

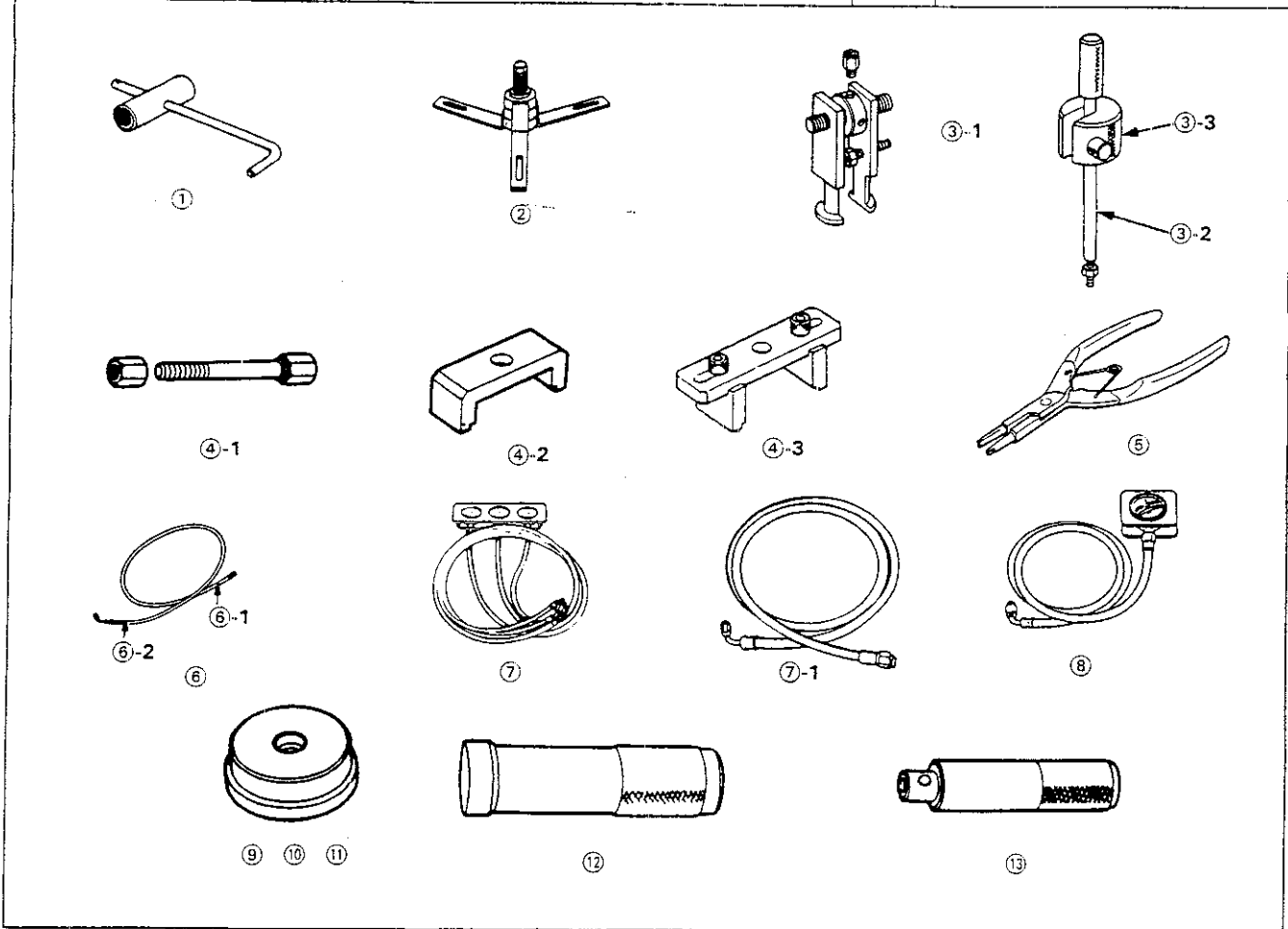
Automatic Transmission

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Special Tools

Ref No.	Tool Number	Description	Qty	Page Reference
①	07GAB-PF50101	Mainshaft Holder	1	14-67, 116
②	07HAC-PK40101	Housing Puller	1	14-69
③	07JAC-PH80000	Adjustable Bearing Remover Set	1	14-107, 108
③-1	07JAC-PH80100	Bearing Remover Attachment	1	14-107, 108
③-2	07JAC-PH80200	Remover Handle Assembly	1	14-107, 108
③-3	07741-0010201	Remover Weight	1	14-107, 108
④	07LAE-PX40000	Clutch Spring Compressor Set	1	14-101, 104
④-1	07GAE-PG40200	Clutch Spring Compressor Bolt	1	14-101, 104
④-2	07HAE-PL50100	Clutch Spring Compressor Attachment	1	14-101, 104
④-3	07LAE-PX40100	Clutch Spring Compressor Attachment	1	14-101, 104
⑤	07LGC-0010100	Snap Ring Pliers	1	14-97, 102, 105, 109, 110
⑥	07MAJ-PY40100	A/T Oil Pressure Gauge Hose Assembly	1	14-50
⑥-1	07MAJ-PY40110	Oil Pressure Gauge Hose	1	14-50
⑥-2	07MAJ-PY40120	Oil Pressure Joint	1	14-50
⑦	07406-0020003	A/T Oil Pressure Gauge Set	1	14-50
⑦-1	07406-0020201	A/T Oil Pressure Gauge Hose	1	14-50
⑧	07406-0070000	A/T Low Pressure Gauge	1	14-50
⑨	07746-0010100	Attachment, 32 x 35 mm	1	14-97
⑩	07746-0010500	Attachment, 62 x 68 mm	1	14-97, 107, 108, 109, 110
⑪	07746-0010600	Attachment, 72 x 75 mm	1	14-107, 109
⑫	07746-0030100	Driver, 40 mm I.D.	1	14-92
⑬	07749-0010000	Driver	1	14-97, 107, 108, 109, 110





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

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator, assembled in a single unit. The torque converter is 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 three parallel shafts, the mainshaft, countershaft and sub-shaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with the 4th gear).

The countershaft includes the 3rd clutch and gears for 3rd, 2nd, 4th, reverse, 1st and parking. Reverse and 4th gears can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector is moved.

The sub-shaft includes the 1st-hold clutch and gear for 1st and 4th.

The gears on the mainshaft are in constant mesh with those on the countershaft and sub-shaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft via the sub-shaft to provide **D4**, **D3**, **2**, **1** and **R**.

Hydraulic Control

The valve body assembly includes the main valve body, secondary valve body, regulator valve body, servo body, modulator valve body, lock-up valve body, and governor body, through the respective separator plates.

They are bolted on the torque converter housing.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 3-2 timing valve, 4th exhaust valve, relief valve, and oil pump gears.

The secondary valve body contains the 4-3 kick-down valve, 3-2 kick-down valve, 2-3 orifice control valve, 2-1 timing valve, Clutch Pressure Control (CPC) valve, servo control valve, reverse control valve, and governor cut valve.

The regulator valve body contains the pressure regulator valve, lock-up control valve, torque converter check valve, and cooler relief valve.

The servo body contains the servo valve which is integrated with the reverse shift fork, throttle valves A and B, 2/3-4 orifice control valve, and accumulators.

The modulator valve body bolted on the servo body contains the modulator valve.

The lock-up valve body contains the lock-up shift valve and lock-up timing valve B, and is bolted on the regulator valve body.

The governor body is bolted on the torque converter housing near the differential.

Fluid from the regulator passes through the manual valve to the various control valves.

Lock-up Mechanism

In **D4** and **D3** position, in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the engine control module (ECM) optimizes the timing of the lock-up mechanism.

The lock-up shift valve controls the range of lock-up according to the lock-up control solenoid valves A and B, and throttle valve B. When the lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the ECM.

(cont'd)

Description

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Gear Selection

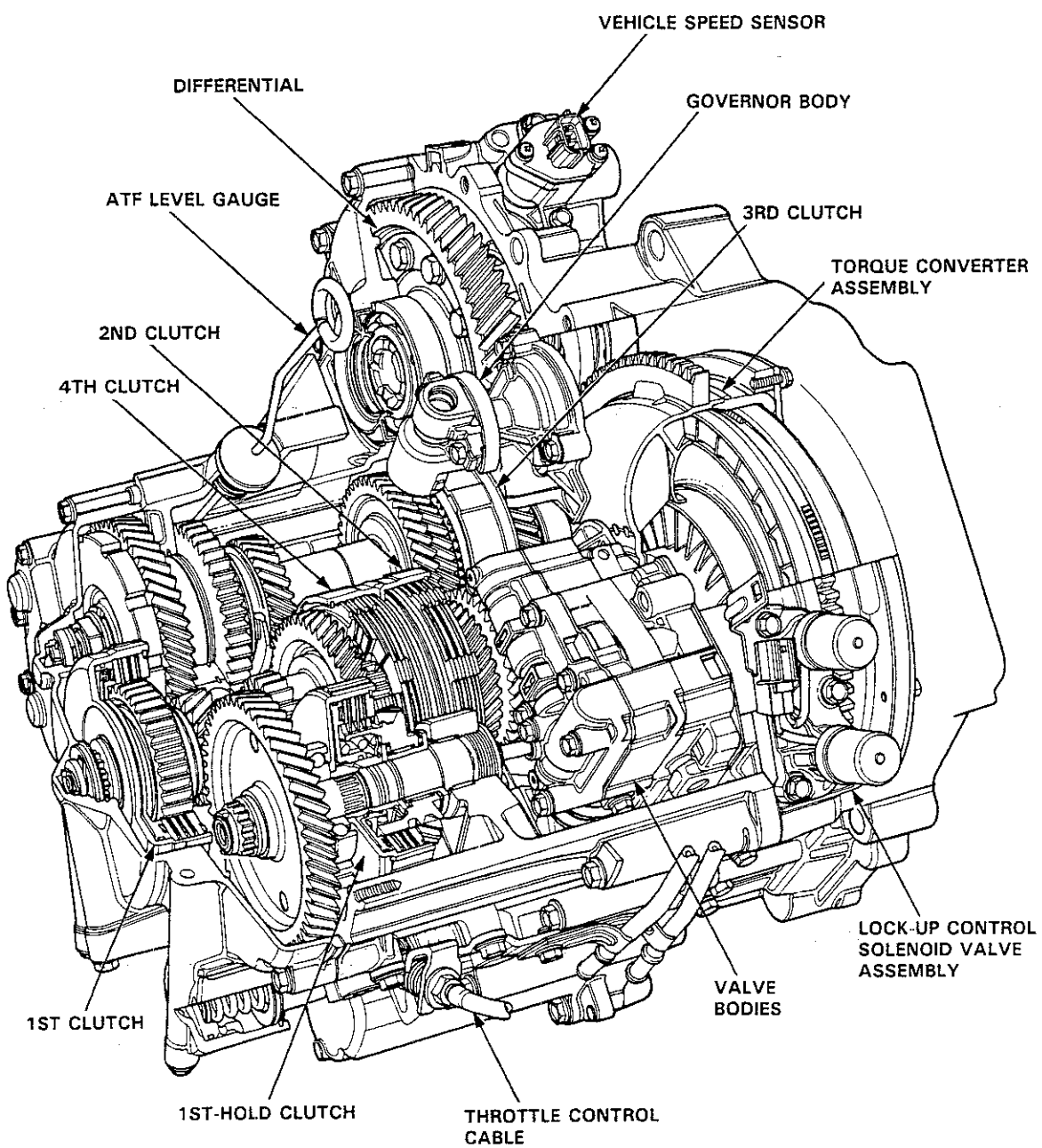
The selector lever has seven positions; **P** PARK, **R** REVERSE, **N** NEUTRAL, **D₄** 1st through 4th positions, **D₃** 1st through 3rd positions, **2** 2nd gear and **1** 1st gear.

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

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

Position Indicator

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



Description

Clutches

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

Likewise, when clutch pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other while disengaged. This allows the gear to spin independently of its shaft, transmitting no power.

[1st Clutch]

The first clutch engages/disengages first gear, and is located at the end of the mainshaft, just behind the R. side cover. The first clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[1st-hold Clutch]

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

[2nd Clutch]

The second clutch engages/disengages second gear, and is located at the center of the mainshaft. The second clutch is joined back-to-back to the fourth clutch. The second clutch is supplied clutch pressure through the mainshaft by a circuit connected to the regulator valve body.

[3rd Clutch]

The third clutch engages/disengages third gear, and is located at the end of the countershaft, opposite the R. side cover. The third clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

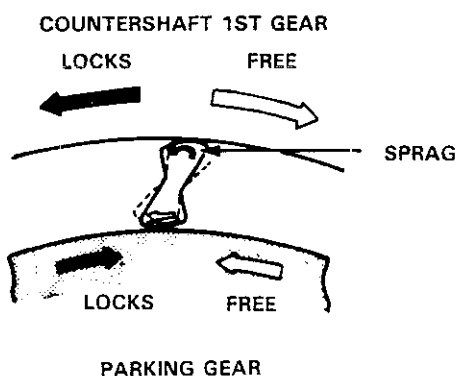
[4th Clutch]

The fourth clutch engages/disengages fourth gear, as well as reverse gear, and is located at the center of the mainshaft. The fourth clutch is joined back-to-back to the second clutch. The fourth clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

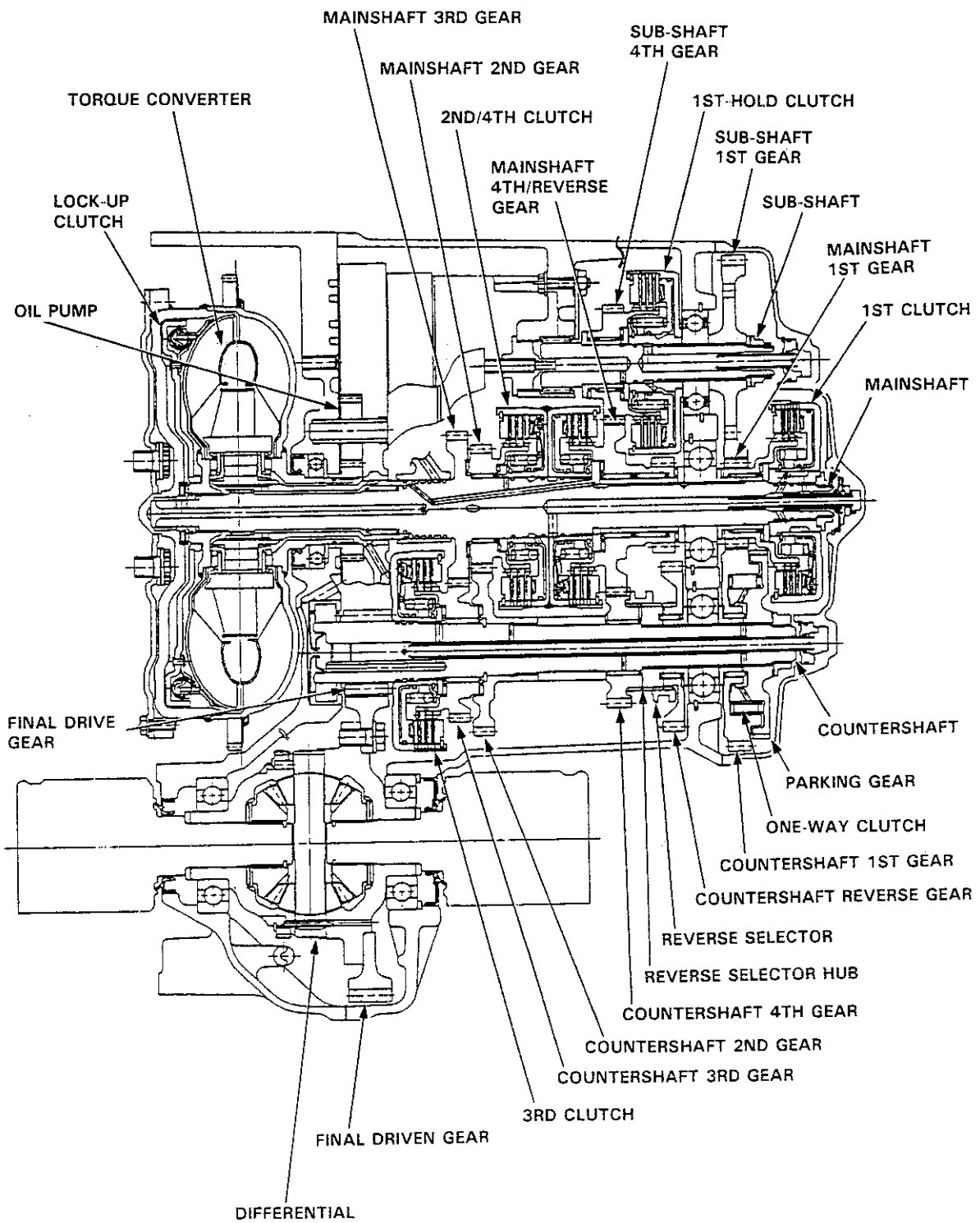
[One-way Clutch]

The one-way clutch is positioned between the parking gear and first gear with the parking gear splined to the countershaft. The first gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft first gear to the countershaft first gear.

