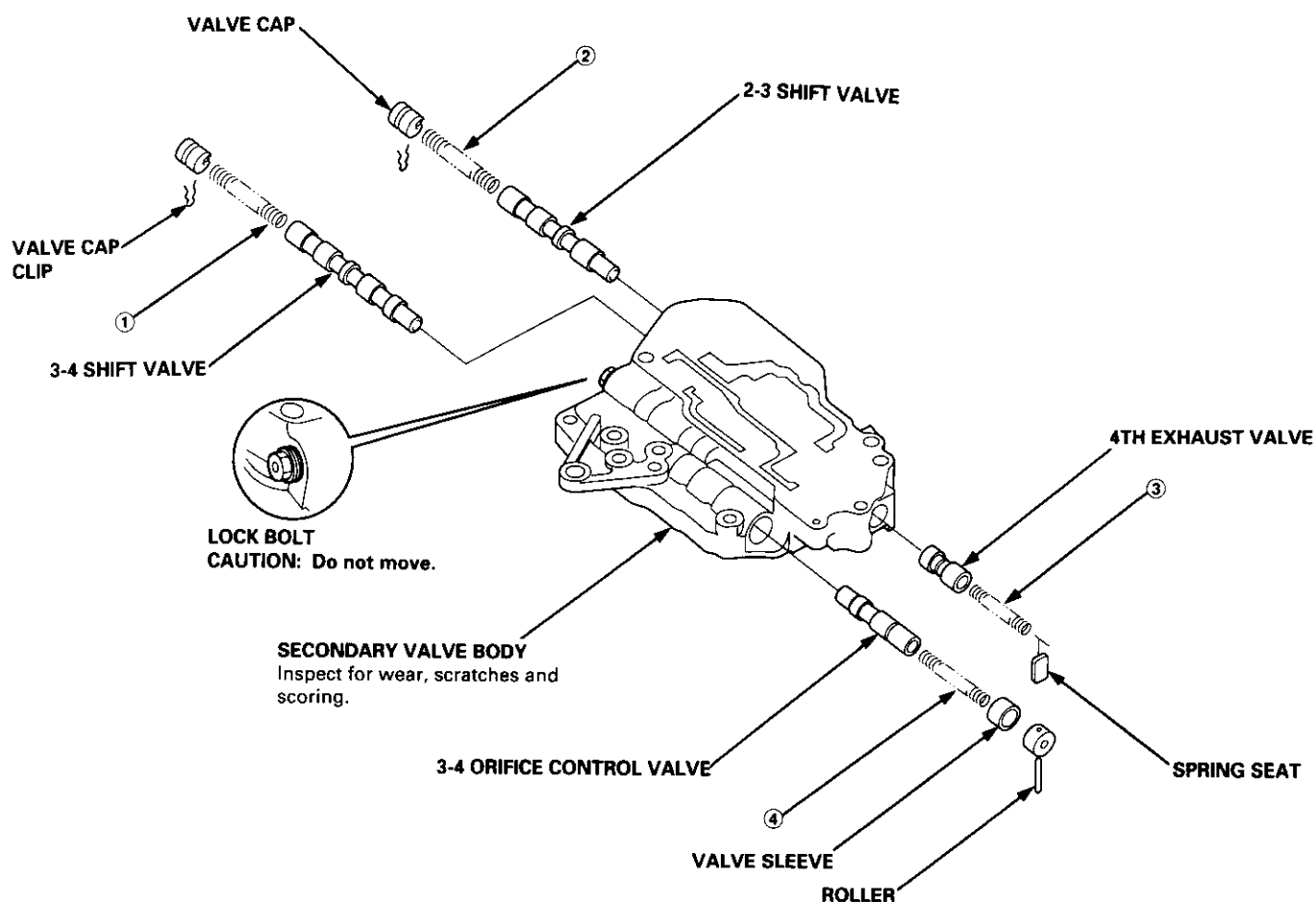
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Relief valve spring	1.1 (0.043)	8.6 (0.342)	37.1 (1.461)	13.4
②	Modulator valve spring	1.4 (0.055)	9.4 (0.374)	35.0 (1.378)	10.9
③	CPB valve spring	0.9 (0.035)	8.1 (0.322)	47.2 (1.858)	18.3
④	1-2 shift valve spring	0.9 (0.035)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

# Secondary Valve Body

## Disassembly/Inspection/Reassembly

### NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the secondary valve body kit, P/N 27700 – P4R – 315 (The secondary valve body kit includes the linear solenoid assembly) if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-139.
- Coat all parts with ATF during assembly.
- The CPC valve is installed in the secondary valve body, held in place by the lock bolt.



### SPRING SPECIFICATIONS

Unit: mm (in)

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

# Regulator Valve Body



## Disassembly/Inspection/Reassembly

### NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-139.

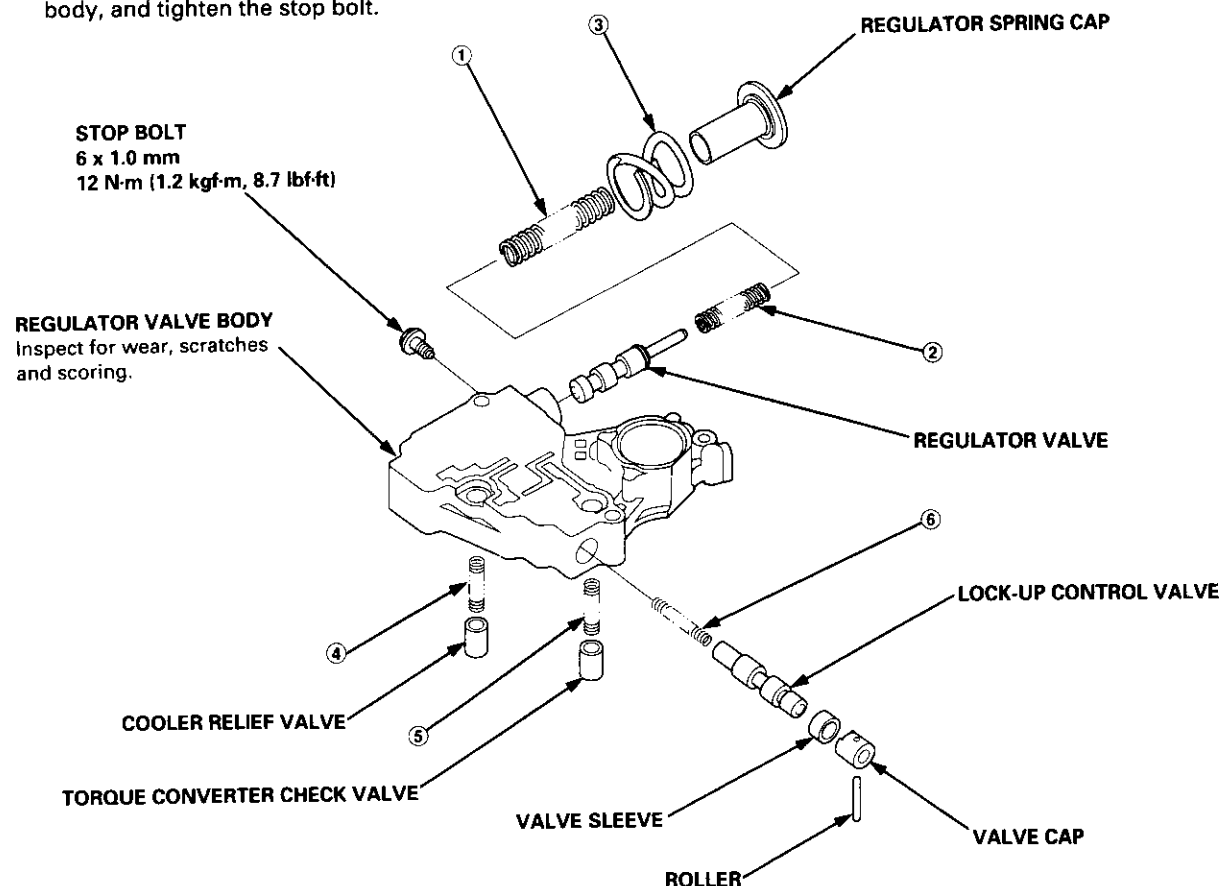
1. Hold the regulator spring cap in place while removing the stop bolt. Once the stop bolt is removed, release the spring cap slowly.

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

2. Reassembly is the reverse order of the disassembly procedure.

### NOTE:

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



### SPRING SPECIFICATIONS

Unit: mm (in)

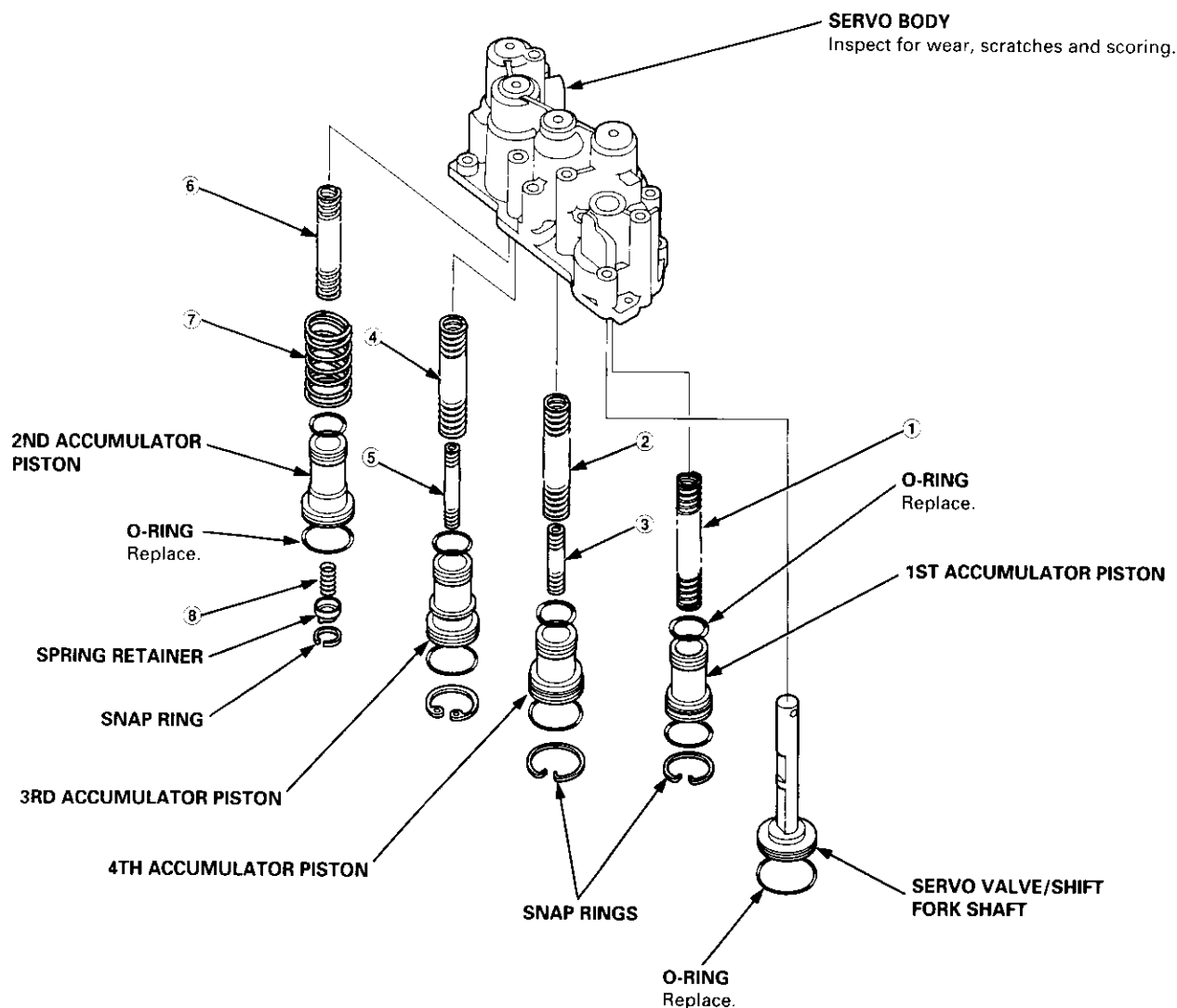
No.	Springs	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A	1.8 (0.071)	14.7 (0.584)	87.8 (3.457)	16.5
②	Regulator valve spring B	1.8 (0.071)	9.6 (0.381)	44.0 (1.732)	11.0
③	Stator reaction spring	4.5 (0.177)	35.4 (1.407)	30.3 (1.193)	1.9
④	Cooler relief valve spring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

# Servo Body

## Disassembly/Inspection/Reassembly

### NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF during assembly.
- Replace the O-rings.
- The servo body shows the '96 – 98 models: the '99 – 00 models have an integrally molded servo detent.



### SPRING SPECIFICATIONS

Unit: mm (in)

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

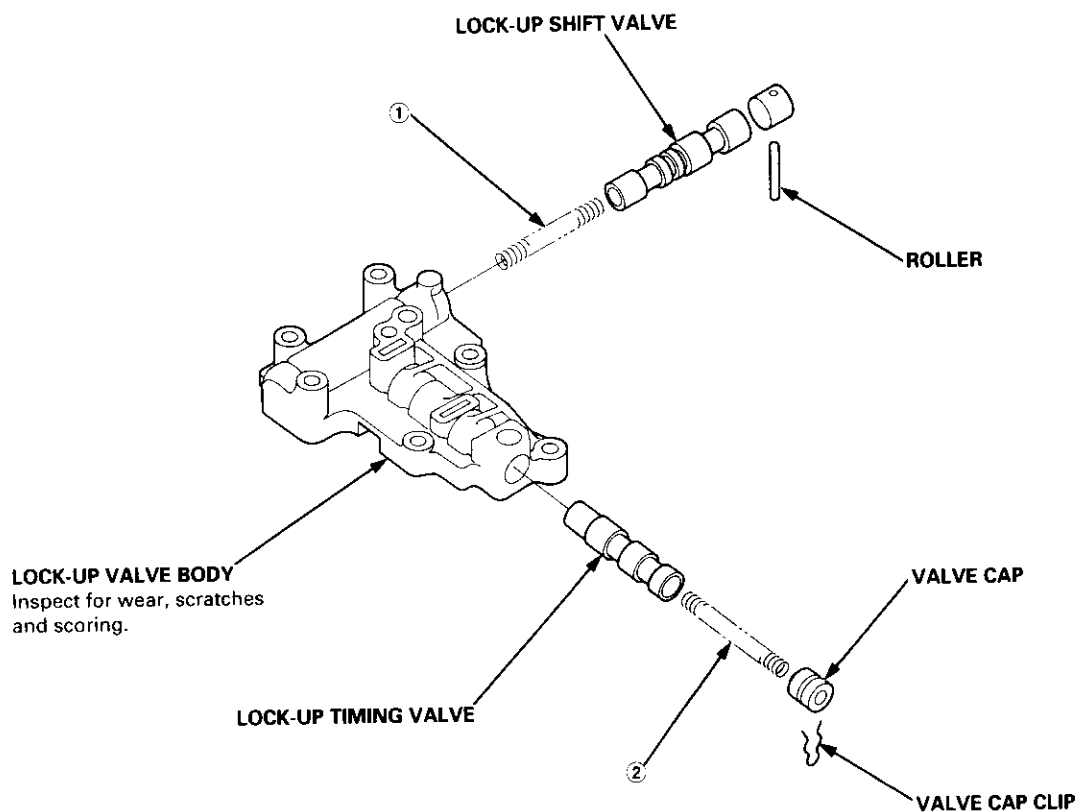


# Lock-up Valve Body

## Disassembly/Inspection/Reassembly

### NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-139.
- Coat all parts with ATF during assembly.



### SPRING SPECIFICATIONS

Unit: mm (in)

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

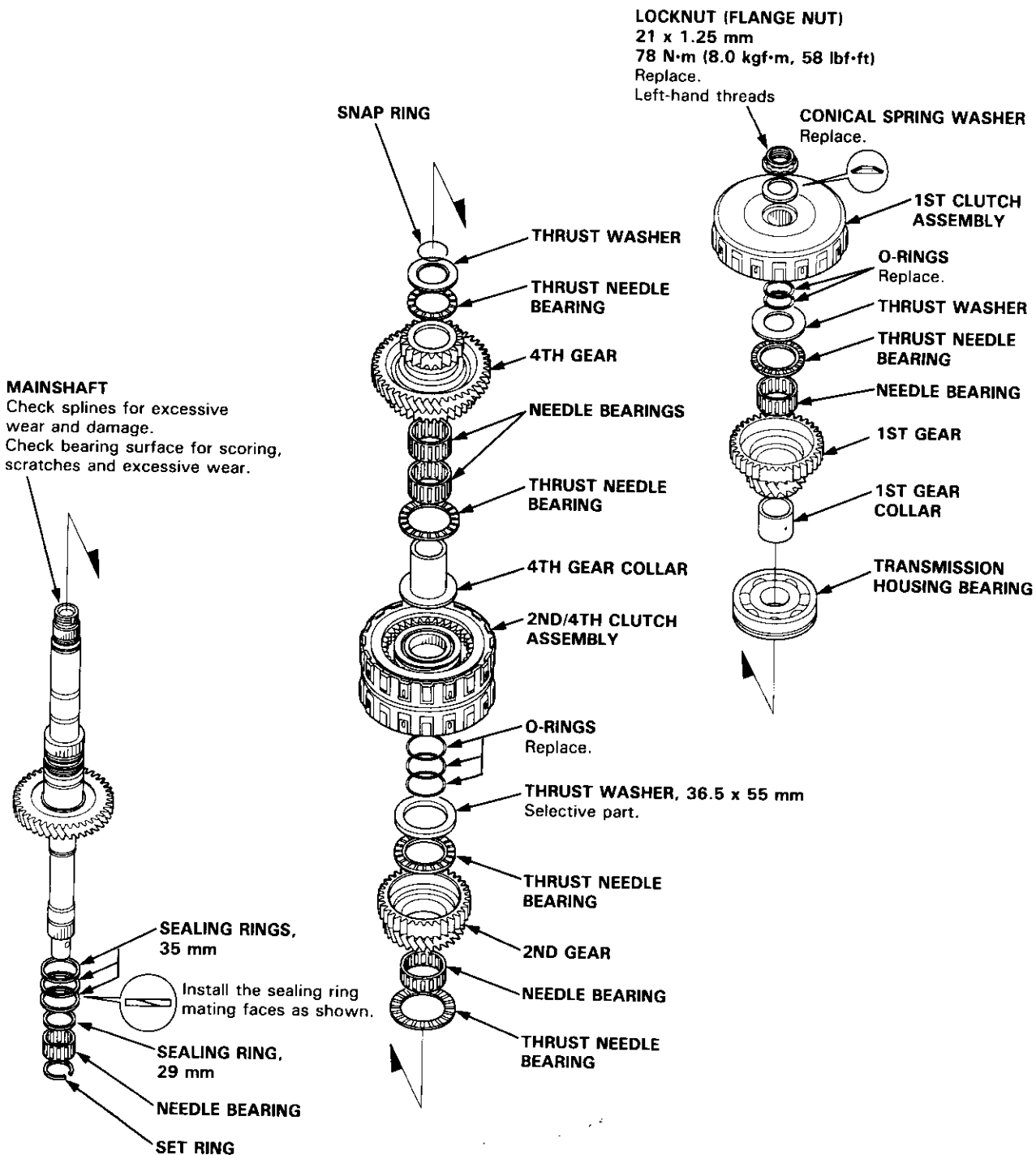


# Mainshaft

## Disassembly/Inspection/Reassembly

### NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.





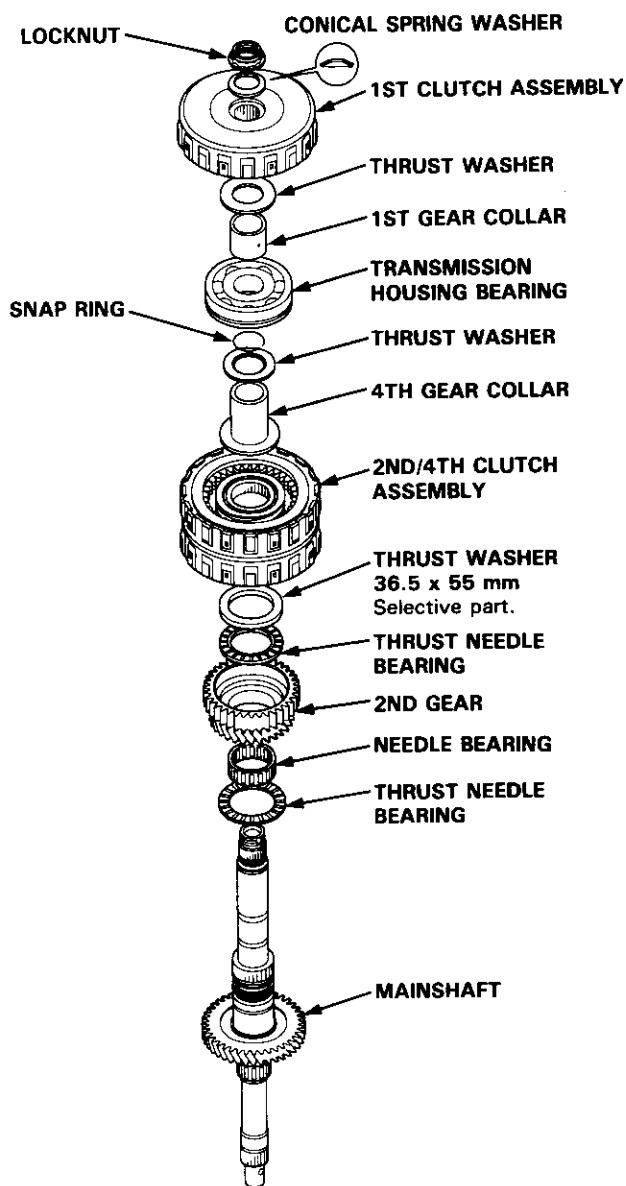
## Inspection

### • Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

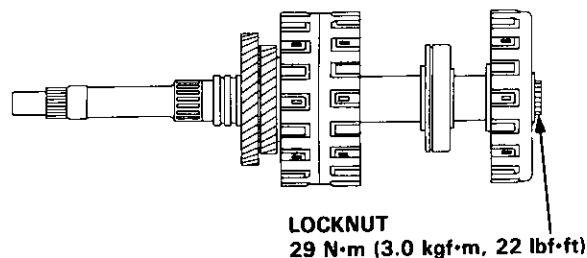
1. Remove the mainshaft bearing from the transmission housing (see page 14-174).
2. Assemble the parts below on the mainshaft.

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



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

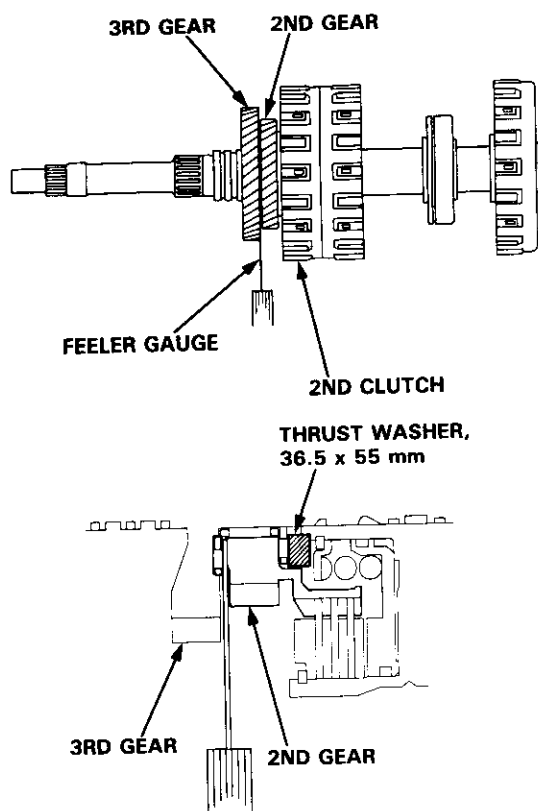
NOTE: Mainshaft locknut has left-hand threads.



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

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

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



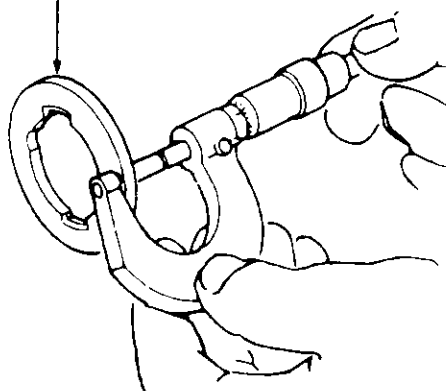
(cont'd)

# Mainshaft

## Inspection (cont'd)

5. If the clearance is out of tolerance, remove the thrust washer and measure the thickness.

THRUST WASHER



6. Select and install a new washer, then recheck.

### THRUST WASHER 36.5 x 55 mm

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

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

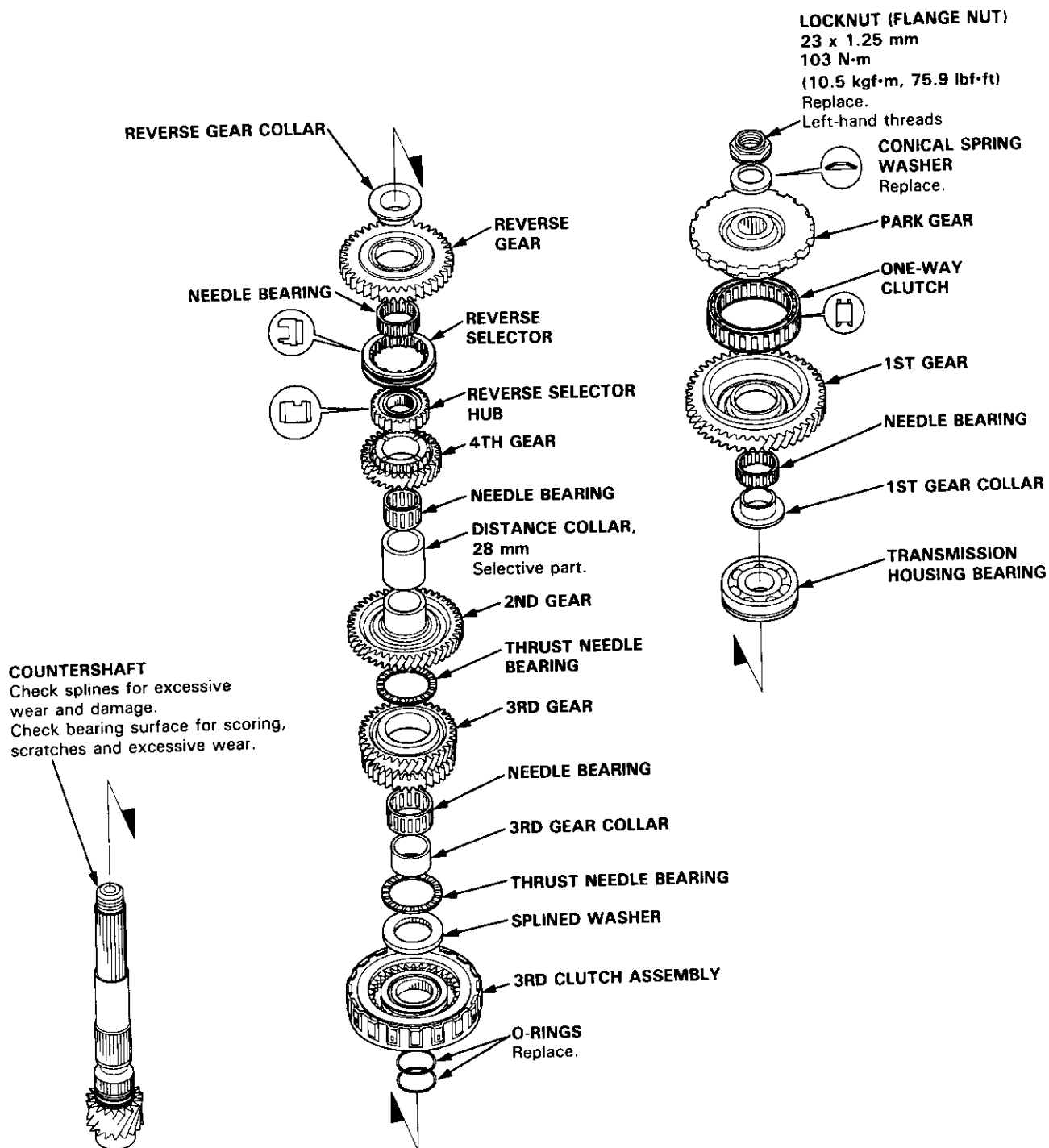
# Countershaft



## Disassembly/Inspection/Reassembly

### NOTE:

- Lubricate all parts with ATF before reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.



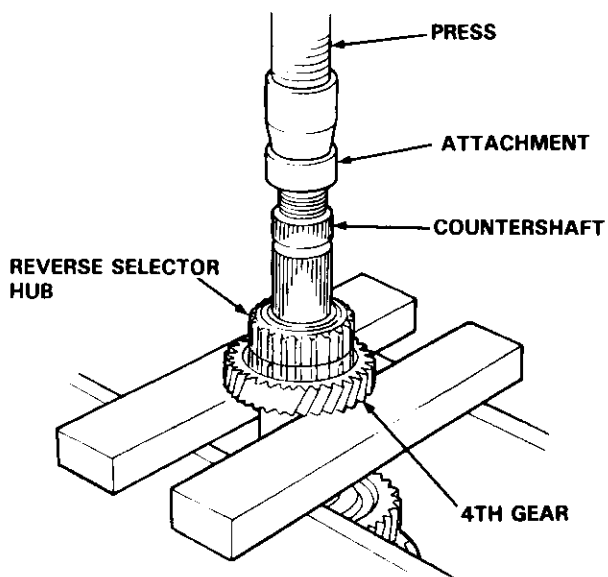
# Countershaft

## Disassembly/Reassembly

1. Using a hydraulic press, press out the countershaft while supporting 4th gear.

NOTE: Place an attachment between the press and the countershaft to prevent damage to the shaft.

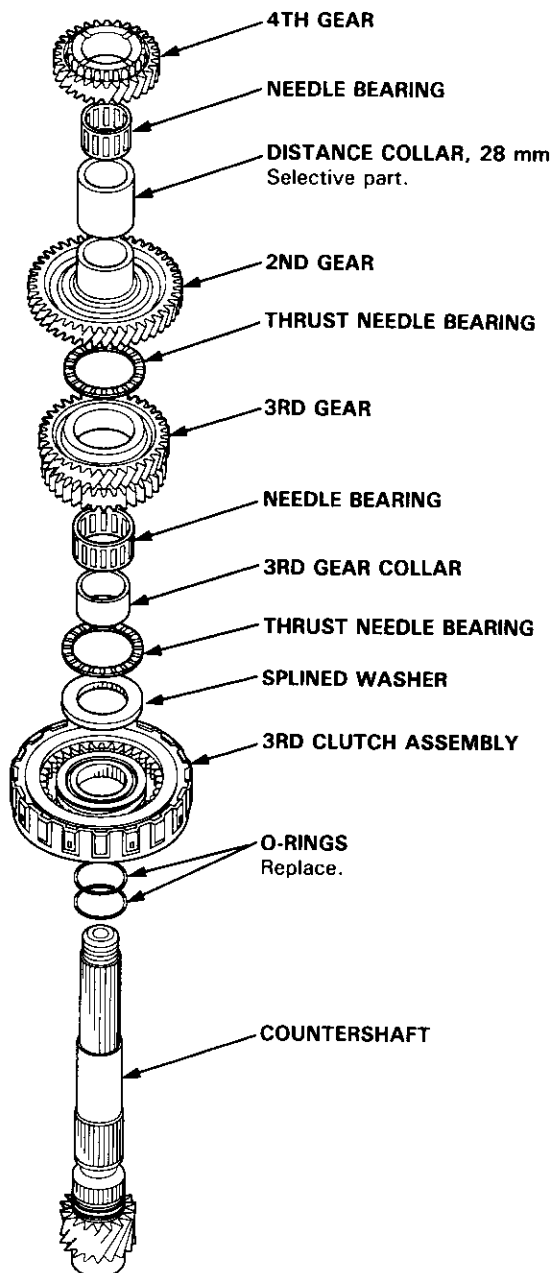
**CAUTION:** Do not allow the countershaft to fall and hit the ground when pressed clear.



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

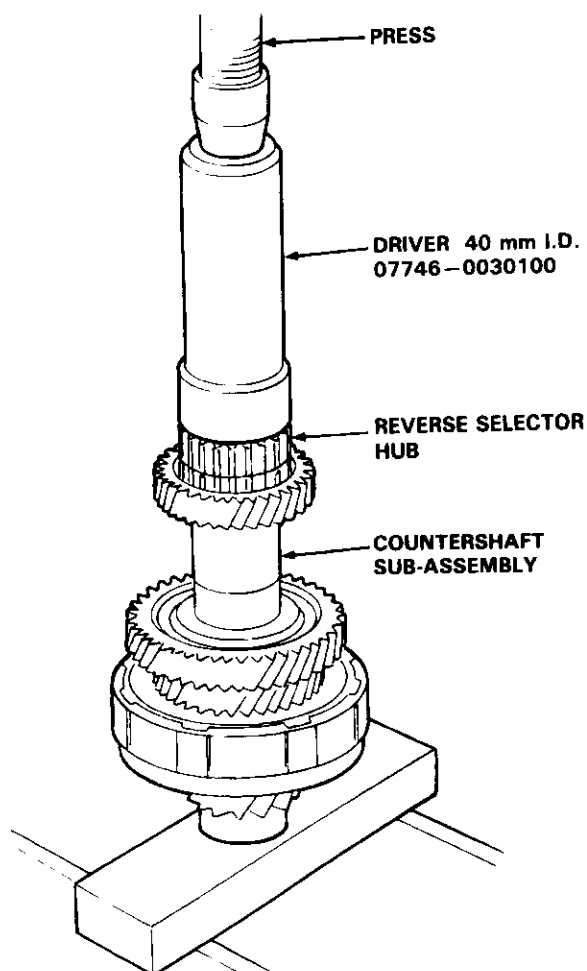
NOTE:

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





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



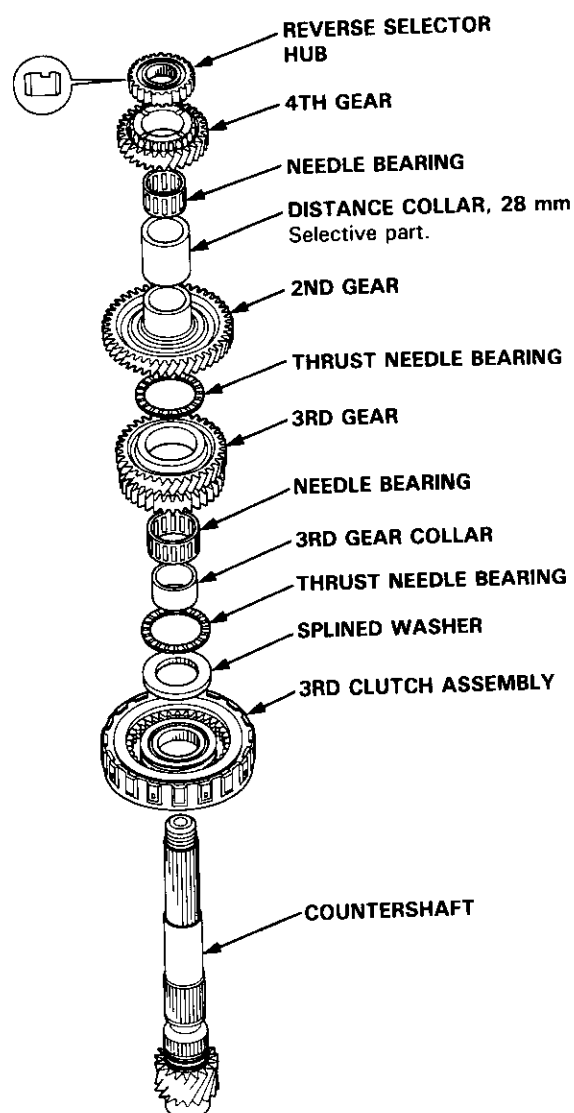
## Inspection

### • Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the countershaft bearing from the transmission housing (see page 14-174).
2. Install the parts below on the countershaft using the special tool and a press as described on this page.

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



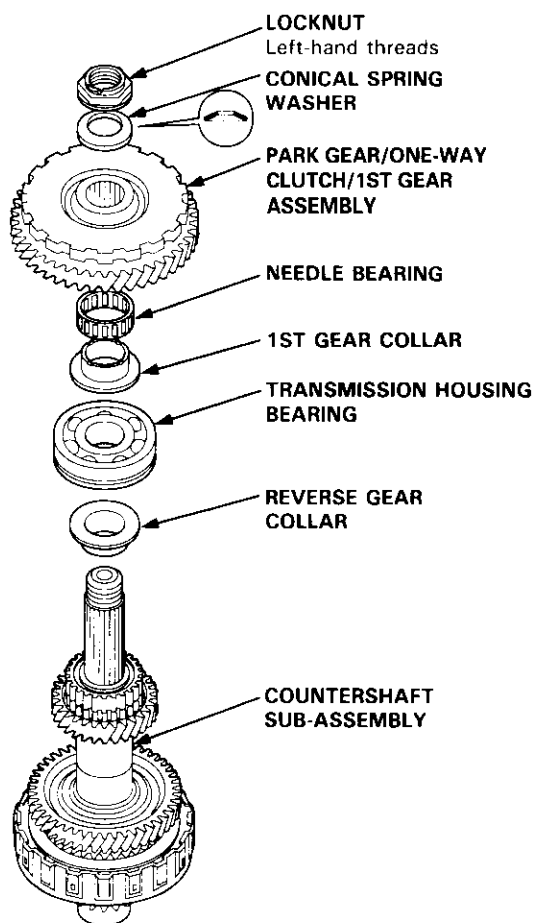
(cont'd)

# Countershaft

## Inspection (cont'd)

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

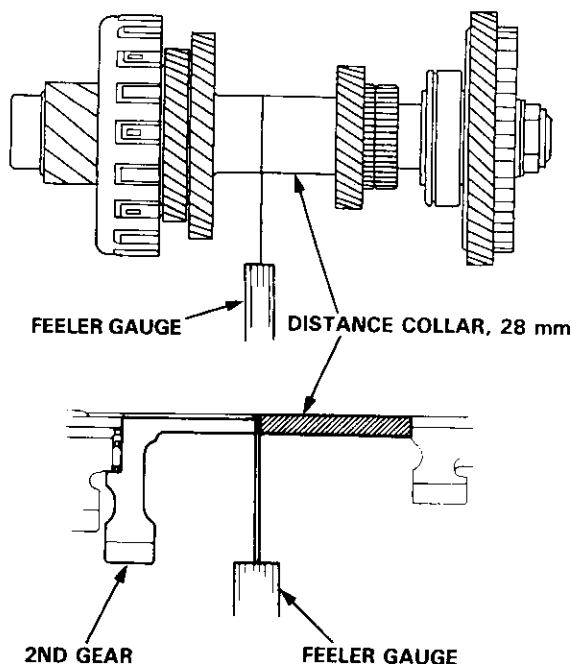
NOTE: Countershaft locknut has left-hand threads.



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

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

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



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

**DISTANCE COLLAR, 28 mm**

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

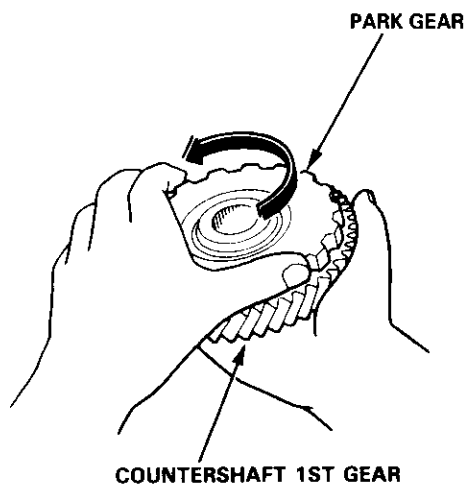
7. After selecting a new distance collar, recheck the clearance and make sure it is within tolerance.

# One-way Clutch

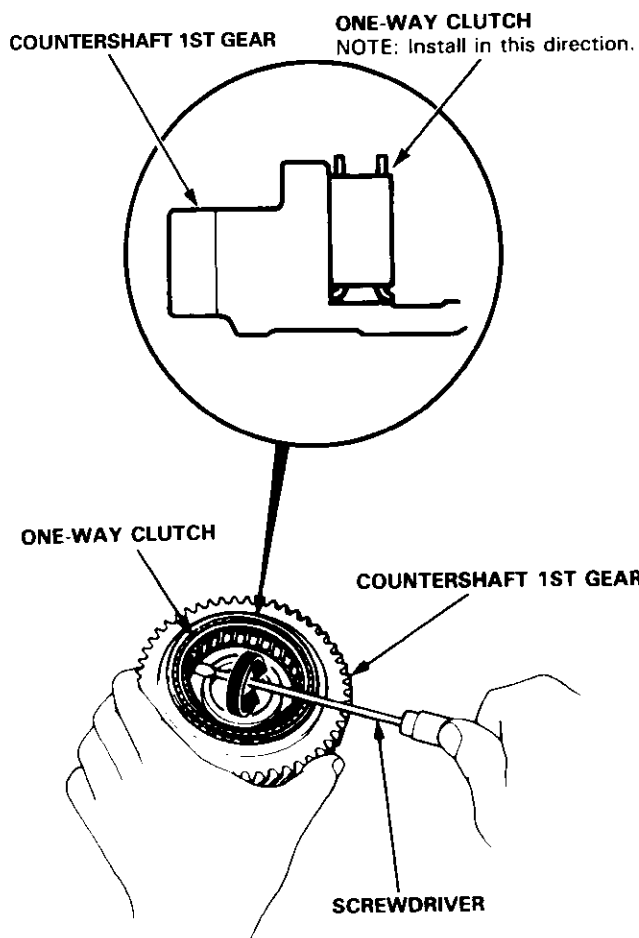


## Disassembly/Inspection/Reassembly

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



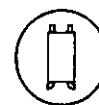
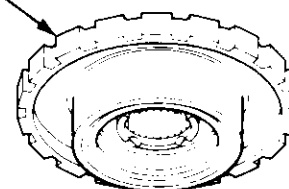
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:

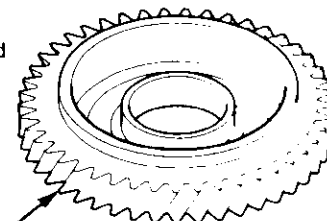
### PARK GEAR

Inspect the park gear for wear and scoring.



### ONE-WAY CLUTCH

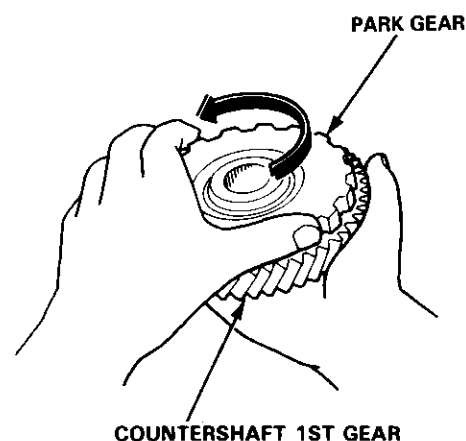
Inspect the one-way clutch for damage and faulty movement.



### 1ST GEAR

Inspect countershaft 1st gear for wear and scoring.

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

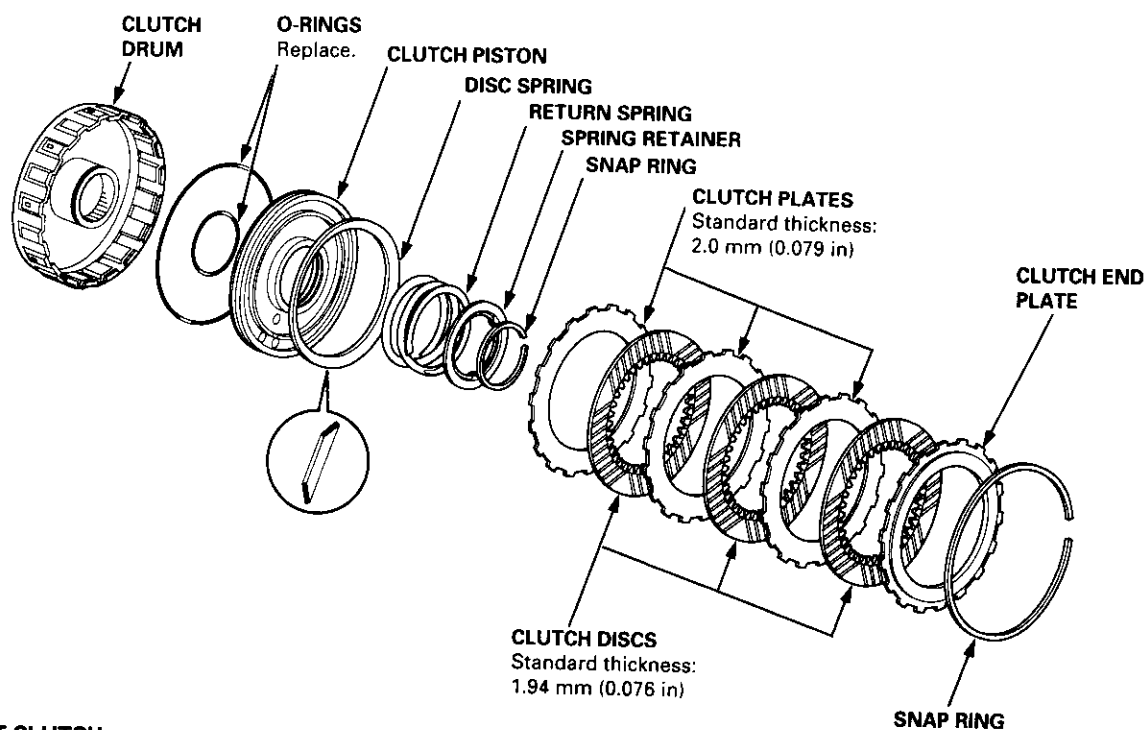




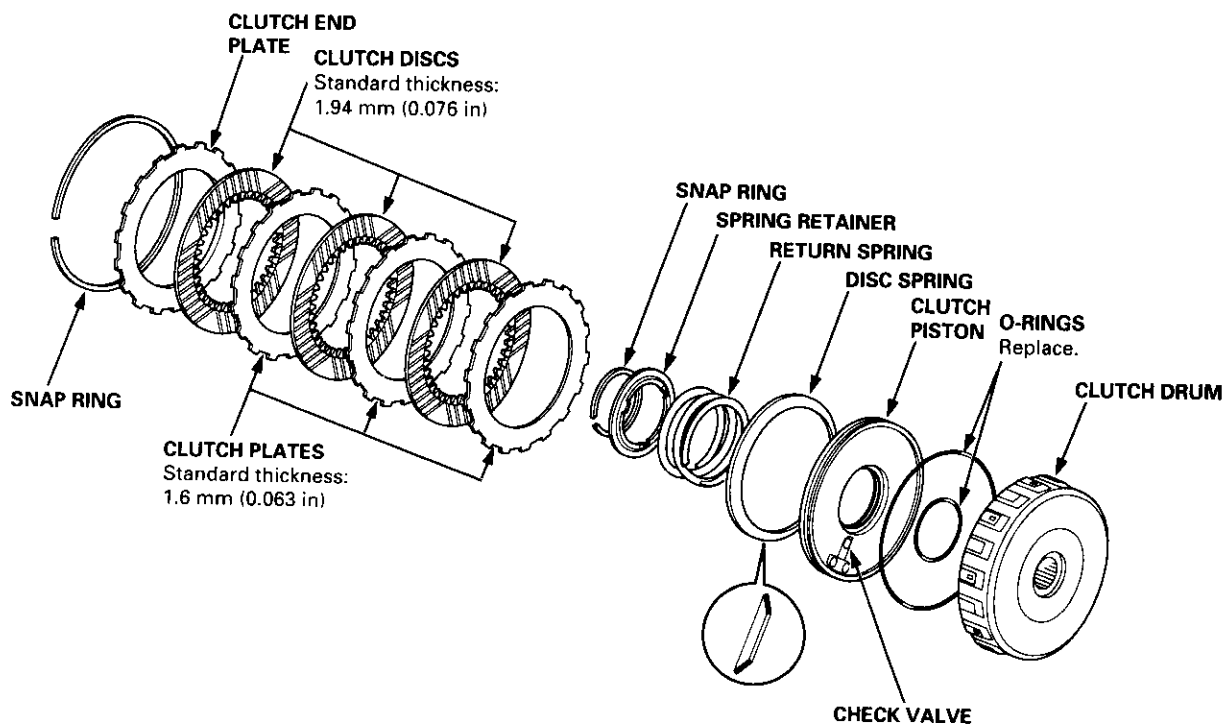
# Clutch

## Illustrated Index (A4RA, B4RA Transmission)

### 3RD CLUTCH

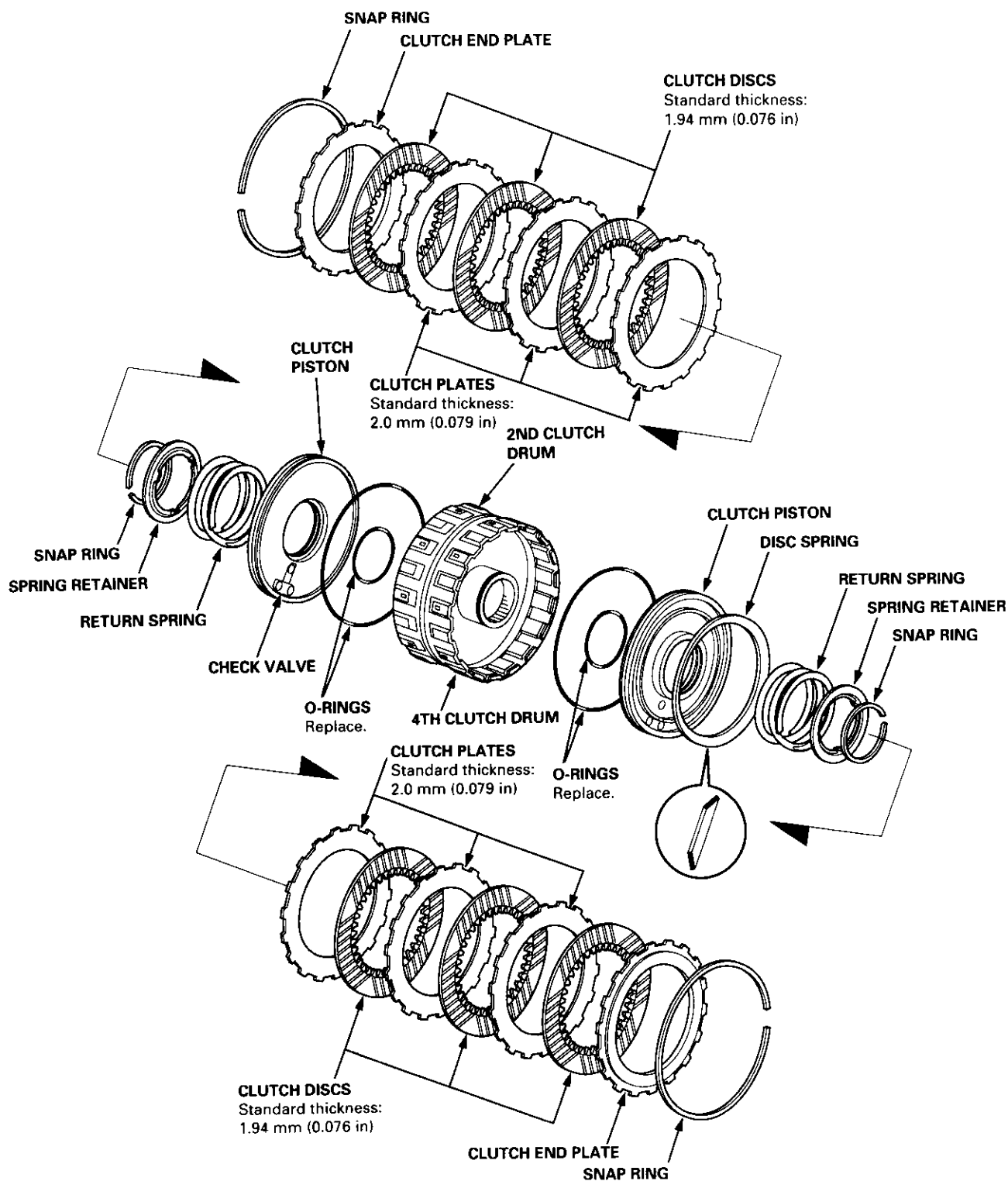


### 1ST CLUTCH





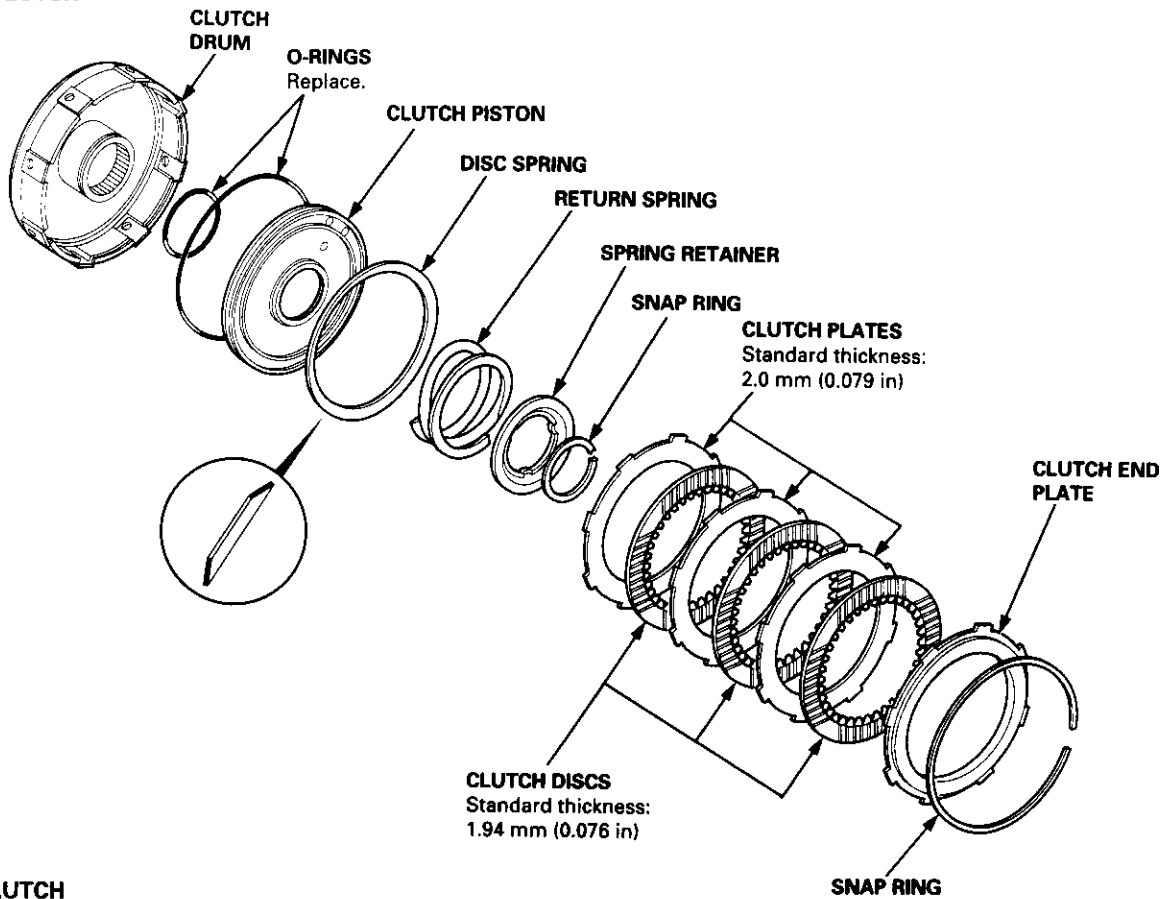
## 2ND/4TH CLUTCH



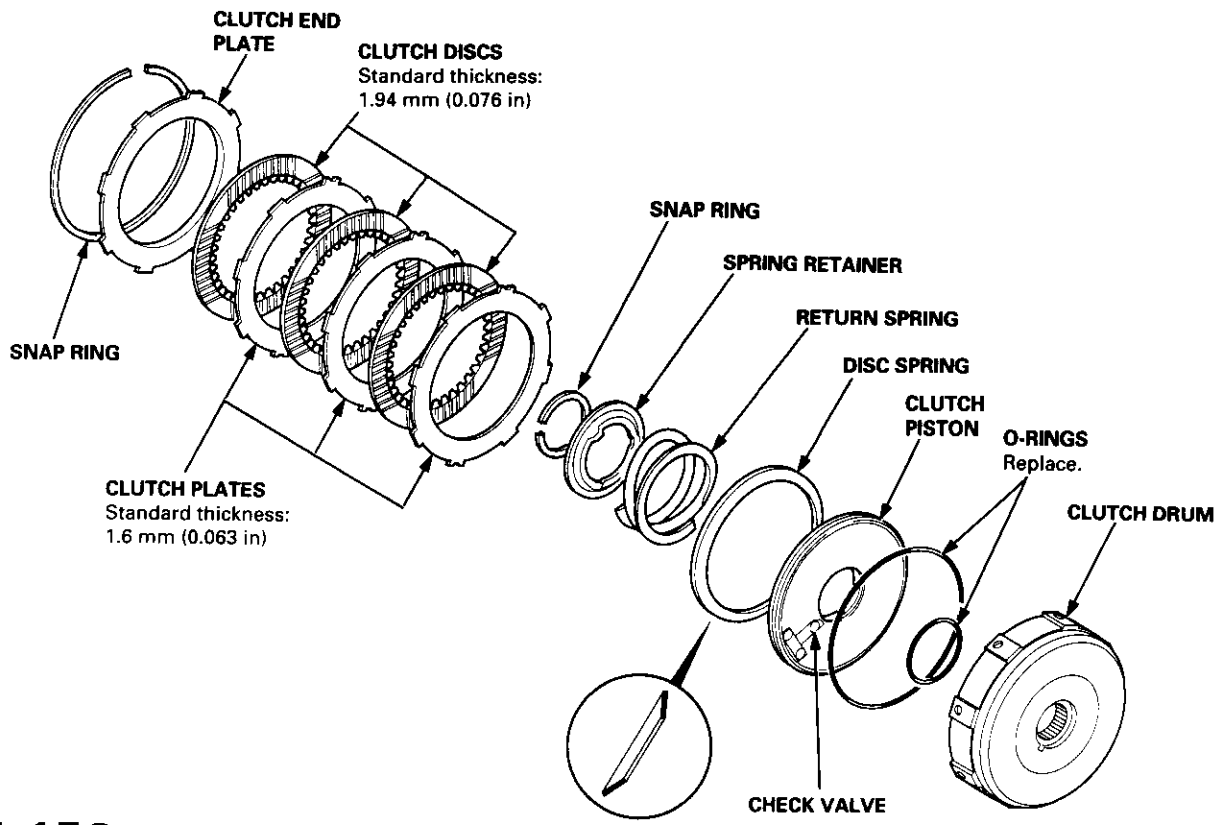
# Clutch

## Illustrated Index (M4RA Transmission)

### 3RD CLUTCH

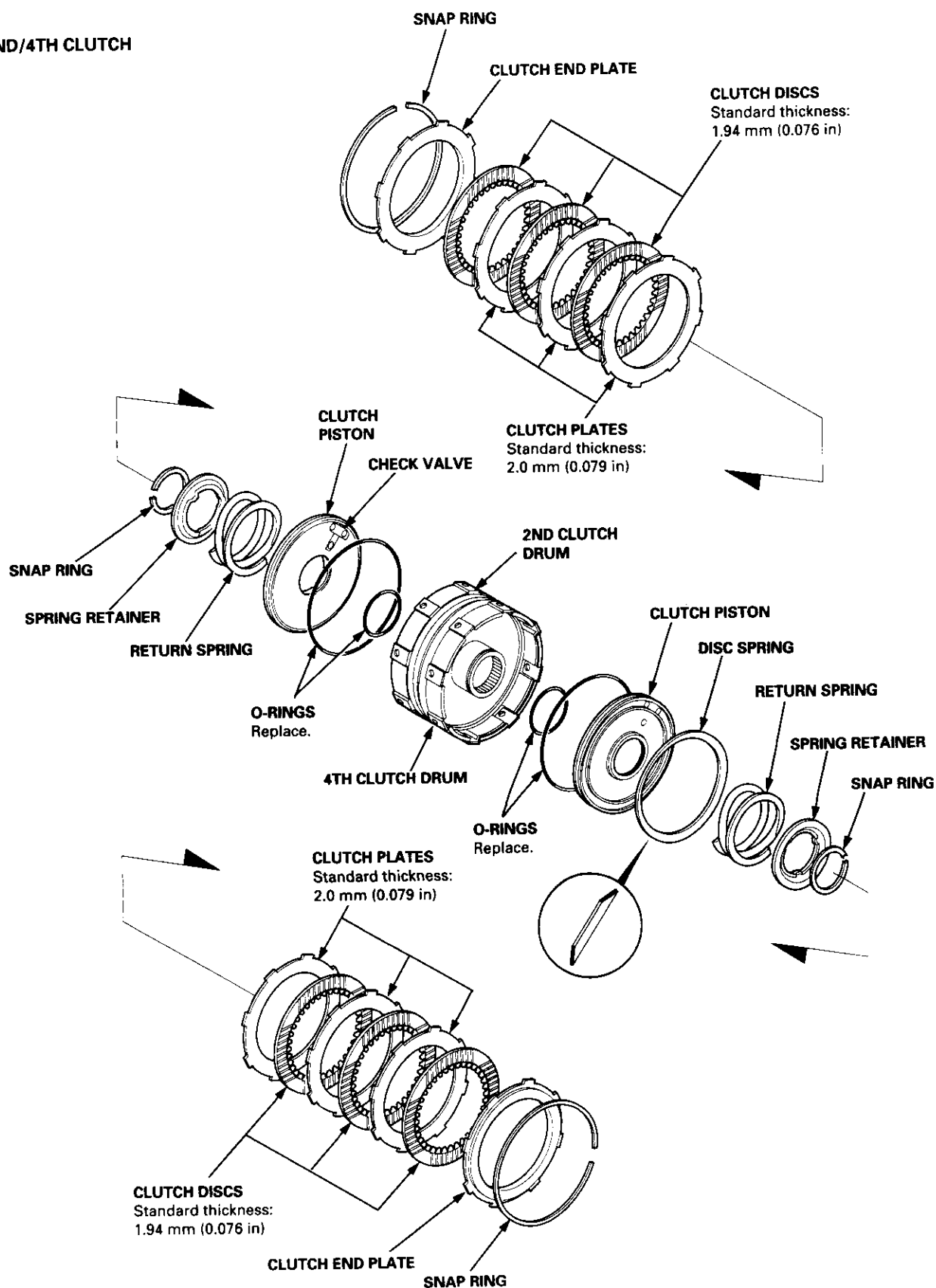


### 1ST CLUTCH





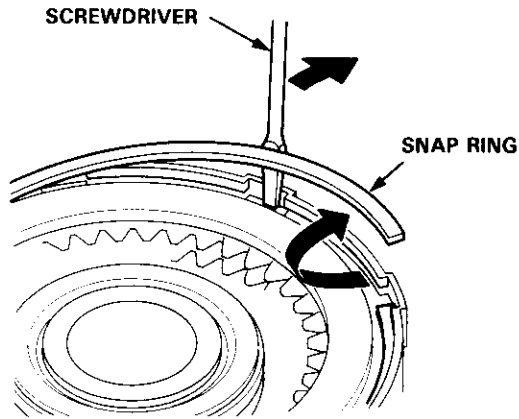
## 2ND/4TH CLUTCH



# Clutch

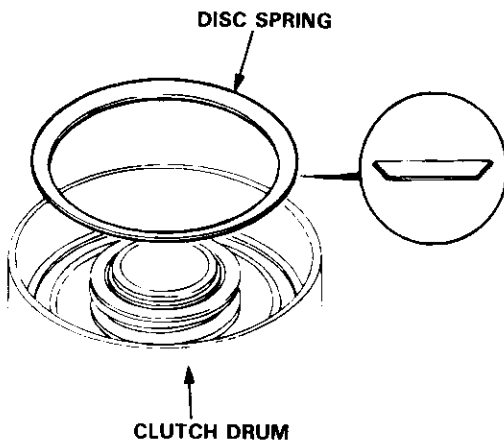
## Disassembly

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

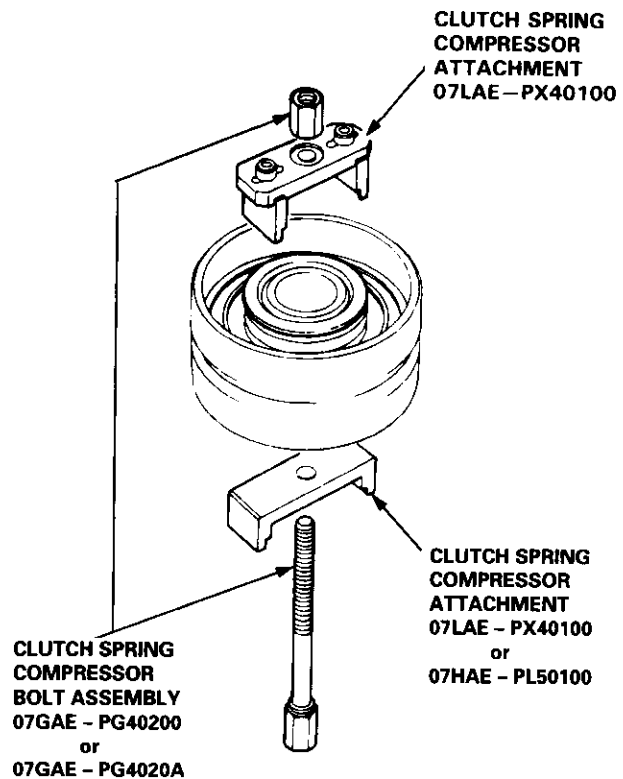
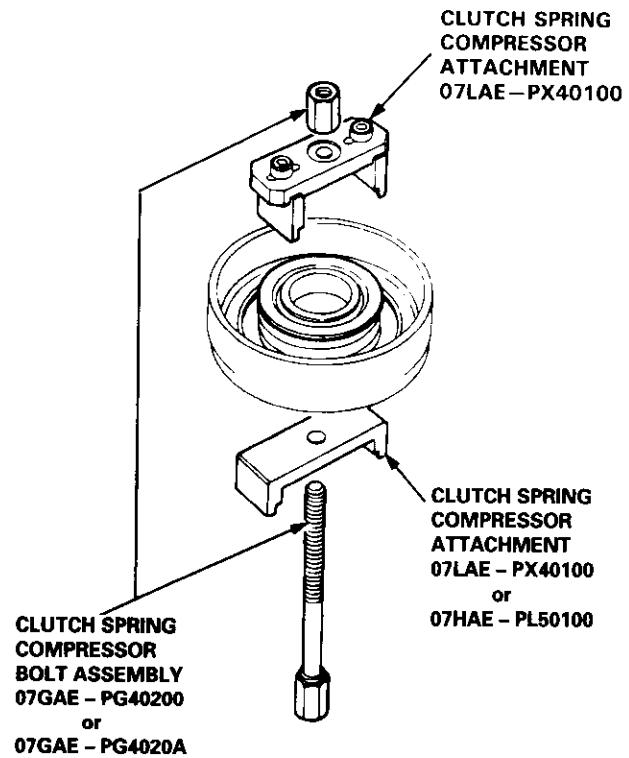


2. Remove the disc spring.

NOTE: Except 2nd clutch.

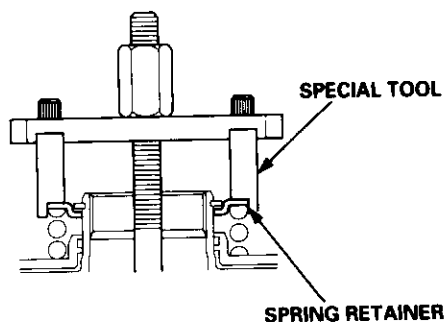
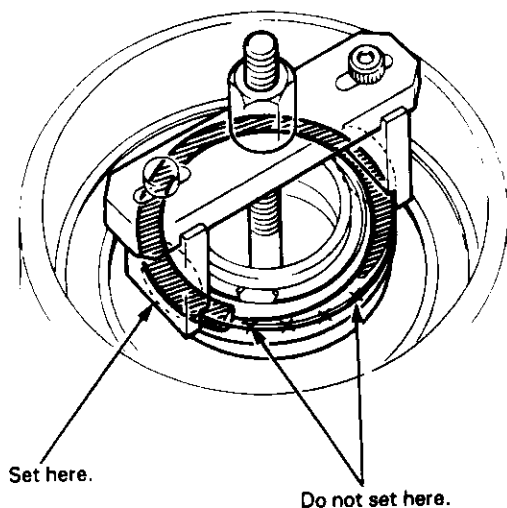


3. Install the special tools as shown.

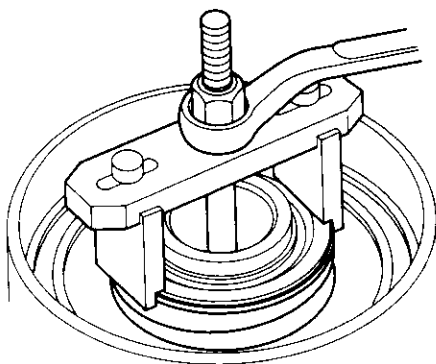




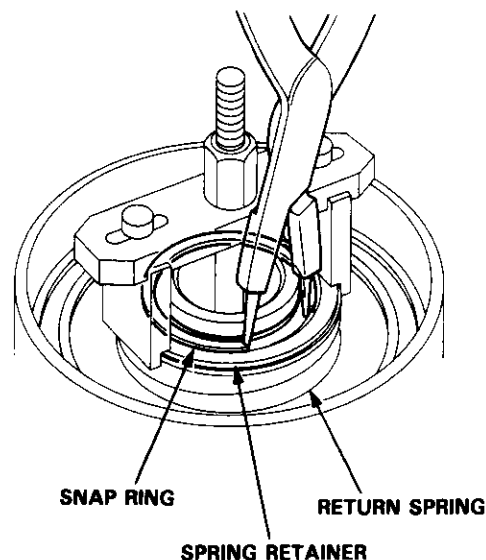
**CAUTION:** If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.



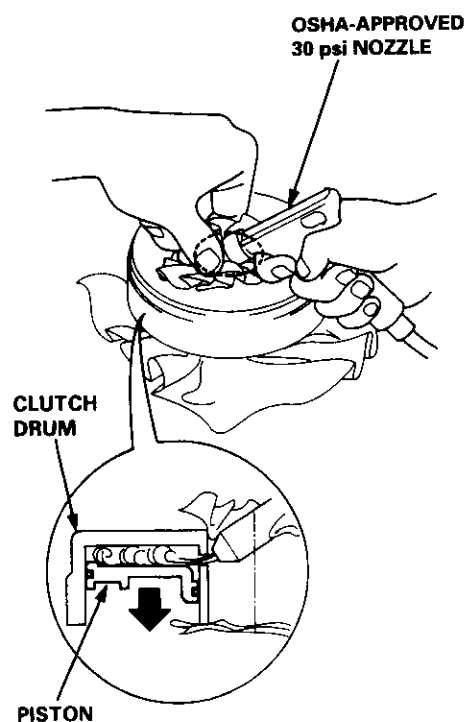
4. Compress the return spring.



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



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



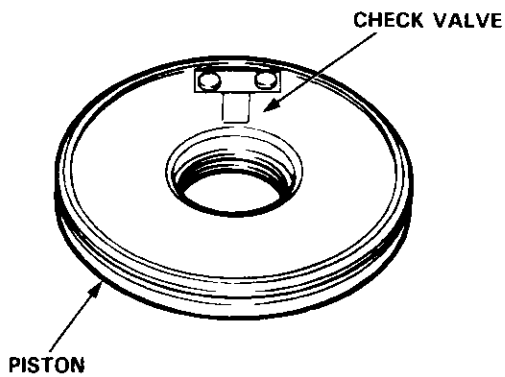
# Clutch

## Reassembly

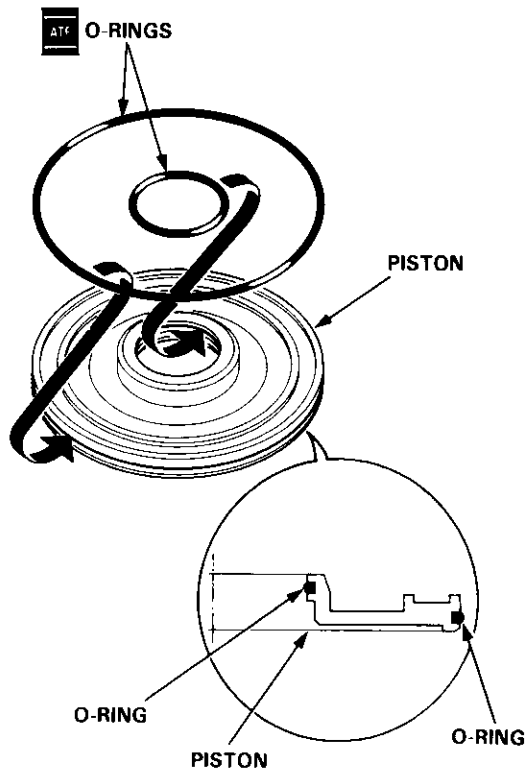
### NOTE:

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

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



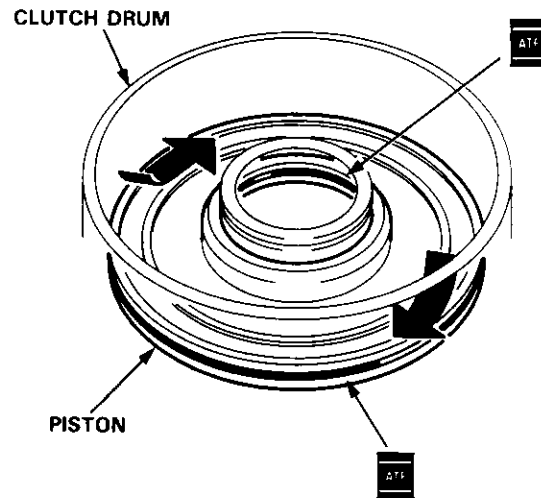
2. Install new O-rings on the clutch piston.



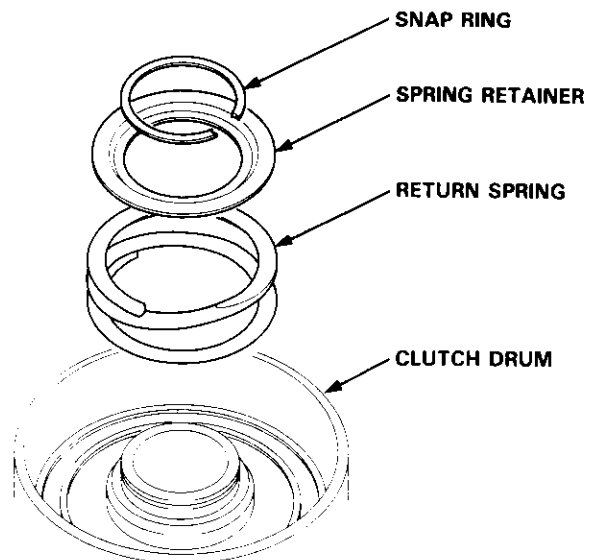
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

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

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

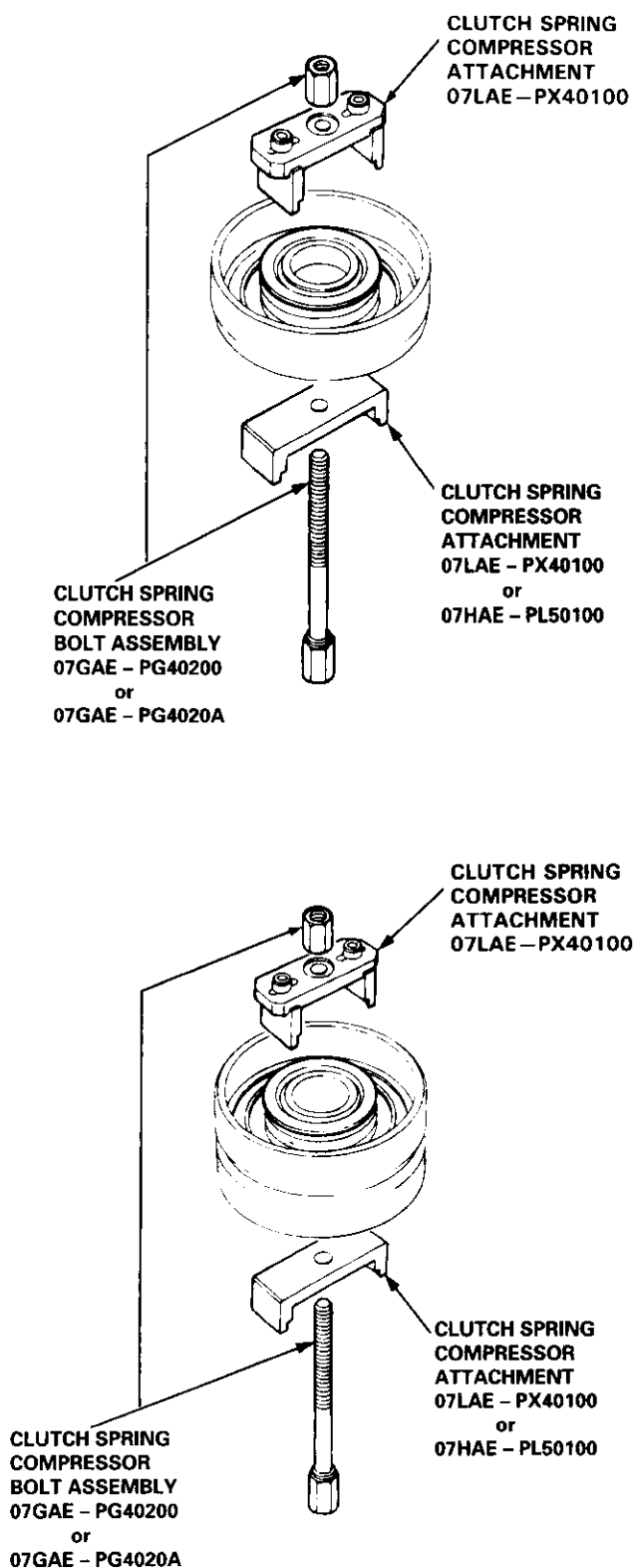


4. Install the return spring and spring retainer, and position the snap ring on the retainer.

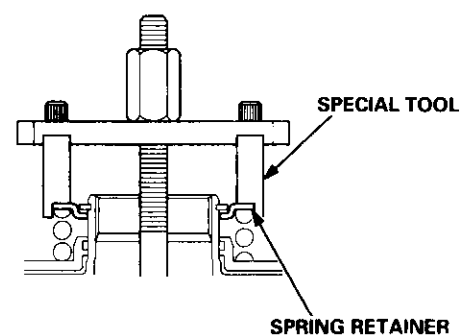
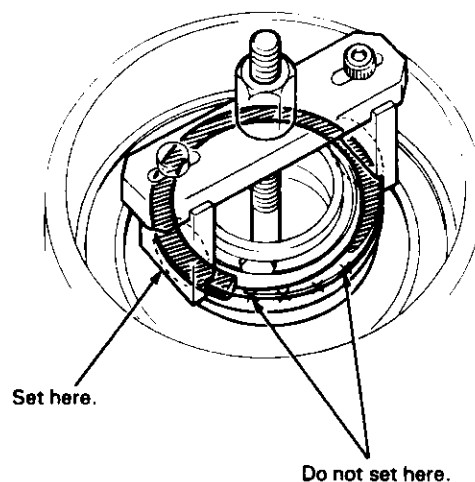




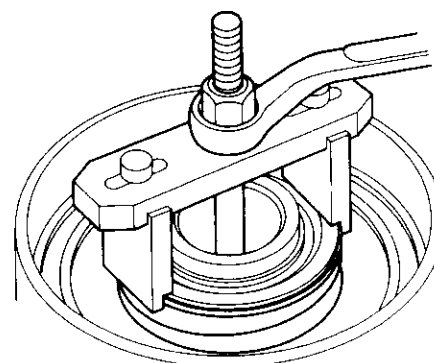
5. Install the special tools as shown.



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



6. Compress the return spring.



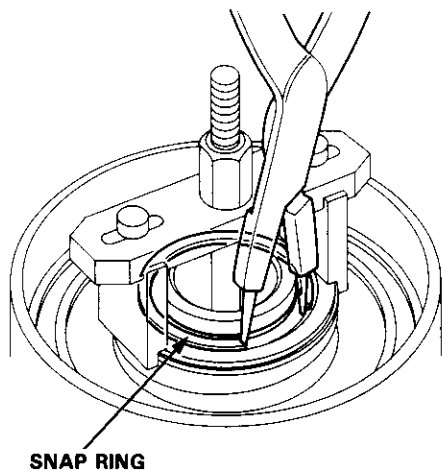
(cont'd)



# Clutch

## Reassembly (cont'd)

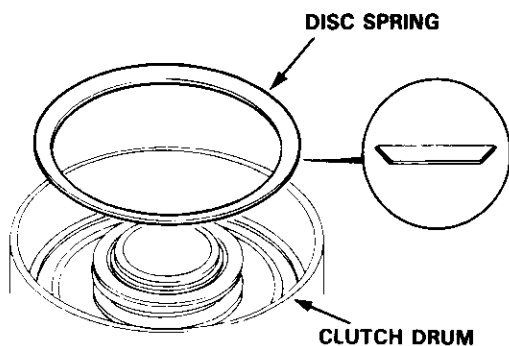
7. Install the snap ring.



8. Remove the special tools.

9. Install the disc spring.

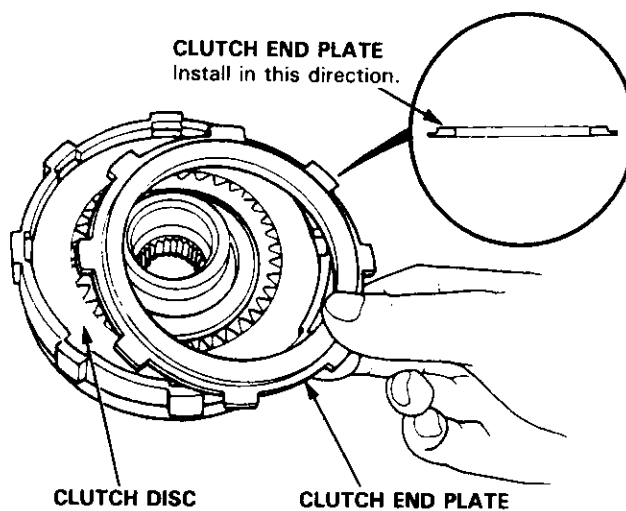
NOTE: Install the disc spring in the direction shown, except 2nd clutch.