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



NOTE: View from R. side cover side



(cont'd)

Description

Power Flow

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

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

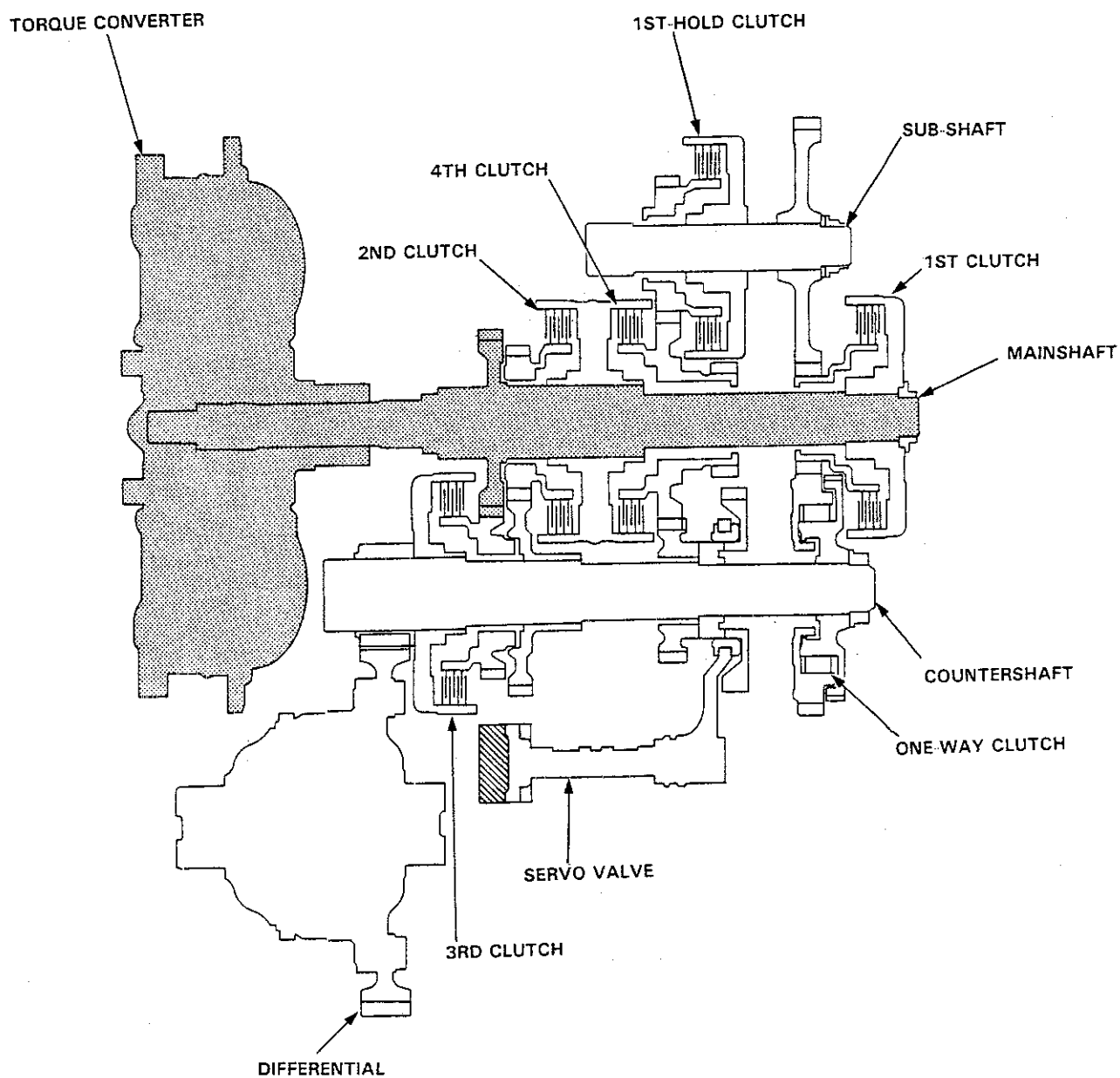


N Position

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

P Position

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



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Description

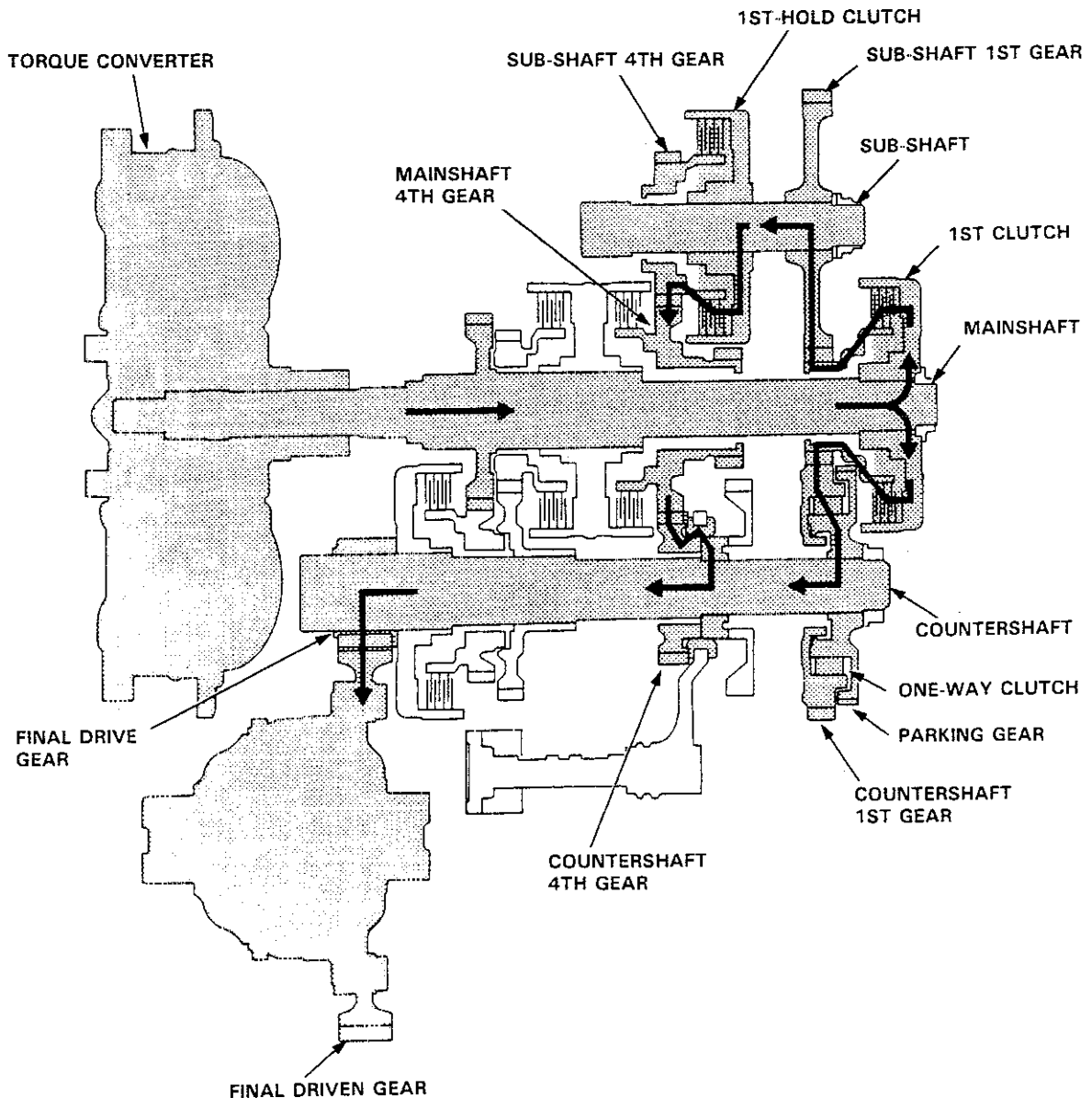
Power Flow (cont'd)

1 Position

At 1 position, hydraulic pressure is applied to the 1st clutch and 1st-hold clutch

The power flow when accelerating is as follows;

1. Hydraulic pressure is applied to the 1st clutch on the mainshaft and power is transmitted via the 1st clutch to the mainshaft 1st gear
2. Hydraulic pressure is also applied to the 1st-hold clutch on the sub-shaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch, and via the sub-shaft 1st gear to the 1st-hold clutch. The one-way clutch is used to drive the countershaft, and the 1st-hold clutch drives the countershaft via the 4th gears.
3. Power is transmitted to the final drive gear and drives the final driven gear

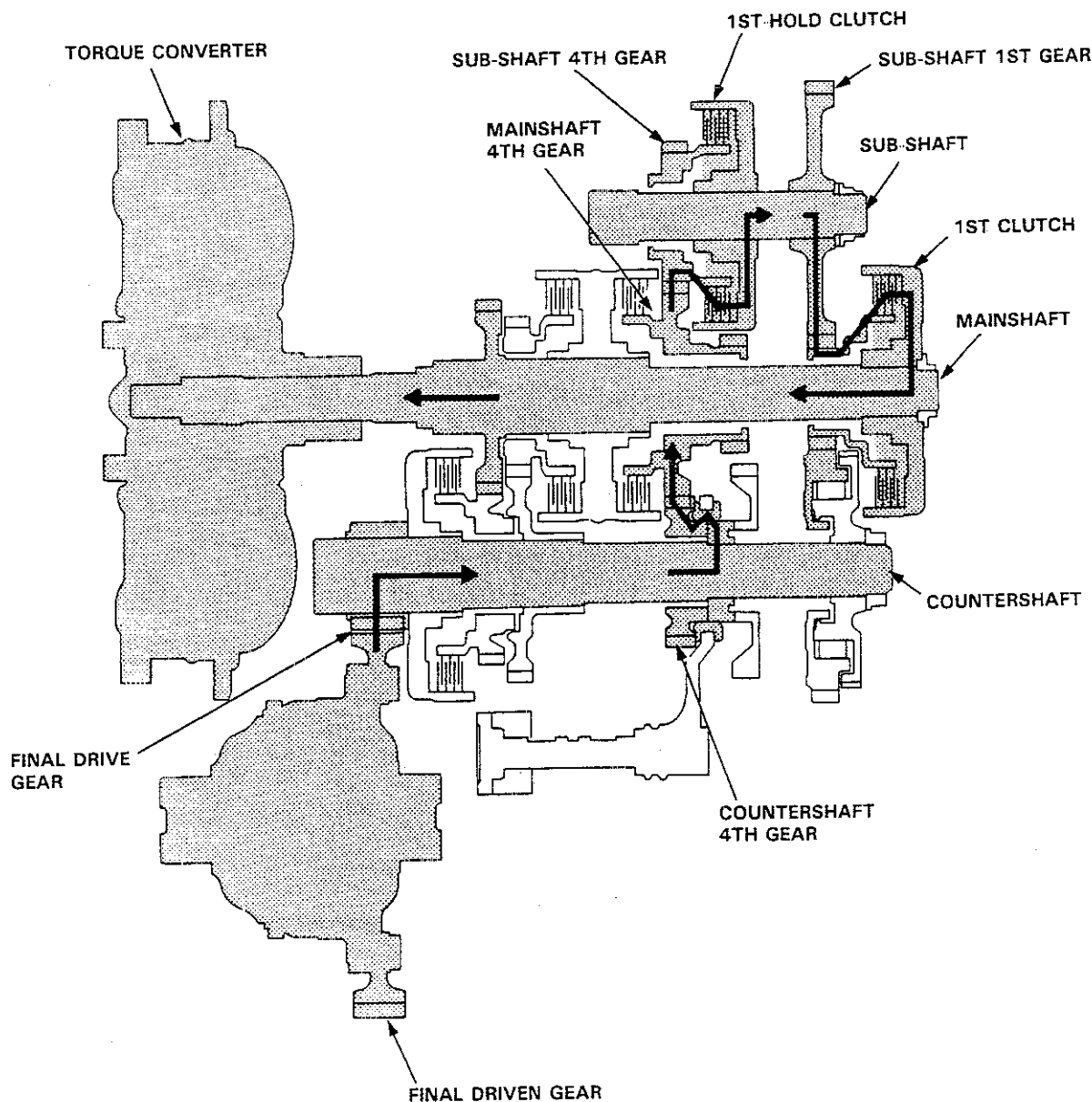




1 Position

The power flow when decelerating is as follows;

- 1 Rolling resistance from the road surface goes through the front wheels to the final drive gear, then to the sub-shaft 1st gear via the 4th gear and 1st-hold clutch which is applied during deceleration.
- 2 The one-way clutch becomes free at this time because torque reverses.
- 3 The counterforce conveyed to the countershaft 4th gear turns the sub-shaft 4th gear via the mainshaft 4th gear. At this time, since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear



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Description

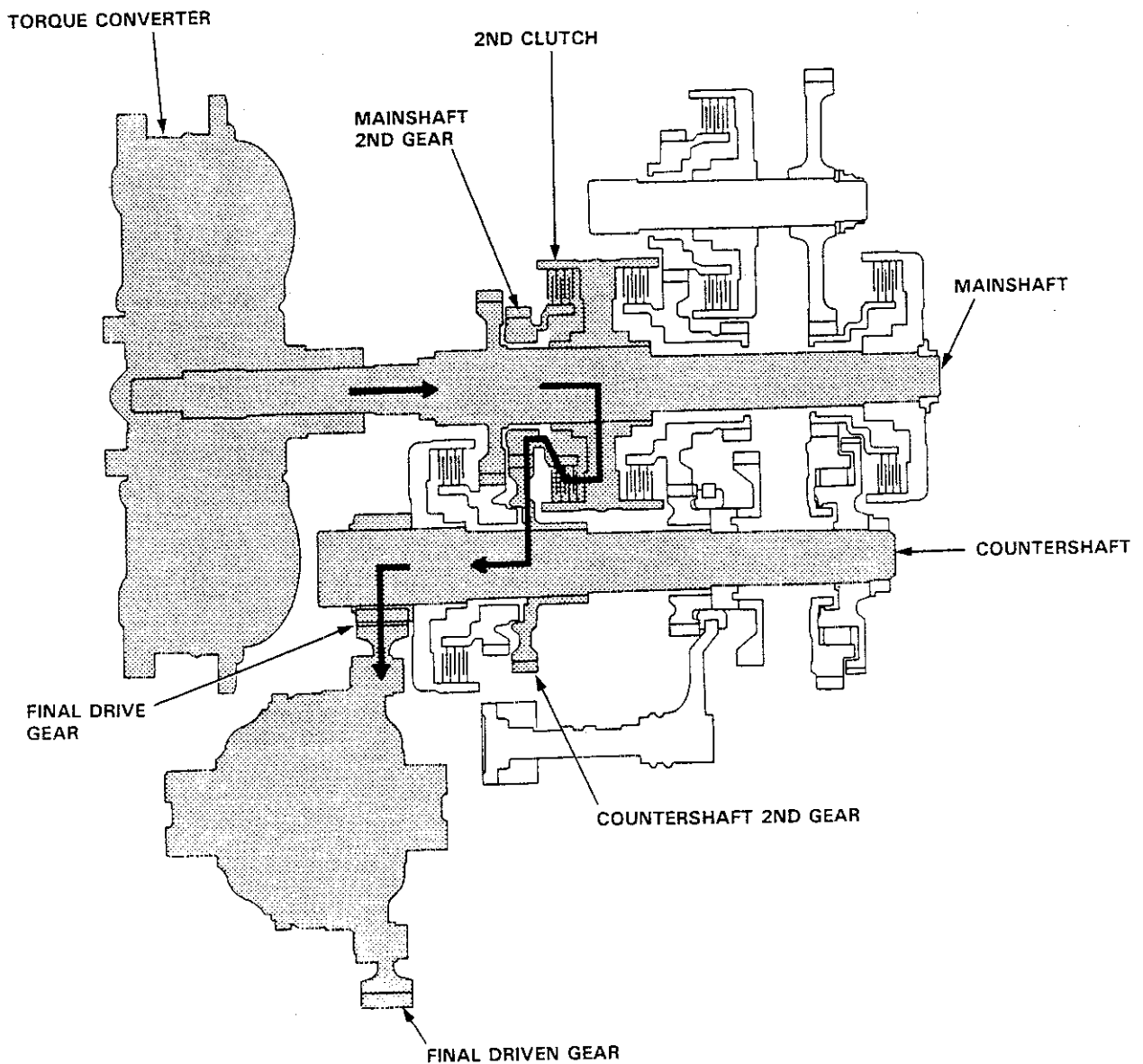
Power Flow (cont'd)

2 Position

2 Position is provided to drive only 2nd speed.

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, and drives the countershaft
3. Power is transmitted to the final drive gear and 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.



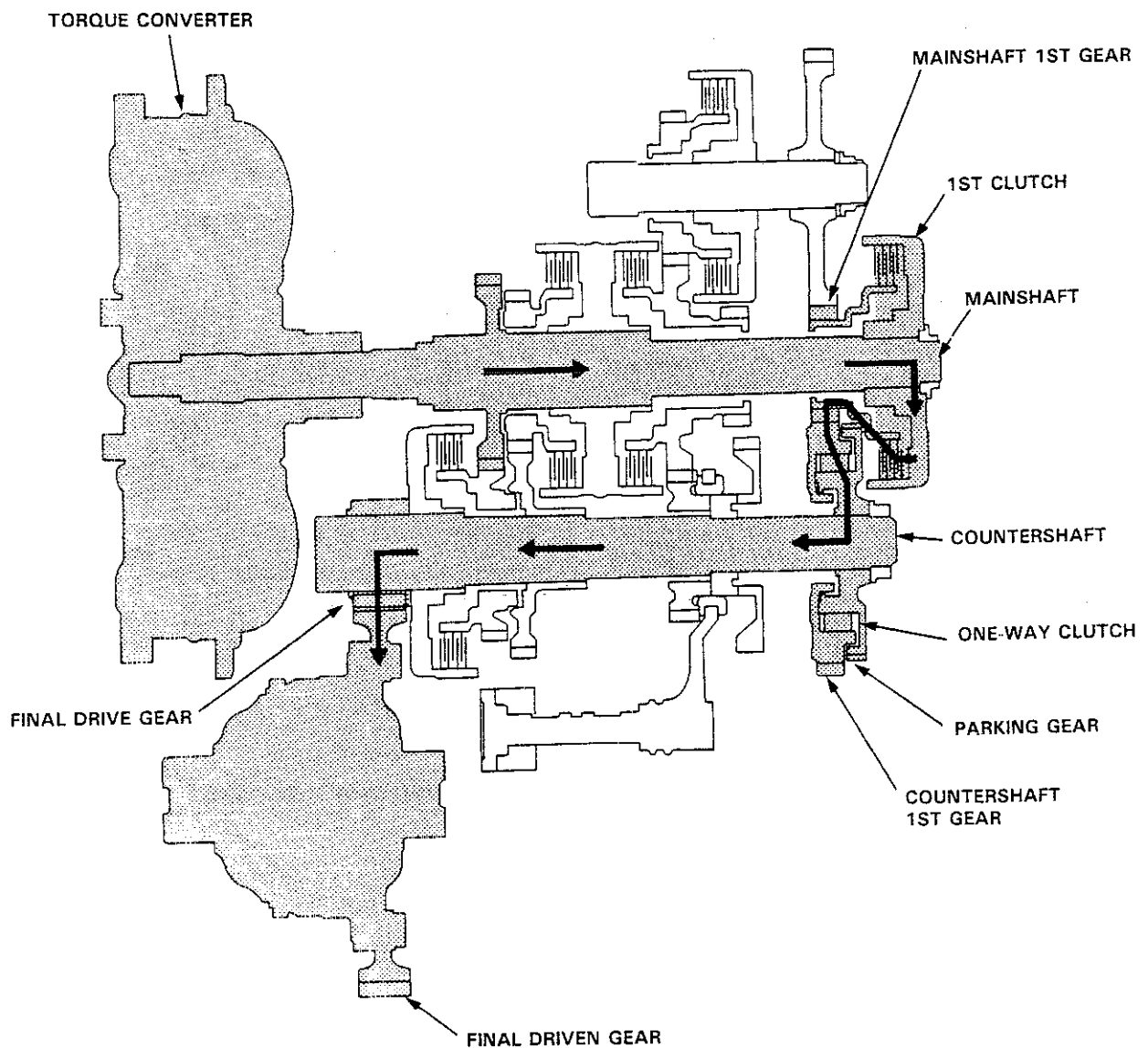


In **D₄** or **D₃** position, the optimum gear is automatically selected from 1st, 2nd, 3rd and 4th speeds, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

D₄ or **D₃** Position. 1st speed

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

NOTE: In **D₄** or **D₃** position, hydraulic pressure is not applied to the 1st-hold clutch.



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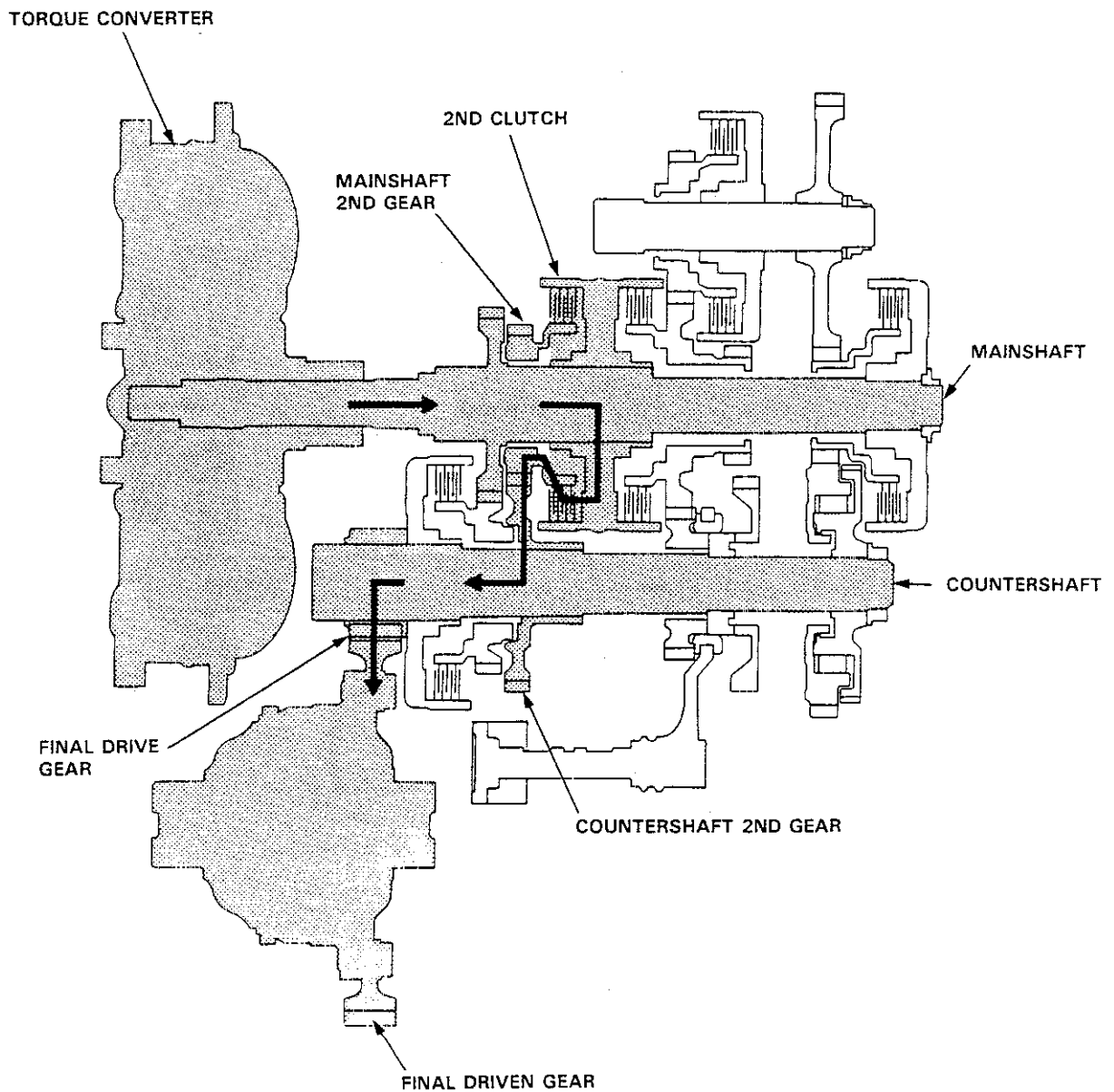
Description

Power Flow (cont'd)

D₄ or **D₃** Position, 2nd speed

- 1 Hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
- 2 Power is transmitted to the countershaft 2nd gear, and drives the countershaft.
- 3 Power is transmitted to the final drive gear and drives the final driven gear

NOTE: In **D₄** or **D₃** position, 2nd speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch

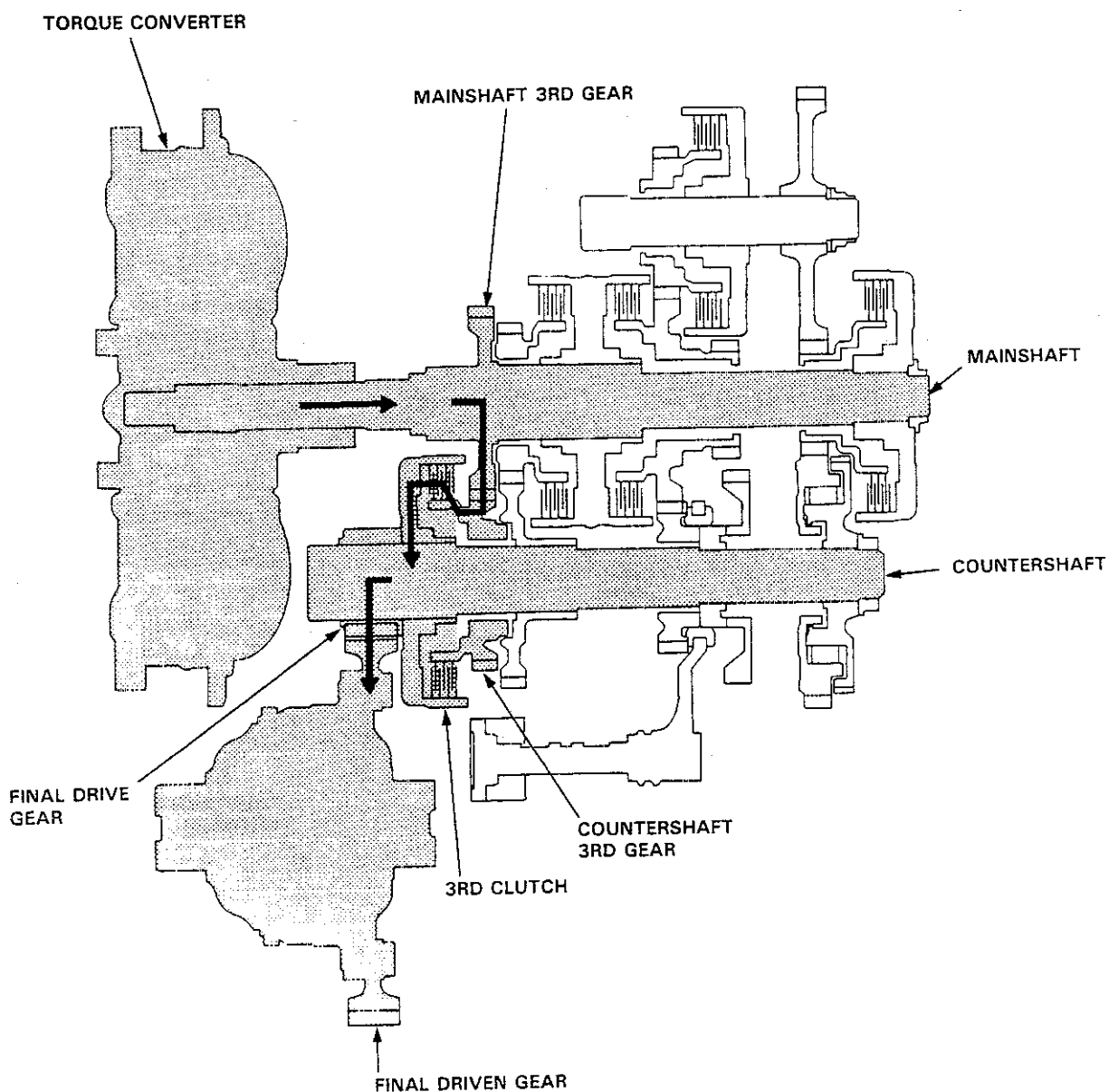




D₄ or **D₃** Position, 3rd speed

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 and drives the final driven gear.

NOTE: In **D₄** or **D₃** position, 3rd speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch



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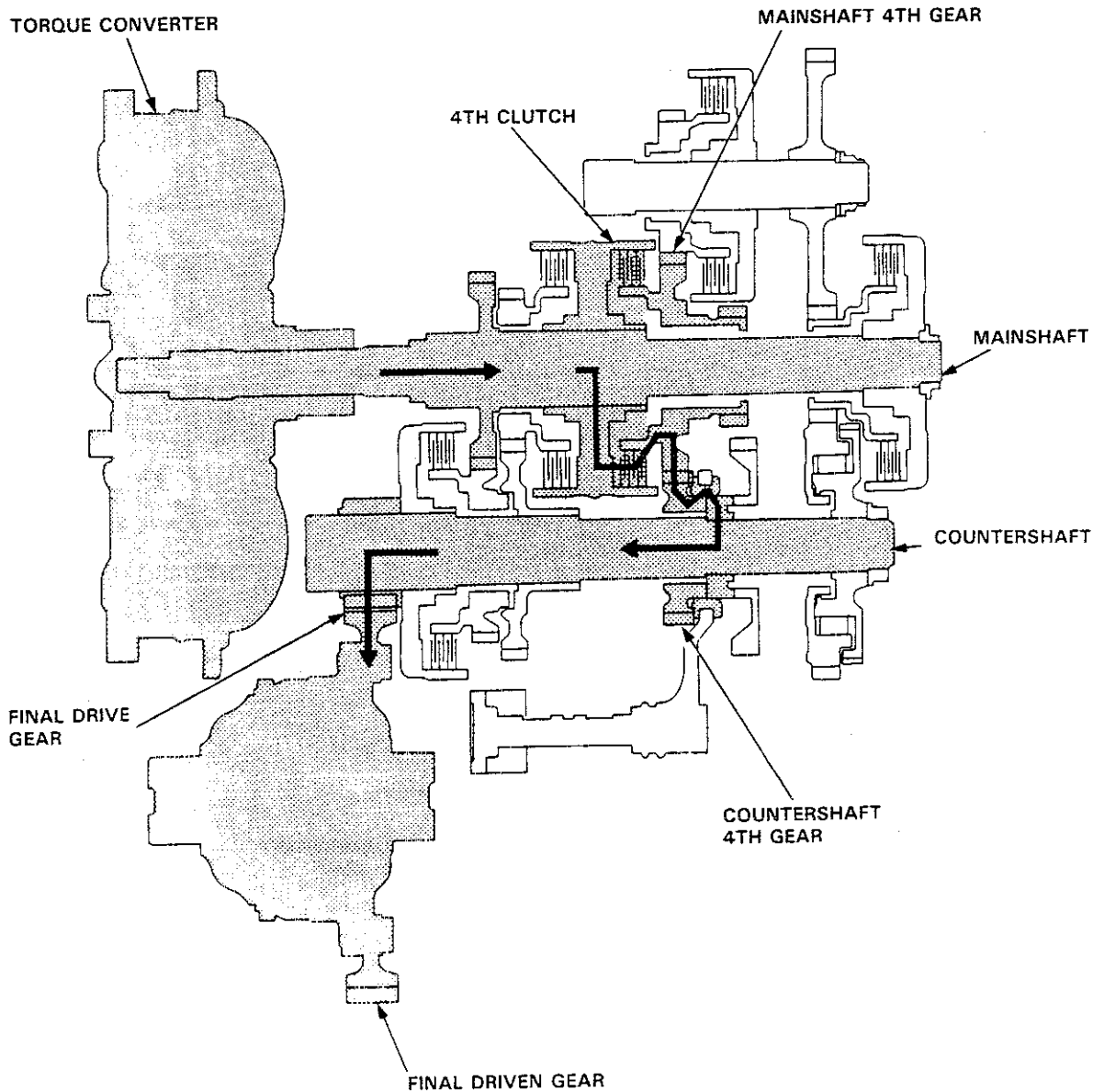
Description

Power Flow (cont'd)

D₄ Position: 4th speed

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

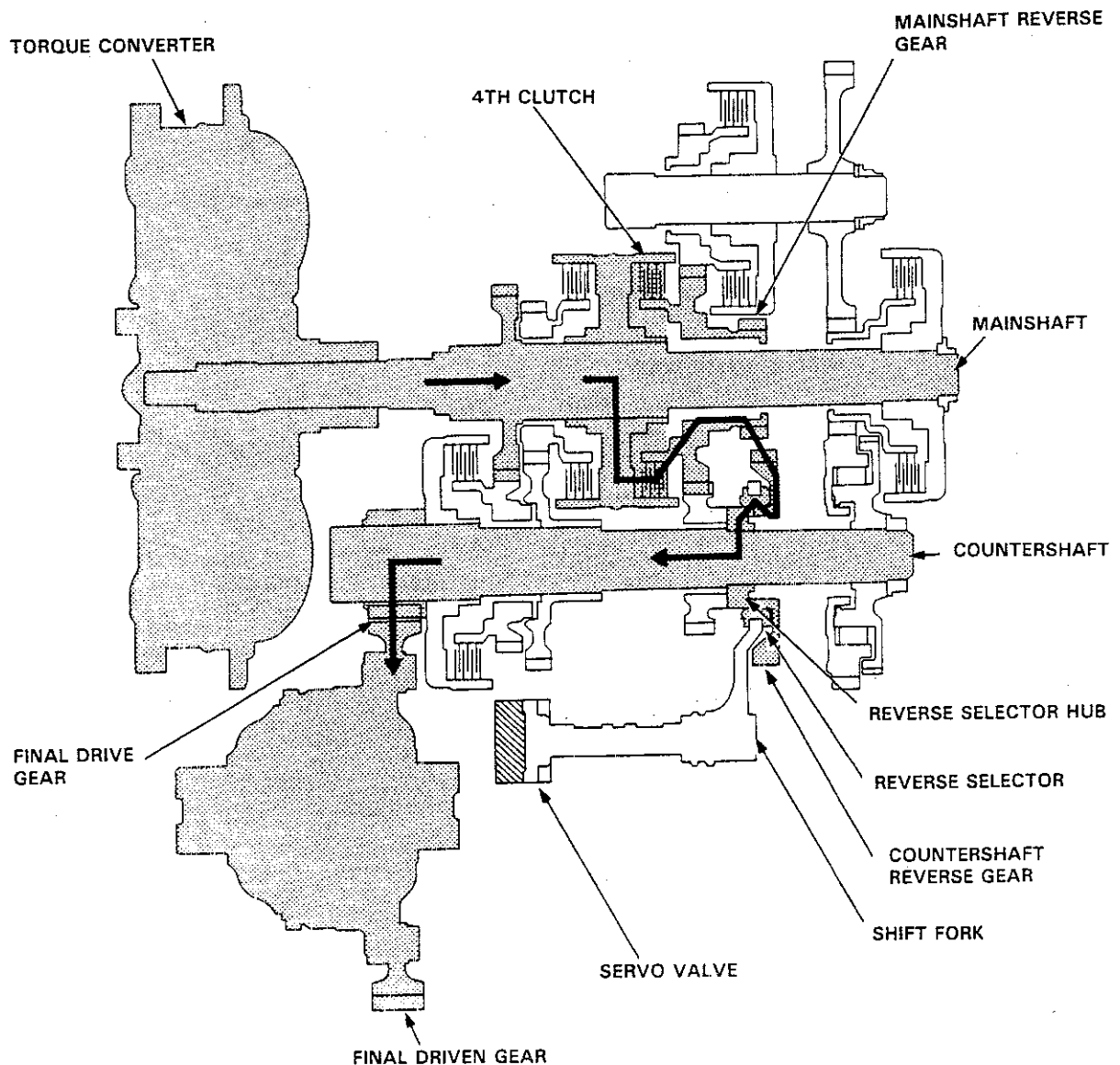
NOTE: In **D₄** position, 4th speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch





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. Rotation direction of the countershaft reverse gear is changed via the reverse idler gear.
4. Power is transmitted to the final drive gear and drives the final driven gear.

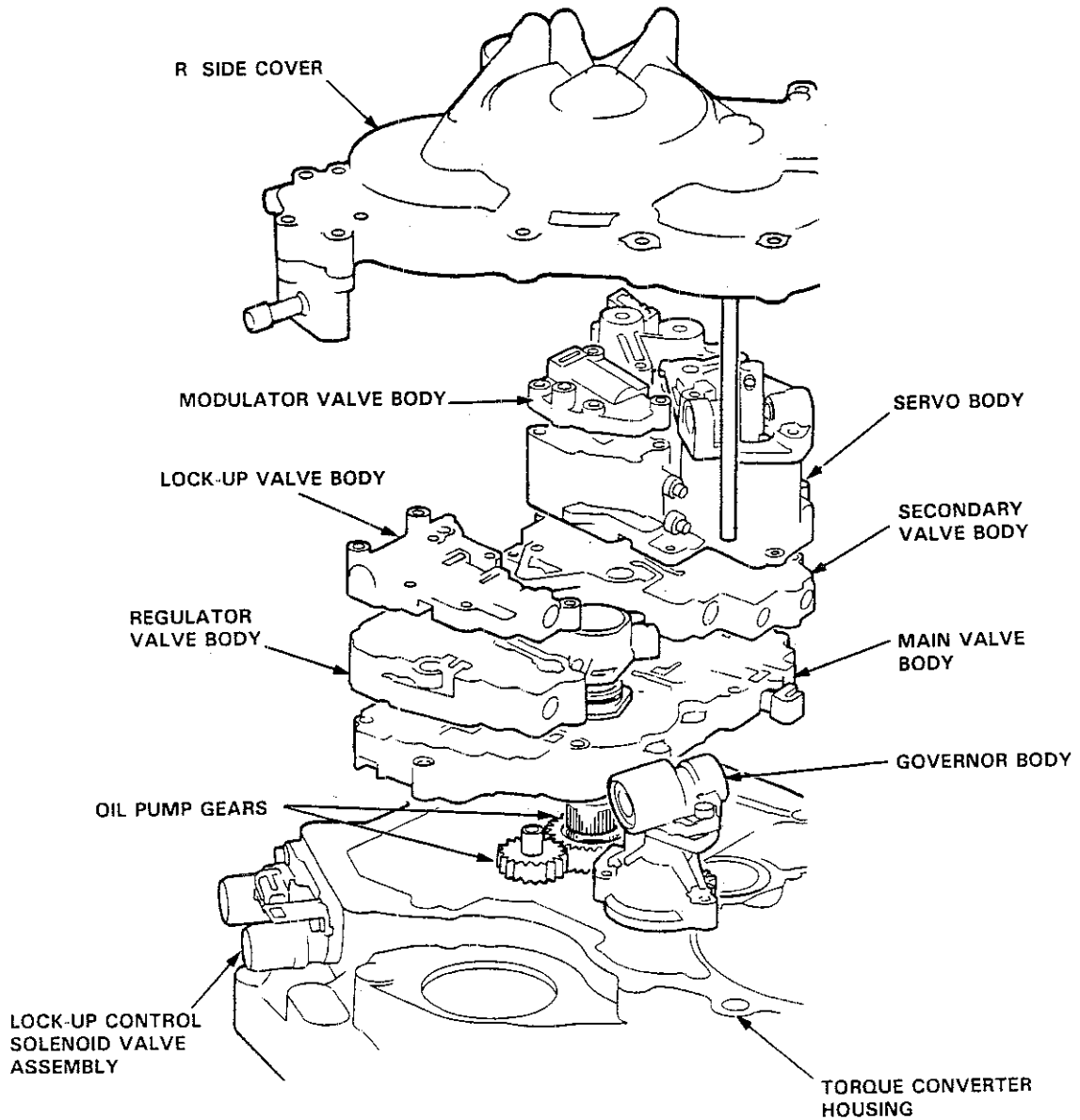


Description

Hydraulic Control

The valve bodies include the main valve body, secondary valve body, regulator valve body, servo body, lock-up valve body, governor body and modulator valve body.