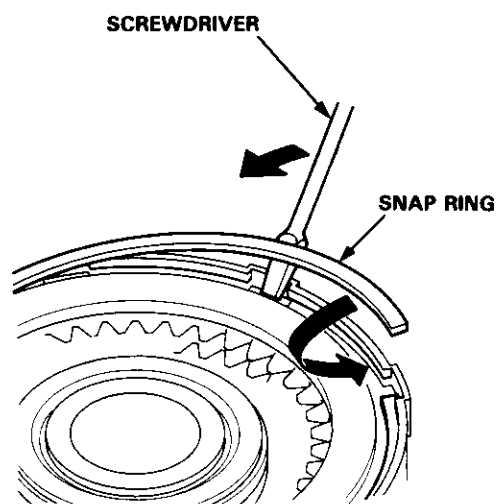
10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

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

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



12. Install the snap ring.



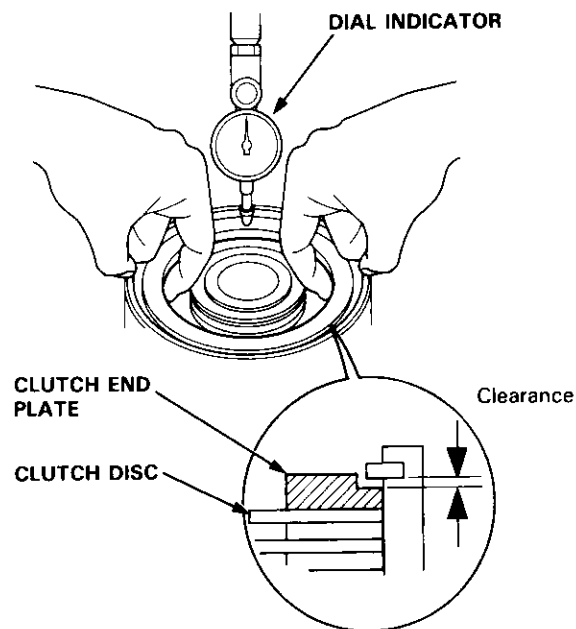


13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

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

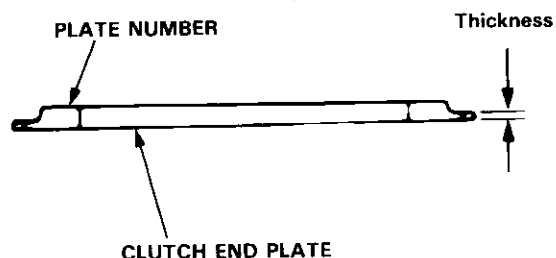
#### Clutch End Plate-to-Top Disc Clearance:

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



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

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



#### CLUTCH END PLATE

##### A4RA, B4RA Transmission:

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

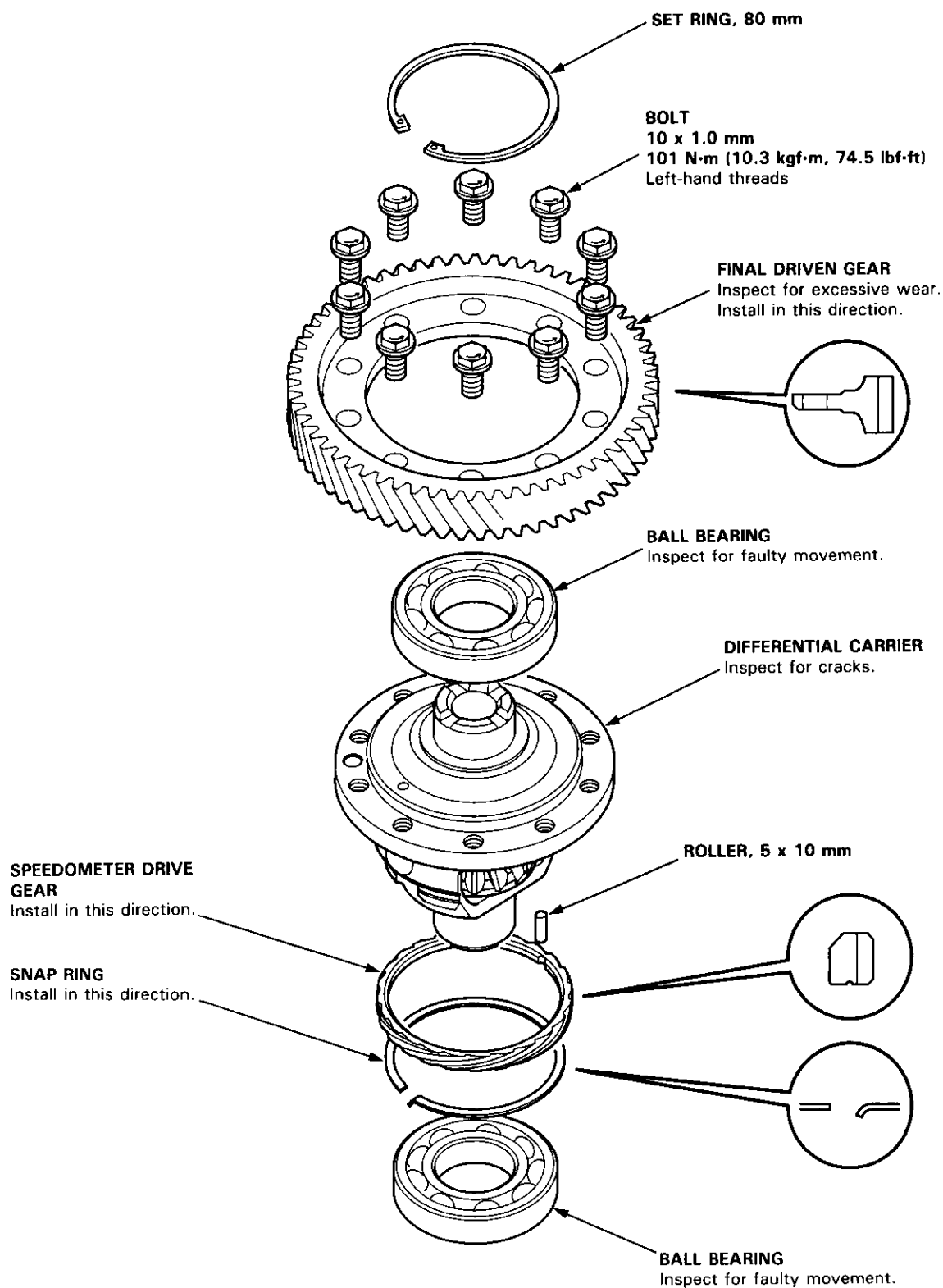
##### M4RA Transmission:

Plate No.	Part Number	Thickness
1	22551 – PC9 – 000	2.4 mm (0.094 in)
2	22552 – PC9 – 000	2.5 mm (0.098 in)
3	22553 – PC9 – 000	2.6 mm (0.102 in)
4	22554 – PC9 – 000	2.7 mm (0.106 in)
5	22555 – PC9 – 000	2.8 mm (0.110 in)
6	22556 – PC9 – 000	2.9 mm (0.114 in)
7	22557 – PC9 – 000	3.0 mm (0.118 in)
8	22558 – PC9 – 000	3.1 mm (0.122 in)
9	22559 – PC9 – 000	3.2 mm (0.126 in)
10	22560 – PC9 – 000	3.3 mm (0.130 in)
11	22561 – PC9 – 000	2.1 mm (0.082 in)
12	22562 – PC9 – 000	2.2 mm (0.086 in)
13	22563 – PC9 – 000	2.3 mm (0.090 in)
14	22574 – P4V – 003	3.4 mm (0.134 in)
15	22561 – P4V – 003	3.5 mm (0.138 in)
16	22562 – P4V – 003	3.6 mm (0.142 in)
17	22563 – P4V – 003	3.7 mm (0.146 in)
18	22564 – P4V – 003	3.8 mm (0.150 in)

15. After replacing the clutch end plate, make sure that the clearance is within tolerance.

# Differential

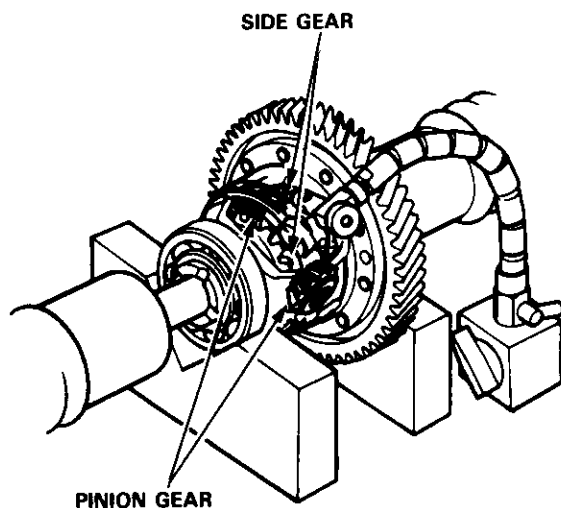
## Illustrated Index





## Backlash Inspection

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



2. Check backlash of both pinion gears.

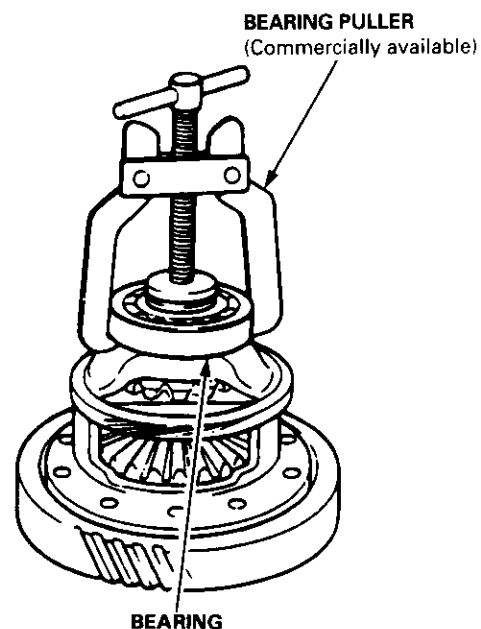
**Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)**

3. If backlash is out of tolerance, replace the differential carrier.

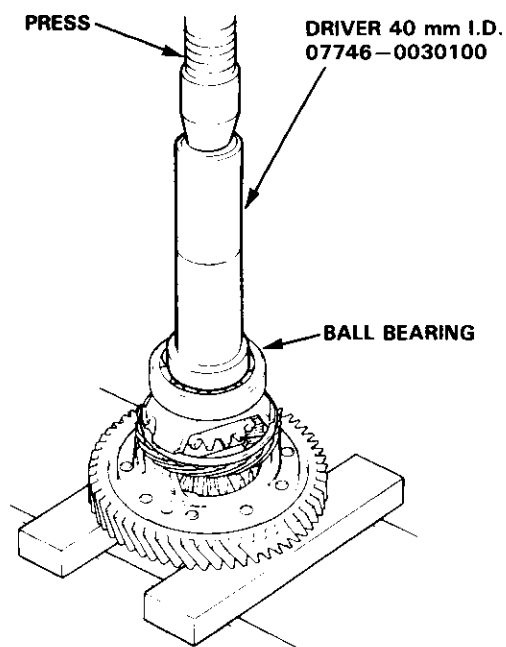
## Bearing Replacement

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

1. Remove bearings using a bearing puller.



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



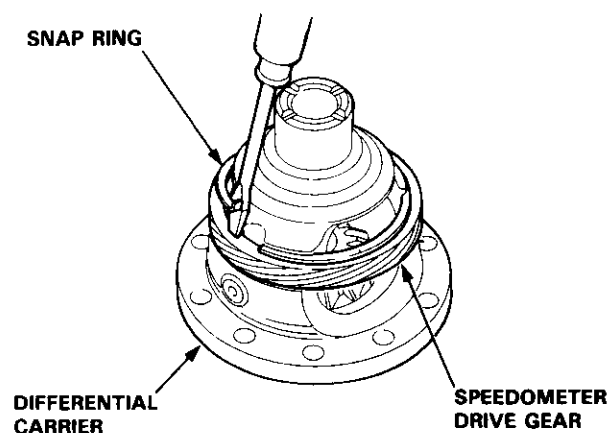
# Differential

## Differential Carrier Replacement

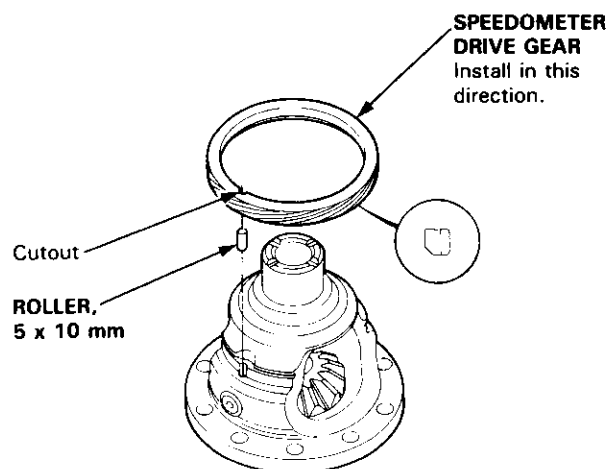
1. Remove the final driven gear from the differential carrier.

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

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

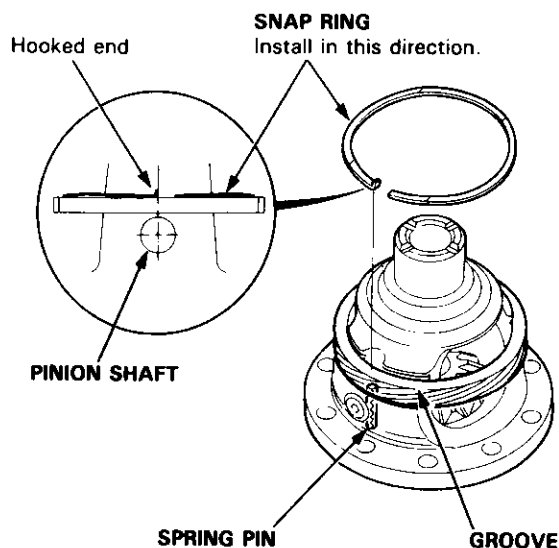


3. Install the 5 x 10 mm roller in the differential carrier.



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

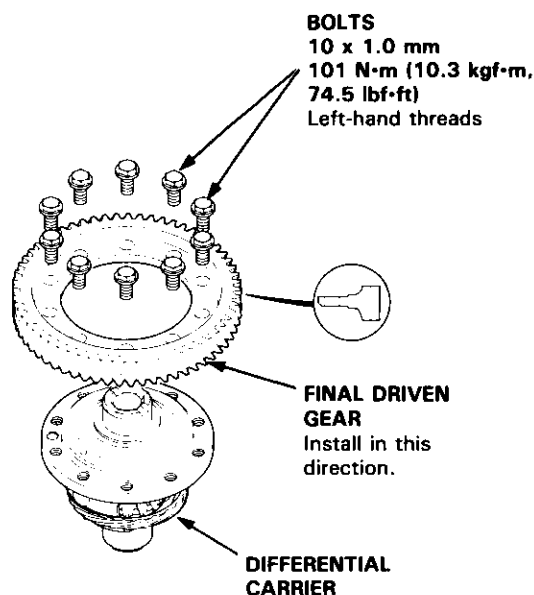
5. Align the hooked end of the snap ring with the pinion shaft as shown, then install the snap ring in the differential carrier groove.



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

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

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

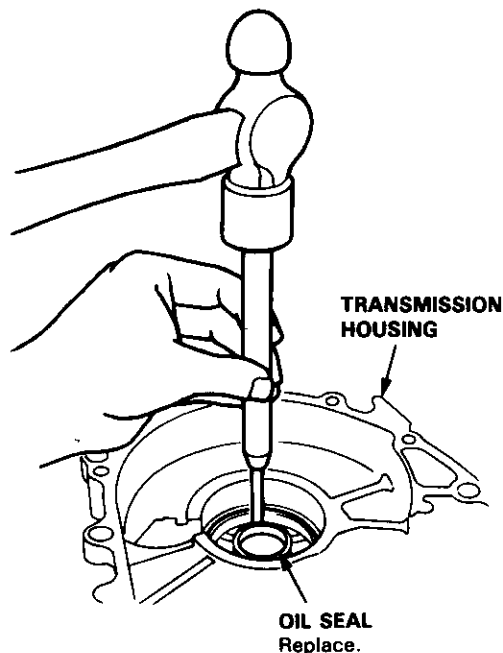


7. Install a new ball bearing (see page 14-167).

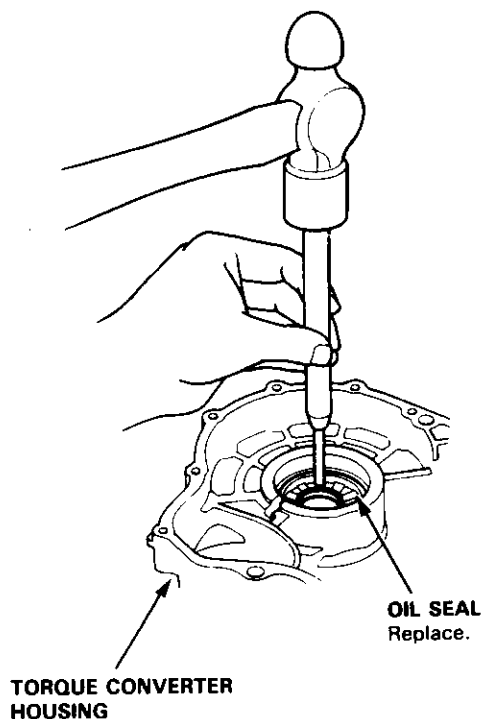


## Oil Seal Removal

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



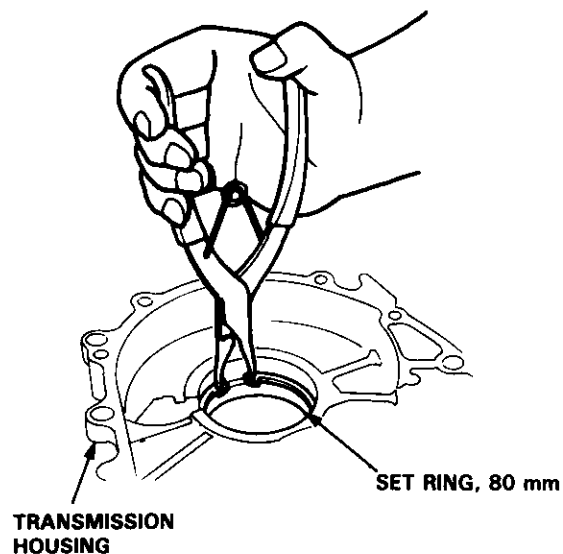
3. Remove the oil seal from the torque converter housing.



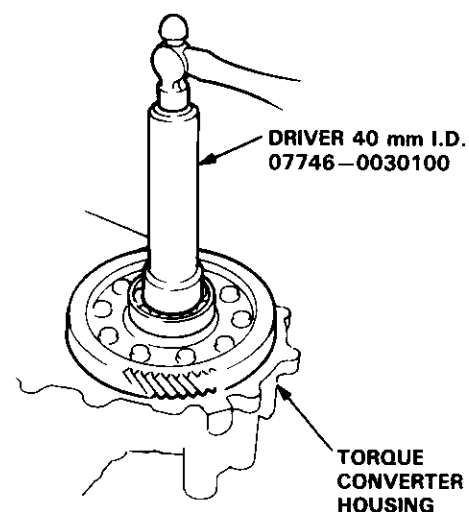
## Oil Seal Installation/Side Clearance

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

NOTE: Do not install the oil seal yet.



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



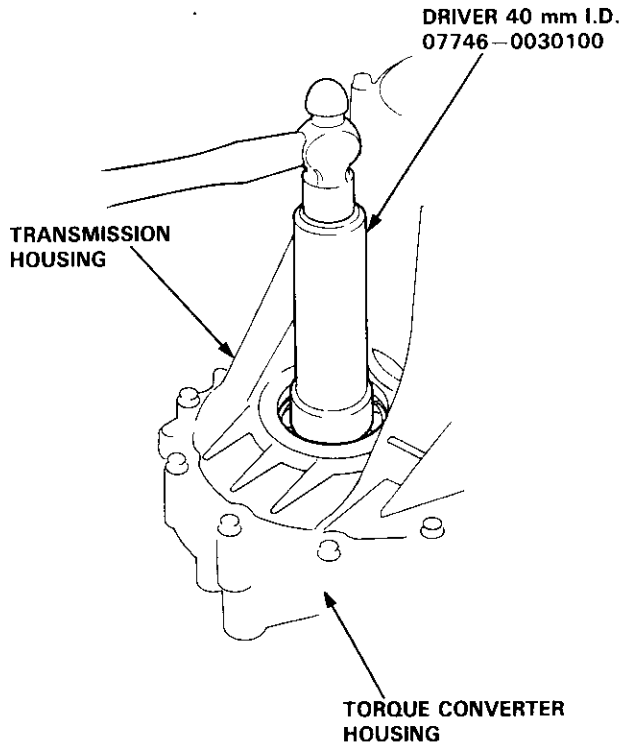
3. Install the transmission housing and tighten the bolts (see page 14-178 and 14-179).

(cont'd)

# Differential

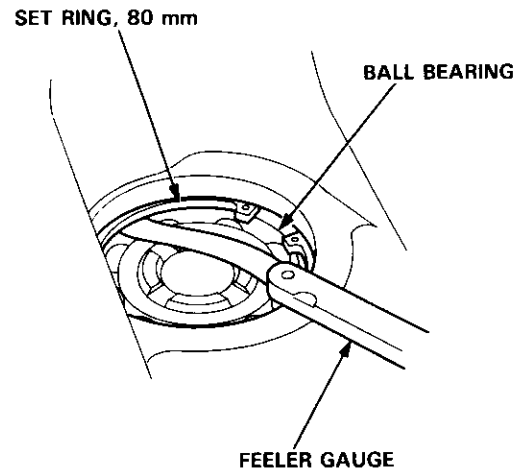
## Oil Seal Installation/Side Clearance (cont'd)

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



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

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



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

**SET RING, 80 mm**

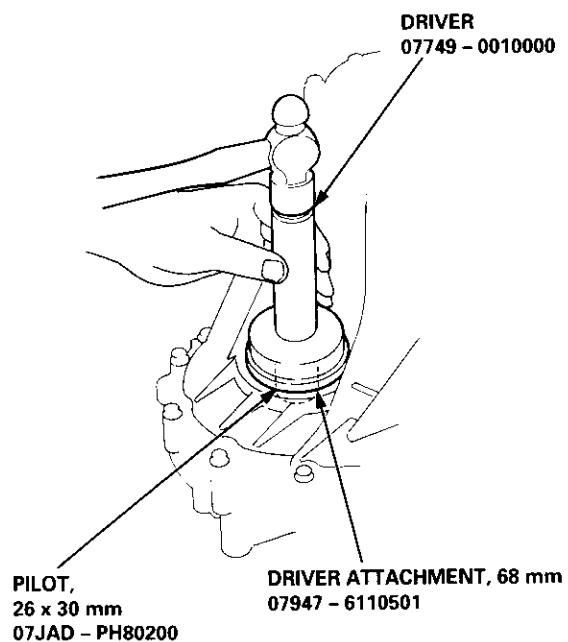
Part Number	Thickness
90414 - 689 - 000	2.50 mm (0.098 in)
90415 - 689 - 000	2.60 mm (0.102 in)
90416 - 689 - 000	2.70 mm (0.106 in)
90417 - 689 - 000	2.80 mm (0.110 in)
90418 - 689 - 000	2.90 mm (0.114 in)
90419 - PH8 - 000	3.00 mm (0.118 in)

**NOTE:** If the clearance measured in step 5 is standard, it is not necessary to perform steps 7 and 8.

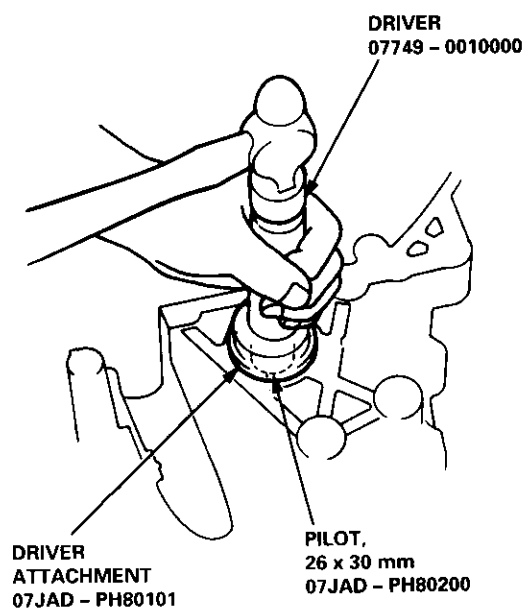
7. Remove the transmission housing.
8. Replace the 2.50 mm (0.098 in) 80 mm set ring with the one of the correct thickness selected in step 6.



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



10. Install the new oil seal flush with the torque converter housing using the special tools as shown.



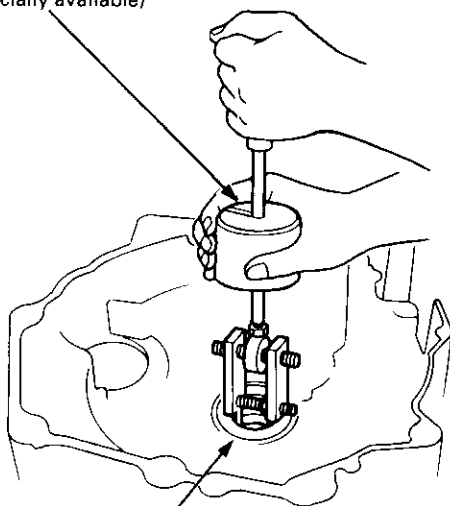


# Torque Converter Housing Bearings

## Mainshaft Bearing/Oil Seal Replacement

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

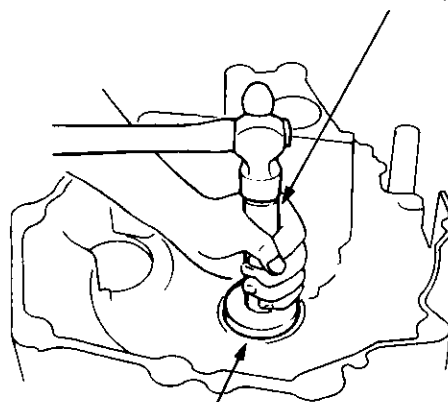
**3/8"-16 SLIDE HAMMER**  
(Commercially available)



**ADJUSTABLE BEARING  
PULLER, 25 - 40 mm**  
07736 - A01000A

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

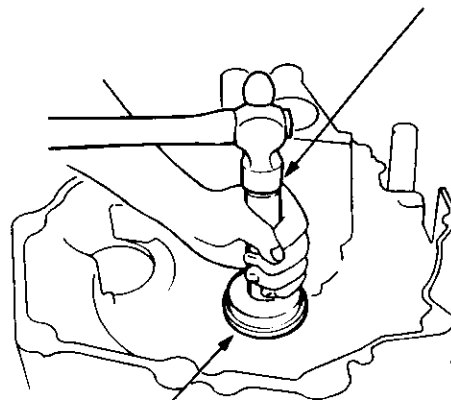
**DRIVER**  
07749 - 0010000



**ATTACHMENT,**  
62 x 68 mm  
07746 - 0010500

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

**DRIVER**  
07749 - 0010000

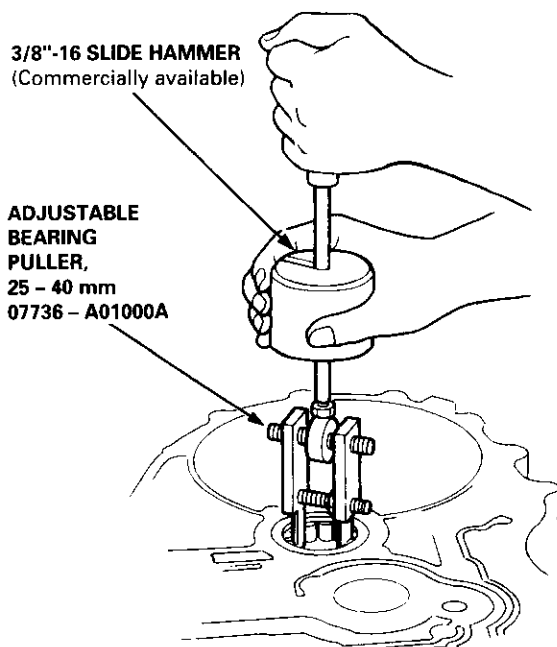


**ATTACHMENT,**  
72 x 75 mm  
07746 - 0010600

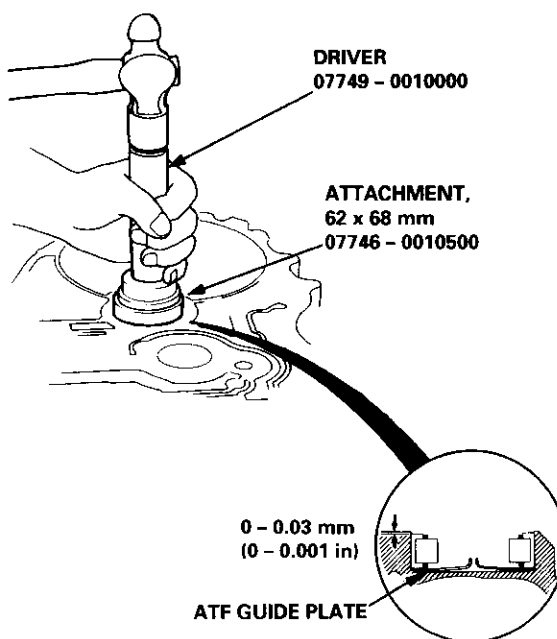


## Countershaft Bearing Replacement

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



2. Install the ATF guide plate.
3. Drive the new bearing into the housing using the special tools as shown.

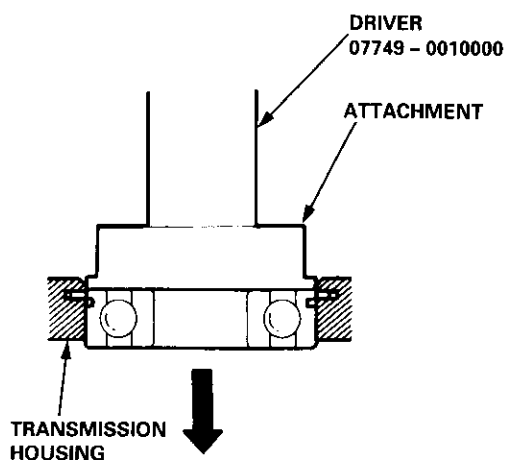
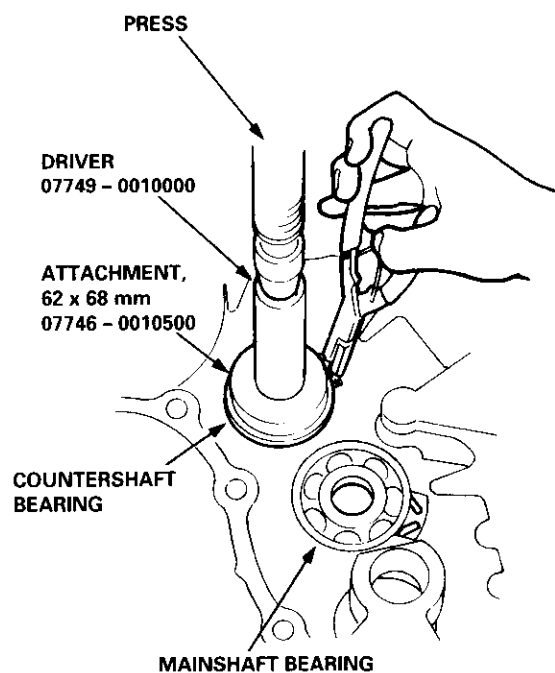


# Transmission Housing Bearings

## Mainshaft/Countershaft Bearings Replacement

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

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



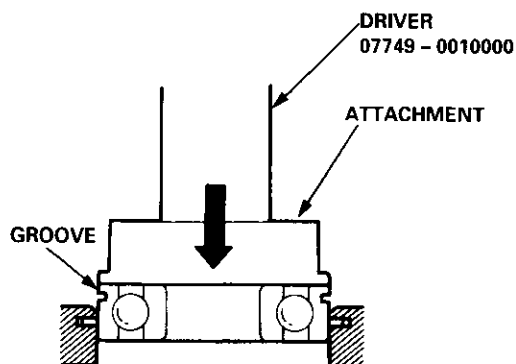
### ATTACHMENT

- Mainshaft Bearing Installation use:  
ATTACHMENT, 72 x 75 mm  
07746 - 0010600
- Countershaft Bearing Installation use:  
ATTACHMENT, 62 x 68 mm  
07746 - 0010500

2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

NOTE: Coat all parts with ATF.

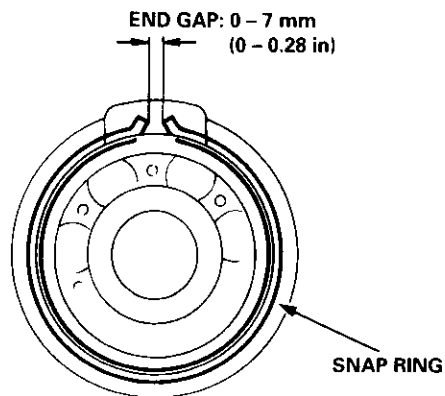
3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it.



### ATTACHMENT

- Mainshaft Bearing Removal use:  
ATTACHMENT, 72 x 75 mm  
07746 - 0010600
- Countershaft Bearing Removal use:  
ATTACHMENT, 62 x 68 mm  
07746 - 0010500

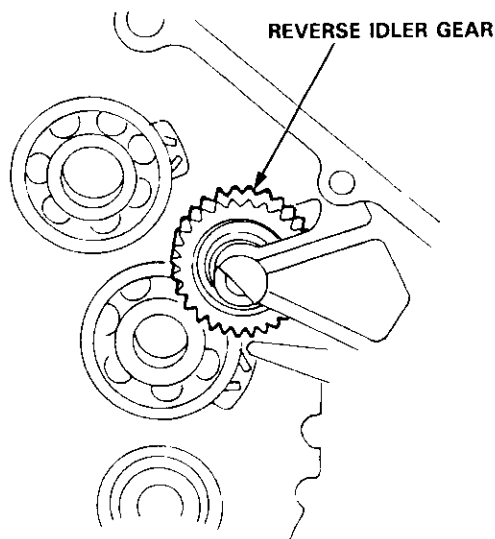
4. After installing the bearing verify the following:
  - The snap ring is seated in the bearing and housing grooves.
  - The ring end gap is correct.



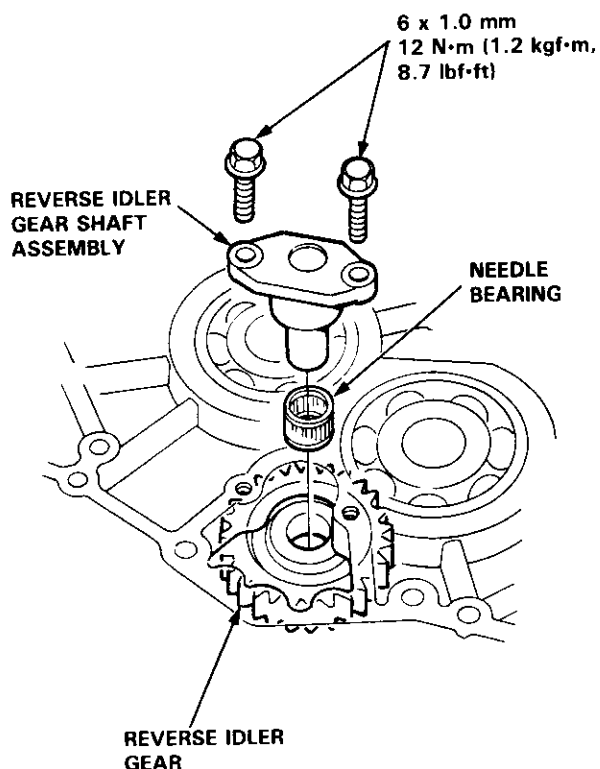


## Installation

1. Install the reverse idler gear.



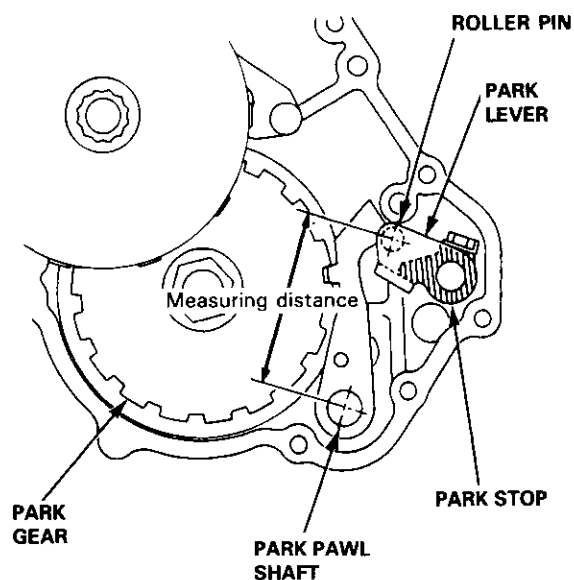
2. Install the reverse idler gear shaft holder and needle bearing into the transmission housing, then tighten the bolts.



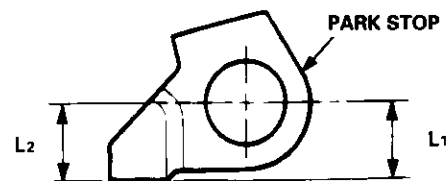
## Inspection/Adjustment

1. Set the park lever in the **P** position.
2. Measure the distance between the park pawl shaft and the park lever roller pin as shown.

**STANDARD: 72.9 – 73.9 mm (2.87 – 2.91 in)**



3. If the measurement is out of tolerance, select and install the appropriate park stop from the table below.



### PARK STOP

Mark	Part Number	L <sub>1</sub>	L <sub>2</sub>
1	24537 – PA9 – 003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538 – PA9 – 003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539 – PA9 – 003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the park stop, make sure the distance is within tolerance.

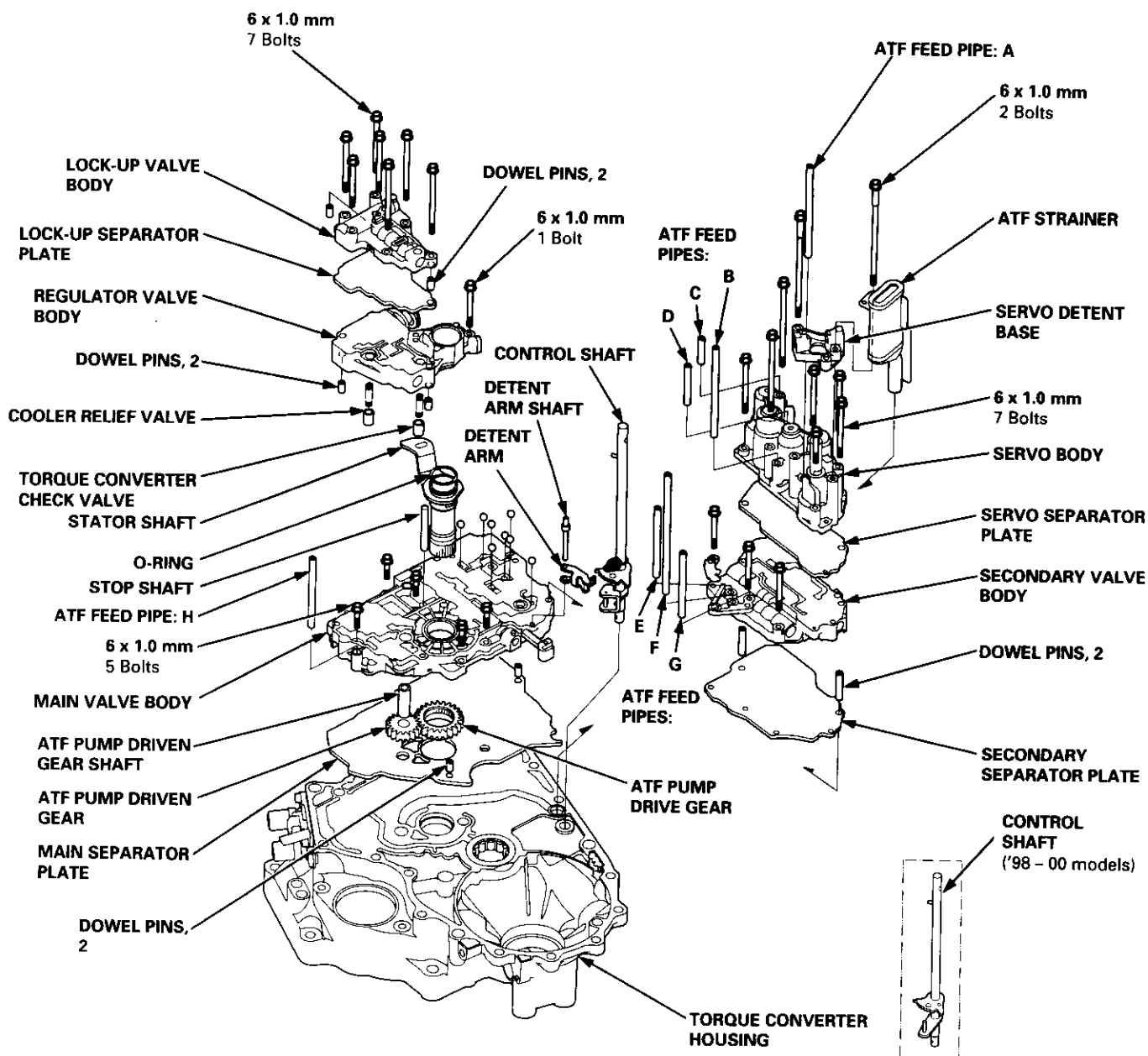
# Transmission

## Reassembly

### NOTE:

- Coat all parts with ATF.
- Replace the following parts:
  - O-rings
  - Lock washers
  - Gaskets
  - Mainshaft and countershaft locknuts and conical spring washers
  - Sealing washers

**TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)**

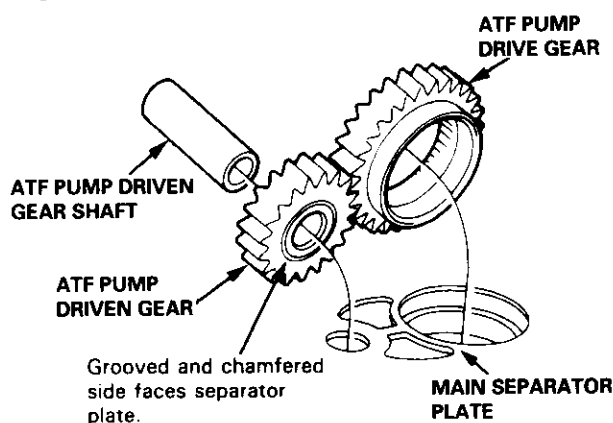


NOTE: The illustration shows the '96 - 98 models, the '99 - 00 models do not have the servo detent base; the servo detent is integral with the servo body.



1. Install the ATF magnet and suction pipe collar in the torque converter housing, if necessary.
2. Install the main separator plate and the two dowel pins on the torque converter housing.
3. Install the ATF pump drive gear, ATF pump driven gear and ATF pump driven gear shaft on the torque converter housing.

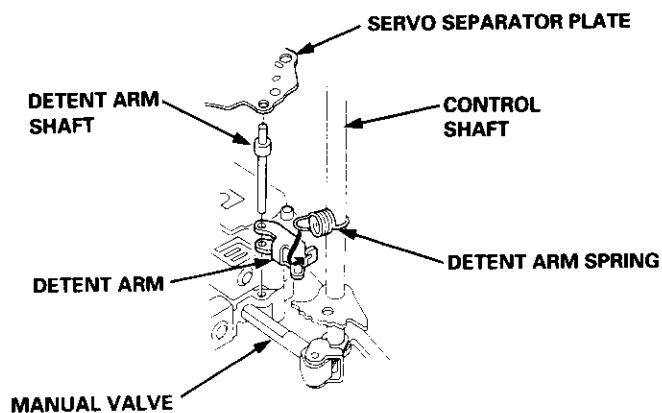
NOTE: Install the ATF pump driven gear with its grooved and chamfered side facing down.



4. Loosely install the main valve body with five bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.
5. Install the secondary valve body, separator plate and two dowel pins on the main valve body.

NOTE: Do not install the bolts.

6. Install the control shaft in the housing with the control shaft and manual valve together.
7. Install the detent arm and arm shaft in the main valve body, then hook the detent arm spring to the detent arm.



8. Install the servo body and separator plate on the secondary valve body ('96 - 98 models: seven bolts, '99 - 00 models: eight bolts).

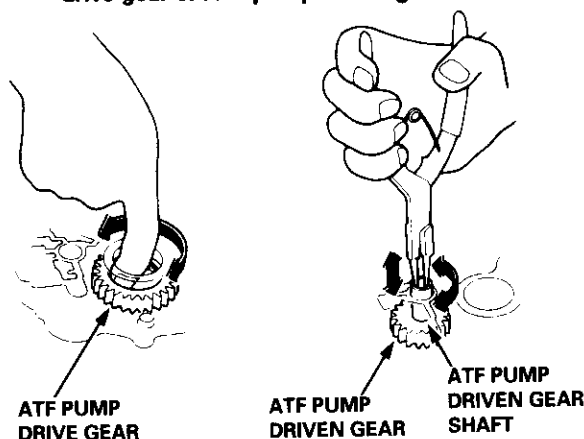
9. For '96 - 98 models: Install the servo detent base and the ATF strainer (two bolts).  
For '99 - 00 models: Install the ATF strainer (one bolt).

10. Tighten the five bolts on the main valve body to 12 N·m (1.2 kgf-m, 8.7 lbf-ft).  
Make sure the ATF pump drive gear and ATF pump driven gear shaft move smoothly.

11. If the ATF pump drive gear and ATF pump driven gear shaft do not move freely, loosen the five bolts on the main valve body, and disassemble the valve bodies.

Realign the ATF pump driven gear shaft and reassemble the valve bodies, then retighten the bolts to the specified torque.

**CAUTION:** Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.



12. Install the stator shaft and stop shaft.

13. Install the bolts and the shaft stop on the secondary valve body, then tighten the bolts (three bolts).

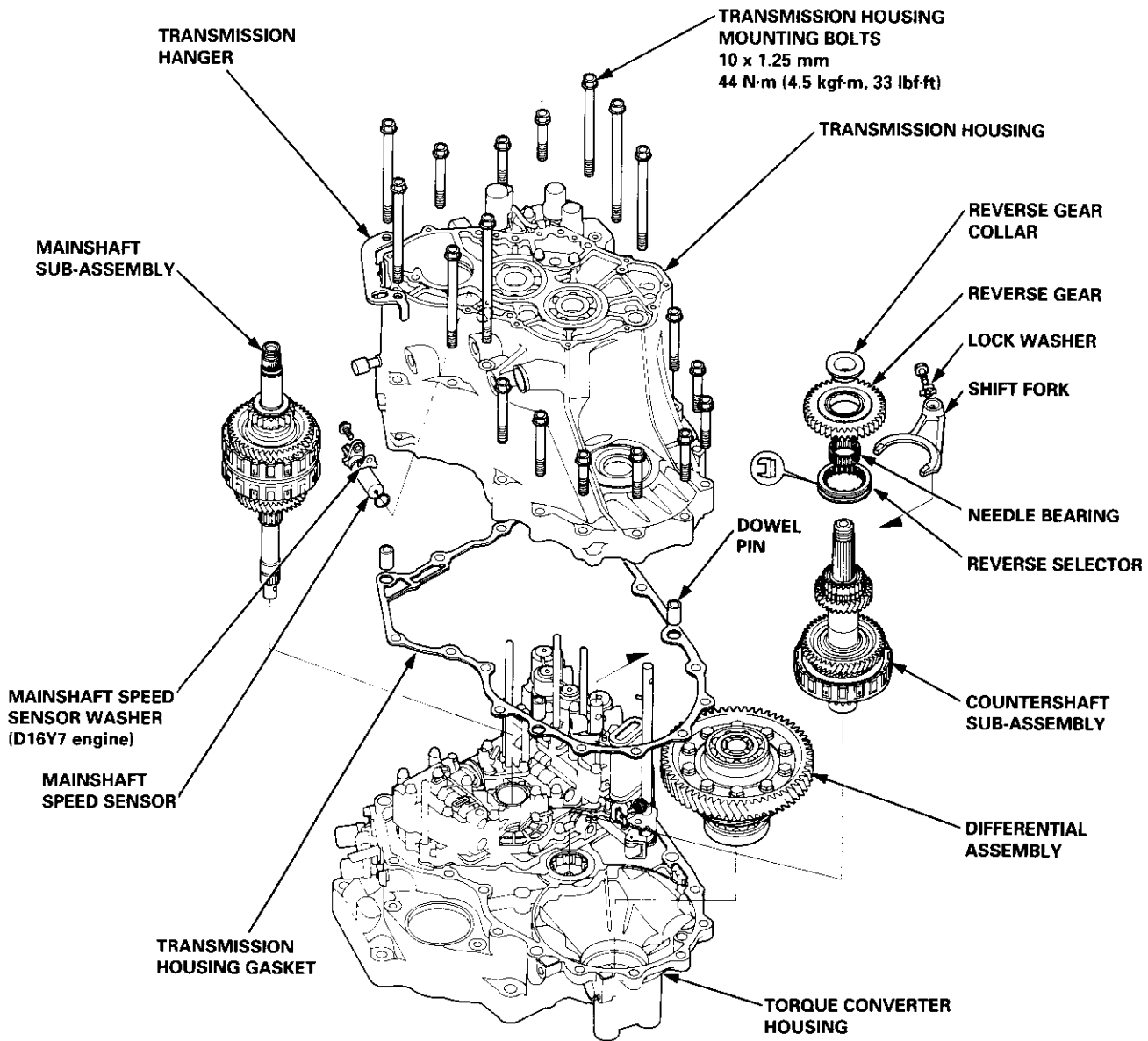
14. Install the torque converter check valve, cooler relief valve and valve springs in the regulator valve body, then install the regulator valve body on the main valve body (one bolt).

15. Install the lock-up valve body on the regulator valve body (seven bolts).

16. Install the ATF feed pipes in the main valve body, the three ATF feed pipes in the secondary valve and the four ATF feed pipes in the servo body. (cont'd)

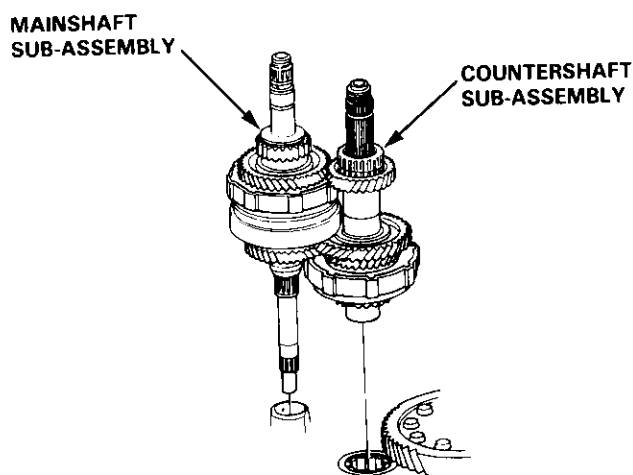
# Transmission

## Reassembly (cont'd)

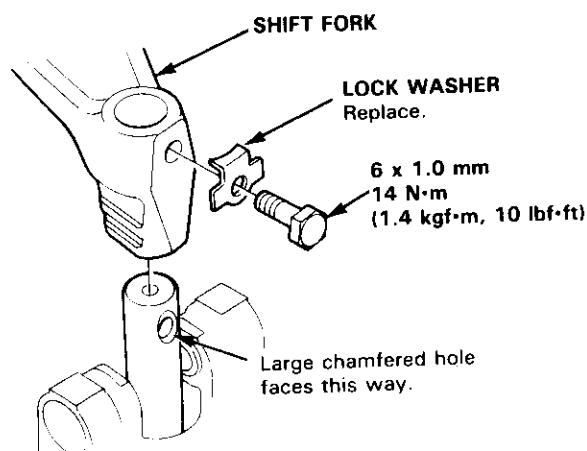




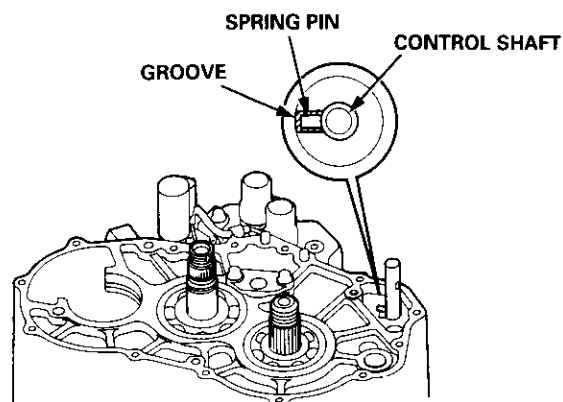
17. Install the reverse idler gear and the gear shaft holder (see page 14-175).
18. Install the differential assembly in the torque converter housing.
19. Assemble the mainshaft sub-assembly and the countershaft sub-assembly, then install them together in the torque converter housing.



20. Turn the shift fork so the large chamfered hole is facing the fork bolt hole, then install the shift fork with the reverse selector, and tighten the lock bolt. Bend the lock tab against the bolt head.



21. Install the needle bearing, countershaft reverse gear and reverse gear collar on the countershaft.
22. Align the spring pin on the control shaft with the transmission housing groove by turning the control shaft.

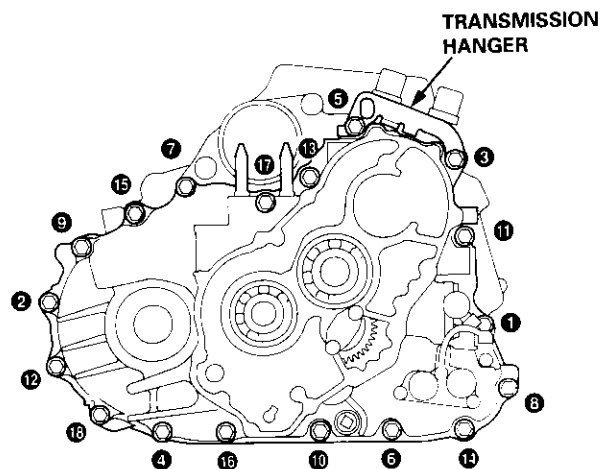


23. Install the two dowel pins and a new gasket on the torque converter housing.
24. Place the transmission housing on the torque converter housing.

**CAUTION:** Make sure that the mainshaft speed sensor is not installed on the transmission housing before installing the transmission housing on the torque converter housing.

25. Install the transmission housing mounting bolts along with the transmission hanger, then tighten the bolts in two or more steps in the sequence as shown.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**



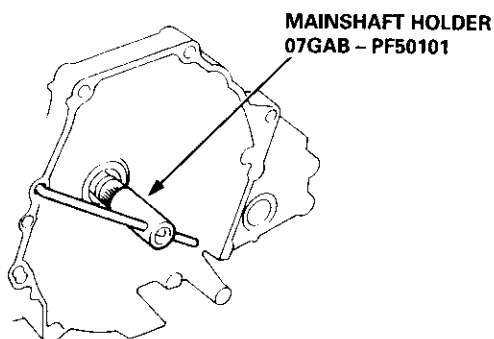
(cont'd)



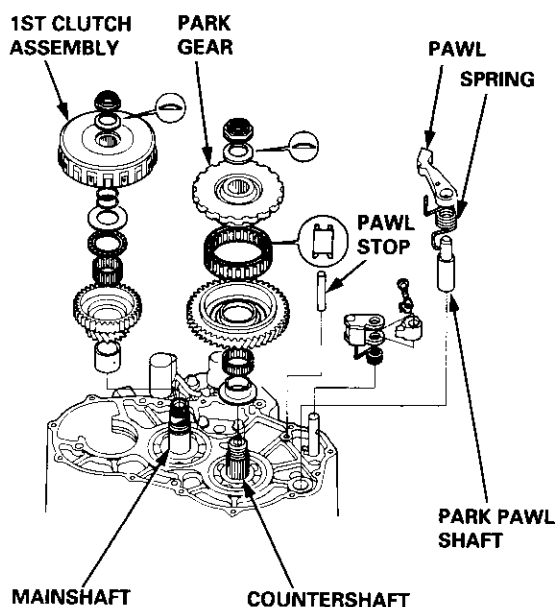
# Transmission

## Reassembly (cont'd)

26. Slip the special tool onto the mainshaft as shown.



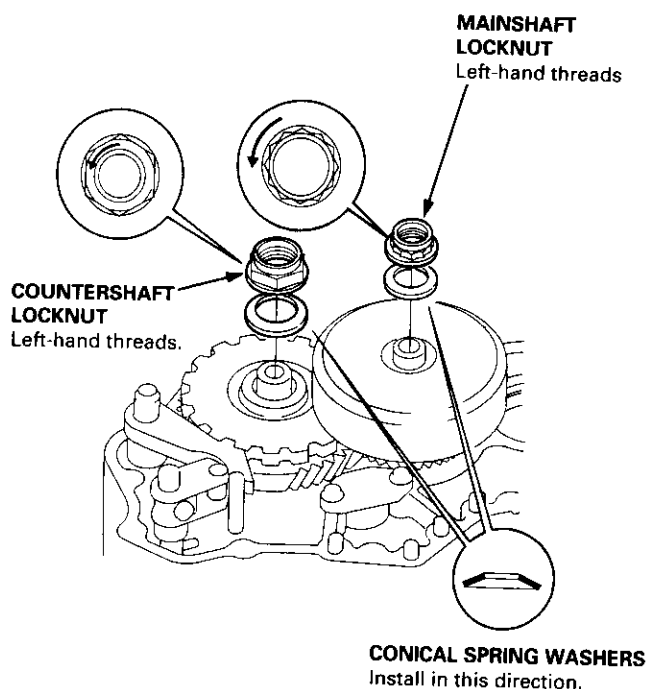
27. Install the park lever on the control shaft.
28. Assemble the one-way clutch and the park gear with the countershaft 1st gear (see page 14-155).
29. Install the countershaft 1st gear collar, needle bearing, and the countershaft 1st gear/park gear assembly on the countershaft.



30. Install the park pawl shaft, spring, pawl, and pawl stop on the transmission housing, then engage the park pawl with the park gear.

31. Install the mainshaft 1st gear collar on the mainshaft.
32. Wrap the shaft splines with tape to prevent the O-rings, then install new O-rings on the mainshaft.
33. Assemble the thrust washer, thrust needle bearing, needle bearing, and mainshaft 1st gear in the 1st clutch assembly, then install them on the mainshaft.
34. Install new conical spring washers and locknuts on each shaft.

**CAUTION:** Install the conical spring washers in the direction shown.



35. Tighten the locknuts to the specified torque.

### NOTE:

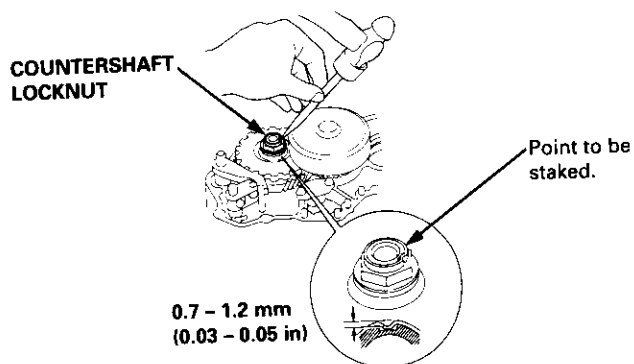
- Do not use an impact wrench. Always use a torque wrench to tighten the locknut.
- Mainshaft and countershaft locknuts have left-hand threads.

### TORQUE:

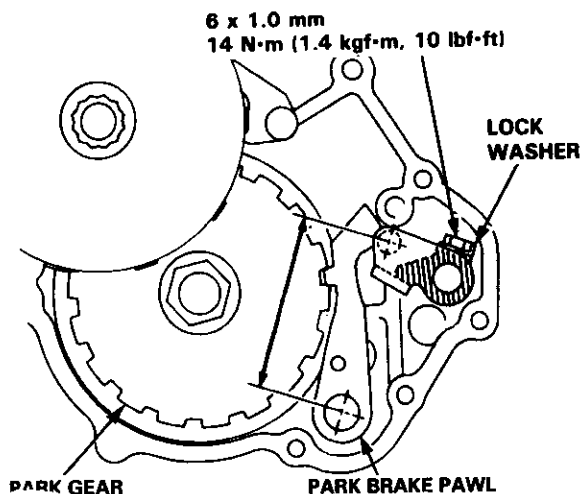
**MAINSHAFT** 78 N·m (8.0 kgf·m, 58 lbf·ft)  
**COUNTERSHAFT** 103 N·m (10.5 kgf·m, 75.9 lbf·ft)



36. Remove the special tool from mainshaft, then stake each locknut using a 3.5 mm punch as shown.

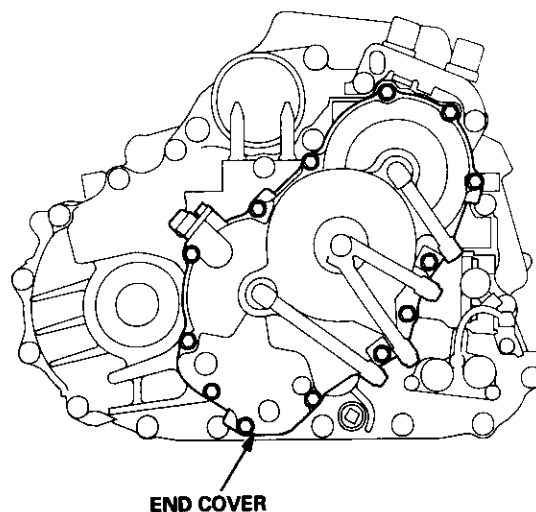


37. Set the park lever in the **P** position, then verify that the park pawl engages the park gear.
38. If the pawl does not engage fully, check the park pawl stop clearance (see page 14-175).
39. Tighten the lock bolt and bend the lock tab.



40. Install the end cover with two dowel pins and a new gasket (thirteen bolts).

**TORQUE: 12 N·m (1.2 kgf-m, 8.7 lbf-ft)**

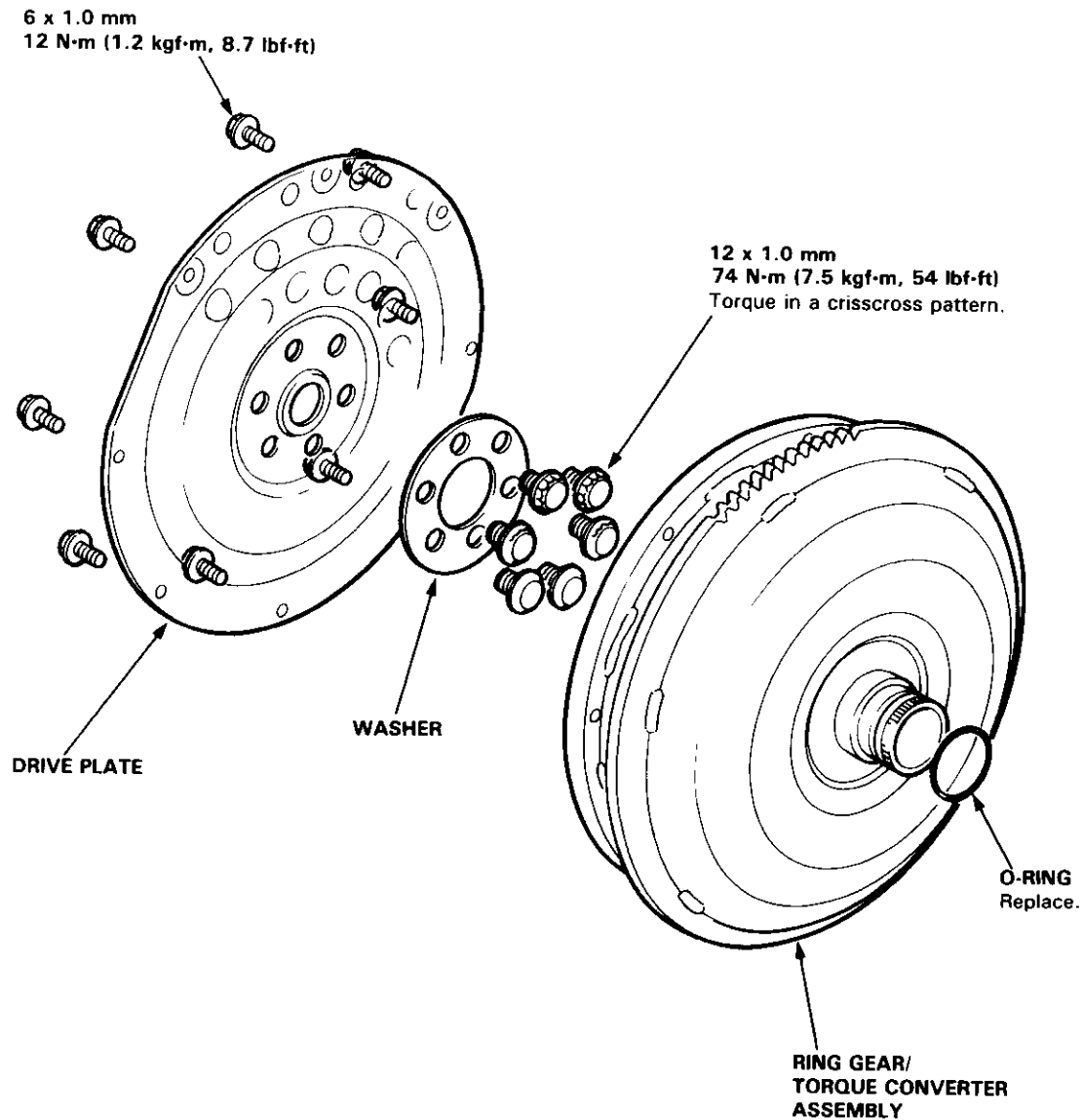


41. Install the ATF cooler lines with new sealing washers.

**TORQUE: 28 N·m (2.9 kgf-m, 21 lbf-ft)**

42. Install the ATF dipstick.

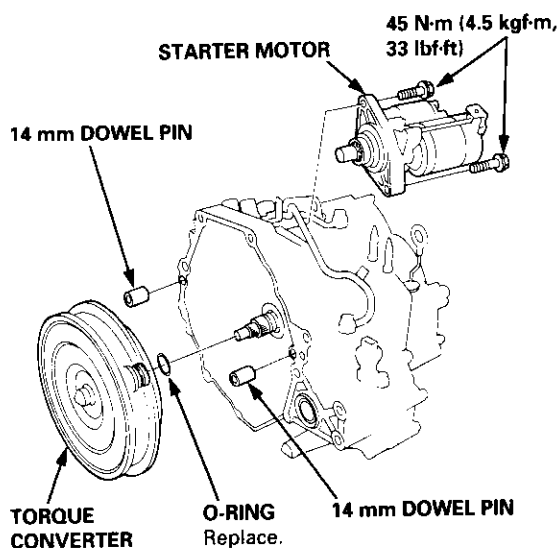
# Torque Converter/Drive Plate



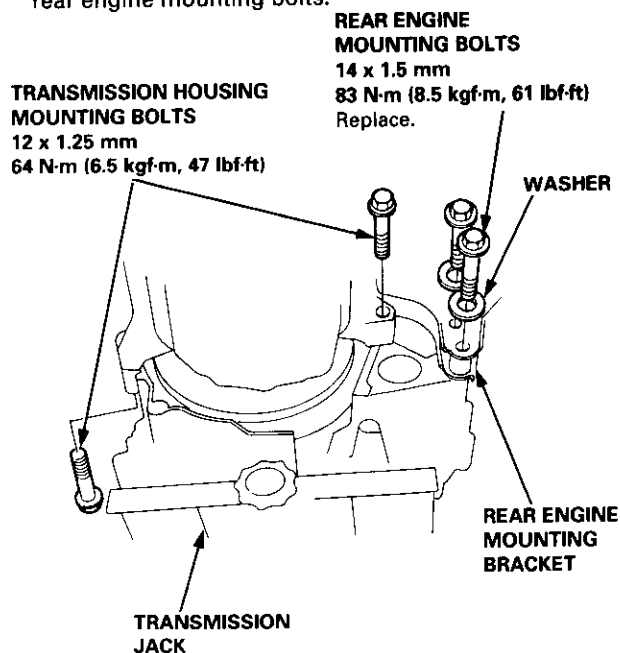


## Installation

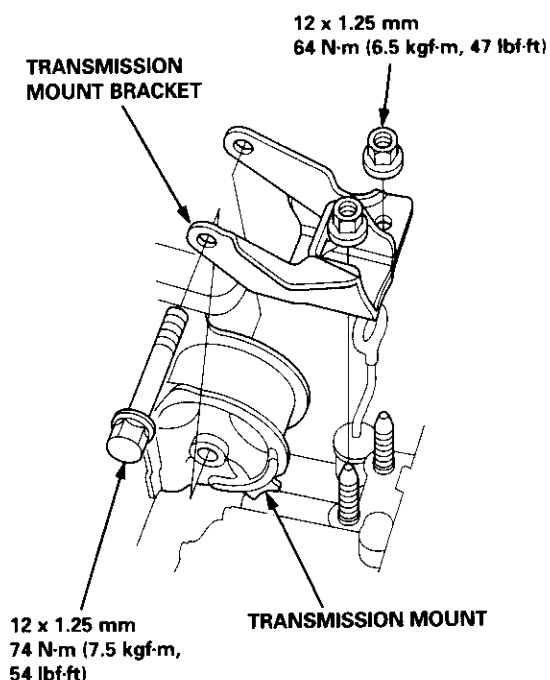
1. Flush the ATF cooler as described on page 14-187 and 14-188.
2. Install the torque converter assembly securely with a new O-ring on the mainshaft.



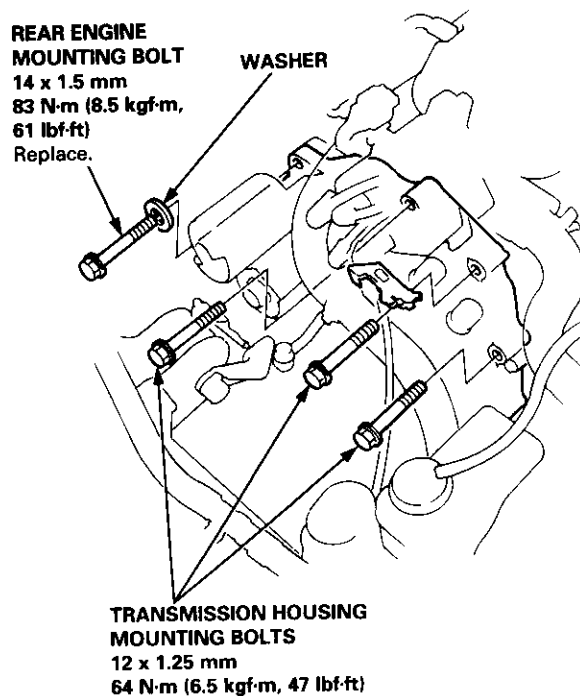
3. Install the starter motor on the torque converter housing, then install the two 14 mm dowel pins in the torque converter housing.
4. Place the transmission on a jack, and raise it to the engine assembly level.
5. Attach the transmission to the engine, then install two transmission housing mounting bolts and two rear engine mounting bolts.



6. Install the transmission mount bracket.



7. Install the remaining transmission housing mounting bolts and remaining rear engine mounting bolt.



8. Remove the transmission jack.

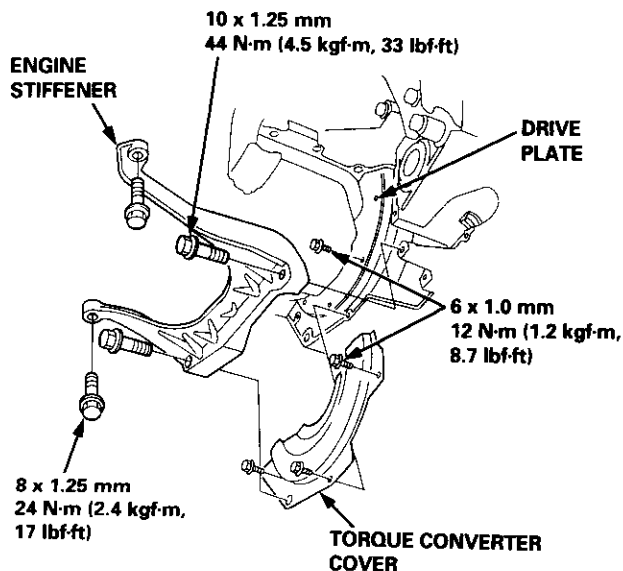
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# Transmission

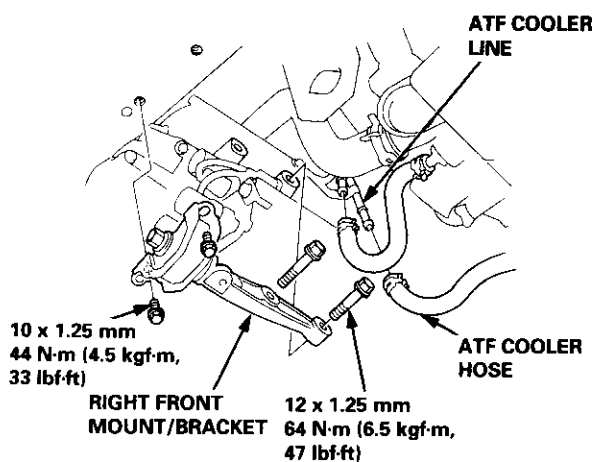
## Installation (cont'd)

9. Attach the torque converter to the drive plate with eight drive plate bolts and torque as follows: Rotate the crankshaft pulley as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.

**TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)**



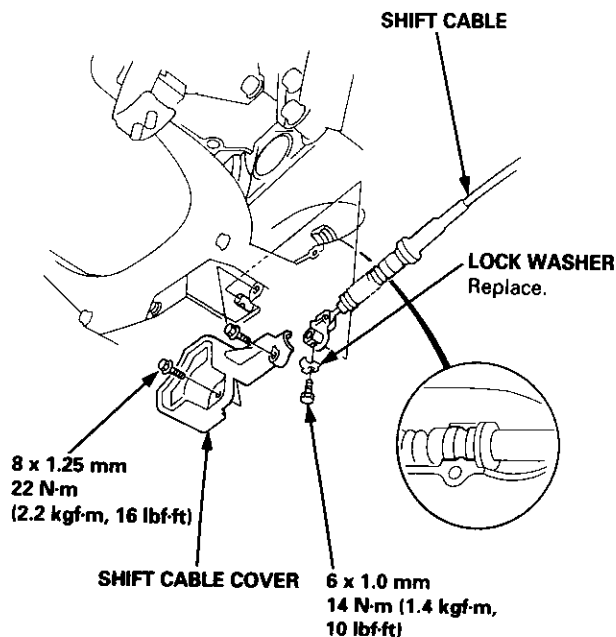
10. Install the torque converter cover and the engine stiffener.  
11. Tighten the crankshaft pulley bolt, if necessary (see section 6).  
12. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-192).



13. Install the right front mount/bracket.

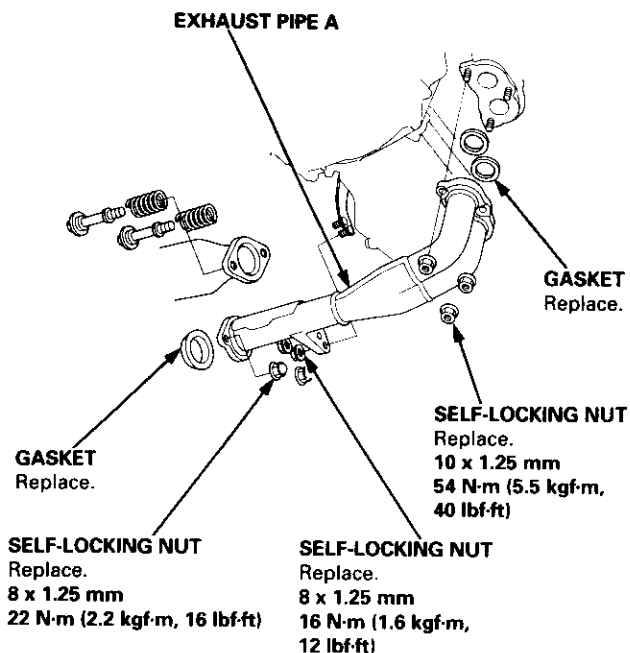
14. Install the control lever with a new lock washer to the control shaft, then install the shift cable cover.

**CAUTION: Take care not to bend the shift cable.**



15. Install the exhaust pipe A.

**NOTE: D16Y8 engine is shown; D16Y7 engine is similar.**





16. Install a new set ring on the end of each driveshaft.  
17. Install the right and left driveshafts (see section 16).  
**CAUTION:** While installing the driveshafts in the differential, be sure not to allow dust and other foreign particles to enter into the transmission.

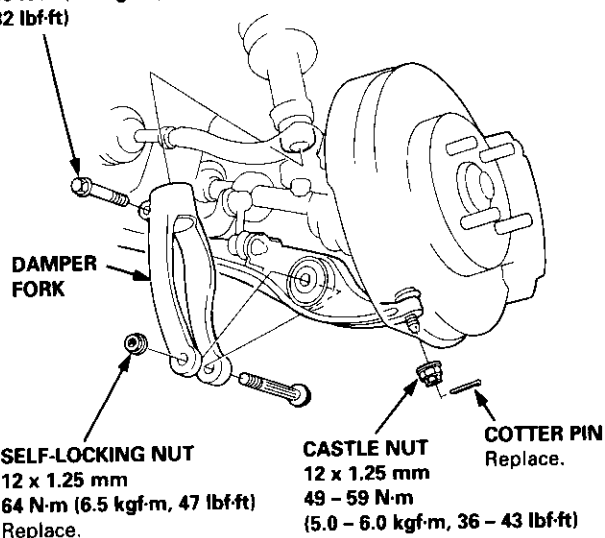
**NOTE:**

- Clean the areas where the driveshafts contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.
- Turn the right and left steering knuckle fully outward, and slide each driveshaft into the differential until you feel its set ring clip engage the side gear.

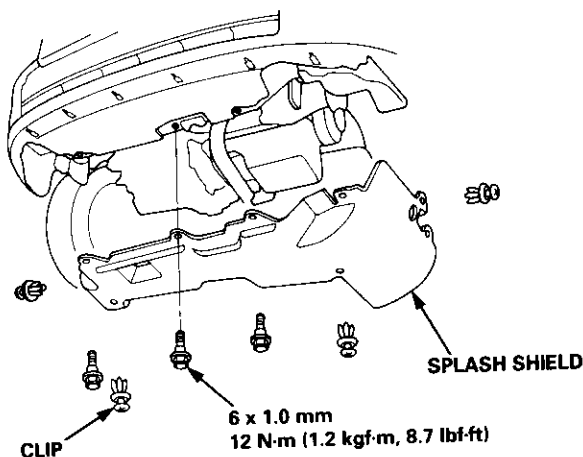
18. Install the damper fork, then install the right and left ball joints to the each lower arm with the castle nuts and new cotter pins.

**DAMPER PINCH BOLT**

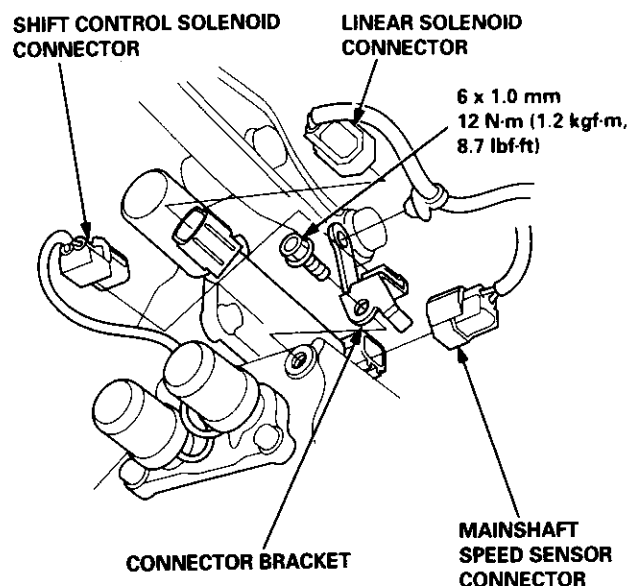
10 x 1.25 mm  
43 N·m (4.4 kgf·m,  
32 lbf·ft)



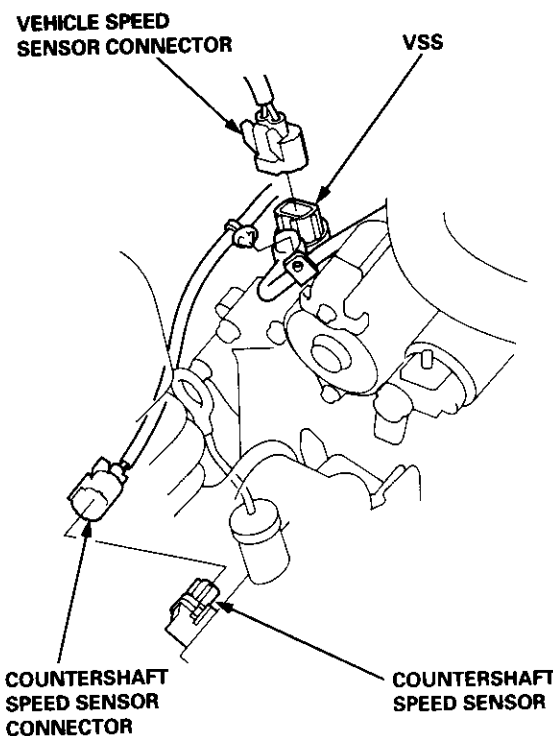
19. Install the splash shield.



20. Connect the mainshaft speed sensor, the linear solenoid and the shift control solenoid connectors.



21. Connect the countershaft speed sensor and the vehicle speed sensor (VSS) connectors.

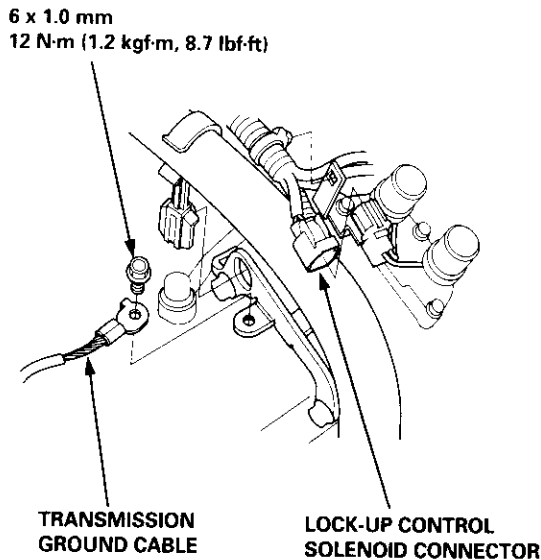


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# Transmission

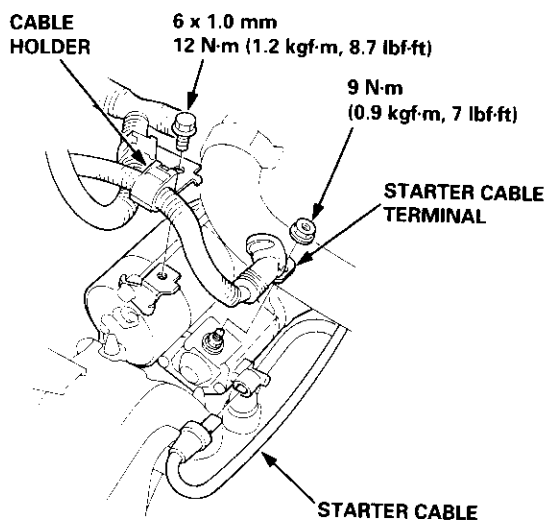
## Installation (cont'd)

22. Connect the lock-up control solenoid connector, and install the transmission ground cable.



23. Connect the starter cables on the starter motor, and install the cable holder.

NOTE: When installing the starter cable terminal, make sure that the crimped side of the ring terminal is facing out (see section 23).



24. Install the intake air duct.

### D16Y7 engine:

Install the intake air duct and the resonator.

### D16Y8 engine:

Install the intake air duct and the air cleaner housing assembly.

25. Refill the transmission with ATF (see page 14-118).
26. Connect the positive (+) cable first, then the negative (-) cable to the battery.
27. Check the ignition timing (see section 23).
28. Start the engine. Set the parking brake, and shift the transmission through all gears, three times. Check the shift cable adjustment (see page 14-190).
29. Check the front wheel alignment (see section 18).
30. Let the engine reach operating temperature (the cooling fan comes on) with the transmission in **N** or **P** position, then turn it off and check the fluid level (see page 14-117).
31. Road test as described on pages 14-113 thru 14-116.



## Cooler Flushing

**⚠ WARNING** To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

NOTE: This procedure should be performed before reinstalling the transmission.

1. Check the tool and hoses for wear and cracks before using. If wear or cracks are found, replace the hoses before using.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 - 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.

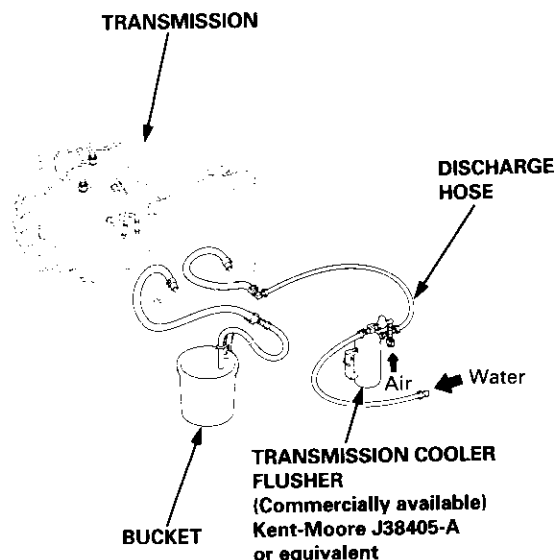
3. Secure the flusher filler cap, and pressurize the tank with compressed air to between 550 - 829 kpa (5.6 - 8.45 kgf/cm<sup>2</sup>, 80 - 120psi).

NOTE: The air line should be equipped with a water trap to ensure a dry air system.

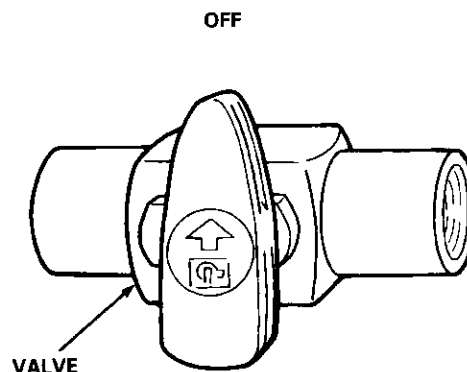
4. Hang the tool under the vehicle.
5. Attach the tank's discharge hose to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line on the transmission cooler using a clamp.

### IMPORTANT:

Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Hot water if available.)



8. Turn on the flusher water valve so water will flow through the cooler for 10 seconds.

NOTE: If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.

9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. While flushing with the water and flushing fluid for two minutes, turn the air valve on for five seconds every 15 - 20 seconds to create a surging action.  
AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm<sup>2</sup>, 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water only for one minute.
13. Turn the water valve off, and turn off the water supply.
14. Turn the air valve on to dry the system out with air for two full minutes or until no moisture is visible leaving the drain hose.

**CAUTION: Residual moisture in the cooler or pipes can damage the transmission.**

15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.

(cont'd)



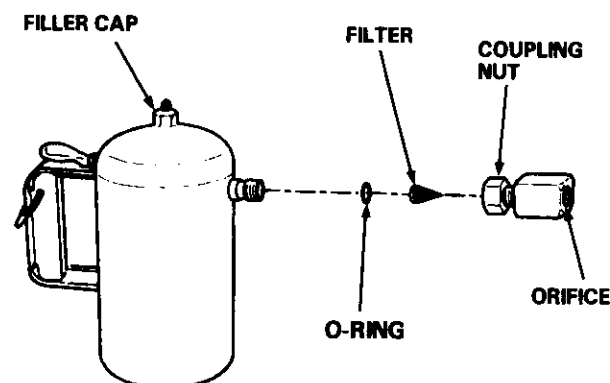
# Transmission

## Cooler Flushing (cont'd)

17. Make sure the transmission is in the **P** position.  
Fill the transmission with ATF, and run the engine for 30 seconds or until approximately 0.95 l (1.0 US qt., 0.8 Imp qt.) is discharged.
18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-192).
19. Refill the transmission with ATF to the proper level (see page 14-118).

### TOOL MAINTENANCE

1. Empty and rinse after each use. Fill the can with water and pressurize the can. Flush the discharge line to ensure that the unit is clean.
2. If discharge liquid does not foam, the orifice may be blocked.
3. To clean, disconnect the plumbing from the tank at the large coupling nut.



4. Remove the in-line filter from the discharge side and clean if necessary.
5. The fluid orifice is located behind the filter.  
Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air. Securely reassemble all parts.

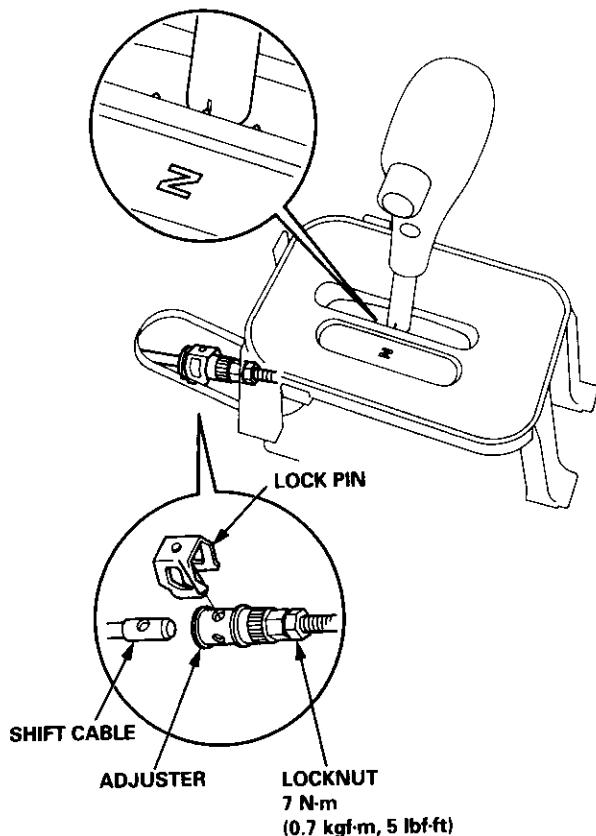
# Shift Cable



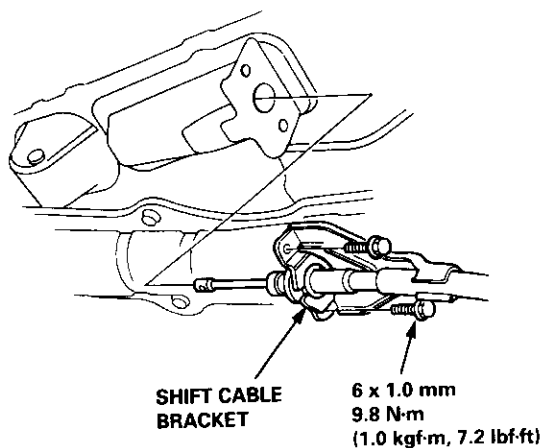
## Removal/Installation

**⚠ WARNING** Make sure lifts are placed properly (see section 1).

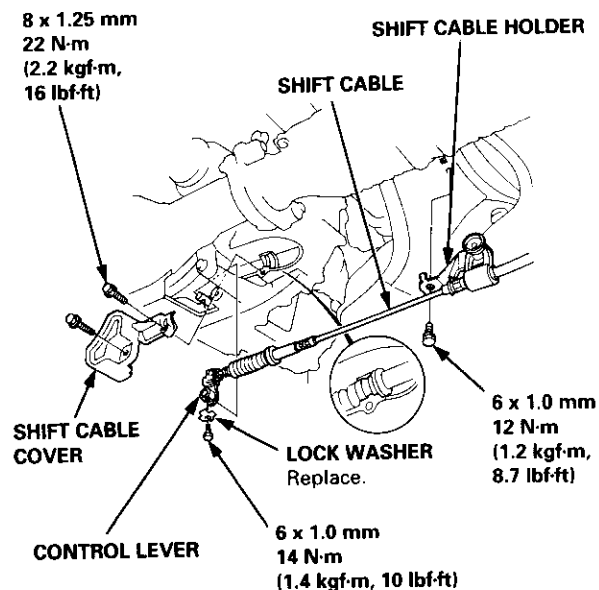
1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.



3. Remove the shift cable bracket.



4. Remove the shift cable holder.
5. Remove the shift cable cover.
6. Remove the control lever from the control shaft, then remove the shift cable. Take care not to bend the cable when removing/installing it.