The oil pump is driven by splines behind the torque converter which is attached to the engine. Oil 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.

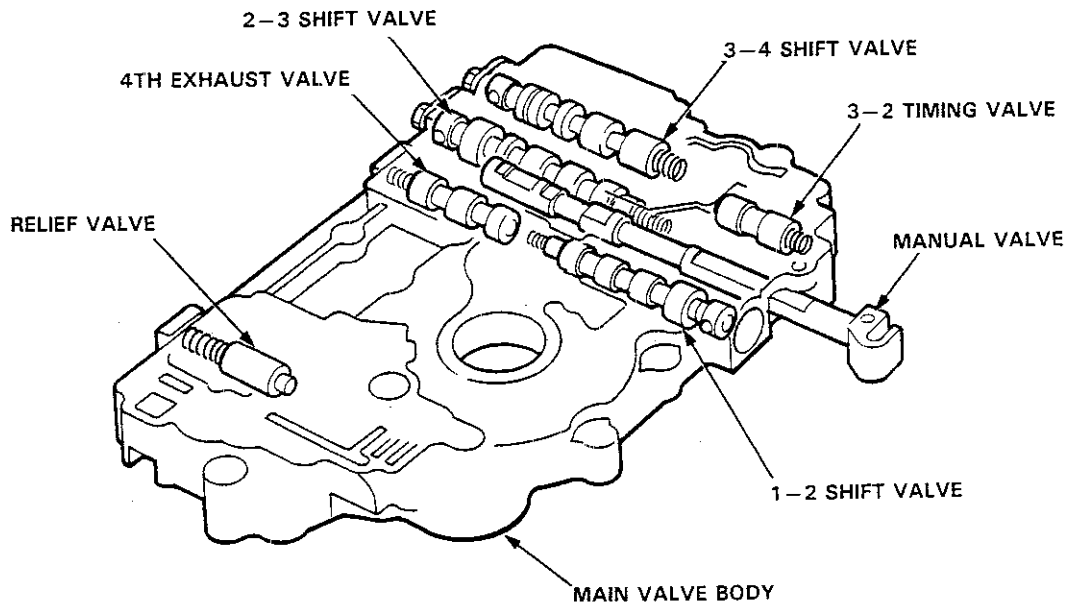




Main Valve Body

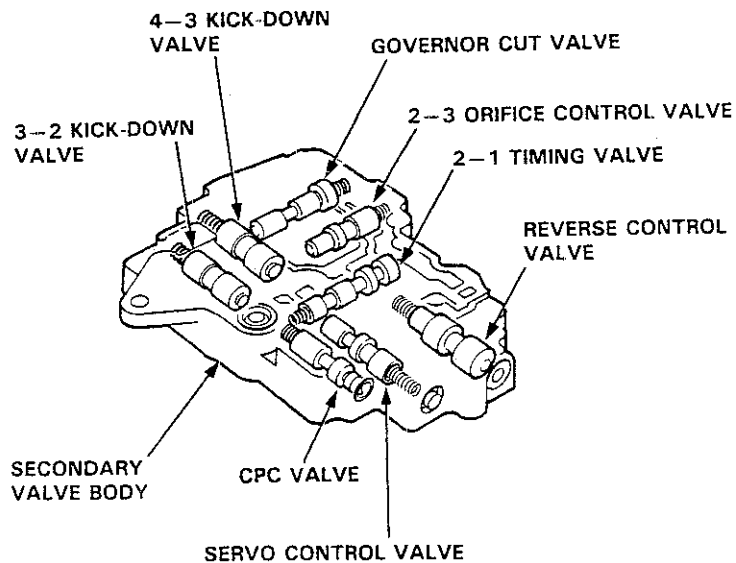
The manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 4th exhaust valve, 3-2 timing valve, and relief valve are all built into the main valve body

The primary function of this valve body is switching oil passages on and off and controlling the hydraulic pressure going to the hydraulic control system



Secondary Valve Body

The secondary valve body is located on the main valve body. The 3-2 kick-down valve, 4-3 kick-down valve, 2-3 orifice control valve, governor cut valve, 2-1 timing valve, reverse control valve, servo control valve, and clutch pressure control (CPC) valve are built into the secondary valve body



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Description

Hydraulic Control (cont'd)

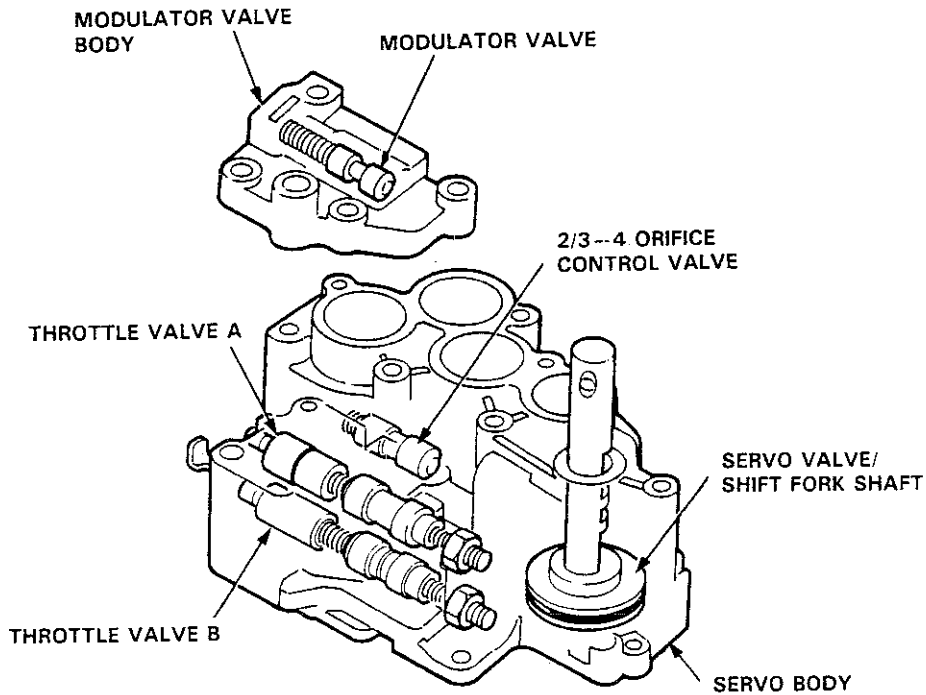
Servo Body

The servo body is located on the secondary valve body

The servo valve which is integrated with the shift fork shaft, throttle valve A and B, 2/3--4 orifice control valve, and accumulator pistons are all built into the servo body.

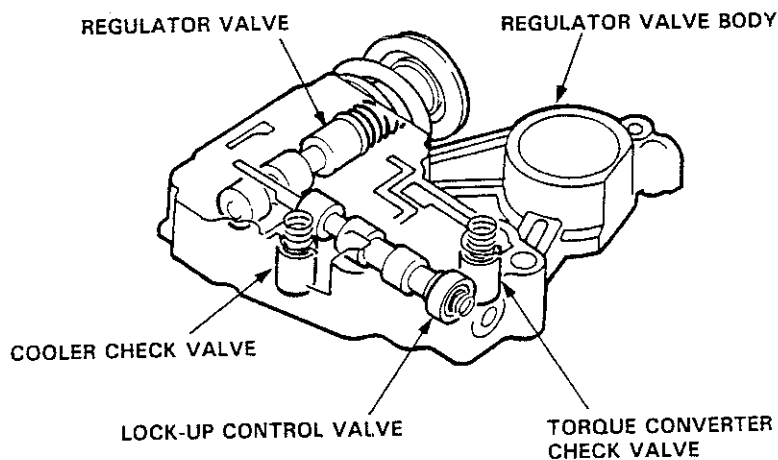
Modulator Valve Body

The modulator valve body with the modulator valve is located on the servo body



Regulator Valve Body

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



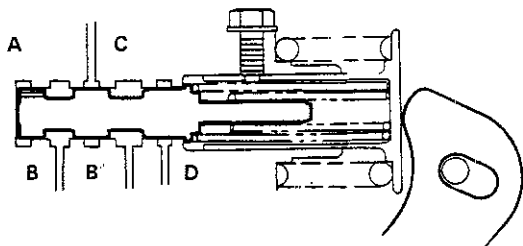


Regulator Valve

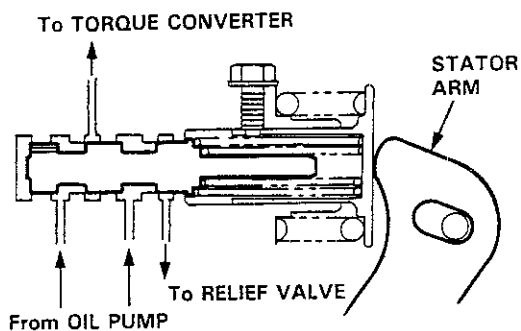
The regulator valve maintains a constant hydraulic pressure from the oil pump to the hydraulic control system, while also furnishing oil to the lubricating system and torque converter

Oil flows through B and B'. The oil which enters through B flows through the valve orifice to A, pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the oil through B' from D thus changes. This operation is continued, thus maintaining the line pressure.

(ENGINE NOT RUNNING)

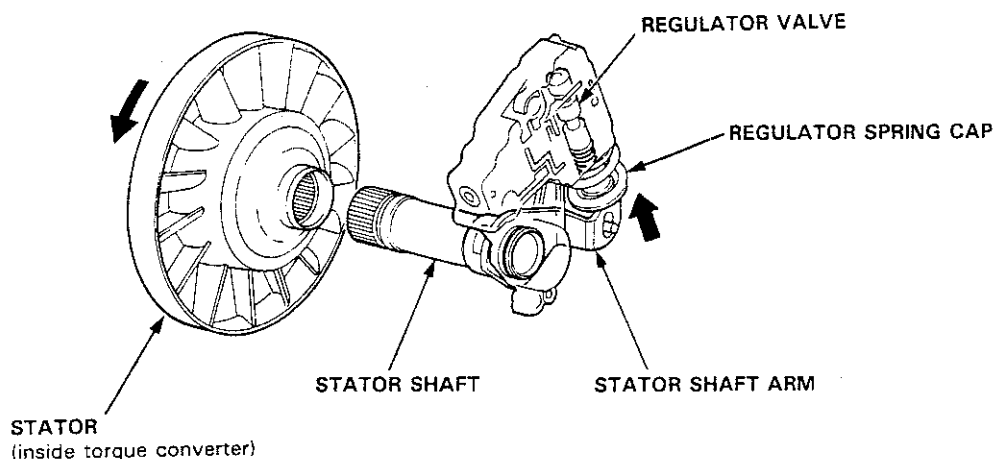


(ENGINE RUNNING)



Stator Reaction Hydraulic Pressure Control

Hydraulic pressure increase, according to torque is performed by the regulator valve using stator torque reaction. The stator shaft is splined to the stator and its arm end contacts the regulator spring cap. When the car is accelerating or climbing (Torque Converter Range) stator torque reaction acts on the stator shaft and the stator arm pushes the regulator spring cap in this → direction in proportion to the reaction. The spring compresses and the valve moves to increase the regulated control pressure or line pressure. Line pressure is maximum when the stator reaction is maximum.



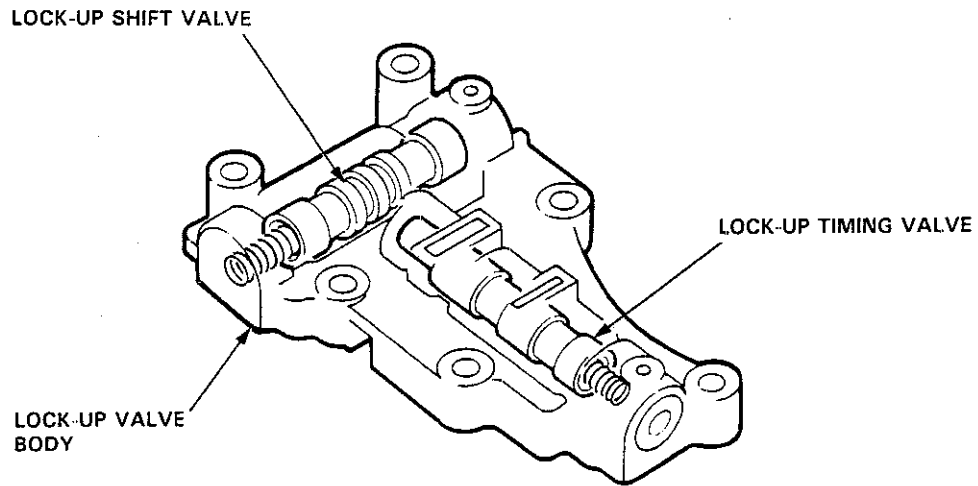
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Description

Hydraulic Control (cont'd)

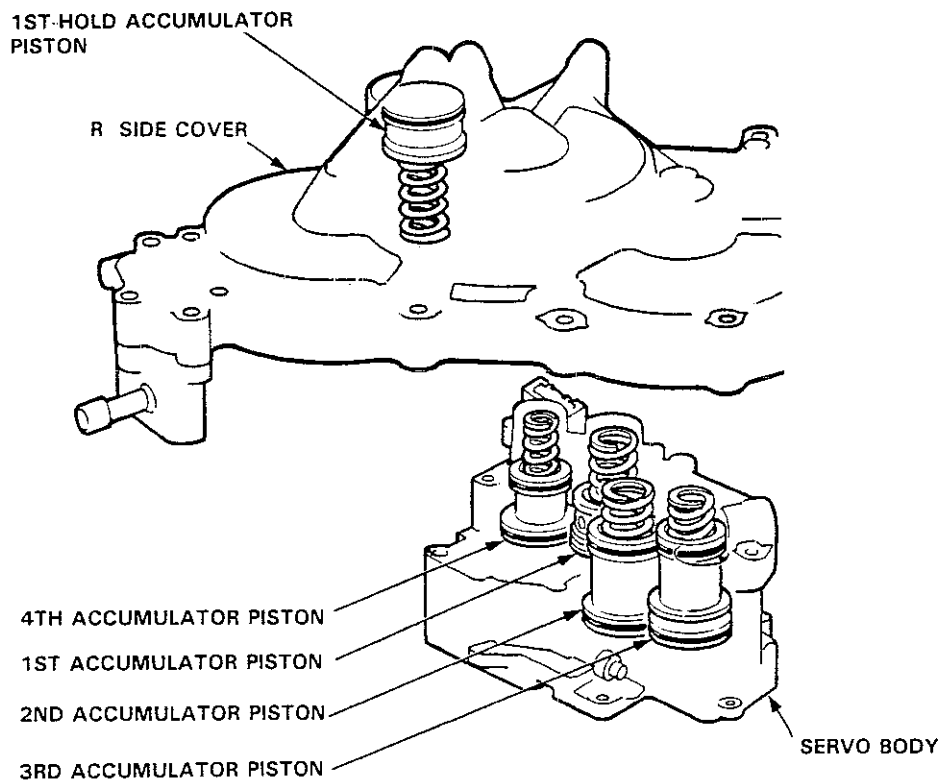
Lock-up Valve Body

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



Accumulator Pistons

The accumulator pistons are built into the servo body and R. side cover. The 1st-hold clutch accumulator piston is in the R. side cover, and the 1st, 2nd, 3rd, and 4th clutch accumulator pistons are built in the servo body.





Hydraulic Flow

General Chart of Hydraulic Pressure

Oil Pump -- Regulator Valve -- Line Pressure
 Torque Converter Pressure
 Lubrication Pressure

Distribution of Hydraulic Pressure

- Regulator Valve -- Line Pressure
 Torque Converter Pressure
 Lubrication Pressure
- Manual Valve -- To Select Line Pressure
- Modulator Valve -- Modulator Pressure
- 1-2 Shift Valve
- 2-3 Shift Valve -- Clutch Pressure
- 3-4 Shift Valve
- Throttle Valve A -- Throttle A Pressure
- Throttle Valve B -- Throttle B Pressure
- Governor Valve -- Governor Pressure

NO	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO	DESCRIPTION OF PRESSURE
1	LINE	16	1ST-HOLD CLUTCH	57	THROTTLE B
2	LINE	18	LINE	58	THROTTLE B
3	LINE	20	2ND CLUTCH	60	GOVERNOR
3'	LINE	21	2ND CLUTCH	61	GOVERNOR
3''	LINE	25	LINE	90	TORQUE CONVERTER
4	LINE	30	3RD CLUTCH	91	TORQUE CONVERTER
4'	LINE	31	3RD CLUTCH	92	TORQUE CONVERTER
5	LINE	40	4TH CLUTCH	93	OIL COOLER
5'	LINE	41	4TH CLUTCH	94	TORQUE CONVERTER
5''	LINE	50	THROTTLE A	95	LUBRICATION
6	MODULATOR	51	THROTTLE A	96	TORQUE CONVERTER
6'	MODULATOR	52	THROTTLE A	97	TORQUE CONVERTER
10	1ST CLUTCH	55	THROTTLE B	99	SUCTION
15	1ST-HOLD CLUTCH	56	THROTTLE B	X	BLEED

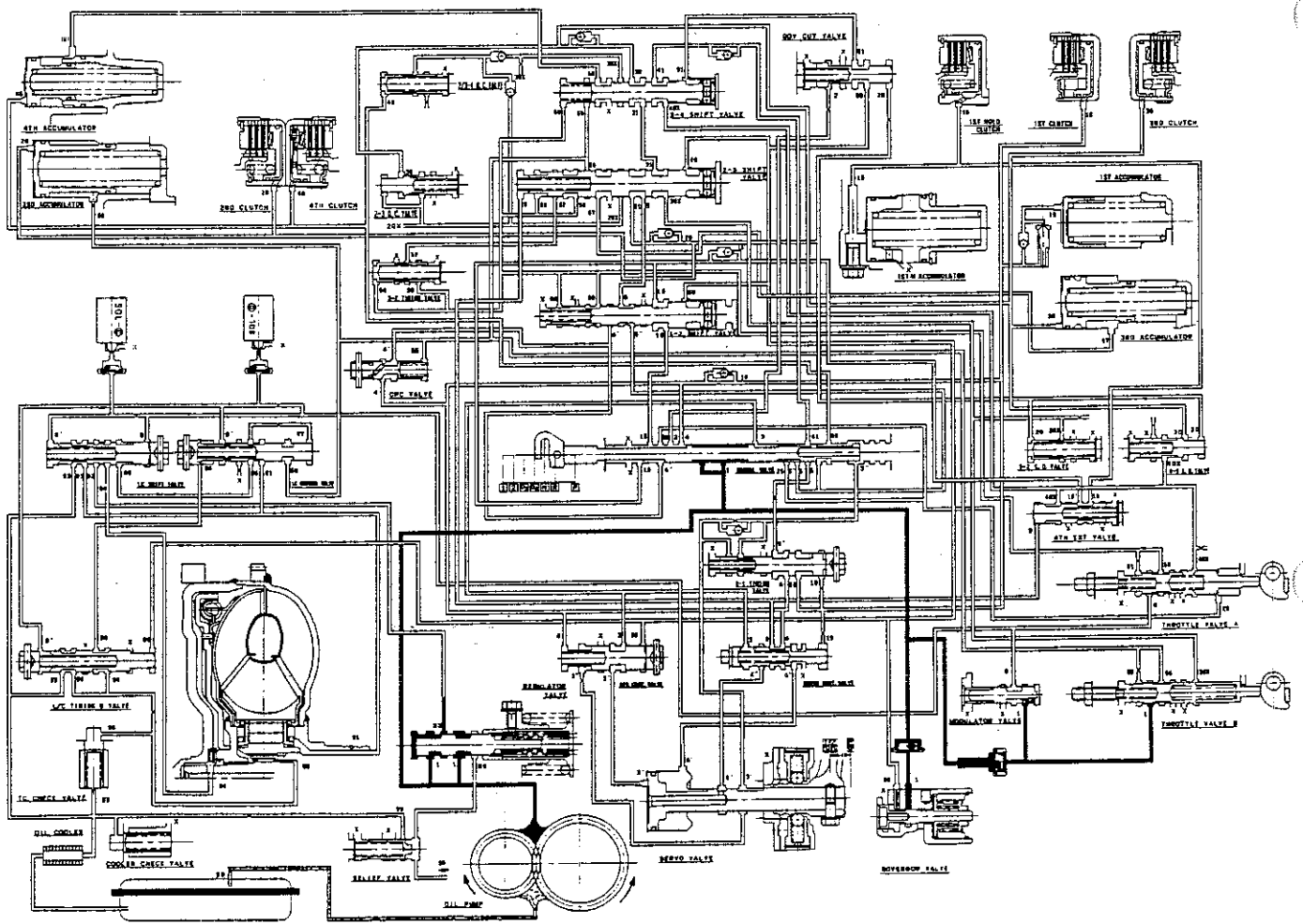
(cont'd)

Description

Hydraulic Flow (cont'd)

N Position

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



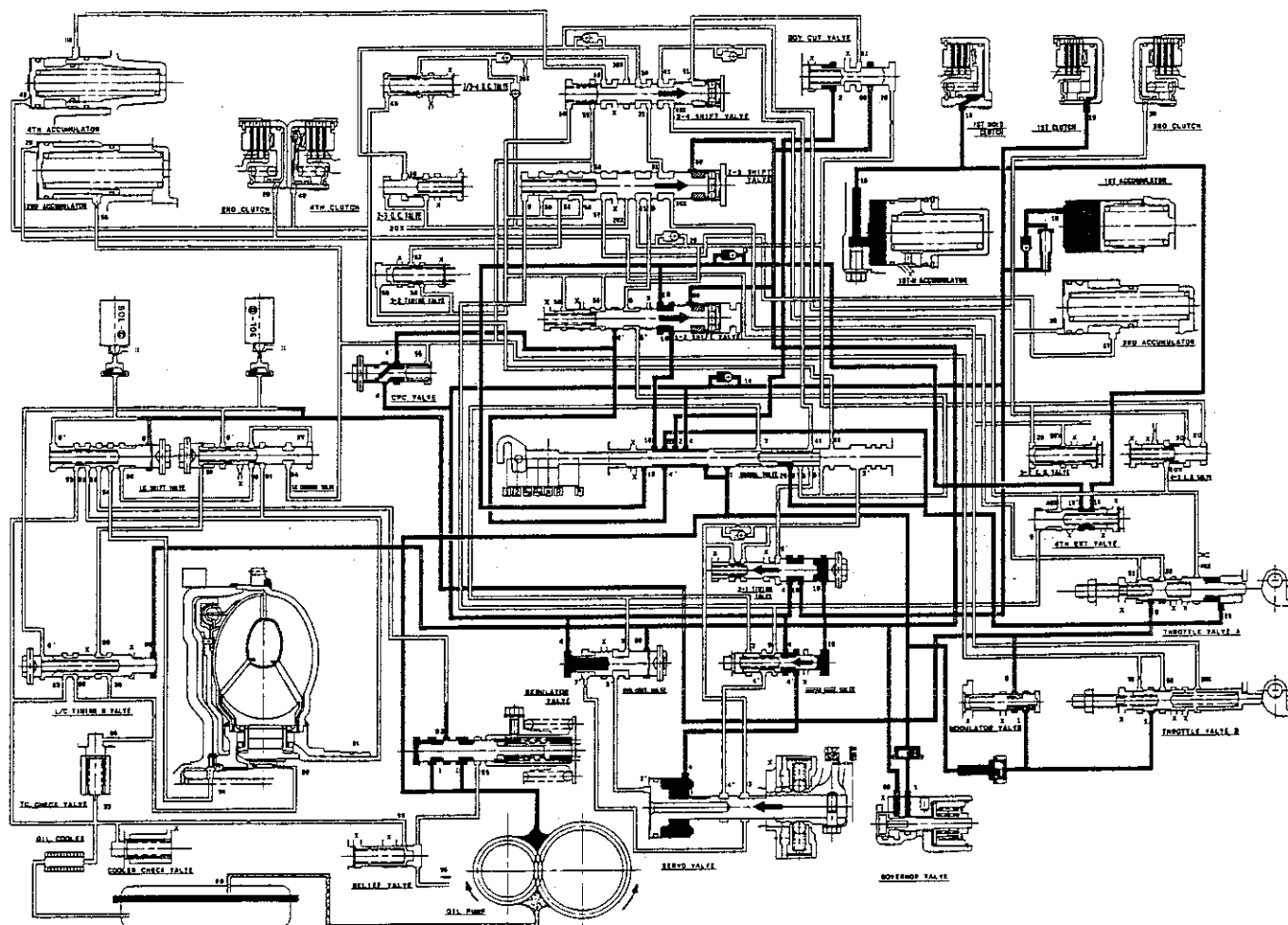


1 Position

The line pressure (1) becomes the line pressure (4) and 1st-hold clutch pressure (16) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves. The shift valves remain on the right side because the governor pressure is lower than the valve spring tension and the throttle A pressure supplied to the left side of the shift valves. The line pressure (4) becomes the 1st clutch pressure (10) via the orifice, then goes to the 1st clutch. The 1st clutch pressure (10) is also supplied to the servo control valve and 2-1 timing valve to move them to the left side. The 1st-hold clutch pressure (16) goes to the 1st-hold clutch via the 1-2 shift valve, orifice and 4th exhaust valve. In the 1 position, the 1st clutch and 1st-hold clutch are engaged. The line pressure (4) also goes to the servo valve via the servo control valve, and holds on the servo valve in the driving range.

NOTE:

- When used, "left" and "right" indicates direction on the flowchart.
- SOL-C: Lock-up Control Solenoid Valve A
- SOL-D: Lock-up Control Solenoid Valve B



(cont d)

Description

Hydraulic Flow (cont'd)

2 Position

The line pressure (1) becomes the line pressure (2), (4), (4'), (25) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves, but the 1-2 and 2-3 shift valves remain on the right side.

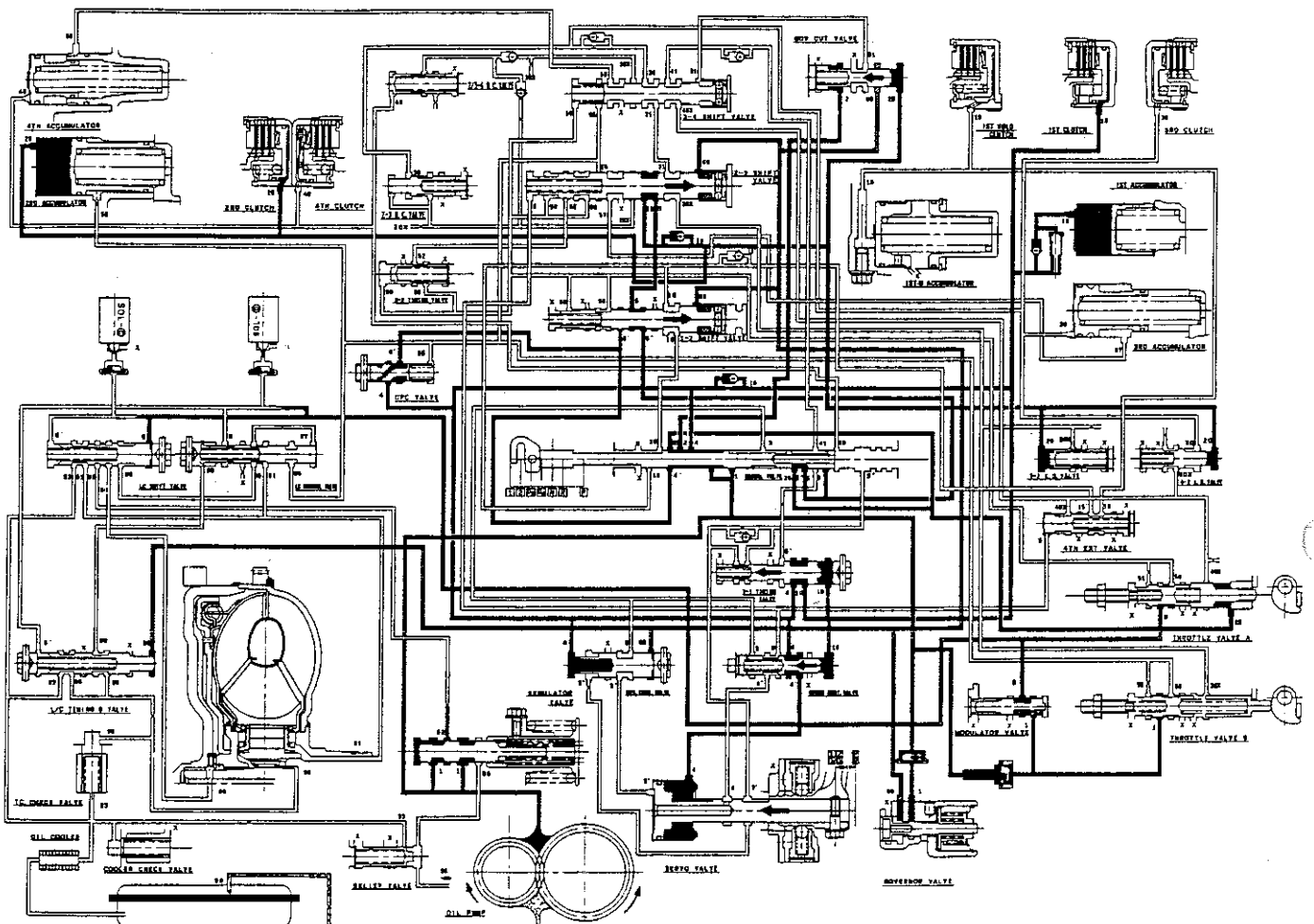
The line pressure (25) goes to the 2-3 shift valve via the 1-2 shift valve and becomes the 2nd clutch pressure (21). The 2nd clutch pressure (21) becomes the 2nd clutch pressure (20) as it passes through the orifice, then goes to the 2nd clutch.

The line pressure (4) becomes the 1st clutch pressure (10) and flows to the 1st clutch, servo control valve and 2-1 timing valve. The line pressure (4') also holds on the servo valve in the driving range as in the 1 Position.

In the 2 position, the 1st clutch and 2nd clutch are engaged. However, no power from the 1st clutch is transmitted by means of the one-way clutch.

NOTE:

- When used, "left" and "right" indicates direction on the flowchart.
- SOL-C: Lock-up Control Solenoid Valve A
- SOL-D: Lock-up Control Solenoid Valve B





D₄ or D₃ Position

1. 1st speed

The flow of fluid through the torque converter is the same as in the **N** position. The line pressure (1) becomes the line pressure (4). The line pressure (4) becomes the 1st clutch pressure (10) as it passes through the orifice. The 1st clutch pressure (10) is supplied to the 1st clutch and 1st accumulator, consequently the vehicle will move as the engine power is transmitted

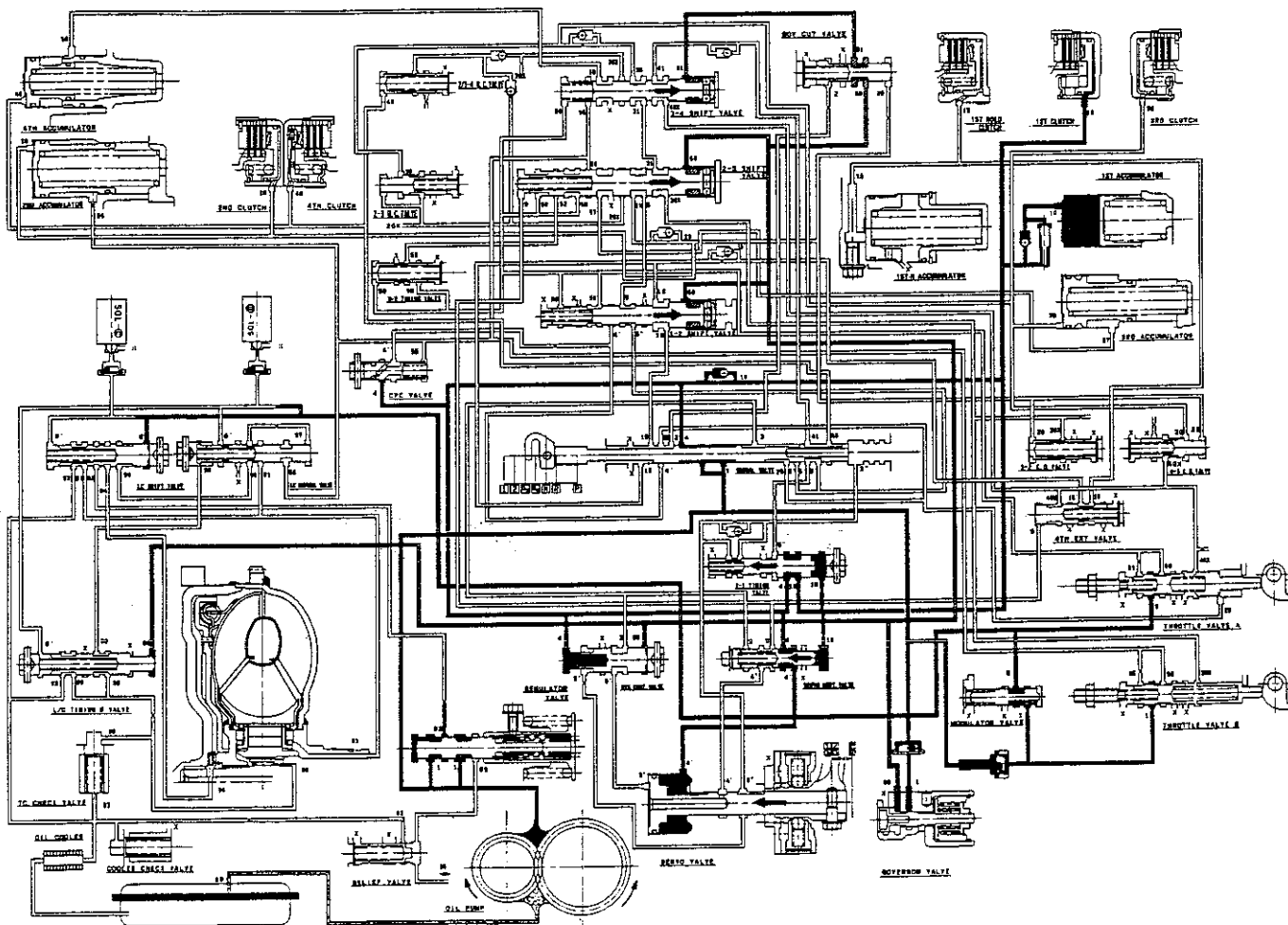
The line pressure (1) becomes the governor pressure (60) by the governor valve and travels to each shift valve. But, all shift valves remain on the right side because the governor pressure (60) is lower than the shift valve spring tension and the throttle A pressure

The line pressure (1) also flows to the modulator valve and throttle valve B

In the **D₄** or **D₃** position, the line pressure (4') flows to the servo valve and holds it on in the driving range as in the **1** and **2** position

NOTE:

- When used, "left" or "right" indicates direction on the flowchart.
- SOL-⊙: Lock-up Control Solenoid Valve A
- SOL-⊖: Lock-up Control Solenoid Valve B



(cont'd)

Description

Hydraulic Flow (cont'd)

2. 2nd speed

The flow of fluid up to the 1-2 and 2-3 shift valves is the same as the 1st speed range. As the speed of the car reaches the prescribed value, the 1-2 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 2nd clutch; the 2nd clutch is engaged.

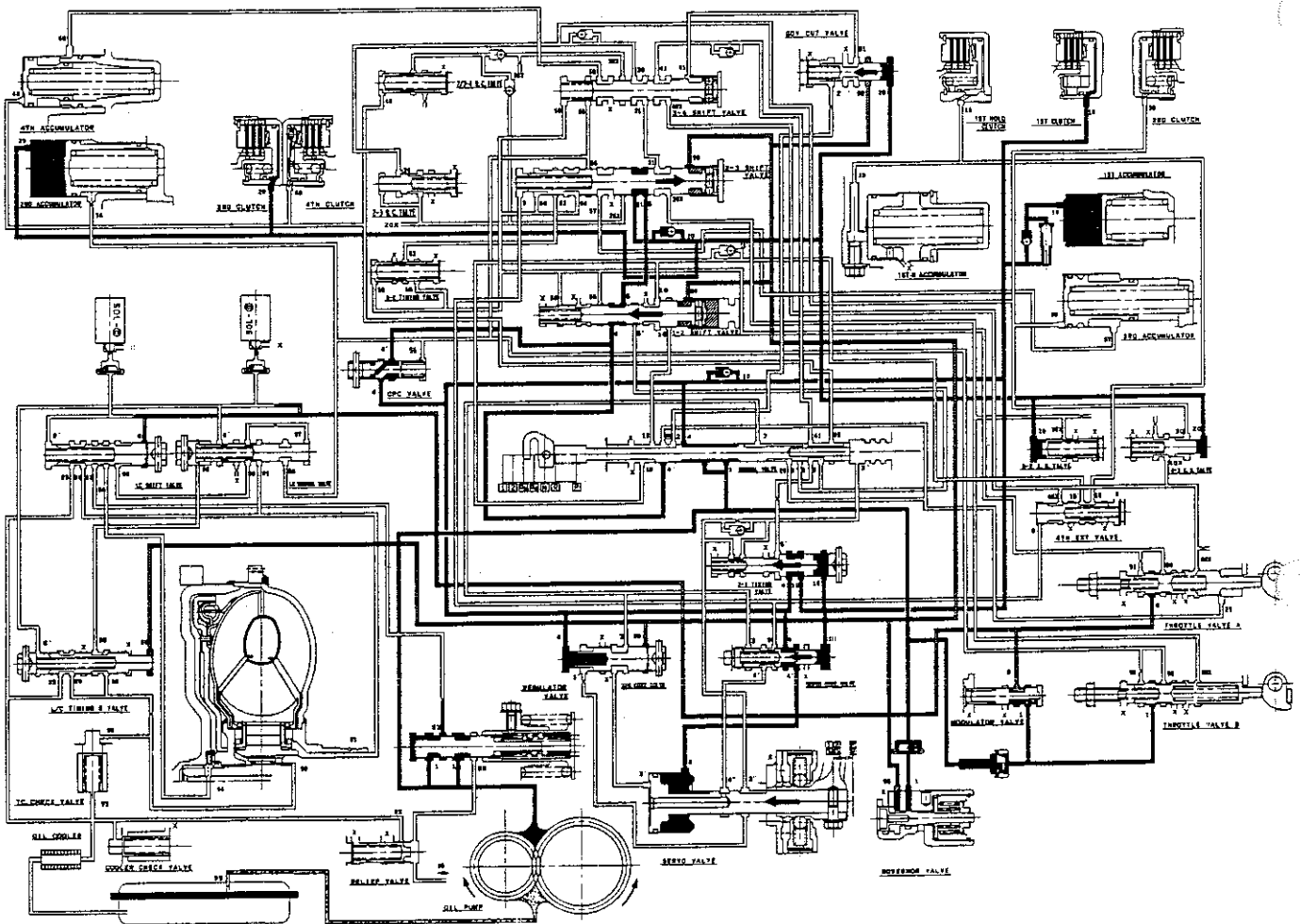
Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4) → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-2nd Clutch Pressure (21) → Orifice-2nd Clutch Pressure (20) → 2nd Clutch

The 2nd clutch pressure (20) is also supplied to the governor cut valve. The governor cut valve is moved to the left side to cover the oil port of the governor pressure (60) to the 3-4 shift valve. The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch.