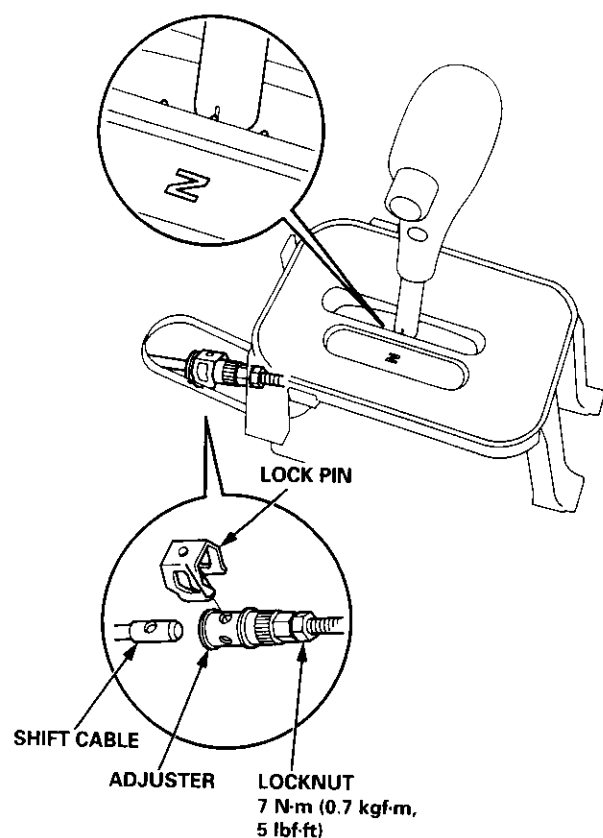
7. Install the shift cable in the reverse order of removal.
8. Check the cable adjustment on reassembly (see page 14-190).

# Shift Cable

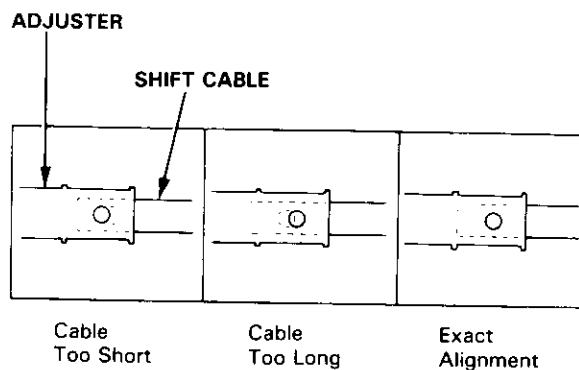
## Adjustment

**▲ WARNING** Make sure lifts are placed properly (see section 1).

1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.



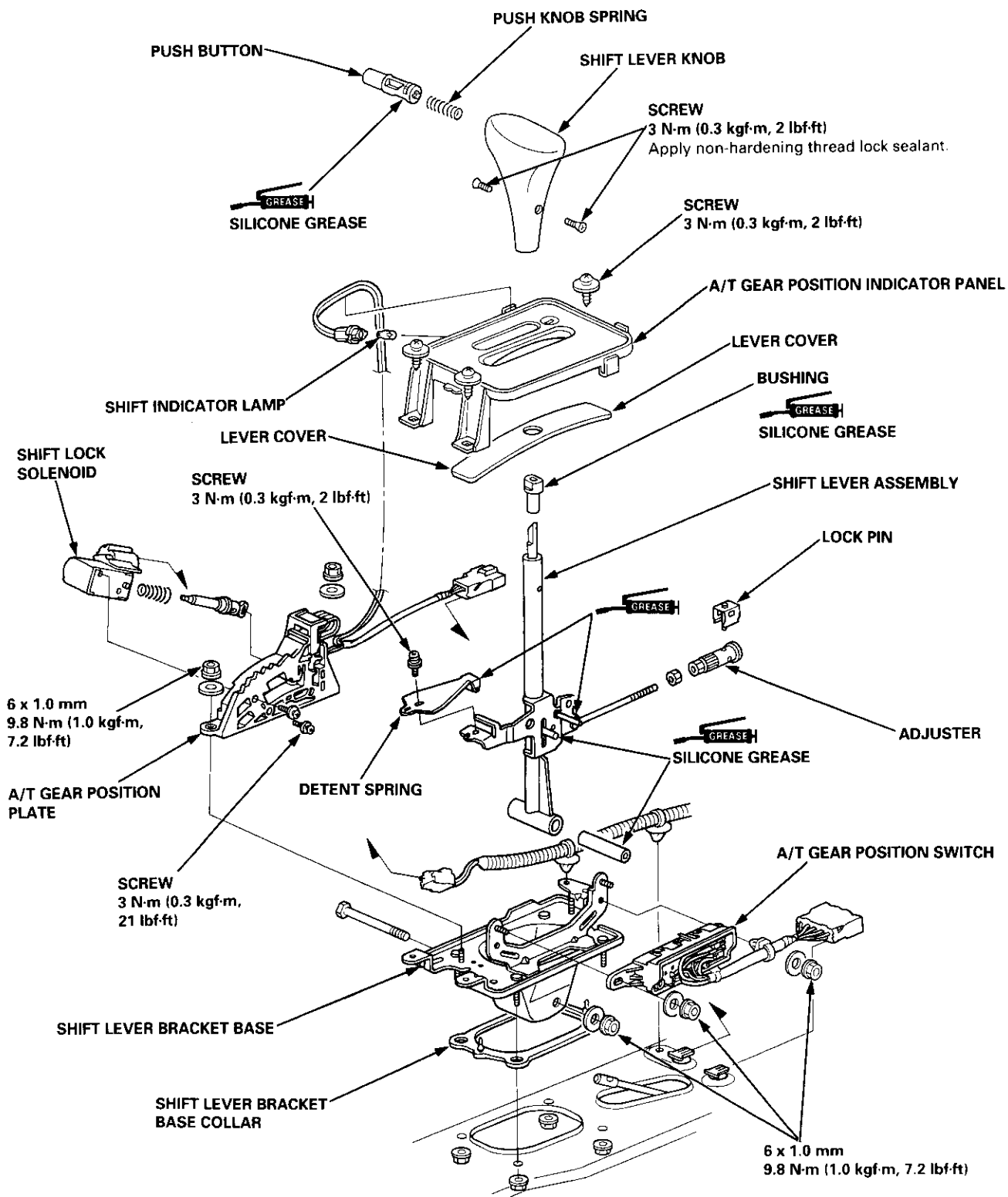
3. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable. There are two holes in the adjuster. They are positioned 90° apart to allow cable adjustment in 1/4 turn increments.



4. If the hole is not perfectly aligned, loosen the locknut on the adjuster and adjust as required.
5. Tighten the locknut to 7 N·m (0.7 kgf·m, 5 lbf·ft).
6. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
7. Make sure the lock pin is seated in the adjuster securely.
8. Move the shift lever to each gear, and verify that the shift position indicator follows the automatic trans-axle gear position switch.
9. Start the engine, and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting (see page 14-109 thru 14-112).
10. Insert the ignition key into the key cylinder on the A/T gear position indicator panel, and verify that the shift lock lever is released.



# Shift Lever

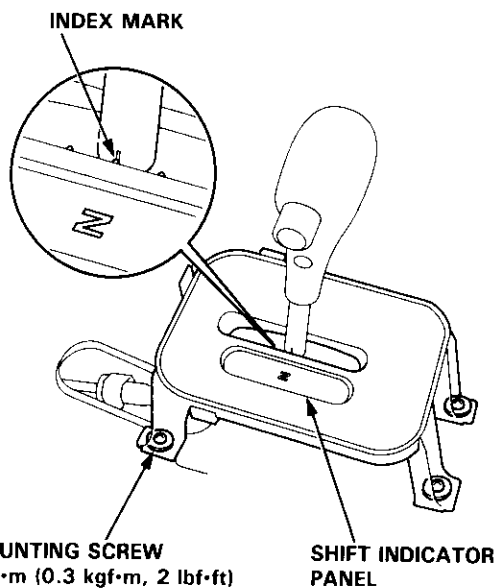


## Shift Indicator Panel

## ATF Cooler Hoses

### Adjustment

1. Check that the index mark on the indicator aligns with the **N** mark on the shift indicator panel when the transmission is in NEUTRAL.

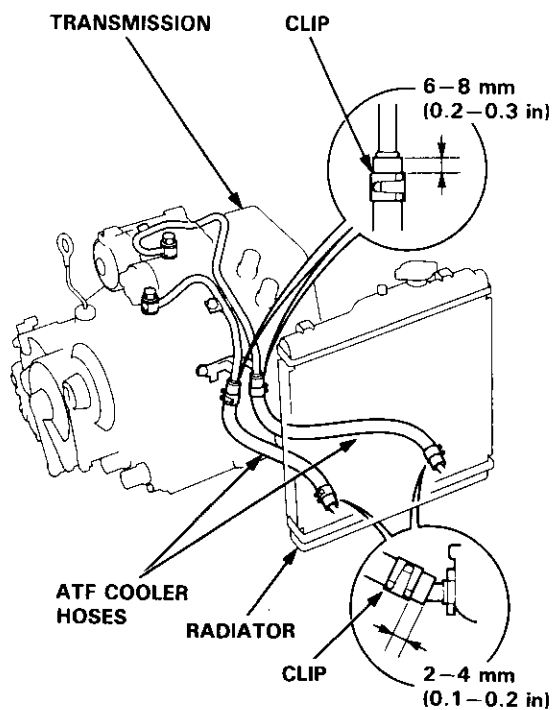


2. If not aligned, remove the front console (see section 20).
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

**NOTE:** Whenever the shift indicator panel is removed, reinstall the panel as described above.

### Connection

1. Connect the ATF cooler hoses to the ATF cooler lines and ATF cooler, and secure them with the clips as shown.



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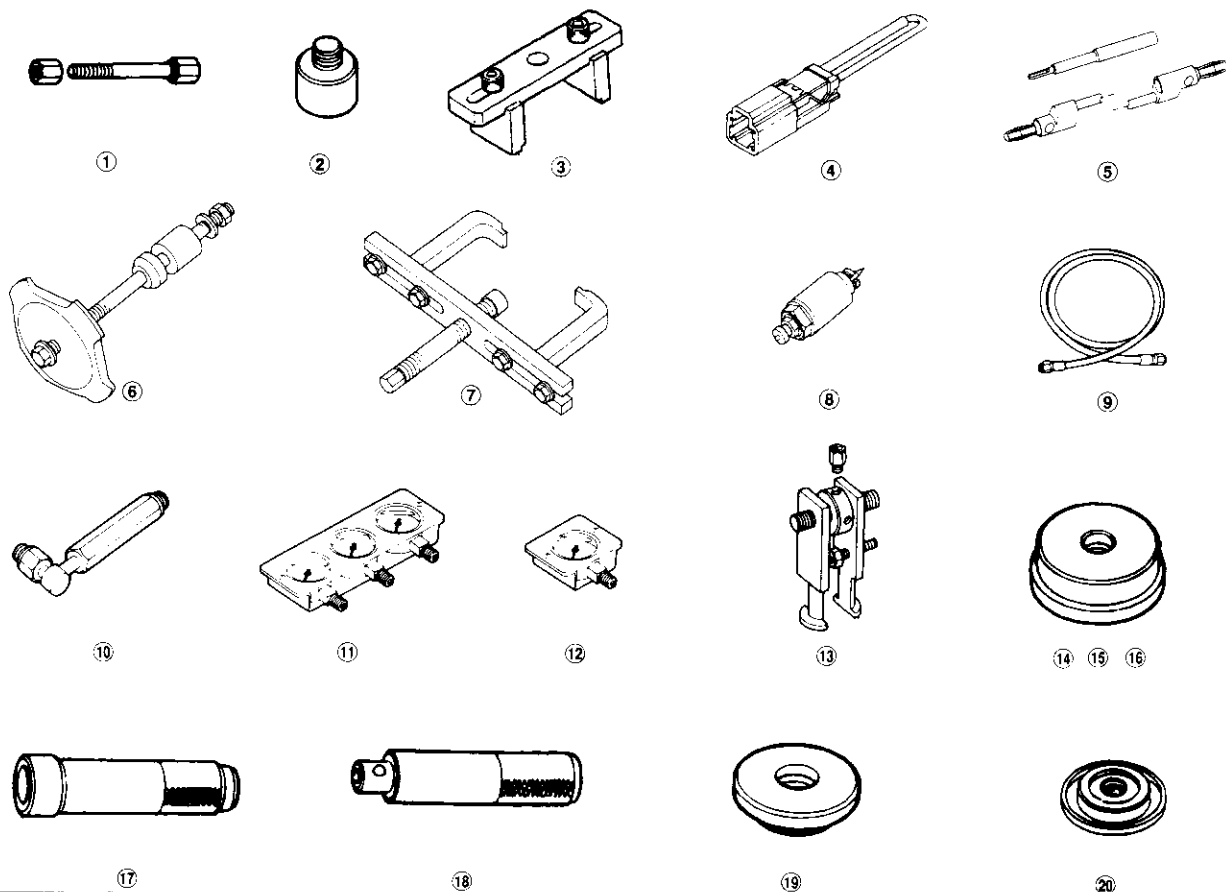


# Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAE - PG40200	Clutch Spring Compressor Bolt Assembly	1	14-322, 325
②	07JAD - PH80200	Pilot, 26 x 30 mm	1	14-333
③*	07LAE - PX40100	Clutch Spring Compressor Attachment	2	14-322, 325
④	07PAZ - 0010100	SCS Service Connector	1	14-235, 293
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⑥	07TAE - P4V0110	Reverse Brake Spring Compressor	1	14-319, 339
⑦	07TAE - P4V0120	Start Clutch Remover	1	14-317
⑧	07TAE - P4V0130	Start Clutch Installer	1	14-342, 343
⑨	07MAJ - PY4011A	A/T Oil Pressure Hose, 2210 mm	4	14-300
⑩	07MAJ - PY40120	A/T Oil Pressure Hose, Adapter	4	14-300
⑪	07406 - 0020400	A/T Oil Pressure Gauge Set w/panel	1	14-300
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⑬**	07736 - A01000A	Adjustable Bearing Puller, 25 - 40 mm	1	14-335
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⑮	07746 - 0010500	Attachment, 62 x 68 mm	1	14-335
⑯	07746 - 0010600	Attachment, 72 x 75 mm	1	14-334, 335
⑰	07746 - 0030100	Driver 40 mm I.D.	1	14-330, 331
⑱	07749 - 0010000	Driver	1	14-333, 334, 335, 336
⑲	07947 - 6110501	Driver Attachment, 68 mm	1	14-333
⑳	07947 - 6340201	Driver Attachment, 58 x 72 mm	1	14-333

\*07HAE - PL50101 can be used as a substitute.

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





The Continuously Variable Transmission (CVT) is an electronically controlled automatic transmission with drive and driven pulleys, and a steel belt. The CVT provides non-stage speeds forward and one reverse. The entire unit is positioned in line with the engine.

## Transmission

Around the outside of the flywheel is a ring gear which meshes with the starter pinion when the engine is being started. The transmission has four parallel shafts: the input shaft, the drive pulley shaft, the driven pulley shaft, and the secondary gear shaft. The input shaft is in line with the engine crankshaft. The drive pulley shaft and the driven pulley shaft consist of movable and fixed face pulleys. Both pulleys are linked by the steel belt.

The input shaft includes the sun gear. The drive pulley shaft includes the forward clutch which mounts the carrier assembly on the forward clutch drum. The carrier assembly includes the pinion gears which mesh with the sun gear and the ring gear. The ring gear has a hub-mounted reverse brake disc.

The driven pulley shaft includes the start clutch and the secondary drive gear which is integral with the park gear. The secondary gear shaft is positioned between the secondary drive gear and the final driven gear. The secondary gear shaft includes the secondary driven gear which serves to change the rotation direction, because the drive pulley shaft and the driven pulley shaft rotate the same direction. When certain combinations of planetary gears in the transmission are engaged by the clutches and the reverse brake, power is transmitted from the drive pulley shaft to the driven pulley shaft to provide **L**, **S**, **D**, and **R**.

## Electronic Control

### '96 – 98 Models:

The electronic control system consists of the Transmission Control Module (TCM), sensors, three linear solenoids, and an inhibitor solenoid. Shifting is electronically controlled under all conditions.

The TCM is located below the dashboard, behind the kick panel on the driver's side.

### '99 – 00 Models:

The electronic control system consists of a Powertrain Control Module (PCM), sensors, three linear solenoids and an inhibitor solenoid. Shifting is electronically controlled under all conditions. A Grade Logic Control System to control shifting in **D** position while the vehicle is ascending or descending a slope.

The PCM is located below the dashboard, under the kick panel on the passenger's side.

## Hydraulic Control

The lower valve body assembly includes the main valve body, the Pressure Low (PL) regulator valve body, the shift valve body, the start clutch control valve body, and the secondary valve body. They are positioned on the lower part of the transmission housing.

The main valve body contains the Pressure High (PH) control valve, the lubrication valve, and the pitot regulator valve.

The secondary valve body contains the PH regulator valve, the clutch reducing valve, the start clutch valve accumulator, and the shift inhibitor valve. The PL regulator valve body contains the PL regulator valve and the PH-PL control valve which is joined to the PH-PL control linear solenoid. The inhibitor solenoid valve is bolted on the PL regulator valve body.

The shift valve body contains the shift valve and the shift control valve, which is joined to the shift control linear solenoid. The start clutch control valve body contains the start clutch control valve, which is joined to the start clutch control linear solenoid. The linear solenoids and the inhibitor solenoid are controlled by the TCM or PCM. The manual valve body which contains the manual valve and the reverse inhibitor valve, is bolted on the intermediate housing.

The ATF pump assembly is located on the transmission housing, and is linked with the input shaft by the sprockets and the sprocket chain. The pulleys and the clutch receive fluid from their respective feed pipes, and the reverse brake receives fluid from internal hydraulic circuit.

## Shift Control Mechanism

Input from various sensors located throughout the vehicle determines which linear solenoid the TCM or PCM will activate. Activating the shift control linear solenoid changes the shift control valve pressure, causing the shift valve to move. This pressurizes the drive pulley pressure to the drive pulley and the driven pulley pressure to the driven pulley and changes their effective pulley ratio. Activating the start clutch control linear solenoid moves the start clutch control valve. The start clutch control valve uncovers the port, providing pressure to the start clutch to engage it.

(cont'd)



# Description

(cont'd)

## Gear Selection

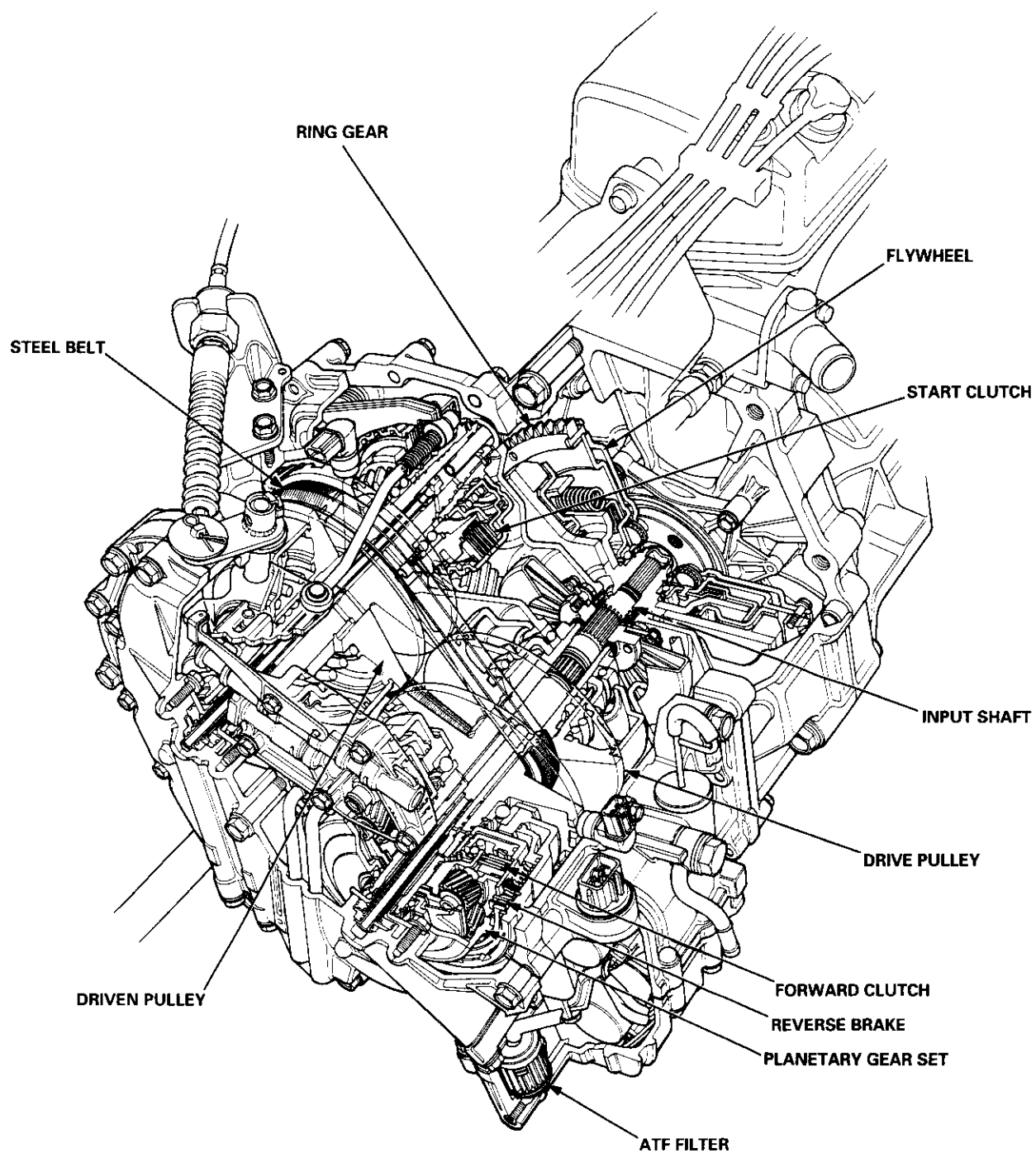
The shift lever has six positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D** DRIVE, **S** SECOND, and **L** LOW.

Position	Description
<b>P</b> PARK	Front wheels locked; park pawl engaged with the park gear on the driven pulley shaft. The start clutch and the forward clutch released.
<b>R</b> REVERSE	Reverse; reverse brake engaged.
<b>N</b> NEUTRAL	Neutral; the start clutch and the forward clutch released.
<b>D</b> DRIVE	General driving; the transmission automatically adjusts to keep the engine at the best speed for driving conditions.
<b>S</b> SECOND	For rapid acceleration at highway speeds; the transmission shifts into a lower range of ratios for better acceleration and increased engine braking.
<b>L</b> LOW	For engine braking and power for climbing; the transmission shifts into the lowest range of the ratios.

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

## Automatic Transaxle (A/T) Gear Position Indicator

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



# Description

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## Clutches/Reverse Brake/Planetary Gear/Pulleys

### Clutches/Reverse Brake

The CVT uses the hydraulically-actuated clutches and brake to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum and the reverse brake piston cavity, the clutch piston and the reverse brake piston move. This presses the friction discs and the steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear, and through engaged ring gear to pinion gears.

Likewise, when the hydraulic pressure is bled from the clutch pack and the reverse brake piston cavity, the piston releases the friction discs and the steel plates, and they are free to slide past each. This allows the gear to spin independently on its shaft, transmitting no power.

### Start Clutch

The start clutch, which is located at the end of the driven pulley shaft, engages/disengages the secondary drive gear. The start clutch is supplied hydraulic pressure by its ATF feed pipes within the driven pulley shaft.

### Forward Clutch

The forward clutch, which is located at the end of the drive pulley shaft, engages/disengages the sun gear. The forward clutch is supplied hydraulic pressure by its ATF feed pipe within the drive pulley shaft.

### Reverse Brake

The reverse brake, which is located inside the intermediate housing around the ring gear, locks the ring gear in **[R]** position. The reverse brake discs are mounted to the ring gear and the reverse brake plates are mounted to the intermediate housing. The reverse brake is supplied hydraulic pressure by a circuit connected to the internal hydraulic circuit.

### Planetary Gear

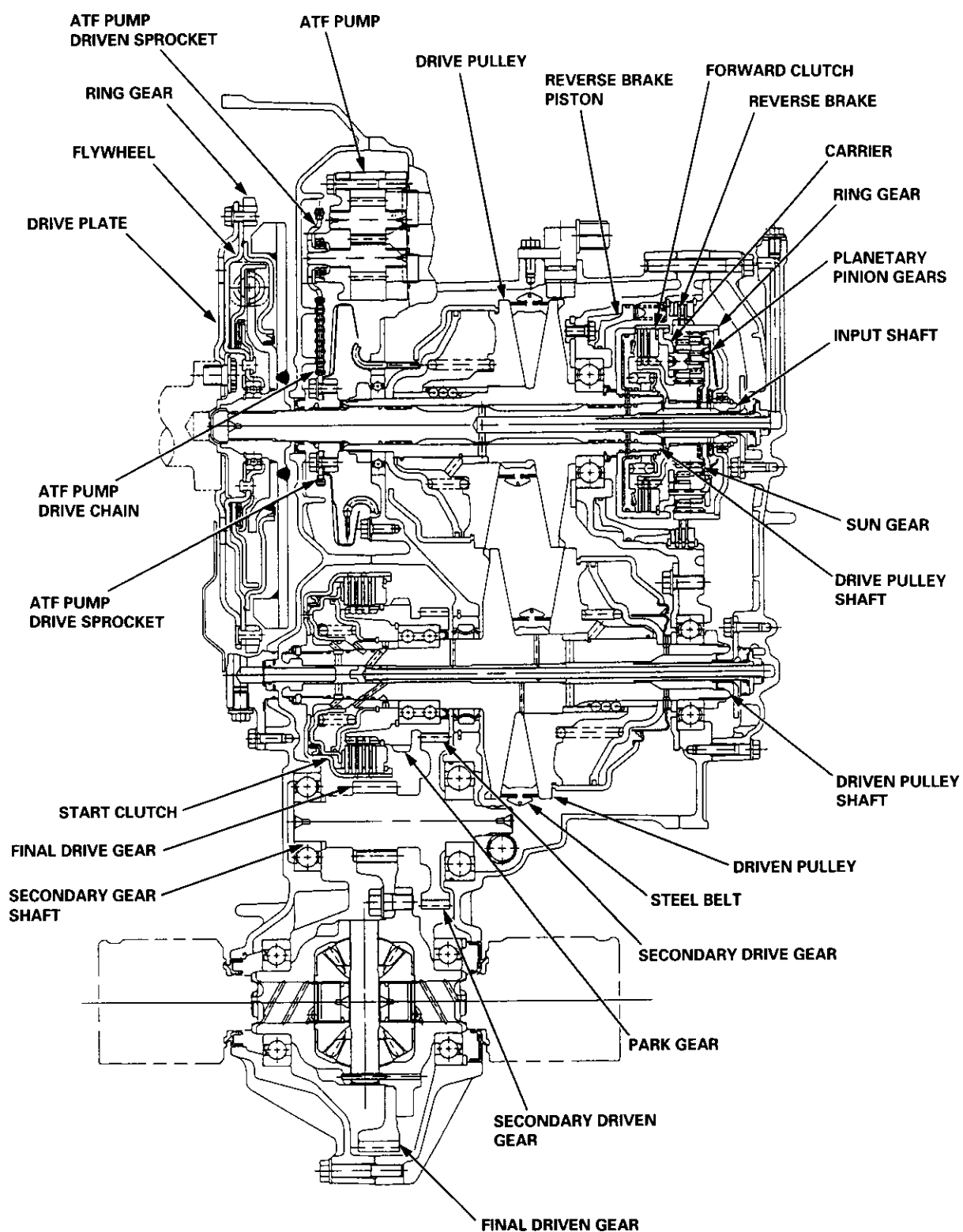
The planetary gear consists of a sun gear, a carrier assembly, and a ring gear. The sun gear is connected to the input shaft with splines. The pinion gears are mounted to the carrier which is mounted to the forward clutch drum. The sun gear inputs the engine power via the input shaft to the planetary gear, and the carrier outputs the engine power. The ring gear is only used for switching the rotation direction of the pulley shafts.

In **[D]**, **[S]**, and **[L]** positions (forward range), the pinion gears don't rotate and revolve with the sun gear, so the carrier rotates. In **[R]** position (reverse range), the reverse brake locks the ring gear and the sun gear drives the pinion gears to rotate. The pinion gears rotate and revolve in the opposite direction from the rotation direction of the sun gear, and the carrier rotates with pinion gear revolution.

### Pulleys

Each pulley consists of a movable face and a fixed face, and the effective pulley ratio changes with engine speed. The drive pulley and the driven pulley are linked by the steel belt.

To achieve a low pulley ratio, high hydraulic pressure works on the movable face of the driven pulley and reduces the effective diameter of the drive pulley, and a lower hydraulic pressure works on the movable face of the drive pulley to eliminate the steel belt slippage. To achieve a high pulley ratio, high hydraulic pressure works on the movable face of the drive pulley and reduces the effective diameter of the driven pulley, and a lower hydraulic pressure works on the movable face of the driven pulley to eliminate the steel belt slippage.



# Description

## Power Flow

### **[N] Position**

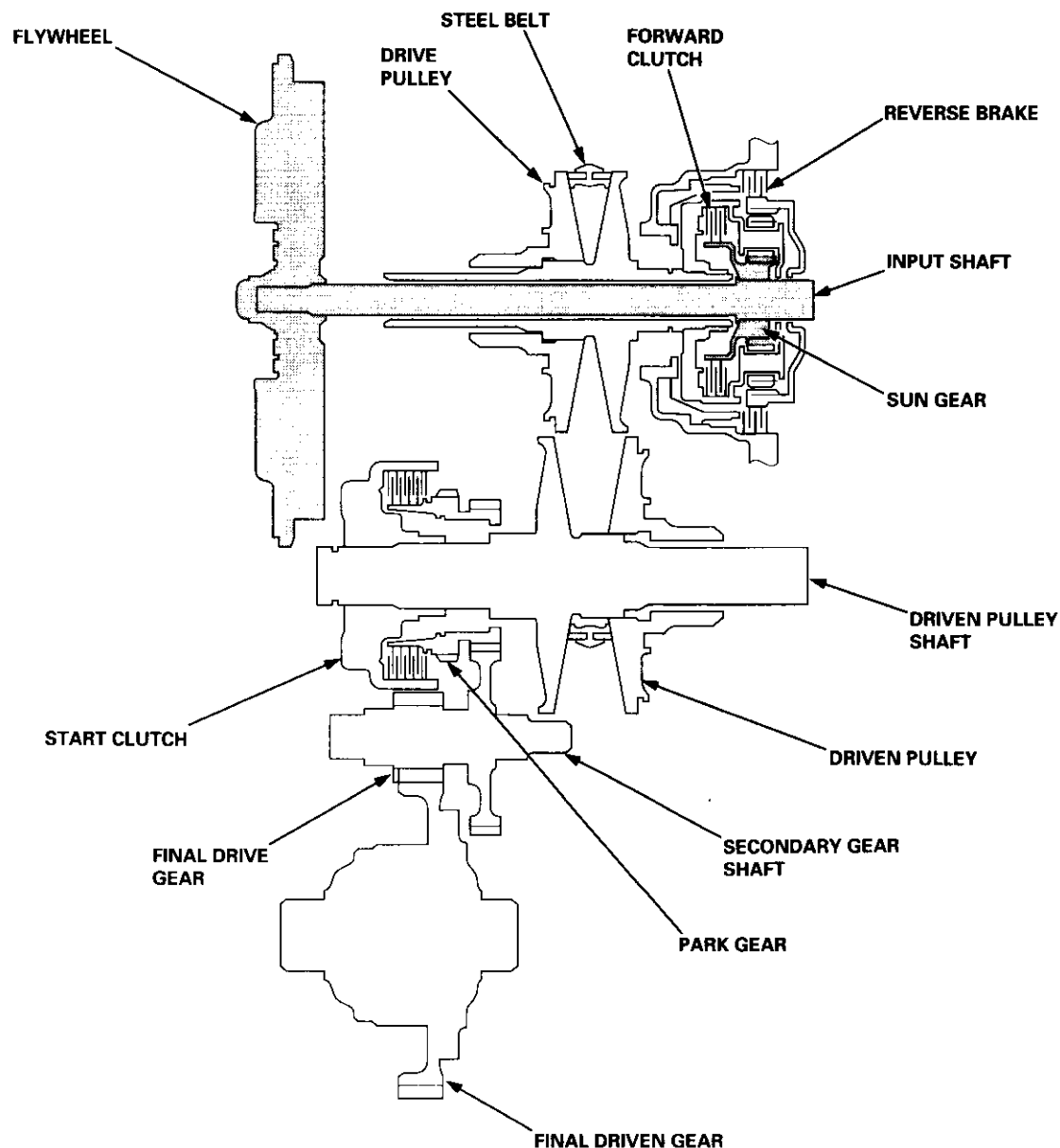
- Start Clutch: released
- Forward Clutch: released
- Reverse Brake: released

Hydraulic pressure is not applied to the start clutch, forward clutch, and the reverse brake. Power is not transmitted to the secondary drive gear.

### **[P] Position**

- Start Clutch: released
- Forward Clutch: released
- Reverse Brake: released

Hydraulic pressure is not applied to the start clutch, forward clutch, and the reverse brake. Power is not transmitted to the secondary drive gear. The secondary drive gear is locked by the park pawl interlocking the park gear.



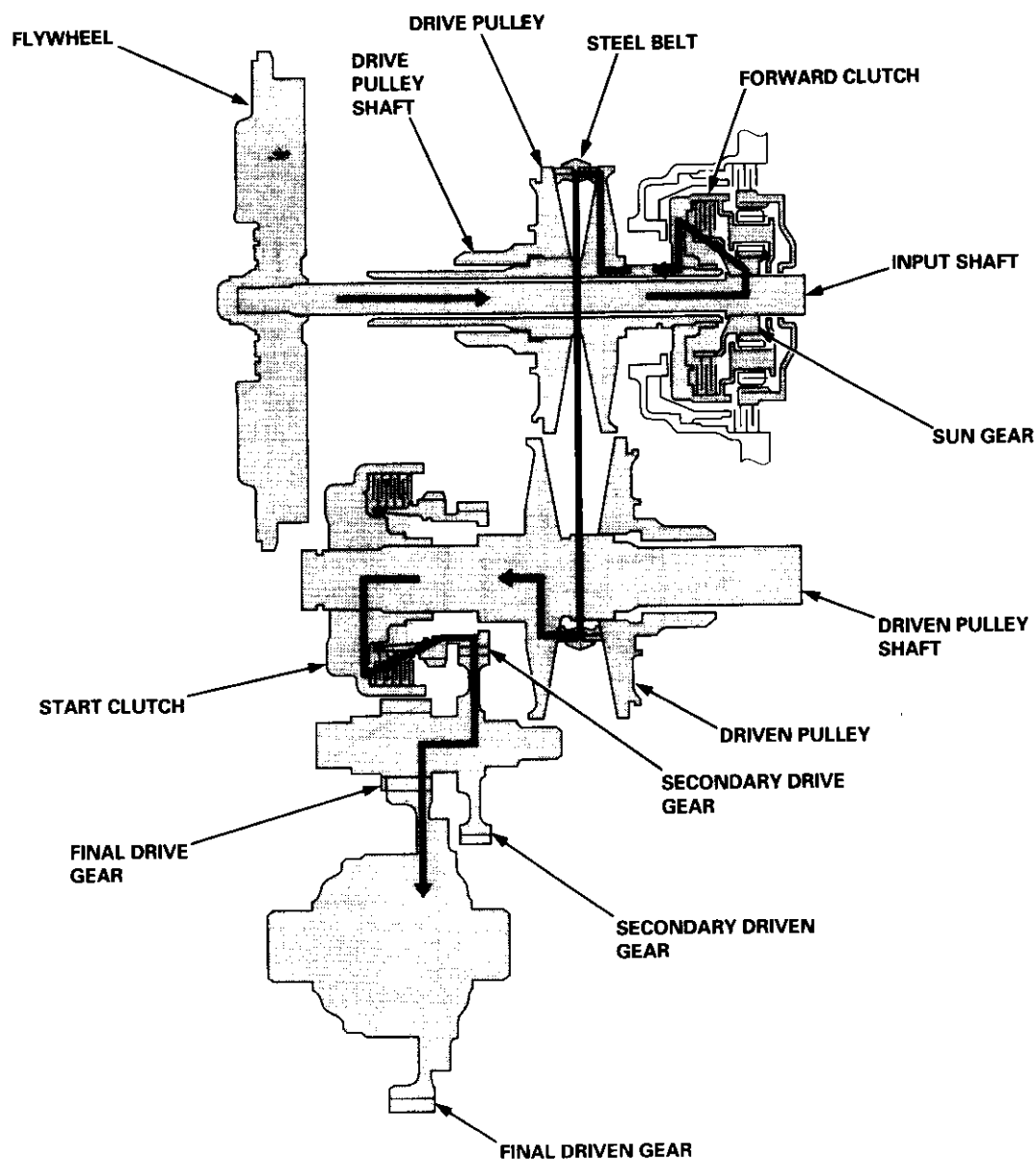


**D, S, and L Positions (Forward Range)**

- Start Clutch: engaged
- Forward Clutch: engaged
- Reverse Brake: released

1. The hydraulic pressure is applied to the forward clutch and the start clutch, and the sun gear drives the forward clutch.
2. The forward clutch drives the drive pulley shaft, which drives the driven pulley shaft linked by the steel belt.
3. The driven pulley shaft drives the secondary drive gear, via the start clutch.
4. Power is transmitted to the secondary driven gear, which drives the final driven gear.

NOTE: The working hydraulic pressure on the movable face of each shaft depends on the throttle opening position.



(cont'd)

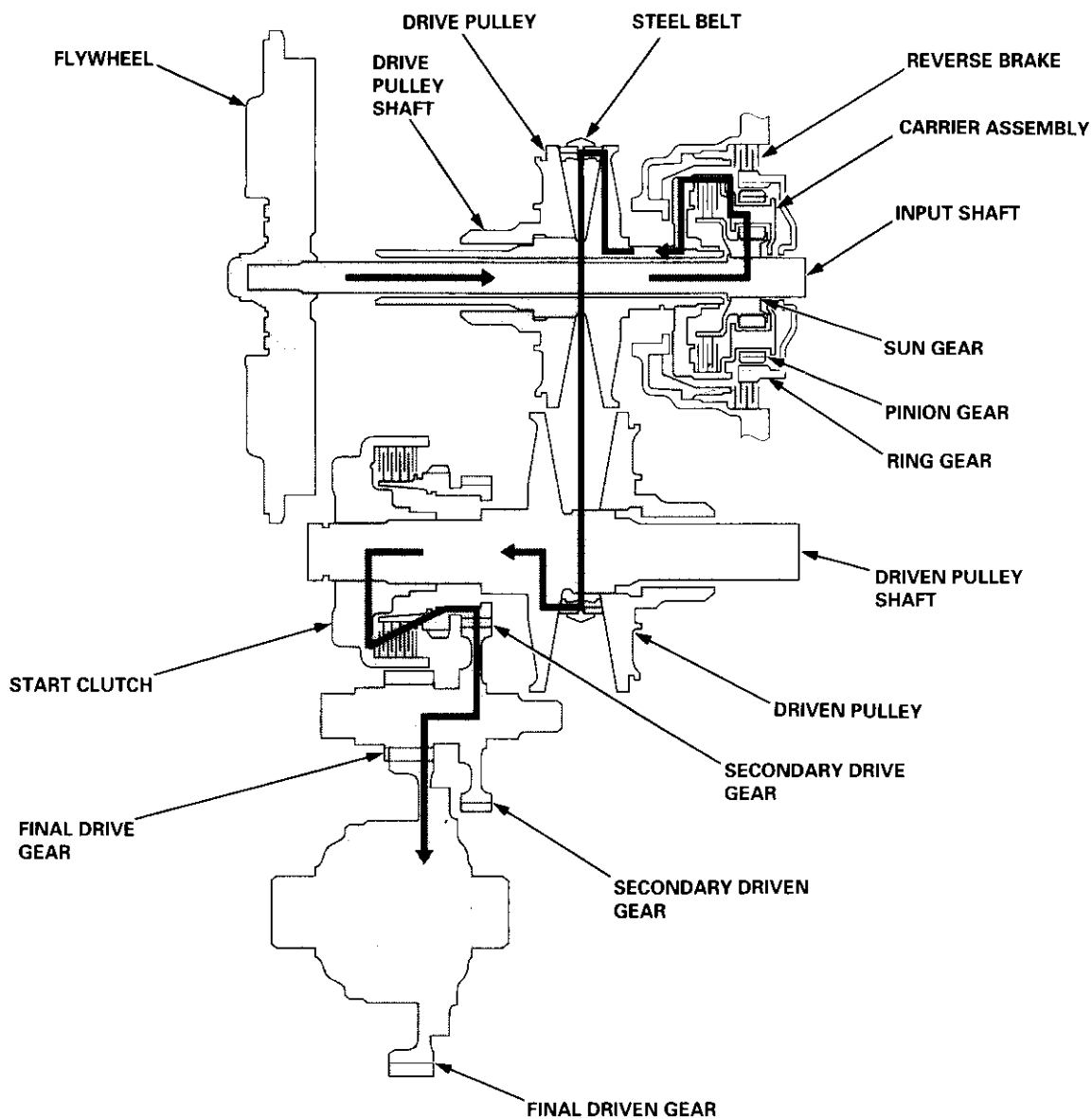
# Description

## Power Flow (cont'd)

### **R** Position

- Start Clutch: engaged
- Forward Clutch: released
- Reverse Brake: engaged

1. The hydraulic pressure is applied to the reverse brake and the start clutch. The sun gear drives the pinion gears, and the pinion gears revolve around the sun gear. The carrier assembly rotates in the opposite direction from the rotation direction of the sun gear.
2. The carrier assembly drives the drive pulley shaft via the forward clutch drum, and the drive pulley shaft drives the driven pulley shaft linked by the steel belt.
3. The driven pulley shaft drives the secondary drive gear via the start clutch.
4. Power is transmitted to the secondary driven gear, which drives the final driven gear.





## Electronic Control System ('96 – 98 Models)

The electronic control system consists of the Transmission Control Module (TCM), sensors, three linear solenoids, and an inhibitor solenoid. Shifting is electronically controlled under all conditions.

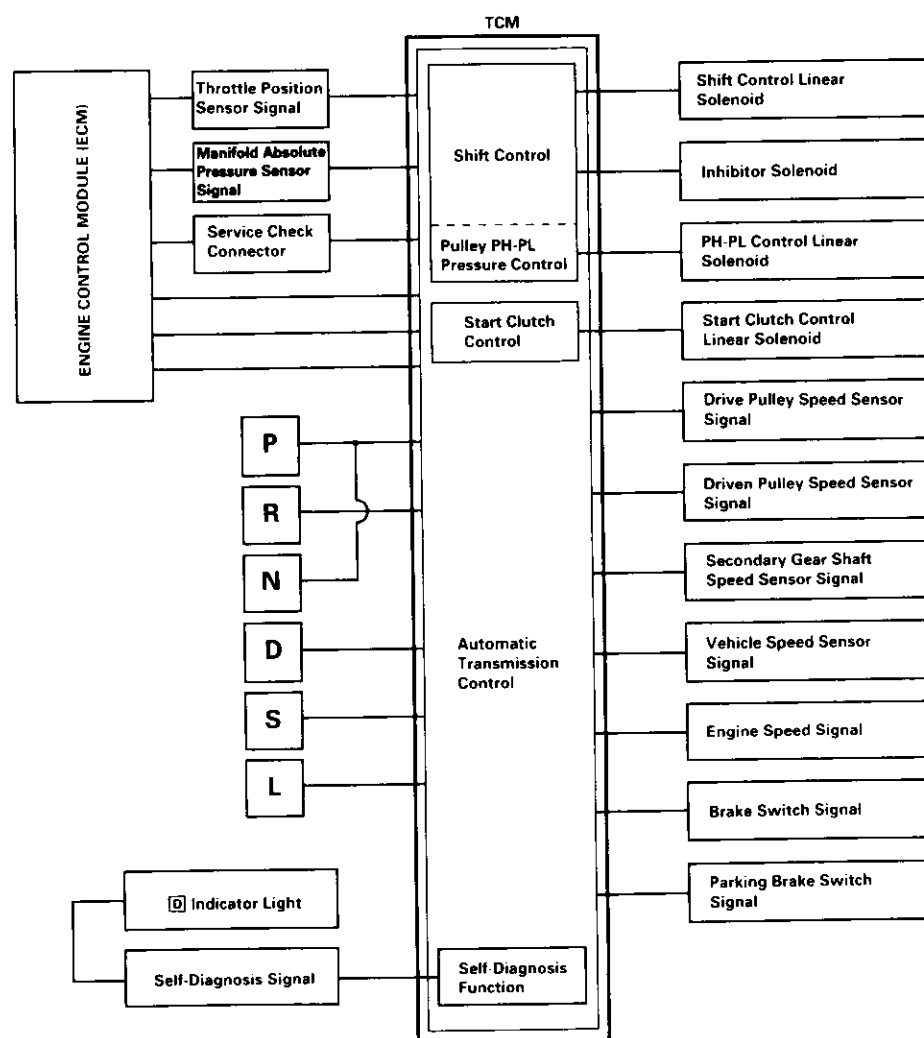
The TCM is located below the dashboard, behind the kick panel on the driver's side.

The TCM controls the transmission to reduce engine speed and retain the engine's cooling efficiency when the vehicle is driven with full throttle acceleration.

If the vehicle is continuously driven at full throttle acceleration, the TCM regulates the pulley hydraulic pressure to increase the pulley ratio, which, as the result, reduces the engine speed and retains the designed cooling efficiency. After the vehicle has been driven at a lower engine speed for a while, the TCM increases the pulley ratio to the original ratio.

For smooth starting in the **[R]** position, the TCM sends a signal to the ECM to cut off the A/C clutch (if the A/C is on) and increases the engine speed to 900 rpm when the transmission is shifted to the **[R]** position.

The start clutch functions to make smooth starting possible. To let the start clutch function properly, the TCM regulates the start clutch hydraulic pressure based on the engine's negative pressure memorized in the **[N]** position.



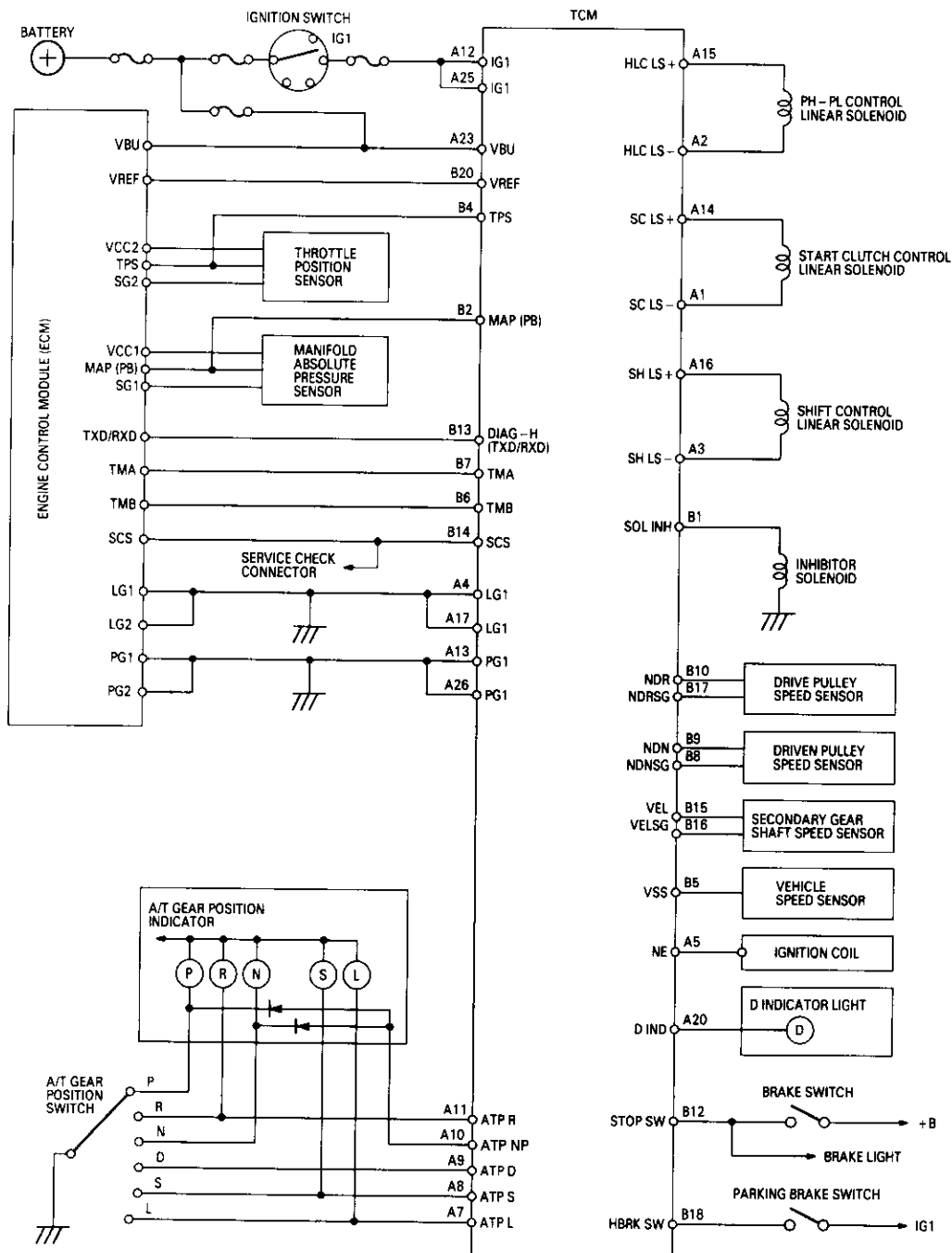
(cont'd)



# Description

## Electronic Control System ('96 - 98 Models) (cont'd)

### Circuit Diagram and Terminal Locations



TCM Terminal Locations

<div></div>																										<div></div>																									
1	2	3	4	5		7	8	9	10	11	12	13	1	2		4	5	6	7	8	9	10																													
14	15	16	17			20			23		25	26	12	13	14	15	16	17	18		20																														



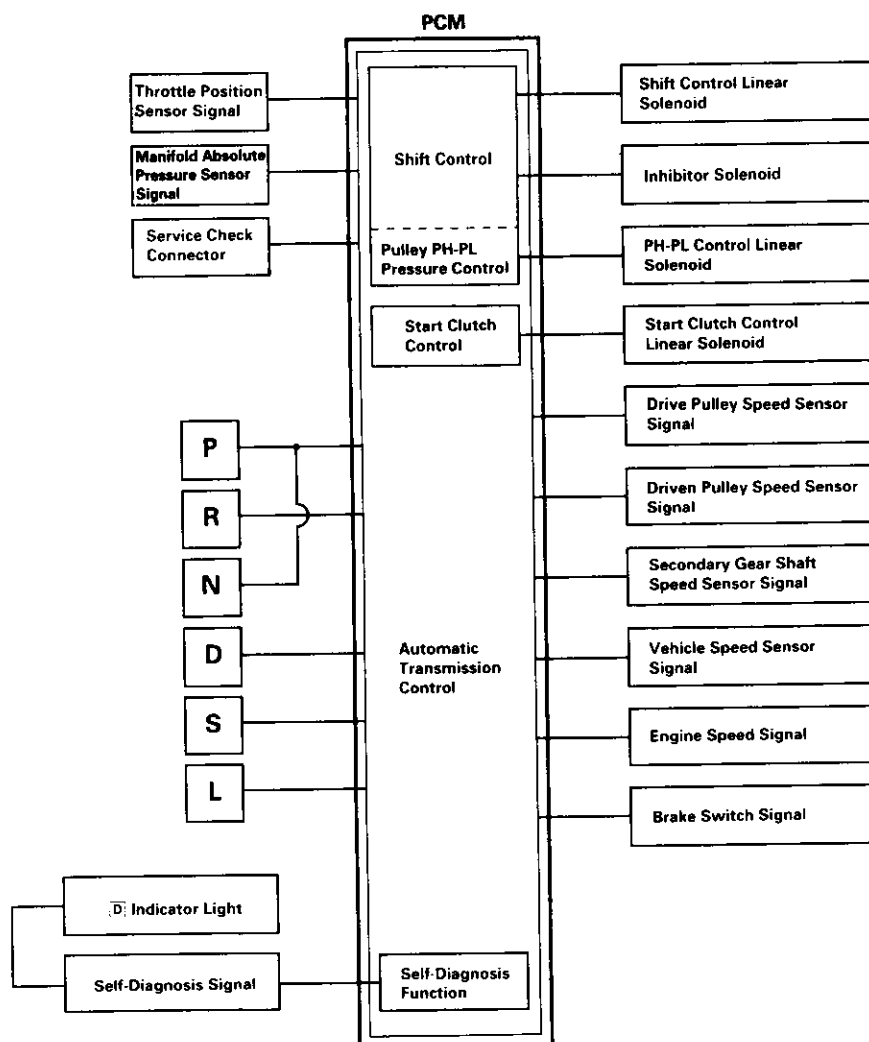
## Electronic Control System ('99 – 00 Models)

The electronic control system consists of a Powertrain Control Module (PCM), sensors, three linear solenoids and an inhibitor solenoid. Shifting is electronically controlled under all conditions. A Grade Logic Control System to control shifting in **D** position while the vehicle is ascending or descending a slope. The PCM is located below the dashboard, under the kick panel on the passenger's side.

The PCM controls the transmission to reduce engine speed and retain the engine's cooling efficiency when the vehicle is driven with full throttle acceleration.

If the vehicle is continuously driven at full throttle acceleration, the PCM regulates the pulley hydraulic pressure to increase the pulley ratio which, as the result, reduces the engine speed and retains the designed cooling efficiency. After the vehicle has been driven at a lower engine speed for a while, the PCM increases the pulley ratio to the original ratio. For smooth starting in the **R** position, the PCM cuts off the A/C clutch (if the A/C is on) and increases the engine speed to 900 rpm when the transmission is shifted to the **R** position.

The start clutch functions to make smooth starting possible. To let the start clutch function properly, the PCM regulates the start clutch hydraulic pressure based on the engine's negative pressure memorized in the **N** position.



(cont'd)

# Description

---

## Electronic Control System ('99 – 00 Models) (cont'd)

### Grade Logic Control System

How it works:

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

### Ascending Control

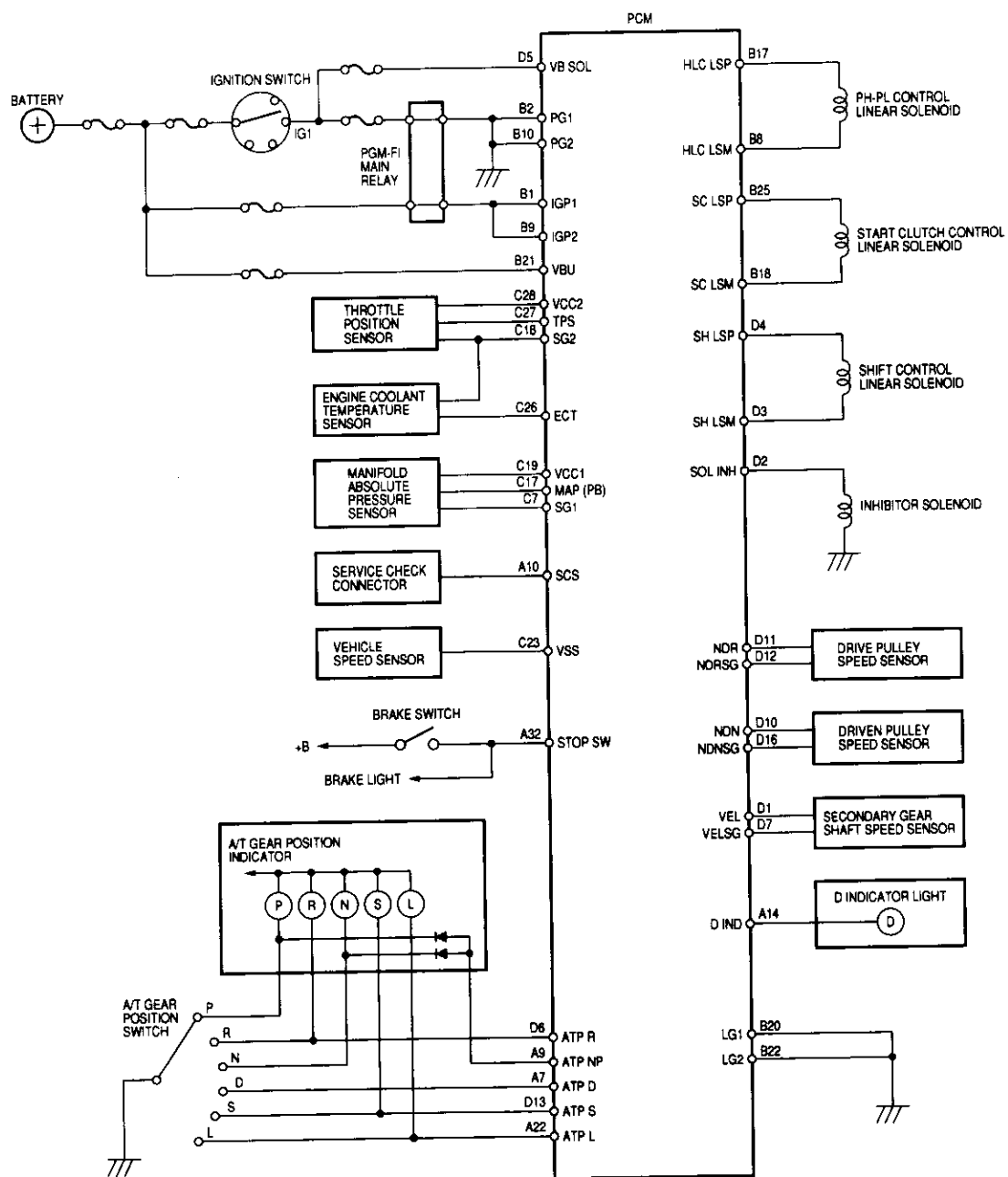
When the PCM determines that the vehicle is climbing a hill in **D** position, the system selects the most suitable shift schedule (pulley ratio) according to the magnitude of a gradient, so the vehicle can run smooth and have more power when needed. There are three ascending modes with different shift schedules according to the magnitude of a gradient in the PCM.

### Descending Control

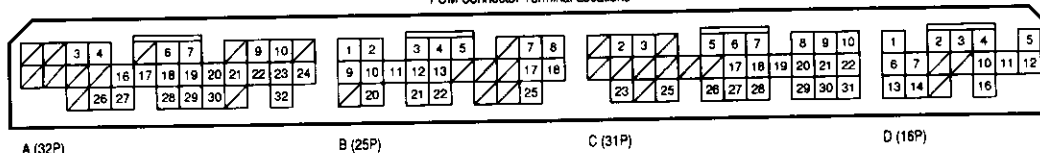
When the PCM determines that the vehicle is going down a hill in **D** position, the system selects the most suitable shift schedule (pulley ratio) according to the magnitude of a gradient. This, in combination with engine braking, achieves smooth driving when the vehicle is descending. There are three descending modes with different shift schedules according to the magnitude of a gradient in the PCM.



## Circuit Diagram and Terminal Locations — '99 - 00 Models



PCM Connector Terminal Locations



A (32P)

B (25P)

C (31P)

D (16P)

# Description

## Hydraulic Control

The hydraulic control system is controlled by the ATF pump, the valves, and the solenoids. The ATF pump is driven by the input shaft. The ATF pump and the input shaft are linked by the ATF pump drive chain and the sprockets. The inhibitor solenoid valve and the linear solenoids, which are located on their valve body, are controlled by the TCM or PCM. Fluid from the ATF pump flows through the PH regulator valve to maintain specified pressure to the drive pulley, the driven pulley, and the manual valve.

The lower valve body assembly includes the main valve body, the PL regulator valve body, the shift valve body, the start clutch control valve body, and the secondary valve body.

### Main Valve Body

The main valve body contains the PH control valve, the lubrication valve, and the pitot regulator valve.

- **PH Control Valve**

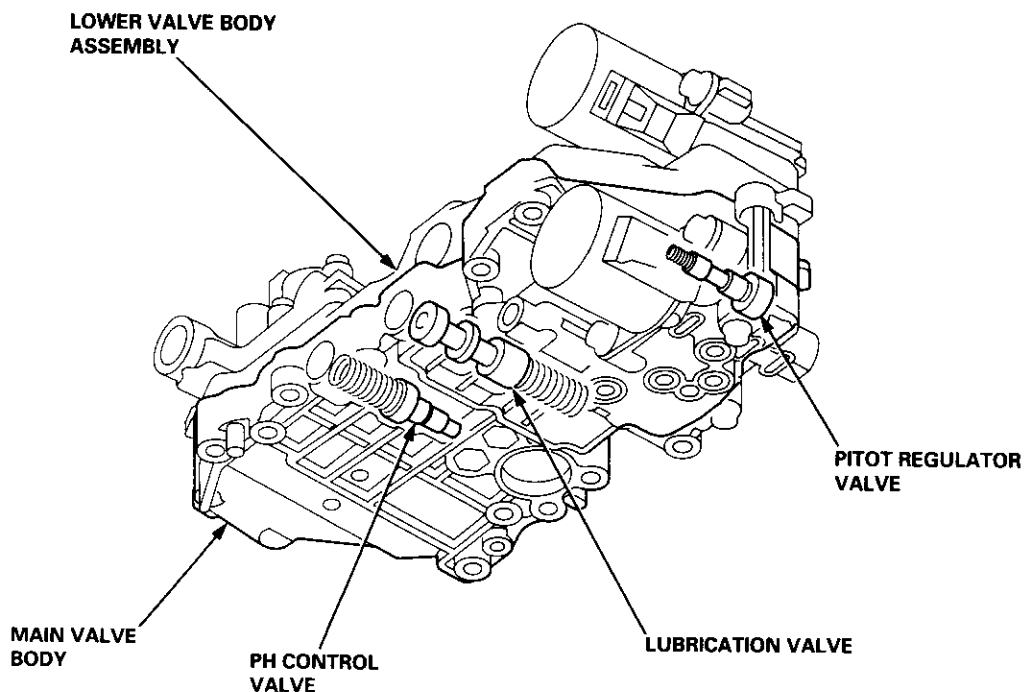
The PH control valve supplies PH control pressure (PHC) in accordance with the PH-PL control pressure (HLC), and supplies PH control pressure to the PH regulator valve, which also regulates PH pressure. At kick-down, it increases PH control pressure which increases the high (PH) pressure. This shortens the shift speed by releasing the reverse inhibitor pressure (RI) from the inhibitor solenoid valve.

- **Lubrication Valve**

The lubrication valve controls the lubrication pressure to each shaft and maintains lubrication pressure. When the pressure is too high, the spring is compressed. This moves the lubrication valve and opens the fluid leak passage.

- **Pitot Regulator Valve**

The pitot regulator valve controls the start clutch pressure (SC) in accordance with the engine speed, when the electronic control system is faulty.





### **Secondary Valve Body**

The secondary valve body contains the PH regulator valve, the clutch reducing valve, the start clutch valve accumulator, and the shift inhibitor valve.

- **PH Regulator Valve**

The PH regulator valve maintains hydraulic pressure supplied from the ATF pump, and supplies PH pressure to the hydraulic control circuit and the lubrication circuit. PH pressure is regulated at the PH regulator valve by the PH control pressure (PHC) from the PH control valve.

- **Clutch Reducing Valve**

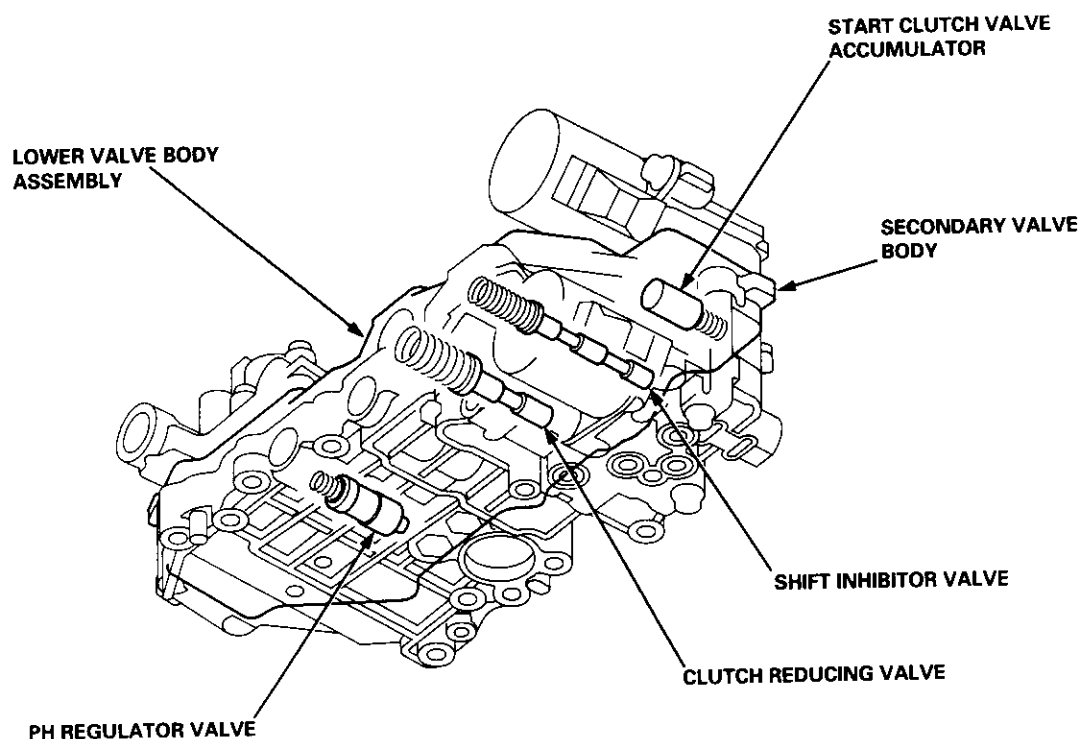
The clutch reducing valve receives PH pressure from the PH regulator valve and regulates the clutch reducing pressure (CR). The clutch reducing valve supplies clutch pressure (CR) to the manual valve and the start clutch control valve, and supplies signal pressure to the PH-PL pressure control valve, the shift control valve, and the inhibitor solenoid valve.

- **Start Clutch Valve Accumulator**

The start clutch valve accumulator stabilizes the hydraulic pressure that is supplied to the start clutch.

- **Shift Inhibitor Valve**

The shift inhibitor valve switches the fluid passage to switch the start clutch control from electronic control to hydraulic control when the electronic control system is faulty. It also supplies clutch reducing pressure (CR) to the pitot regulator valve and the pitot lubrication pipe.



(cont'd)

# Description

## Hydraulic Control (cont'd)

### PL Regulator Valve Body

The PL regulator valve body contains the PL regulator valve and the PH-PL control valve, which is joined with the PH-PL control linear solenoid. The inhibitor solenoid is bolted on the PL regulator valve body.

- **PL Regulator Valve**

The PL regulator valve supplies low pressure (PL) to the pulley to eliminate steel belt slippage.

The PL pressure is controlled by the PH-PL control pressure (HLC).

- **PH-PL Control Valve**

The PH-PL control valve controls the PL regulator valve according to engine torque. The PH-PL control valve supplies PH-PL control pressure (HLC) to the PH control valve to regulate PH pressure higher than PL pressure. The PH-PL control valve is controlled by the PH-PL control linear solenoid, which is controlled by the TCM or PCM.

- **Inhibitor Solenoid**

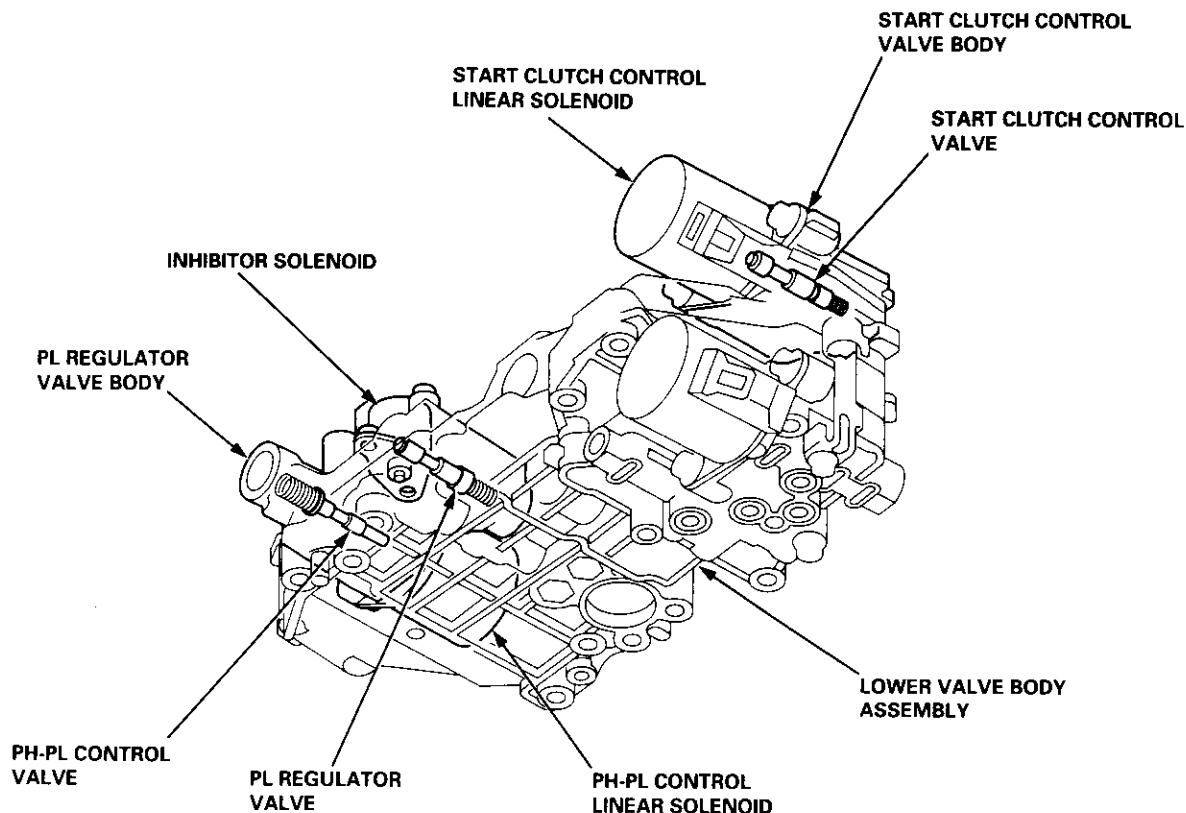
The inhibitor solenoid controls the reverse inhibitor valve by turning on and off. Also, the inhibitor solenoid controls PH control pressure (PHC) by applying reverse inhibitor pressure (RI) to the PH control valve. The inhibitor solenoid is controlled by the TCM or PCM.

### Start Clutch Control Valve Body

The start clutch control valve body contains the start clutch control valve. Both are joined to the start clutch control linear solenoid.

- **Start Clutch Control Valve**

The start clutch control valve controls start clutch engagement according to the throttle opening. The start clutch control valve is controlled by the start clutch control linear solenoid, which is controlled by the TCM or PCM.





### Shift Valve Body

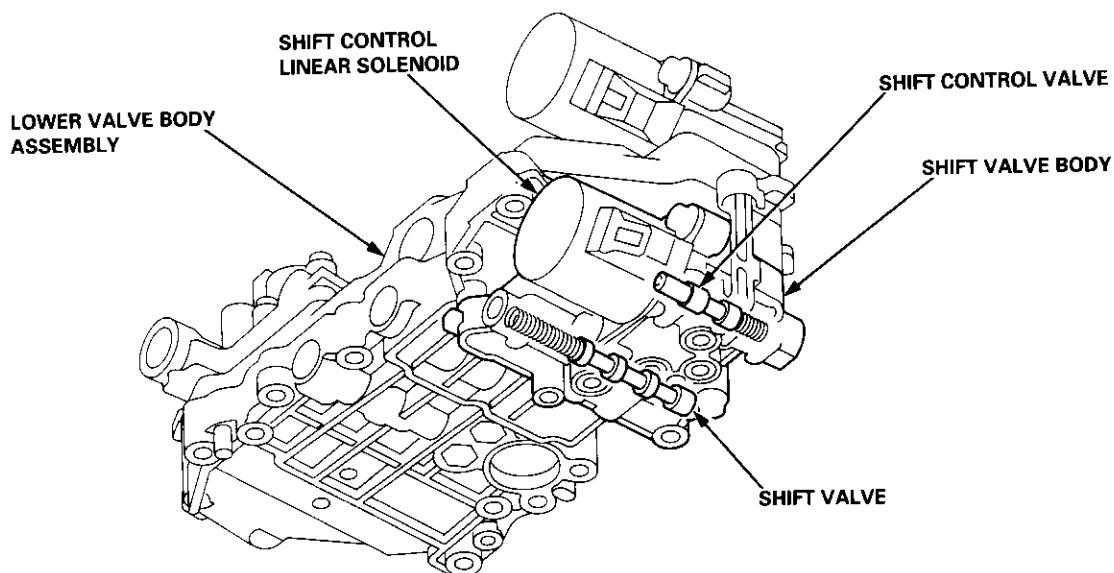
The shift valve body contains the shift valve and the shift control valve. Both are joined to the shift control linear solenoid.

- **Shift Valve**

The shift valve is controlled by shift valve pressure (SV) from the shift control valve. The shift valve distributes PH pressure and PL pressure to drive pulley and the driven pulley, to shift the transmission.

- **Shift Control Valve**

The shift control valve controls the shift valve in accordance with the throttle opening and vehicle speed. The shift control valve is controlled by the shift control linear solenoid, which is controlled by the TCM or PCM. When the electronic control system is faulty, the shift control valve switches the shift inhibitor valve to uncover the port leading the pitot regulator pressure to the start clutch.



### Manual Valve Body

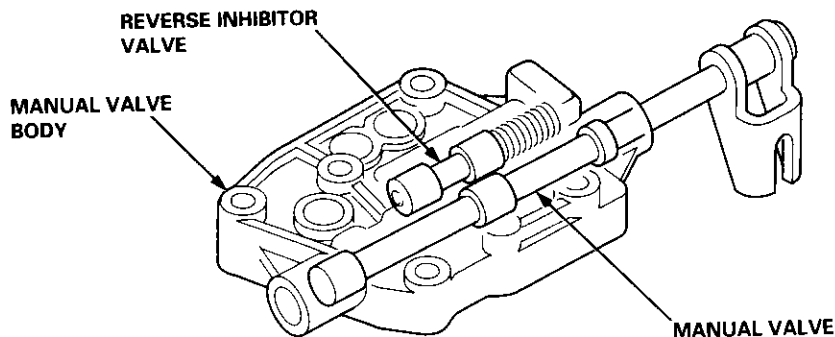
The manual valve body contains the manual valve and the reverse inhibitor valve. The manual valve body is bolted to the intermediate housing.

- **Manual Valve**

The manual valve mechanically uncovers/covers the fluid passage according to the shift lever position.

- **Reverse Inhibitor Valve**

The reverse inhibitor valve is controlled by the reverse inhibitor pressure (RI). It intercepts the hydraulic circuit to the reverse brake while the vehicle is moving forward at speeds over approximately 6 mph (10 km/h).

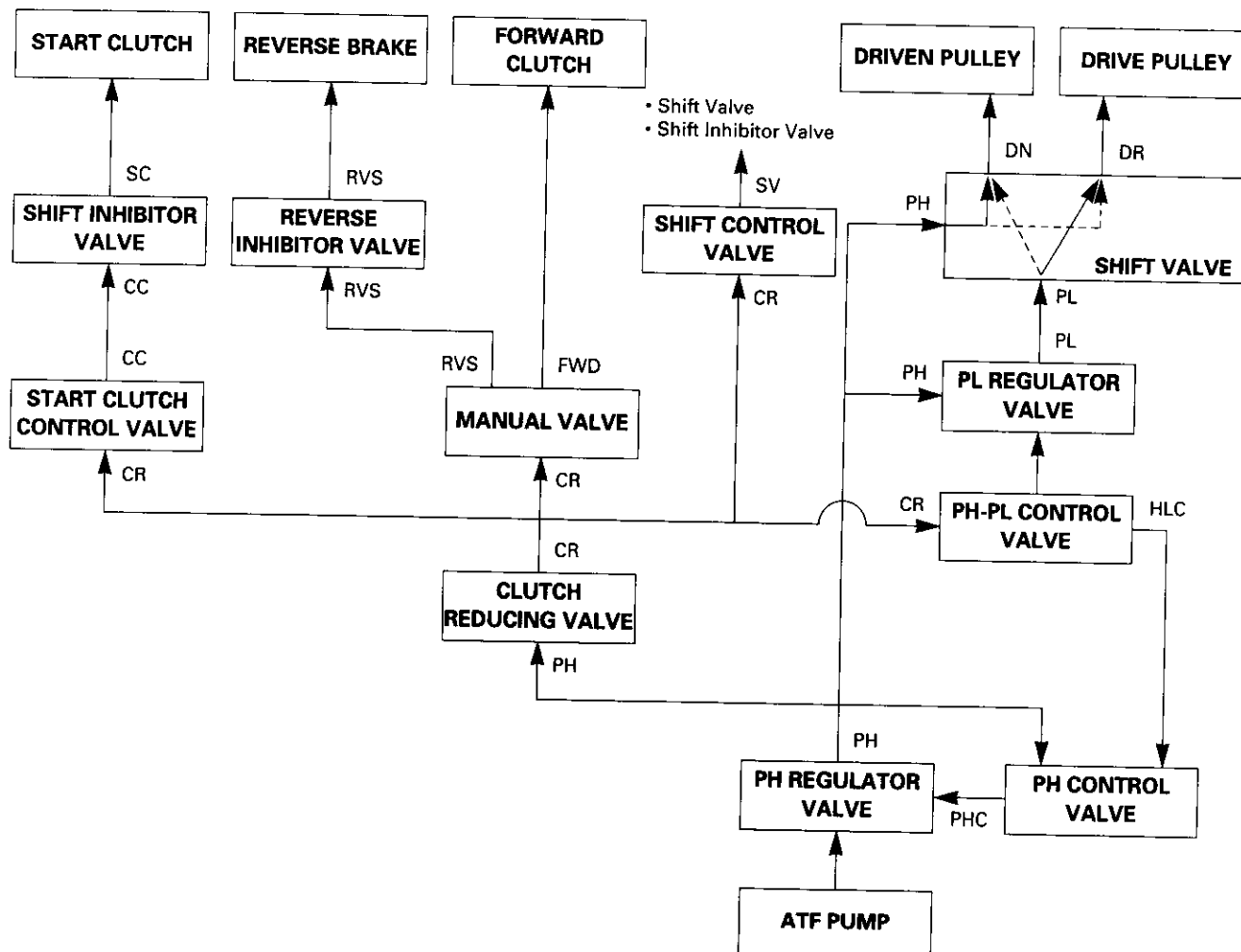




# Description

## Hydraulic Flow

General Chart of Hydraulic Pressure



NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
CC	CLUTCH CONTROL	PP	PITOT PIPE
COL	ATF COOLER	PR	PITOT REGULATOR
CR	CLUTCH REDUCING	RCC	RECIRCULATION
DN	DRIVEN PULLEY	RI	REVERSE INHIBITOR
DR	DRIVE PULLEY	RVS	REVERSE BRAKE
FWD	FORWARD CLUTCH	SC	START CLUTCH
HLC	PH-PL CONTROL	SI	SHIFT INHIBITOR
LUB	LUBRICATION	SUC	SUCTION
PH	PRESSURE HIGH	SV	SHIFT VALVE
PHC	PH CONTROL	X	LEAK
PL	PRESSURE LOW		

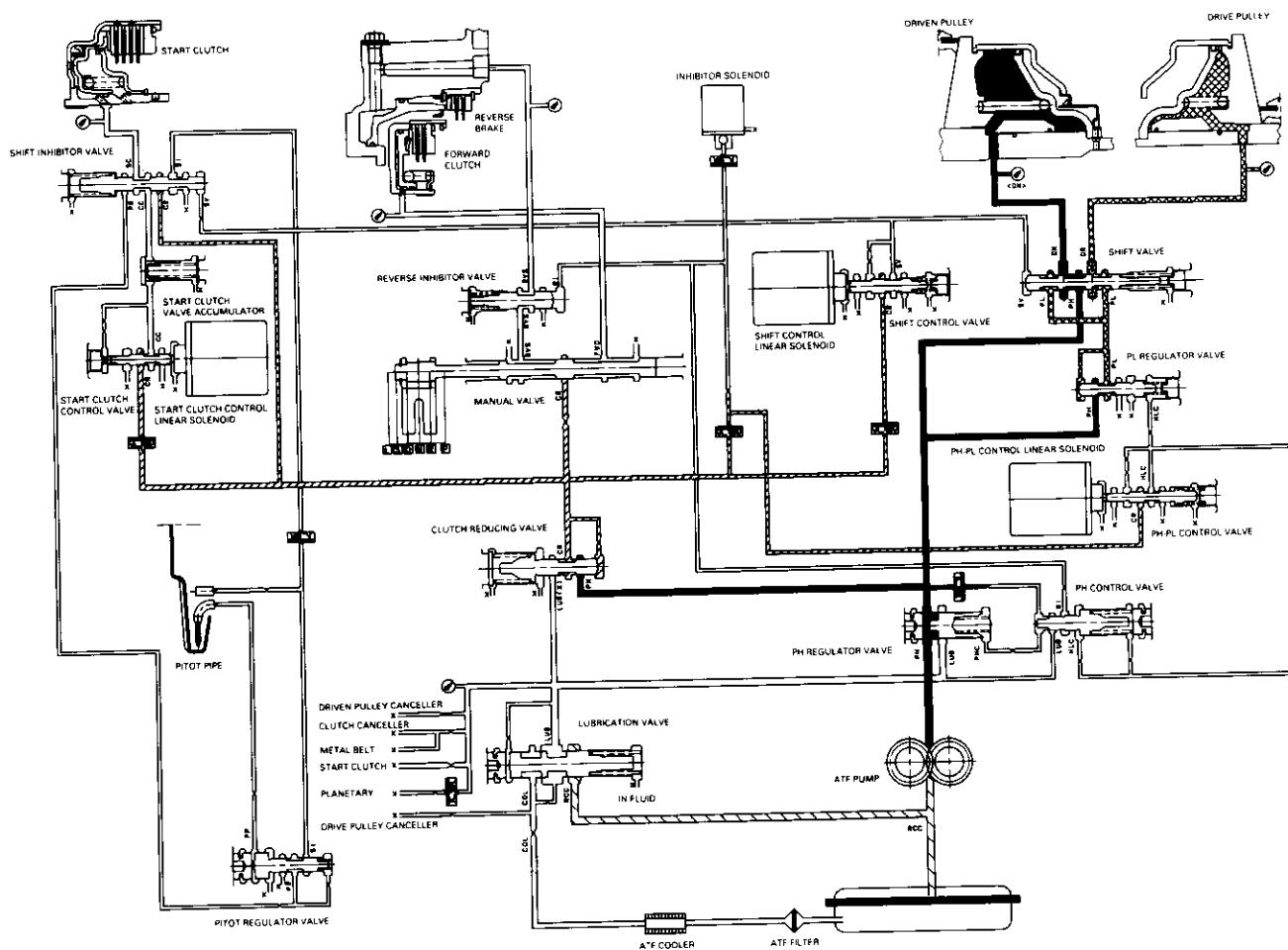


## **N** Position

As the engine turns, the ATF pump also starts to operate. Fluid from the ATF pump flows to the PH regulator valve and the clutch reducing valve. The PH regulator valve regulates high pressure (PH), and send it to the shift valve and the PL regulator valve. The high pressure (PH) flows to the movable face of the driven pulley via the shift valve, and turns into low pressure (PL) at the PL regulator valve. The low pressure (PL) flows to the movable face of the drive pulley via the shift valve. At this time, the pulley ratio remains low.

The high pressure (PH) becomes the clutch reducing pressure (CR) at the clutch reducing valve. The clutch reducing pressure (CR) flows to the start clutch control valve, the manual valve, the PH-PL control valve, and the shift control valve, and is intercepted by those valves.

Under this condition, hydraulic pressure is not applied to the clutches and reverse brake.



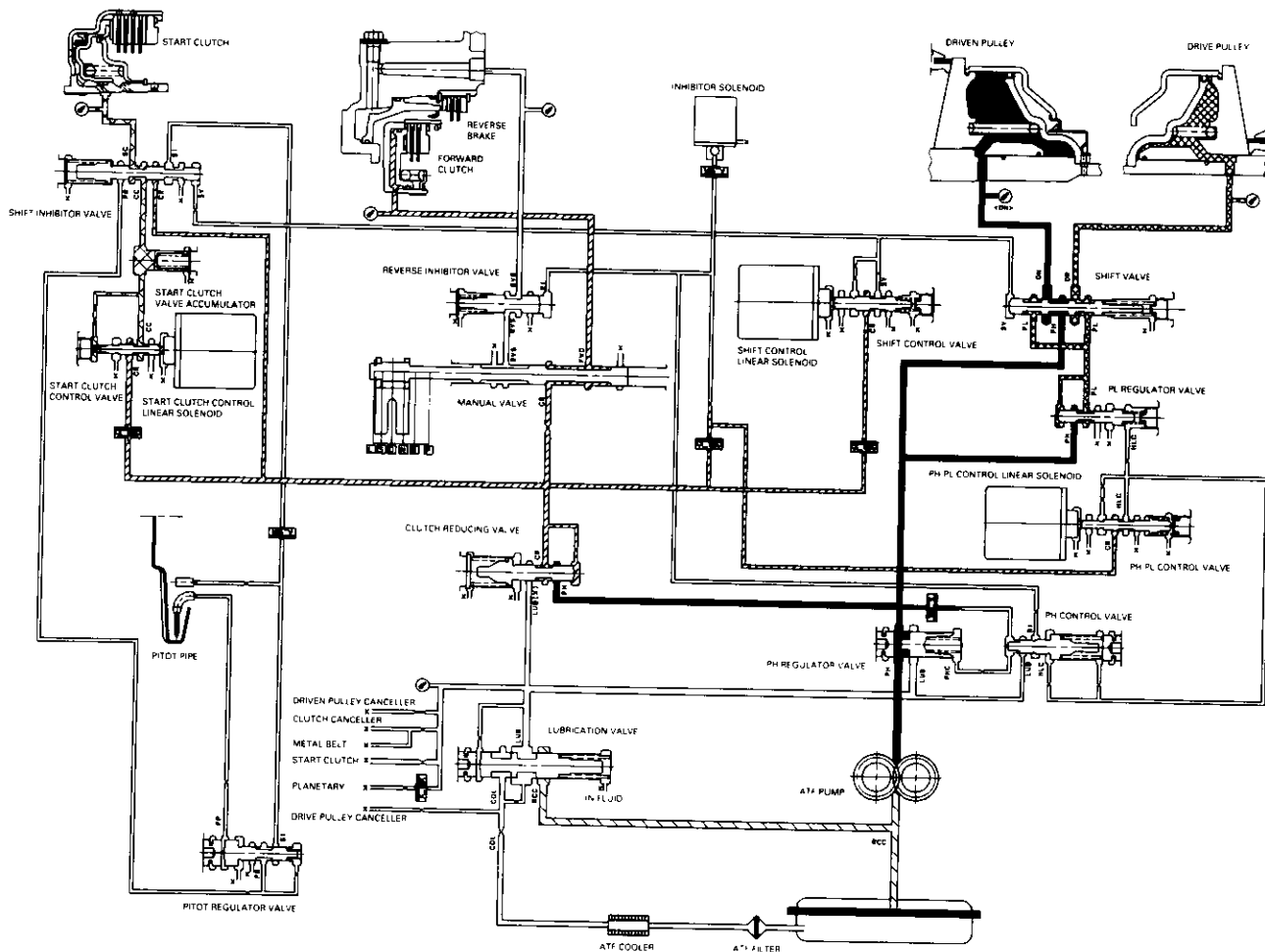
(cont'd)

# Description

## Hydraulic Flow (cont'd)

### **D** position, at low speed range

The flow of fluid up to the drive pulley, the driven pulley, and the clutch reducing valve is the same as in **N** position. The pulley ratio is low because the driven pulley receives high pressure (PH), and the drive pulley receives low pressure (PL). The clutch reducing pressure (CR) flows through the manual valve to the forward clutch, then forward clutch is engaged. The forward clutch then drives the drive pulley shaft, which drives the driven pulley shaft. Also, clutch reducing pressure (CR) flows to the start clutch control valve, and becomes clutch control pressure (CC). Clutch control pressure (CC) becomes start clutch pressure (SC) at the shift inhibitor valve. Start clutch pressure (SC) is applied to the start clutch to engage the start clutch.