NOTE:

- When used, "left" or "right" indicates direction on the flowchart.
- SOL-⊙: Lock-up Control Solenoid Valve A
- SOL-⊖: Lock-up Control Solenoid Valve B





3 3rd speed

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 2nd speed range. As the speed of the car reaches the prescribed value, the 2-3 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 3rd clutch. Since the 1-2 shift valve is kept on the left side, and the 3-4 shift valve is on the right side to uncover the oil port leading to the 3rd clutch, the 3rd clutch is engaged.

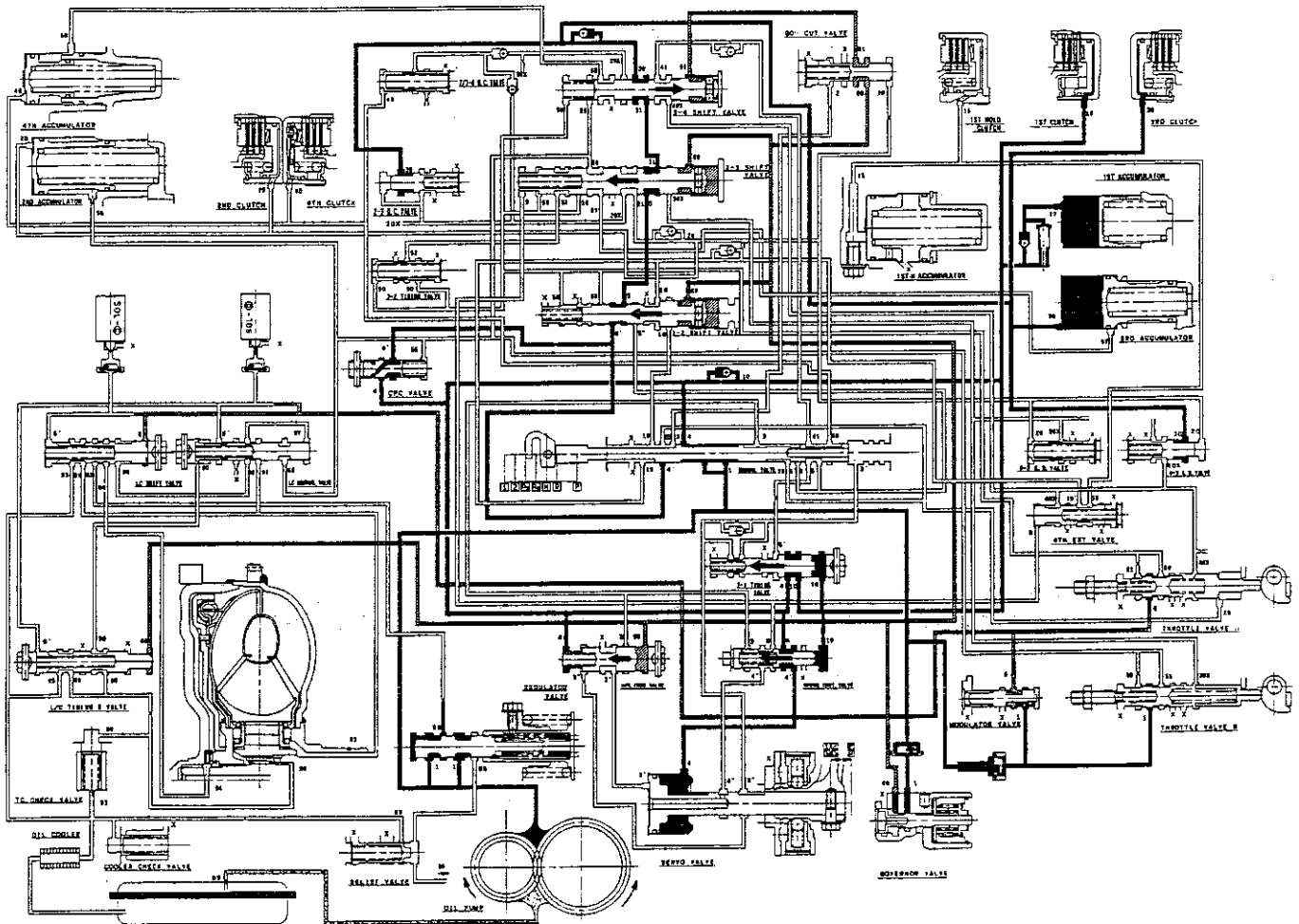
Fluid flows by way of:

Line Pressure (4) — CPC Valve-Line Pressure (4') — 1-2 Shift Valve-Line Pressure (5) — 2-3 Shift Valve-3rd Clutch Pressure (31) — 3-4 Shift Valve-3rd Clutch Pressure (30) — Orifice — 3rd Clutch.

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

NOTE:

- When used, "left" and "right" indicates direction on the flowchart
- SOL-C: Lock-up Control Solenoid Valve A
- SOL-D: Lock-up Control Solenoid Valve B



(cont d)

Description

Hydraulic Flow (cont'd)

4. 4th speed

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 3rd speed range. As the speed of the car reaches the prescribed value, the 3-4 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through to the 4th clutch; the power is transmitted through the 4th clutch.

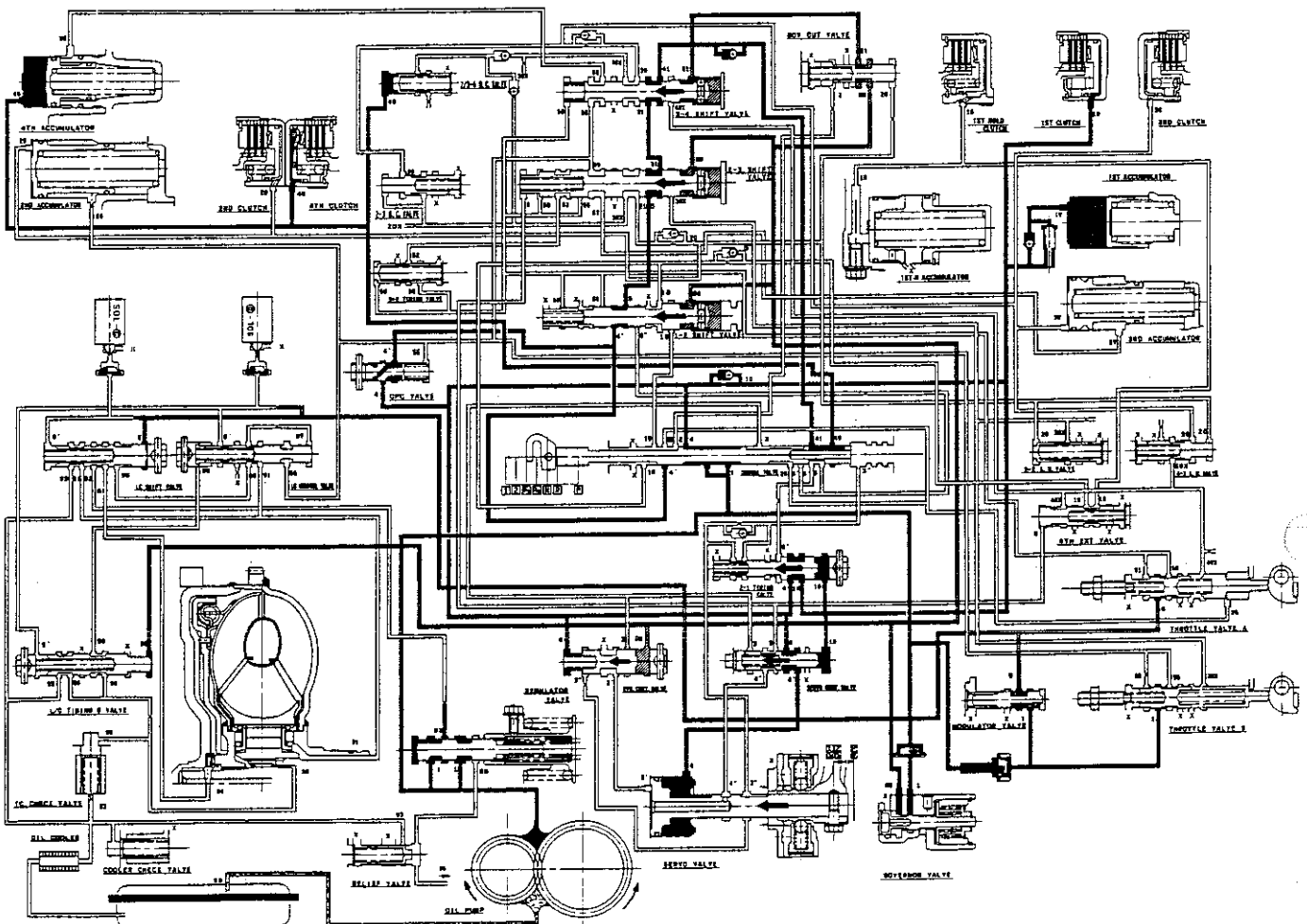
Fluid flows by way of:

Line Pressure (4) - CPC Valve-Line Pressure (4') - 1-2 Shift Valve-Line Pressure (5) - 2-3 Shift Valve-3rd Clutch Pressure (31) - 3-4 Shift Valve-4th Clutch Pressure (41) - Orifice - Manual Valve-4th Clutch Pressure (40) - 4th Clutch.

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch as in the 3rd speed.

NOTE:

- When used, "left" or "right" indicates direction on the flowchart.
- SOL-⊙: Lock-up Control Solenoid Valve A
- SOL-⊖: Lock-up Control Solenoid Valve B





R Position

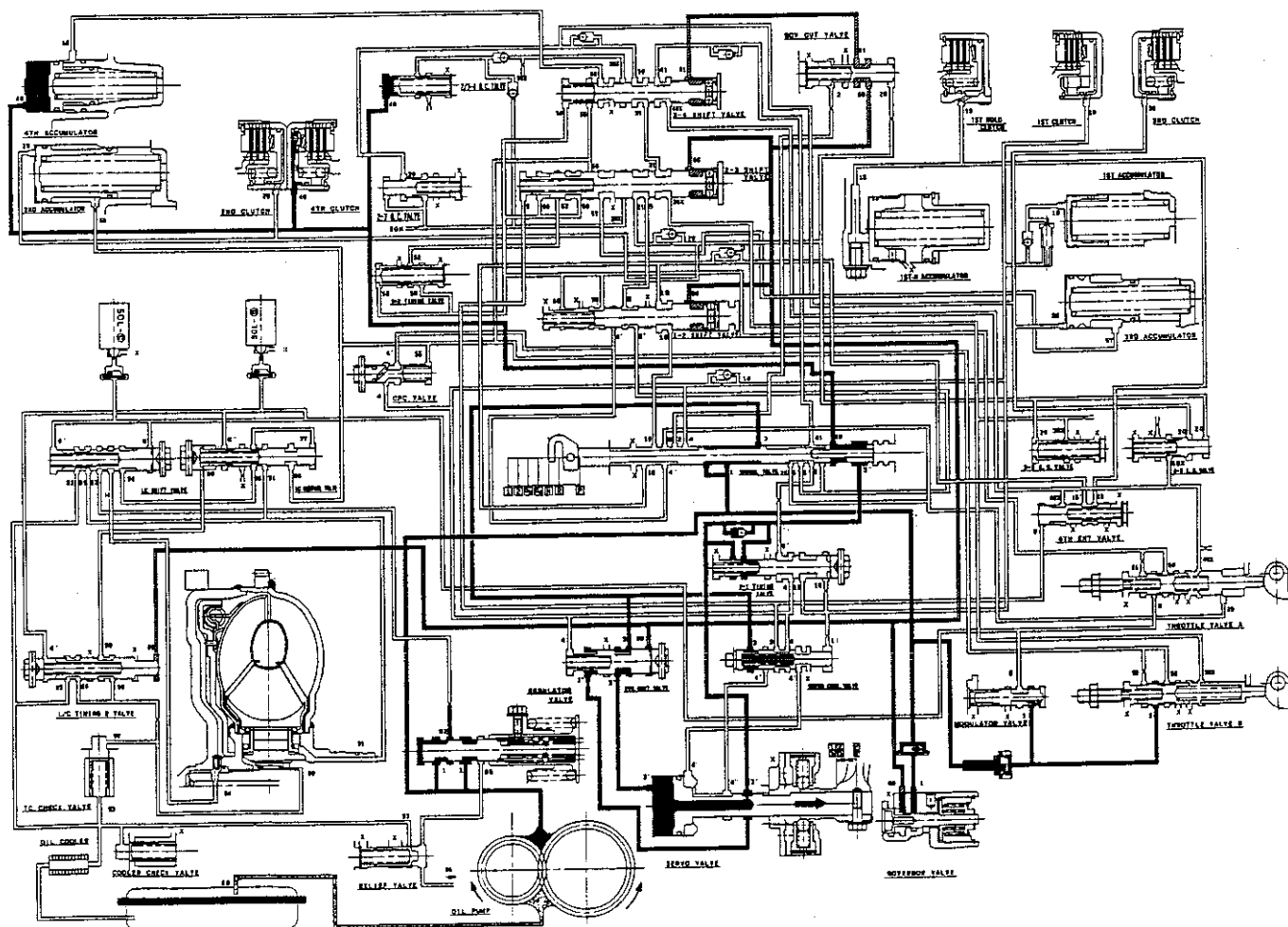
The flow of fluid through the torque converter circuit is the same as in the **N** position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. It then flows through the reverse control valve to the servo valve, causing the reverse shift fork shaft to be moved to the reverse position. The line pressure (3') from the servo valve goes to the manual valve and becomes the 4th clutch pressure (40). Then it goes to the 4th clutch; the power is transmitted through the 4th clutch.

When the **R** position is selected while the vehicle is moving forward at more than a certain speed. The line pressure (3) is cut by the governor pressure (60) which activates the reverse control valve.

When shifting to **R** from **D₄**, **D₃**, **2** or **1** position, the servo control valve is moved to the left side by 1st clutch pressure (10). The servo control valve combines with the reverse shift fork shaft detent system to control movement of the servo valve.

NOTE:

- When used, "left" and "right" indicates direction on the flowchart
- SOL-C: Lock-up Control Solenoid Valve A
- SOL-D: Lock-up Control Solenoid Valve B



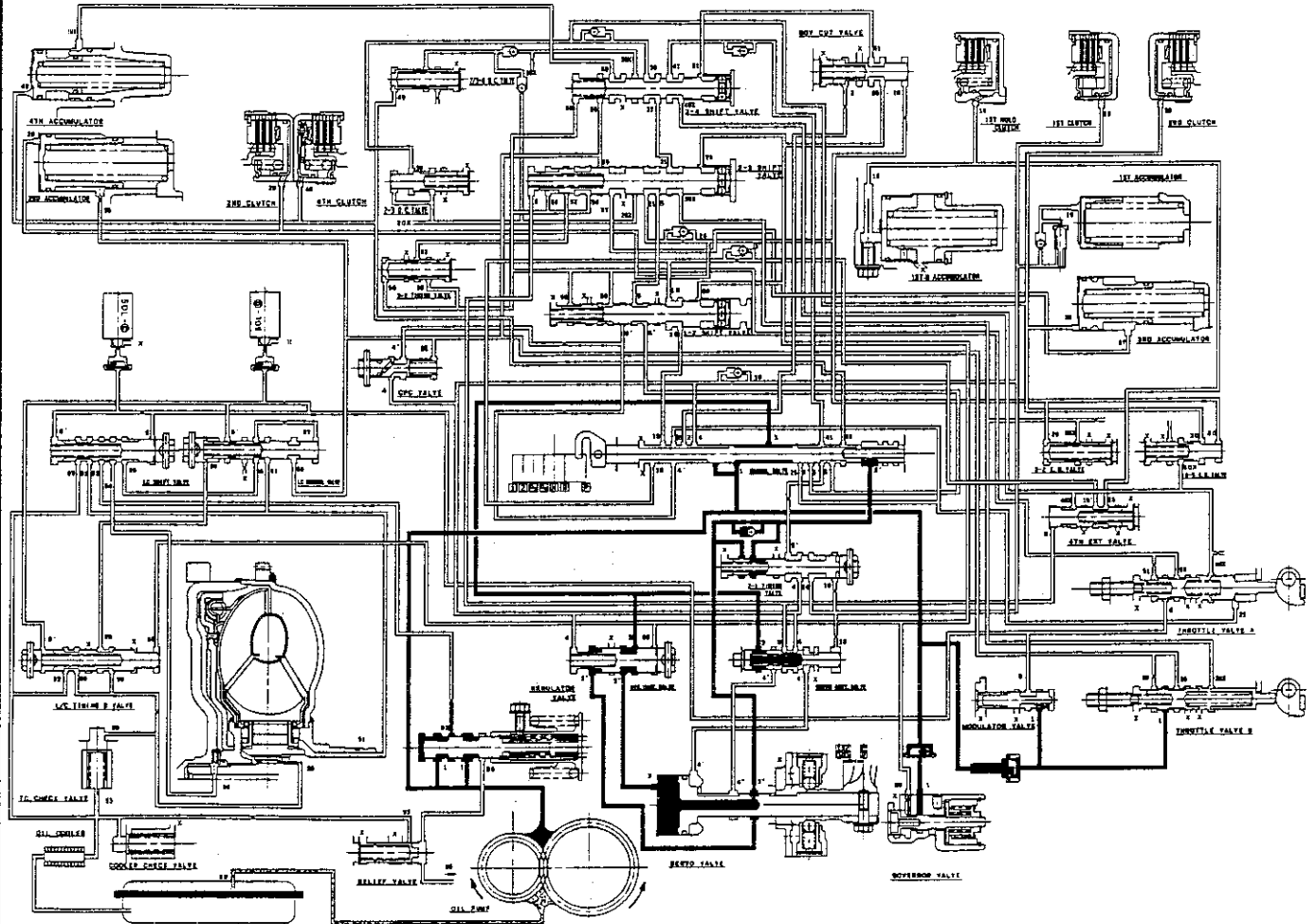
(cont'd)

Description

Hydraulic Flow (cont'd)

P Position

The flow of fluid through the torque converter is the same as in the **N** position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. The line pressure (3) flows through the reverse control valve to the servo valve, causing the reverse shift fork to be moved to the reverse position as in the **R** position. However, the hydraulic pressure is not supplied to the clutches. The power is not transmitted.