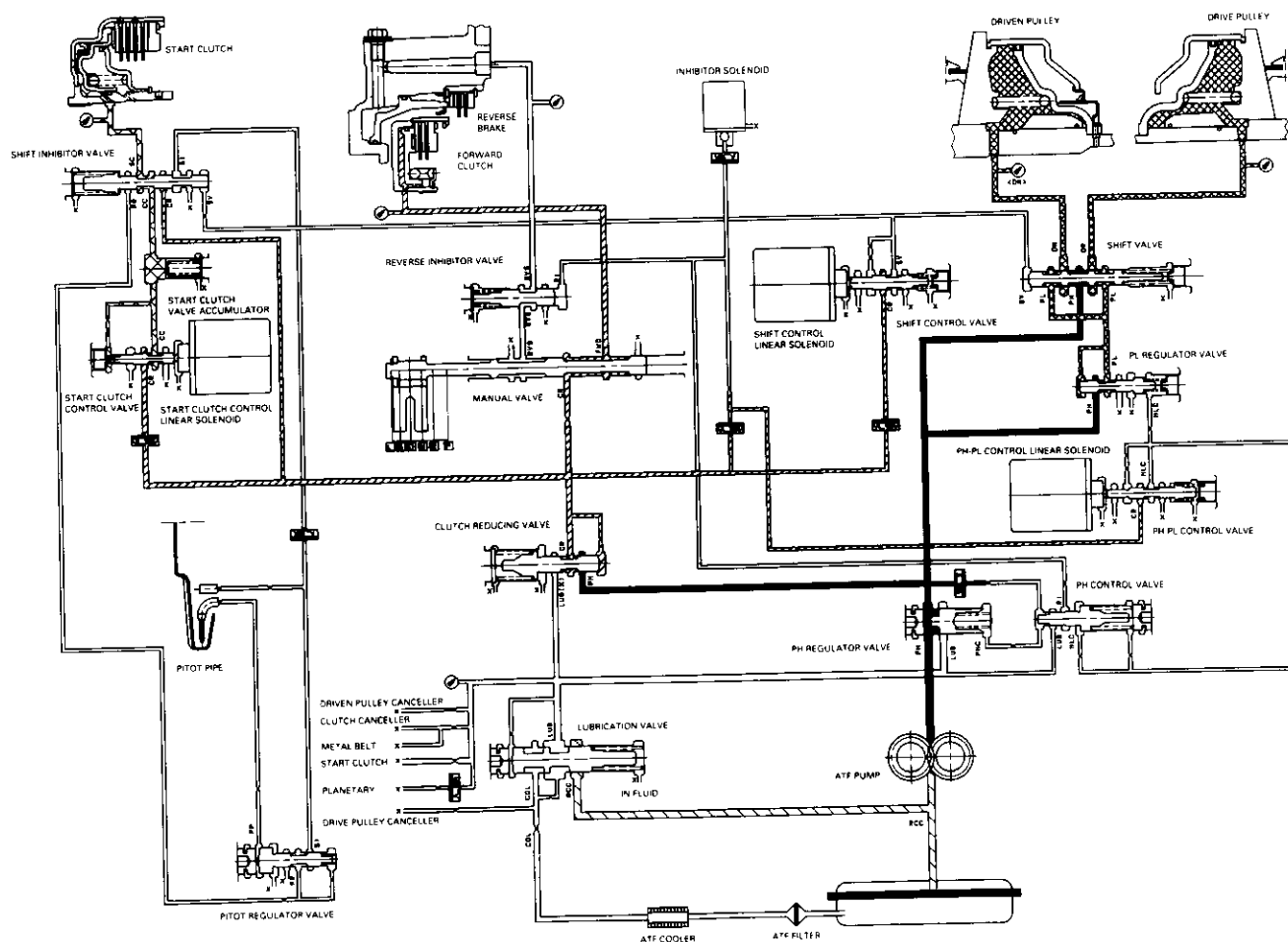




**D position, at middle speed range**

As the speed of the vehicle reaches the prescribed value, the shift control linear solenoid is activated by the TCM or PCM. The shift control linear solenoid controls the shift control valve to activate shift valve pressure (SV). Clutch reducing pressure (CR) from the clutch reducing valve becomes shift valve pressure (SV) at the shift control valve. Shift valve pressure (SV) flows to the left end of the shift valve, the shift valve to the right side and positioning it in the middle of its travel. The shift valve covers the port to stop high pressure (PH) to the pulleys, and uncovers the port leading low pressure (PL) to the pulleys. The drive pulley and the driven pulley receive low pressure (PL). At this time, the pulley ratio is in the middle. Pressure remains to apply the forward clutch and the start clutch.

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



(cont'd)

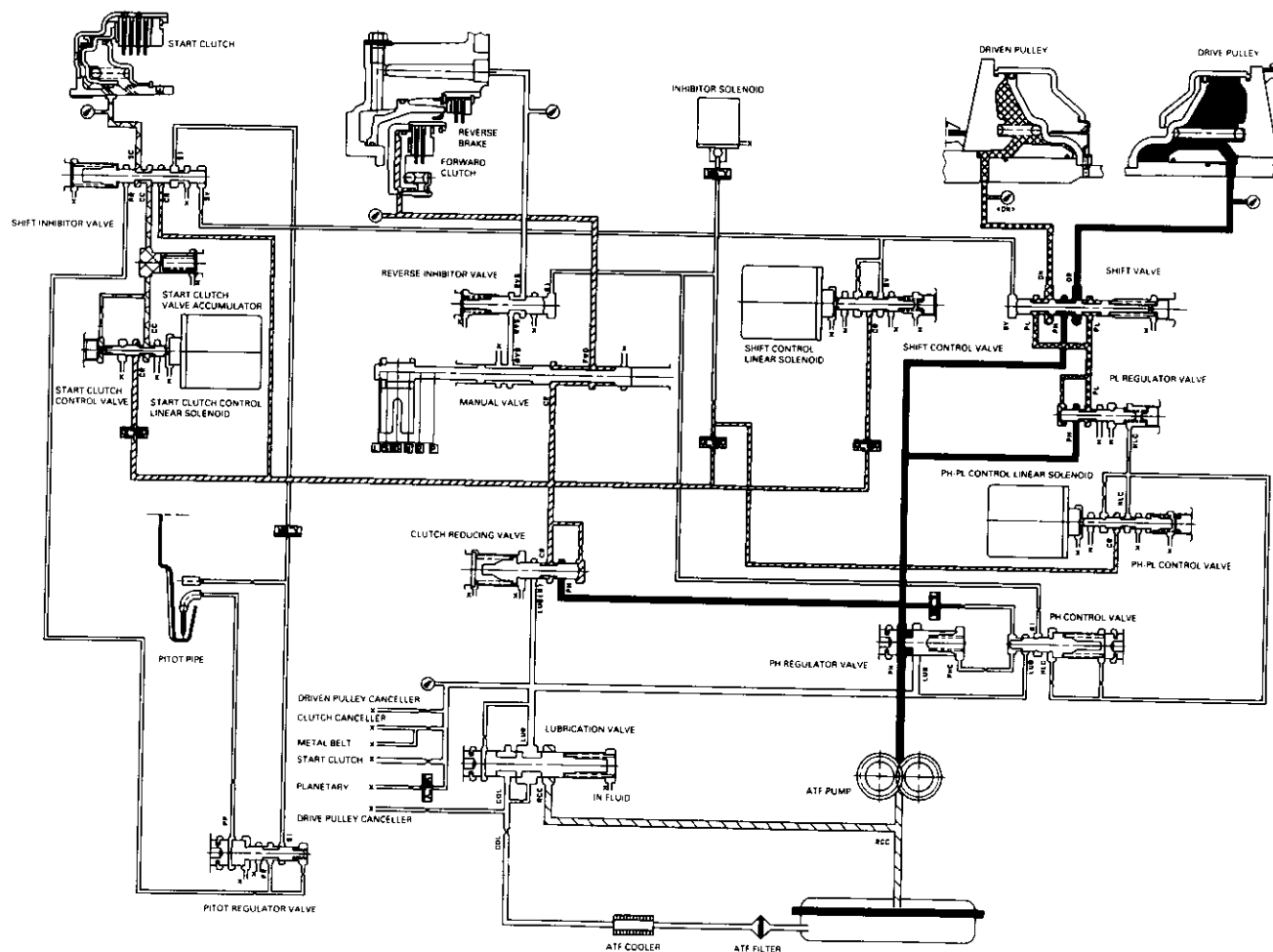
# Description

## Hydraulic Flow (cont'd)

### D position, at high speed range

As the speed of the vehicle reaches the prescribed value, the shift control linear solenoid moves the shift control valve to the left end of the shift valve. The shift valve moves to the right side compared to its position at the middle pulley ratio. The shift valve uncovers the port leading high pressure (PH) to the drive pulley and uncovers the port leading low pressure (PL) to the driven pulley. The drive pulley receives high pressure (PH) and the driven pulley receives low pressure (PL). The pulley ratio is high. Pressure remains to apply the forward clutch and the start clutch.

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

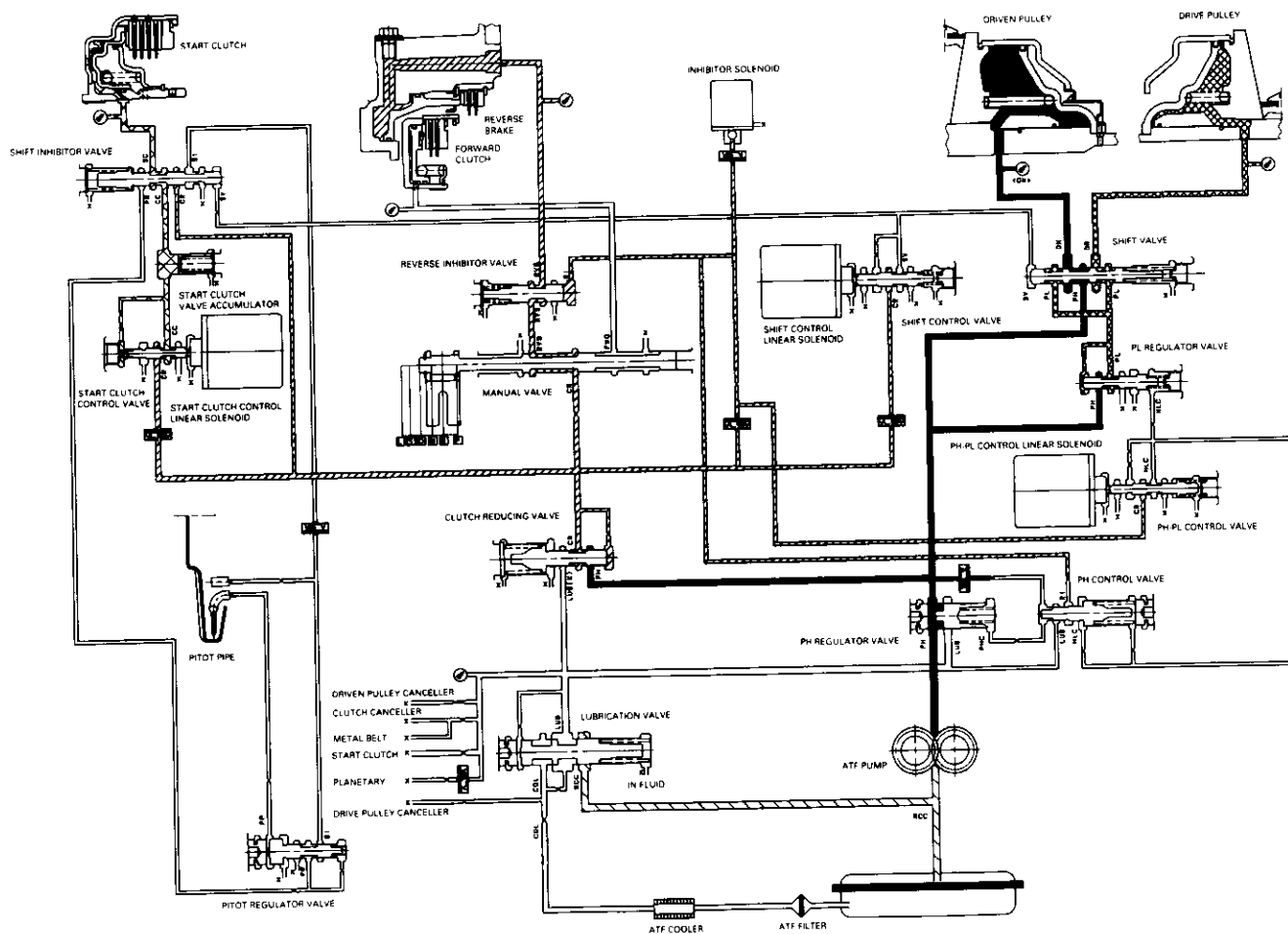




## **R** position

The flow of fluid up to the drive pulley, the driven pulley, and the clutch reducing valve is the same as in **N** position. The pulley ratio is low because the driven pulley receives high pressure (PH) and the drive pulley receives low pressure (PL). The manual valve is shifted into the **R** position, and it uncovers the port that leads reverse brake pressure (RVS) to the reverse inhibitor valve. The inhibitor solenoid turns off by means of the TCM or PCM, and reverse inhibitor pressure (RI) is applied to the right end of the reverse inhibitor valve. The reverse inhibitor valve moves to the left side, and uncovers the port that leads reverse brake pressure (RVS) to the reverse brake. Clutch reducing pressure (CR) becomes reverse brake pressure (RVS) at the manual valve, and flows to the reverse brake. The reverse brake is engaged, and it locks the ring gear.

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



(cont'd)

# Description

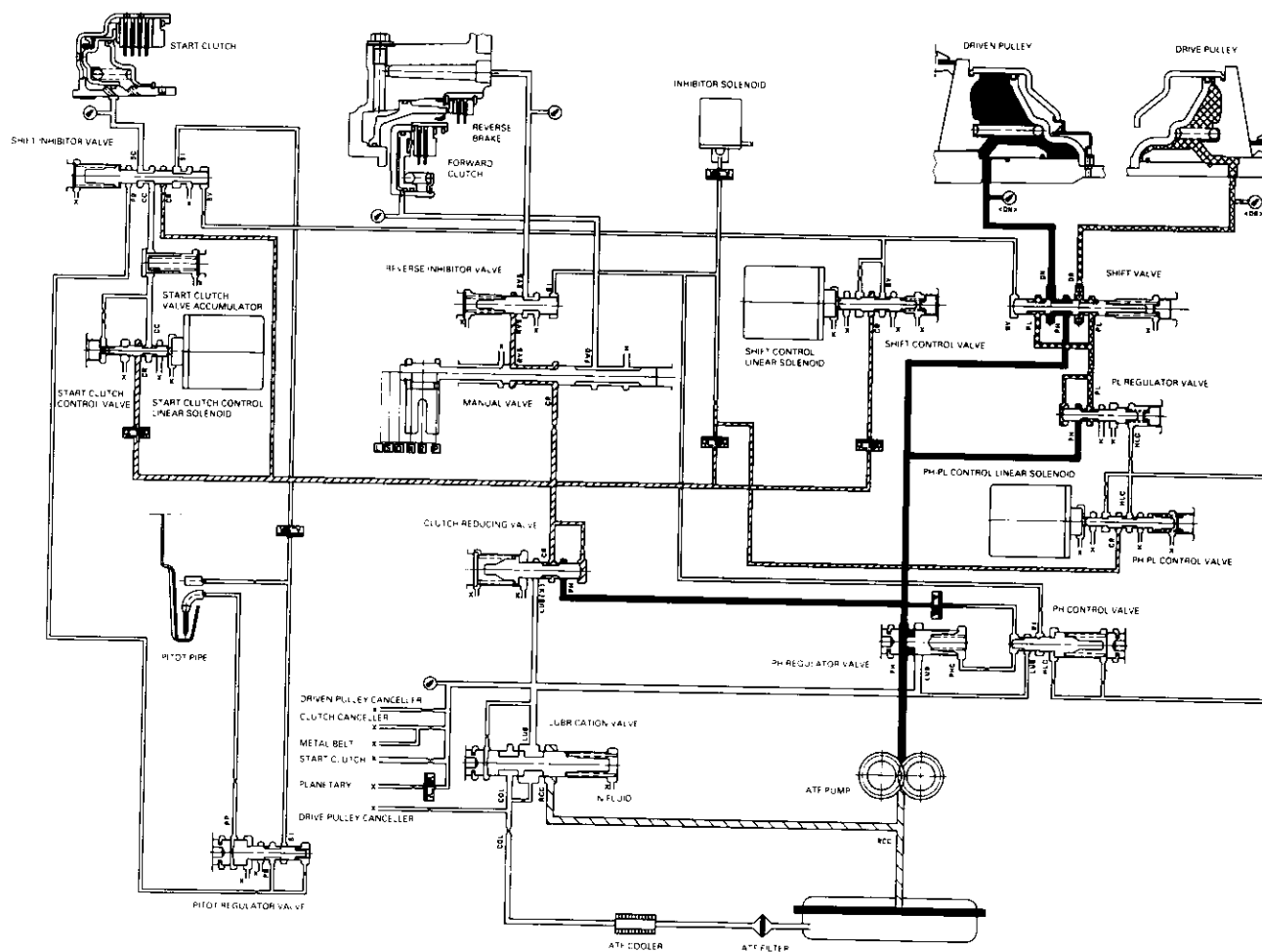
## Hydraulic Flow (cont'd)

### **R** position

#### Reverse Inhibitor Control

If the **R** position is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the inhibitor solenoid doesn't turn off by means of the TCM or PCM. Reverse inhibitor pressure (RI) is not applied to the reverse inhibitor valve as the reverse inhibitor solenoid turns on. The reverse inhibitor valve is kept on the right side, and covers the port to stop reverse brake pressure (RVS) to the reverse brake from the manual valve. Reverse brake pressure (RVS) is not applied to the reverse brake, and power is not transmitted to the reverse direction.

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

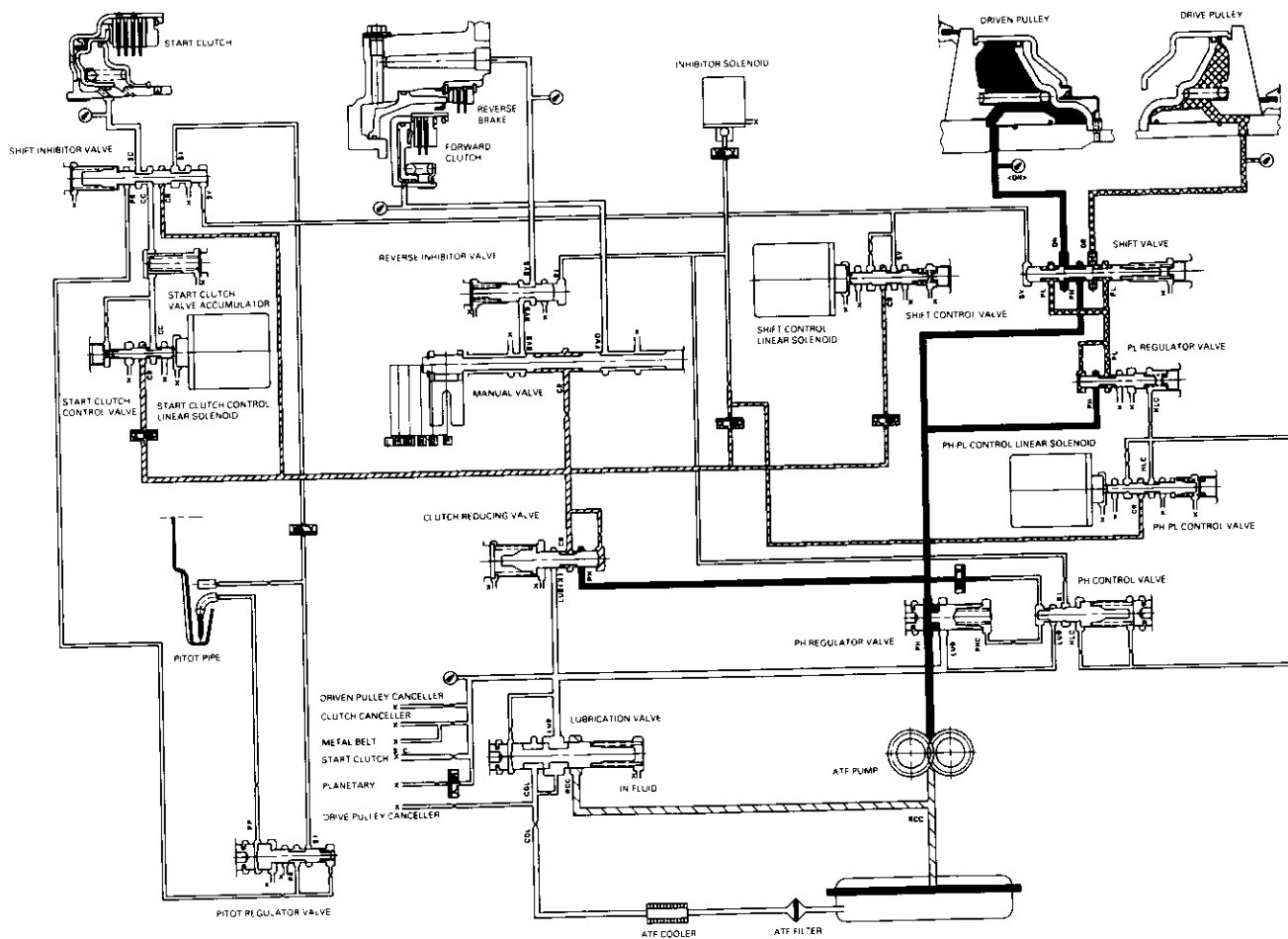




## **P** position

The flow of fluid up to the drive pulley, the driven pulley, and the clutch reducing valve is the same as in **N** position. Clutch reducing pressure (CR) flows to the start clutch control valve, the manual valve, and the shift control valve, and is intercepted by those valves.

Under this condition, hydraulic pressure is not applied to the clutches and reverse brake.



(cont'd)



## Description

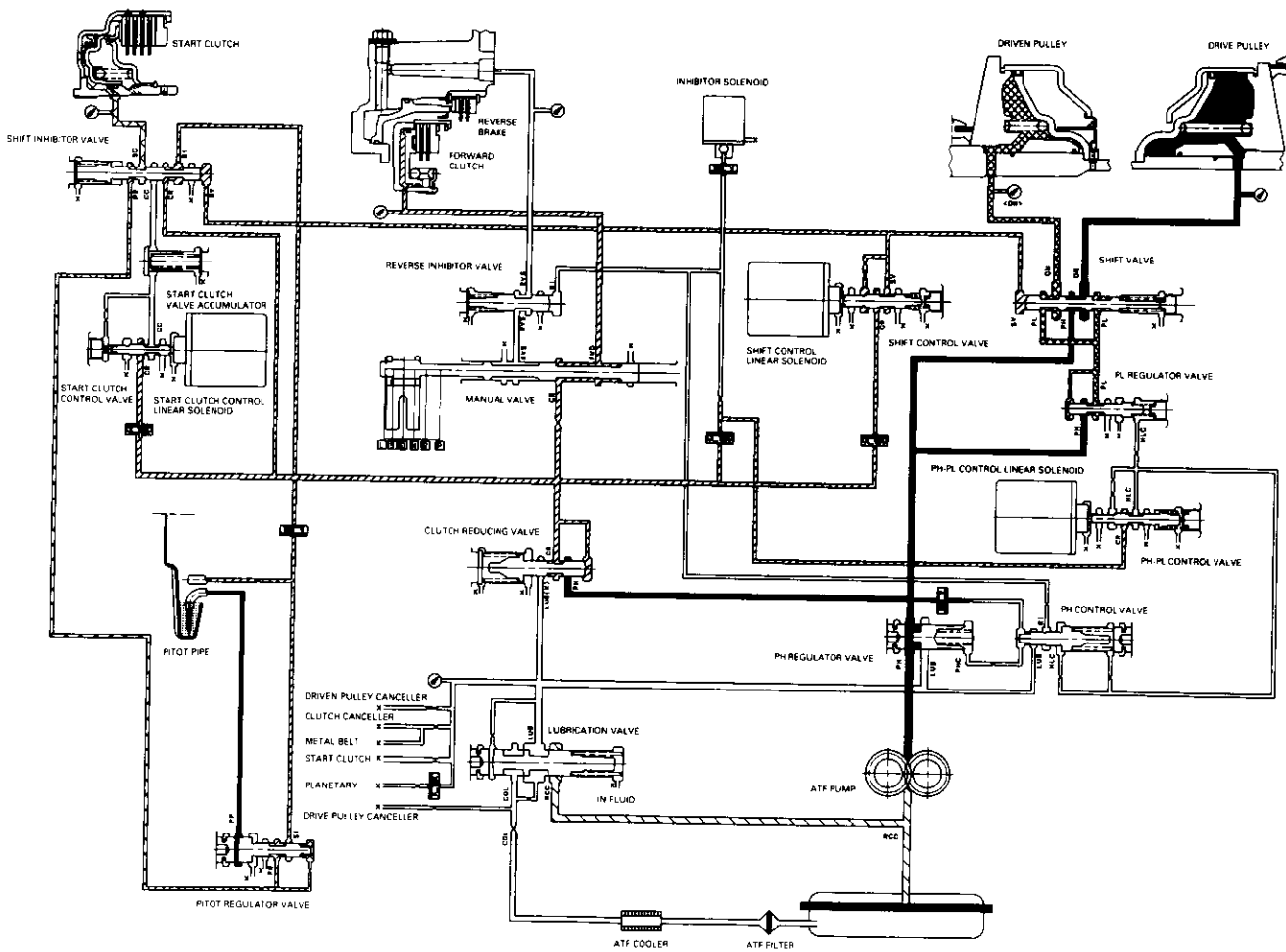
## Hydraulic Flow (cont'd)

**D** position, when the electronic control system is faulty.

When the electronic control system (linear solenoids and sensors) is faulty, the transmission uses the pitot pipe pressure (PP) to allow the vehicle to drive.

When all linear solenoids and sensors are off because of a faulty electronic control system, clutch reducing pressure (CR) flows to the start clutch control valve, the manual valve, the PH-PL control valve, and the shift control valve. Clutch reducing pressure (CR) becomes shift valve pressure (SV) at the shift control valve, and shift valve pressure (SV) is applied to the left end of the shift valve and the right end of the shift inhibitor valve. The shift valve moves to the right side, and uncovers the port that leads high pressure (PH) to the drive pulley and uncovers the port that leads low pressure (PL) to the driven pulley. At this time, the pulley ratio is high. The shift inhibitor valve moves to the left side, and uncovers the port that leads shift inhibitor pressure (SI) to the pitot lubrication pipe and the pitot regulator valve. The pitot lubrication pipe discharges fluid inside of the pitot flange, and discharged fluid enters into the pitot pipe and it is applied to the left end of the pitot regulator valve. The pitot regulator valve moves to the right side, and uncovers the port that leads pitot regulator pressure (PR) to the shift inhibitor valve. Pitot regulator pressure (PR) becomes start clutch pressure (SC) at the shift inhibitor valve, and is applied to the start clutch. The start clutch is engaged. The forward clutch pressure (FWD) is applied to the forward clutch, and the forward clutch is engaged. This allows the vehicle to drive.

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

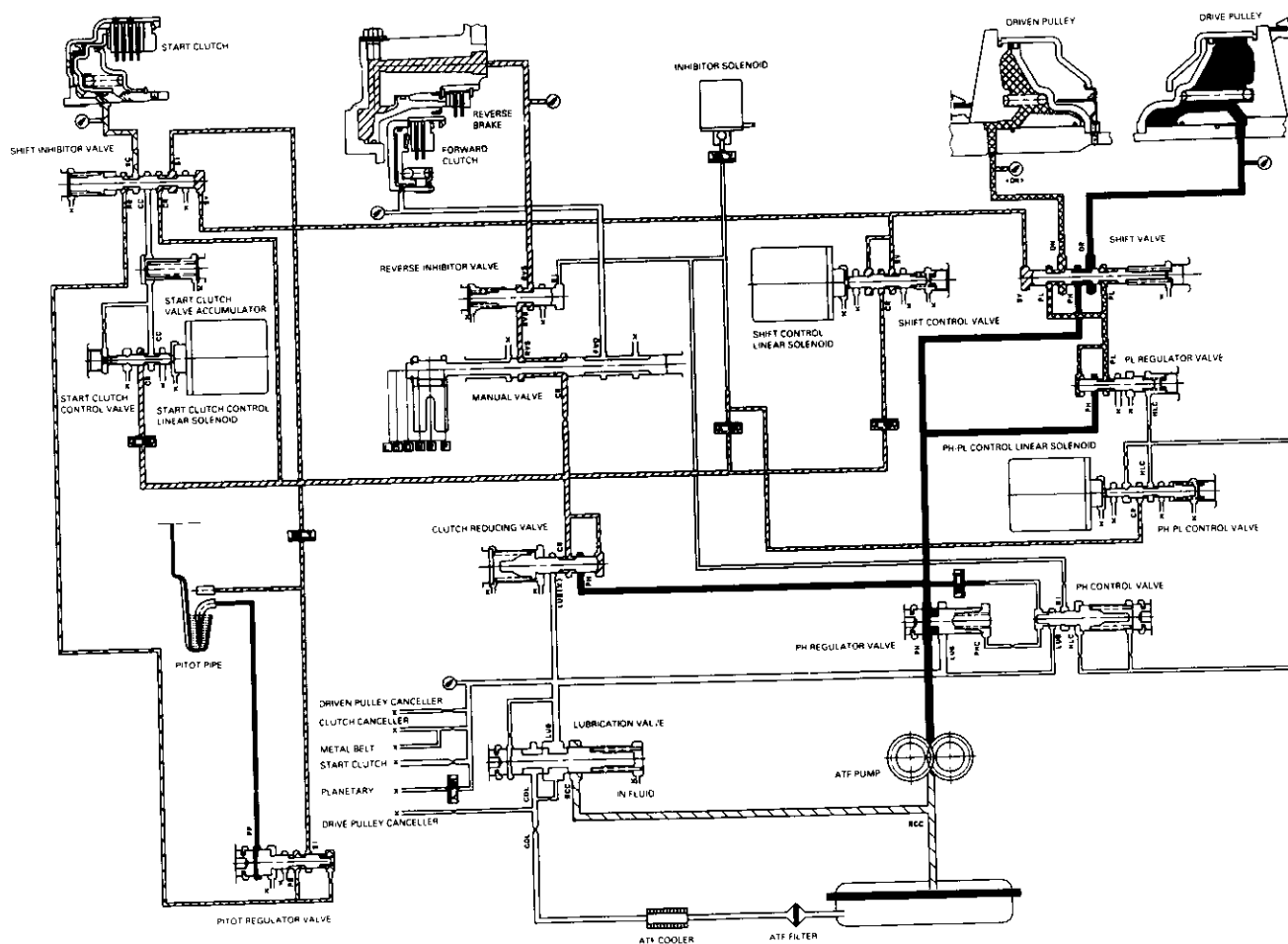




**R** position, when the electronic control system is faulty.

The flow of fluid up to the drive pulley, the driven pulley, and the start clutch is the same as in **D** position. The manual valve is shifted into the **R** position, and it uncovers the port that leads reverse brake pressure (RVS) to the reverse inhibitor valve. Reverse inhibitor pressure (RI) is applied to the right end of the reverse inhibitor valve because of a faulty inhibitor solenoid. The reverse inhibitor valve moves to the left side, and uncovers the port that leads reverse brake pressure (RVS) to the reverse brake. Clutch reducing pressure (CR) becomes reverse brake pressure (RVS) at the manual valve, and flows to the reverse brake. The reverse brake is engaged and locks the ring gear. This allows the vehicle to drive in reverse.

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

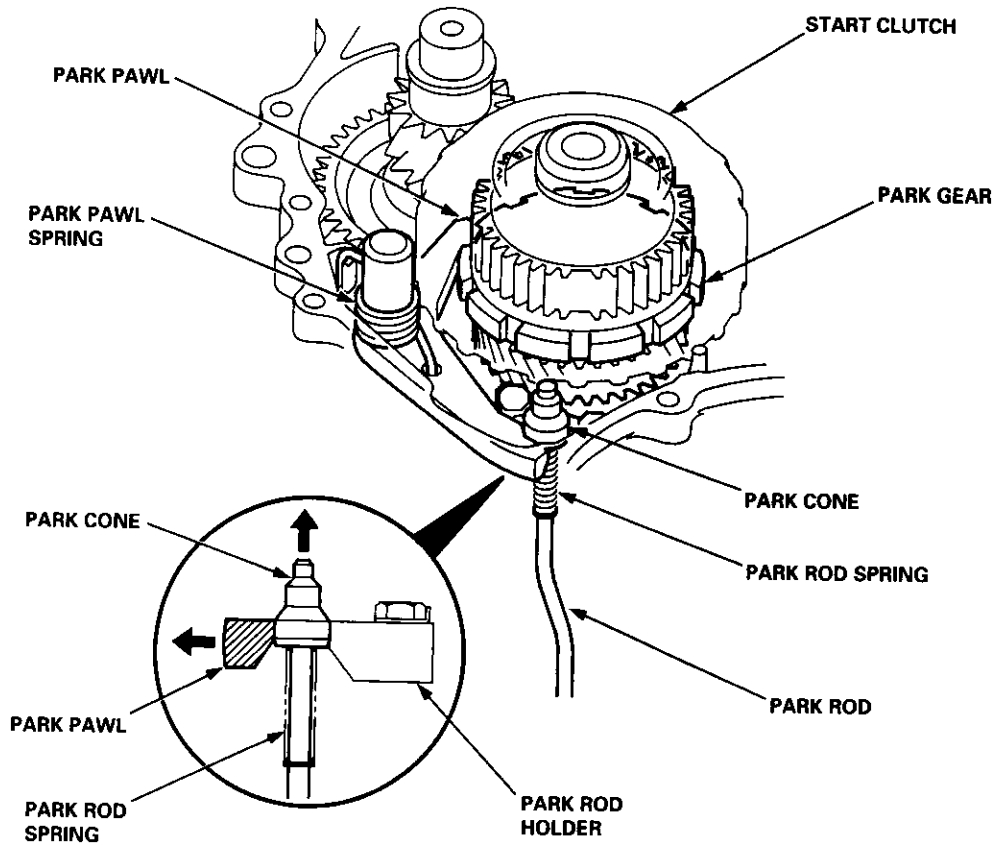


# Description

## Park Mechanism

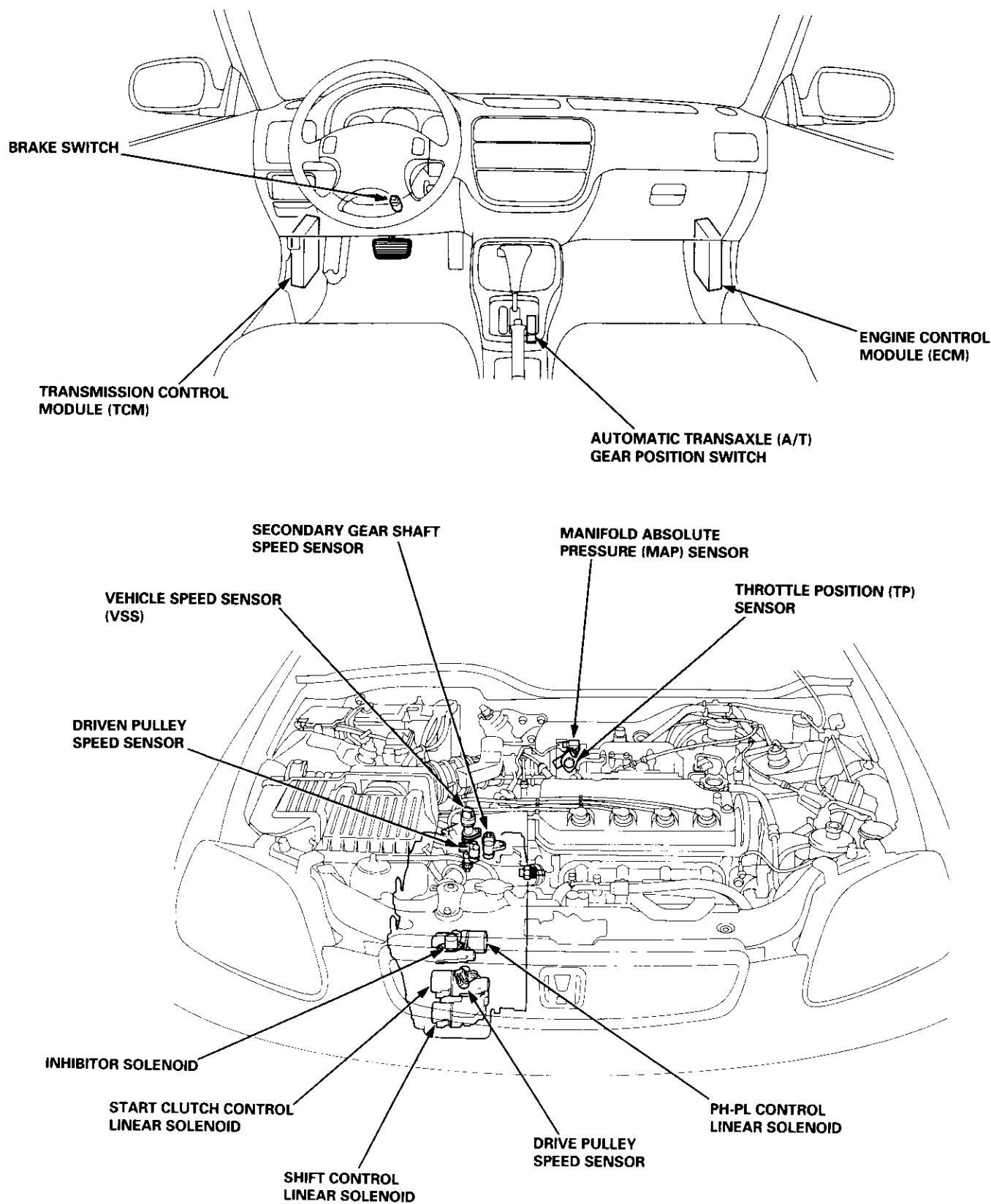
The park mechanism locks the transmission by engaging the park pawl with the park gear which is integral with the secondary drive gear. The secondary drive gear engages with the secondary driven gear which engages with the final driven gear.

Shifting to **P** position causes the park cone (installed at the end of the park rod) to press the park pawl onto the park gear. Even if the end of the park pawl rides on the top of the park gear teeth, slight movement of the vehicle will cause the park pawl and the park gear to mesh with each other completely because the park cone receives the tension from the park rod spring. The park pawl receives the tension (which acts to separate the park pawl from the park gear) from the park pawl spring.



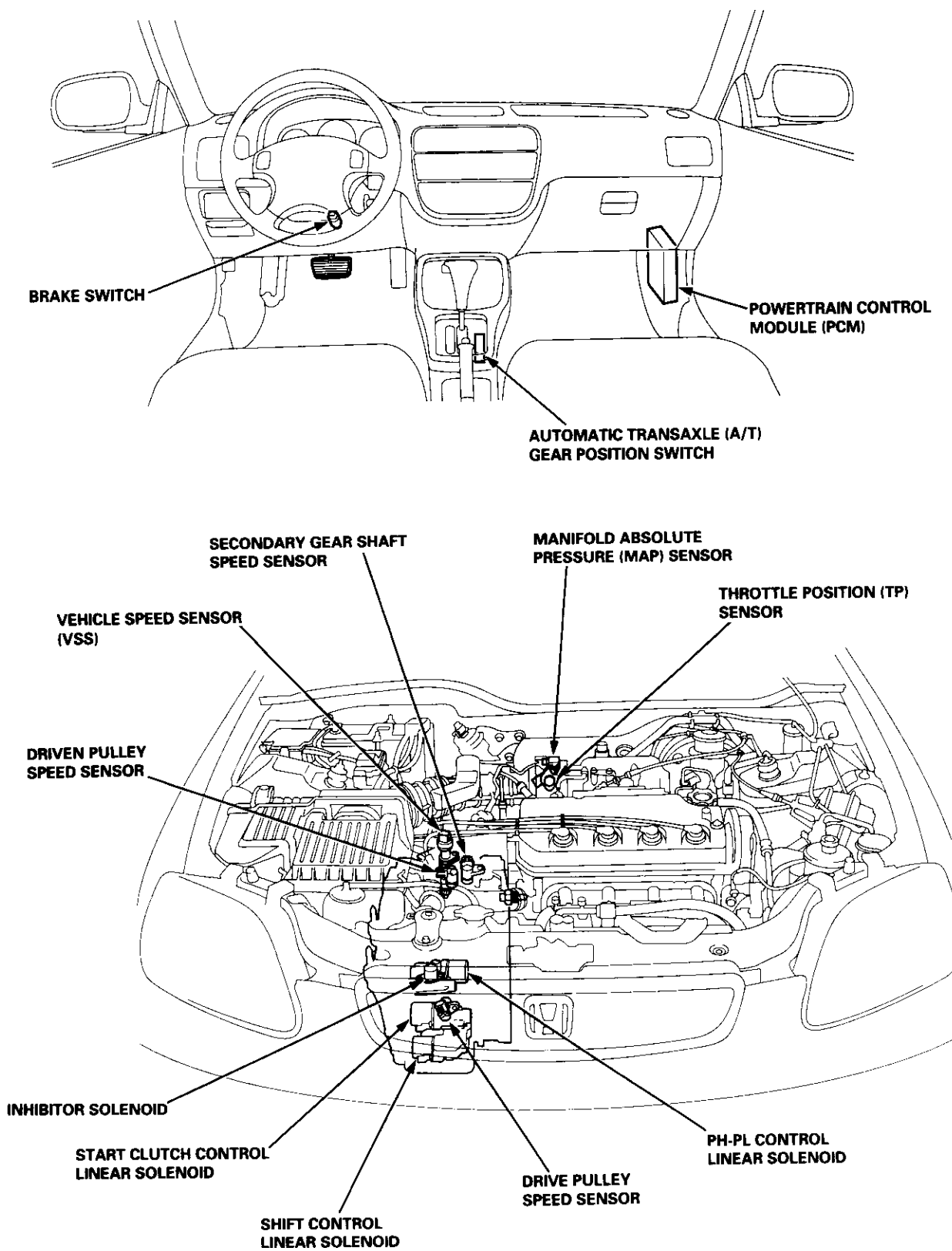
# Component Locations

'96 - 98 Models

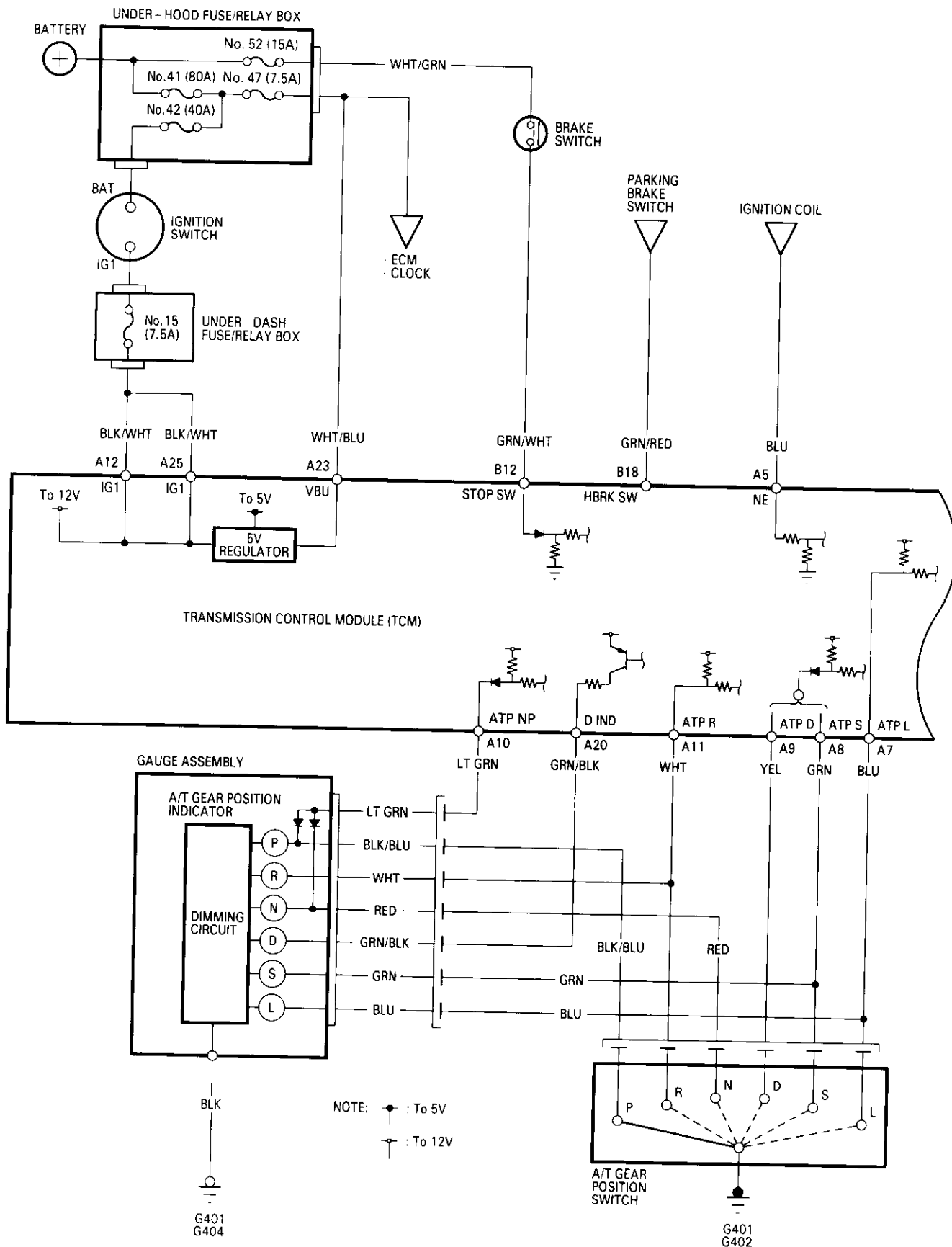


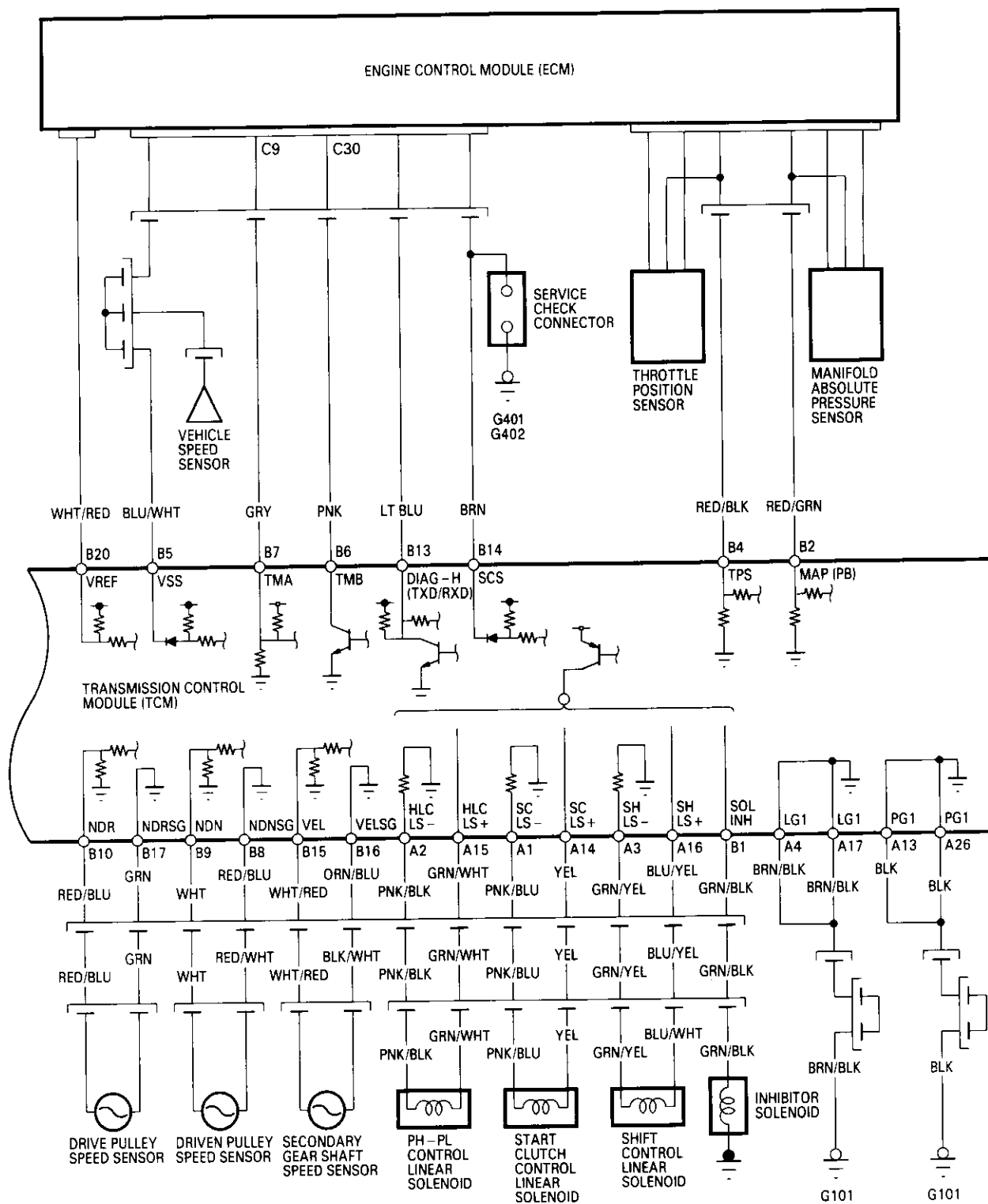


'99 - 00 Models



# TCM Circuit Diagram ('96 - 98 Models)





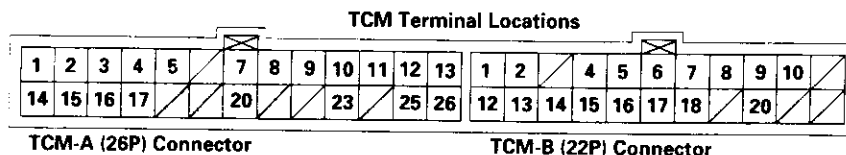
TCM Terminal Locations

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

TCM - A (26P) Connector

TCM - B (22P) Connector

# TCM Terminal Voltage/Measuring Conditions (’96 – 98 Models)



## TCM CONNECTOR A (26P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A1	SC LS-	Start clutch control linear solenoid power supply negative electrode	Engine idling, <b>P</b> position: Approx. 0.4 V
A2	HLC LS-	PH-PL control linear solenoid power supply negative electrode	Engine idling, <b>P</b> position: Approx. 0.7 V
A3	SH LS-	Shift control linear solenoid power supply negative electrode	Engine idling, <b>P</b> position: Approx. 0.8 V
A4	LG1	Ground	
A5	NE	Engine speed signal input	With engine running: Pulsing signal
A6	—	Not used	
A7	ATP L	A/T gear position switch <b>L</b> position signal input	In <b>L</b> position: 0 V In other than <b>L</b> position: Approx. 10 V
A8	ATP S	A/T gear position switch <b>S</b> position signal input	In <b>S</b> position: 0 V In other than <b>S</b> position: Approx. 10 V
A9	ATP D	A/T gear position switch <b>D</b> position signal input	In <b>D</b> position: 0 V In other than <b>D</b> position: Approx. 10 V
A10	ATP NP	A/T gear position switch <b>N</b> or <b>P</b> position signals input	In <b>N</b> or <b>P</b> position: 0 V In other than <b>N</b> or <b>P</b> position: Approx. 10 V
A11	ATP R	A/T gear position switch <b>R</b> position signal input	In <b>R</b> position: 0 V In other than <b>R</b> position: Approx. 10 V
A12	IG1	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A13	PG1	Ground	
A14	SC LS+	Start clutch control linear solenoid power supply positive electrode	Engine idling, <b>P</b> position: Approx. 2.5 V
A15	HLC LS+	PH-PL control linear solenoid power supply positive electrode	Engine idling, <b>P</b> position: Approx. 5.0 V
A16	SH LS+	Shift control linear solenoid power supply positive electrode	Engine idling, <b>P</b> position: Approx. 6.0 V
A17	LG1	Ground	
A18	—	Not used	
A19	—	Not used	
A20	D IND	<b>D</b> indicator light control	When <b>D</b> indicator light comes on: Approx. 10 V When <b>D</b> indicator light OFF: 0 V
A21	—	Not used	
A22	—	Not used	
A23	VBUS	Back-up power system	Always battery voltage
A24	—	Not used	
A25	IG1	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A26	PG1	Ground	

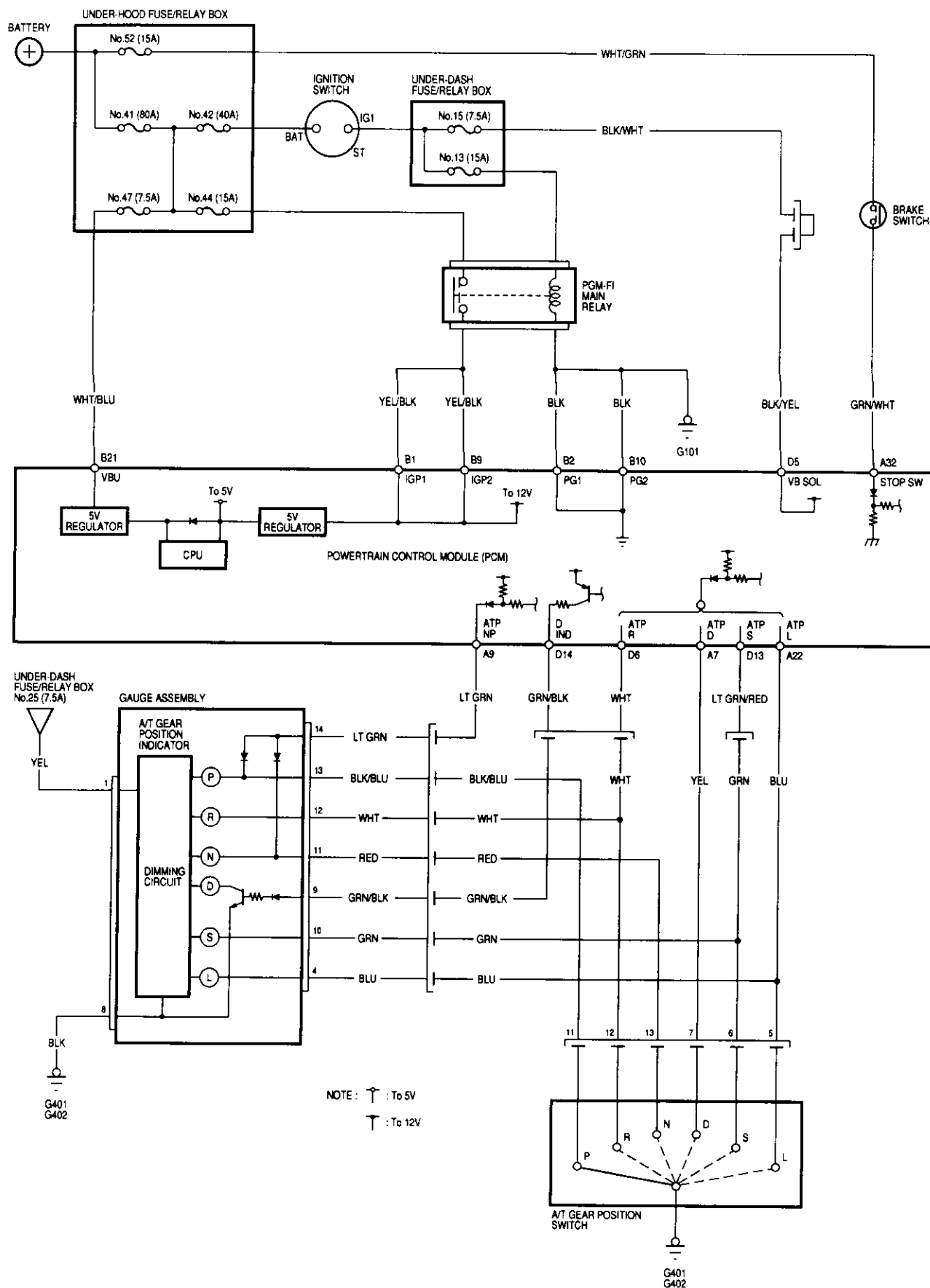


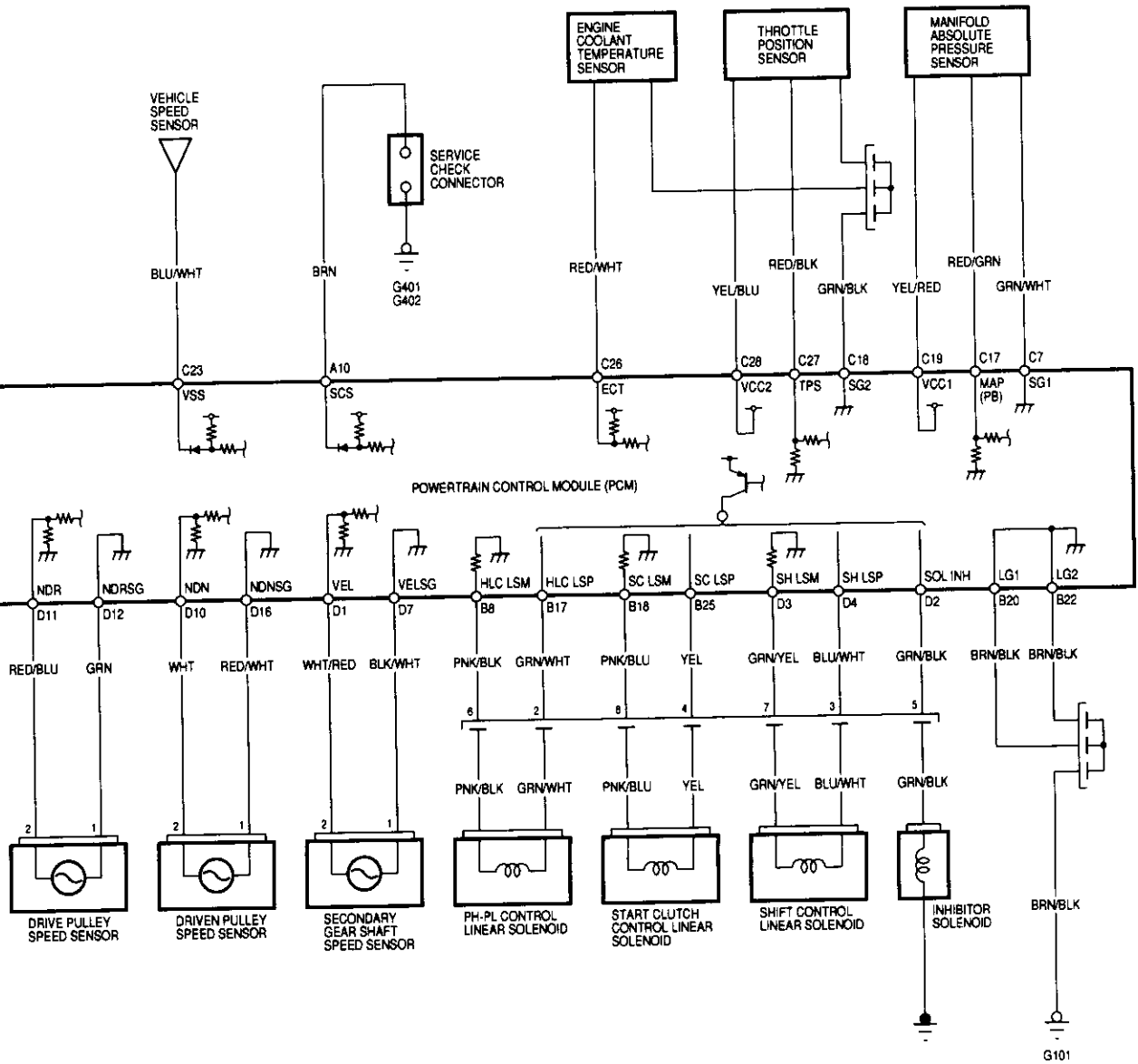


#### TCM CONNECTOR B (22P)

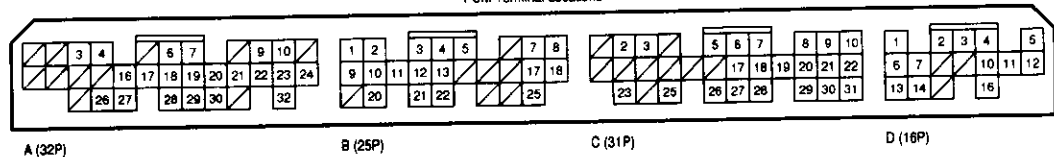
Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	SOL INH	Inhibitor solenoid control	With inhibitor solenoid ON: Battery voltage With inhibitor solenoid OFF: 0 V
B2	MAP (PB)	Manifold Absolute Pressure (MAP) sensor signal input	With ignition switch ON (II): Approx. 2.5 V With engine idling: Approx. 1.0 V (depending on engine speed)
B3	—	Not used	
B4	TPS	Throttle Position (TP) sensor signal input	With ignition switch ON (II) and throttle fully open: 4.14 – 4.82 V With ignition switch ON (II) and throttle fully closed: 0.44 – 0.56 V
B5	VSS	Vehicle Speed Sensor (VSS) signal input	With ignition switch ON (II) and rotating front wheels: 0 – 5 V cycle
B6	TMB	Data communication with ECM: Transmission control data output	With ignition switch ON (II): Pulsing signal
B7	TMA	Data communication with ECM: PGM-FI control data input	With ignition switch ON (II): Pulsing signal
B8	NDN SG	Driven pulley speed sensor ground	
B9	NDN	Driven pulley speed sensor signal input	In other than <b>N</b> and <b>P</b> position: Pulsing signal
B10	NDR	Drive pulley speed sensor signal input	In other than <b>N</b> and <b>P</b> position: Pulsing signal
B11	—	Not used	
B12	STOP SW	Brake switch signal input	With brake pedal depressed: Battery voltage With brake pedal released: 0 V
B13	DIAG-H (TXD/RXD)	Data communication: Diagnostic trouble code output	With ignition switch ON (III): Approx. 5.0 V
B14	SCS	Service check signal	With ignition switch ON (II) and service check connector open: Approx. 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
B15	VEL	Secondary gear shaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: 0 V
B16	VEL SG	Secondary gear shaft speed sensor ground	
B17	NDR SG	Drive pulley speed sensor ground	
B18	HBRK SW	Parking brake switch signal input	With parking brake lever pulled: 0 V With parking brake lever released: Battery voltage
B19	—	Not used	
B20	VREF	+5 V reference	With ignition switch ON (II): Approx. 5 V
B21	—	Not used	
B22	—	Not used	

# PCM Circuit Diagram (A/T Control System: '99 – 00 Models)





PCM Terminal Locations

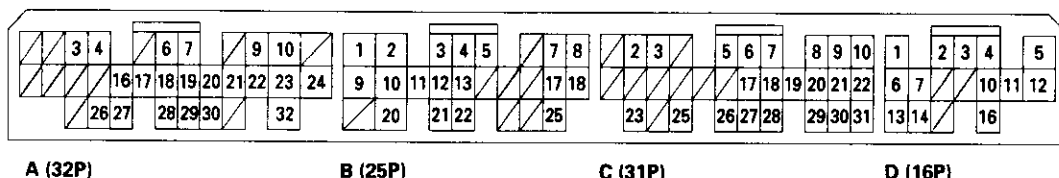


# PCM Terminal Voltage/Measuring Conditions ('99 – 00 Models)

## A/T Control System

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

PCM Connector Terminal Locations



### PCM CONNECTOR A (32P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A7	ATP D	A/T gear position switch D position input	In D position: 0 V In other than D position: Approx. 10 V
A9	ATP NP	A/T gear position switch P and N positions input	In P and N positions: 0 V In other than P and N position: Approx. 10 V
A10	SCS	Timing and adjustment service check signal	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
A22	ATP L	A/T gear position switch L position input	In L position: 0 V In other than L position: Approx. 10 V
A32	STOP SW	Brake switch signal output	Brake pedal depressed: Battery voltage Brake pedal released: 0 V

### PCM CONNECTOR B (25P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	IGP1	Power supply circuit from main relay	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B2	PG1	Ground	
B8	HLC LSM	PH-PL control linear solenoid power supply negative electrode	
B9	IGP2	Power supply circuit from main relay	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B10	PG2	Ground	
B17	HLC LSP	PH-PL control linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal
B18	SC LSM	Start clutch control linear solenoid power supply negative electrode	
B20	LG1	Ground	
B21	VBU	Back-up power supply	Always battery voltage
B22	LG2	Ground	
B25	SC LSP	Start clutch control linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal

**PCM CONNECTOR D (16P)**

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D1	VEL	Secondary gear shaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: Approx. 0 V
D2	SOL INH	Inhibitor solenoid control	With inhibitor solenoid ON: Battery voltage With inhibitor solenoid OFF: 0 V
D3	SH LSM	Shift control linear solenoid power supply negative electrode	
D4	SH LSP	Shift control linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal
D5	VB SOL	Power supply for solenoid valves	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
D6	ATP R	A/T gear position switch <b>[R]</b> position input	In <b>[R]</b> position: 0 V In other than <b>[R]</b> position: Approx. 10 V
D7	VEL SG	Secondary gear shaft speed sensor ground	
D8	—	Not used	
D9	—	Not used	
D10	NDN	Driven pulley speed sensor signal input	In other than <b>[P]</b> and <b>[N]</b> position: Pulsing signal
D11	NDR	Driven pulley speed sensor signal input	In other than <b>[P]</b> and <b>[N]</b> position: Pulsing signal
D12	NDR SG	Drive pulley speed sensor ground	
D13	ATP S	A/T gear position switch <b>[S]</b> position input	In <b>[S]</b> position: 0 V In other than <b>[S]</b> position: Battery voltage
D14	D IND	D indicator light control	When ignition switch is first turned ON (II): Battery voltage for two seconds In <b>[D]</b> position: Battery voltage
D15	—	Not used	
D16	NDN SG	Driven pulley speed sensor ground	

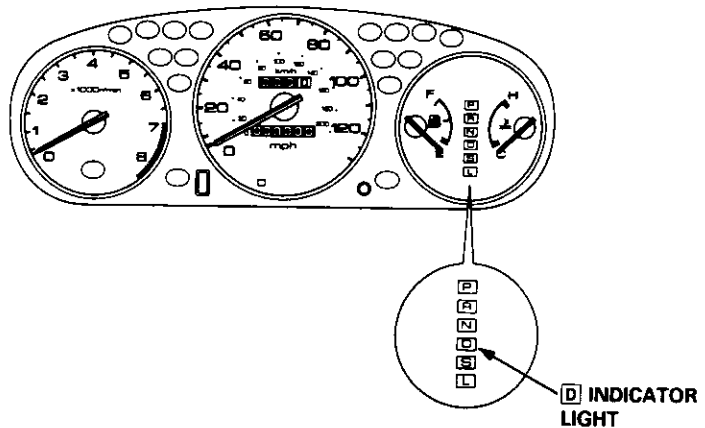
# Troubleshooting Procedures

## I. How To Begin Troubleshooting

When the **D** indicator light has been reported on, use the appropriate procedure below to diagnose and repair the problem.

A. When the **D** indicator light has come on:

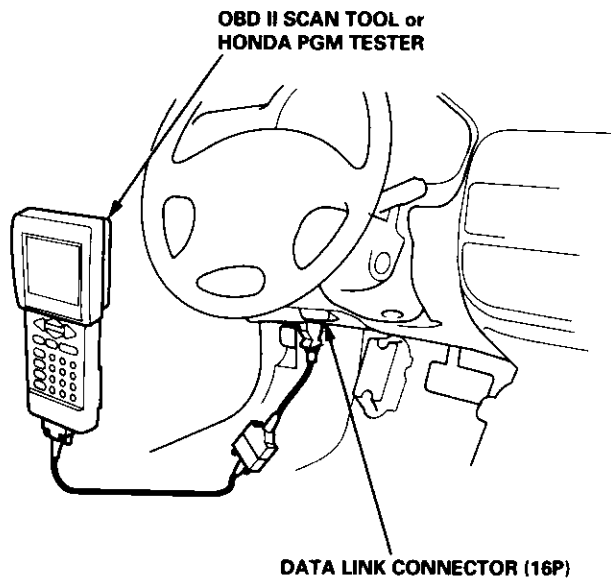
1. Connect the Honda PGM Tester or an OBD II Scan Tool to the 16P Data Link Connector (DLC) located near the left kick panel.
2. Turn the ignition switch ON (II).
3. Check the DTC and note it. Also check and note the freeze frame data.  
Refer to the Diagnostic Trouble Code Chart and begin troubleshooting.




**NOTE:** See the OBD II Scan Tool or Honda PGM Tester user's manuals for specific operating instructions.

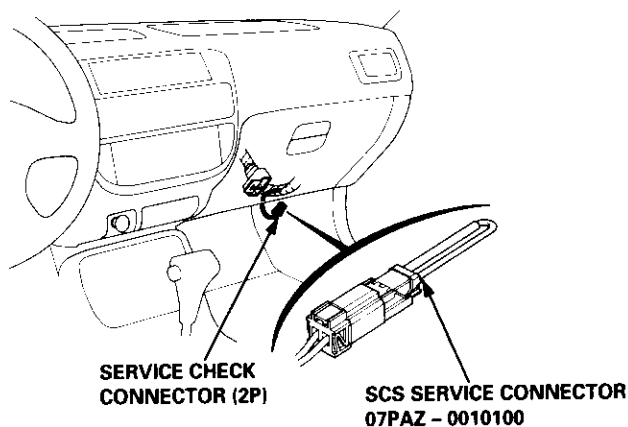
Some PGM-FI problems will also make the **D** indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP fuse (7.5 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM or PCM memory, then recheck.

**NOTE:** Disconnecting the BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.

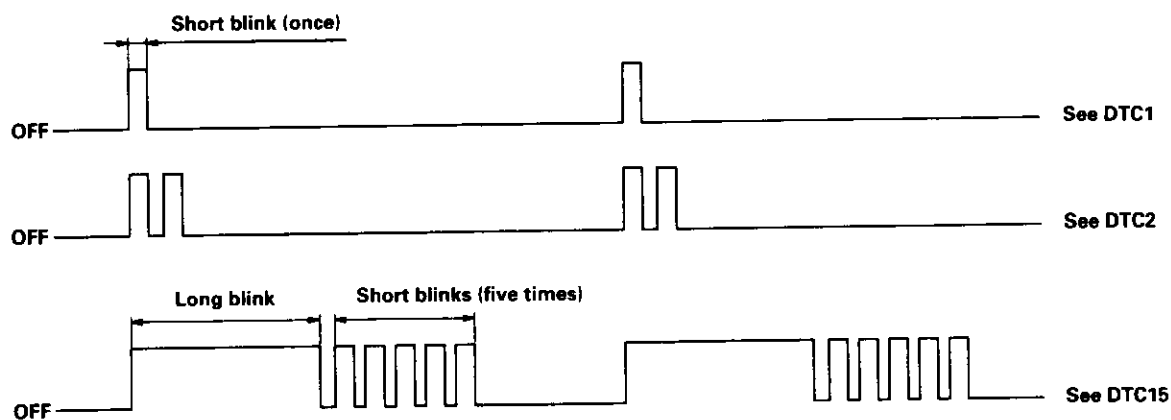





B. DTCs will be indicated by the blinking of the  indicator light with the SCS service connector connected to the Service Check Connector as shown. (The Service Check Connector (2P) is located under the dash on the passenger's side of the vehicle.) Turn the ignition switch ON (II).



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to-Component Chart on pages 14-238 and 14-239 for the '96 - 98 models, and on pages 14-240 and 14-241 for the '99 - 00 models.



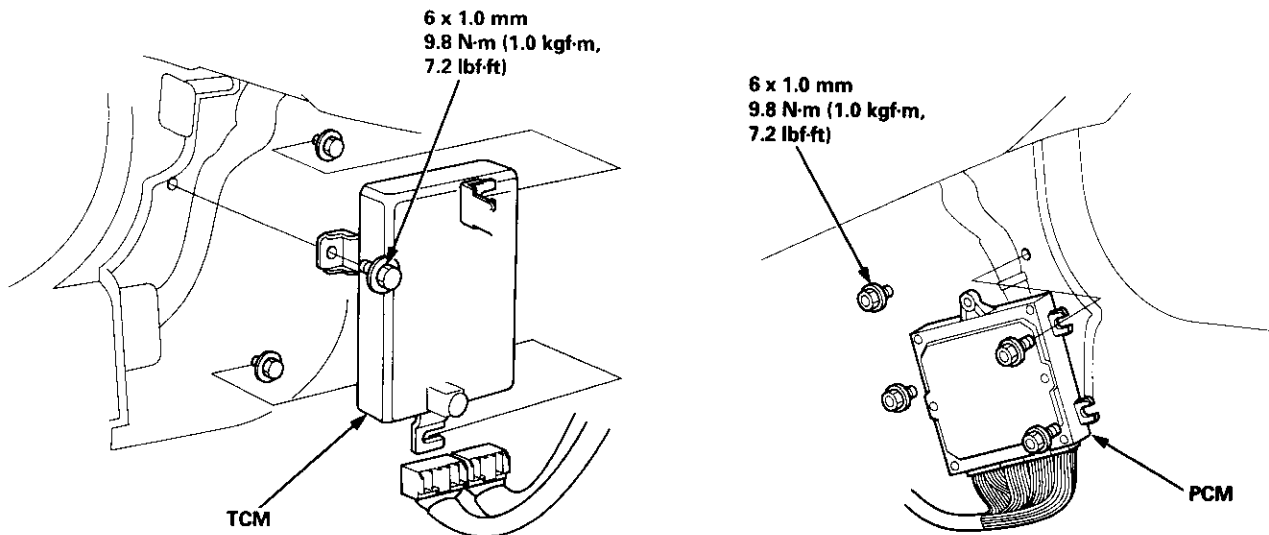
Some PGM-FI problems will also make the  indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP fuse (7.5 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM or PCM memory, then recheck.

(cont'd)

# Troubleshooting Procedures

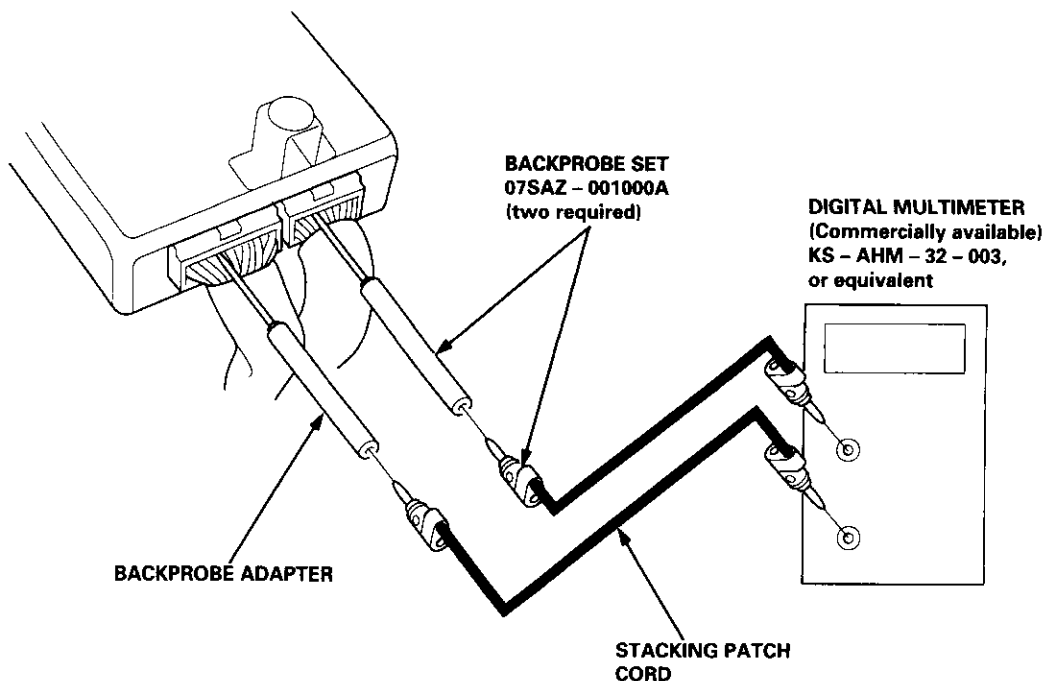
(cont'd)

- C. If the inspection for a particular code requires voltage or resistance checks at the TCM or PCM connectors, remove the driver's side kick panel, and unbolt the TCM, and at the PCM connectors, remove the passenger's side kick panel, and unbolt the PCM. Turn the ignition switch OFF, and connect the backprobe sets and a digital multimeter as described below. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.



## How to use the Backprobe Set

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





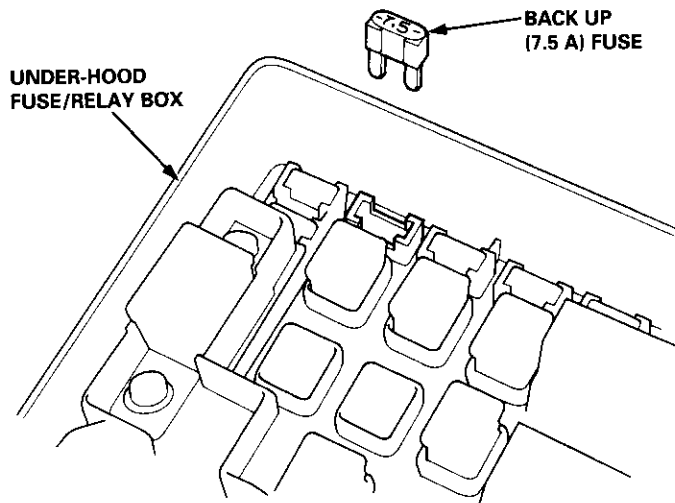


## II. TCM Reset Procedure

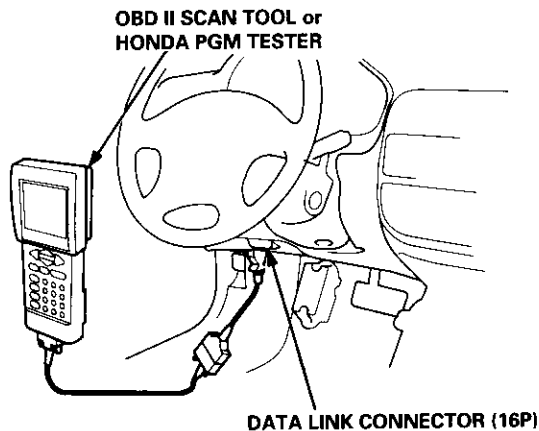
1. Turn the ignition switch off.
2. Remove the BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset the TCM or PCM.

### NOTE:

- Disconnecting the BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



- The TCM or PCM can also be cleared by using the OBD II Scan Tool or Honda PGM Tester.




## III. Final Procedure


NOTE: This procedure must be done after any troubleshooting.

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

# Symptom-to-Component Chart

## Electrical System — '96 – 98 Models

DTC*	 Indicator Light	MIL	Detection Item	Page
P1790 (3)	Blinks	ON	Throttle position sensor	14-242
P1791 (4)	Blinks	ON	Vehicle speed sensor	14-243
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	14-244
P1706 (6)	OFF	ON	A/T gear position switch (open)	14-246
P0725 (11)	Blinks	ON	Ignition coil	14-248
P1793 (12)	Blinks	ON	Manifold absolute pressure sensor	14-249
P1870 (30)	Blinks	ON	Shift control linear solenoid	14-250
P1873 (31)	Blinks	ON	PH-PL control linear solenoid	14-251
P1879 (32)	Blinks	ON	Start clutch control linear solenoid	14-252
P1882 (33)	Blinks	ON	Inhibitor solenoid	14-253
P1885 (34)	Blinks	ON	Drive pulley speed sensor	14-254
P1886 (35)	Blinks	ON	Driven pulley speed sensor	14-255
P1888 (36)	Blinks	ON	Secondary gear shaft speed sensor	14-256
P1655 (37)	Blinks	ON	ECM or TCM	14-257
P1890 (42)	Blinks	ON	Shift control system	14-259
P1891 (43)	Blinks	ON	Start clutch control system	14-260

\*: The DTC in parentheses is the code  indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.



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


Symptom	Inspection	Ref. page
<b>D</b> indicator light does not come on for two seconds after ignition switch is first turn on (II).	—	14-262
<b>D</b> indicator light is on constantly (not blinking) whenever the ignition switch is on (II).	—	14-264


**NOTE:**

- If a customer described the symptom for code P1706 (6), it will be necessary to recreate the symptom by test driving, then recheck the DTC.
- Sometime the **D** indicator light and the Malfunction Indicator lamp (MIL) may come on simultaneously. If so, repair the PGM-FI system according to the DTC, then reset the memory by removing the BACK UP fuse in the under-hood fuse/relay box for more than 10 seconds. Drive the vehicle for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.


# Symptom-to-Component Chart



## Electrical System — '99 – 00 Models

DTC*	 Indicator Light	MIL	Detection Item	Page
P1705 (5)	Blinks	ON	A/T gear position switch (short to ground)	14-265
P1706 (6)	OFF	ON	A/T gear position switch (open)	14-268
P1870 (30)	Blinks	ON	Shift control linear solenoid	14-271
P1873 (31)	Blinks	ON	PH-PL control linear solenoid	14-273
P1879 (32)	Blinks	ON	Start clutch control linear solenoid	14-275
P1882 (33)	Blinks	ON	Inhibitor solenoid	14-277
P1885 (34)	Blinks	ON	Drive pulley speed sensor	14-279
P1886 (35)	Blinks	ON	Driven pulley speed sensor	14-281
P1888 (36)	Blinks	ON	Secondary gear shaft speed sensor	14-283
P1890 (42)	Blinks	ON	Shift control system	14-285
P1891 (43)	Blinks	ON	Start clutch control system	14-286


\*: The DTC in parentheses is the code  indicator light indicates when the Data Link Connector is connected to the Honda PGM Tester.



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

Symptom	Inspection	Ref. page
 indicator light does not come on for two seconds after ignition switch is first turned ON (II).	—	14-288
 indicator light is on constantly (not blinking) whenever the ignition switch is ON (II).	—	14-290


NOTE:

- If a customer described the symptom for code P1706 (6), it will be necessary to recreate the symptom by test driving, then recheck the DTC.
- Sometimes, the  indicator light and the Malfunction Indicator lamp (MIL) may come on simultaneously. If so, repair the PGM-FI system according to the DTC, then reset the memory by removing the BACK UP RADIO fuse in the underhood fuse/relay box for more than 10 seconds. Drive the car for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.

# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Throttle Position (TP) Sensor

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1790.
- Self-diagnosis  indicator light blinks three times.

### Possible Cause

- Disconnected throttle position (TP) sensor connector
- Short or open in TP sensor wire
- Faulty TP sensor

### Check for Another Code or MIL Blinking:

1. Turn the ignition switch ON (II).
2. Check whether the OBD II scan tool indicates another code or the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Does the OBD II scan tool indicate another code or is the MIL blinking?

YES

Repair the PGM-FI system (see section 11).

NO

### Measure VREF Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) and B (22P) connectors from the TCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B20 and A13 or A26 terminals.

Is there approx. 5 V?

NO

Repair open or short in the wire between the B20 terminal and the ECM.

YES

### Measure TPS Voltage:

Measure the voltage between the B4 and A13 or A26 terminals.

Is there 0.4 – 0.6 V?

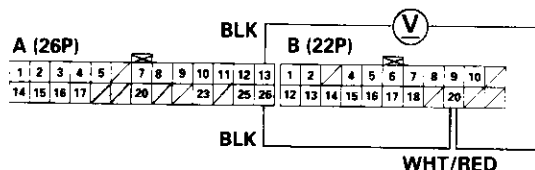
NO

Repair open in the wire between the B4 terminal and the TP sensor.

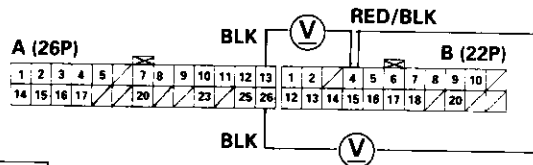
YES

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

### TCM CONNECTORS



Wire side of female terminals





## Troubleshooting Flowchart — Vehicle Speed Sensor (VSS)

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1791.
- Self-diagnosis indicator light blinks four times.

### Possible Cause

- Disconnected vehicle speed sensor (VSS) connector
- Short or open in VSS wire
- Faulty VSS

Check that the speedometer operates correctly.

Does the speedometer operate?

NO

Refer to section 23 for vehicle speed sensor (VSS) test.

YES

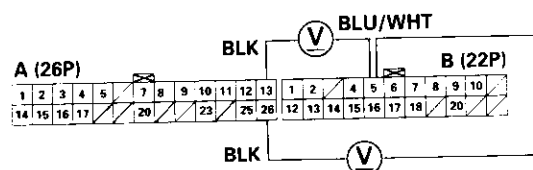
### Check the VSS Voltage:

1. Raise the vehicle.
2. Shift the transmission to position.
3. Disconnect the A (26P) and B (22P) connectors from the TCM.
4. Turn the ignition switch ON (II).
5. Rotate the front wheel and check for the voltage between the B5 and A13 or A26 terminals. Block the other wheel so it does not turn.

### ⚠ WARNING

- Make sure lifts, jacks, and safety stands are placed properly (see section 1).
- Set the parking brake securely, and block the rear wheels.
- Jack up the front of the vehicle, and support it with safety stands.

### TCM CONNECTORS



Wire side of female terminals

Does 0 V and approx. 5 V or more appear alternately?

NO

Check for open in the wire between the B5 terminal and the vehicle speed sensor (VSS). If wire is OK, check the VSS (see section 23).

YES

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

# Electrical Troubleshooting ('96 – 98 Models)

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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1705.
- Self-diagnosis **D** indicator light blinks five times.

### Possible Cause

- Short in A/T gear position switch wire
- Faulty A/T gear position switch

NOTE: Code P1705(5) is caused when the TCM receives two gear position inputs at the same time.

### Observe the A/T gear position indicator:

1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift to each position separately.

Do any indicators stay on when the shift lever is not in that position?

NO

The system is OK at this time. Check the wire harness for damage.

YES

### Measure ATP R Voltage:

1. Shift to all positions other than **R**.
2. Measure the voltage between the A11 and A13 or A26 terminals.

Is there approx. 10 V?

NO

Check for short in the wire between the A11 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

YES

### Measure ATP NP Voltage:

1. Shift to all positions other than **N** or **P**.
2. Measure the voltage between the A10 and A13 or A26 terminals.

Is there approx. 10 V?

NO

Check for short in the wire between the A10 terminal and the A/T gear position indicator, or a short in the wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

YES

### Measure ATP D Voltage:

1. Shift to all positions other than **D**.
2. Measure the voltage between the A9 and A13 or A26 terminals.

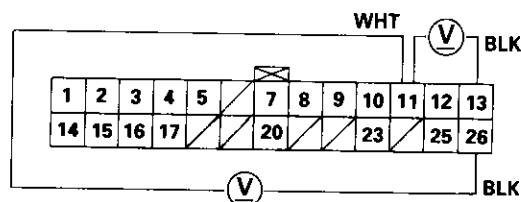
Is there approx. 10 V?

NO

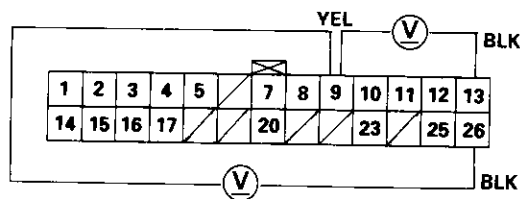
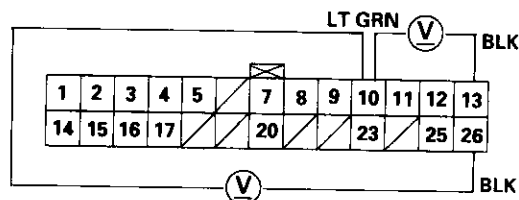
Check for short in the wire between the A9 terminal and the A/T gear position switch. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

YES

TCM CONNECTOR A (26P)



Wire side of female terminals







From page 14-244

**Measure ATP S Voltage:**

1. Shift to all positions other than **S**.
2. Measure the voltage between the A8 and A13 or A26 terminals.

Is there approx. 10 V?

NO

YES

**Measure ATP L Voltage:**

1. Shift to all positions other than **L**.
2. Measure the voltage between the A7 and A13 or A26 terminals.

Is there approx. 10 V?

NO

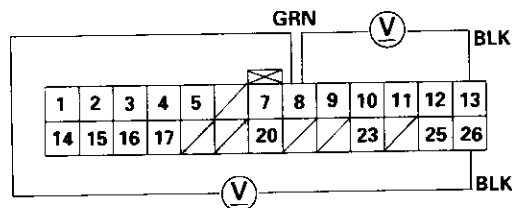
YES

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

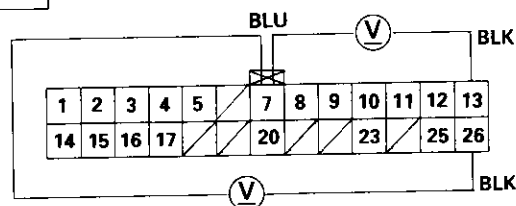
Check for short in the wire between the A8 terminal and the A/T gear position switch or the A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

Check for short in the wire between the A7 terminal and the A/T gear position switch or the A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

TCM CONNECTOR A (26P)



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1706.
- Self-diagnosis **D** indicator light blinks six times.

### Possible Cause

- Disconnected A/T gear position switch connector
- Open in A/T gear position switch wire
- Faulty A/T gear position switch

### Measure ATP R Voltage:

1. Turn the ignition switch ON (II).
2. Shift to **R** position.
3. Measure the voltage between the A11 and A13 or A26 terminals.

Is there voltage?

YES

Repair open in the wire between the A11 terminal and the A/T gear position switch.

NO

### Measure ATP NP Voltage:

1. Shift to **N** or **P** position.
2. Measure the voltage between the A10 and A13 or A26 terminals.

Is there voltage?

YES

Repair open in the wire between the A10 terminal and the A/T gear position switch.

NO

### Measure ATP D Voltage:

1. Shift to **D** position.
2. Measure the voltage between the A9 and A13 or A26 terminals.

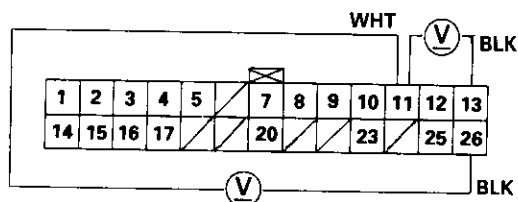
Is there voltage?

YES

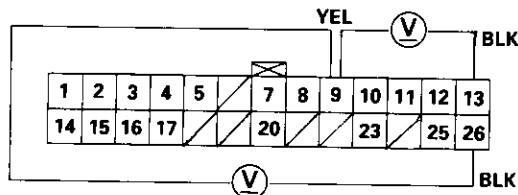
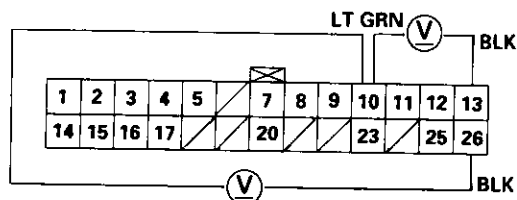
Repair open in the wire between the A9 terminal and the A/T gear position switch.

NO

TCM CONNECTOR A (26P)



Wire side of female terminals



To page 14-247



From page 14-246

**Measure ATP S Voltage:**

1. Shift to **S** position.
2. Measure the voltage between the A8 and A13 or A26 terminals.

Is there voltage?

YES

Repair open in the wire between the A8 terminal and the A/T gear position switch.

NO

**Measure ATP L Voltage:**

1. Shift to **L** position.
2. Measure the voltage between the A7 and A13 or A26 terminals.

Is there voltage?

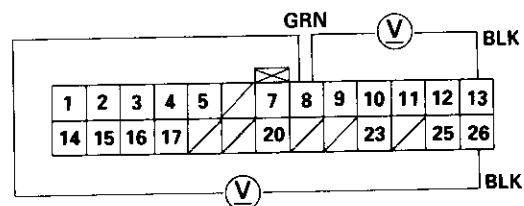
YES

Repair open in the wire between the A7 terminal and the A/T gear position switch.

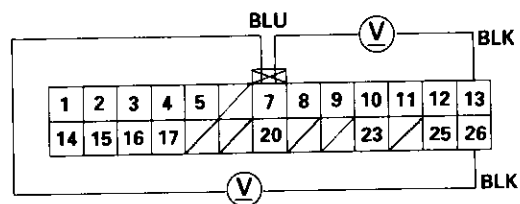
NO

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

**TCM CONNECTOR A (26P)**



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Ignition Coil

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P0725.
- Self-diagnosis **D** indicator light indicates Code 11.

### Possible Cause

- Disconnected ignition coil connector
- Short or open ignition coil wire
- Faulty ignition coil

### Measure NE Voltage:

1. Disconnect the A (26P) connector from the TCM.
2. Start the engine.
3. Measure the voltage between the A5 and A13 or A26 terminals.

Is there battery voltage?

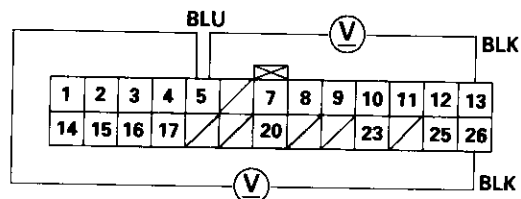
NO

YES

Check for loose TCM connector. If necessary, substitute a known-good TCM and recheck.

Repair open or short in the wire between the A5 terminal and the ignition coil. If wire is OK, check the ignition coil test (see section 23).

TCM CONNECTOR A (26P)



Wire side of female terminals



## Troubleshooting Flowchart — Manifold Absolute Pressure (MAP) Sensor

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1793.
- Self-diagnosis indicator light indicates Code 12.

### Possible Cause

- Disconnected manifold absolute pressure (MAP) sensor connector
- Short or open in MAP sensor wire
- Faulty MAP sensor

### Check for Another Code or MIL Blinking:

1. Turn the ignition switch ON (II).
2. Check whether the OBD II scan tool indicates another code or the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Does the OBD II scan tool indicate another code or is the MIL blinking?

YES

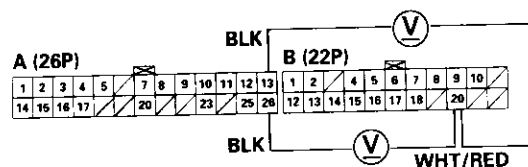
Repair PGM-FI system (see section 11).

NO

### Measure VREF Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) and B (22P) connectors from the TCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the B20 and A13 or A26 terminals.

### TCM CONNECTORS



Wire side of female terminals

Is there approx. 5 V?

NO

Repair open or short in the wire between the B20 terminal and the ECM.

YES

### Measure MAP (PB) Voltage:

Measure the voltage between the B2 and A13 or A26 terminals.

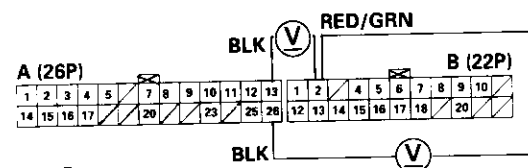
Is there approx. 3 V?

NO

Repair open or short in the wire between the B2 terminal and the MAP sensor.

YES

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



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Shift Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1870.
- Self-diagnosis **D** indicator light indicates Code 30.

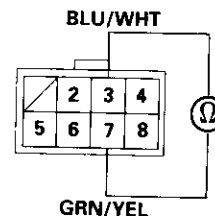
### Possible Cause

- Disconnected solenoid harness connector
- Short or open in shift control linear solenoid wire
- Faulty shift control linear solenoid

### Measure Shift Control Linear Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the 8P connector from the solenoid harness connector.
2. Measure the resistance between the No. 3 and the No. 7 terminals of the solenoid harness connector.

### SOLENOID HARNESS 8P CONNECTOR



Terminal side of male terminals

Is the resistance 3.8 – 6.8 Ω?

NO

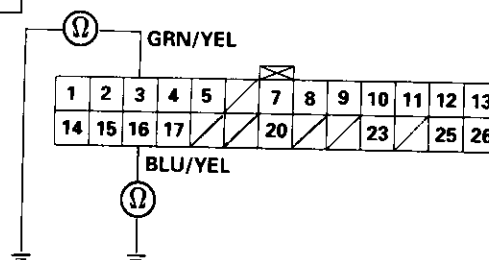
Replace the lower valve body assembly.

YES

### Check Shift Control Linear Solenoid for a Short Circuit:

1. Disconnect the A (26P) connector from the TCM.
2. Check for continuity between body ground and the A3 terminal and the A16 terminal individually.

### TCM CONNECTOR A (26P)



Wire side of female terminals

Is there continuity?

YES

Repair short in the wires between the A3 and A16 terminals and the body ground.

NO

### Measure Shift Control Linear Solenoid Resistance:

1. Connect the 8P connector to the solenoid harness connector.
2. Measure the resistance between the A3 and A16 terminals.

Is the resistance 3.8 – 6.8 Ω?

NO

Repair loose terminal or open in the wires between the A3 and A16 terminals and the solenoid harness connector.

YES

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



## Troubleshooting Flowchart — PH-PL Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1873.
- Self-diagnosis indicator light indicates Code 31.

### Possible Cause

- Disconnected solenoid harness connector
- Short or open in PH-PL control linear solenoid wire
- Faulty PH-PL control linear solenoid

### Measure PH-PL Control Linear Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the 8P connector from the solenoid harness connector.
2. Measure the resistance between the No. 2 and the No. 6 terminals of the solenoid harness connector.

Is the resistance 3.8 – 6.8  $\Omega$ ?

NO

Replace the lower valve body assembly.

YES

### Check PH-PL Control Linear Solenoid for a Short Circuit:

1. Disconnect the A (26P) connector from the TCM.
2. Check for continuity between body ground and the A2 terminal and the A15 terminal individually.

Is there continuity?

YES

Repair short in the wires between the A2 and A15 terminals and the body ground.

NO

### Measure PH-PL Control Linear Solenoid Resistance:

1. Connect the 8P connector to the solenoid harness connector.
2. Measure the resistance between the A2 and A15 terminals.

Is the resistance 3.8 – 6.8  $\Omega$ ?

NO

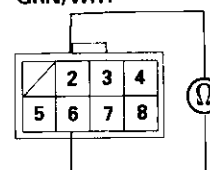
Repair loose terminal or open in the wires between the A2 and A15 terminals and the solenoid harness connector.

YES

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

### SOLENOID HARNESS 8P CONNECTOR

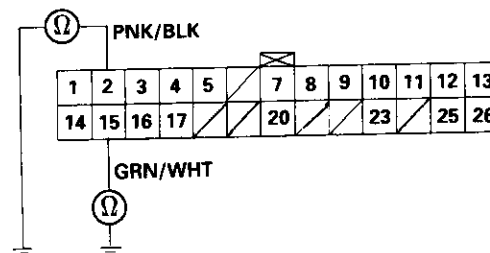
GRN/WHT



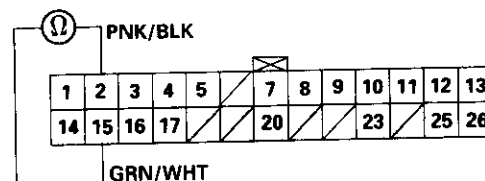
PNK/BLK

Terminal side of male terminals

### TCM CONNECTOR A (26P)



Wire side of female terminals



# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Start Clutch Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1879.
- Self-diagnosis  $\square$  indicator light indicates Code 32.

### Possible Cause

- Disconnected solenoid harness connector
- Short or open in start clutch control linear solenoid wire
- Faulty start clutch control linear solenoid

### Measure Start Clutch Control Linear Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the 8P connector from the solenoid harness connector.
2. Measure the resistance between the No. 4 and the No. 8 terminals of the solenoid harness connector.

Is the resistance 3.8 – 6.8  $\Omega$ ?

NO

Replace the lower valve body assembly.

YES

### Check Start Clutch Control Linear Solenoid for a Short Circuit:

1. Disconnect the A (26P) connector from the TCM.
2. Check for continuity between body ground and the A1 terminal and the A14 terminal individually.

Is there continuity?

YES

Repair short in the wires between the A1 and A14 terminals and the body ground.

NO

### Measure Start Clutch Control Linear Solenoid Resistance:

1. Connect the 8P connector to the solenoid harness connector.
2. Measure the resistance between the A1 and A14 terminals.

Is the resistance 3.8 – 6.8  $\Omega$ ?

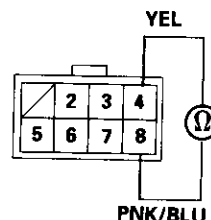
NO

Repair loose terminal or open in the wires between the A1 and A14 terminals and the solenoid harness connector.

YES

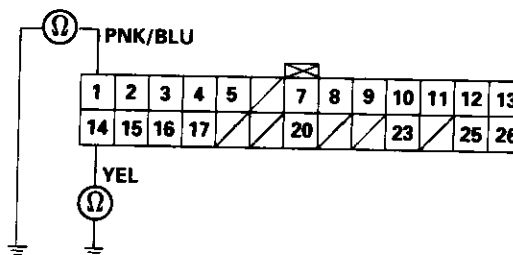
Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

SOLENOID HARNESS 8P CONNECTOR

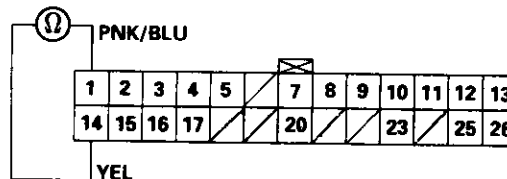


Terminal side of male terminals

TCM CONNECTOR A (26P)



Wire side of female terminals







# Troubleshooting Flowchart — Inhibitor Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1882.
- Self-diagnosis indicator light indicates Code 33.

## Possible Cause

- Disconnected solenoid harness connector
- Short or open in inhibitor solenoid wire
- Faulty inhibitor solenoid

## Measure Inhibitor Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the 8P connector from the solenoid harness connector.
2. Measure the resistance between the No. 5 terminal of the solenoid harness connector and body ground.

Is the resistance 11.7 – 21.0  $\Omega$ ?

NO

Replace the lower valve body assembly.

YES

## Check Inhibitor Solenoid for a Short Circuit:

1. Disconnect the B (22P) connector from the TCM.
2. Check for continuity between the B1 terminal and body ground.

Is there continuity?

YES

Repair short in the wire between the B1 and the body ground.

NO

## Measure Inhibitor Solenoid Resistance:

1. Connect the 8P connector to the solenoid harness connector.
2. Measure the resistance between the B1 and body ground.

Is the resistance 11.7 – 21.0  $\Omega$ ?

NO

Repair loose terminal or open in the wire between the B1 and the solenoid harness connector.

YES

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

## SOLENOID HARNESS 8P CONNECTOR

	2	3	4
5	6	7	8

GRN/BLK



Terminal side of male terminals

## TCM CONNECTOR B (22P)



GRN/BLK

1	2	4	5	6	7	8	9	10
12	13	14	15	16	17	18	20	

Wire side of female terminals



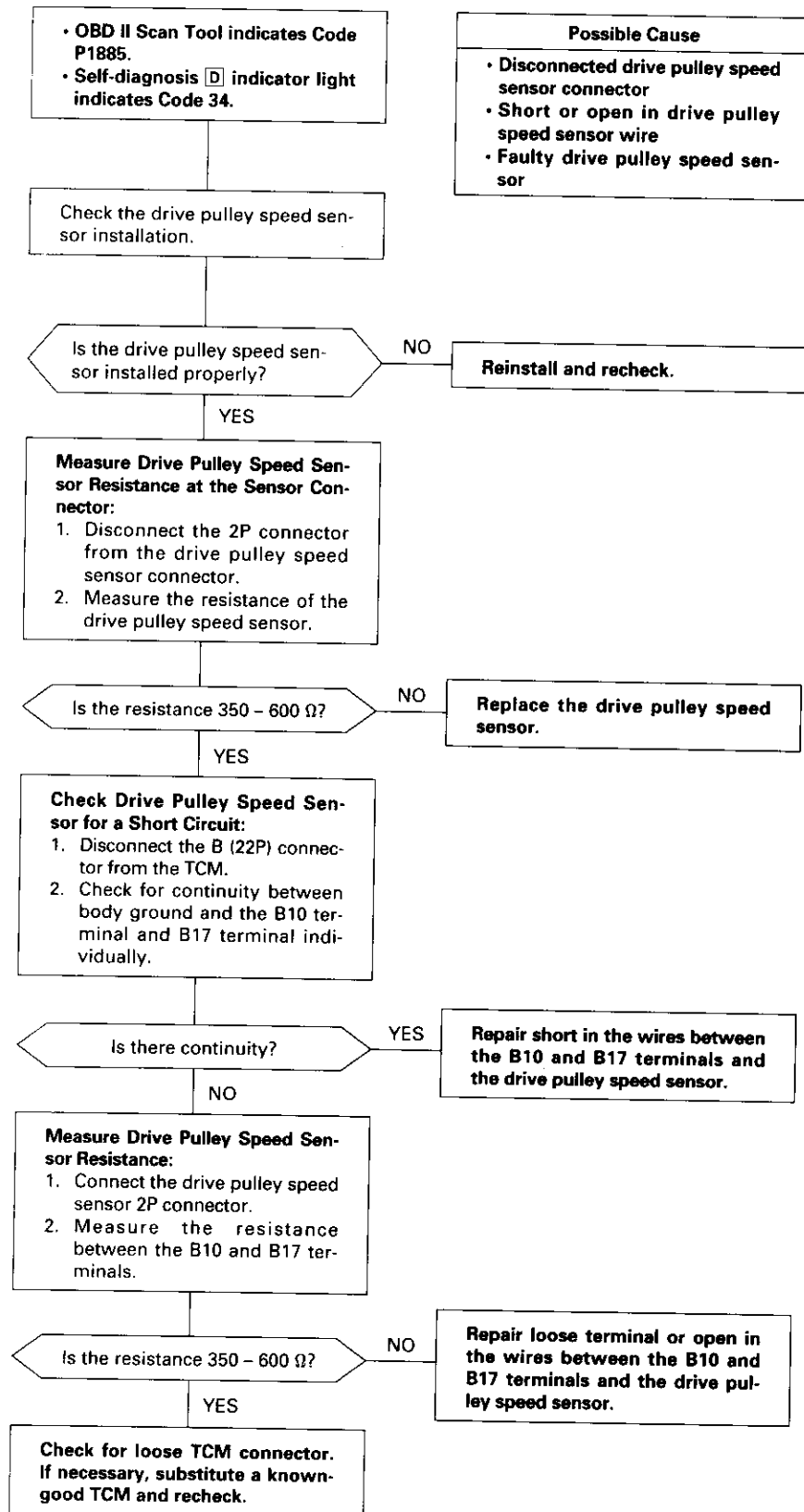
GRN/BLK

1	2	4	5	6	7	8	9	10
12	13	14	15	16	17	18	20	

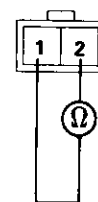
# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Drive Pulley Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

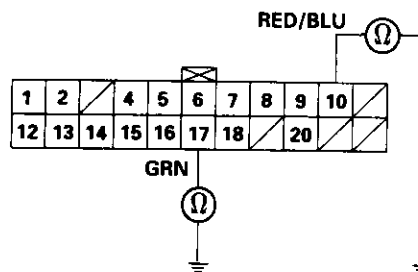


DRIVE PULLEY SPEED SENSOR 2P CONNECTOR

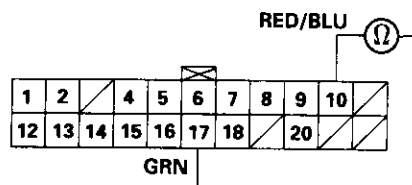


Terminal side of male terminals

TCM CONNECTOR B (22P)



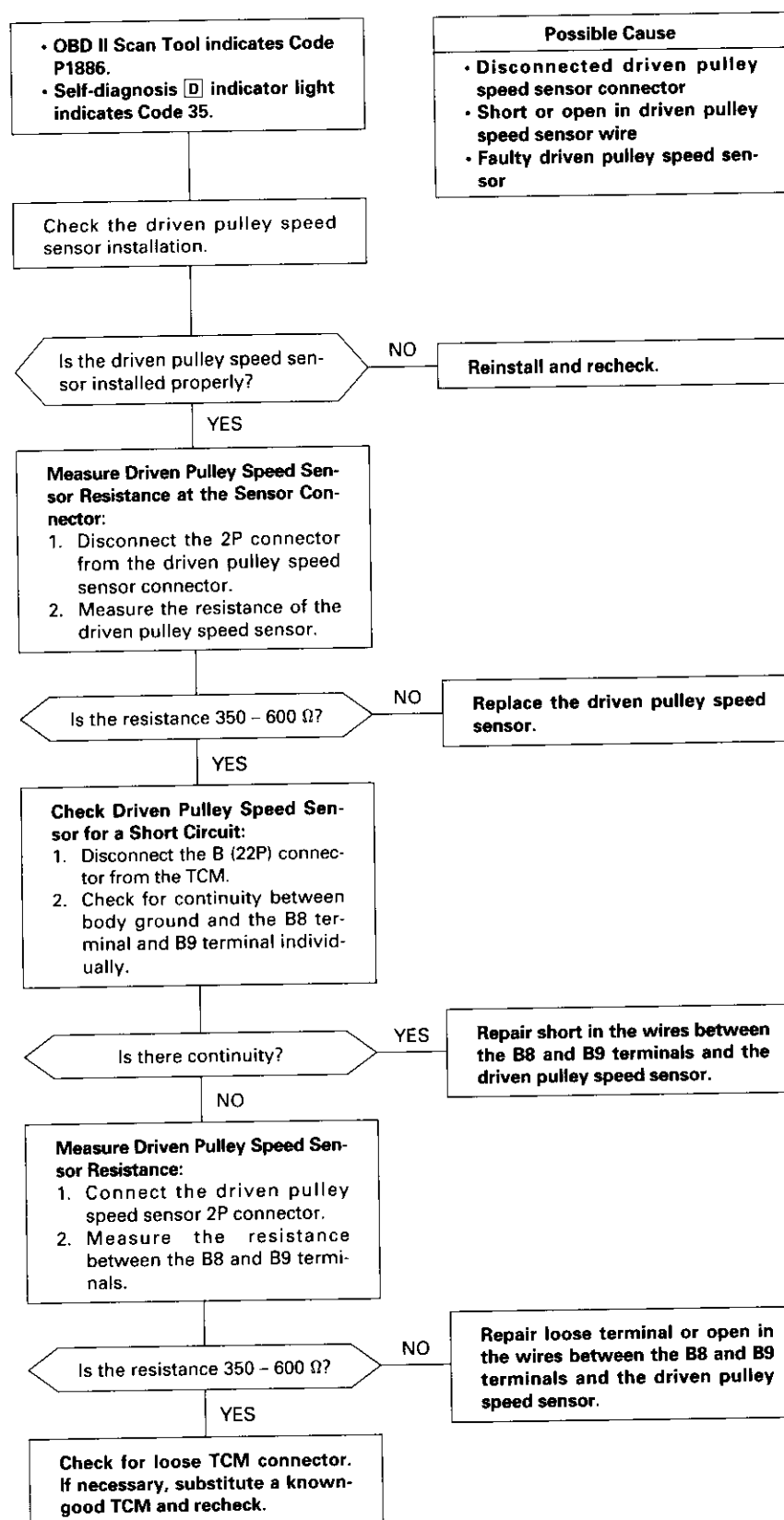
Wire side of female terminals



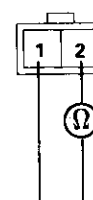


## Troubleshooting Flowchart — Driven Pulley Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

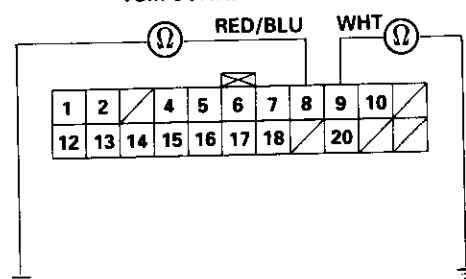


DRIVEN PULLEY SPEED SENSOR 2P CONNECTOR

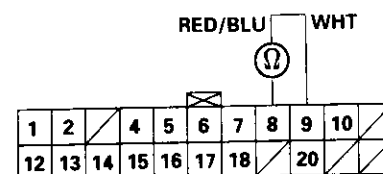


Terminal side of male terminals

TCM CONNECTOR B (22P)



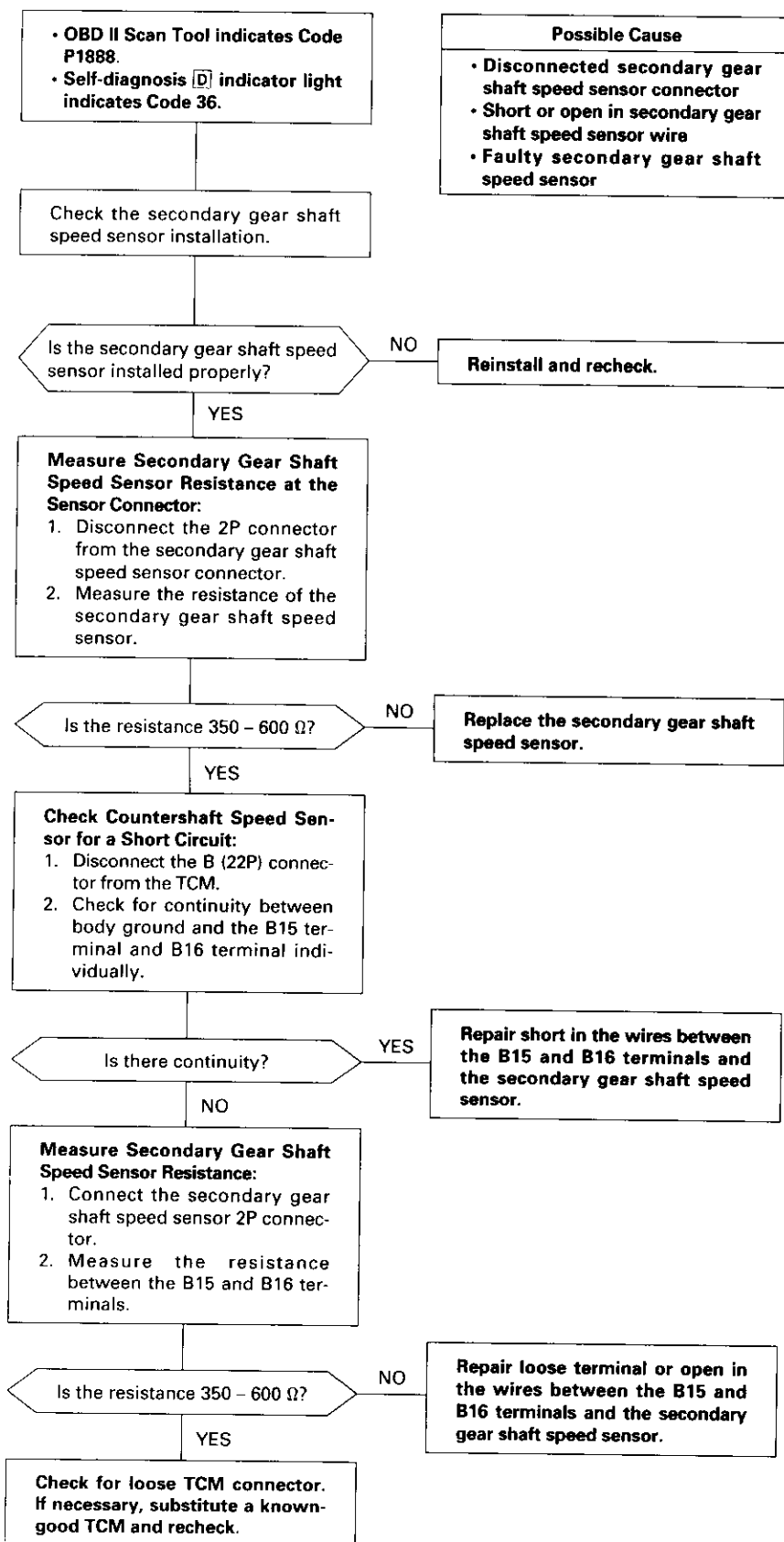
Wire side of female terminals



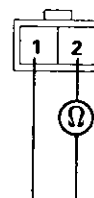
# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — Secondary Gear Shaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

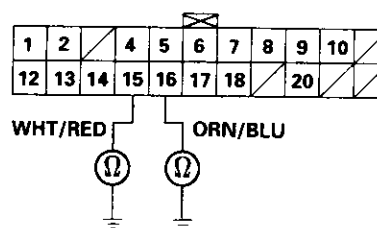


SECONDARY GEAR SHAFT SPEED SENSOR 2P CONNECTOR

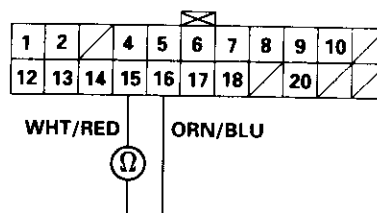


Terminal side of male terminals

TCM CONNECTOR B (22P)



Wire side of female terminals





## Troubleshooting Flowchart — TMA and TMB Signals

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1655.
- Self-diagnosis indicator light indicates Code 37.

### Possible Cause

- Short or open in TMA wire between B7 terminal and ECM
- Short or open in TMB wire between B6 terminal and ECM
- Faulty ECM
- Faulty TCM

### Check TMA Wire Continuity:

1. Turn the ignition switch OFF.
2. Disconnect the B (22P) connector from the TCM.
3. Disconnect the C (31P) connector from the ECM.
4. Check for continuity between the B7 terminal of the TCM and the C9 terminal of the ECM.

Is there continuity?

NO

Repair open in the wire between the TCM and the ECM.

YES

### Check TMA Wire for a Short Circuit:

Check for continuity between the B7 terminal of the TCM or the C9 terminal of the ECM and body ground.

Is there continuity?

YES

Repair short to body ground in the wire.

NO

### Check the ECM:

1. Reconnect the C (31P) connector to the ECM, and the B (22P) connector to the TCM.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the C9 terminal of the ECM and body ground.

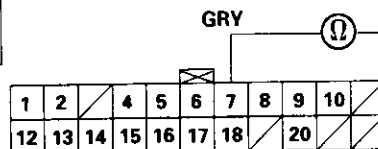
Is there approx. 10 V?

YES

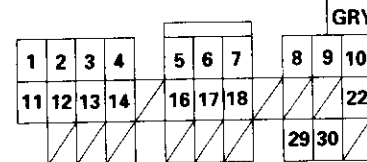
Check for loose ECM connectors. If necessary, substitute a known-good ECM and recheck.

NO

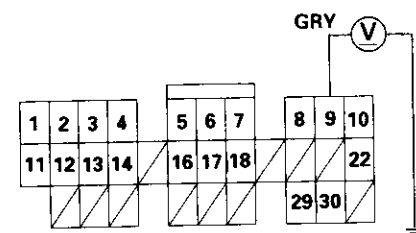
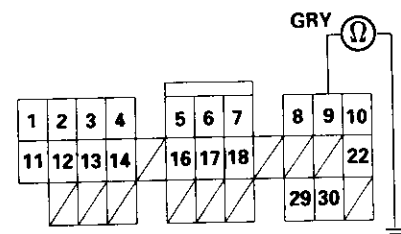
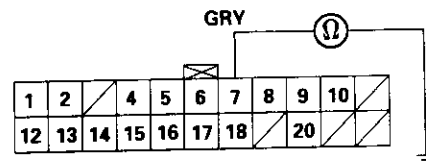
TCM CONNECTOR B (22P)



ECM CONNECTOR C (31P)



Wire side of female terminals



(cont'd)

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# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — TMA and TMB Signals (cont'd)

from page 14-257

### Check TMB Wire Continuity:

1. Turn the ignition switch OFF.
2. Disconnect the C (31P) connector from the ECM, and the B (22P) connector from the TCM.
3. Check for continuity between the B6 terminal of the TCM and the C30 terminal of the ECM.

Is there continuity?

NO

Repair open in the wire between the TCM and the ECM.

YES

### Check TMB Wire for a Short Circuit:

Check for continuity between the B6 terminal of the TCM or the C30 terminal of the ECM and body ground.

Is there continuity?

YES

Repair short to body ground in the wire.

NO

### Check the TCM:

1. Reconnect the B (22P) connector to the TCM, and the C (31P) connector to the ECM.
2. Turn the ignition switch ON (II).
3. Measure the voltage between the B6 terminal of the TCM and body ground.

Is there approx. 5 V?

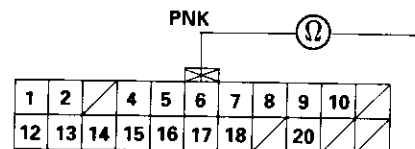
NO

Replace the TCM.

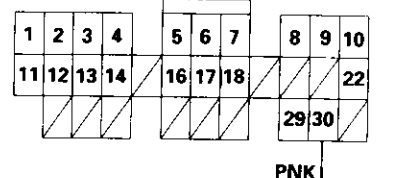
YES

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

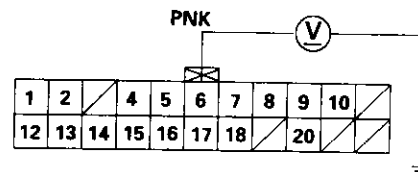
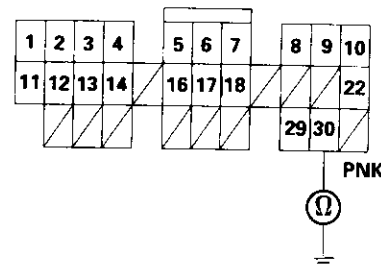
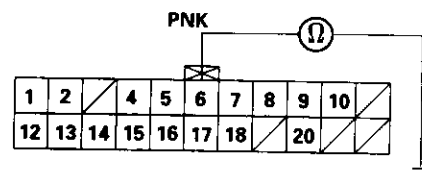
TCM CONNECTOR B (22P)



ECM CONNECTOR C (31P)



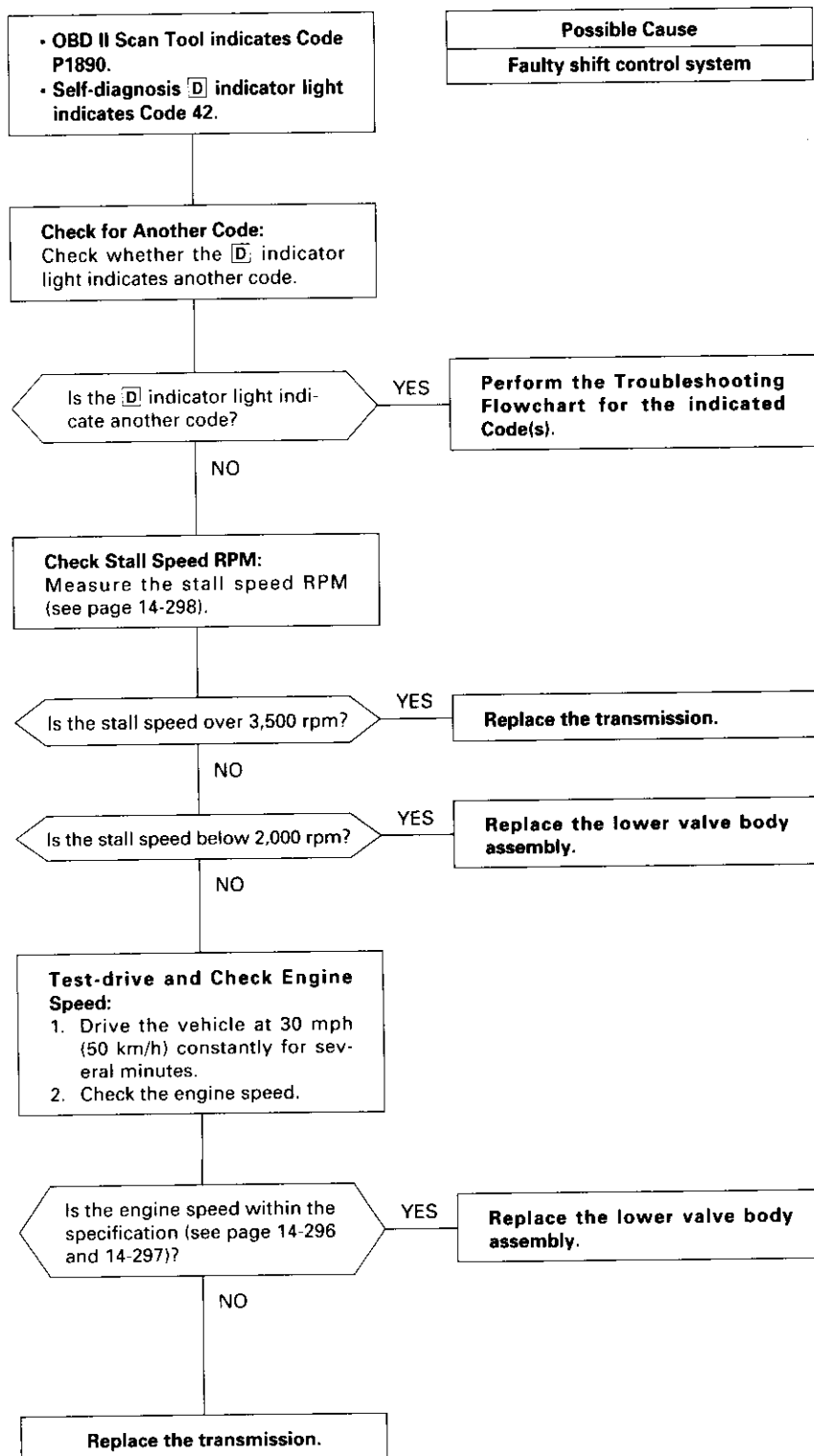
Wire side of female terminals





## Troubleshooting Flowchart — Shift Control System

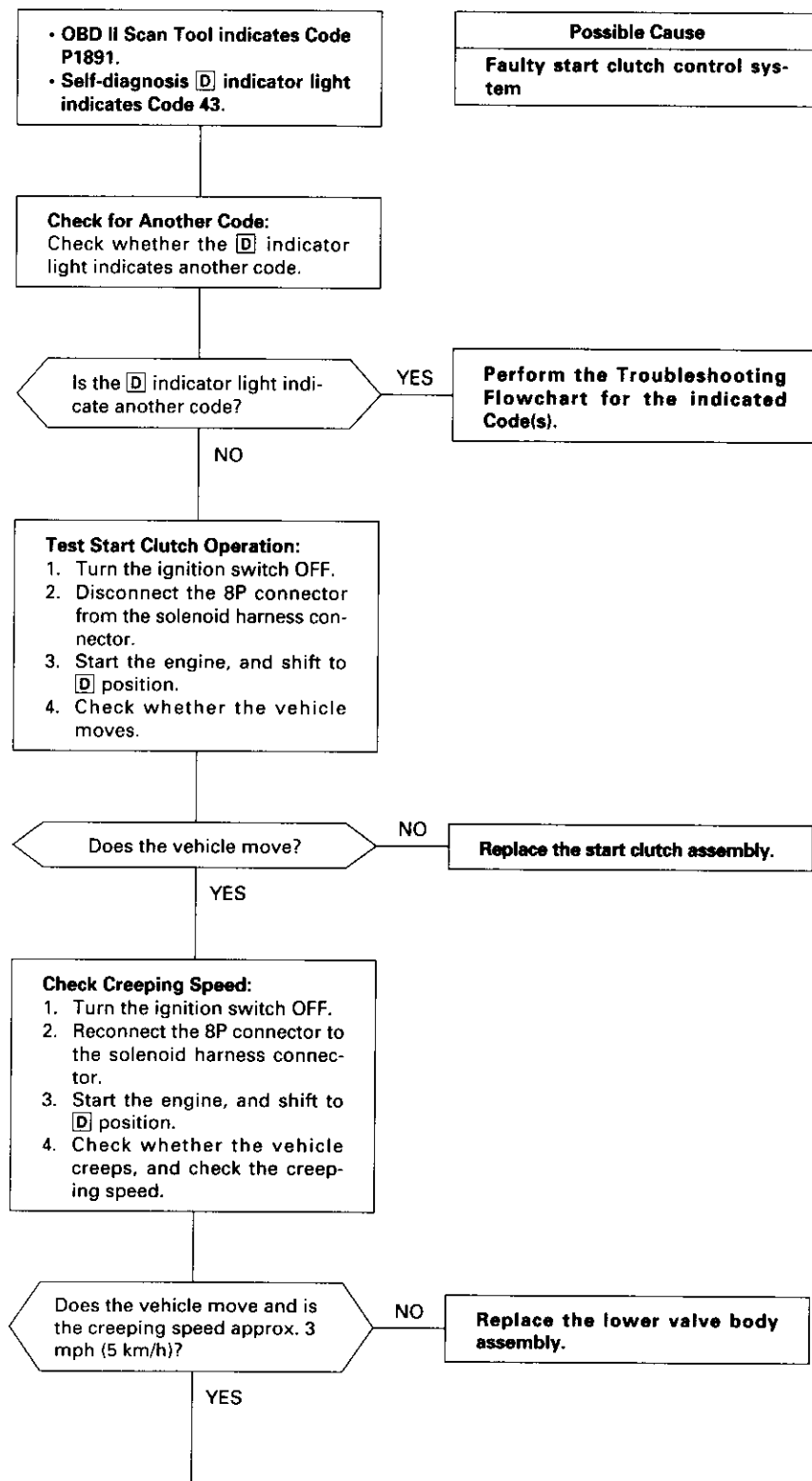
NOTE: Record all freeze data before you troubleshoot.



# Electrical Troubleshooting ('96 – 98 Models)

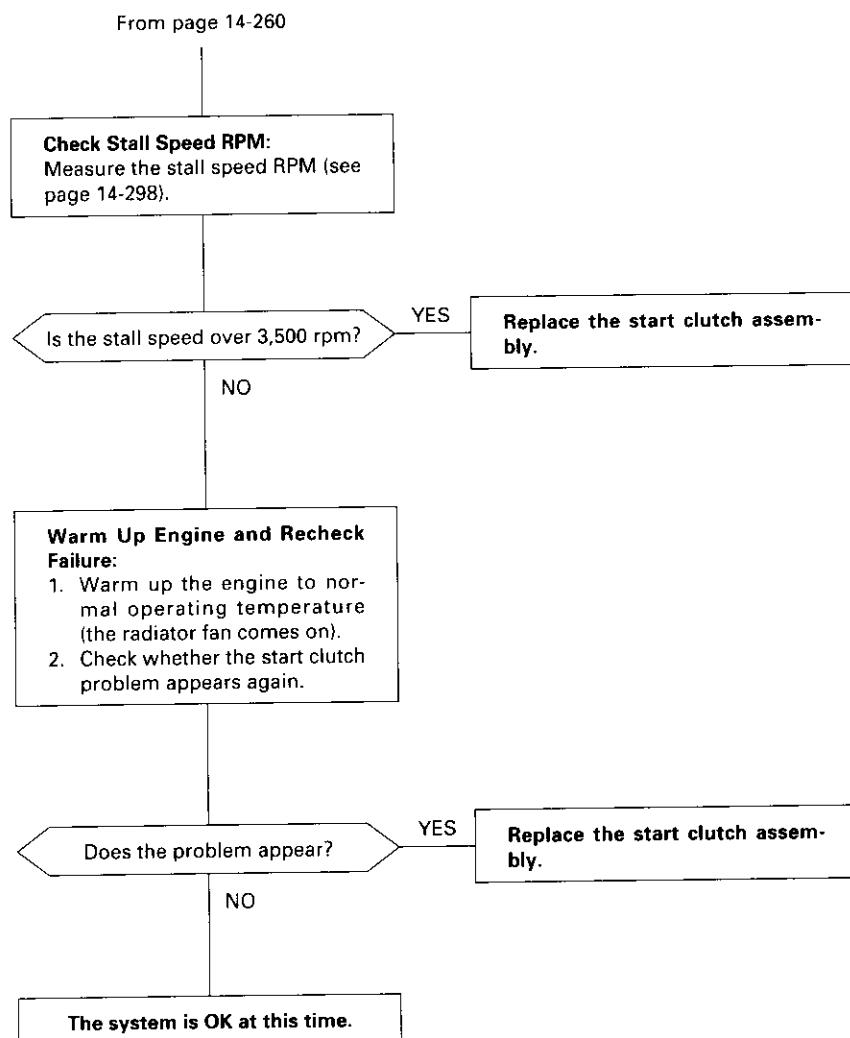
## Troubleshooting Flowchart — Start Clutch Control System

NOTE: Record all freeze data before you troubleshoot.



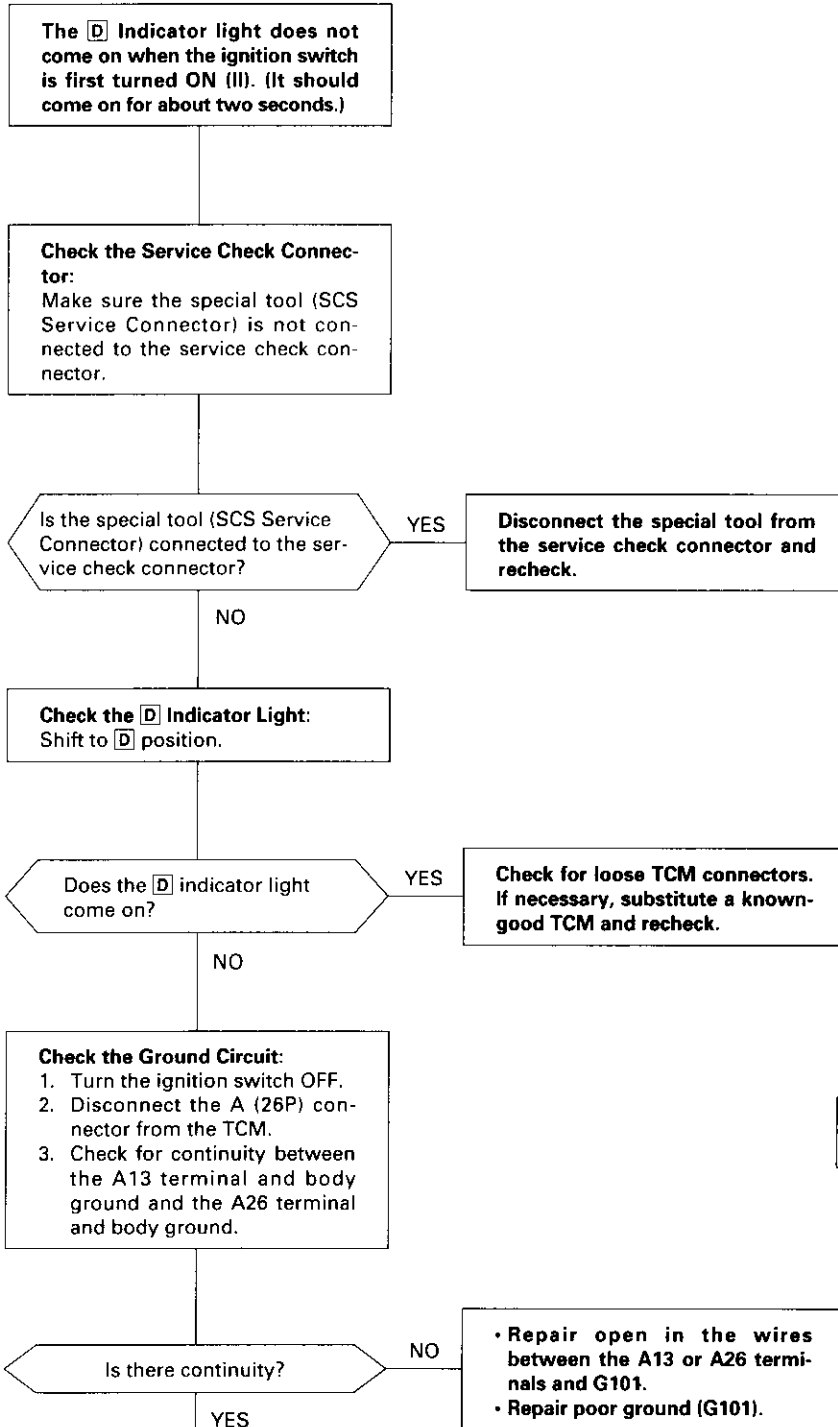
To page 14-261



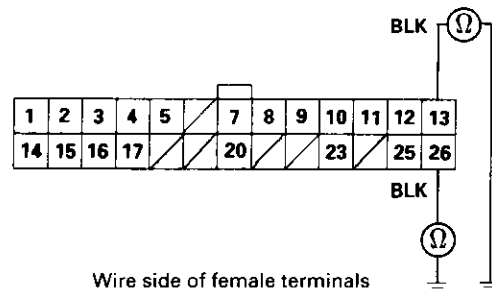


# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — **D** Indicator Light Does Not Come On



TCM CONNECTOR A (26P)



To page 14-263



From page 14-262

**Measure Power Supply Circuit Voltage:**

1. Turn the ignition switch ON (II).
2. Measure the voltage between terminals A12 and A13 and between terminals A25 and A26.

Is there battery voltage?

NO

Repair open or short in the wire between the A12 and/or A25 terminals and the under-dash fuse box.

YES

**Measure D IND Voltage:**

1. Turn the ignition switch OFF.
2. Connect the A (26P) connector to the TCM.
3. Connect a digital multimeter to the A20 and A13 or A26 terminals.
4. Turn the ignition switch ON (III), and make sure that the voltage is available for two seconds.

Is there voltage?

YES

Check for open in the wire between the A20 terminal and the gauge assembly. If the wire is OK, check for a faulty **D** indicator light bulb or a faulty gauge assembly printed circuit board.

NO

**Check D IND for an Short Circuit:**

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) connector from the TCM.
3. Check for continuity between the A20 terminal and the No. 9 terminal of the gauge assembly connector (see section 23).

Is there continuity?

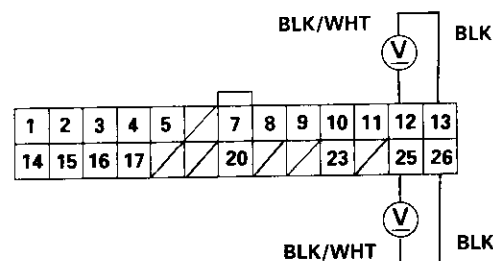
NO

Repair open in the wire between the A20 terminal and the gauge assembly.

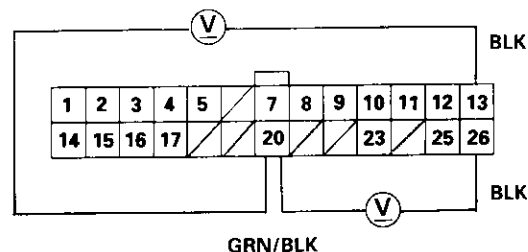
YES

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

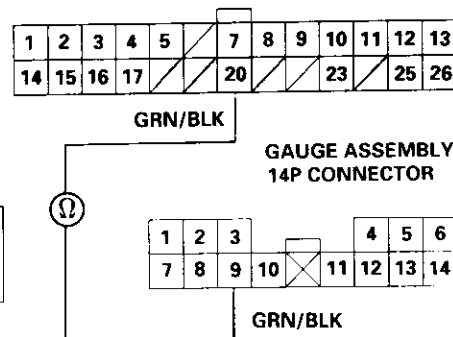
TCM CONNECTOR A (26P)



Wire side of female terminals



TCM CONNECTOR A (26P)



Wire side of female terminals

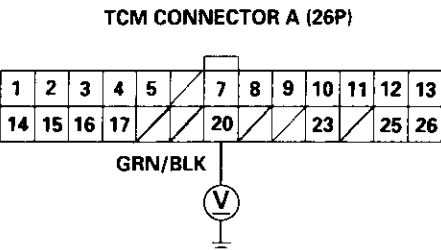
# Electrical Troubleshooting ('96 – 98 Models)

## Troubleshooting Flowchart — **D** Indicator Light On Constantly

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

**Measure D IND Voltage:**

1. Turn the ignition switch OFF.
2. Disconnect the A (26P) connector from the TCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the A20 terminal and body ground.



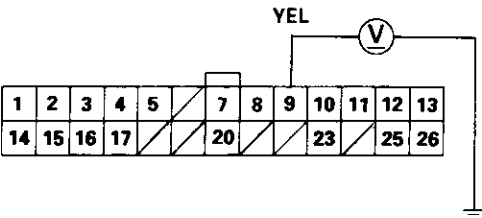
Wire side of female terminals

Is there voltage? YES

Repair short to power in the wire between the A20 terminal and the gauge assembly.

**Measure ATP D Voltage:**

1. Turn the ignition switch OFF.
2. Connect the A (26P) connector to the TCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than **D**.
5. Measure the voltage between the A9 terminal and body ground.



Is there voltage? NO

Check for a short to ground on the wire. If wire is OK, replace the A/T gear position indicator.

YES

Replace the TCM.



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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1705.
- Self-diagnosis **D** indicator light blinks five times.

### Possible Cause

- Short in A/T gear position switch wire
- Faulty A/T gear position switch

NOTE: Code P1705(5) is caused when the PCM received two gear position inputs at the same time.

### Observe the A/T Gear Position Indicator:

1. Turn the ignition switch ON (II).
2. Observe the A/T gear position indicator, and shift each position separately.

Does any indicator stay on when the shift lever is not in that position?

NO

The system is OK at this time. Check the wire harness for damage.

YES

Disconnect the A/T gear position switch connector.

Do all gear position indicators go out?

YES

Replace the A/T gear position switch.

NO

Connect the A/T gear position switch connector.

### Measure ATP R Voltage:

1. Shift to all positions other than **R**.
2. Measure the voltage between the D6 and B20 or B22 terminals.

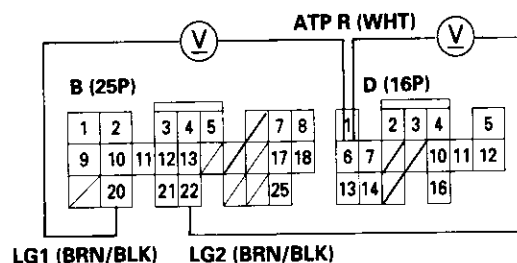
Is there approx. 10 V?

NO

Check for short in the wire between the D6 terminal and the A/T gear position switch or A/T gear position indicator, and check for open in the wires between the B20 and B22 terminals and body ground (G101). If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

YES

### PCM CONNECTORS



Wire side of female terminals

To page 14-266

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — A/T Gear Position Switch (Short) (cont'd)

From page 14-265

### Measure ATP NP Voltage:

1. Shift to all positions other than **P** or **N**.
2. Measure the voltage between the A9 and B20 or B22 terminals.

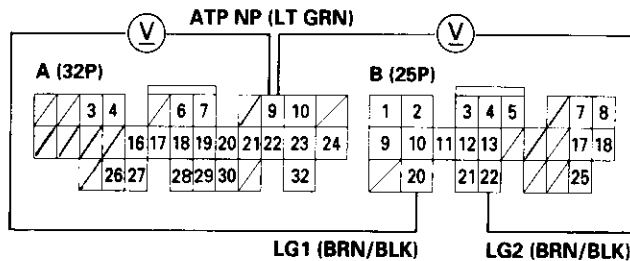
Is there approx. 10 V?

YES

NO

Check for short in the wire between the A9 terminal and the A/T gear position switch, and in the **P** and **N** position signal wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

### PCM CONNECTORS



Wire side of female terminals

### Measure ATP D Voltage:

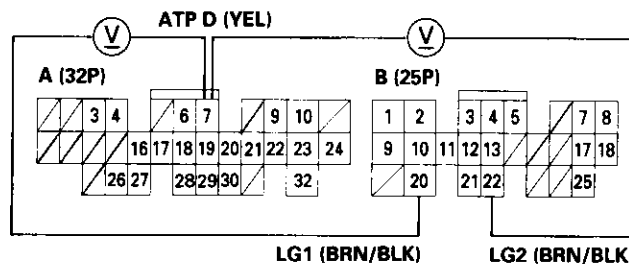
1. Shift to all positions other than **D**.
2. Measure the voltage between the A7 and B20 or B22 terminals.

Is there approx. 10 V?

YES

NO

Check for short in the wire between the A7 terminal and the A/T gear position switch. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.



To page 14-267



From page 14-266

**Measure ATP S Voltage:**

1. Shift to all positions other than **S**.
2. Measure the voltage between the D13 and B20 or B22 terminals.

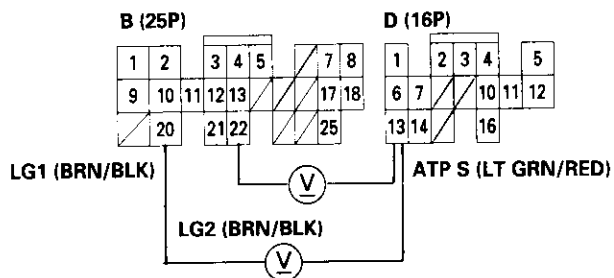
Is there approx. 10 V?

YES

NO

Check for short in the wire between the D13 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

**PCM CONNECTORS**



Wire side of female terminals

**Measure ATP L Voltage:**

1. Shift to all positions other than **L**.
2. Measure the voltage between the A22 and B20 or B22 terminals.

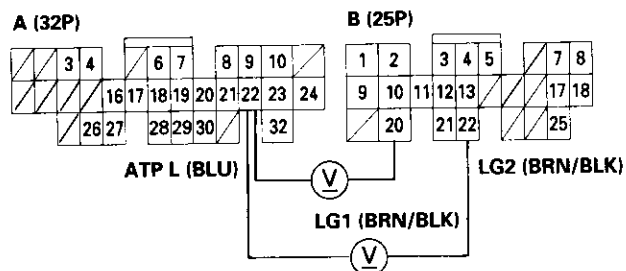
Is there approx. 10 V?

YES

NO

Check for short in the wire between the A22 terminal and the A/T gear position switch or A/T gear position indicator. If wires are OK, check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

**PCM CONNECTORS**



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

# Electrical Troubleshooting ('99 – 00 Models)

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

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1706.
- Self-diagnosis **D** indicator light blinks six times.

**Possible Cause**

- Disconnected A/T gear position switch
- Open in A/T gear position switch wire
- Faulty A/T gear position switch

Test the A/T gear position switch (see section 23).

Is the switch OK?

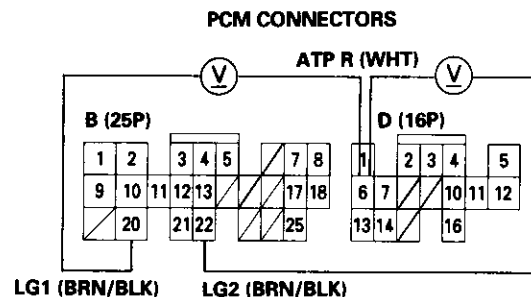
NO

Replace the A/T gear position switch.

YES

**Measure ATP R Voltage:**

1. Turn the ignition switch ON (II).
2. Shift to **R** position.
3. Measure the voltage between the D6 and B20 or B22 terminals.



Wire side of female terminals

Is there voltage?

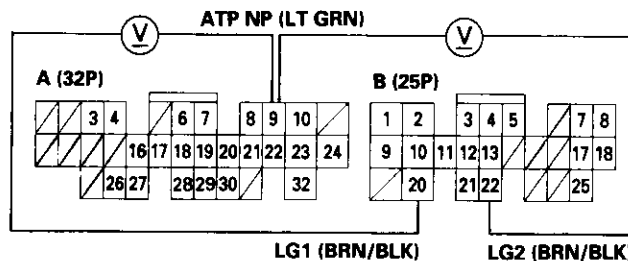
YES

Repair open in the wire between the D6 terminal and the A/T gear position switch.

NO

**Measure ATP NP Voltage:**

1. Shift to **P** or **N** position.
2. Measure the voltage between the A9 and B20 or B22 terminals.



Is there voltage?

YES

Repair open in the wire between the A9 terminal and the A/T gear position switch.

To page 14-269





From page 14-268

**Measure ATP D Voltage:**

1. Shift to **D** position.
2. Measure the voltage between the A7 and B20 or B22 terminals.

Is there voltage?

YES

Repair open in the wire between the A7 terminal and the A/T gear position switch.

NO

**Measure ATP S Voltage:**

1. Shift to **S** position.
2. Measure the voltage between the D13 and B20 or B22 terminals.

Is there voltage?

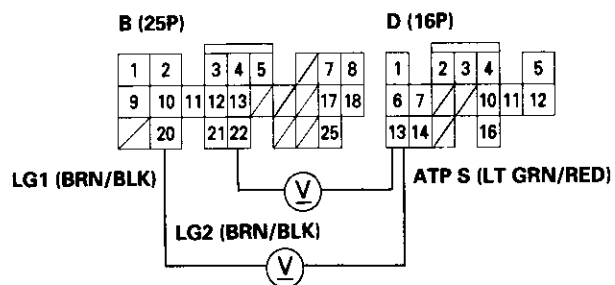
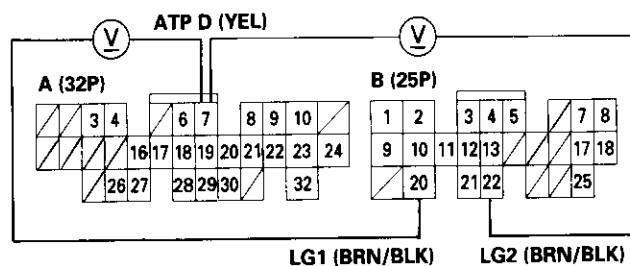
YES

Repair open in the wire between the D13 terminal and the A/T gear position switch.

NO

To page 14-270

**PCM CONNECTORS**



(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — A/T Gear Position Switch (Open) (cont'd)

From page 14-B-269

### Measure ATP L Voltage:

1. Shift to **L** position.
2. Measure the voltage between the A22 and B20 or B22 terminals.

Is there voltage?

YES

Repair open in the wire between the A22 terminal and the A/T gear position switch.

NO

### Check LG Wire for an Open Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the B20 terminal and body ground, and between the B22 terminal and body ground.

Is there continuity?

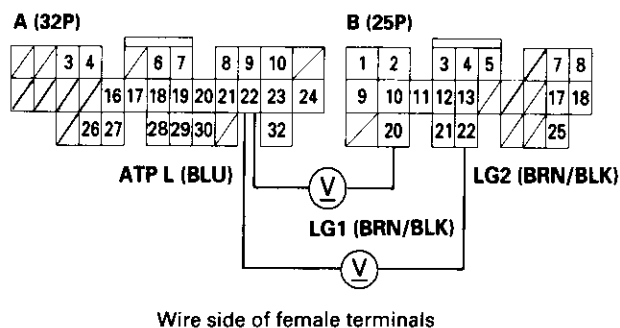
NO

Repair open in the wires between the B20 and B22 terminals and body ground, and repair poor ground (G101).

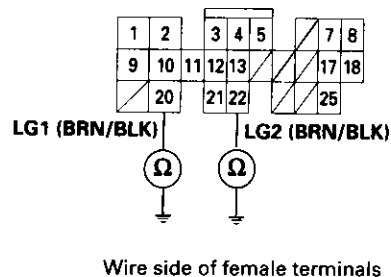
YES

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

### PCM CONNECTORS



### PCM CONNECTOR B (25P)





## Troubleshooting Flowchart — Shift Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1870.
- Self-diagnosis **D** indicator light indicates Code 30.

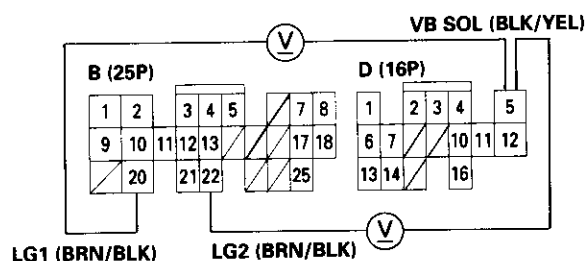
### Possible Cause

- Disconnected solenoid harness connector
- Short or open in shift control linear solenoid wire
- Faulty shift control linear solenoid
- Open in VB SOL wire
- Open in PG1 and PG2 wires or poor ground (G101)

### Measure VB SOL Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO

Repair open or short in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

### Check the Ground Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the terminals B2 and B22 and between terminals B10 and B20.

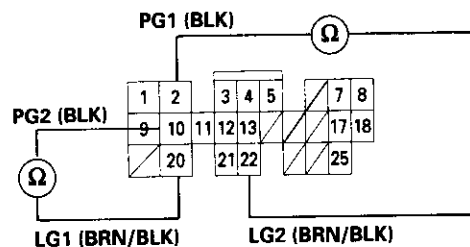
Is there continuity?

NO

Repair open in the wire between the terminals B2, B10, B20, and B22 and G101. Repair poor ground (G101).

YES

### PCM CONNECTOR B (25P)



(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Shift Control Linear Solenoid (cont'd)

From page 14-271

### Measure Shift Control Linear Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the solenoid harness 8P connector.
2. Measure the resistance between the No. 3 and No. 7 terminals of the solenoid harness 8P connector.

Is the resistance 3.8 – 6.8  $\Omega$ ?

NO

Replace the lower valve body assembly.

YES

### Check Shift Control Linear Solenoid for a Short Circuit:

Check for continuity between the body ground and the D3 terminal and D4 terminal individually.

Is there continuity?

YES

Repair short in the wire between the D3 and D4 terminals and the shift control linear solenoid.

NO

### Measure Shift Control Linear Solenoid Resistance:

1. Connect the solenoid harness 8P connector.
2. Measure the resistance between the D3 and D4 terminals.

Is the resistance 3.8 – 6.8  $\Omega$ ?

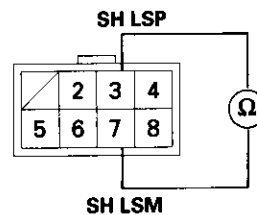
NO

Repair loose terminal or open in the wires between the D3 and D4 terminals and the shift control linear solenoid.

YES

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

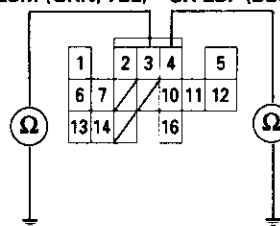
SOLENOID HARNESS 8P CONNECTOR



Terminal side of male terminals

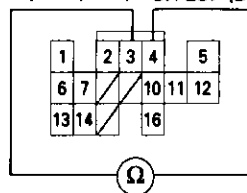
PCM CONNECTOR D (16P)

SH LSM (GRN/YEL) SH LSP (BLU/WHT)



Wire side of female terminals

SH LSM (GRN/YEL) SH LSP (BLU/WHT)





## Troubleshooting Flowchart — PH-PL Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1873.
- Self-diagnosis **D** indicator light indicates Code 31.

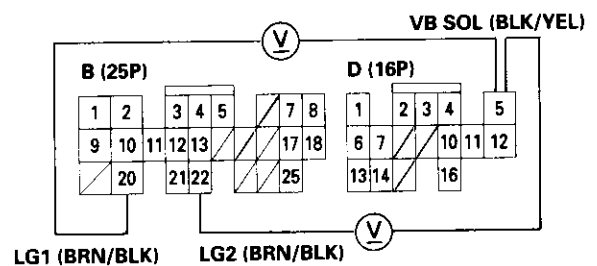
### Possible Cause

- Disconnected solenoid harness connector
- Short or open in PH-PL control linear solenoid wire
- Faulty PH-PL control linear solenoid
- Open in VB SOL wire
- Open in PG1 and PG2 wires or poor ground (G101)

### Measure VB SOL Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO

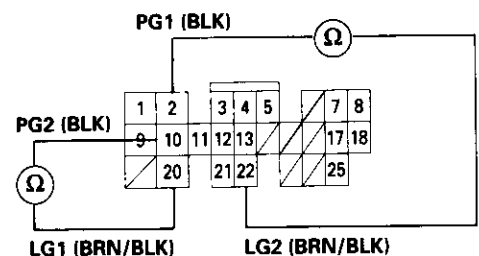
Repair open or short in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

### Check the Ground Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the terminals B2 and B22 and between terminals B10 and B20.

### PCM CONNECTOR B (25P)



Is there continuity?

NO

Repair open in the wire between the terminals B2, B10, B20, and B22 and G101. Repair poor ground (G101).

YES

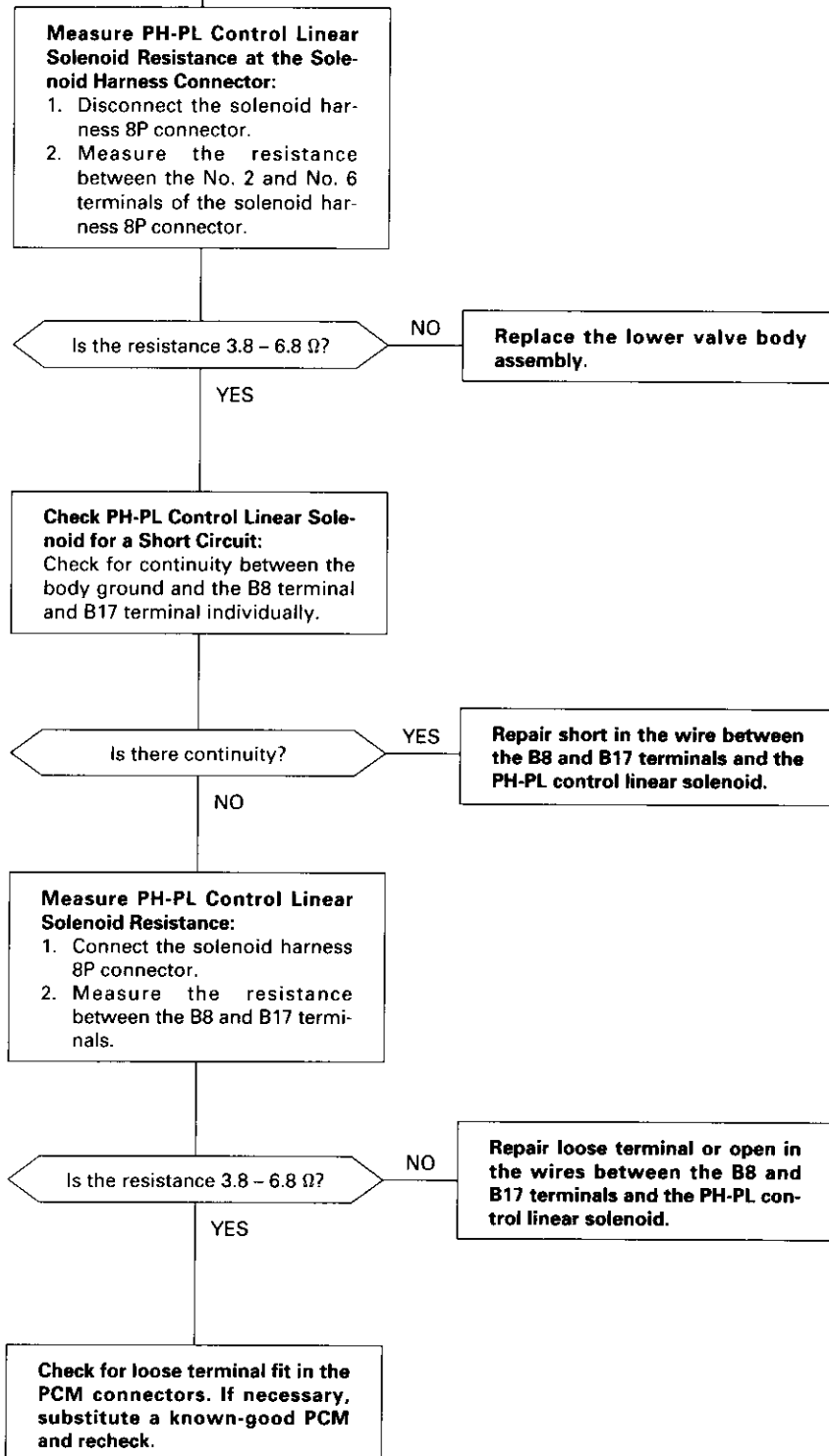
To page 14-274

(cont'd)

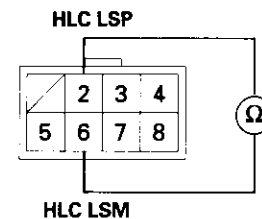
# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — PH-PL Control Linear Solenoid (cont'd)

From page 14-273

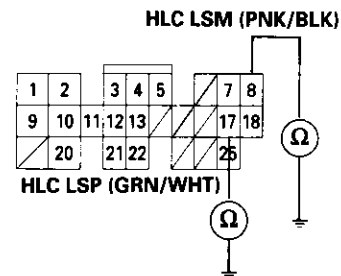


SOLENOID HARNESS 8P CONNECTOR

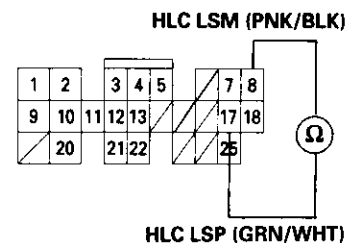


Terminal side of male terminals

PCM CONNECTOR B (25P)



Wire side of female terminals





## Troubleshooting Flowchart — Start Clutch Control Linear Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1879.
- Self-diagnosis **D** indicator light indicates Code 32.

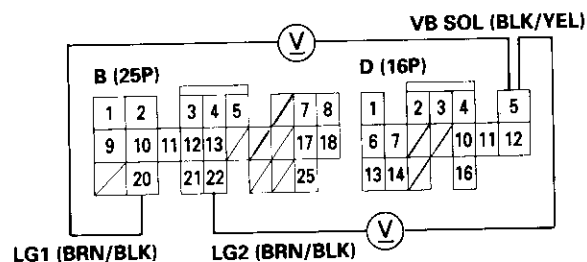
### Possible Cause

- Disconnected solenoid harness connector
- Short or open in start clutch control linear solenoid wire
- Faulty start clutch control linear solenoid
- Open in VB SOL wire
- Open in PG1 and PG2 wires or poor ground (G101)

### Measure VB SOL Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO

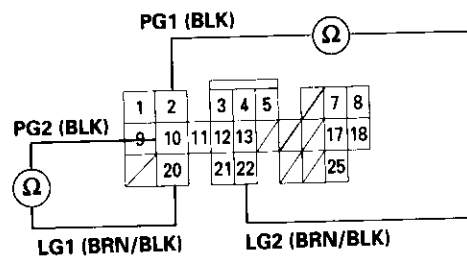
Repair open or short in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

### Check the Ground Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the terminals B2 and B22 and between terminals B10 and B20.

### PCM CONNECTOR B (25P)



Is there continuity?

NO

Repair open in the wire between the terminals B2, B10, B20, and B22 and G101. Repair poor ground (G101).

YES

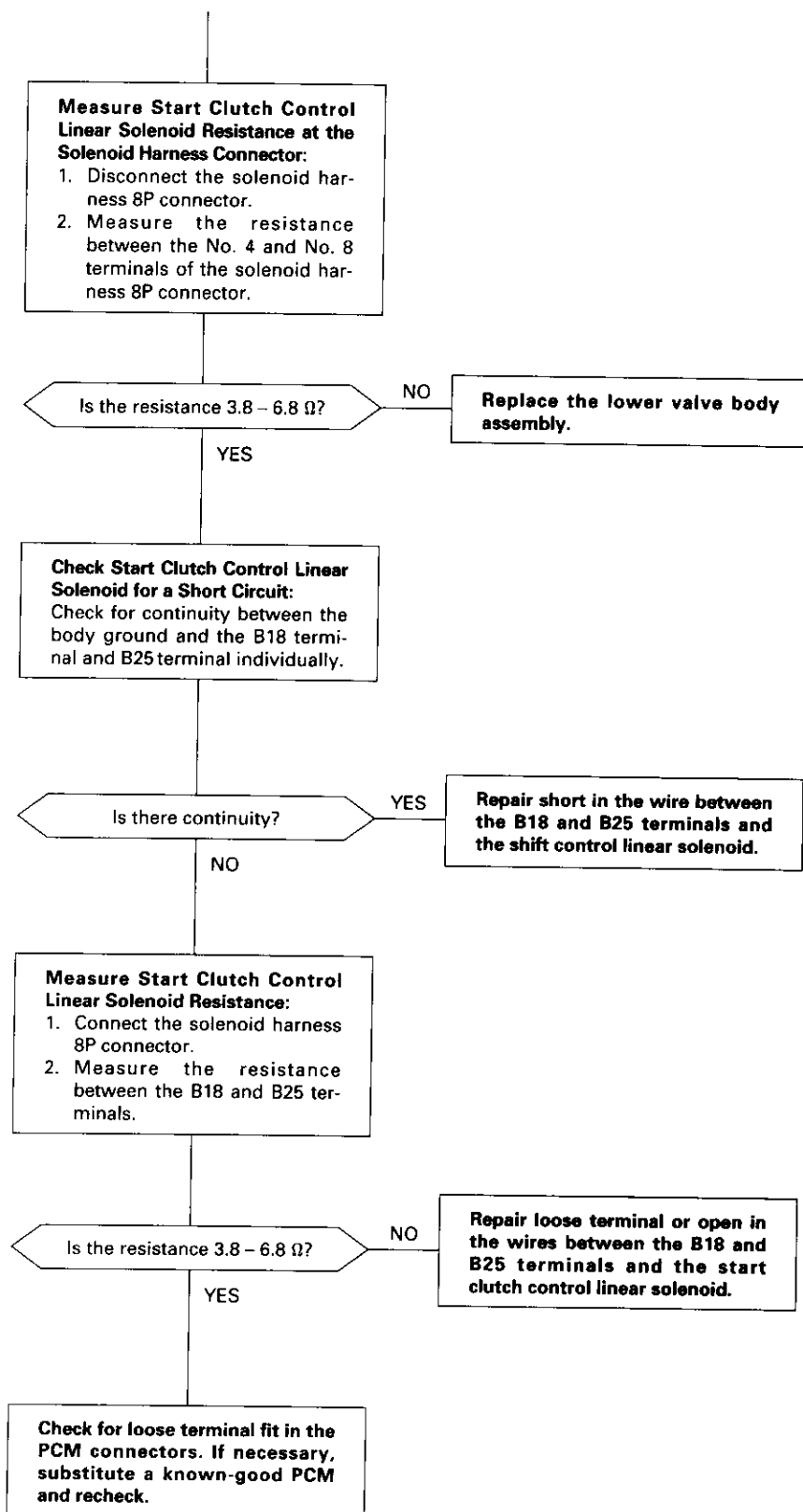
(cont'd)

To page 14-276

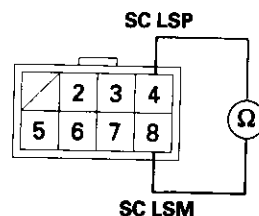
# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Start Clutch Control Linear Solenoid (cont'd)

From page 14-275

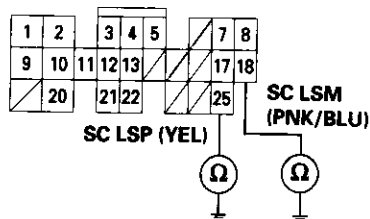


SOLENOID HARNESS 8P CONNECTOR

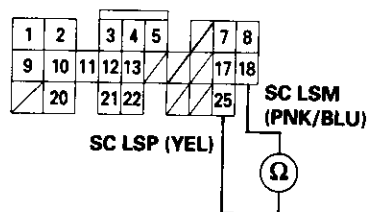


Terminal side of male terminals

PCM CONNECTOR B (25P)



Wire side of female terminals







## Troubleshooting Flowchart — Inhibitor Solenoid

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1882.
- Self-diagnosis indicator light indicates Code 33.

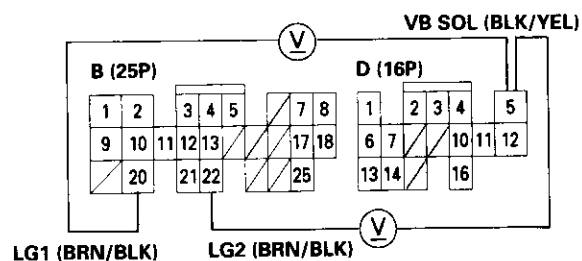
### Possible Cause

- Disconnected solenoid harness connector
- Short or open in inhibitor solenoid wire
- Faulty inhibitor solenoid
- Open in VB SOL wire
- Open in PG1 and PG2 wires or poor ground (G101)

### Measure VB SOL Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the B (25P) and D (16P) connectors from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D5 and B20 or B22 terminals.

### PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO

Repair open or short in the wire between the D5 terminal and the under-dash fuse/relay box.

YES

### Check the Ground Circuit:

1. Turn the ignition switch OFF.
2. Check for continuity between the terminals B2 and B22 and between terminals B10 and B20.

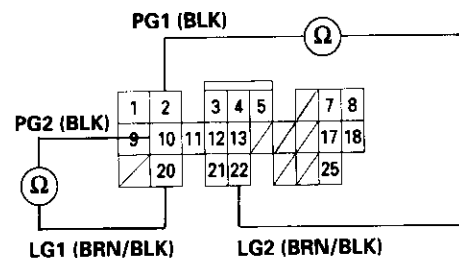
Is there continuity?

NO

Repair open in the wire between the terminals B2, B10, B20, and B22 and G101. Repair poor ground (G101).

YES

### PCM CONNECTOR B (25P)



(cont'd)

To page 14-278

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Inhibitor Solenoid (cont'd)

From page 14-277

### Measure Inhibitor Solenoid Resistance at the Solenoid Harness Connector:

1. Disconnect the solenoid harness 8P connector.
2. Measure the resistance between the No. 5 terminal of the solenoid harness 8P connector and body ground.

Is the resistance 11.7 – 21.0  $\Omega$ ?

NO

Replace the lower valve body assembly.

YES

### Check Inhibitor Solenoid for a Short Circuit:

Check for continuity between the D2 and B20 or B22 terminals.

Is there continuity?

YES

Repair short in the wire between the D2 terminal and the inhibitor solenoid.

NO

### Measure Inhibitor Solenoid Resistance:

1. Connect the solenoid harness 8P connector.
2. Measure the resistance between the D2 and B20 or B22 terminals.

Is the resistance 11.7 – 21.0  $\Omega$ ?

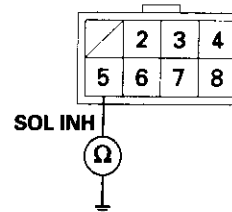
NO

Repair loose terminal or open in the wire between the D2 terminal and the inhibitor solenoid.

YES

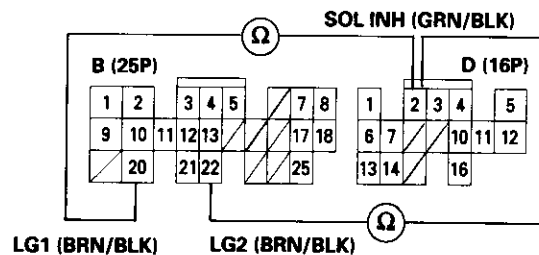
Check for loose terminal fit in the PCM connectors. If necessary, substitute a known-good PCM and recheck.

SOLENOID HARNESS 8P CONNECTOR

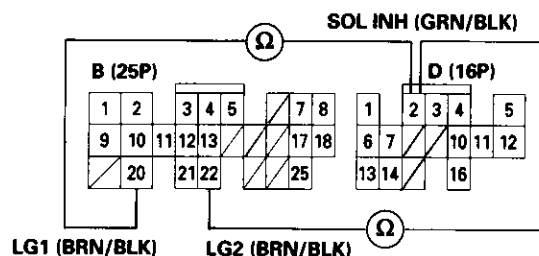


Terminal side of male terminals

PCM CONNECTORS



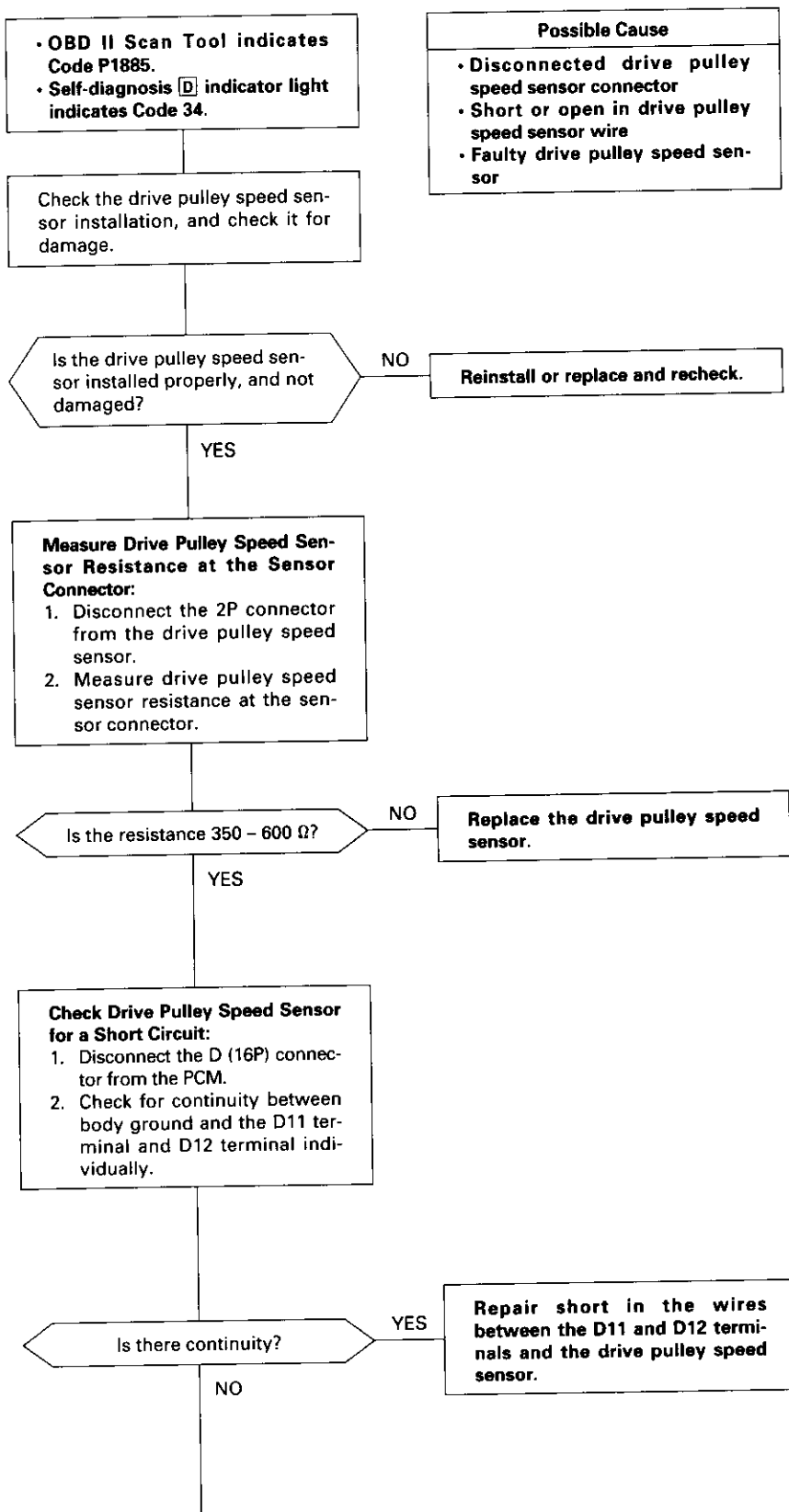
Wire side of female terminals



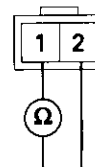


## Troubleshooting Flowchart — Drive Pulley Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

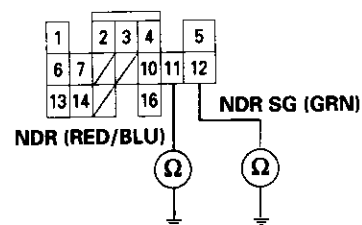


**DRIVE PULLEY SPEED SENSOR CONNECTOR**



Terminal side of male terminals

**PCM CONNECTOR D (16P)**



Wire side of female terminals

(cont'd)

To page 14-280

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Drive Pulley Speed Sensor (cont'd)

From page 14-279

### Measure Drive Pulley Speed Sensor Circuit for an Open:

1. Connect the drive pulley speed sensor connector.
2. Measure the resistance between the D11 and D12 terminals.

Is the resistance 350 – 600  $\Omega$ ?