Lock-up System

Lock-up Clutch

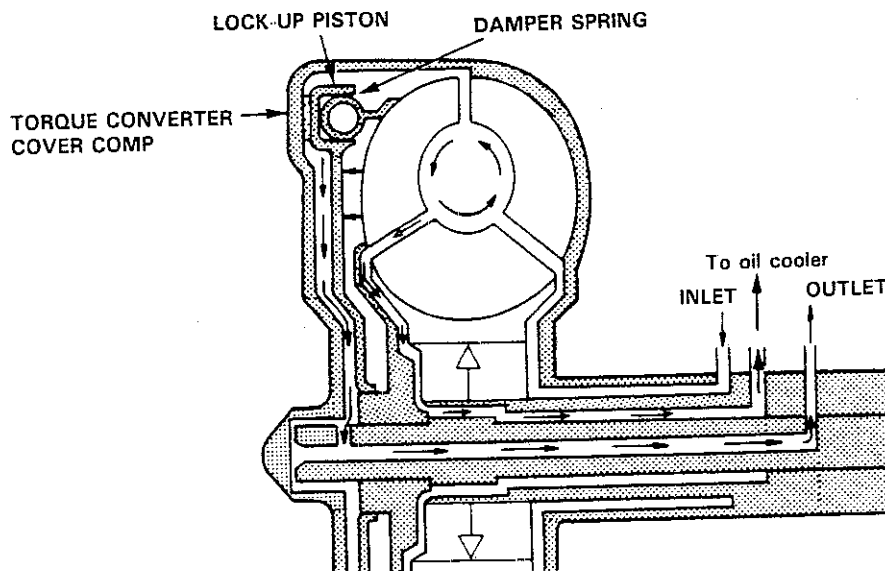
1 Operation (clutch on)

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

Power flow

The power flows by way of:

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

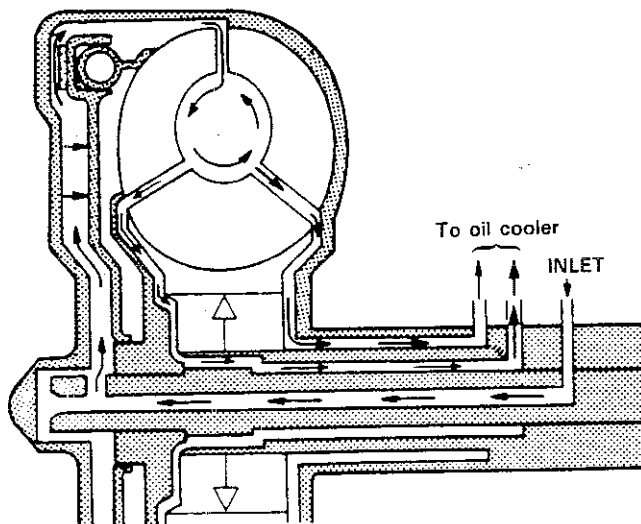


2 Operation (clutch off)

With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result the lock-up piston is moved away from the converter cover; that is, 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)

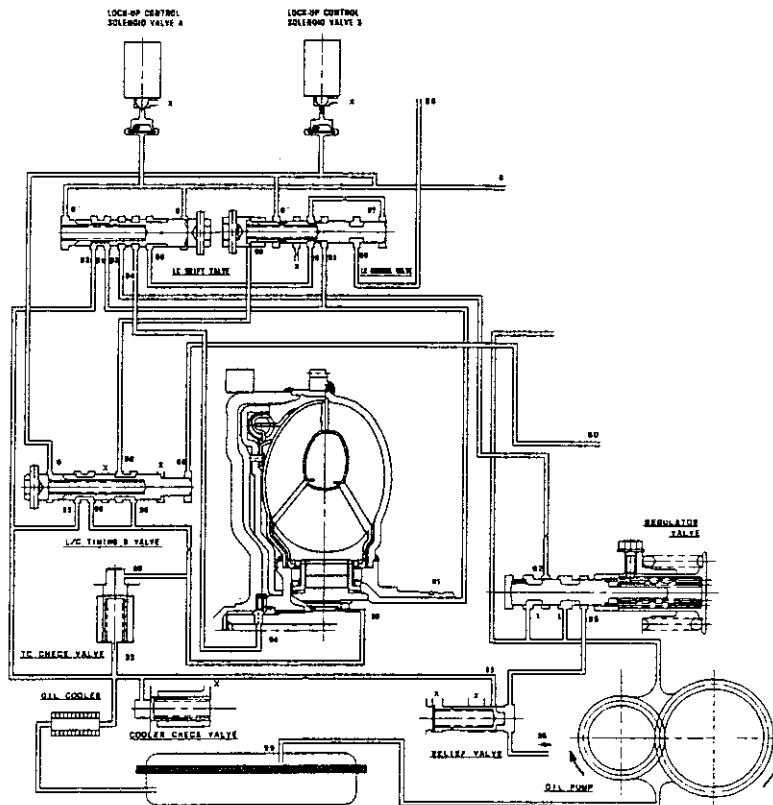
in **D4** or **D3** in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the ECM optimizes the timing of the lock-up system. Under certain conditions, the lock-up operation is applied during deceleration, in 2nd, 3rd and 4th speed.

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

From sensor input signals, the ECM detects 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 is shown in the table below

Solenoid valve	A	B
Lock-up condition		
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	Duty operation OFF ---- ON
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ---- ON





Half Lock-up (Lock-up, half)

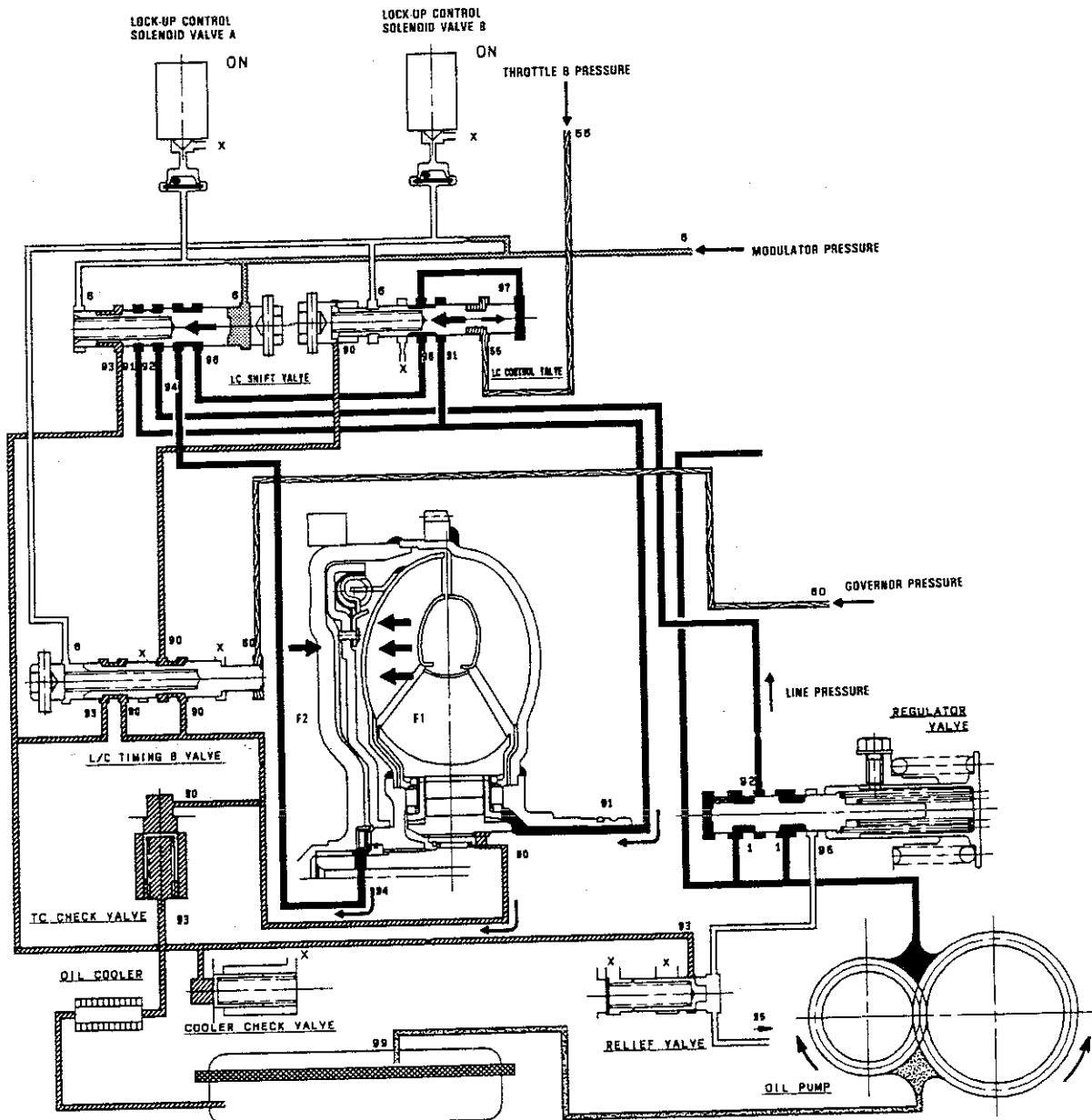
Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON

The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lock-up control valve to lower.

Also, the modulator pressure in the left cavity of the lock-up timing B valve is low. However, the governor pressure is still low at this time, consequently the lock-up timing B valve is kept on the right side by the spring force.

With the lock-up control solenoid valve B turned ON, the lock-up control valve is moved somewhat to the left side, causing the back pressure (F2) to lower. This allows a greater amount of the fluid (F1) to work on the lock-up clutch so as to engage the clutch. The back pressure (F2) which still exists prevents the clutch from engaging fully.

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



(cont d)

Description

Lock-up System (cont'd)

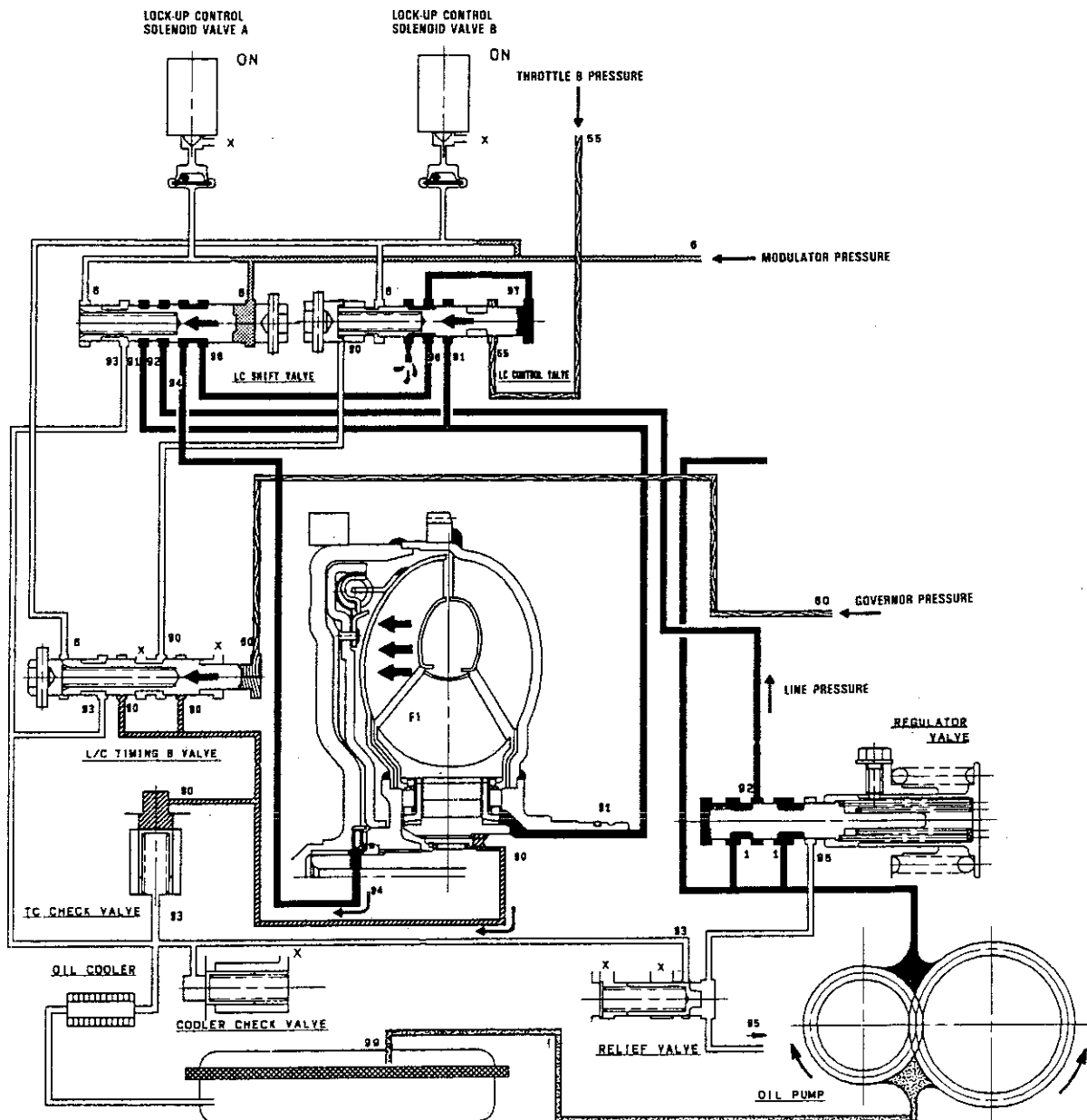
Full Lock-up (Lock-up, full)

Lock-up Control Solenoid Valve A: ON

Lock-up Control Solenoid Valve B: ON

When the vehicle speed further increases, the governor pressure is increased. The lock-up timing B valve overcomes the spring force and moves to the left side. Also this valve closes the oil port leading to the torque converter check valve. Under this condition, the throttle B pressure working on the right side of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); i. e., the lock-up control valve is moved to the left side. As this happens, 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 flowchart.

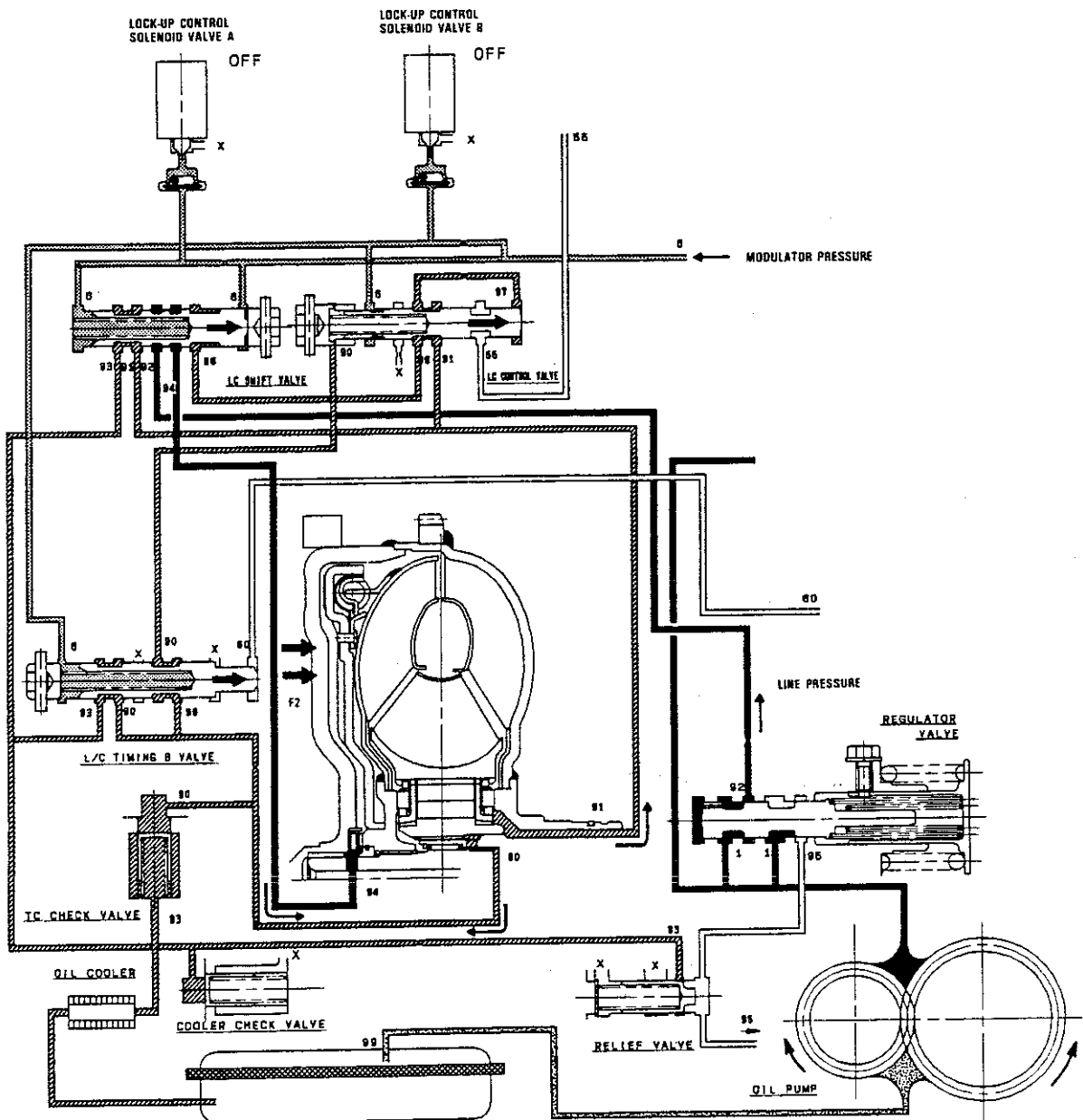




No Lock-up (Lock-up OFF)

Pressured fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Under this condition, the pressure on both ends of the lock-up shift valve are equal, and the lock-up shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the oil pump will flow through the left side of the lock-up clutch to the torque converter; i.e., the lock-up clutch is OFF.