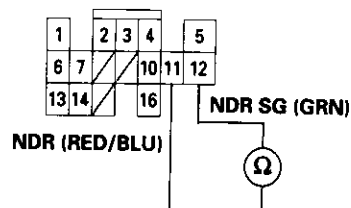
NO

Repair loose terminal or open in the wires between the D11 and D12 terminals and the drive pulley speed sensor.

YES

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

PCM CONNECTOR D (16P)

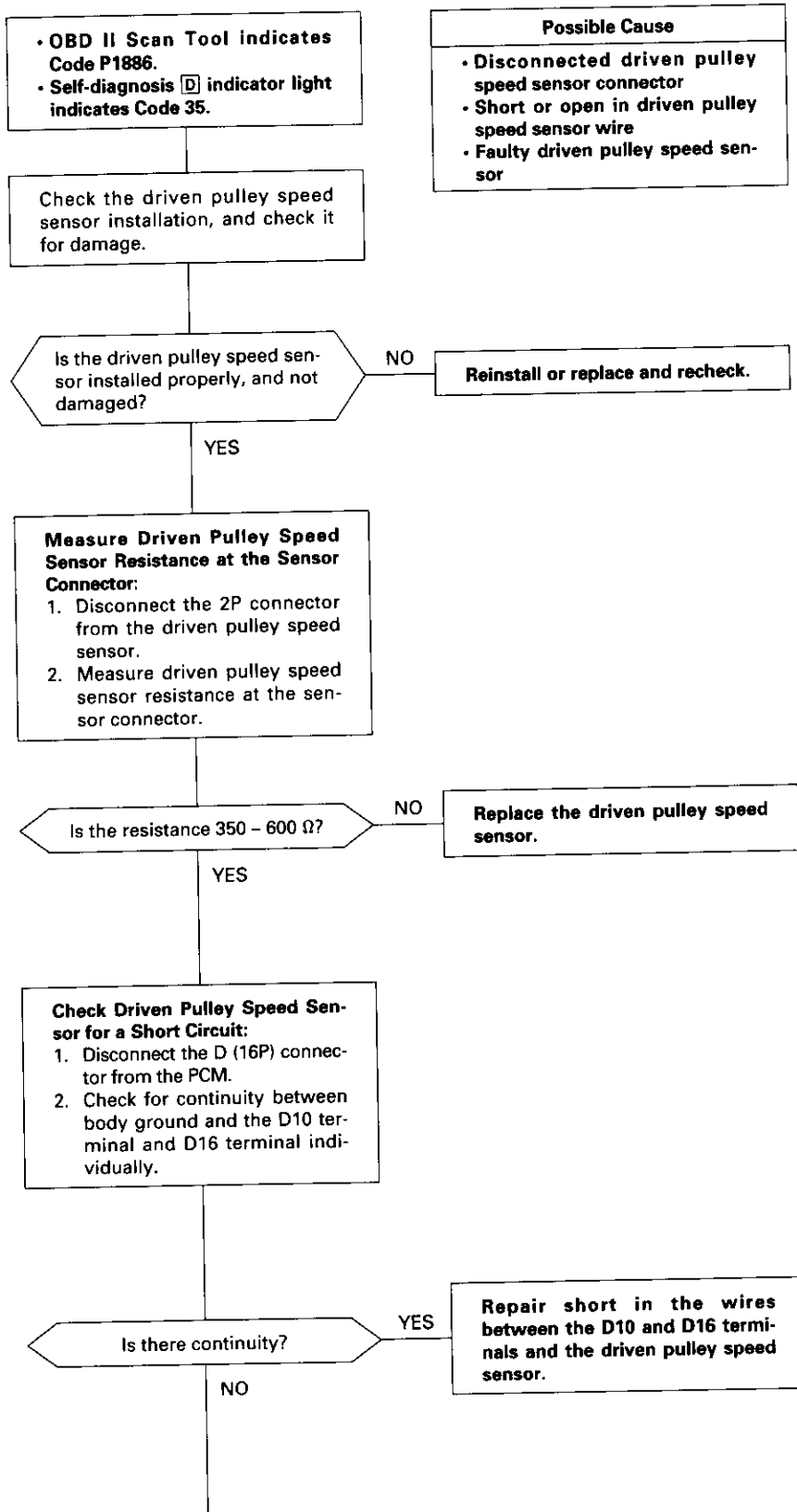


Wire side of female terminals

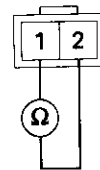


## Troubleshooting Flowchart — Driven Pulley Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

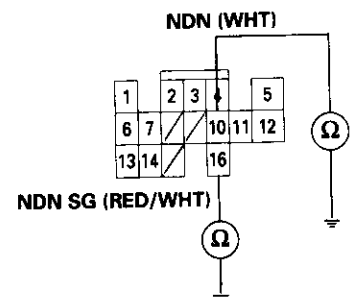


**DRIVEN PULLEY SPEED SENSOR CONNECTOR**



Terminal side of male terminals

**PCM CONNECTOR D (16P)**



Wire side of female terminals

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Driven Pulley Speed Sensor (cont'd)

From page 14-281

### Measure Driven Pulley Speed Sensor Circuit for an Open:

1. Connect the driven pulley speed sensor connector.
2. Measure the resistance between the D10 and D16 terminals.

Is the resistance 350 – 600  $\Omega$ ?

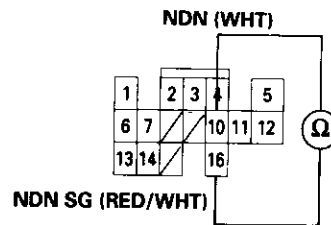
NO

Repair loose terminal or open in the wires between the D10 and D16 terminals and the driven pulley speed sensor.

YES

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

PCM CONNECTOR D (16P)



Wire side of female terminals



## Troubleshooting Flowchart — Secondary Gear Shaft Speed Sensor

NOTE: Record all freeze data before you troubleshoot.

- OBD II Scan Tool indicates Code P1888.
- Self-diagnosis indicator light indicates Code 36.

### Possible Cause

- Disconnected secondary gear shaft speed sensor connector
- Short or open in secondary gear shaft speed sensor wire
- Faulty secondary gear shaft speed sensor

Check the secondary gear shaft speed sensor installation, and check it for damage.

Is the secondary gear shaft speed sensor installed properly, and not damaged?

NO

Reinstall or replace and recheck.

YES

### Measure Secondary Gear Shaft Speed Sensor Resistance at the Sensor Connector:

1. Disconnect the 2P connector from the secondary gear shaft speed sensor.
2. Measure secondary gear shaft speed sensor resistance at the sensor connector.

Is the resistance 350 – 600  $\Omega$ ?

NO

Replace the secondary gear shaft speed sensor.

YES

### Check Secondary Gear Shaft Speed Sensor for a Short Circuit:

1. Disconnect the D (16P) connector from the PCM.
2. Check for continuity between body ground and the D1 terminal and D7 terminal individually.

Is there continuity?

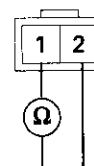
YES

Repair short in the wires between the D1 and D7 terminals and the secondary gear shaft speed sensor.

NO

To page 14-284

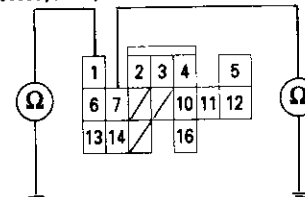
### SECONDARY GEAR SHAFT SPEED SENSOR CONNECTOR



Terminal side of male terminals

### PCM CONNECTOR D (16P)

VEL (WHT/RED) VEL SG (BLK/WHT)



Wire side of female terminals

(cont'd)

# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Secondary Gear Shaft Speed Sensor (cont'd)

From page 14-283

### Measure Secondary Gear Shaft Speed Sensor Circuit for an Open:

1. Connect the secondary gear shaft speed sensor connector.
2. Measure the resistance between the D1 and D7 terminals.

Is the resistance 350 – 600  $\Omega$ ?

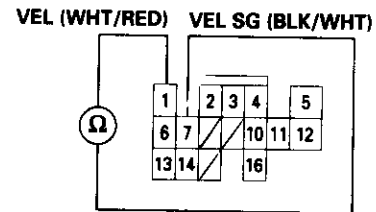
NO

Repair loose terminal or open in the wires between the D1 and D7 terminals and the secondary gear shaft speed sensor.

YES

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

PCM CONNECTOR D (16P)



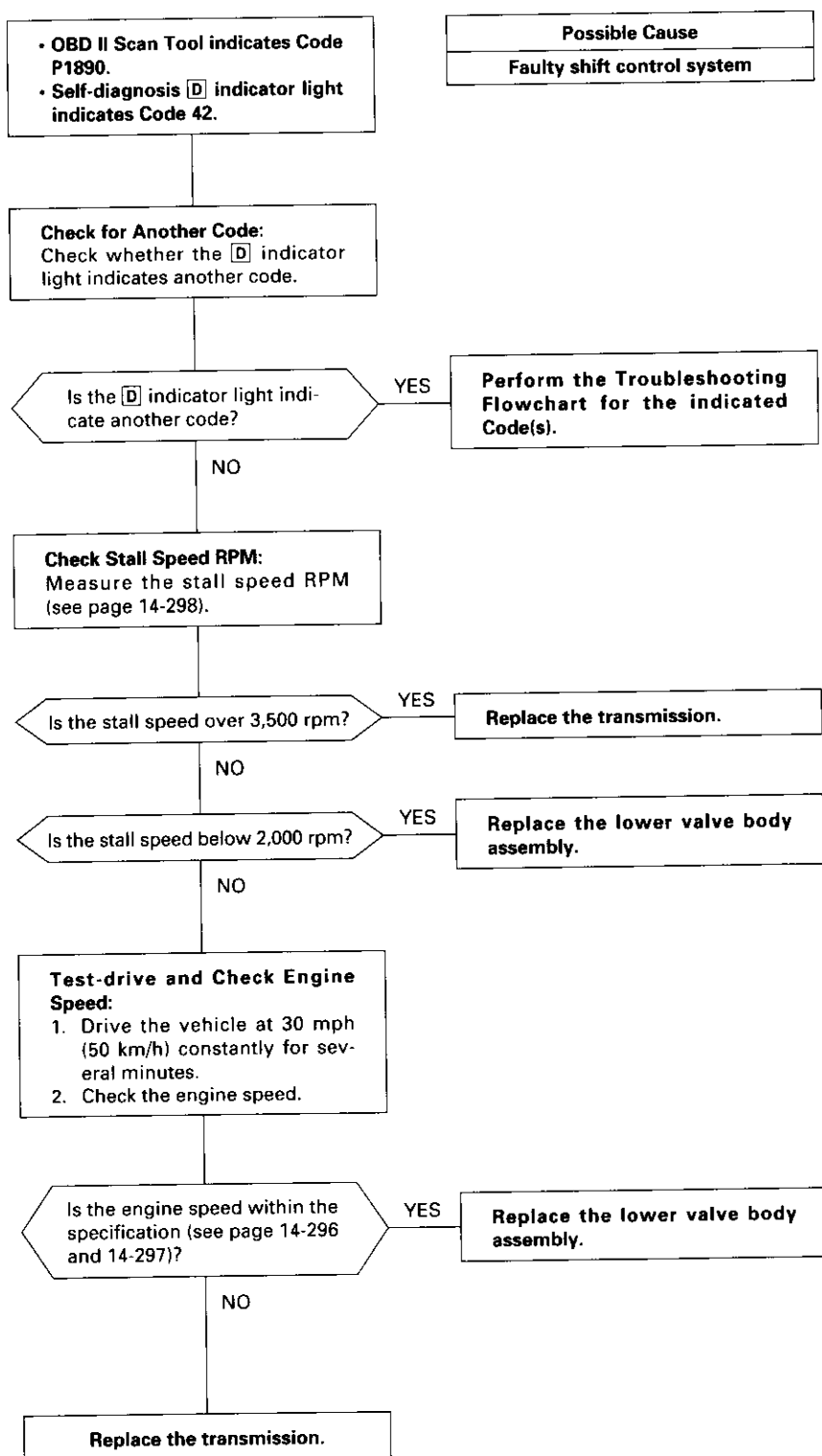
Wire side of female terminals





## Troubleshooting Flowchart — Shift Control System

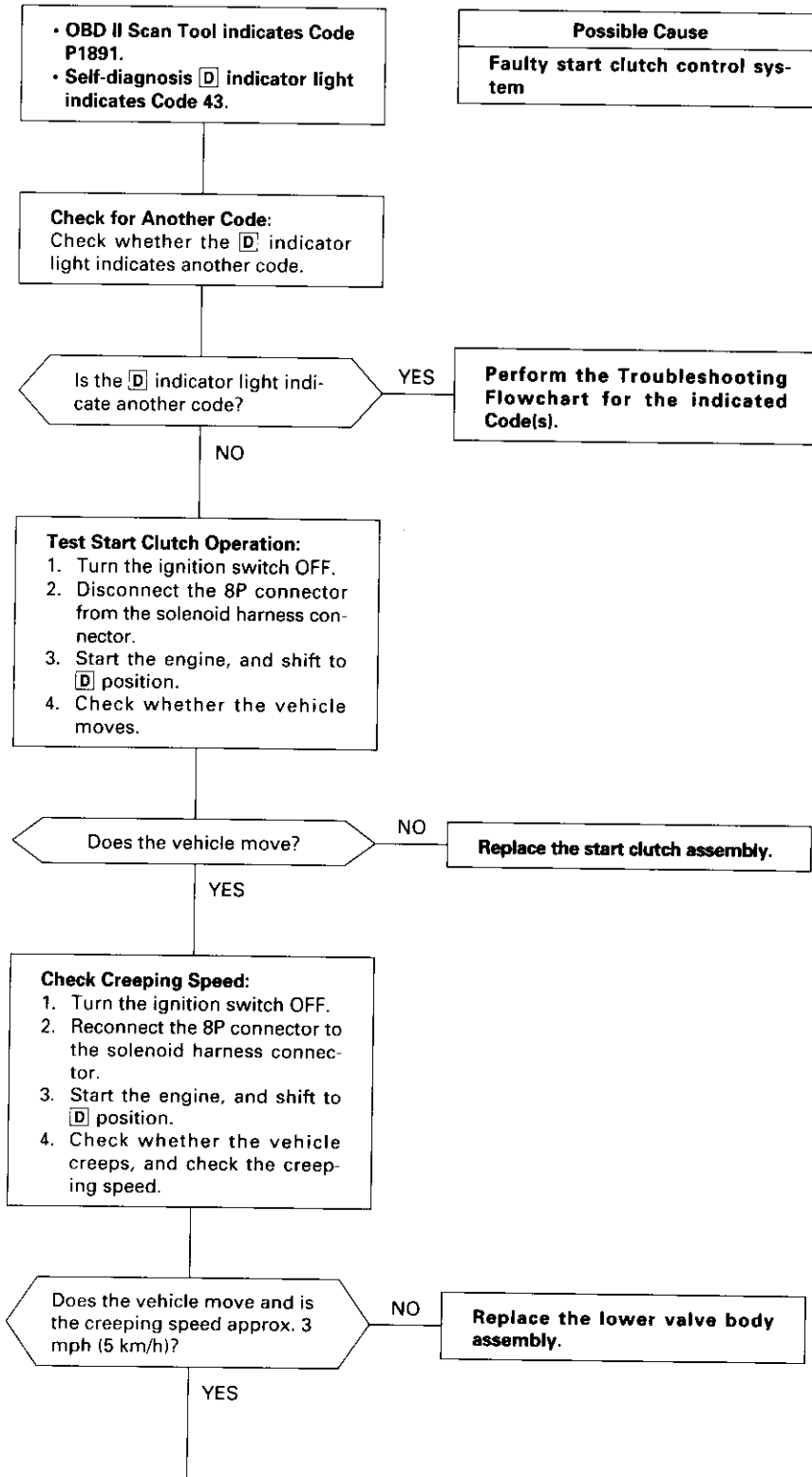
NOTE: Record all freeze data before you troubleshoot.



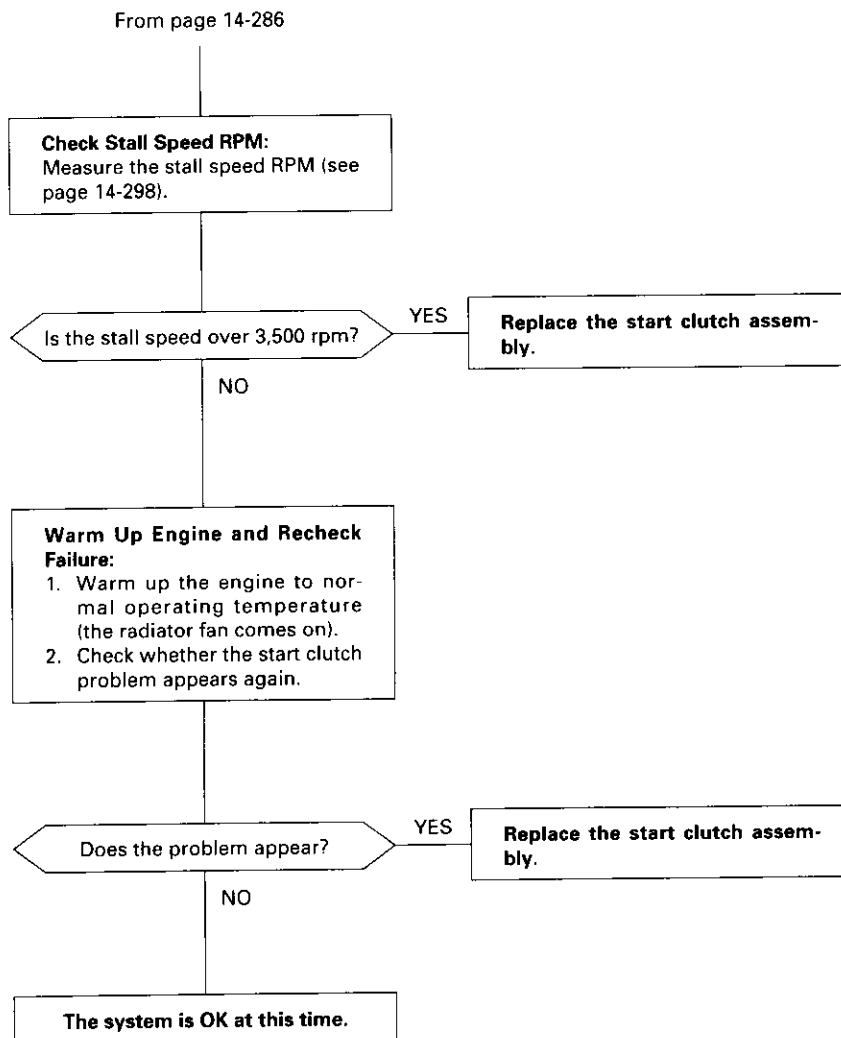
# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — Start Clutch Control System

NOTE: Record all freeze data before you troubleshoot.

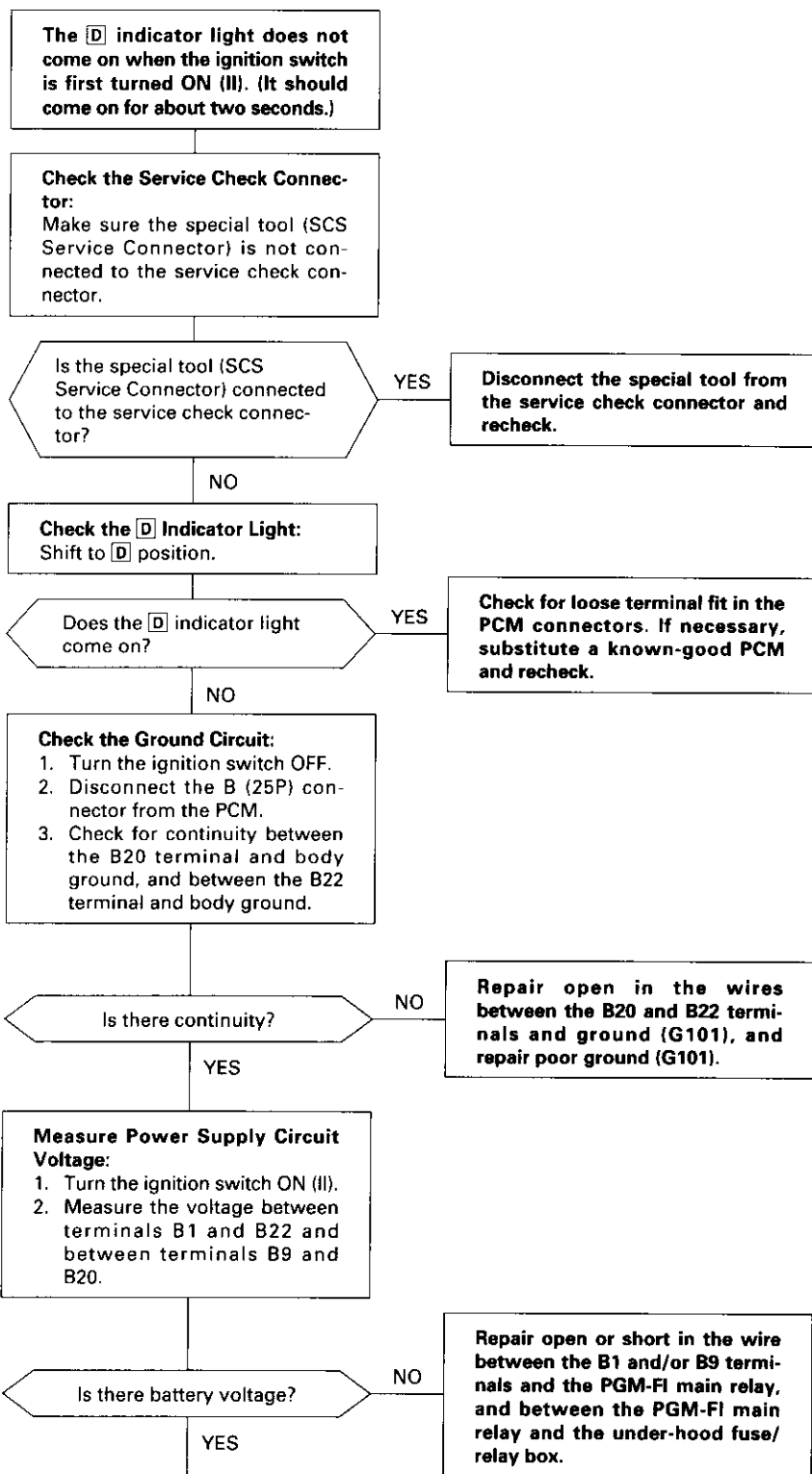


To page 14-287

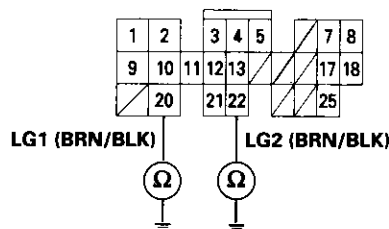


# Electrical Troubleshooting ('99 – 00 Models)

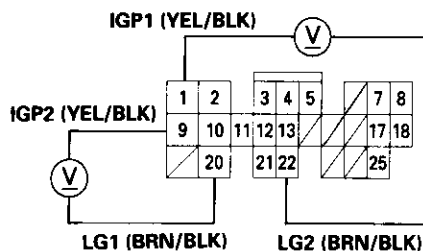
## Troubleshooting Flowchart — **D** Indicator Light Does Not Come On



PCM CONNECTOR B (25P)



Wire side of female terminals





From page 14-289

**Measure D IND Voltage:**

1. Turn the ignition switch OFF.
2. Connect the B (25P) connector to the PCM.
3. Connect a digital multimeter to the D14 and B20 or B22 terminals.
4. Turn the ignition switch ON (II), and make sure that voltage is available for two seconds.

Is there voltage?

YES

NO

Check for open in the wire between the D14 terminal and the gauge assembly. If wire is OK, check for a faulty indicator light bulb or a faulty gauge assembly printed circuit board.

**Check D IND for a Short Circuit:**  
Check for continuity between the D14 terminal and body ground.

Is there continuity?

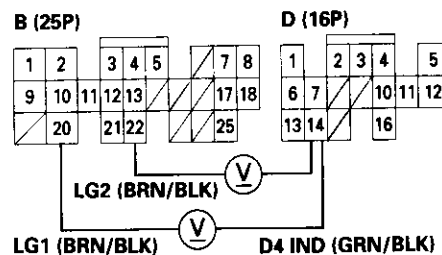
YES

NO

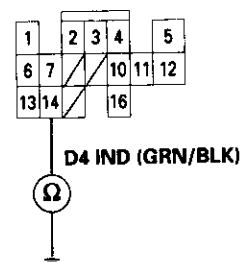
Repair short in the wire between the D14 terminal and the gauge assembly.

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

**PCM CONNECTORS**



Wire side of female terminals



# Electrical Troubleshooting ('99 – 00 Models)

## Troubleshooting Flowchart — **D** Indicator Light On Constantly

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

### Measure D IND Voltage:

1. Turn the ignition switch OFF.
2. Disconnect the D (16P) connector from the PCM.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the D14 terminal and body ground.

Is there voltage?

YES

Repair short to power in the wire between the D14 terminal and the gauge assembly.

NO

### Measure ATP D Voltage:

1. Turn the ignition switch OFF.
2. Connect the D (16P) connector to the PCM.
3. Turn the ignition switch ON (II).
4. Shift to any position other than **D**.
5. Measure the voltage between the A7 terminal and body ground.

Is there approx. 10 V?

YES

Replace the PCM.

NO

Test the A/T gear position switch (see section 23).

Is the switch OK?

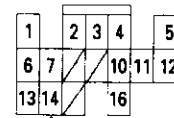
NO

Replace the A/T gear position switch.

YES

Check for a short to ground in the wire between the A7 terminal and A/T gear position switch. If wire is OK, substitute a known-good PCM and recheck.

PCM CONNECTOR D (16P)



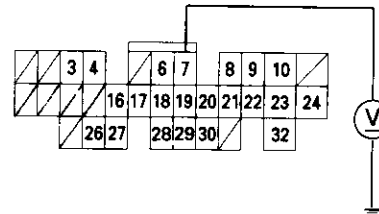
D4 IND (GRN/BLK)



Wire side of female terminals

PCM CONNECTOR A (32P)

ATP D4 (YEL)



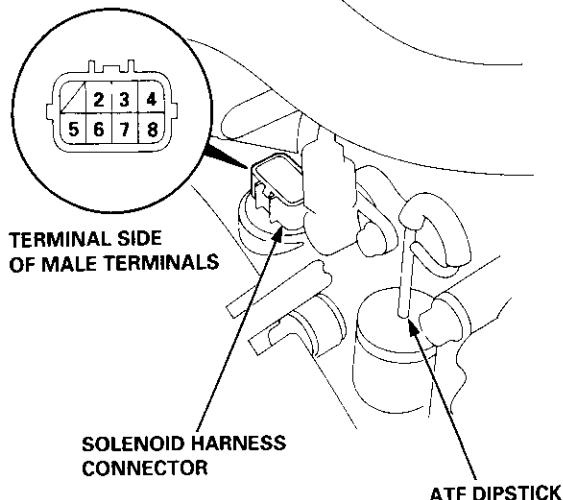
Wire side of female terminals



## Test

1. Disconnect the 8P connector from the solenoid harness connector.

SOLENOID HARNESS CONNECTOR



2. Measure the resistance of the shift control linear solenoid between the No. 3 and No. 7 terminals of the solenoid harness connector.
3. Measure the resistance of the PH-PL control linear solenoid between the No. 2 and No. 6 terminals.
4. Measure the resistance of the start clutch control linear solenoid between the No. 4 and No. 8 terminals.

**STANDARD: 3.8 – 6.8  $\Omega$**

5. Measure the resistance of the inhibitor solenoid between the No. 5 terminal and body ground.

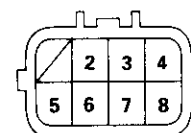
**STANDARD: 11.7 – 21.0  $\Omega$**

6. Replace the lower valve body assembly if any solenoid resistance is not within its standard.

7. If all of the resistances are within the standard, a clicking sound should be heard when connecting the battery terminals to the solenoid harness connector terminals below:

- **Shift control linear solenoid**  
No. 3: Battery positive terminal  
No. 7: Battery negative terminal
- **PH-PL control linear solenoid**  
No. 2: Battery positive terminal  
No. 6: Battery negative terminal
- **Start clutch control linear solenoid**  
No. 4: Battery positive terminal  
No. 8: Battery negative terminal
- **Inhibitor solenoid**  
No. 5: Battery positive terminal  
Body ground: Battery negative terminal

SOLENOID HARNESS CONNECTOR



Terminal side of male terminals

8. If no clicking sound is heard, replace the lower valve body assembly.

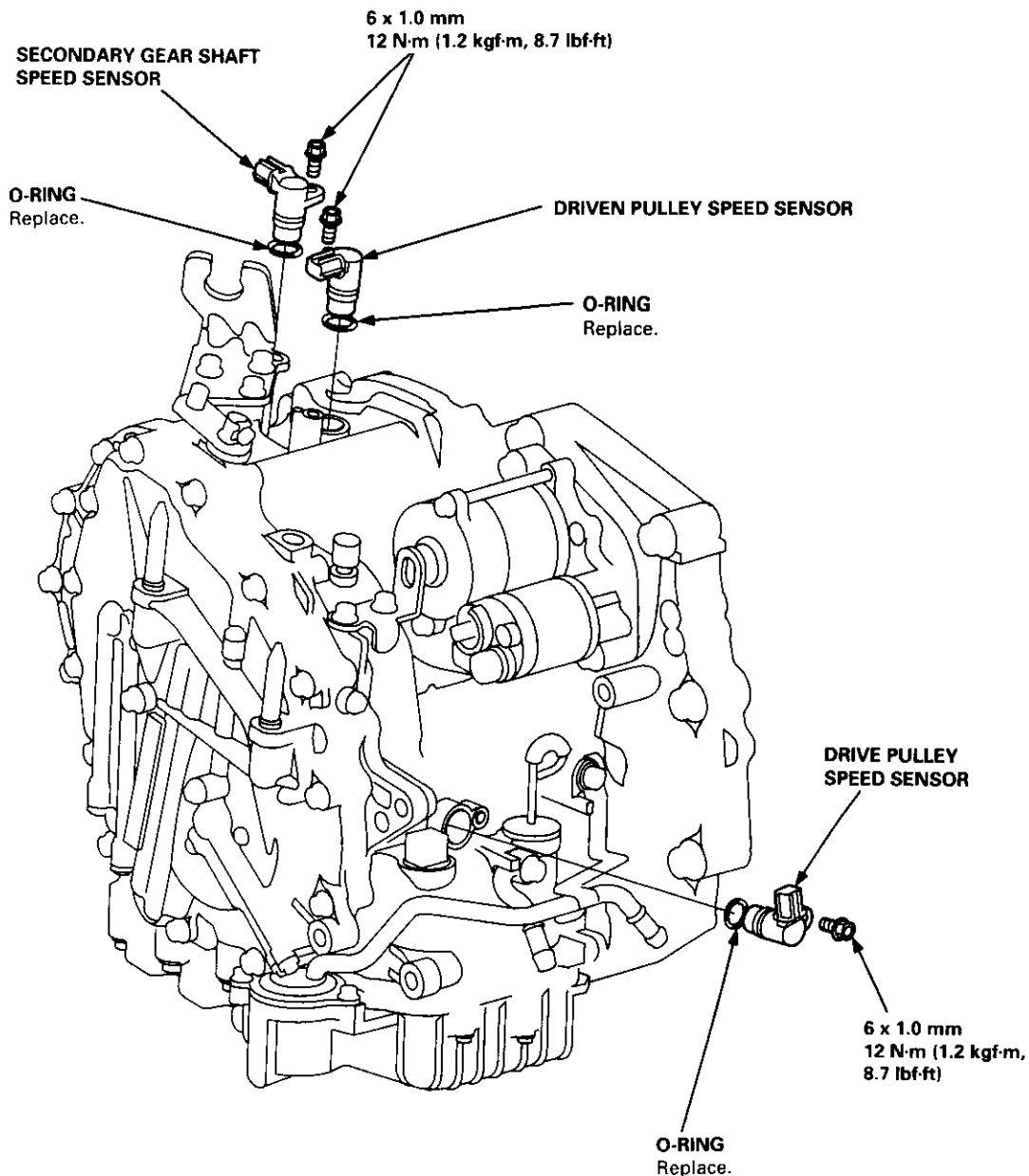
**NOTE:** If the lower valve body assembly replacement is required, see Lower Valve Body Assembly Replacement (page 14-302).

# Drive Pulley/Driven Pulley/Secondary Gear Shaft Speed Sensors

## Replacement

**CAUTION:** While replacing the speed sensor, be sure not to allow dust and other foreign particles to enter into the transmission.

1. Disconnect the connectors for the drive pulley, the driven pulley, and the secondary gear shaft speed sensor.
2. Remove the 6 mm bolt from the transmission housing, and remove the drive pulley, the driven pulley, and the secondary gear shaft speed sensors.
3. Replace the O-rings before reinstalling the drive pulley, the driven pulley, and the secondary gear shaft speed sensors.







## Start Clutch Calibration Procedure

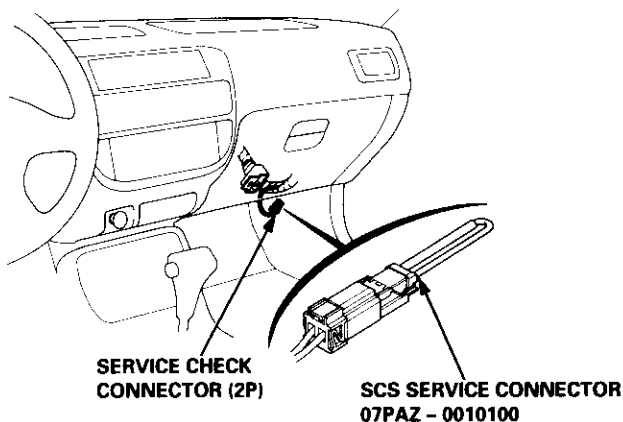
NOTE: When the following parts are replaced, the TCM must memorize the feedback signal for the start clutch control.

- TCM
- Transmission assembly
- Start clutch assembly
- Lower valve body assembly
- Engine assembly or overhaul

### '96 Model Only

**CAUTION:** Do not use this procedure on '97 – 00 models or you will damage the transmission. On '97 – 00 models, the TCM or PCM memorizes the feedback signals when you drive the vehicle.

1. Engage the parking brake, and block the front wheels securely.
2. Connect the SCS service connector to the Service Check Connector as shown. (The Service Check Connector (2P) is located under the dash on the passenger's side of the vehicle.)



3. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on twice).
4. Fully depress the brake pedal and accelerator for 20 seconds in the **D** position.

5. Shift into **N** or **P** position. To store the engine negative pressure in memory, let the engine idle in **N** or **P** position for one minute under the following conditions:

- With the brake pedal depressed.
- With the A/C switch OFF.
- With the combination light switch OFF.
- With the heater fan switch OFF.
- Turn OFF all other electrical systems.

NOTE: Start step 5 within 60 seconds after the radiator fan goes off.

6. Shift into **D** position, and let the engine idle for two minutes to store the feedback signal in memory under the same conditions as in step 5.
7. Connect the Honda PGM Tester. Check that the TCM has completed the start clutch calibration.

### NOTE:

- The TCM will not store the feedback signal when the CVT fluid temperature is below 40°C (104°F) even if the engine coolant temperature reaches the normal operating temperature.
- Repeat these procedures until the start clutch calibration is completed.

8. Disconnect the SCS service connector from the Service Check Connector.

### '97 – 00 Models

The TCM ('97 – 98 models) and PCM ('99 – 00 models) memorize the feedback signal when you drive the vehicle as follows:

- After warming up the engine (the radiator fan comes on).
- Shift into **D** position.
- Turn OFF all electrical systems.
- Drive the vehicle up to the speed 37 mph (60 km/h).
- After the speed reaches 37 mph (60 km/h), release the accelerator for 5 seconds.

# Symptom-to-Component Chart

## Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List
Engine runs, but vehicle does not move in any position.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 34, 35, 36, 38, 41
Vehicle does not move in <b>D</b> , <b>L</b> , <b>S</b> positions.	10, 11, 12, 20, 41
Vehicle does not move in <b>R</b> position.	5, 10, 11, 12, 17, 18, 19, 20, 39, 41
No shift to higher ratio.	9, 13, 14, 15, 16, 35, 37, 40
Poor acceleration.	9, 13, 14, 15, 16, 20, 35, 37, 38, 40
Flares on moving.	9, 10, 20, 21, 35, 36, 38, 40, 42
Excessive shock when depressing and releasing accelerator pedal.	9, 10, 20, 21, 35, 36, 38, 42
No engine braking.	9, 20, 21, 35, 36, 38
Vehicle does not accelerate in <b>R</b> position.	9, 17, 18, 19, 20, 35, 36, 38
Vehicle moves in <b>N</b> position. (Shift cable adjustment is proper).	10, 22, 23
Late shift from <b>N</b> position to <b>D</b> position, and from <b>D</b> position to <b>N</b> position.	10, 11, 12, 22, 41
Late shift from <b>N</b> position to <b>R</b> position, and from <b>R</b> position to <b>N</b> position.	11, 12, 17, 18, 22, 41
Engine stops when shifted to <b>D</b> position from <b>N</b> position.	9, 10, 20, 35, 37, 38, 42
Engine stops when shifted to <b>R</b> position from <b>N</b> position.	9, 18, 19, 20, 25, 26, 35, 37, 38, 42
Noise from transmission in <b>R</b> position.*1	5, 17, 18, 19, 25, 26
Excessive idle vibration.	2, 3, 8, 27, 28
Noise from transmission in <b>N</b> and <b>P</b> positions.	2, 3, 19, 24, 25, 28
Hunting engine speed.	16, 35, 37, 38
Vibration in all position.	8, 28
Shift lever does not operate smoothly.	11, 29, 41
Transmission will not shift into <b>P</b> position or transmission cannot be removed from <b>P</b> position.	11, 29, 30, 31, 32, 33
Vehicle does not accelerate to more than a certain speed.	9, 10, 14, 15, 16, 20, 35, 37
Excessive shock on starting off.	38, 42
Flares on accelerating at low speed.	20, 21, 38, 42
Excessive vibration in <b>D</b> , <b>L</b> , <b>S</b> , <b>R</b> positions.	20, 21, 38, 42
Low engine speed in <b>D</b> , <b>L</b> , <b>S</b> , <b>R</b> positions.	20, 21, 38, 42
Stall speed high.	10, 20, 38
Stall speed low.	9, 20, 27, 37, 38
Judder on starting off.	20, 43

\*1: Some gear noise is normal in the **R** position due to planetary gear action.



PROBABLE CAUSE LIST	
1	Low CVT fluid level
2	ATF pump worn. AT gears worn or damaged. Foreign material in ATF pump.
3	ATF pump chain/ATF pump sprocket worn or damaged.
4	Input shaft worn or damaged.
5	Sun gear worn or damaged.
6	Final driven gear worn or damaged.
7	Secondary drive gear/secondary driven gear worn or damaged.
8	Flywheel/drive plate worn or damaged.
9	Intermediate housing assembly worn or damaged.
10	Forward clutch defective.
11	Shift cable broken/out of adjustment.
12	Manual lever pin worn.
13	ATF feed pipe (pulley pressure) worn or damaged.
14	Drive pulley speed sensor/driven pulley speed sensor defective.
15	Vehicle speed sensor defective.
16	TCM or PCM defective.
17	Reverse brake defective.
18	Reverse brake piston and related parts worn or damaged.
19	Planetary gear worn or damaged.
20	Start clutch defective.
21	ATF feed pipe (start clutch pressure) worn or damaged.
22	Clutch clearance/reverse brake clearance incorrect.
23	Reverse brake return spring/retainer worn or damaged.
24	Needle bearing on input shaft worn or damaged.
25	Thrust needle bearing on carrier worn or damaged.
26	Thrust washer on carrier worn or damaged.
27	Engine output low.
28	Flywheel assembly defective.
29	Control lever worn or damaged.
30	Park pawl/park pawl shaft worn or damaged.
31	Detent lever/park brake rod assembly worn or damaged.
32	Park gear worn or damaged.
33	Park pawl spring worn or damaged.
34	ATF strainer/ATF filter clogged.
35	Lower valve body assembly defective.
36	Lower valve body assembly defective (PL regulator valve body assembly defective).
37	Lower valve body assembly defective (shift valve body assembly defective).
38	Lower valve body assembly defective (start clutch control valve body assembly defective).
39	Lower valve body assembly defective (inhibitor solenoid defective).
40	Solenoid harness worn or damaged.
41	Manual valve body worn or damaged.
42	PB feedback system defective.
43	CVT fluid deteriorated.

# Road Test

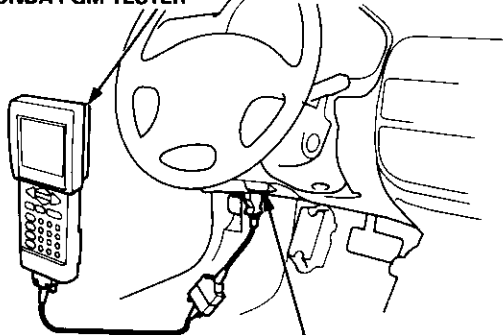
NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

1. Apply the parking brake and block the wheels. Start the engine, then shift to the **D** position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.
2. Test in **P** position  
Park the vehicle in a slope (approx. 16°), apply the parking brake, and shift into **P** position. Release the brake; the vehicle should not move.
3. Test-drive the vehicle on a flat road in the position shown in the table. Check that the engine speeds meet the approximate vehicle speeds shown in the table.

NOTE: Throttle position sensor voltage represents the throttle opening. To monitor the throttle position sensor voltage, use one of the following methods:

A. Connect the Honda PGM Tester, and go to the PGM-FI Data List.

OBD II SCAN TOOL or  
HONDA PGM TESTER



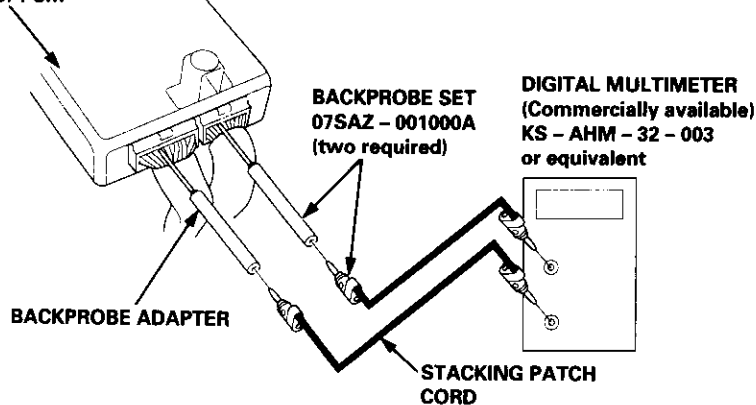
DATA LINK CONNECTOR (16P)

B. 1. For road testing on '96 – 98 models, remove the driver's side kick panel to expose the TCM; on '99 – 00 models, remove the passenger's side kick panel to expose the PCM (see page 14-236).

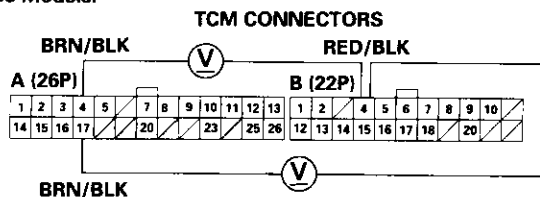
2. Set the digital multimeter to check throttle position sensor voltage between terminals:

- '96 – 98 models: TCM B4 (+) and A4 (–) or A17 (–).
- '99 – 00 models: PCM C27 (+) and B20 (–) or B22 (–).

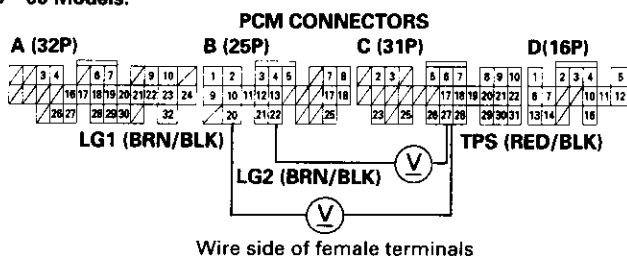
TCM or PCM



'96 – 98 Models:



'99 – 00 Models:





- **D position: Engine Speed rpm**

Throttle Opening	Vehicle Speed		
	25 mph (40 km/h)	37 mph (60 km/h)	62 mph (100 km/h)
Throttle position sensor voltage: 0.75 V	1,250 – 1,650	—	—
Throttle position sensor voltage: 2.25 V	2,500 – 3,100	2,650 – 3,250	2,700 – 3,300
Throttle position sensor voltage: 4.5 V Full throttle position	3,950 – 4,550	4,650 – 5,250	5,200 – 5,800

- **S position: Engine Speed rpm**

Throttle Opening	Vehicle Speed		
	25 mph (40 km/h)	37 mph (60 km/h)	62 mph (100 km/h)
Throttle position sensor voltage: 0.75 V	1,800 – 2,200	2,200 – 2,800	3,550 – 4,150
Throttle position sensor voltage: 2.25 V	2,950 – 3,550	3,250 – 3,850	4,050 – 4,650
Throttle position sensor voltage: 4.5 V Full throttle position	4,100 – 4,700	5,100 – 5,700	5,900 – 6,500

- **L position: Engine Speed rpm**

Throttle Opening	Vehicle Speed		
	25 mph (40 km/h)	37 mph (60 km/h)	62 mph (100 km/h)
Throttle position sensor voltage: 0.75 V	3,100 – 3,700	3,650 – 4,250	4,450 – 5,050
Throttle position sensor voltage: 2.25 V	3,500 – 4,100	4,050 – 4,650	4,800 – 5,400
Throttle position sensor voltage: 4.5 V Full throttle position	4,100 – 4,700	5,100 – 5,700	5,900 – 6,500

# Stall Speed

## Test

### CAUTION:

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

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

### Stall Speed RPM in **D** position:

Specification: 2,500 rpm

Service Limit: 2,350 – 2,650 rpm

### Stall Speed RPM in **S**, **L** and **R** positions:

Specification: 3,000 rpm

Service Limit: 2,800 – 3,100 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in <b>D</b> , <b>S</b> , <b>L</b> , and <b>R</b> positions	<ul style="list-style-type: none"><li>• Low fluid level or ATF pump output</li><li>• Clogged ATF strainer</li><li>• PH regulator valve stuck closed</li><li>• Slippage of forward clutch</li><li>• Faulty start clutch</li></ul>
Stall rpm high in <b>R</b> position	<ul style="list-style-type: none"><li>• Slippage of reverse brake</li><li>• Faulty start clutch</li></ul>
Stall rpm low in <b>D</b> , <b>S</b> , <b>L</b> , and <b>R</b> positions	<ul style="list-style-type: none"><li>• Engine output low</li><li>• Faulty start clutch</li><li>• Stuck shift valve</li></ul>



## Checking/Changing

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

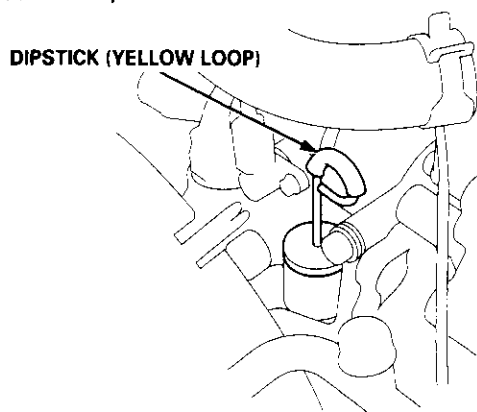
### Checking

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

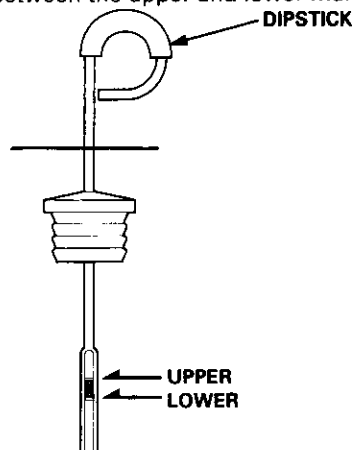
1. Park the vehicle on the level ground. Turn off the engine.
2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.

**NOTE:** Check the transmission fluid 60 to 90 seconds after shutting off the engine.

3. Insert the dipstick into the transmission.



4. Remove the dipstick and check the fluid level. It should be between the upper and lower mark.



5. If the level is below the lower mark, add fluid into the filler hole to bring it to the upper mark. Use Genuine Honda CVT Fluid only.
6. Insert the dipstick into the transmission.

### Changing

1. Bring the transmission up to normal operating temperature (the radiator fan comes on) by driving the vehicle. Park the vehicle on the level ground, and turn off the engine.

2. Remove the drain plug, and drain the CVT fluid.

**NOTE:** If a cooler flusher is to be used, see page 14-352 and 14-353.

3. Reinstall the drain plug with a new sealing washer, then refill the transmission with Genuine Honda CVT Fluid to the upper mark on the dipstick.

**Automatic Transmission Fluid Capacity:**  
3.9 l (4.1 US qt, 3.4 Imp qt) at changing  
6.4 l (6.8 US qt, 5.6 Imp qt) at overhaul

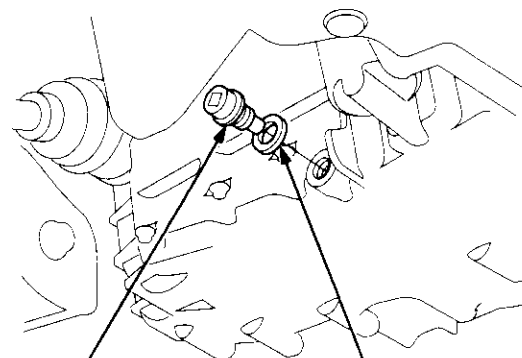
**Recommended Automatic Transmission Fluid:**  
Genuine Honda CVT Fluid.

Use Genuine Honda CVT fluid only. Using other fluids can affect transmission operation and may reduce transmission life.

#### Change Interval:

**Normal Condition:** 30,000 miles (48,000 km)

**Severe Condition:** 30,000 miles (48,000 km), but if you drive at high speeds in high [90°F (32°C) and above] temperatures, the transmission fluid should be changed every 15,000 miles (24,000 km).



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

**SEALING WASHER**  
Replace.

# Pressure Testing

## ⚠ WARNING

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


## CAUTION:

- Before testing, be sure the transmission fluid is filled to the proper level.
- Warm up the engine to normal operating temperature before testing.
- While testing, be sure not to allow dust and other foreign particles to enter into the transmission.

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Allow the front wheels to rotate freely.
4. Warm up the engine (the radiator fan comes on), then stop and connect a tachometer.
5. Connect the special tool to each inspection hole.

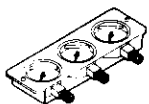
**TORQUE: 18 N·m (1.8 kgf-m, 13 lbf-ft)**

## CAUTION:

- Connect the oil pressure gauge securely, be sure not to allow dust and other foreign particles to enter the inspection hole.
- When troubleshooting by the  indicator light indicates a problem, you must use an oil pressure gauge that measures 4,900 kPa (4.90 MPa, 50.0 kgf/cm<sup>2</sup>, 711 psi) or more when measuring drive pulley pressure and driven pulley pressure.

## NOTE:

- Drive pulley pressure may be above 3,430 kPa (3.43 MPa, 35.0 kgf/cm<sup>2</sup>, 498 psi) when there is a transmission problem that causes the TCM or PCM to go into the fail-safe mode.
- Use a commercially available oil pressure gauge that measures 4,900 kPa (4.90 MPa, 50.0 kgf/cm<sup>2</sup>, 711 psi) or more, and the A/T Oil Pressure Hose, 2210 mm (07MAJ – PY4011A).



**A/T OIL PRESSURE  
GAUGE  
SET W/PANEL**  
07406 – 0020400



**A/T LOW PRESSURE  
GAUGE W/PANEL**  
07406 – 0070300



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



**A/T PRESSURE HOSE**  
2210 mm  
07MAJ – PY4011A  
(4 Required)

**FORWARD CLUTCH PRESSURE  
INSPECTION HOLE**  
(Marked with "F")

**DRIVE PULLEY PRESSURE  
INSPECTION HOLE**  
(Marked with "DR")

**REVERSE BRAKE PRESSURE  
INSPECTION HOLE**

**LUBRICATION PRESSURE  
INSPECTION HOLE**  
(Marked with "LUB")

**DRIVEN PULLEY PRESSURE  
INSPECTION HOLE**  
(Marked with "DN")

**ATF DIPSTICK**

**START CLUTCH PRESSURE  
INSPECTION HOLE**  
(Marked with "SC")





6. Start the engine.

7. Shift to the respective shift lever positions in the table, and measure the following pressures at 1,500 rpm.

- Forward Clutch Pressure
- Reverse Brake Pressure
- Drive Pulley Pressure
- Driven Pulley Pressure

8. Shift to **[N]** position, and measure the lubrication pressure at 3,000 rpm.

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE
				Standard/Service Limit
Forward Clutch	<b>[D]</b>	No or low forward clutch pressure	Forward Clutch	1.4 – 1.75 MPa (14.3 – 17.8 kgf/cm <sup>2</sup> , 203 – 253 psi)
Reverse Brake	<b>[R]</b>	No or low reverse brake pressure	Reverse Brake	1.4 – 1.75 MPa (14.3 – 17.8 kgf/cm <sup>2</sup> , 203 – 253 psi)
Drive Pulley	<b>[N]</b>	No or low drive pulley pressure	ATF pump, PH regulator valve, PL regulator valve, Shift valve	0.2 – 0.7 MPa (2 – 7.1 kgf/cm <sup>2</sup> , 28 – 101 psi)
		Drive pulley pressure too high	PH regulator valve, PL regulator valve, Shift valve, Shift control linear solenoid	
Driven Pulley		No or low driven pulley pressure	ATF pump, PH regulator valve, Shift valve, Shift control linear solenoid	1.5 – 2.3 MPa (15.3 – 23.5 kgf/cm <sup>2</sup> , 218 – 334 psi)
		Driven pulley pressure too high	PH regulator valve	
Lubrication		No or low lubrication pressure	ATF pump, Lubrication valve	Above 0.2 MPa (Above 2 kgf/cm <sup>2</sup> , 30 psi)

9. Disconnect the special tool after pressure testing.

10. Install the sealing bolts in the inspection holes with new sealing washers, and tighten the bolts to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

**CAUTION: Keep all foreign particles out of the transmission.**

# Lower Valve Body Assembly

## Replacement

**▲ WARNING** Make sure lifts, jacks, and safety stands are placed properly (see section 1).

**CAUTION:** While removing and installing the lower valve body assembly, be sure not to allow dust and other foreign particles to enter into the transmission.

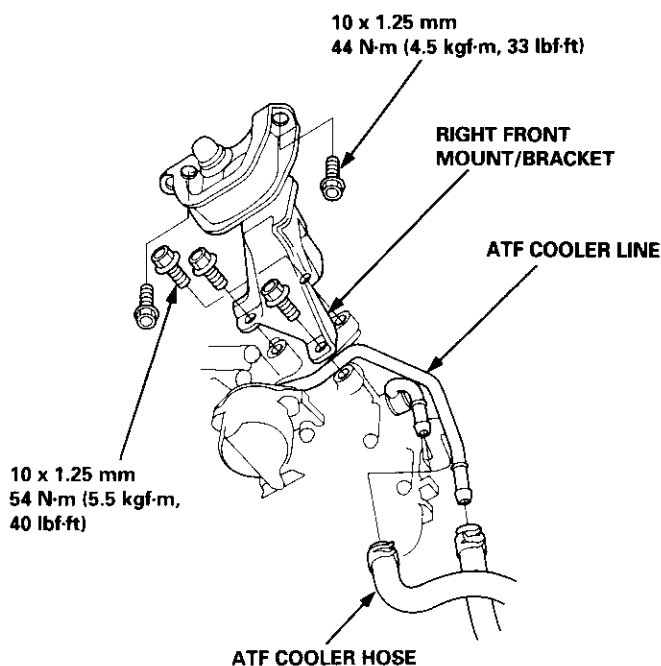
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Remove the drain plug, and drain the CVT fluid. Reinstall the drain plug with a new sealing washer (see page 14-299).

**CAUTION:** Keep all of other foreign particles out of the transmission.

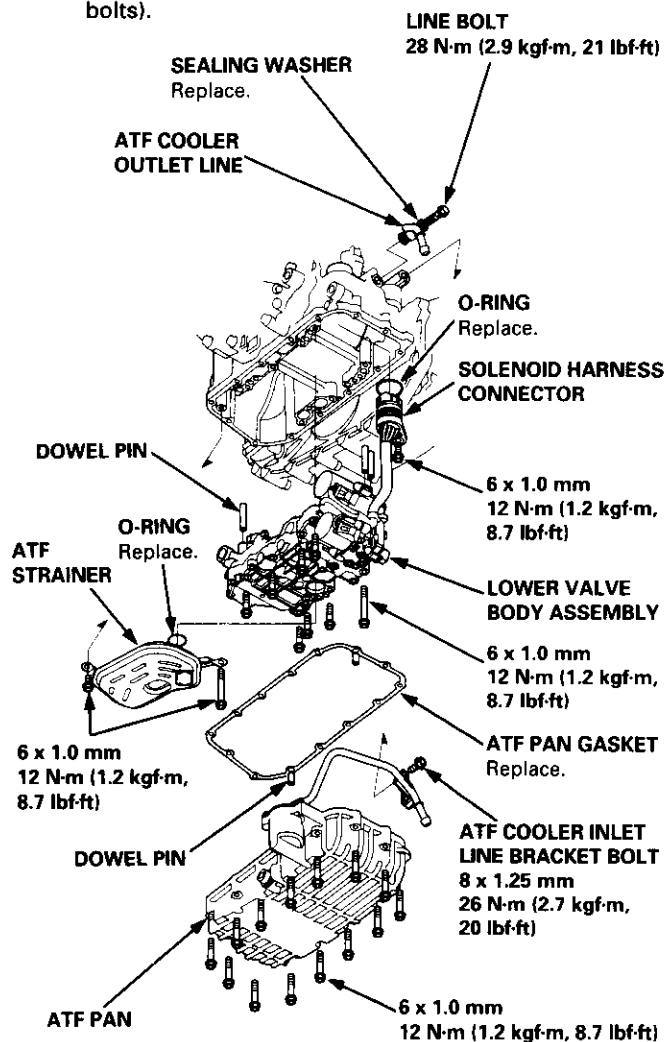
4. Disconnect the 8P connector from the solenoid harness connector.
5. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler hoses.

**CAUTION:** Keep all of other foreign particles out of the transmission.

6. Remove the right front mount/bracket.



7. Remove the ATF cooler outlet line.
8. Remove the ATF cooler line bracket bolt.
9. Remove the ATF pan (fourteen bolts).
10. Remove the ATF strainer (two bolts).
11. Remove the one bolt securing the solenoid harness connector.
12. Remove the lower valve body assembly (eight bolts).



13. Install the new lower valve body in the reverse order of the removal procedure.

**CAUTION:** Keep all of other foreign particles out of the transmission.

**NOTE:**

- Replace the following parts:
  - O-rings on the solenoid harness connector and the ATF strainer
  - ATF pan gasket
  - Sealing washers
- If the ATF cooler inlet line bracket is bent or warped, put it back to the original position.

14. Perform the start clutch calibration procedure on page 14-293.



## Removal/Installation

**⚠ WARNING** Make sure lifts, jacks, and safety stands are placed properly (see section 1).

**CAUTION:** While removing and installing the ATF filter, be sure not to allow dust or other foreign particles to enter the transmission.

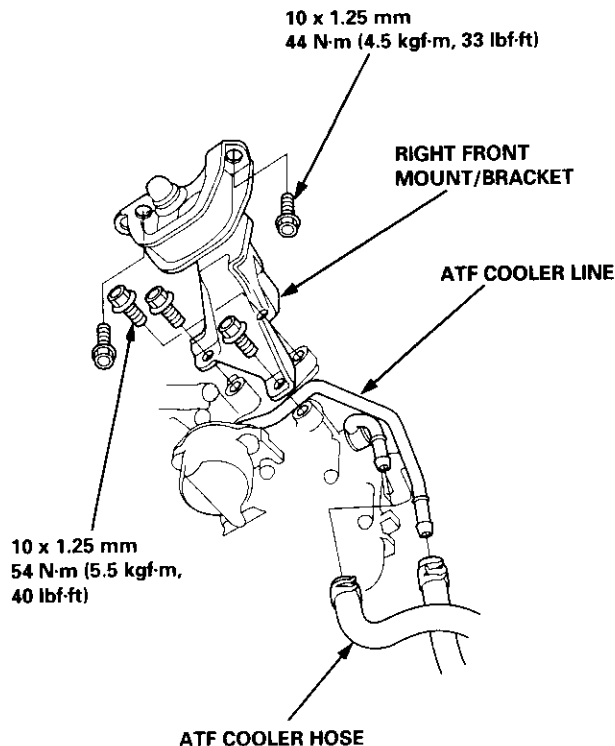
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Remove the drain plug, and drain the CVT fluid. Reinstall the drain plug with a new sealing washer (see page 14-299).

**CAUTION:** Keep all foreign particles out of the transmission.

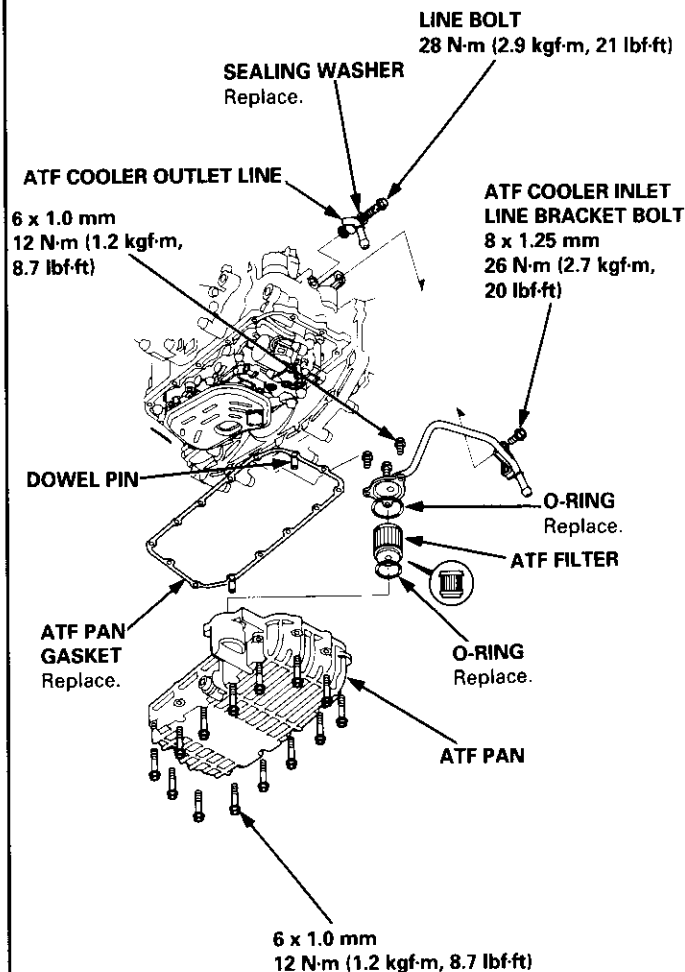
4. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler hoses.

**CAUTION:** Keep all foreign particles out of the transmission.

5. Remove the right front mount/bracket.



6. Remove the ATF cooler outlet line.
7. Remove the ATF cooler line bracket bolt.
8. Remove the ATF pan (fourteen bolts).
9. Remove the ATF cooler inlet line from the ATF pan (three bolts).
10. Remove the ATF filter, and clean it.
11. Check that the ATF filter is in good condition.
12. Replace the ATF filter if it is clogged.



13. Install the ATF filter in the reverse order of the removal procedure.

**CAUTION:** Keep all foreign particles out of the transmission.

### NOTE:

- Replace the O-rings, the ATF pan gasket and sealing washers.
- If the ATF cooler inlet line bracket is bent or warped, put it back to the original position.

# Transmission

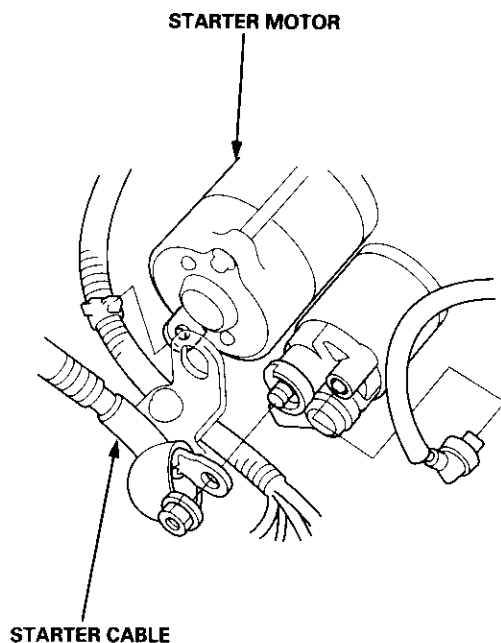
## Removal

### ⚠ WARNING

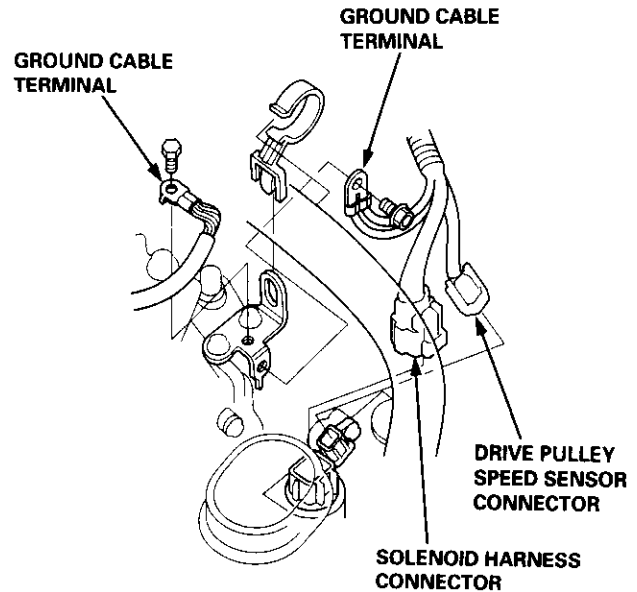
- Make sure lifts, jacks, and safety stands are placed properly, and hoist bracket are attached to the correct position on the engine (see section 1).
- Apply parking brake and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.

**CAUTION:** Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (-) terminal from the battery, then remove the positive (+) terminal.
2. Remove the intake air duct and air cleaner housing assembly.
3. Remove the starter cables and cable holder from the starter motor.

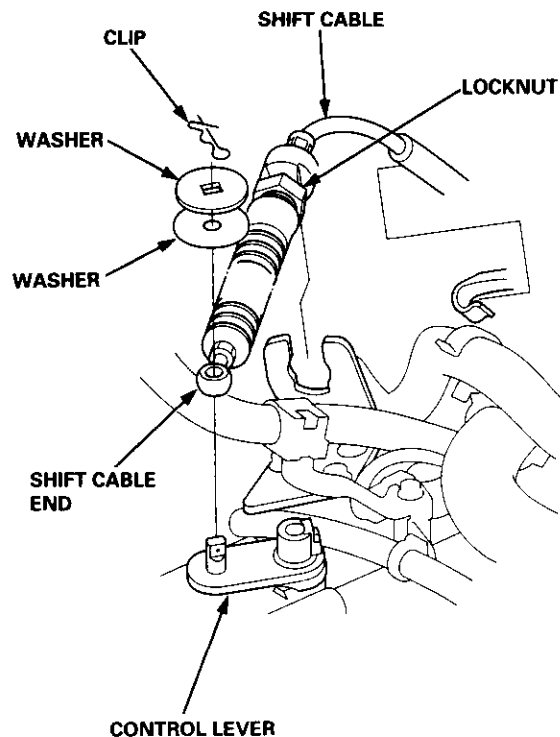


4. Disconnect the solenoid harness connector, the drive pulley speed sensor connector, and the ground cable terminals.



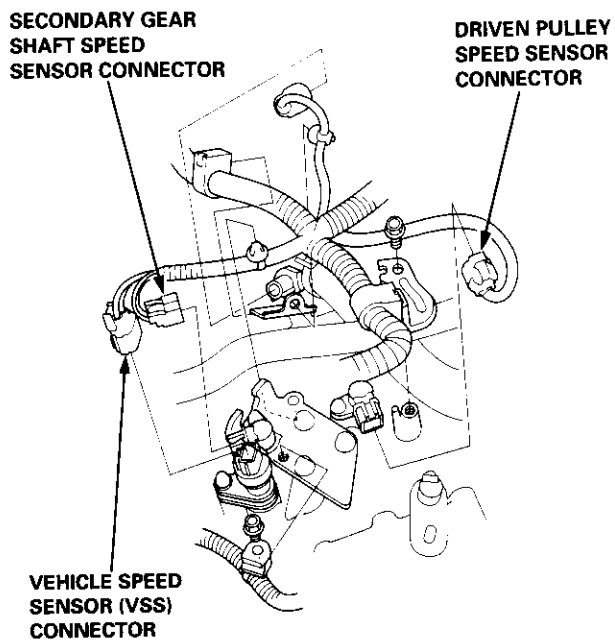
5. Remove the clip, then separate the shift cable from the control lever.

**CAUTION:** Take care not to bend the shift cable.

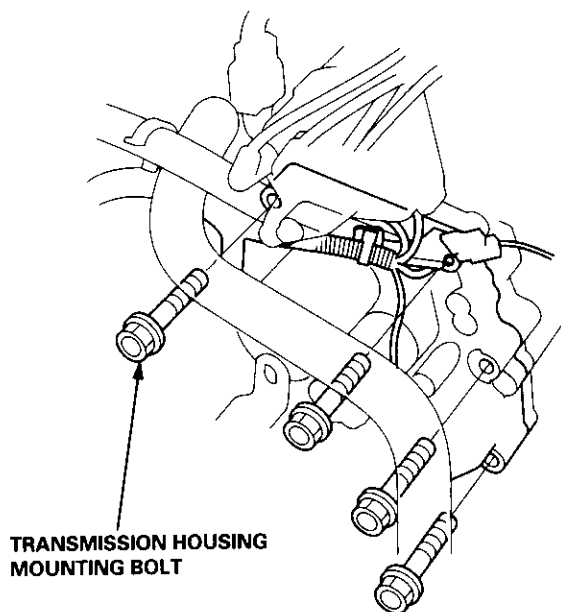




6. Disconnect the vehicle speed sensor (VSS) connector, the driven pulley speed sensor connector, and the secondary gear shaft speed sensor connector.

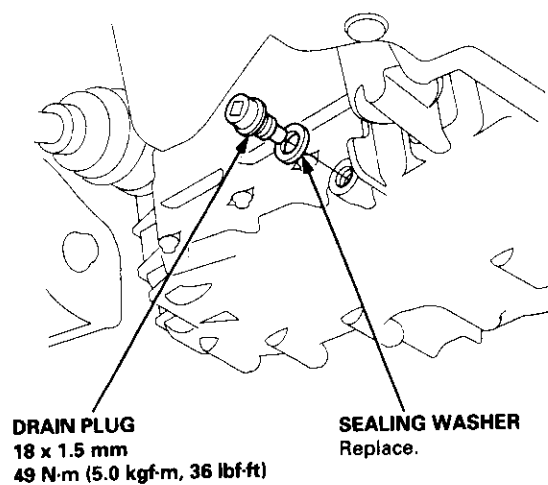


7. Remove the transmission housing mounting bolts.

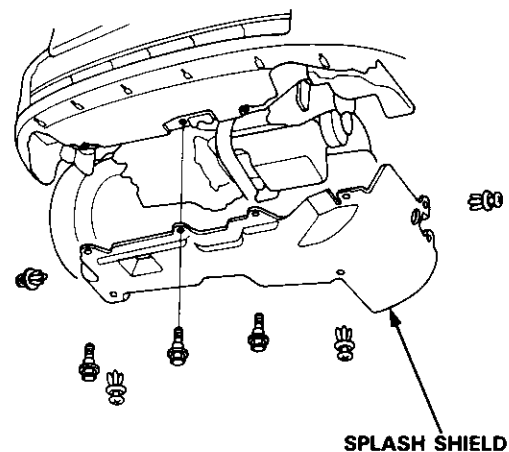


8. Remove the drain plug, and drain the CVT fluid. Reinstall the drain plug with a new sealing washer.

**CAUTION:** While installing the drain plug, be sure not to allow dust and other foreign particles to enter into the transmission.



9. Remove the splash shield.

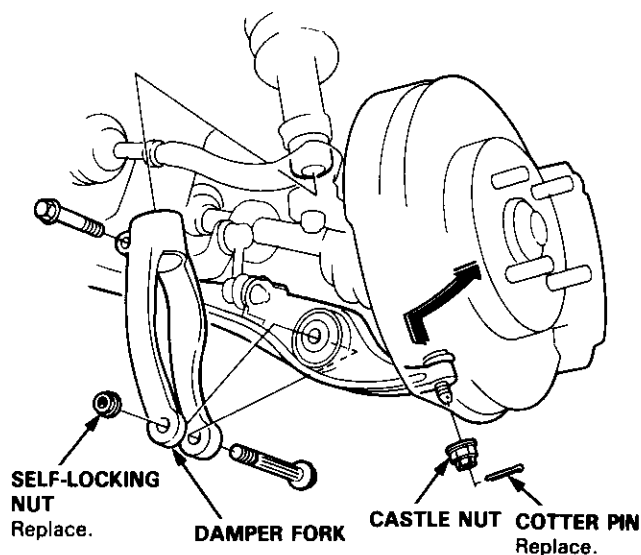


(cont'd)

# Transmission

## Removal (cont'd)

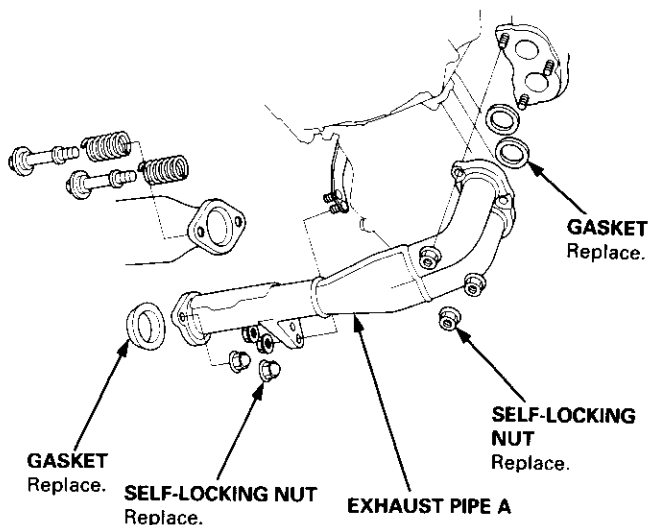
10. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arm (see section 18).



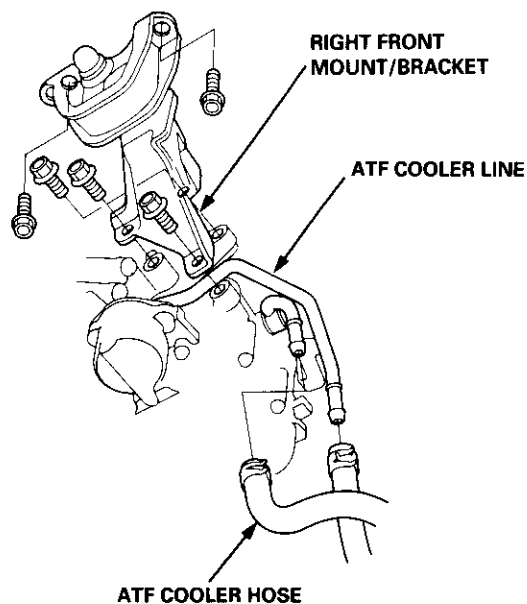
11. Remove the right damper fork bolt, then separate right damper fork and damper.
12. Pry the right and left driveshafts out of the differential.
13. Pull on the inboard joint to remove the right and left driveshafts (see section 16).
14. Tie plastic bags over the driveshaft ends.

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

15. Remove the exhaust pipe A.



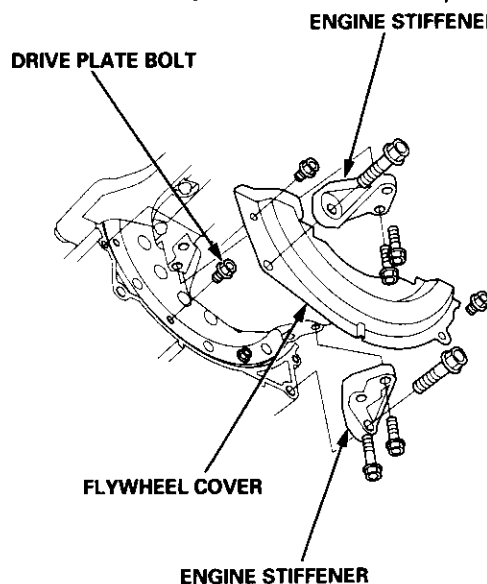
16. Remove the right front mount/bracket.



17. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the ATF cooler hoses up to prevent CVT fluid from flowing out, then plug the ATF cooler hoses and lines.

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

18. Remove the engine stiffeners and the flywheel cover.

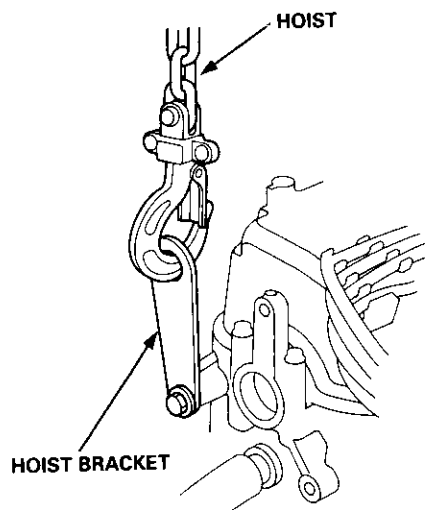


19. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.

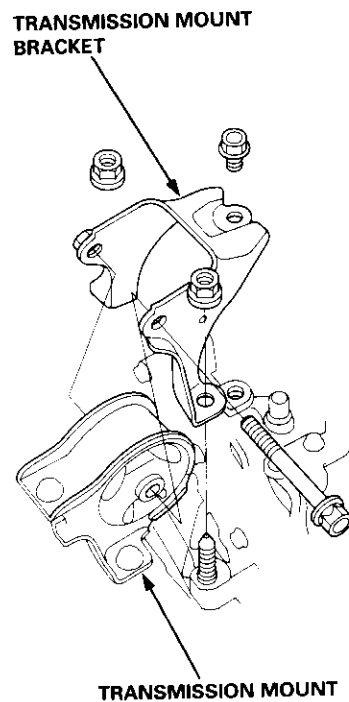


20. Remove the distributor.

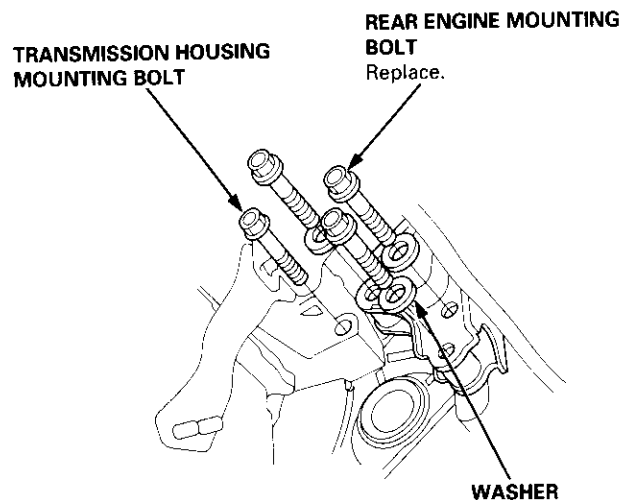
21. Attach a hoisting bracket to the engine, then lift the engine slightly.



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



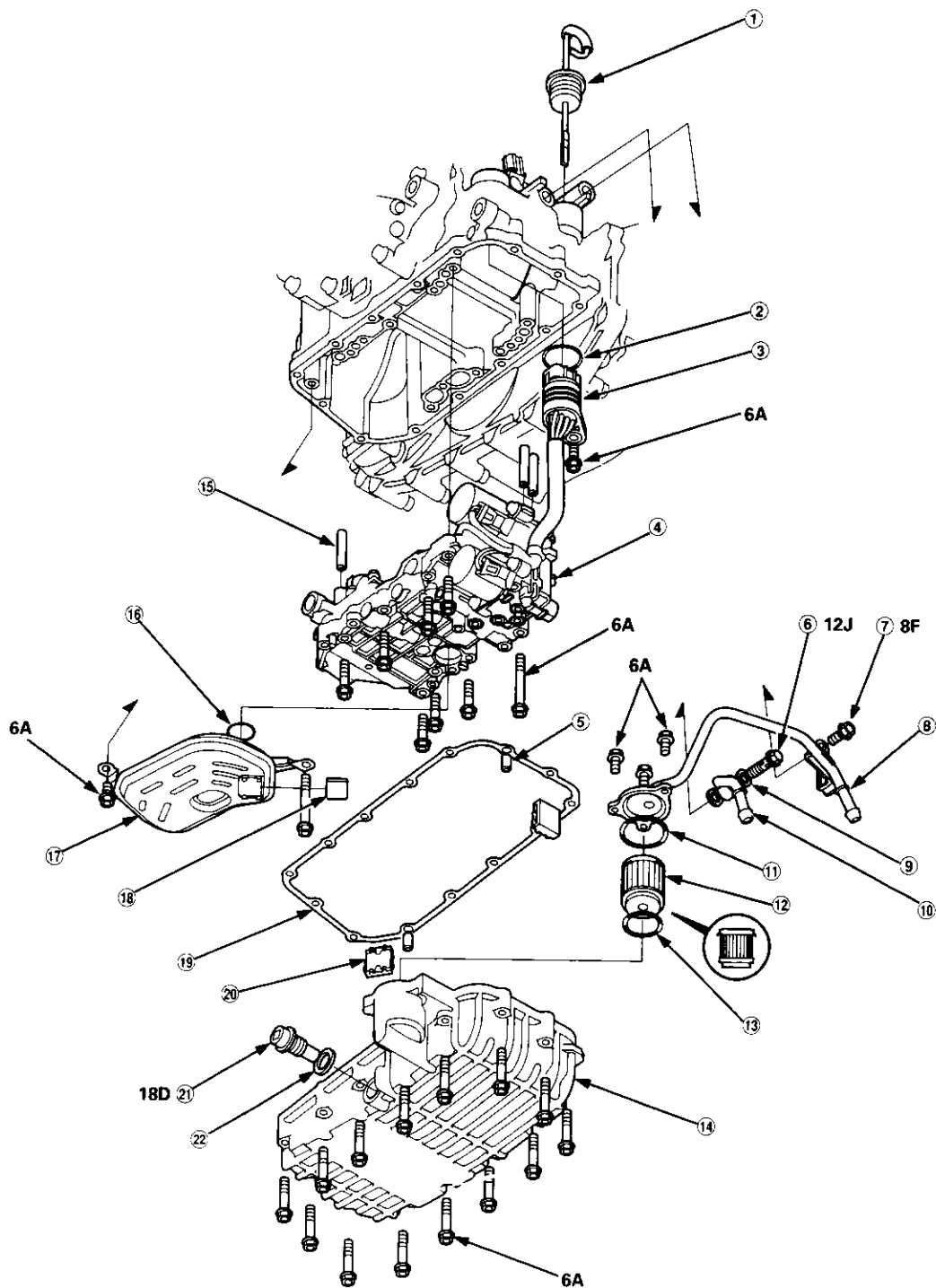
23. Remove the transmission housing mounting bolt and rear engine mounting bolts.



24. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.

# Illustrated Index

## Transmission/Lower Valve Body Assembly







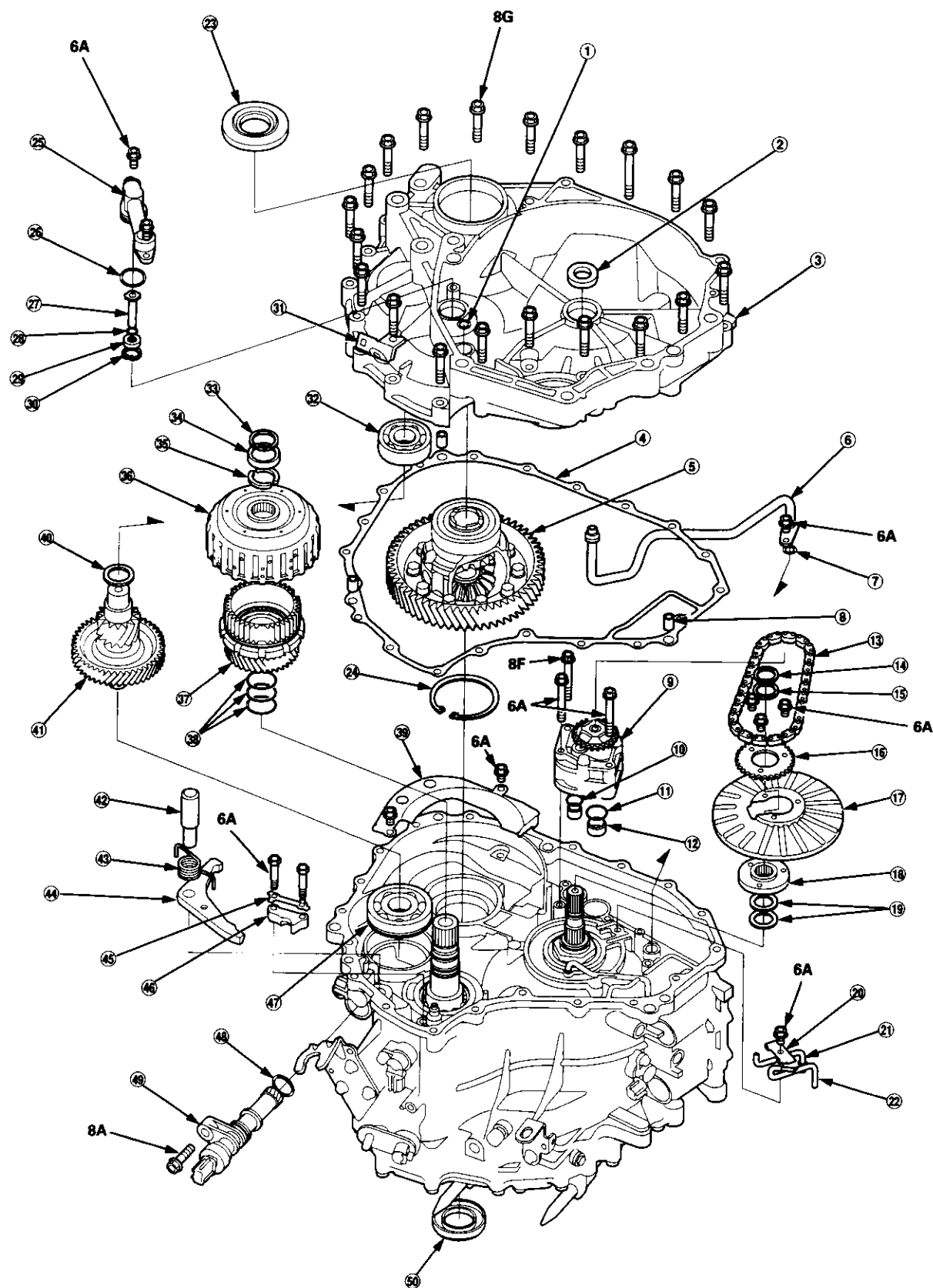
- ① ATF DIPSTICK
- ② O-RING Replace.
- ③ SOLENOID HARNESS CONNECTOR
- ④ LOWER VALVE BODY ASSEMBLY
- ⑤ DOWEL PIN
- ⑥ LINE BOLT
- ⑦ ATF COOLER INLET LINE BRACKET BOLT
- ⑧ ATF COOLER INLET LINE ASSEMBLY
- ⑨ SEALING WASHER Replace.
- ⑩ ATF COOLER OUTLET PIPE
- ⑪ O-RING Replace.
- ⑫ ATF FILTER
- ⑬ O-RING Replace.
- ⑭ ATF PAN
- ⑮ DOWEL PIN
- ⑯ O-RING Replace.
- ⑰ ATF STRAINER
- ⑱ ATF MAGNET
- ⑲ ATF PAN GASKET Replace.
- ⑳ ATF MAGNET
- ㉑ DRAIN PLUG
- ㉒ SEALING WASHER Replace.

#### TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	Line bolt Drain plug
8F	26 N·m (2.7 kgf·m, 20 lbf·ft)	8 x 1.25 mm	
12J	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	
18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	

# Illustrated Index

## Transmission Housing/Flywheel Housing





- ① O-RING Replace.
- ② OIL SEAL Replace.
- ③ FLYWHEEL HOUSING
- ④ FLYWHEEL HOUSING GASKET Replace.
- ⑤ DIFFERENTIAL ASSEMBLY
- ⑥ ATF PASSAGE LINE ASSEMBLY
- ⑦ O-RING Replace.
- ⑧ DOWEL PIN
- ⑨ ATF PUMP ASSEMBLY
- ⑩ DOWEL PIN, 18 x 10 mm
- ⑪ O-RING Replace.
- ⑫ DOWEL PIN, 22 x 10 mm
- ⑬ ATF PUMP DRIVE CHAIN
- ⑭ SNAP RING
- ⑮ THRUST SHIM, 22 x 28 mm Selective part
- ⑯ ATF PUMP DRIVE SPROCKET
- ⑰ PITOT FLANGE
- ⑱ ATF PUMP DRIVE SPROCKET HUB
- ⑲ THRUST WASHERS
- ⑳ PITOT PIPE BRACKET
- ㉑ PITOT LUBRICATION PIPE
- ㉒ PITOT PIPE
- ㉓ OIL SEAL Replace.
- ㉔ SET RING, 80 mm Selective part
- ㉕ ATF PASSAGE LINE HOLDER ASSEMBLY

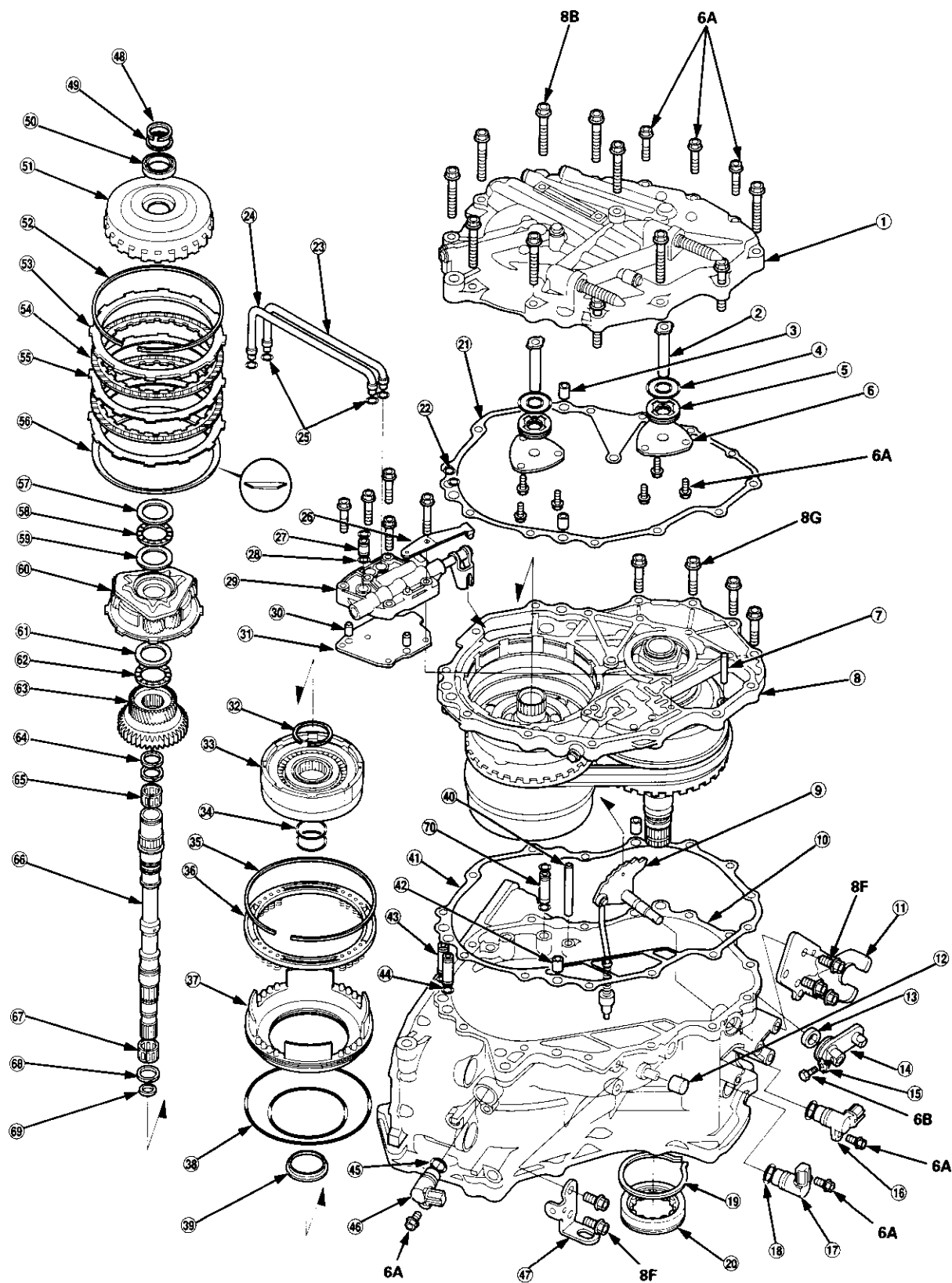
- ㉖ O-RING Replace.
- ㉗ START CLUTCH ATF FEED PIPE
- ㉘ O-RING Replace.
- ㉙ FEED PIPE FLANGE
- ㉚ SNAP RING
- ㉛ CONNECTOR BRACKET
- ㉜ BALL BEARING
- ㉝ SNAP RING
- ㉞ COTTER RETAINER
- ㉟ COTTERS, 25.5 mm Selective part
- ㊱ START CLUTCH ASSEMBLY
- ㊲ SECONDARY DRIVE GEAR ASSEMBLY
- ㊳ O-RINGS Replace.
- ㊴ DIFFERENTIAL COVER
- ㊵ THRUST SHIM, 25 x 35 mm Selective part
- ㊶ SECONDARY GEAR SHAFT
- ㊷ PARK PAWL SHAFT
- ㊸ PARK PAWL SPRING
- ㊹ PARK PAWL
- ㊺ TONGUED WASHER Replace.
- ㊻ PARK ROD HOLDER
- ㊼ BALL BEARING
- ㊽ O-RING Replace.
- ㊾ VEHICLE SPEED SENSOR
- ㊿ OIL SEAL Replace.

#### TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
8A	22 N·m (2.2 kgf·m, 16 lbf·ft)	8 x 1.25 mm	
8F	26 N·m (2.7 kgf·m, 20 lbf·ft)	8 x 1.25 mm	
8G	29 N·m (3.0 kgf·m, 22 lbf·ft)	8 x 1.25 mm	

# Illustrated Index

## Right Side Cover/Intermediate Housing





- ① END COVER
- ② ATF FEED PIPE
- ③ DOWEL PIN
- ④ O-RING Replace.
- ⑤ FEED PIPE FLANGE
- ⑥ FEED PIPE FLANGE PLATE
- ⑦ ROLLER
- ⑧ INTERMEDIATE HOUSING ASSEMBLY
- ⑨ CONTROL SHAFT ASSEMBLY
- ⑩ TRANSMISSION HOUSING
- ⑪ SHIFT CABLE BRACKET
- ⑫ BREATHER CAP
- ⑬ OIL SEAL Replace.
- ⑭ CONTROL LEVER
- ⑮ LOCK WASHER Replace.
- ⑯ SECONDARY GEAR SHAFT SPEED SENSOR
- ⑰ DRIVEN PULLEY SPEED SENSOR
- ⑱ O-RING Replace.
- ⑲ SNAP RING
- ⑳ TRANSMISSION HOUSING DRIVEN PULLEY SHAFT ROLLER BEARING
- ㉑ END COVER GASKET Replace.
- ㉒ O-RING Replace.
- ㉓ MANUAL VALVE BODY LINE A
- ㉔ MANUAL VALVE BODY LINE B
- ㉕ O-RING Replace.
- ㉖ DETENT SPRING
- ㉗ ATF FEED PIPE
- ㉘ O-RING Replace.
- ㉙ MANUAL VALVE BODY
- ㉚ DOWEL PIN
- ㉛ MANUAL VALVE BODY SEPARATOR PLATE
- ㉜ SNAP RING
- ㉝ FORWARD CLUTCH ASSEMBLY
- ㉞ O-RING Replace.
- ㉟ SNAP RING
- ㊱ SPRING RETAINER/RETURN SPRING ASSEMBLY
- ㊲ REVERSE BRAKE PISTON
- ㊳ O-RING Replace.
- ㊴ SNAP RING RETAINER
- ㊵ ATF FEED PIPE

- ㊶ TRANSMISSION HOUSING GASKET Replace.
- ㊷ DOWEL PIN
- ㊸ ATF FEED PIPE
- ㊹ O-RING Replace.
- ㊺ O-RING Replace.
- ㊻ DRIVE PULLEY SPEED SENSOR
- ㊼ TRANSMISSION HANGER
- ㊽ SNAP RING
- ㊾ THRUST SHIM, 25 x 31 mm Selective part
- ㊿ BALL BEARING
- ① RING GEAR
- ② SNAP RING
- ③ REVERSE BRAKE END PLATE Selective part
- ④ REVERSE BRAKE DISC
- ⑤ REVERSE BRAKE PLATE
- ⑥ DISC SPRING
- ⑦ THRUST WASHER
- ⑧ THRUST NEEDLE BEARING
- ⑨ THRUST WASHER
- ⑩ CARRIER ASSEMBLY
- ⑪ THRUST WASHER
- ⑫ THRUST NEEDLE BEARING
- ⑬ SUN GEAR
- ⑭ SEALING RING Replace.
- ⑮ NEEDLE BEARING
- ⑯ INPUT SHAFT
- ⑰ NEEDLE BEARING
- ⑱ SEALING RING Replace.
- ⑲ SEALING RING (RUBBER) Replace.
- ㉑ ATF FEED PIPE

#### TORQUE SPECIFICATIONS

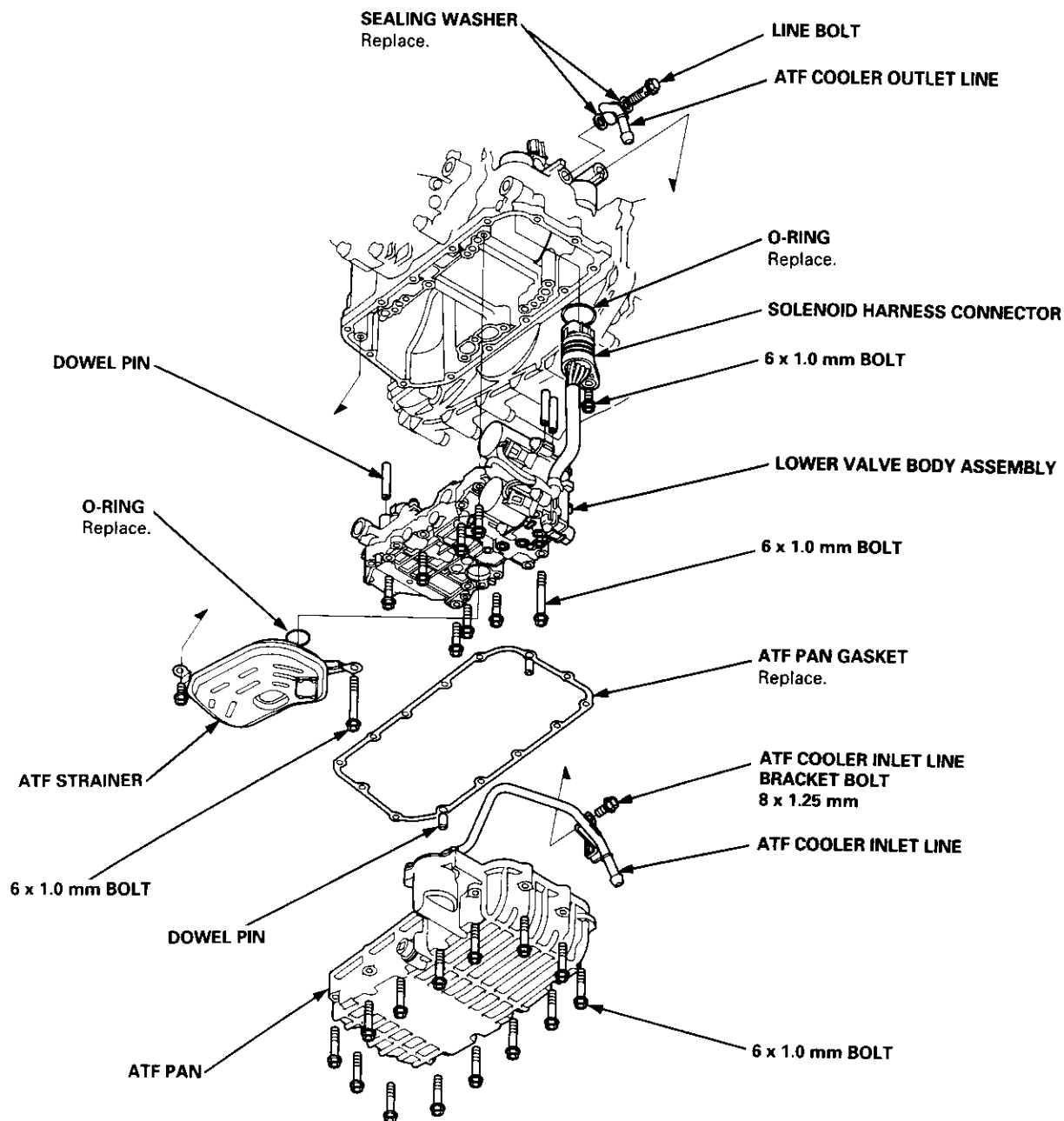
Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
8B	37 N·m (3.8 kgf·m, 27 lbf·ft)	8 x 1.25 mm	
8F	26 N·m (2.7 kgf·m, 20 lbf·ft)	8 x 1.25 mm	
8G	29 N·m (3.0 kgf·m, 22 lbf·ft)	8 x 1.25 mm	

# Transmission Housing/Lower Valve Body Assembly

## Removal

### NOTE:

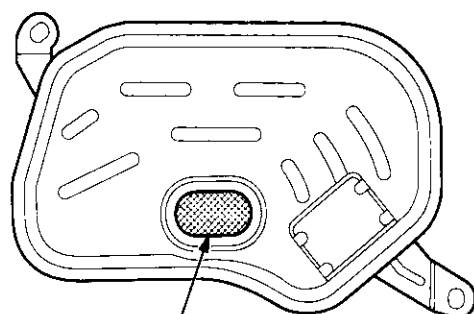
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the lower valve body, replace the following:
  - O-rings
  - ATF pan gasket
  - Sealing washers





1. Remove the ATF cooler inlet line bracket bolt.
2. Remove the ATF cooler outlet line.
3. Remove the ATF pan (fourteen bolts).
4. Remove the ATF strainer (two bolts).
5. Remove the one bolt securing the solenoid harness connector, then push the connector.
6. Remove the lower valve body (eight bolts).
7. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.

#### ATF STRAINER



INLET OPENING

8. Replace the ATF strainer if it is clogged or damaged.

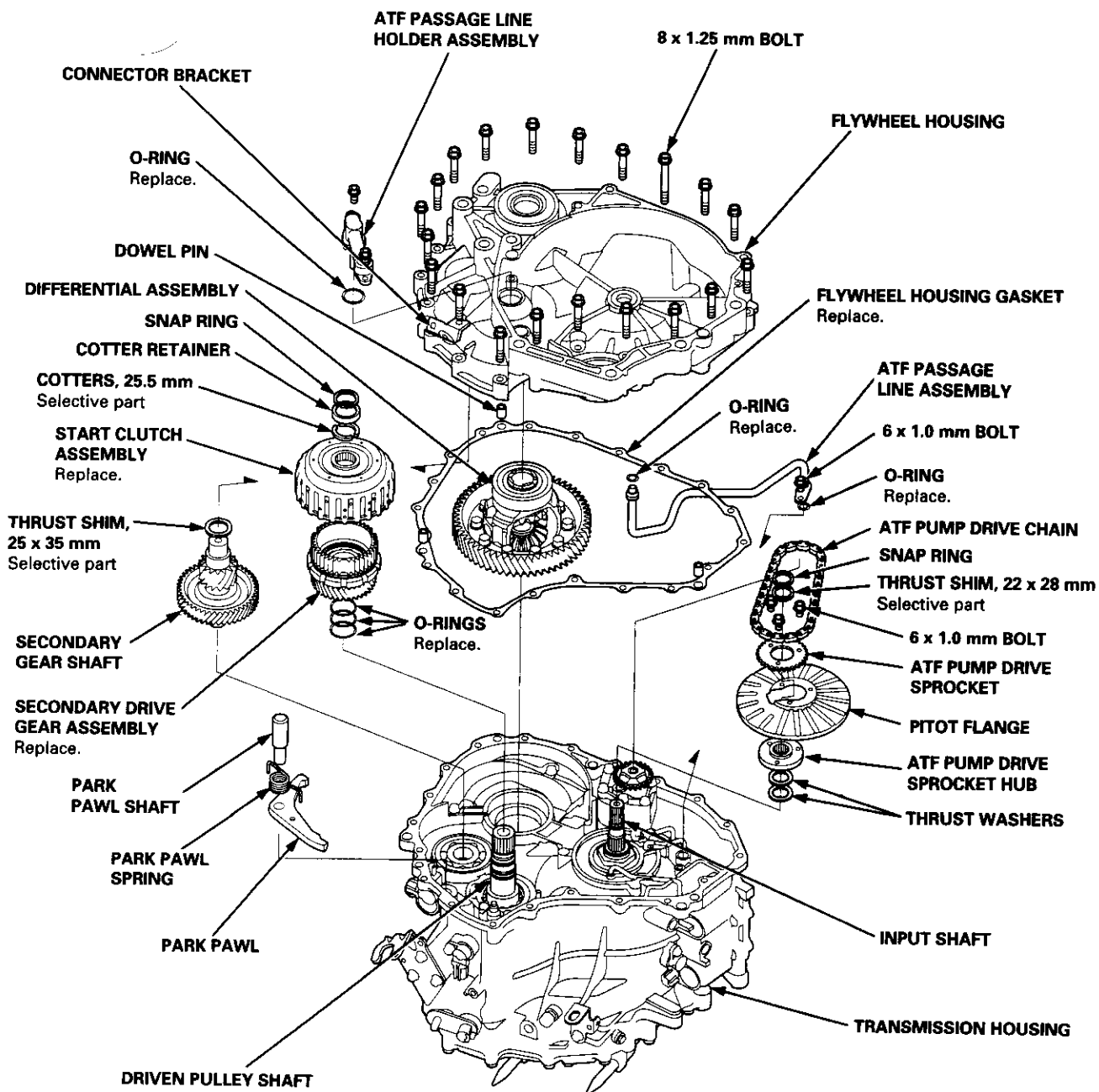
NOTE: The ATF strainer can be reused if it is not clogged.

# Transmission Housing/Flywheel Housing

## Removal

### NOTE:

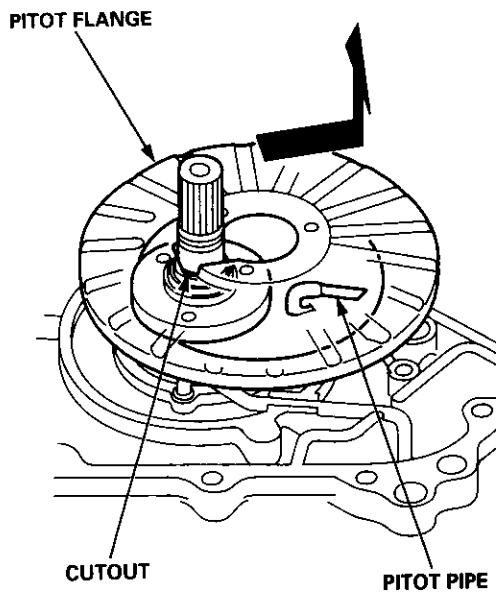
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing/flywheel housing, replace the following:
  - O-rings
  - Secondary drive gear assembly
  - Start clutch assembly
  - Flywheel housing gasket







1. Remove the ATF passage line holder assembly.
2. Remove the flywheel housing (twenty bolts).
3. Remove the ATF passage line assembly (one bolt).
4. Remove the ATF pump drive sprocket (three bolts), then remove the ATF pump drive chain.
5. Move the pitot flange toward its cutout, then remove the pitot flange.

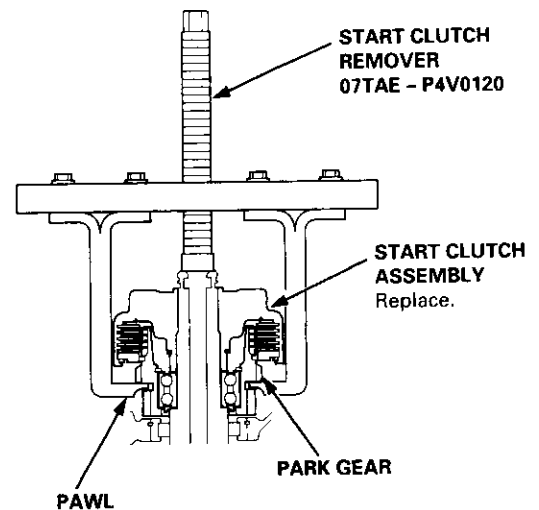


6. Remove the snap ring securing the ATF pump drive sprocket hub, then remove the 22 x 28 mm thrust shim, the ATF pump drive sprocket hub and the thrust washers.
7. Remove the differential assembly.
8. Remove the park pawl shaft, the park pawl spring, and the park pawl.
9. Remove the snap ring securing the start clutch, then remove the cotter retainer and the cotters.

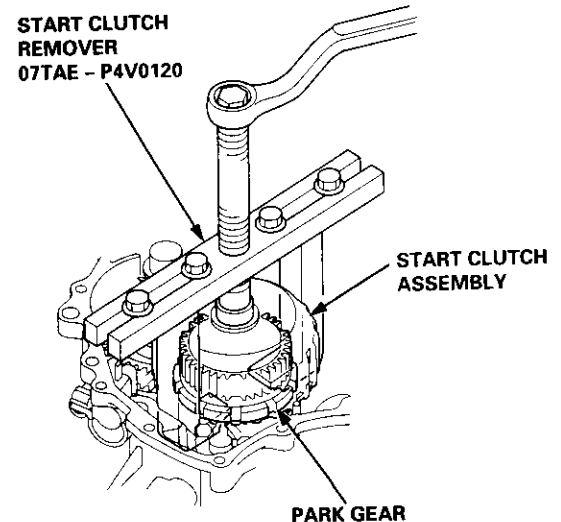
10. Set the special tool on the start clutch, and attach the pawl of the special tool to the park gear securely as shown.

**CAUTION:**

- Do not place the pawl of the special tool on the start clutch guide. If the pawl of the special tool contacts the start clutch guide, the start clutch guide may be damaged.
- Be sure not to allow dust and other foreign particles to enter into the driven pulley shaft.



11. Remove the start clutch and the secondary drive gear assembly using the special tool, then remove the secondary gear shaft.

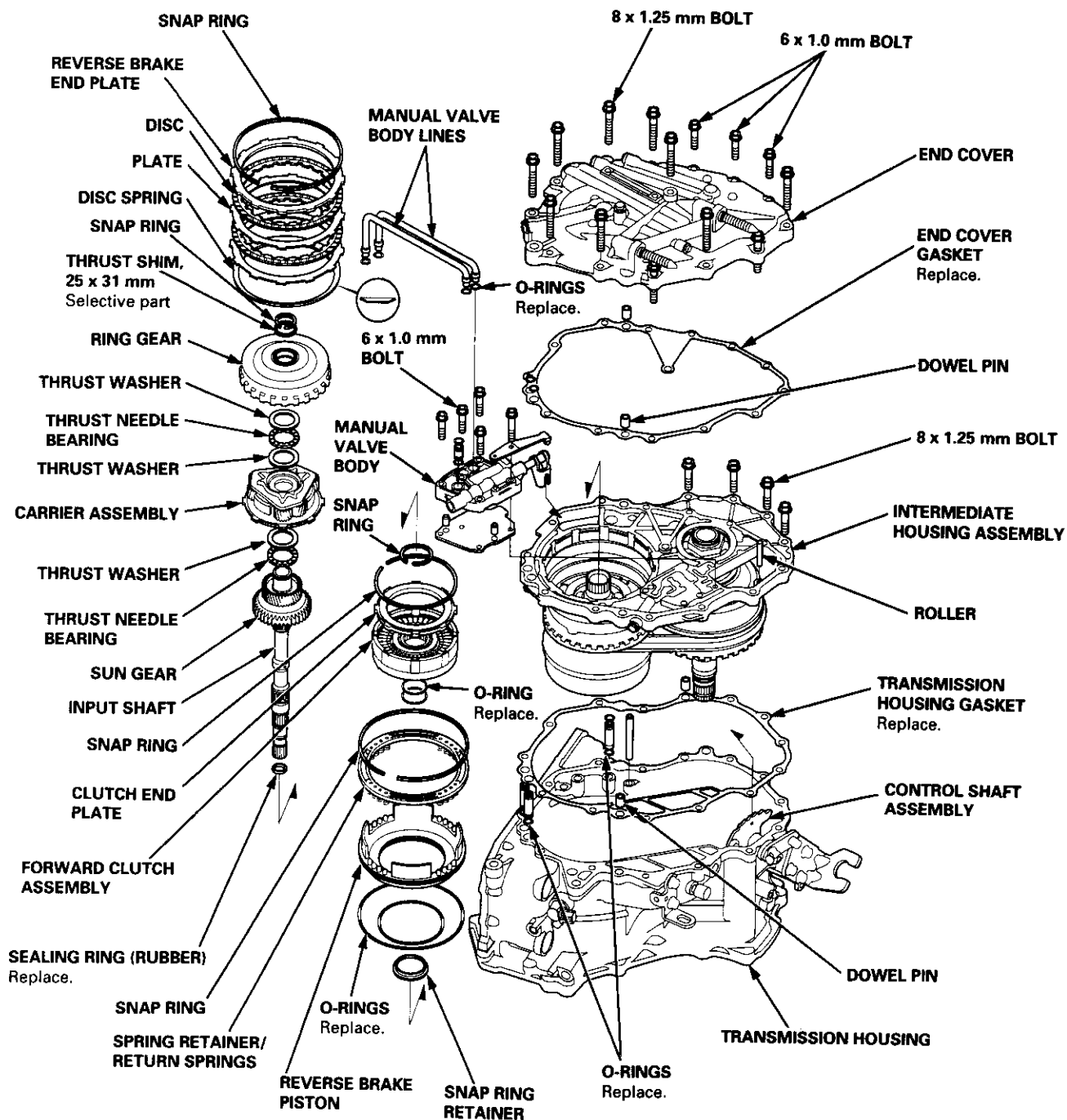


# End Cover/Intermediate Housing

## Removal

### NOTE:

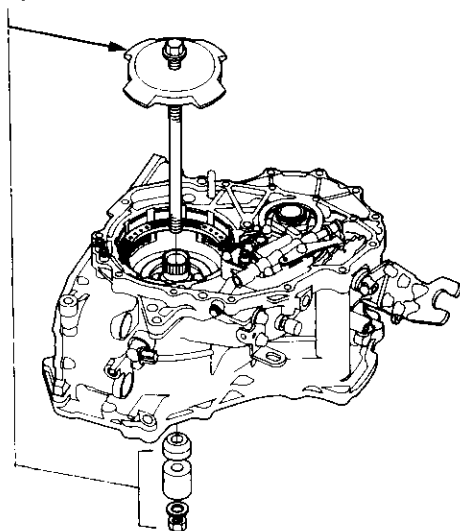
- Clean all parts in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the end cover/intermediate housing, replace the following parts:
  - O-rings
  - End cover gasket
  - Transmission housing gasket
  - Sealing rings
  - Sealing washers





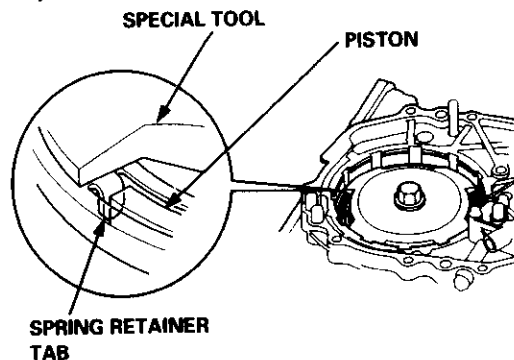
1. Remove the end cover (three 6 mm bolts, eleven 8 mm bolts).
2. Remove the manual valve body lines A and B.
3. Remove the snap ring securing the ring gear, then remove the thrust shim and the ring gear.
4. Remove the snap ring securing the reverse brake discs and plates, then remove the reverse brake end plate, brake discs, brake plates, and disc spring.
5. Remove the carrier with the thrust washers and the thrust needle bearing from the forward clutch.
6. Remove the sun gear and the input shaft as a sub assembly by pulling it.  
The sun gear is press fitted tightly into input shaft.
7. Remove the snap ring securing the forward clutch, and remove the snap ring securing the forward clutch end plate, then remove the forward clutch end plate.
8. Reinstall the carrier on the forward clutch, then secure the carrier with the snap ring on the forward clutch end plate.
9. Remove the forward clutch and carrier assembly together.
10. Install the special tool to remove the snap ring securing the reverse brake return spring retainer as shown.

**REVERSE BRAKE  
SPRING COMPRESSOR  
07TAE - P4V0110**

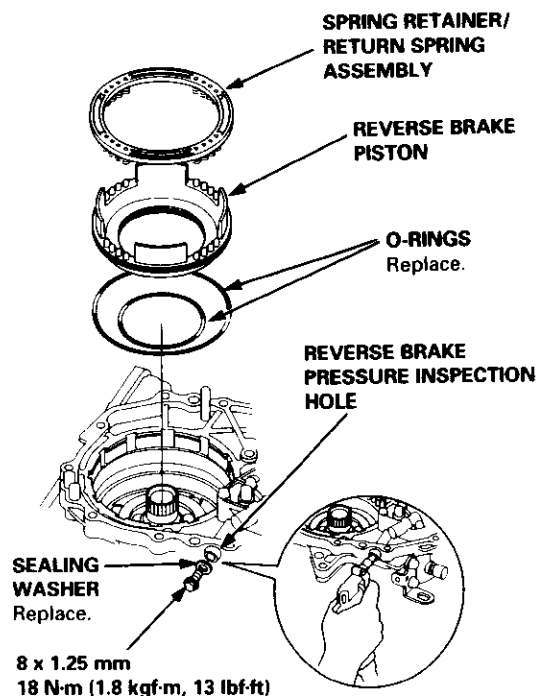


11. Compress the return springs, then remove the snap ring.

**CAUTION:** If the spring retainer tab is on the reverse brake piston, the spring retainer may be damaged. Be sure the spring retainer tab is not on the piston.



12. Remove the special tool, then remove the spring retainer/return spring assembly.
13. Remove the sealing bolt securing the reverse brake pressure inspection hole.
14. Apply air pressure to the inspection hole to remove the reverse brake piston.



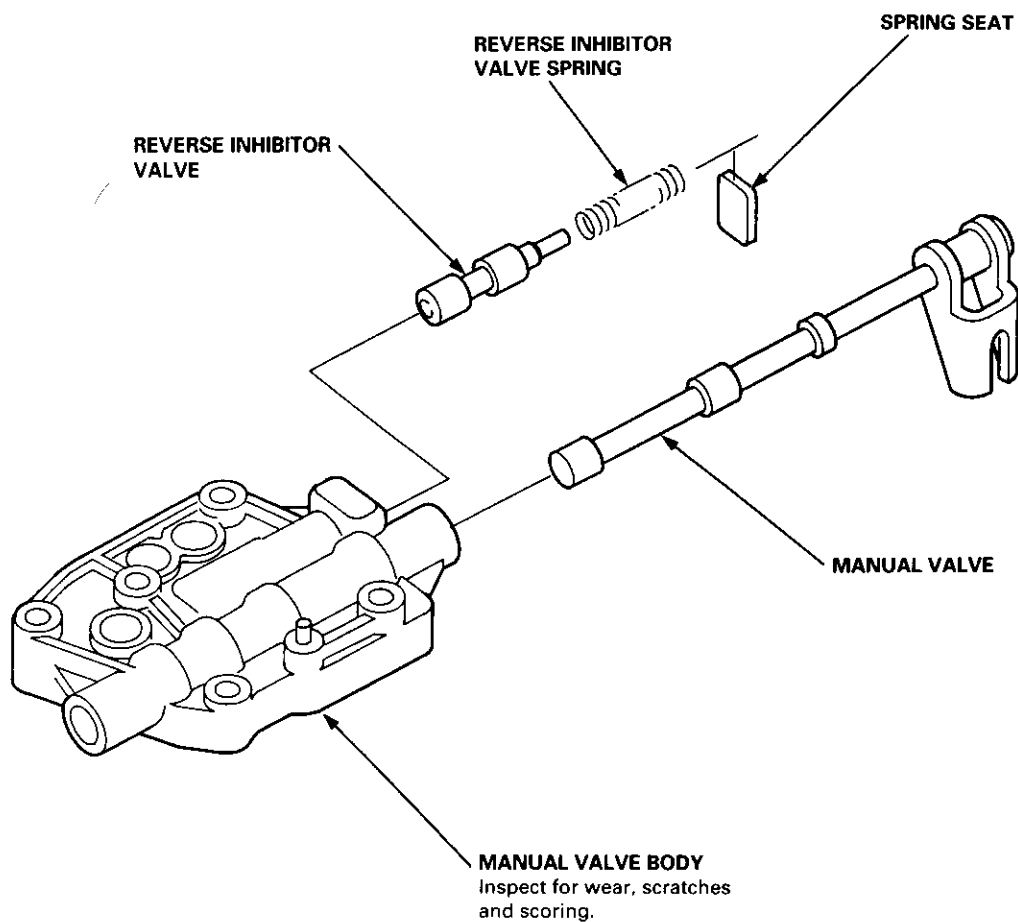
15. Remove the snap ring retainer from the drive pulley shaft.
16. Remove the manual valve body (five bolts).
17. Remove the roller and push the control shaft assembly toward the outside of the transmission housing, then remove the intermediate housing (four bolts).

# Manual Valve Body

## Disassembly/Inspection/Reassembly

### NOTE:

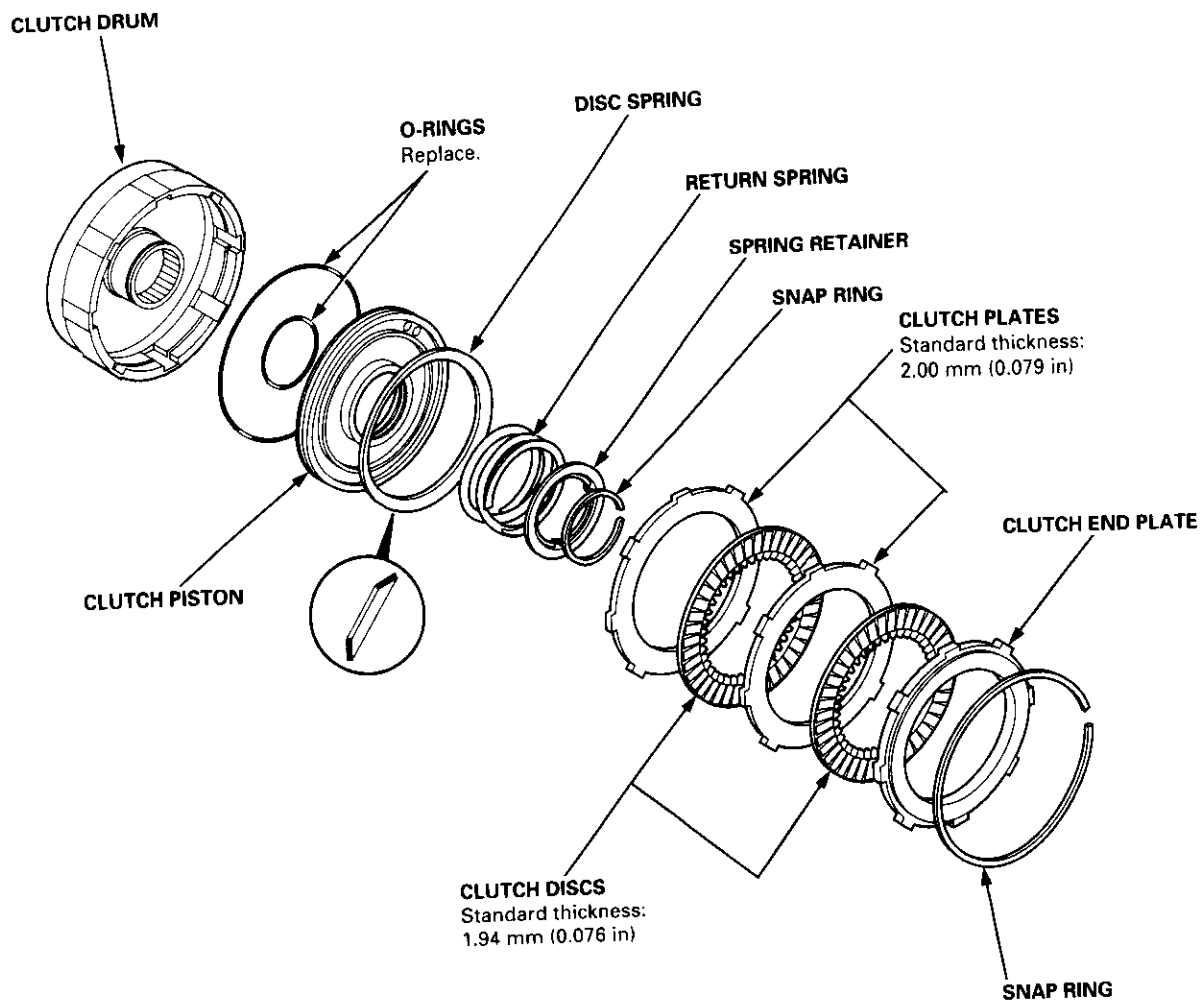
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Coat all parts with CVT Fluid during assembly.





# Forward Clutch

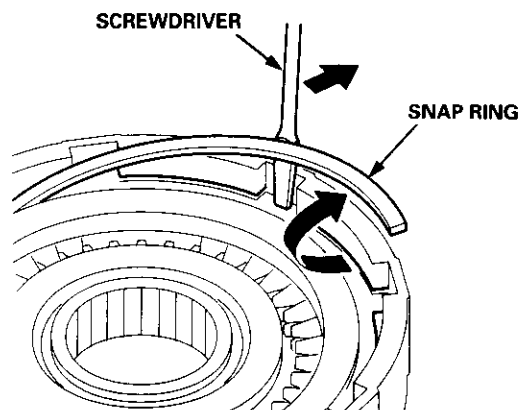
## Illustrated Index



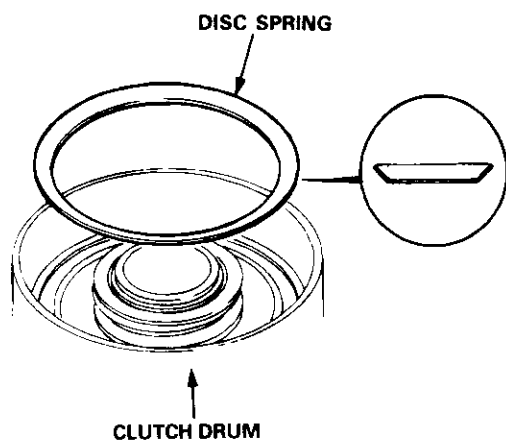
# Forward Clutch

## Disassembly

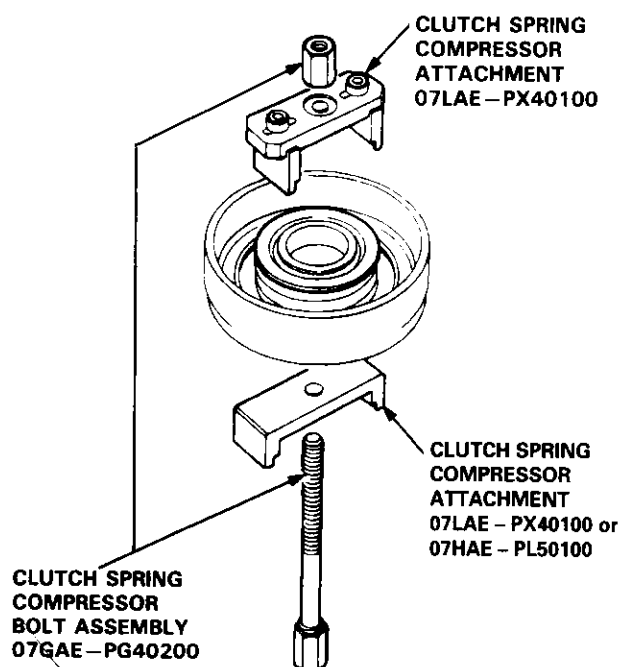
1. Remove the snap ring, then remove the clutch end plate, clutch discs, and plates.



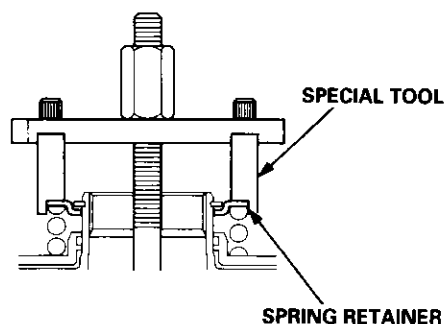
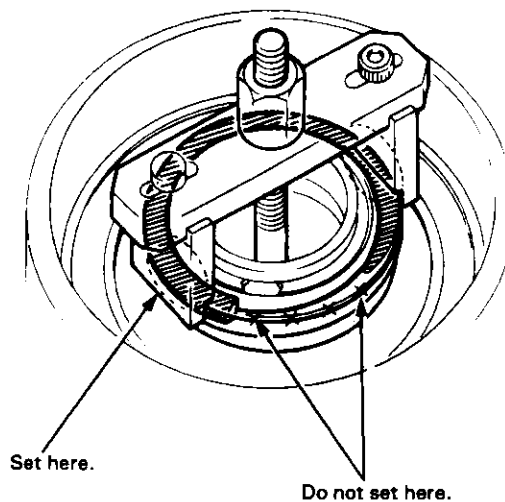
2. Remove the disc spring.



3. Install the special tools as shown.

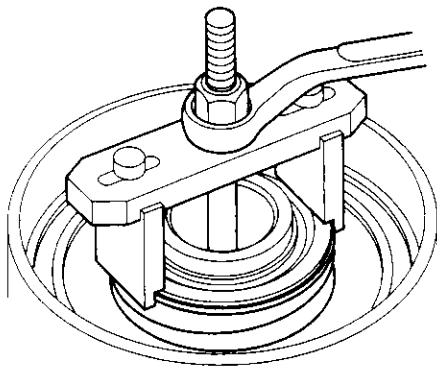


**CAUTION:** If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

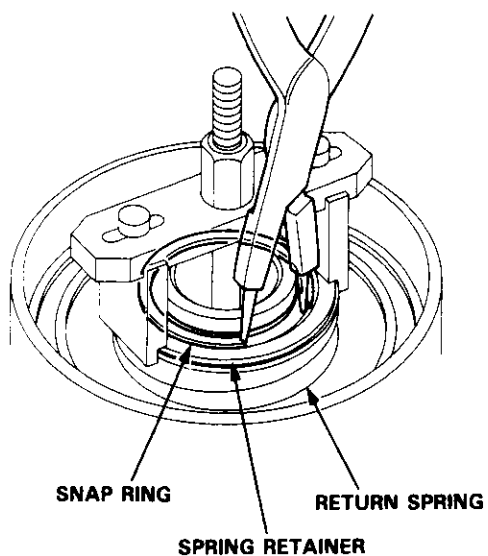




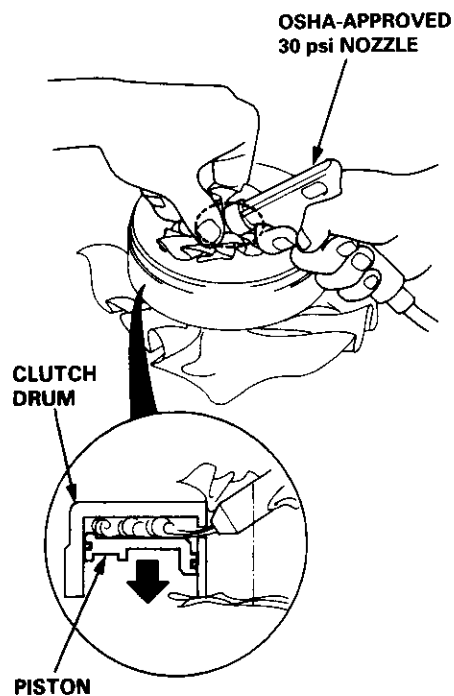
4. Compress the return spring.



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



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



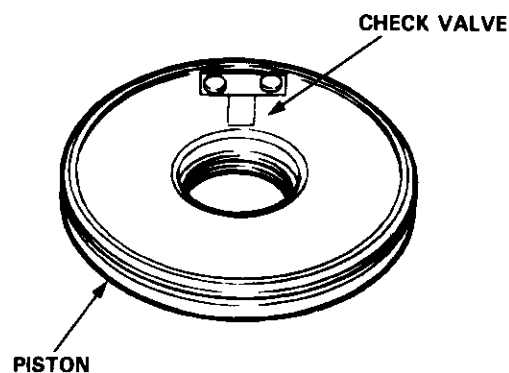
# Forward Clutch

## Reassembly

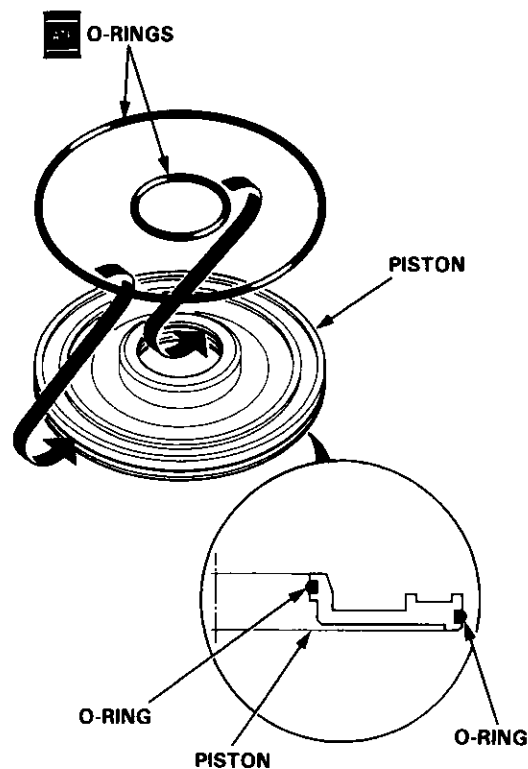
### NOTE:

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

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



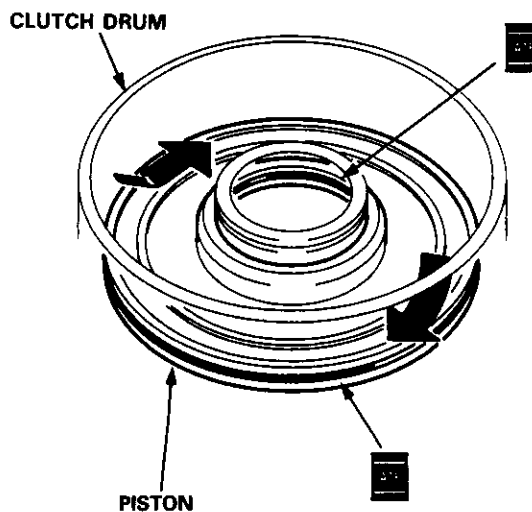
2. Install new O-rings on the clutch piston.



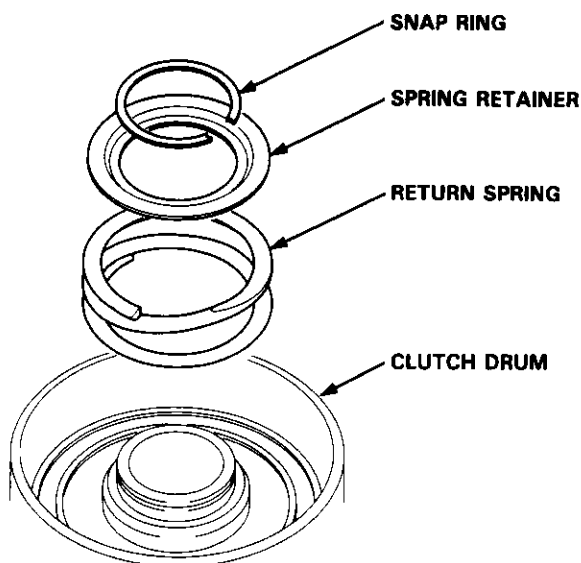
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

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

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



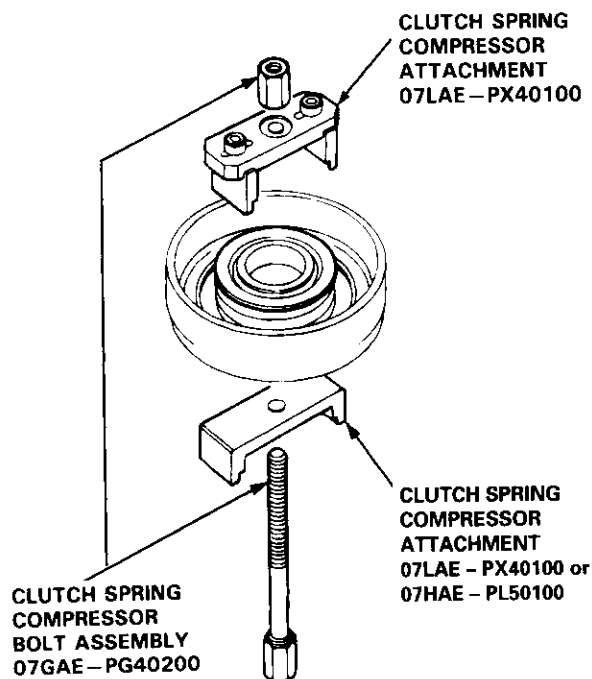
4. Install the return spring and spring retainer, and position the snap ring on the retainer.



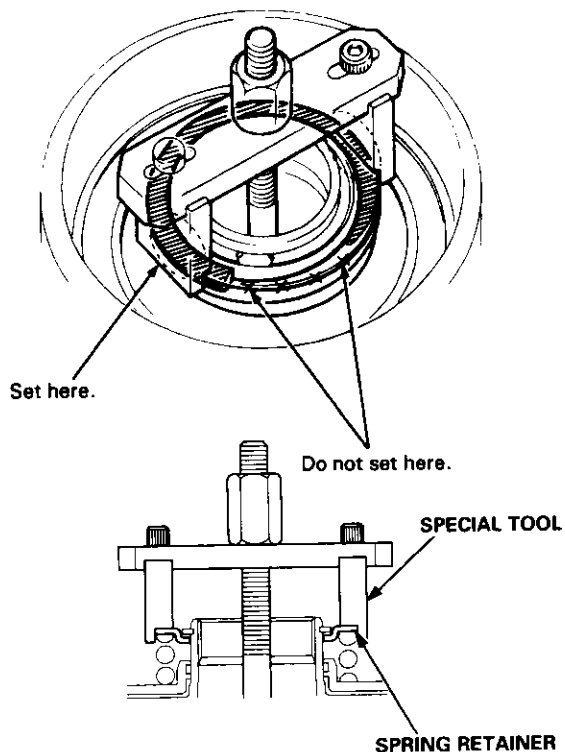




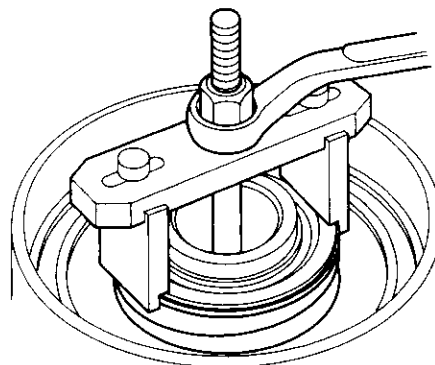
5. Install the special tools as shown.



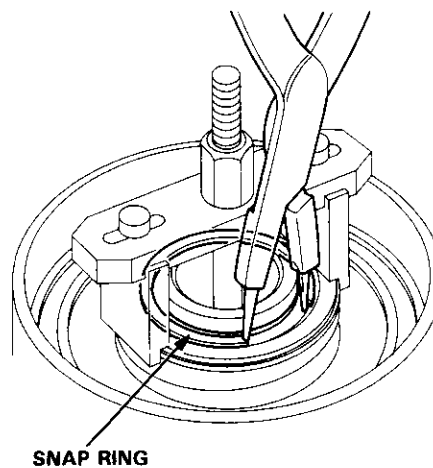
**CAUTION:** If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.



6. Compress the return spring.



7. Install the snap ring.



8. Remove the special tools.

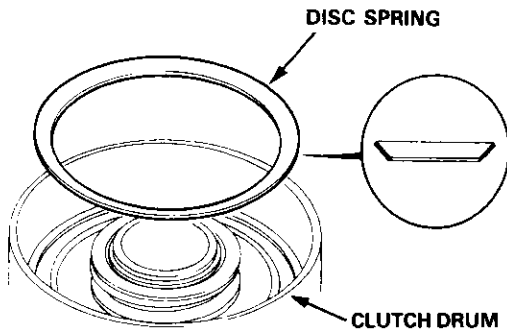
(cont'd)

# Forward Clutch

## Reassembly (cont'd)

9. Install the disc spring.

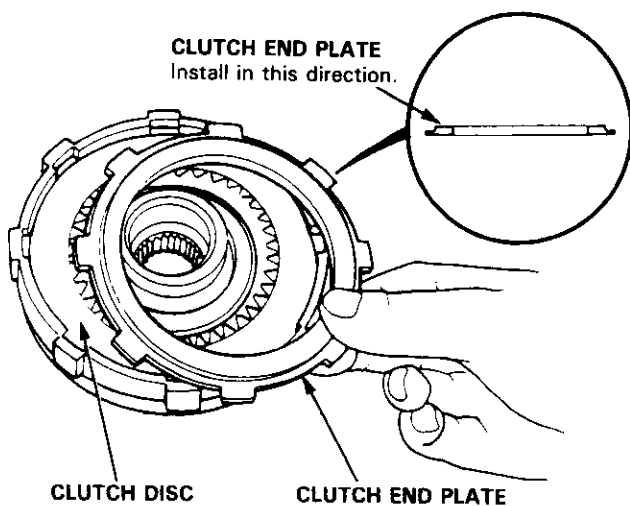
NOTE: Install the disc spring in the direction shown.



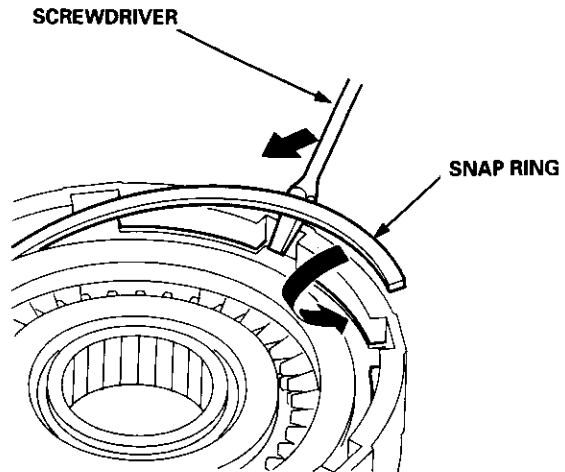
10. Soak the clutch discs thoroughly in CVT Fluid for a minimum of 30 minutes.

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

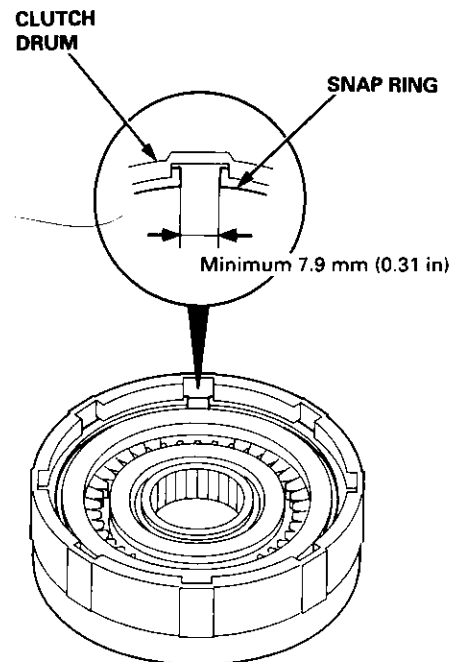
NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.



12. Install the snap ring.



13. Verify that the snap ring end gap is correct.



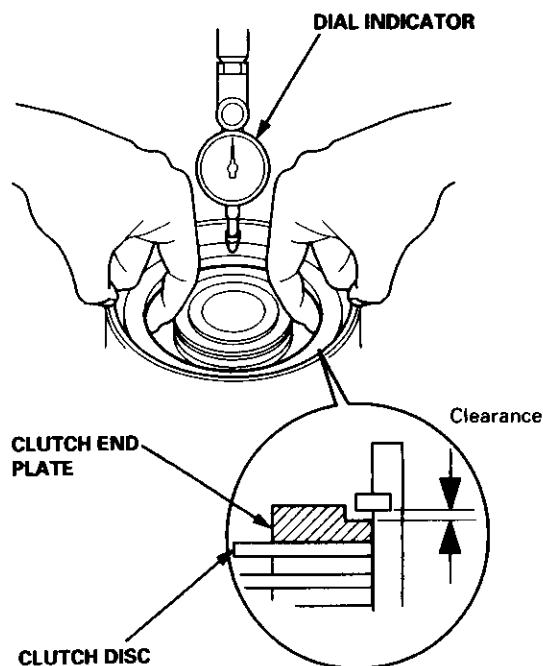


14. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

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

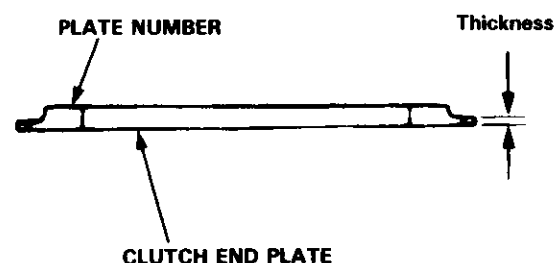
#### Clutch End Plate-to-Top Disc Clearance:

STANDARD: 0.6 – 0.8 mm (0.024 – 0.031 in)



15. If the clearance is out of tolerance, select a new clutch end plate from the following table, then recheck.

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



#### FORWARD CLUTCH END PLATE

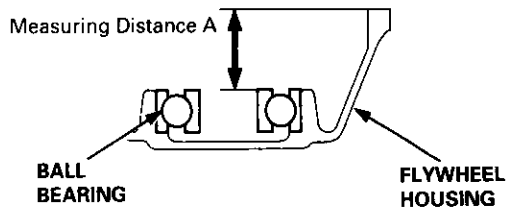
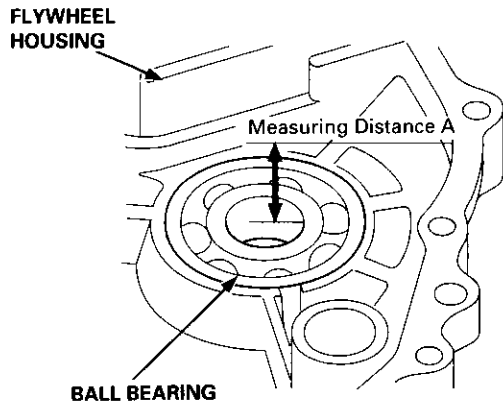
Plate No.	Part Number	Thickness
1 or 15	22561 – P4V – 003	3.5 mm (0.138 in)
2 or 16	22562 – P4V – 003	3.6 mm (0.142 in)
3 or 17	22563 – P4V – 003	3.7 mm (0.146 in)
4 or 18	22564 – P4V – 003	3.8 mm (0.150 in)
5 or 19	22565 – P4V – 003	3.9 mm (0.154 in)
6 or 20	22566 – P4V – 003	4.0 mm (0.157 in)
7 or 21	22567 – P4V – 003	4.1 mm (0.161 in)
8 or 22	22568 – P4V – 003	4.2 mm (0.165 in)
9 or 23	22569 – P4V – 003	4.3 mm (0.169 in)
10 or 24	22570 – P4V – 003	4.4 mm (0.173 in)
11 or 25	22571 – P4V – 003	4.5 mm (0.177 in)
12 or 26	22572 – P4V – 003	4.6 mm (0.181 in)
13 or 27	22573 – P4V – 003	4.7 mm (0.185 in)

16. After replacing the clutch end plate, make sure that the clearance is within tolerance.

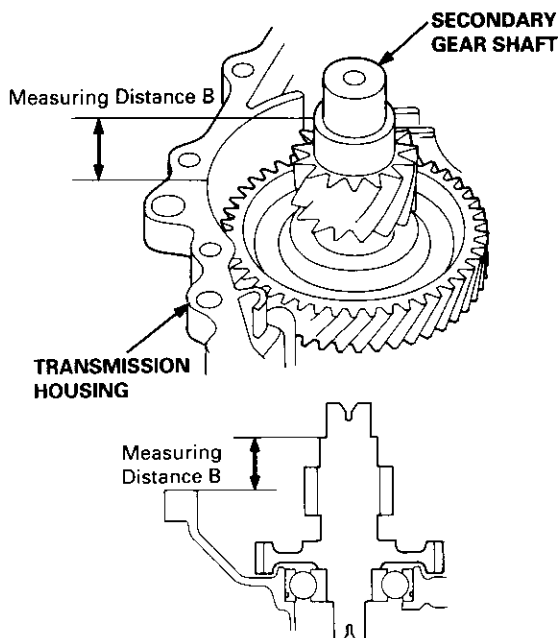
# Secondary Gear Shaft

## 25 x 35 mm Thrust Shim Selection

1. Measure the distance between the flywheel housing surface and the ball bearing as shown, then note the measurement (Measurement A).



2. Install the secondary gear shaft in the transmission housing.
3. Measure the distance between the transmission housing surface and the thrust washer mounting surface of the secondary gear shaft as shown, then note the measurement (Measurement B).



4. Calculate 25 x 35 mm thrust shim thickness by following formula.

### FORMULA:

**25 x 35 mm Thrust Shim Thickness**

**= Measurement A - Measurement B + Flywheel Housing Gasket Thickness: 0.5 mm (0.020 in)**

### Example:

**Measurement A: 32.7 mm (1.287 in)**

**Measurement B: 30.1 mm (1.185 in)**

**25 x 35 mm Thrust Shim Thickness**

**= 32.7 mm (1.287 in) - 30.1 mm (1.185 in)**

**+ 0.5 mm (0.020 in)**

**= 3.1 mm (0.122 in)**

**Select 25 x 35 mm Thrust Shim D.**

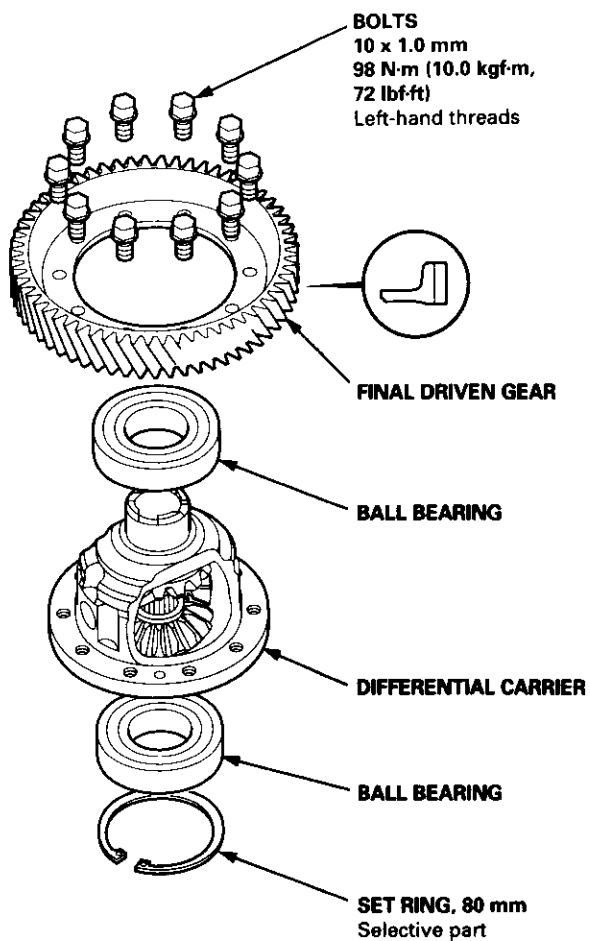
5. Select the 25 x 35 mm thrust shim from the following table.

**THRUST SHIM, 25 x 35 mm**

No.	Part Number	Thickness
A	90551 - P4V - 000	2.8 mm (0.110 in)
B	90552 - P4V - 000	2.9 mm (0.114 in)
C	90553 - P4V - 000	3.0 mm (0.118 in)
D	90554 - P4V - 000	3.1 mm (0.122 in)
E	90555 - P4V - 000	3.2 mm (0.126 in)
F	90556 - P4V - 000	3.3 mm (0.130 in)
G	90557 - P4V - 000	3.4 mm (0.134 in)
H	90558 - P4V - 000	3.5 mm (0.138 in)
I	90559 - P4V - 000	3.6 mm (0.142 in)
J	90560 - P4V - 000	3.7 mm (0.146 in)
K	90561 - P4V - 000	3.8 mm (0.150 in)



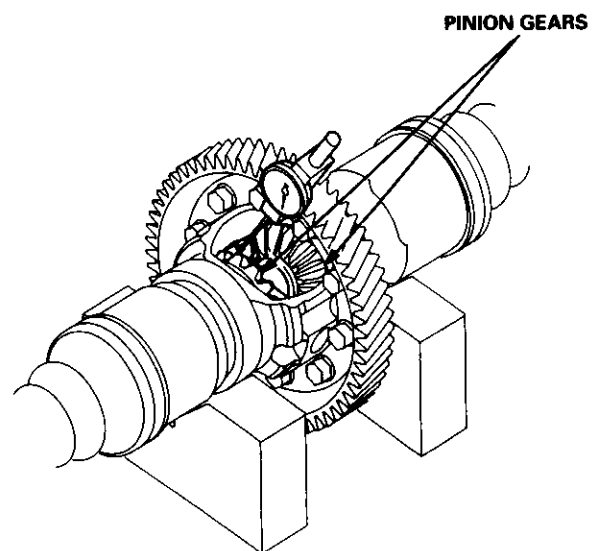
## Illustrated Index



## Backlash Inspection

1. Place the differential assembly on V-blocks, and install both axles.
2. Check the backlash of both pinion gears.

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



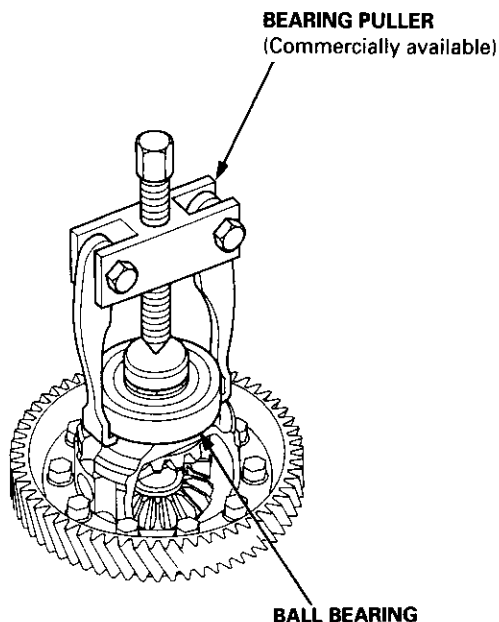
3. If the backlash is out of tolerance, replace the differential carrier.

# Differential

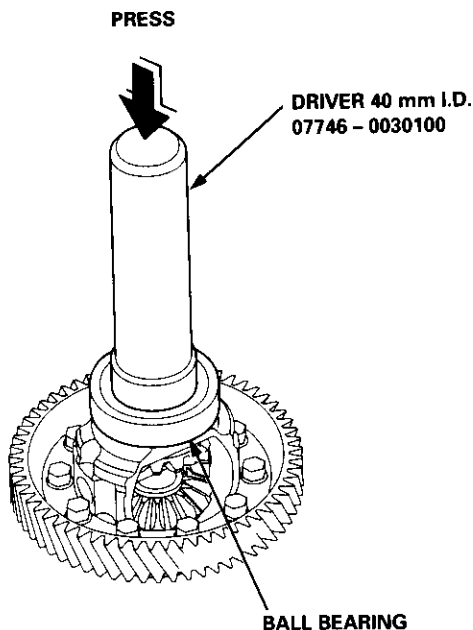
## Bearing Replacement

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

1. Remove the ball bearings using a bearing puller.



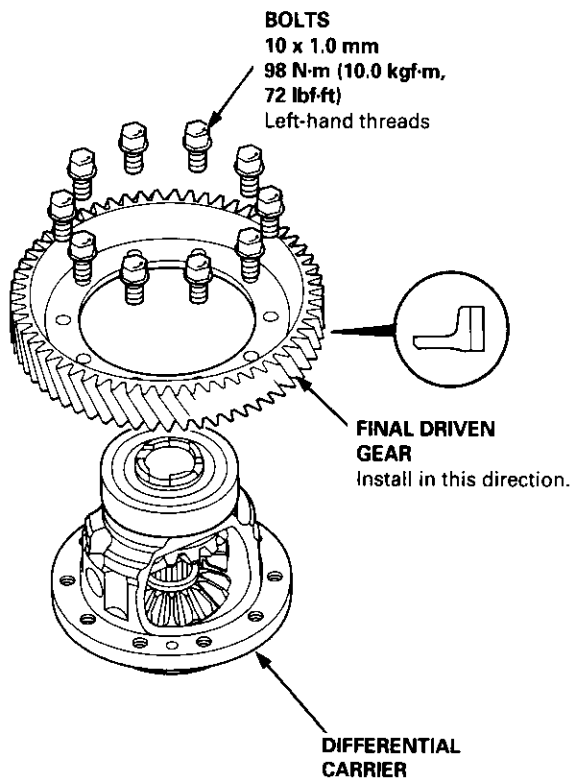
2. Install the new ball bearings using the special tool with a press as shown.



## Differential Carrier Replacement

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

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



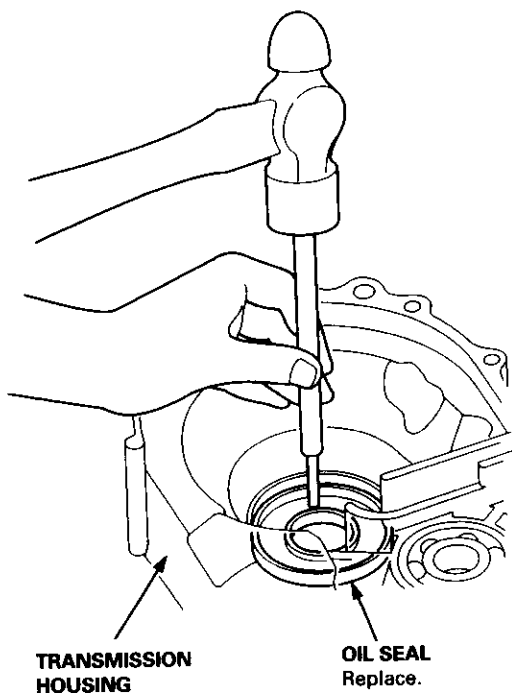
2. Install the final driven gear with its chamfered side on the inner bore facing the differential carrier.
3. Tighten the bolts to the specified torque in a crisscross pattern.

**TORQUE: 98 N·m (10.0 kgf·m, 72 lbf·ft)**

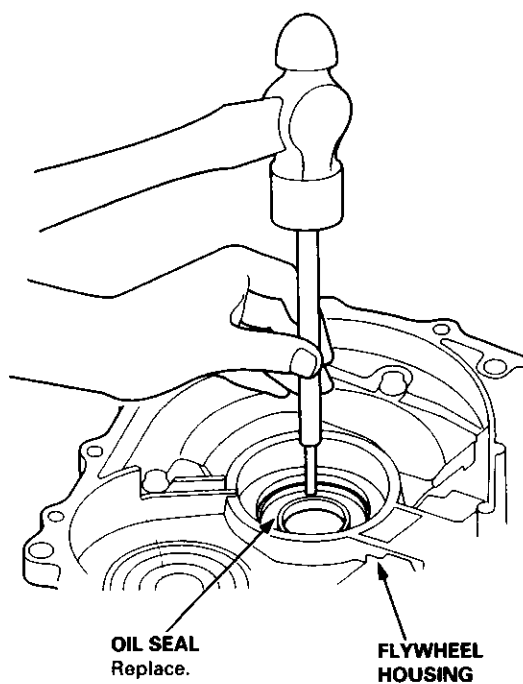


## Oil Seal Removal

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



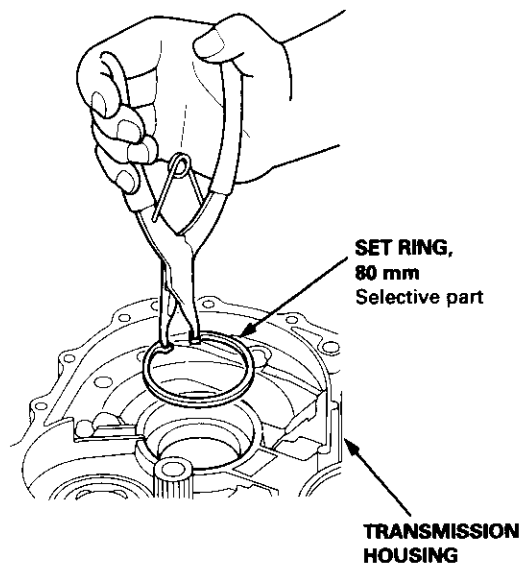
3. Remove the oil seal from the flywheel housing.



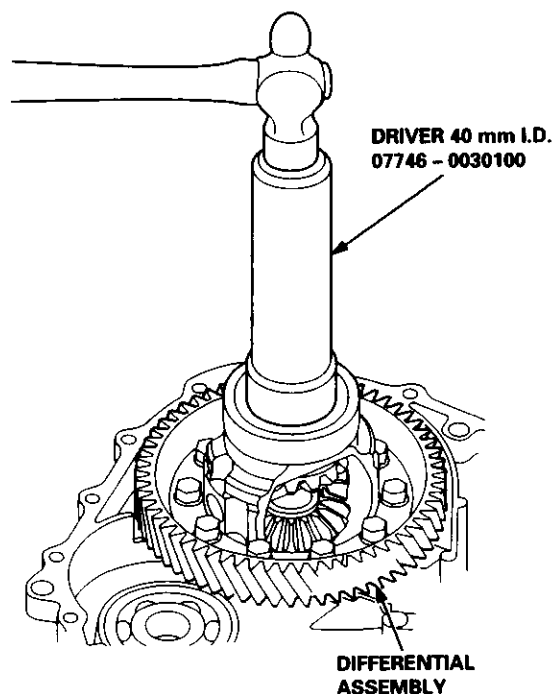
## Oil Seal Installation/Side Clearance

1. Install a 2.50 mm (0.098 in) thick 80 mm wide set ring in the transmission housing.

NOTE: Do not install the oil seal yet.



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

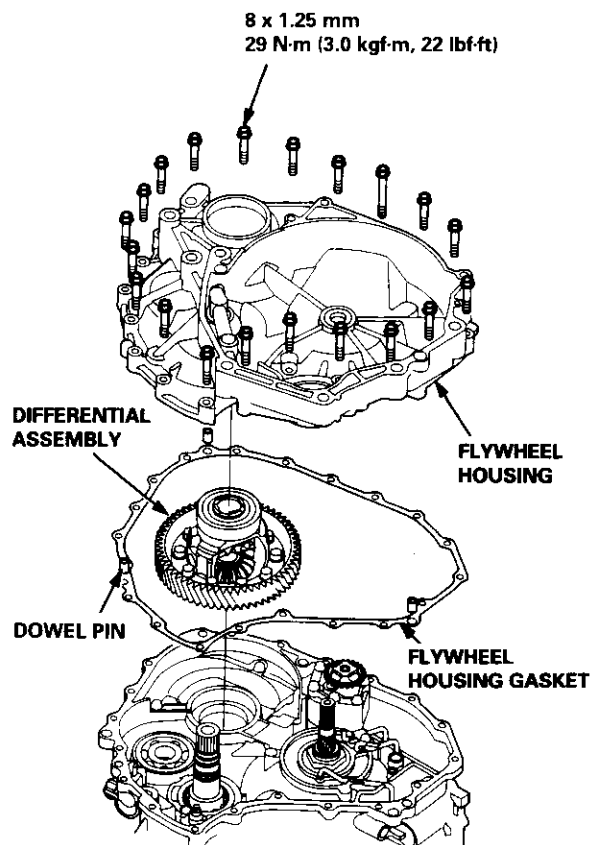


(cont'd)

# Differential

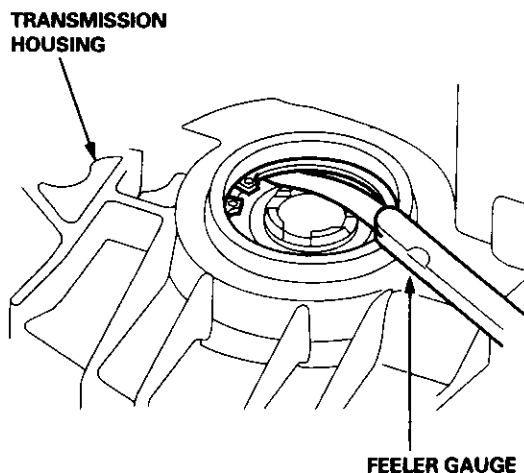
## Oil Seal Installation/Side Clearance (cont'd)

3. Install the flywheel housing, and tighten the bolts.



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

**STANDARD: 0 – 0.15 mm (0 – 0.006 in)**



5. If the clearance is more than the standard, select a new set ring from the table, and install it.

### SET RING, 80 mm

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

**NOTE:** If the clearance measured in step 4 is standard, it is not necessary to perform steps 7 and 8.

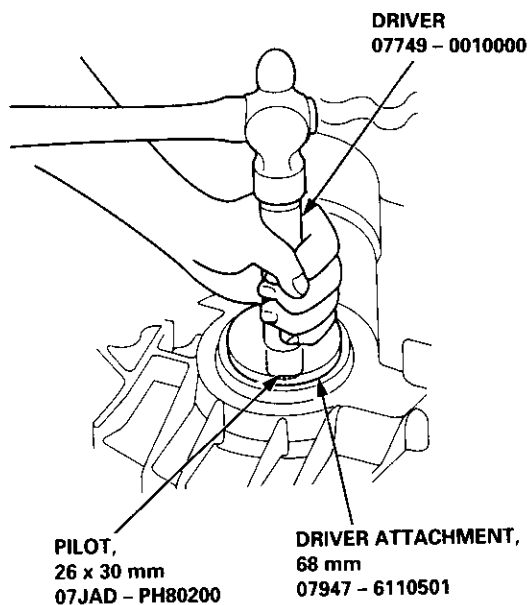
6. Remove the flywheel housing.
7. Replace the 2.50 mm (0.098 in) set ring, 80 mm with the one of the correct thickness selected in step 5.



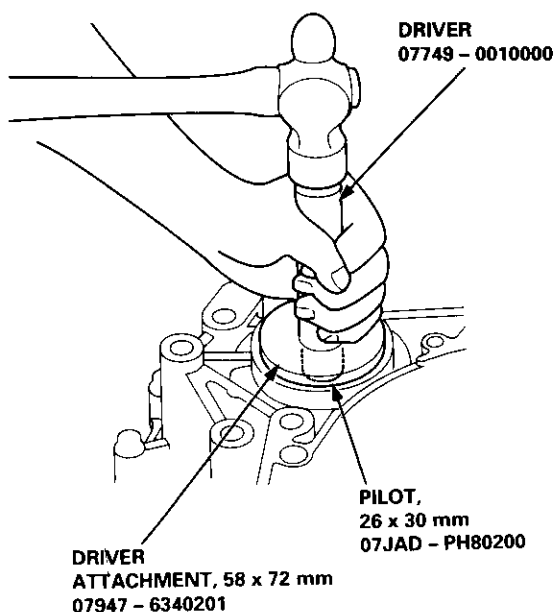


## Replacement

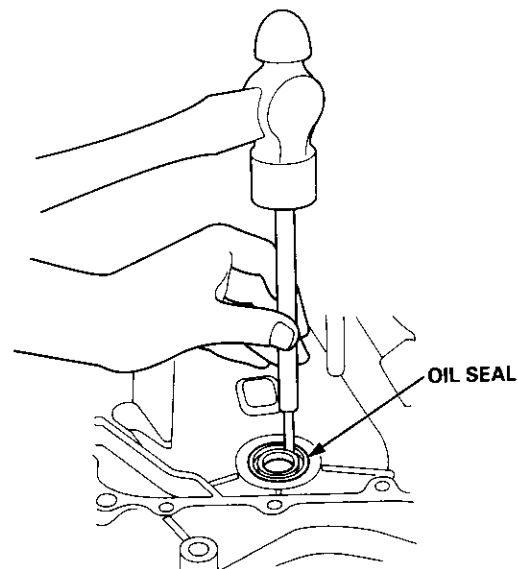
8. Install the oil seal in the transmission housing using the special tools as shown.



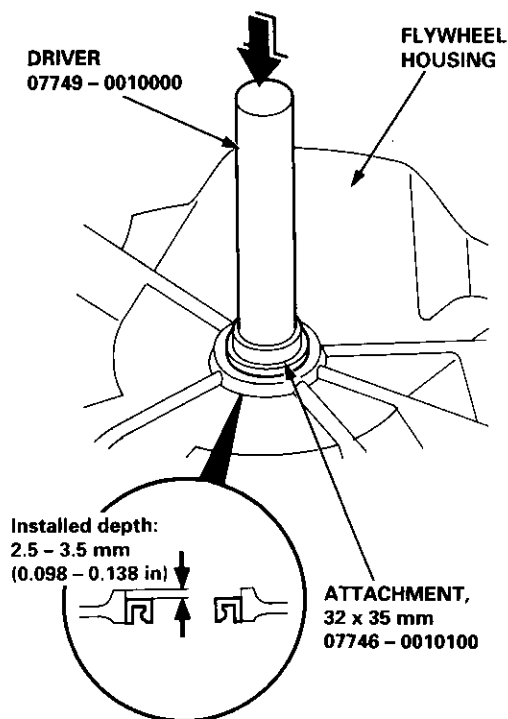
9. Install the oil seal in the flywheel housing using the special tools as shown.



1. Remove the input shaft oil seal from the flywheel housing.



2. Install the oil seal in the flywheel housing using the special tools as shown.

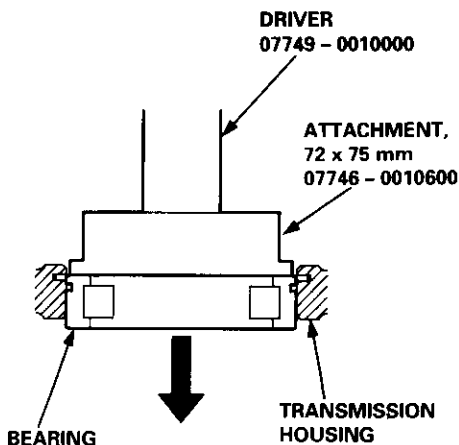
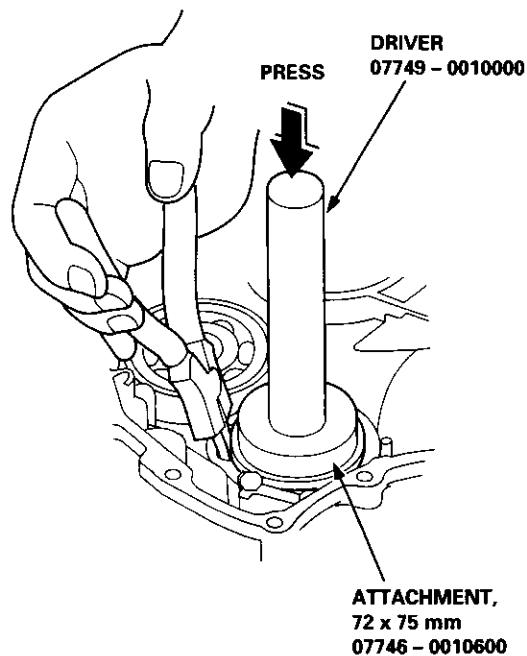


# Transmission Housing Bearings

## Driven Pulley Shaft Bearing Replacement

1. To remove the driven pulley shaft bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

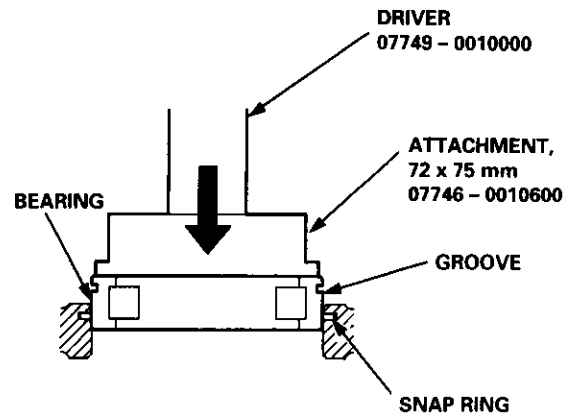
NOTE: Do not remove the snap ring unless it's necessary to clean the groove in the housing.



2. Expand the snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

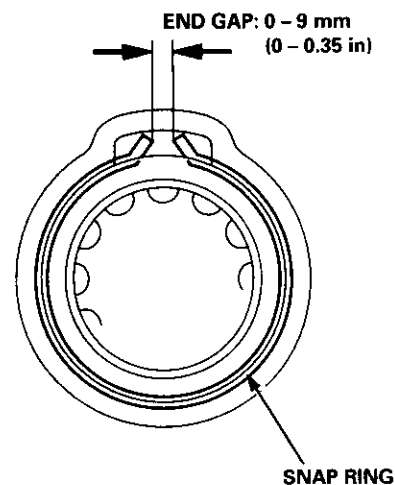
NOTE: Coat all parts with CVT Fluid.

3. Release the pliers, then using the special tools, push the bearing down into the housing until the snap ring snaps in place.



4. After installing the bearing verify the following:

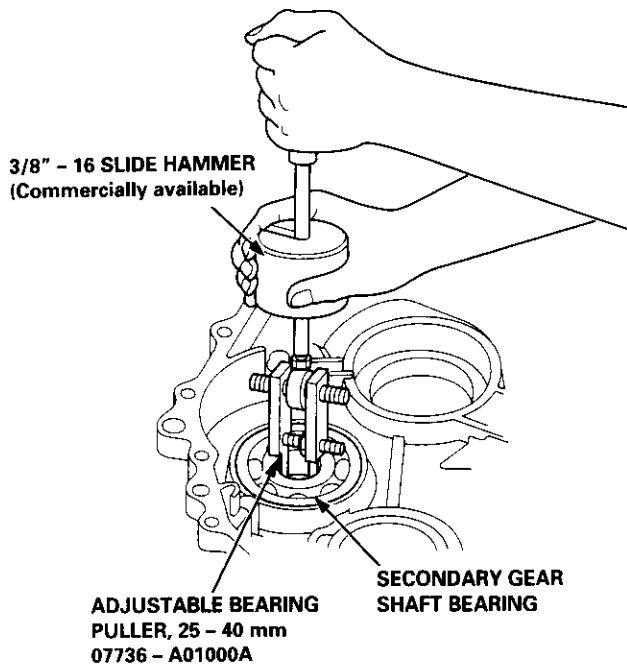
- The snap ring is seated in the bearing and housing grooves.
- The ring end gap is correct.



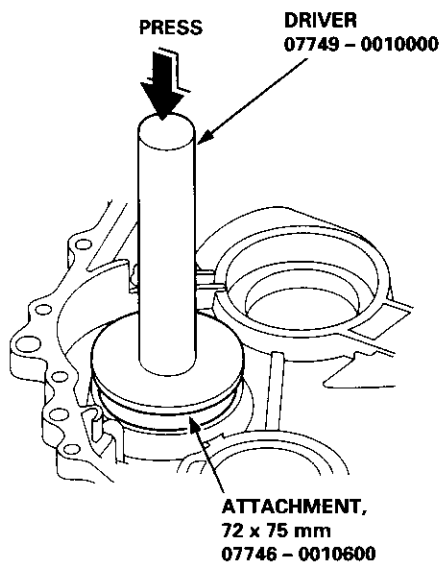


## Secondary Gear Shaft Bearing Replacement

1. Remove the secondary gear shaft bearing using the special tools as shown.

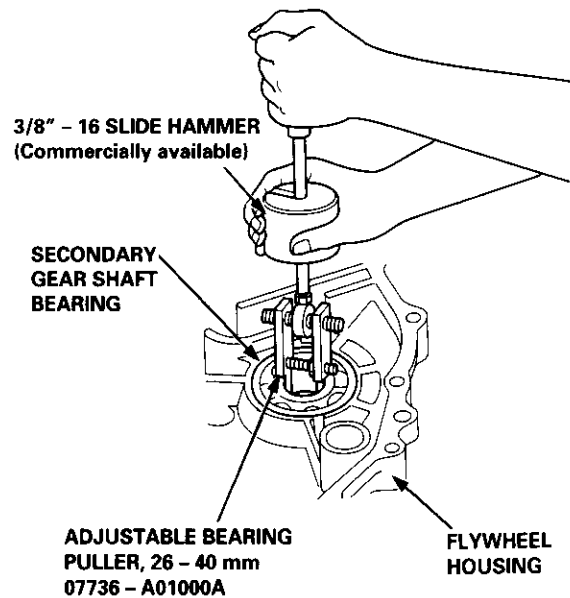


2. Install the new secondary gear shaft bearing until it bottoms in the transmission housing, using the special tools as shown.

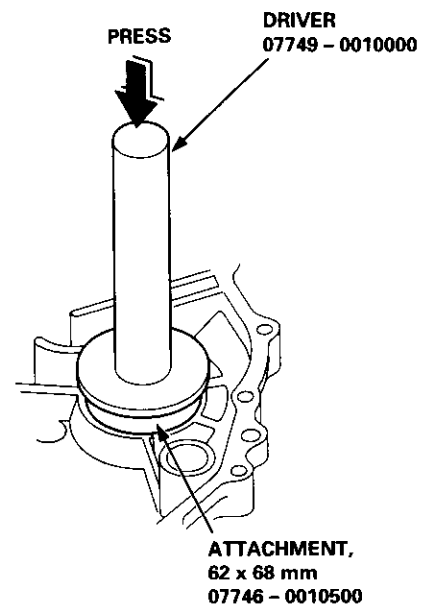


## Secondary Gear Shaft Bearing Replacement

1. Remove the secondary gear shaft bearing using the special tool as shown.



2. Install the new secondary gear shaft bearing until it bottoms in the flywheel housing, using the special tools as shown.

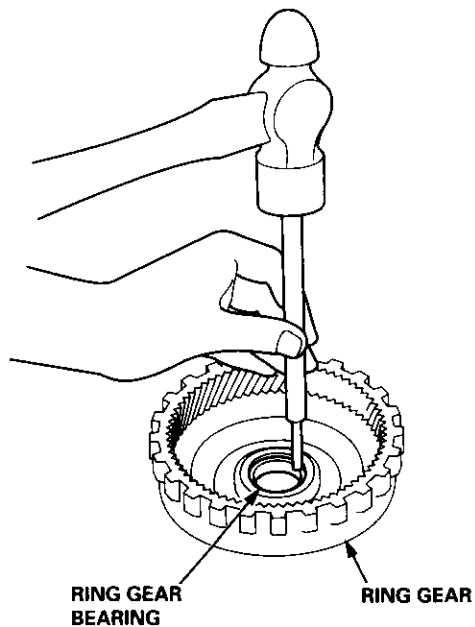


# Ring Gear Bearing

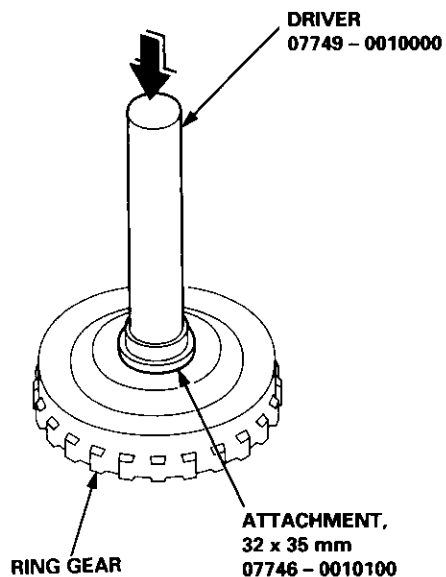
# Control Shaft Assembly

## Replacement

1. Remove the ring gear bearing.

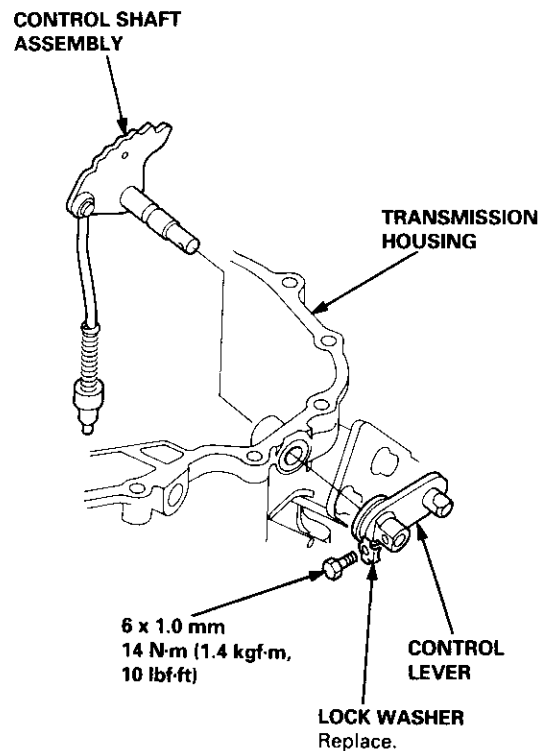


2. Install the new ring gear bearing until it bottoms in the ring gear, using the special tools as shown.



## Removal/Installation

1. Remove the bolt and lock washer.



2. Remove the control lever from the control shaft.
3. Remove the control shaft assembly.
4. Install the control shaft assembly in the transmission housing.
5. Install the control lever to the control shaft.
6. Install and tighten the bolt with a new lock washer.

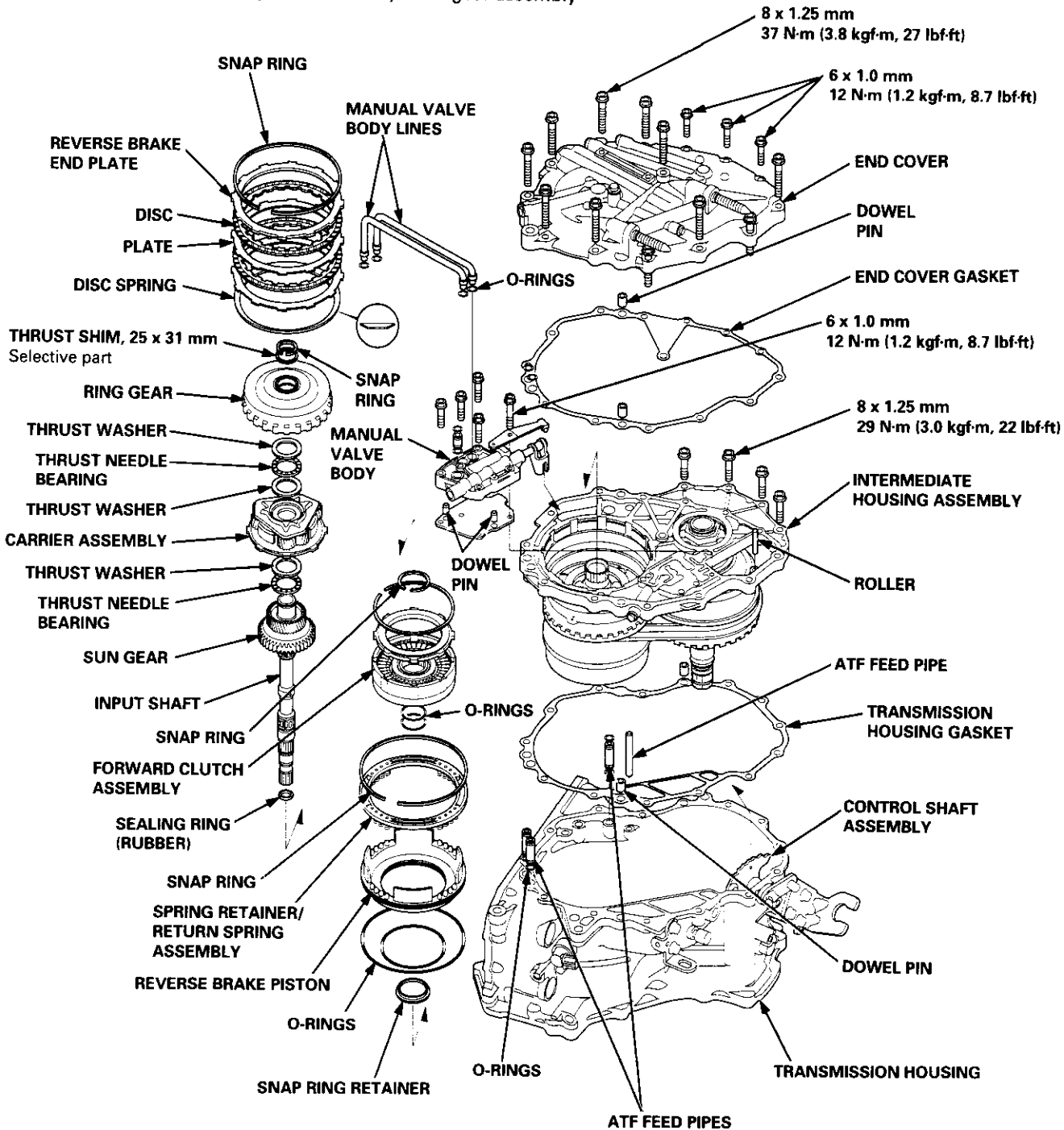
# Transmission

## Reassembly

**CAUTION:** While reassembling, be sure not to allow dust and other foreign particles to enter into the transmission.

**NOTE:**

- Coat all parts with CVT Fluid.
- Replace the following parts:
  - O-rings
  - Sealing rings
  - Sealing washers
  - Gaskets
  - Start clutch assembly and secondary drive gear assembly



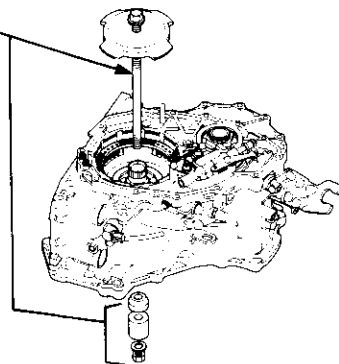


1. Install the ATF feed pipe in the transmission housing, and install the three ATF feed pipes with new O-rings in the transmission housing.
2. Install the two dowel pins and new transmission housing gasket on the transmission housing.
3. Push the control shaft assembly toward the outside of the transmission housing, then install the intermediate housing assembly (four bolts).
4. Install the manual valve body separator plate and the two dowel pins on the intermediate housing, then install the manual valve body with the detent spring (five bolts).
5. Put the control shaft assembly back, then install the roller in the intermediate housing.
6. Install the reverse brake piston in the intermediate housing.
7. Install the spring retainer/return spring assembly on the reverse brake piston.

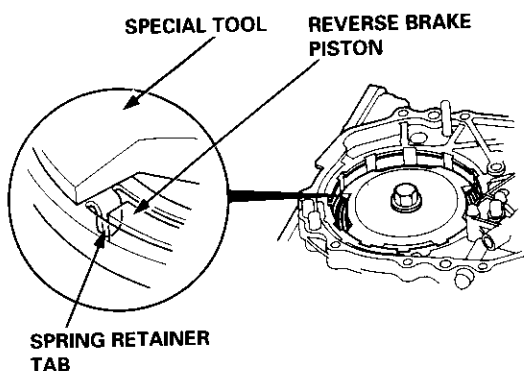
**NOTE:** Install the return springs on the spring guides of the reverse brake piston securely.

8. Install the special tool to compress the return spring as shown.

**REVERSE BRAKE  
SPRING COMPRESSOR  
07TAE - P4V0110**

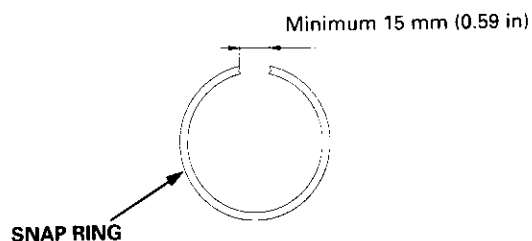


**CAUTION:** If the spring retainer tab is on the reverse brake piston, the spring retainer may be damaged. Be sure the spring retainer tab is not on the piston.



9. Compress the return springs, then install the snap ring in the intermediate housing above the spring retainer.

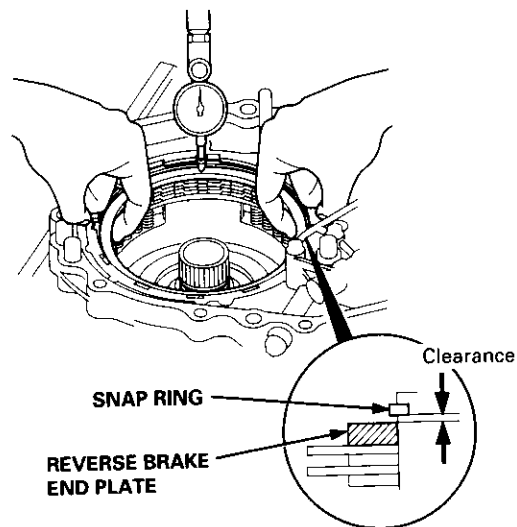
10. Verify that the snap ring end gap is correct.



11. Soak the reverse brake discs thoroughly in CVT Fluid for minimum 30 minutes.
12. Install the disc spring on the reverse brake piston.
13. Starting with a reverse brake plate, alternately install the reverse brake plates and discs. Install the reverse brake end plate, and the snap ring.
14. Measure the clearance between the reverse brake end plate and the top disc with a dial indicator. Zero the dial indicator with a reverse brake end plate lowered, and lift it up to the snap ring. The distance that the reverse brake and plate moves is the clearance between the reverse end plate, and the top disc.

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

**STANDARD: 0.45 - 0.75 mm (0.018 - 0.030 in)**



(cont'd)

# Transmission

## Reassembly (cont'd)

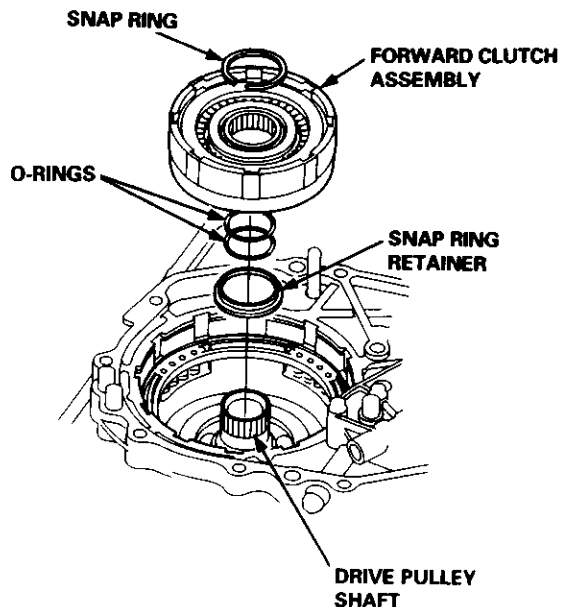
15. If the clearance is not within the standard, remove the reverse brake end plate and measure its thickness.
16. Select and install a new reverse brake end plate, then recheck.

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

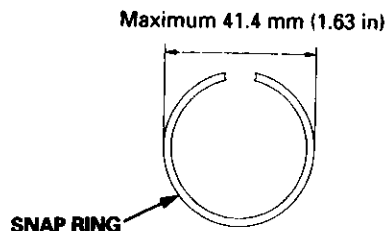
### REVERSE BRAKE END PLATE

Plate No.	Part Number	Thickness
1	22551 - P4V - 003	3.6 mm (0.142 in)
2	22552 - P4V - 003	3.8 mm (0.150 in)
3	22553 - P4V - 003	4.0 mm (0.157 in)
4	22554 - P4V - 003	4.2 mm (0.165 in)
5	22555 - P4V - 003	4.4 mm (0.173 in)
6	22556 - P4V - 003	4.6 mm (0.181 in)
7	22557 - P4V - 003	4.8 mm (0.189 in)
8	22558 - P4V - 003	5.0 mm (0.200 in)

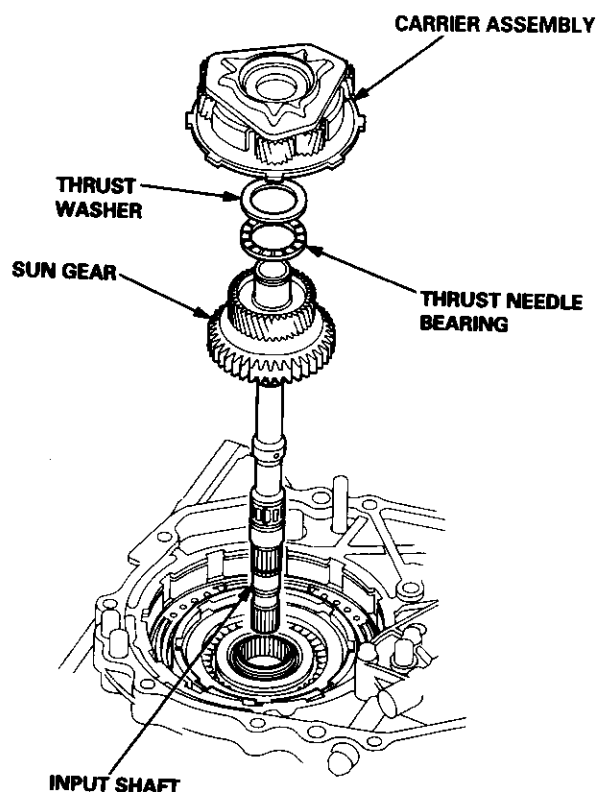
17. After replacing the reverse brake end plate, make sure that the clearance is within the standard.
18. Remove the snap ring, reverse brake end plate, discs, plates, and disc spring.
19. Install the snap ring retainer on the drive pulley shaft.
20. Wrap the drive pulley shaft splines with tape to prevent damage to the O-rings, then install new O-rings.
21. Install the forward clutch assembly on the drive pulley shaft, then install the snap ring.



22. Verify that the outside diameter of the snap ring is correct.



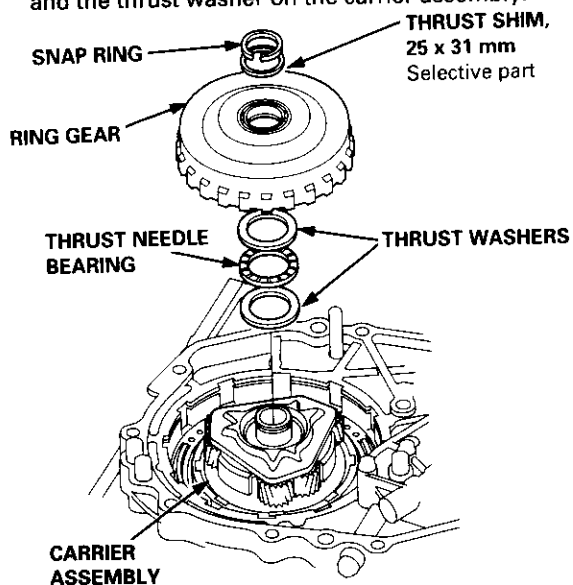
23. Install the input shaft and the sun gear as a sub assembly.
24. Install the thrust needle bearing and the thrust washer on the sun gear.



25. Install the carrier assembly on the forward clutch.



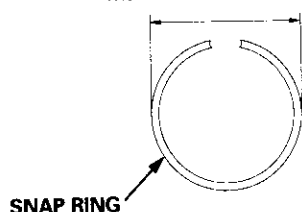
26. Install the thrust washer, the thrust needle bearing, and the thrust washer on the carrier assembly.



27. Install the ring gear and the 25 x 31 mm thrust shim, then install the snap ring.

28. Verify that the outside diameter of the snap ring is correct.

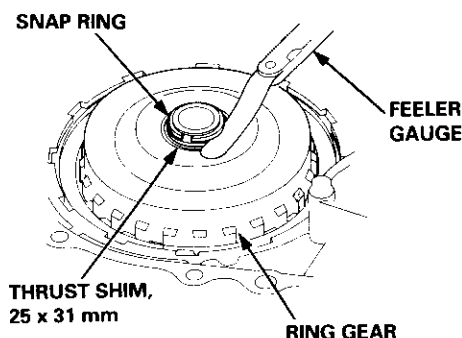
Maximum 30.7 mm (1.21 in)



29. Measure the clearance between the 25 x 31 mm thrust shim and the snap ring.

**STANDARD: 0.05 – 0.11 mm (0.0020 – 0.0043 in)**

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



30. If the clearance is out of tolerance, remove the 25 x 31 mm thrust shim and measure its thickness.

31. Select and install a new 25 x 31 mm thrust shim, then recheck.

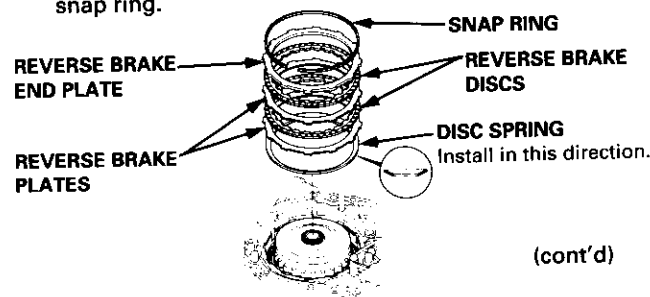
#### THRUST SHIM, 25 x 31 mm

No.	Part Number	Thickness
A	90451 – P4V – 000	1.05 mm (0.041 in)
B	90452 – P4V – 000	1.12 mm (0.044 in)
C	90453 – P4V – 000	1.19 mm (0.047 in)
D	90454 – P4V – 000	1.26 mm (0.050 in)
E	90455 – P4V – 000	1.33 mm (0.052 in)
F	90456 – P4V – 000	1.40 mm (0.055 in)
G	90457 – P4V – 000	1.47 mm (0.058 in)
H	90458 – P4V – 000	1.54 mm (0.061 in)
I	90459 – P4V – 000	1.61 mm (0.063 in)
J	90460 – P4V – 000	1.68 mm (0.066 in)
K	90461 – P4V – 000	1.75 mm (0.069 in)
L	90462 – P4V – 000	1.82 mm (0.072 in)
M	90480 – P4V – 000	1.085 mm (0.0427 in)
N	90481 – P4V – 000	1.155 mm (0.0454 in)
O	90482 – P4V – 000	1.225 mm (0.0482 in)
P	90483 – P4V – 000	1.295 mm (0.0510 in)
Q	90484 – P4V – 000	1.365 mm (0.0537 in)
R	90485 – P4V – 000	1.435 mm (0.0565 in)
S	90486 – P4V – 000	1.505 mm (0.0593 in)
T	90487 – P4V – 000	1.575 mm (0.0620 in)
U	90488 – P4V – 000	1.645 mm (0.0648 in)
V	90489 – P4V – 000	1.715 mm (0.0675 in)
W	90490 – P4V – 000	1.785 mm (0.0703 in)

32. After replacing the 25 x 31 mm thrust shim, make sure that the clearance is within tolerance and the snap ring outside diameter is correct.

33. Install the disc spring in the direction shown.

34. Starting with a reverse brake plate, alternately install the reverse brake plates and discs. Install selected reverse brake end plate, then install the snap ring.



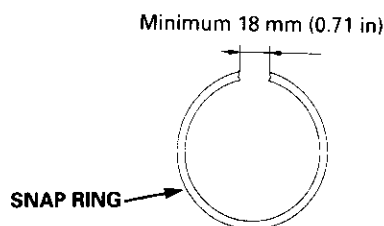
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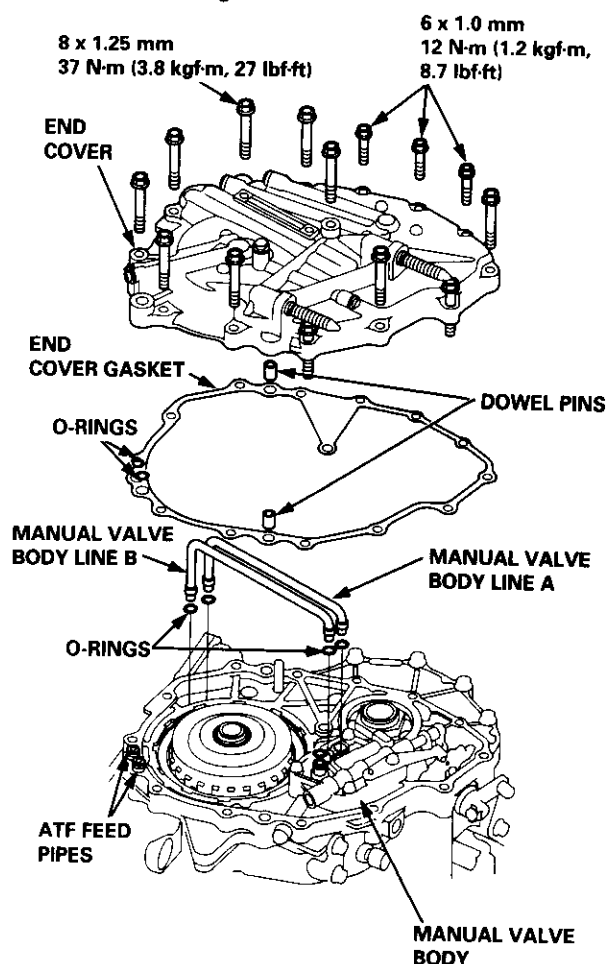
# Transmission

## Reassembly (cont'd)

35. Verify that the snap ring end gap is correct.



36. Install the manual valve body lines A and B with new O-rings on the manual valve body and the intermediate housing.

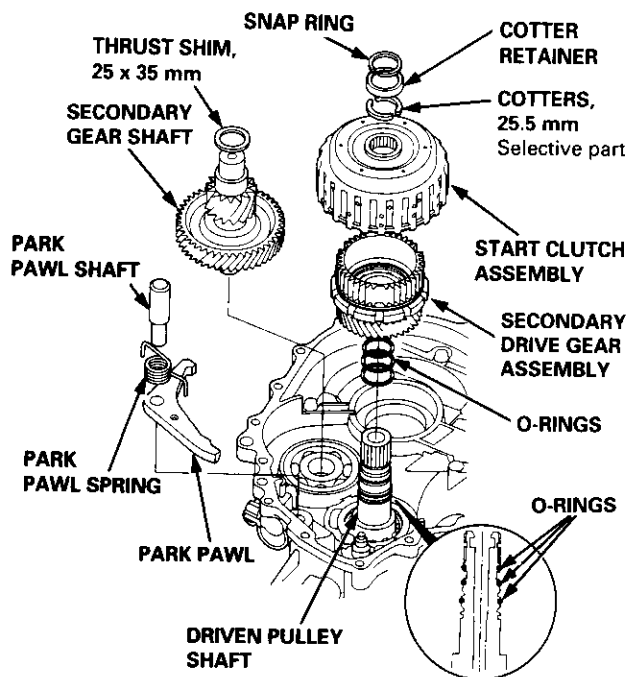


37. Install the two dowel pins and new end cover gasket on the intermediate housing, then install new O-rings on the ATF feed pipes.

38. Install the end cover (three 6 mm bolts, eleven 8 mm bolts).

NOTE: Install the nine 8 mm bolts in the end cover (two 8 mm bolts remain in the end cover) then tighten the eleven 8 mm bolts.

39. Install the park pawl, spring, and shaft on the transmission housing, then move the control lever to any gear other than **P** position.



40. Install the secondary gear shaft with selected 25 x 35 mm thrust shim (see page 14-328).

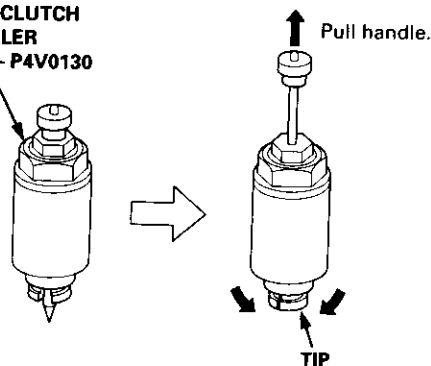
41. Wrap the driven pulley shaft splines with tape to prevent damage to the O-rings, then install new O-rings.

42. Assemble the secondary drive gear assembly in the start clutch assembly, then install them on the driven pulley shaft.

43. Pull the handle of the special tool up, then install the tip of it into the driven pulley shaft hole, and set the special tool on the start clutch.

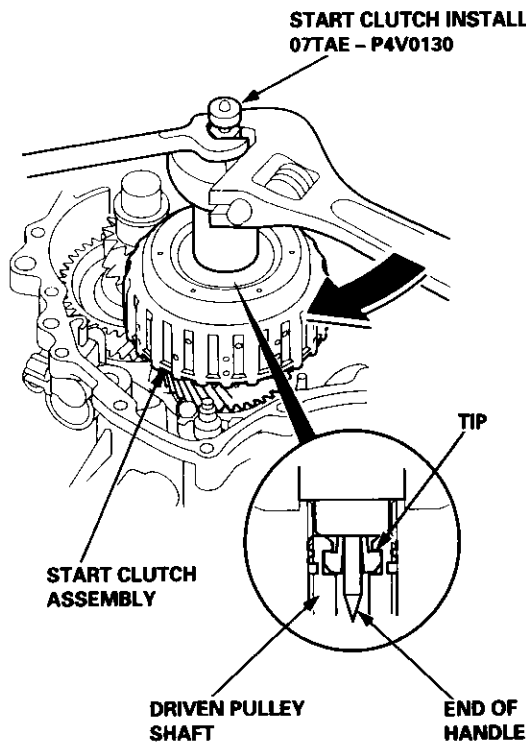
**CAUTION:** While installing the start clutch and the secondary drive gear assembly using the special tool, be sure not to allow dust or other foreign particles to enter into the transmission.

START CLUTCH  
INSTALLER  
07TAE - P4V0130





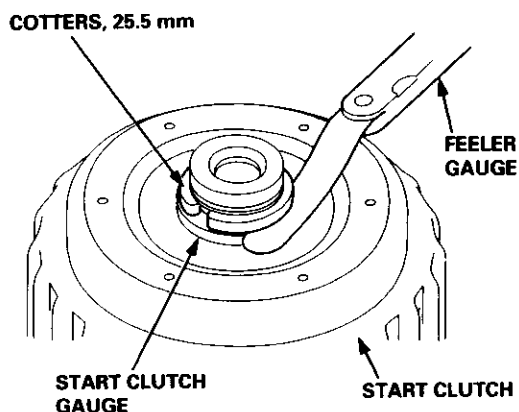
44. Push the handle of the special tool, then tighten the nut to seat the secondary drive gear assembly on the driven pulley shaft securely.



45. Pull the handle of the special tool up, and remove the special tool.
46. Install the cotters, then measure the clearance between the cotters and the start clutch guide.

**STANDARD: 0 - 0.13 mm (0 - 0.005 in)**

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

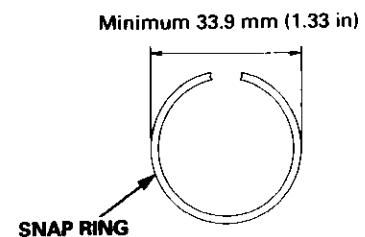


47. If the clearance is not within the standard, remove the cotters and measure their thickness.
48. Select and install new cotters, then recheck.

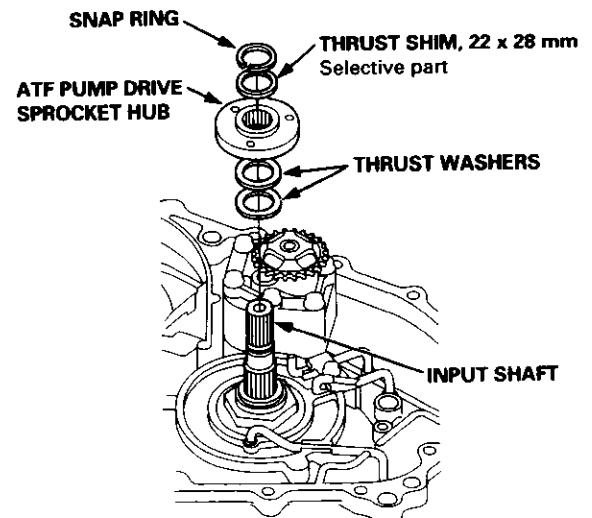
**COTTERS, 25.5 mm**

No.	Part Number	Thickness
A	90429 - P4V - 000	2.9 mm (0.114 in)
B	90430 - P4V - 000	3.0 mm (0.118 in)
C	90431 - P4V - 000	3.1 mm (0.122 in)
D	90432 - P4V - 000	3.2 mm (0.126 in)

49. After replacing the 25.5 mm cotters, make sure that the clearance is the standard.
50. Install the cotter retainer and the snap ring.
51. Verify that the outside diameter of the snap ring is correct.



52. Install the thrust washers, the ATF pump drive sprocket hub and the 22 x 28 mm thrust shim on the input shaft, then install the snap ring.

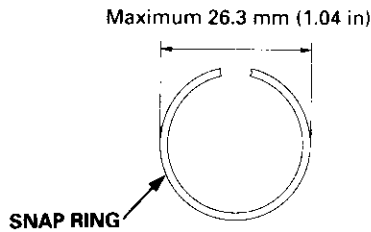


(cont'd)

# Transmission

## Reassembly (cont'd)

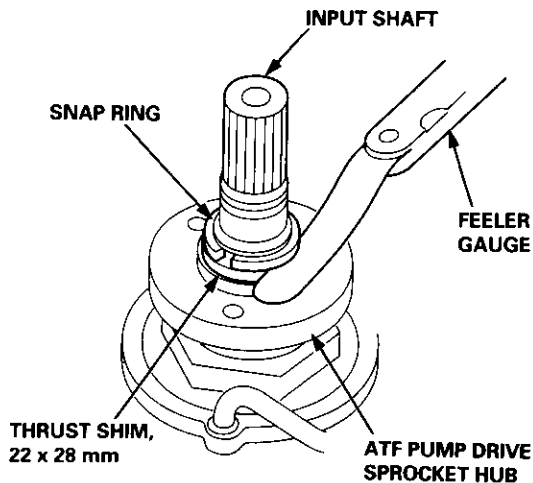
53. Verify that the outside diameter of the snap ring is correct.



54. Measure the clearance between the 22 x 28 mm thrust shim and the snap ring.

**STANDARD: 0.37 – 0.65 mm (0.015 – 0.026 in)**

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



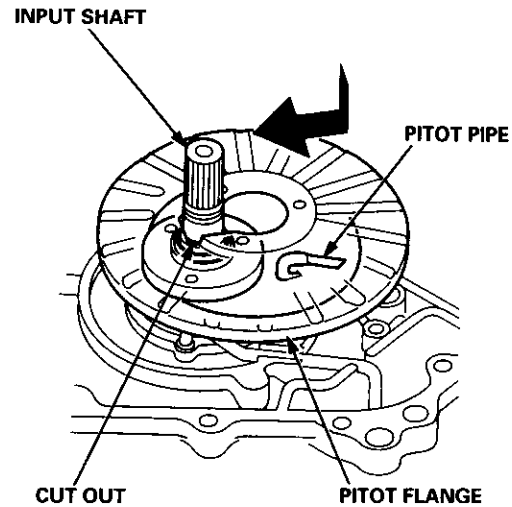
55. If the clearance is out of tolerance, remove the 22 x 28 mm thrust shim and measure its thickness.
56. Select and install a new 22 x 28 mm thrust shim, then recheck.

**THRUST SHIM, 22 x 28 mm**

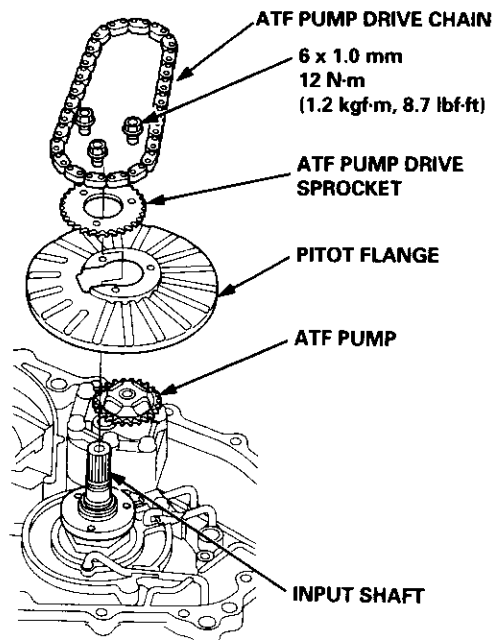
No.	Part Number	Thickness
C	90573 - P4V - 000	1.15 mm (0.045 in)
D	90574 - P4V - 000	1.40 mm (0.055 in)
E	90575 - P4V - 000	1.65 mm (0.065 in)
F	90576 - P4V - 000	1.90 mm (0.075 in)
G	90577 - P4V - 000	2.15 mm (0.085 in)
H	90578 - P4V - 000	2.40 mm (0.095 in)

57. After replacing the 22 x 28 mm thrust shim, make sure that the clearance is within tolerance and the snap ring outside diameter is correct.

58. Install the pitot flange using its cutout as shown to clear the pitot pipes.

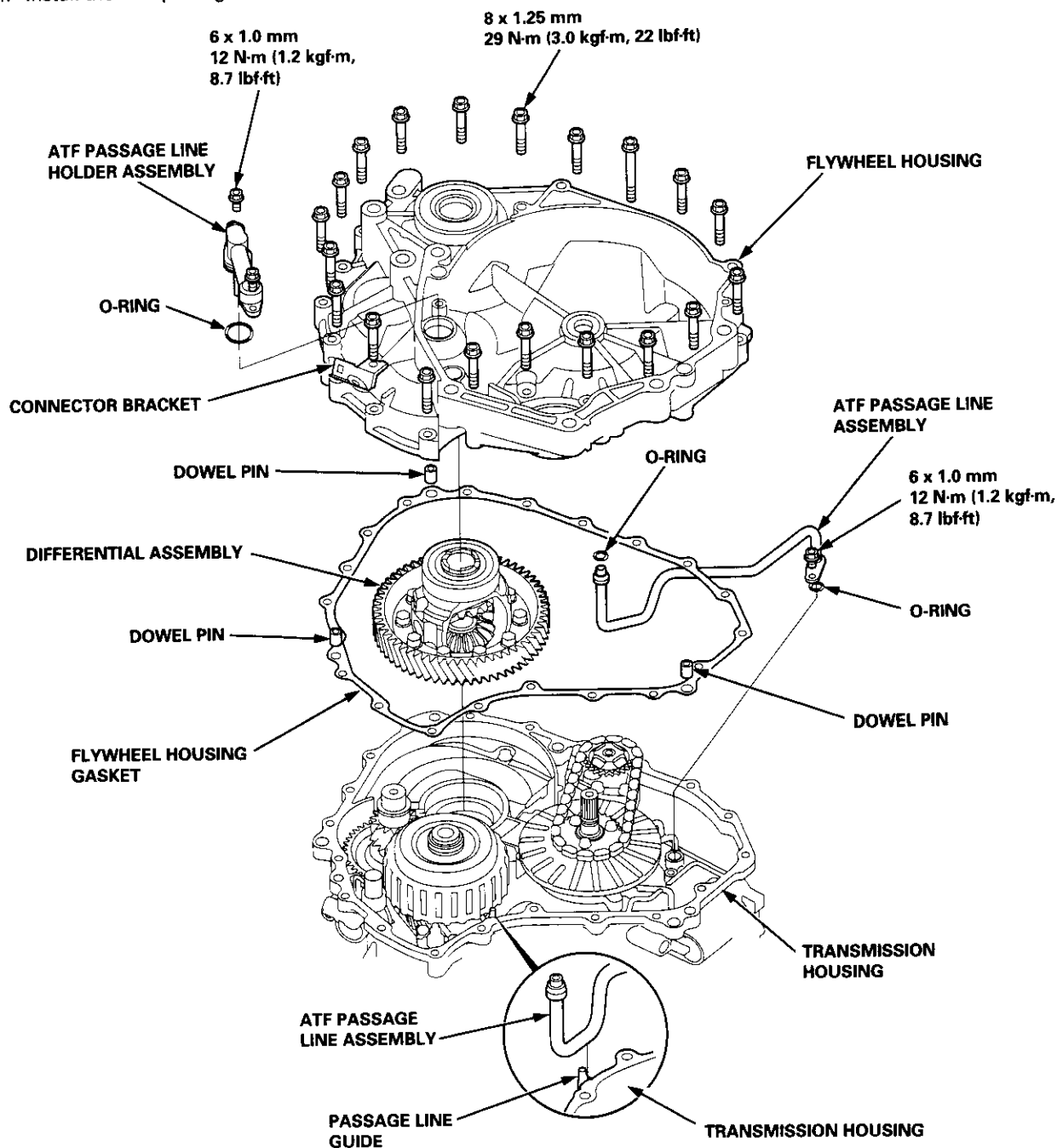


59. Install the ATF pump drive sprocket, and put the ATF pump drive chain on the ATF pump drive and driven sprockets, then install and tighten the bolts (three bolts).





60. Install the differential assembly.
61. Install the ATF passage line assembly with new O-rings (one bolt).
62. Install the three dowel pins and new flywheel housing gasket on the transmission housing.
63. Install the flywheel housing and connector bracket (twenty bolts).
64. Install the ATF passage line holder assembly (two bolts).

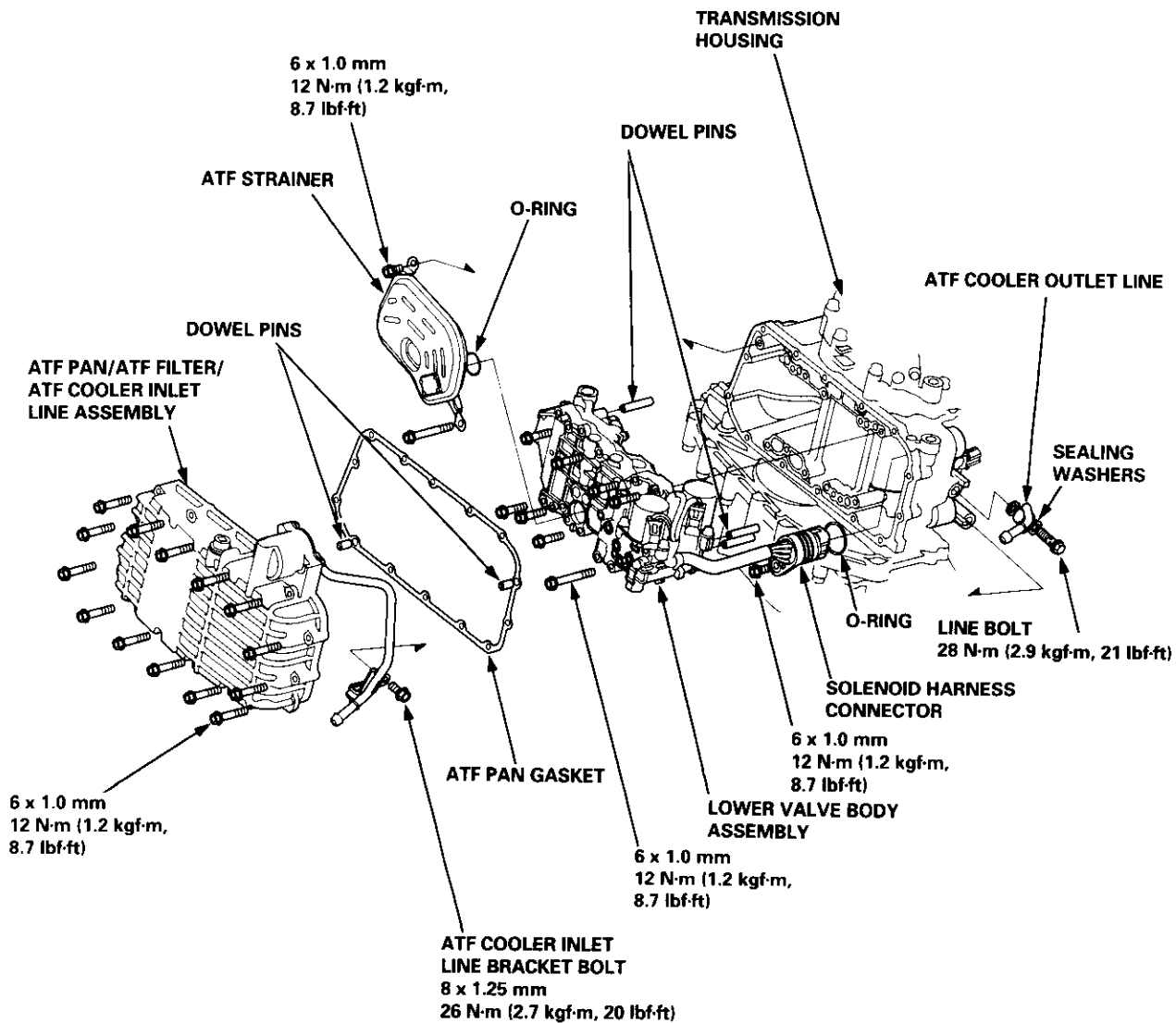


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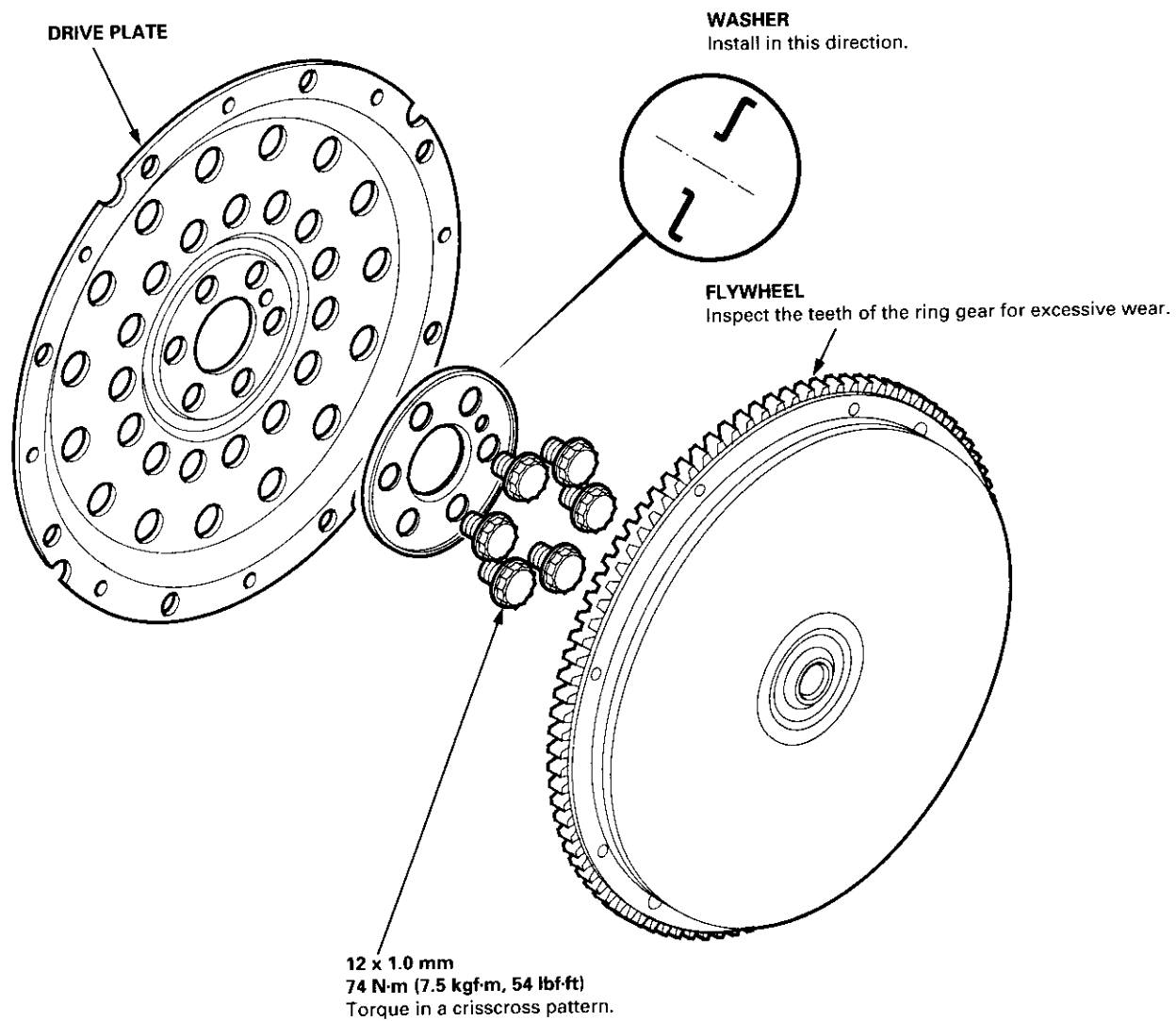
# Transmission

## Reassembly (cont'd)

65. Install the solenoid harness connector with a new O-ring (one bolt), then install the lower valve body assembly with three dowel pins (eight bolts).
66. Install the ATF strainer with a new O-ring (two bolts).
67. If necessary, assemble the ATF pan, ATF filter, and the ATF cooler inlet line (see page 14-303).
68. Install the ATF pan with the two dowel pins and a new ATF pan gasket (fourteen bolts).
69. Install the ATF cooler inlet line bracket bolt.
70. Install the ATF cooler outlet line with the line bolt and new sealing washers.



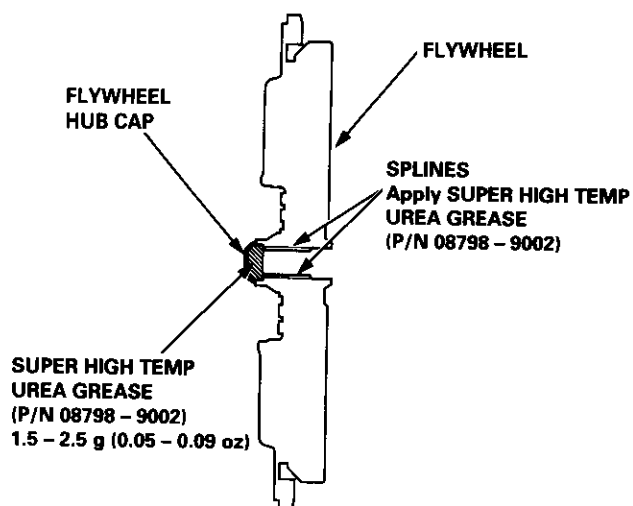
# Flywheel/Drive Plate



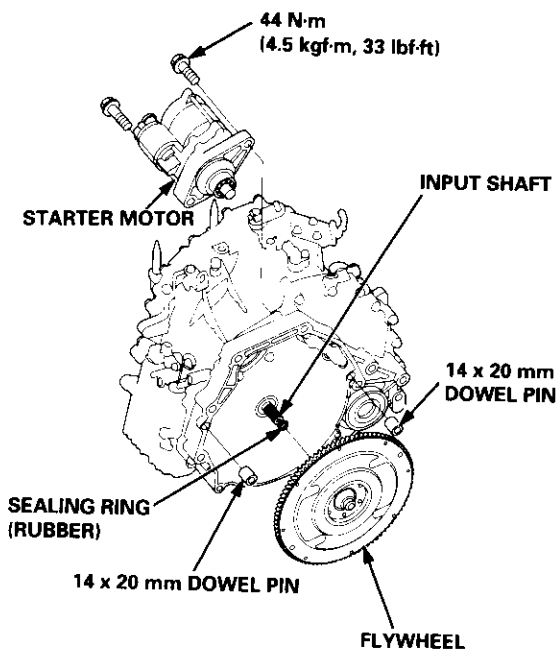
# Transmission

## Installation

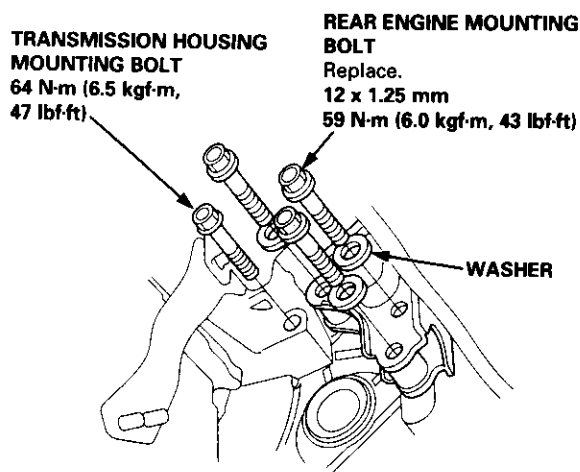
1. Flush the ATF cooler as described on pages 14-352 and 14-353.
2. Remove the used grease in the flywheel hub cap and flywheel splines.
3. Fill the inside of the flywheel hub cap, and coat the flywheel hub splines with Super High Temp Urea Grease (P/N 08798 - 9002) as shown.



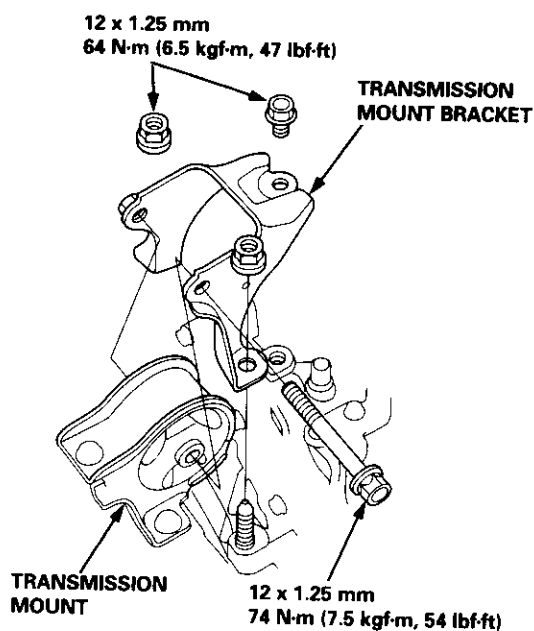
4. Install a new sealing ring (rubber) on the input shaft, and install two 14 x 20 mm dowel pins in the flywheel housing.
5. Install the flywheel securely on the input shaft, then install the starter motor on the flywheel housing.



6. Place the transmission on a jack, and raise it to the engine assembly level.
7. Attach the transmission on the engine, then install the transmission housing mounting bolt and rear engine mounting bolts.

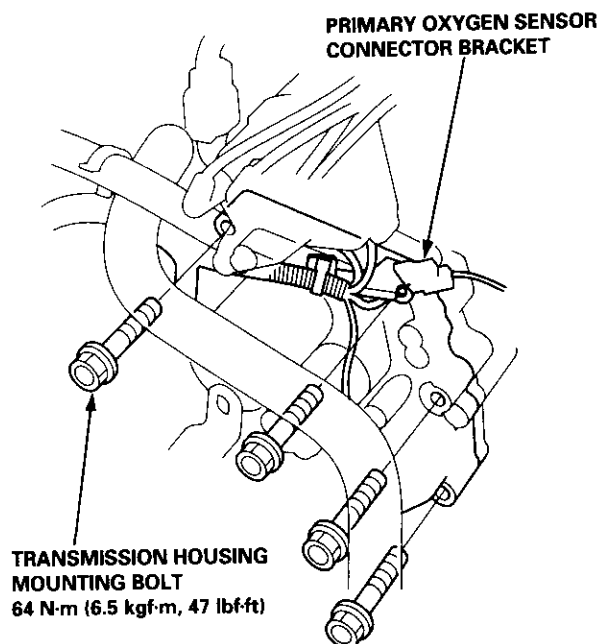


8. Install the transmission mount bracket. Tighten the long bolt loosely, and tighten the nuts and bolt on the mount bracket to the specified torque. Then tighten the long bolt to the specified torque.



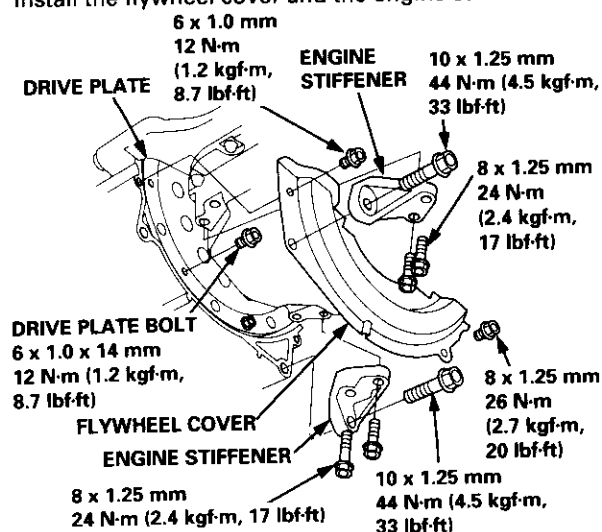


9. Install the remaining transmission housing mounting bolts.



10. Remove the transmission jack and the hoist, then remove the hoist bracket from the engine.
11. Attach the flywheel to the drive plate with eight bolts and torque as follows:  
Rotate the crankshaft pulley as necessary to tighten the bolts to half of the specified torque, then to the final torque, in a crisscross pattern.  
After tightening the last bolt, check that the crankshaft rotates freely.

12. Install the flywheel cover and the engine stiffeners.

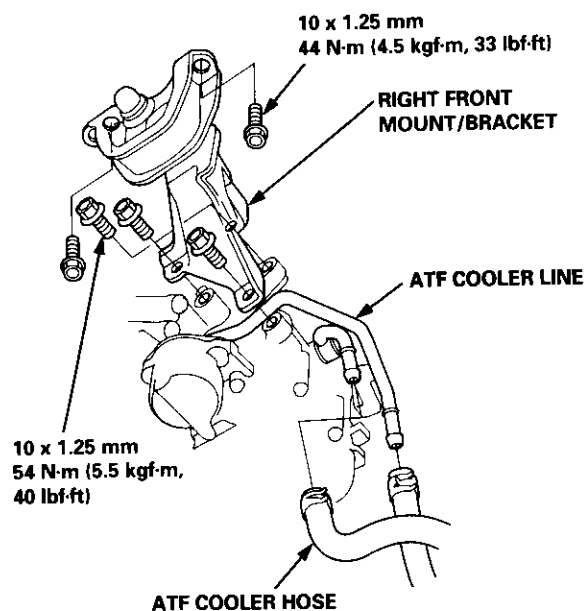


13. Tighten the crankshaft pulley bolt, if necessary (see section 6).

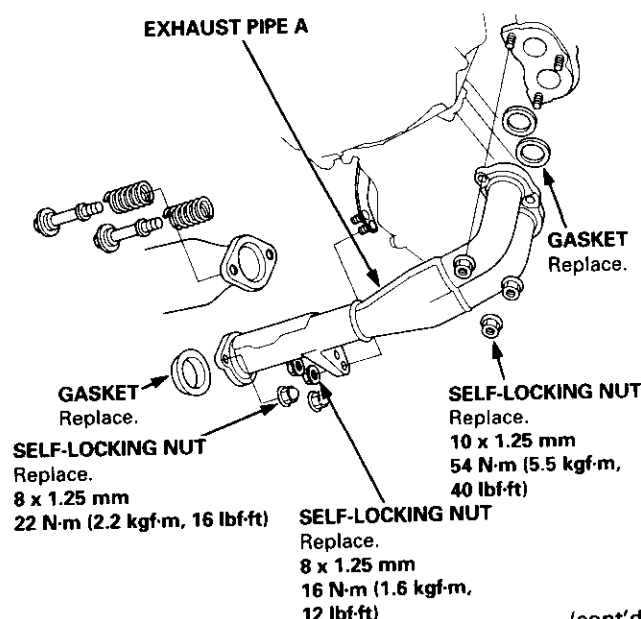
14. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-357).

**CAUTION:** While connecting the ATF cooler hoses, be sure not to allow dust and other foreign particles to enter into the transmission.

15. Install the right front mount/bracket.



16. Install the exhaust pipe A.



(cont'd)



# Transmission

## Installation (cont'd)

17. Install a new set ring on the end of each driveshaft.
18. Install the right and left driveshafts (see section 16).

**CAUTION:** While installing the driveshafts in the differential, be sure not to allow dust and other foreign particles to enter into the transmission.

**NOTE:**

- Clean the areas where the driveshafts contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.
- Turn the right and left steering knuckle fully outward, and slide each driveshaft into the differential until you feel its set ring clip engage the side gear.

19. Install the damper fork, then install the right and left ball joints to each lower arm with the castle nuts and new cotter pins.

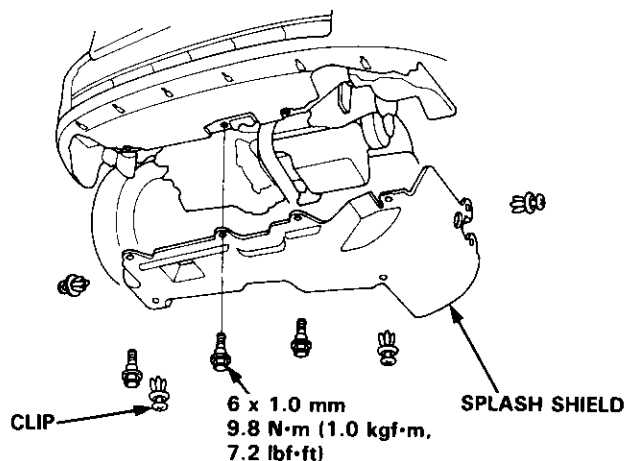
10 x 1.25 mm  
43 N·m  
(4.4 kgf·m, 32 lbf·ft)

**SELF-LOCKING NUT**  
Replace.  
12 x 1.25 mm  
64 N·m  
(6.5 kgf·m, 47 lbf·ft)

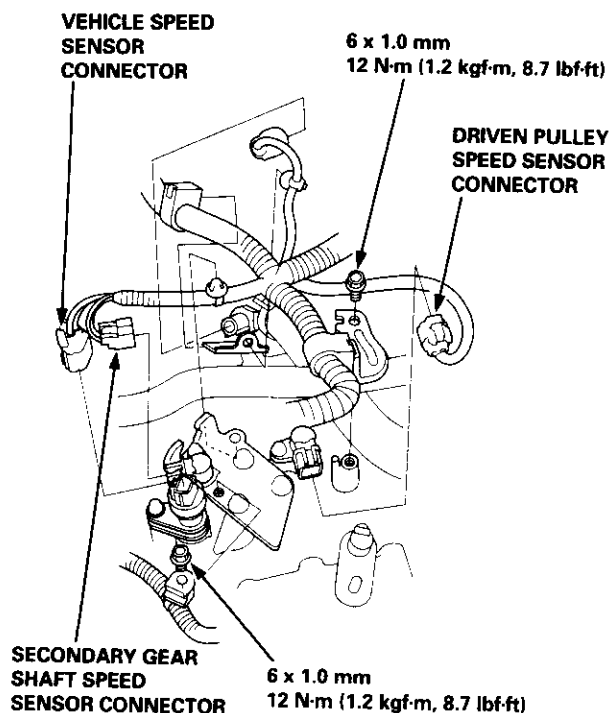
**CASTLE NUT**  
12 x 1.25 mm  
49 – 59 N·m (5.0 – 6.0 kgf·m,  
36 – 43 lbf·ft)

**COTTER PIN**  
Replace.

20. Install the splash shield.



21. Connect the vehicle speed sensor connector, the driven pulley speed sensor connector and the secondary gear shaft speed sensor connector.

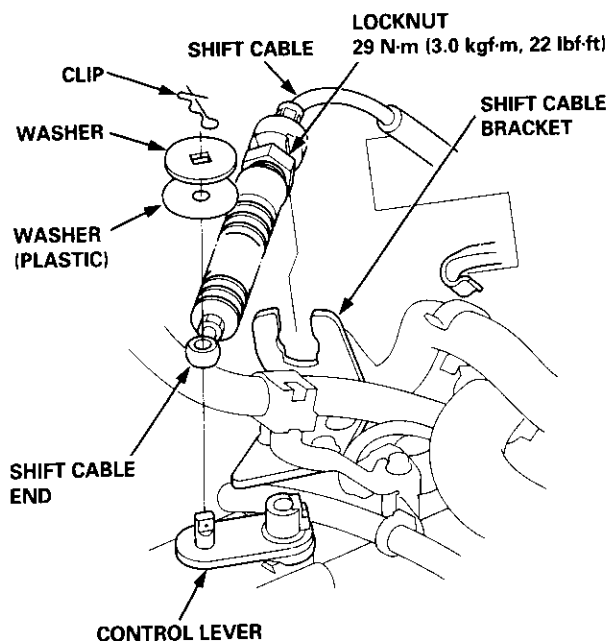




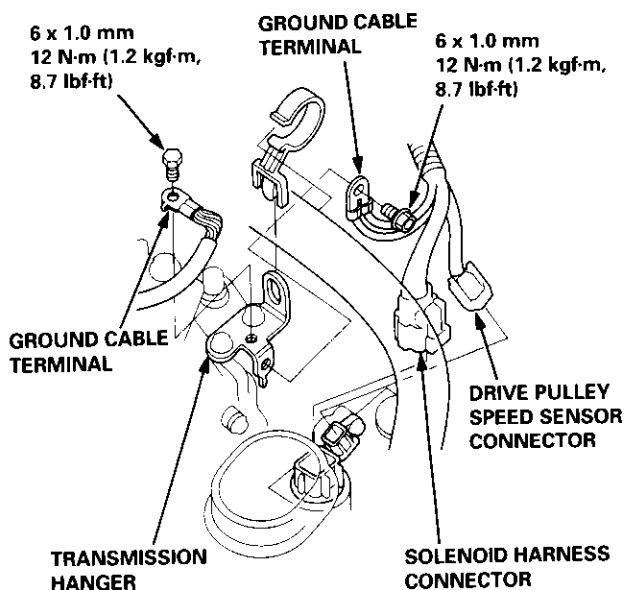
22. Install the shift cable end on the control lever, and install the shift cable on the shift cable bracket.

**CAUTION:** Take care not to bend the shift cable.

23. Install the clip in the direction shown.

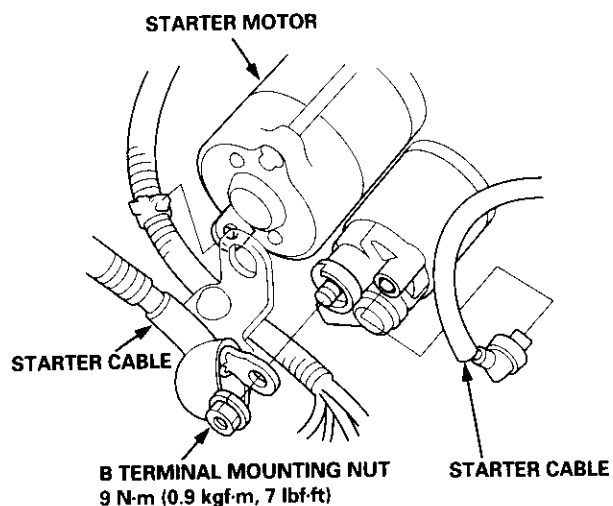


24. Connect the solenoid harness connector, the drive pulley speed sensor connector, and the ground cable terminals.



25. Connect the starter motor cable on the starter motor, and install the cable holder.

**NOTE:** When installing the starter motor cable, make sure that the crimped side of the ring terminal is facing out (see section 23).



26. Install all removed connectors and clamps.  
27. Install the distributor.  
28. Install the intake air duct and air cleaner housing assembly.  
29. Refill the transmission with the recommended Genuine Honda CVT Fluid (see page 14-299).

**CAUTION:** While filling the CVT Fluid, be sure not to allow dust and other foreign particles to enter into the transmission.

30. Connect the battery positive (+) terminal first, then the negative (-) terminal to the battery.  
31. Check the ignition timing (see section 23).  
32. Start the engine. Set the parking brake, and shift the transmission through all gears three times. Check shift cable adjustment (see page 14-355).  
33. Check the front wheel alignment (see section 18).  
34. Let the engine reach operating temperature (the radiator fan comes on) with the transmission in **N** or **P** position, then turn it off and check fluid level.  
35. Perform the start clutch calibration procedure on page 14-293.  
36. Road test as described on pages 14-296 and 14-297.

# Transmission

## Cooler Flushing

**⚠ WARNING** To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

NOTE: This procedure should be performed before reinstalling the transmission.

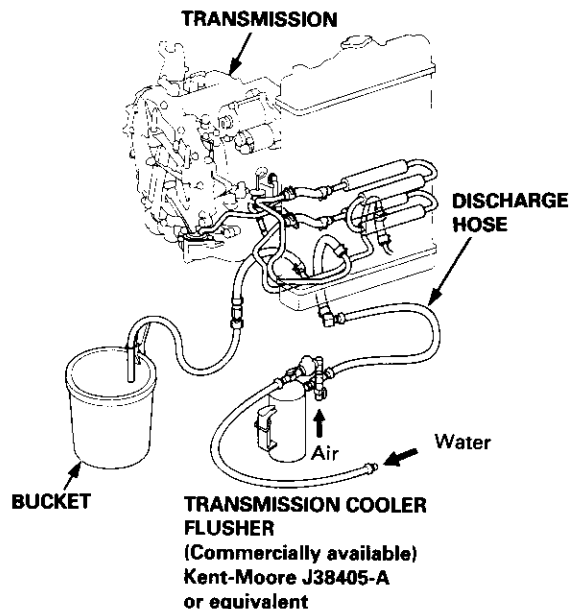
1. Check the tools and hoses for wear and cracks before using. If wear or cracks are found, replace the hoses before using.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 – 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.
3. Secure the flusher filler cap, and pressurize the tank with compressed air to between 550 – 829 kpa (5.6 – 8.45 kgf/cm<sup>2</sup>, 80 – 120 psi).

NOTE: The air line should be equipped with a water trap to ensure a dry air system.

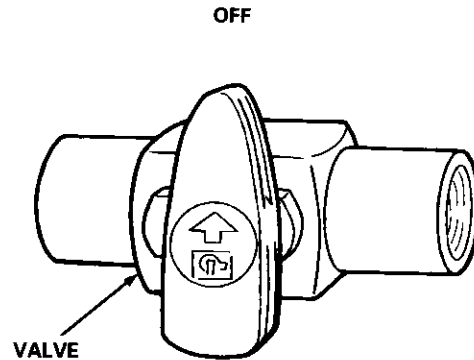
4. Hang the tool under the vehicle.
5. Attach the tank's discharge hose to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line on the transmission cooler using a clamp.

**IMPORTANT:**

Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Hot water if available.)



8. Turn on the flusher water valve so water will flow through the cooler for 10 seconds.

NOTE: If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.

9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. While flushing with the water and flushing fluid for two minutes, turn the air valve on for five seconds every 15 – 20 seconds to create a surging action.  
AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm<sup>2</sup>, 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water only for one minute.
13. Turn the water valve off, and turn off the water supply.
14. Turn the air valve on to dry the system out with air for two full minutes or until no moisture is visible leaving the drain hose.

**CAUTION:** Residual moisture in the cooler or lines can damage the transmission.

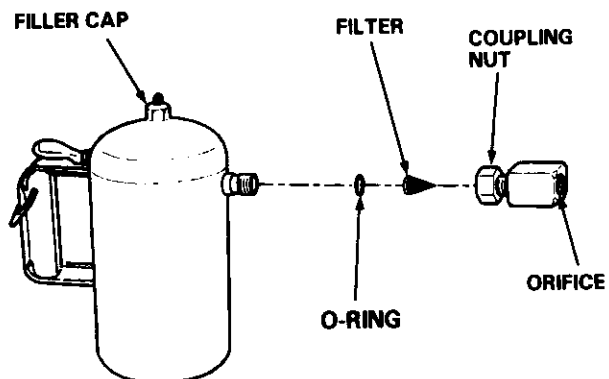
15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.



17. Make sure the transmission is in the **P** position. Fill the transmission with CVT Fluid, and run the engine for 30 seconds or until approximately 0.95 ℓ (1.0 US qt., 0.8 Imp qt.) is discharged.
18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-355).
19. Refill the transmission with CVT Fluid to the proper level (see page 14-299).

#### TOOL MAINTENANCE

1. Empty and rinse after each use. Fill the can with water and pressurize the can. Flush the discharge line to ensure that the unit is clean.
2. If discharge liquid does not foam, the orifice may be blocked.
3. To clean, disconnect the plumbing from the tank at the large coupling nut.



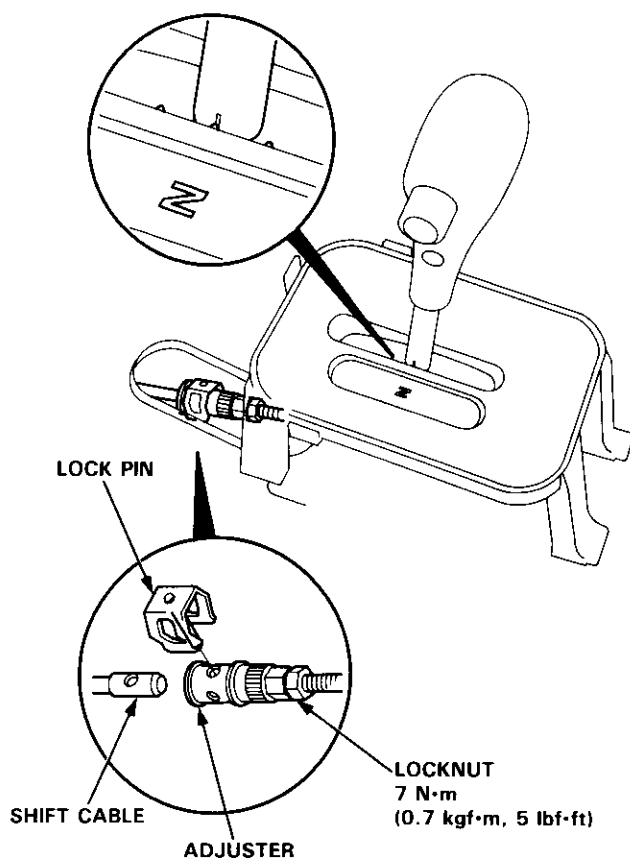
4. Remove the in-line filter from the discharge side and clean if necessary.
5. The fluid orifice is located behind the filter. Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air. Securely reassemble all parts.

# Shift Cable

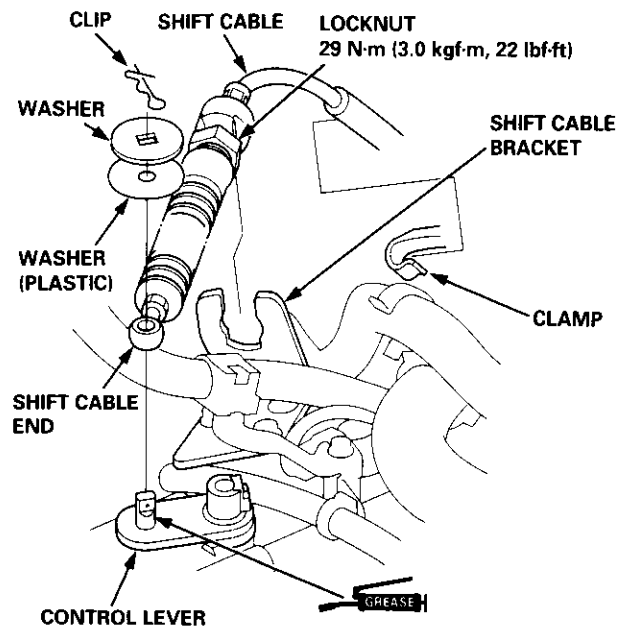
## Removal/Installation

**⚠ WARNING** Make sure lifts, jacks and safety stands are placed properly (see section 1).

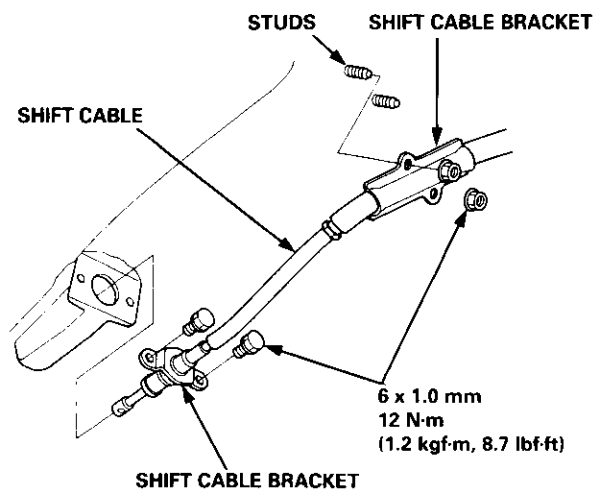
1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.



3. Remove the air cleaner housing assembly.
4. Remove the clip from the control lever, and loosen the locknut.



5. Remove the shift cable from the control lever, the shift cable bracket, and the clamp.
6. Remove the shift cable bracket bolts and nuts, then remove the shift cable. Take care not to bend the shift cable when removing/installing it.



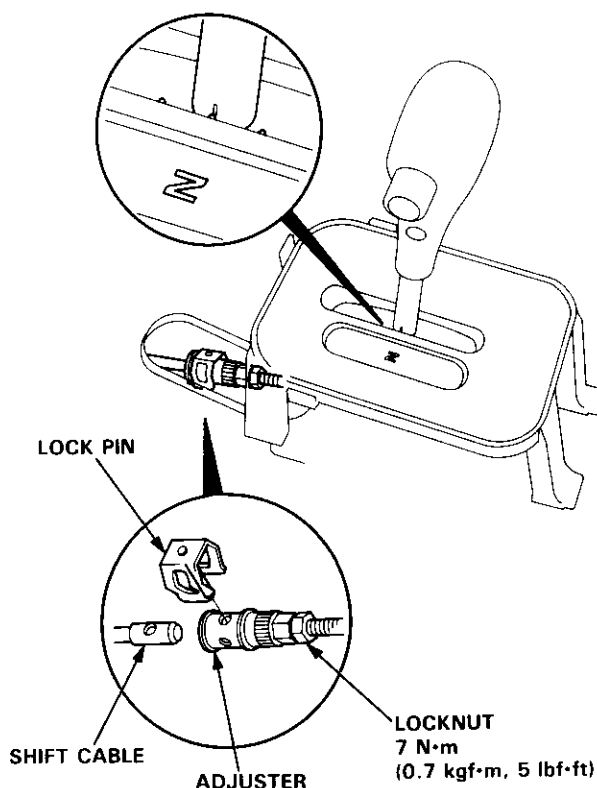
7. Install the shift cable in the reverse order of removal.
8. Check the cable adjustment (see page 14-355).



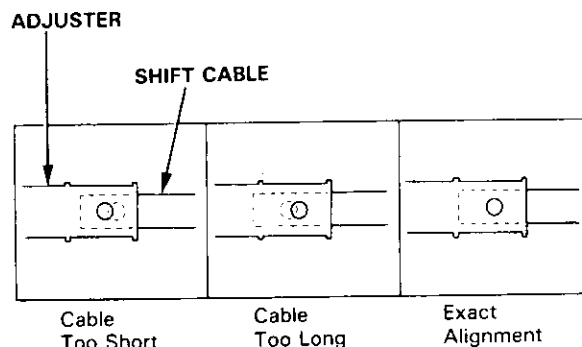
## Adjustment

**⚠ WARNING** Make sure lifts, jacks and safety stands are placed properly (see section 1).

1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.

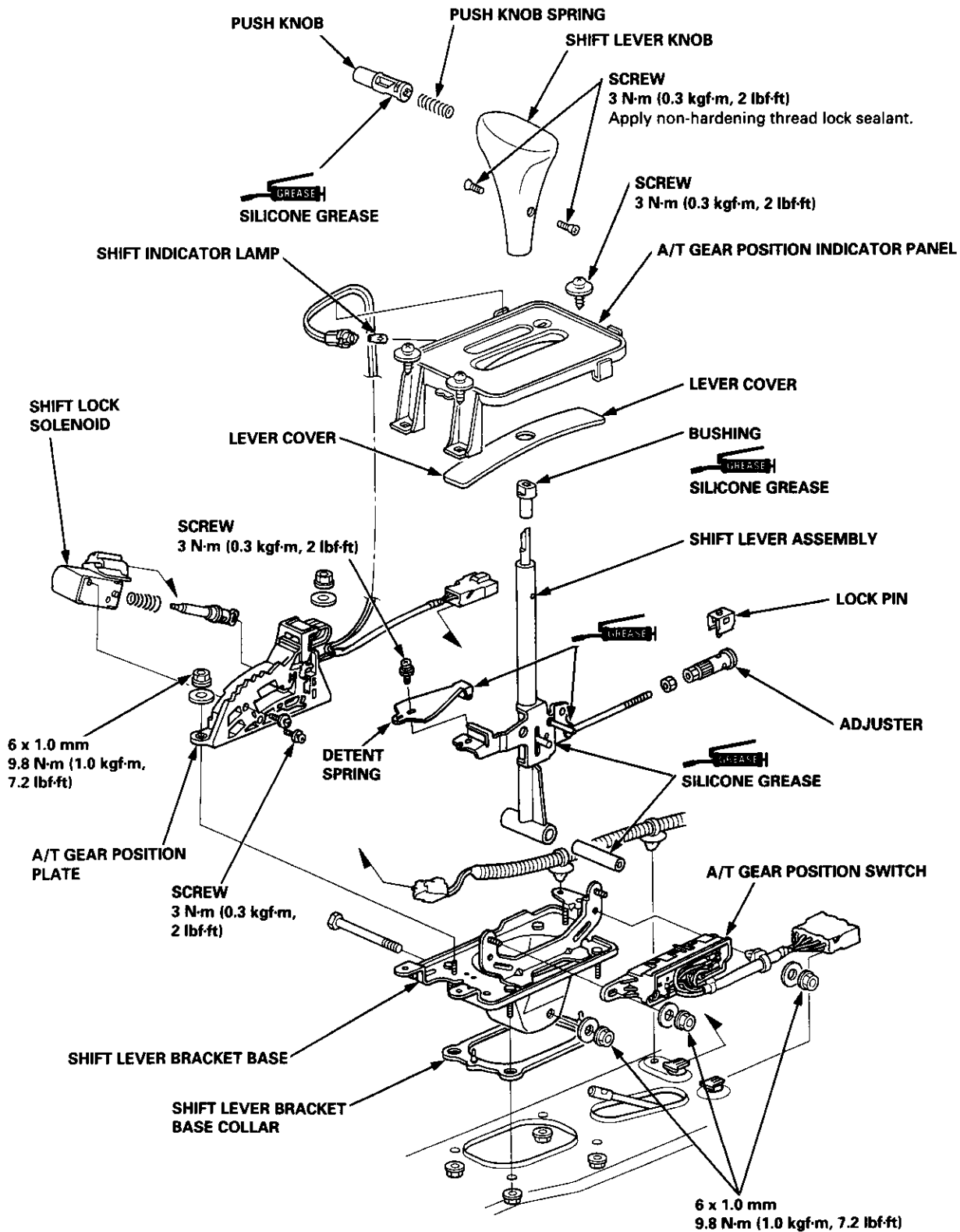


3. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable. There are two holes in the adjuster. They are positioned 90° apart to allow cable adjustment in 1/4 turn increments.



4. If the hole is not perfectly aligned, loosen the locknut on the adjuster and adjust as required.
5. Tighten the locknut to 7 N·m (0.7 kgf·m, 5 lbf·ft).
6. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
7. Make sure the lock pin is seated in the adjuster securely.
8. Move the shift lever to each position, and verify that the shift position indicator follows the automatic transaxle gear position switch.
9. Start the engine, and check the shift lever in all positions. If any gear does not work properly, refer to troubleshooting (see page 14-294 and 14-295).
10. Insert the ignition key into the key cylinder on the A/T gear position indicator panel, and verify that the shift lock lever is released.

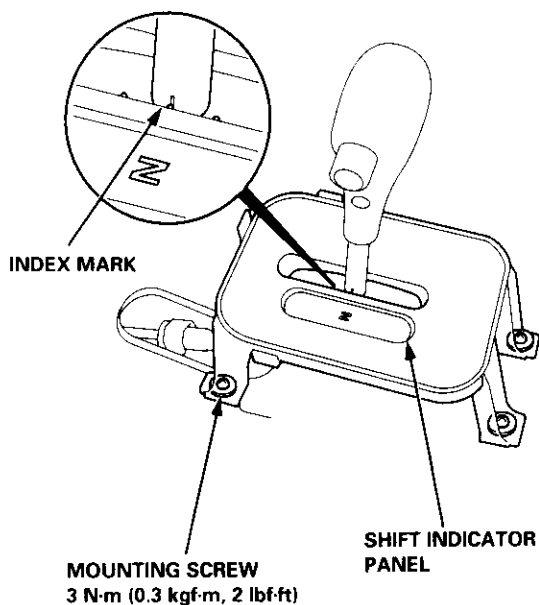
# Shift Lever





## Adjustment

1. Check that the index mark on the indicator aligns with the **N** mark on the shift indicator panel when the transmission is in NEUTRAL.

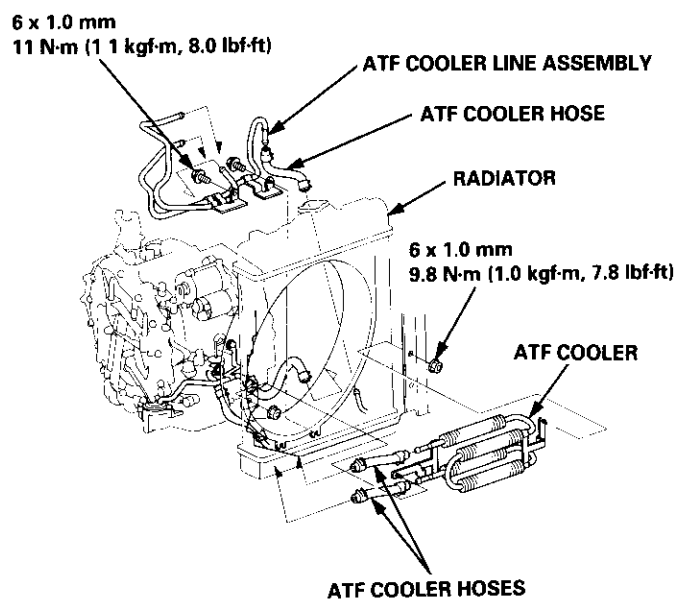


2. If not aligned, remove the front console (see section 20).
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.

## Installation

1. Install the ATF cooler, ATF cooler line assembly and the ATF cooler hoses.



2. Connect the ATF cooler hoses to the ATF cooler lines and ATF cooler, and secure them with the clips as shown.