NOTE: When used, "left" or "right" indicates direction on the flowchart



(cont'd)

Description

Lock-up System (cont'd)

Partial Lock-up (Lock-up, slight)

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty operation (ON ↔ OFF)

The ECM switches the solenoid valve A to 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.

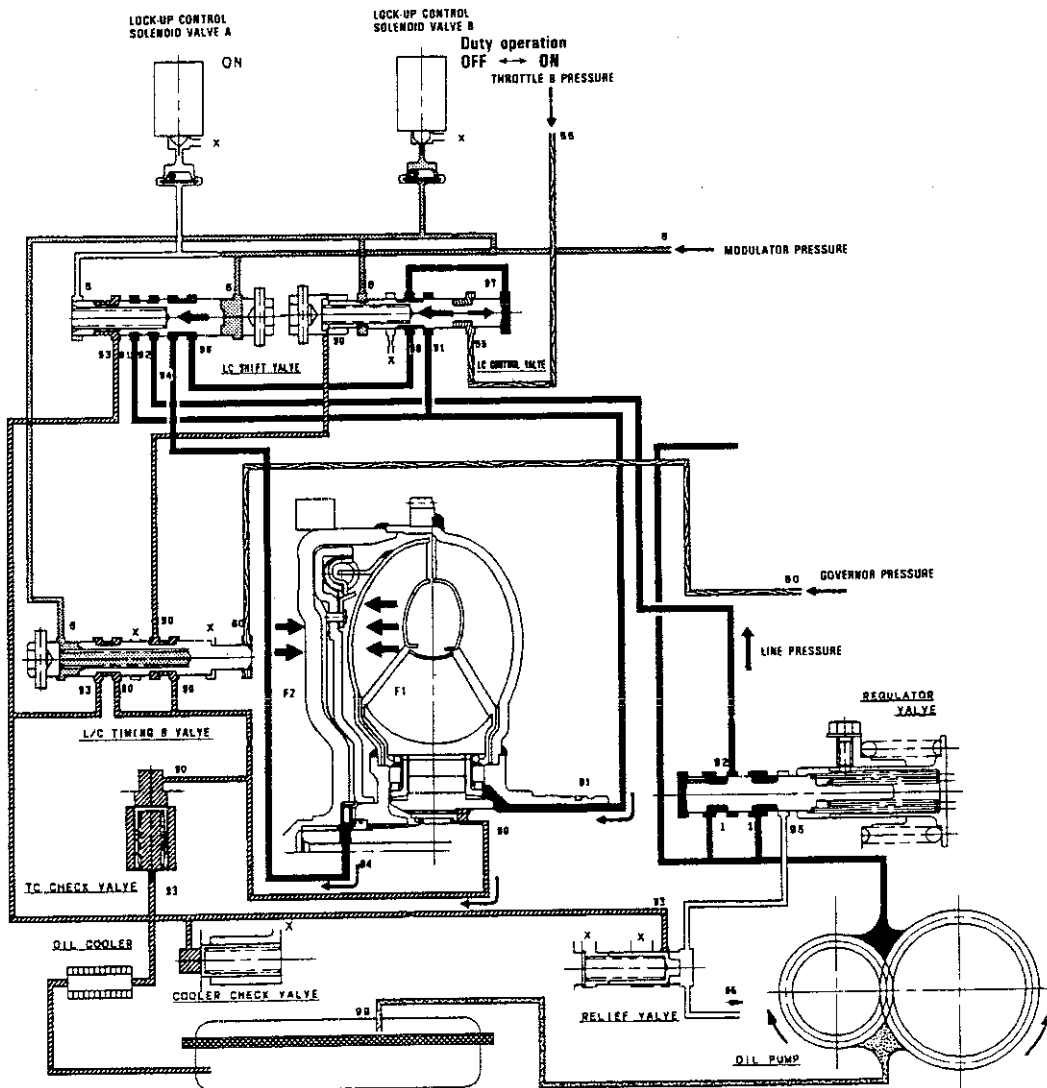
The torque converter pressure is separated into two passages:

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

Torque Converter Back Pressure: entered 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 B valve is determined by the governor pressure, tension of the valve spring and pressure regulated by the modulator. Also the position of the lock-up control valve is determined by the throttle B pressure, torque converter back pressure and torque converter pressure regulated by the check valve. In low speed range, the throttle B pressure of the lock-up control valve is low, causing the valve to be moved to the right side. With the lock-up control solenoid valve B to ON and OFF alternately, the modulator pressure is maintained in the left side of the lock-up control valve; in other words, the lock-up control valve is moved slightly to the left side. This slight movement of the lock-up control valve causes the back pressure (F2) to be lowered slightly, resulting in partial lock-up.

NOTE: When used, 'left' or 'right' indicates direction on the flowchart.



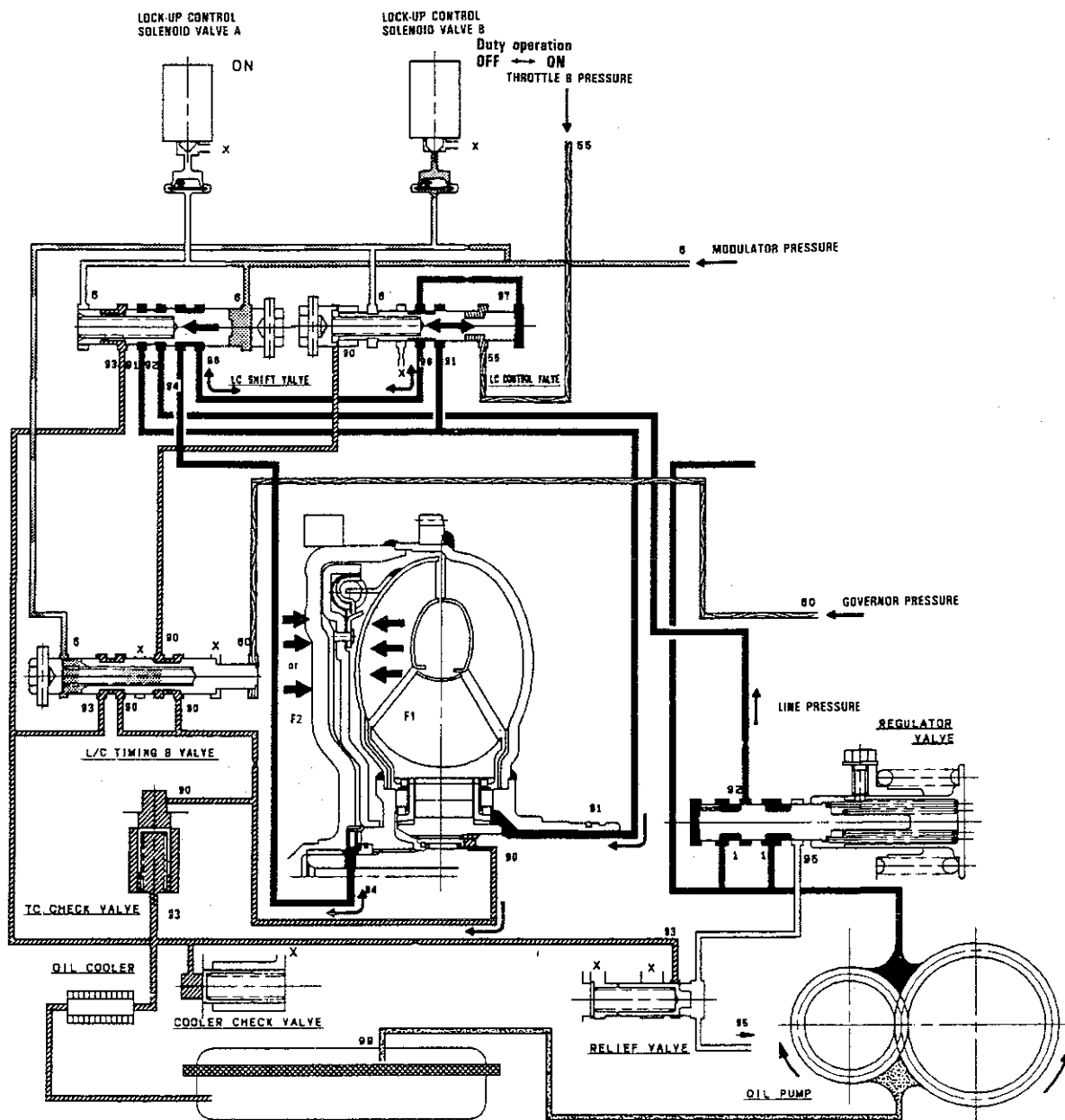


Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty Operation (ON ↔ OFF)

The ECM switches the solenoid valve B to ON and OFF alternately at high speeds 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 flowchart

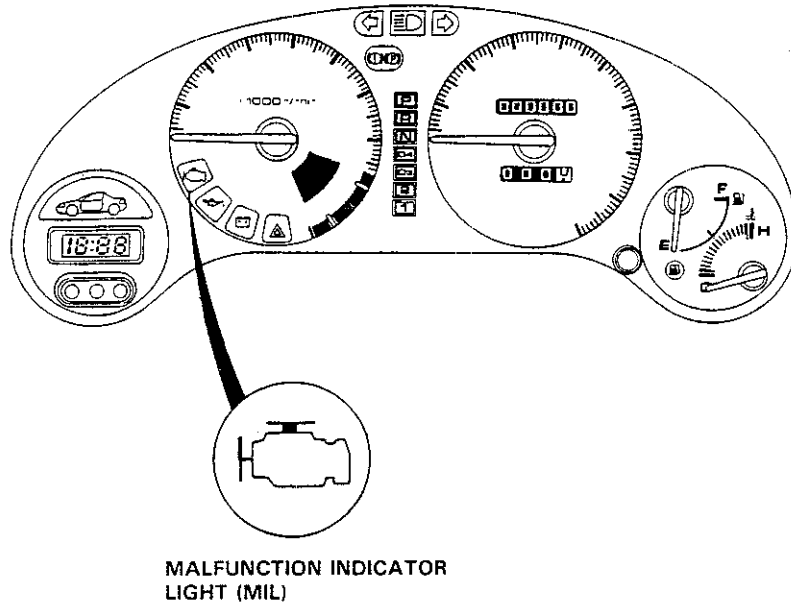


Troubleshooting

Electrical Troubleshooting

If the lock-up control system is suspected to be faulty, do the following:

- 1 If the malfunction indicator light (MIL) comes on, check and inspect PGM-FI system according to PGM-FI Troubleshooting (See Section 11).



- 2 If the malfunction indicator light (MIL) does not come on or it blinks other than nineteen times while connecting the Service Check Connector terminals with a jumper wire, check and inspect according to the Symptom-to-Component Chart (see page 14-42 thru 45)
- 3 Check the lock-up control solenoid valve (see page 14-41)



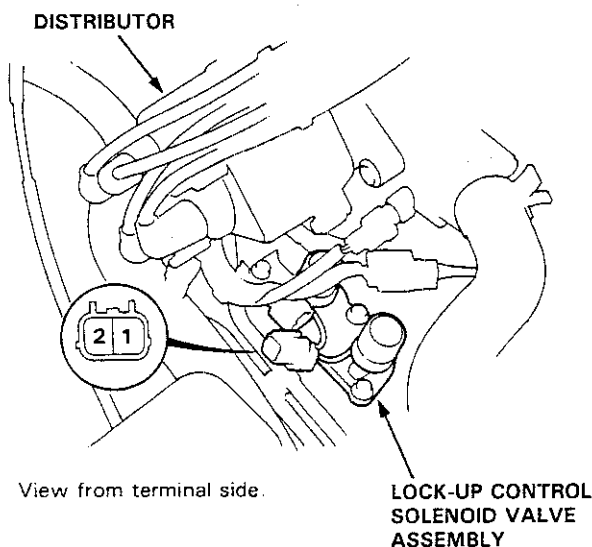
Lock-up Control Solenoid Valve A/B

Test

NOTE: Lock-up control solenoid valve must be removed/replaced as an assembly.

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

STANDARD: 14.1–15.5 Ω (at 25°C)



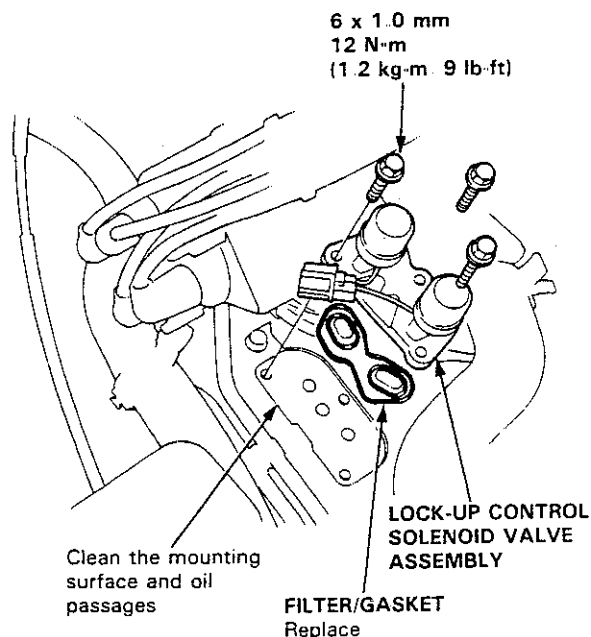
3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
4. Connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal and body ground. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal and body ground. A clicking sound should be heard.
5. If not, check for continuity between the engine control module (ECM) A19 or A17 harness and body ground (See Section 11)
6. Replace the lock-up control solenoid valve assembly if there is continuity between the ECM A19 or A17 harness and body ground (See Section 11)

Replacement

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

NOTE: Be sure to remove or replace the lock-up control solenoid valve as an assembly.

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



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

Hydraulic System

Symptom-to-Component Chart

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R and 2 , but not in D3 , D4 or 1 .	8, 29, 44, 48	C, M, O
Car moves in D3 , D4 , 1 , R , but not in 2 .	9, 30, 49	C, L
Car moves in D3 , D4 , 2 , 1 , but not in R .	1, 11, 22, 34, 38, 39, 40	C, L, Q
Car moves in N	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L, U
No engine braking in 1 position.	12	C, D, L
Slips in 1st gear.	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	C
Flares on 1-2 upshift.	3, 15	E, L, V
Flares on 2-3 upshift.	3, 15, 24, 44	E, L, V
Flares on 3-4 upshift.	3, 15, 25, 44	E, L, V
No upshift, transmission stays in low gear.	14, 19, 23	G, L
No downshift to low gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	2, 14, 26	V
Harsh shift (up and down shifting)	2, 4, 15, 23, 24, 27, 47	E, H, I, L, V
Harsh shift (1-2).	2, 9	C, D, V
Harsh shift (2-3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3-4).	2, 11, 23, 25	C, D, I, L, V
Harsh kick-down shifts.	2, 23, 27, 28	L, Q, V
Harsh kick-down shift (2-1).	48	O
Harsh downshift at closed throttle.	15	E, T
Harsh shift when manually shifting to 1 .	33	L
Axle(s) slips out of transmission on turns.	43, 50	L, P, Q
Axle(s) stuck in transmission.	43	L, Q
Ratcheting noise when shifting into R .	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R .	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P or from R to N .	38, 39, 40, 45	L, Q
Noise from transmission in all selector lever positions.	6, 17	K, L, Q
Noise from transmission only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Transmission will not shift into 4th gear in D4 .	1, 21, 28, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting At disassembly large particles of metal are found on magnet.	43	L, Q



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

(cont'd)

Hydraulic System

Symptom-to-Component Chart (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Car creeps in N .	R1, R2	
Car does not move in D3 or D4 .	R4	
Transmission locks up in R .	R3, R12	
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	
Harsh upshifts.	R11	

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



NOTES	
B	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of shop manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G	If the 1 – 2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H.	If the 2 – 3 orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 2/3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve (CPC) is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of main valve body and torque converter housing may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.
L	If the ATF strainer is clogged with particles of steel or aluminum, inspect the oil 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 feedpipe guide in the R side cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the R side cover as it is dented. The O-ring under the guide is probably worn.
N	Replace the mainshaft if the bushings for the 1st and 4th feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the R. side cover.
O	A worn or damaged one-way (sprag) clutch is mostly a result of shifting the transmission in D₃ or D₄ while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect for damage or wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 3rd clutch for swirl marks. Replace items 1, 2 and 4 if worn or damaged. If transmission makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and 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. If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and ring gear.
R	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body. This will result in oil pump seizure if not detected. Use proper tools.
S	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the oil return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle cable adjustment may clear this problem.
U	Check if separator plate is installed. If it was not installed, the servo valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted, but also the shift quality and lock-up clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

Road Test

NOTE: Warm up the engine to operating temperature.

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

D₄ or **D₃** Position

● Upshift

Throttle Opening	Unit of speed	1st – 2nd	2nd – 3rd	3rd – 4th
Full-closed throttle	Km/h	15 – 19	35 – 39	49 – 53
	mph	9 – 12	22 – 24	30 – 33
3/16 throttle	Km/h	21 – 25	48 – 52	64 – 70
	mph	13 – 16	30 – 32	40 – 43
6/16 throttle	Km/h	26 – 34	62 – 74	83 – 95
	mph	16 – 21	39 – 46	52 – 59
Full-opened throttle	Km/h	57 – 62	106 – 113	155 – 165
	mph	35 – 39	66 – 70	96 – 103

● Downshift

Throttle Opening	Unit of speed	4th – 3rd	3rd – 2nd	2nd – 1st
Full-closed throttle	Km/h	—	29 – 33	9 – 13
	mph	—	18 – 21	6 – 8
Full-opened throttle	Km/h	134 – 145	94 – 102	40 – 44
	mph	83 – 90	58 – 63	25 – 27

● Lock-up

Throttle Opening	Unit of speed	D₄ Position		D₃ Position	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Full-closed throttle	Km/h	24 – 27	23 – 26	97 – 103	92 – 98
	mph	15 – 17	14 – 16	60 – 64	57 – 61
6/16 throttle	Km/h	107 – 113	87 – 93	107 – 113	92 – 98
	mph	66 – 70	54 – 58	66 – 70	57 – 61
Full-opened throttle	Km/h	151 – 157	145 – 151	132 – 138	127 – 133
	mph	94 – 98	90 – 94	82 – 86	79 – 83



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

CAUTION: Do not shift from **D₄** or **D₃** to **2** or **1** at speeds over 160 km/h (99 mph); you may damage the transmission.

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

1 (1st Gear) Position

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

2 (2nd Gear) Position

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

R (Reverse) Position

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

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

Park car on slope (approx 16°), apply the parking brake, and shift into **P** position. Release the brake; the car 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 all four wheels
2. Connect the tachometer, and start the engine.
3. After the engine has warmed up to normal operating temperature, shift into [2] position.
4. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
5. Allow 2 minutes for cooling, then repeat same test in [1], [D4] and [R] position.

NOTE:

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

Stall Speed RPM: min^{-1} (rpm)

Specification: $2,600 \text{ min}^{-1}$ (rpm)

Service Limit: $2,400 - 2,800 \text{ min}^{-1}$ (rpm)

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



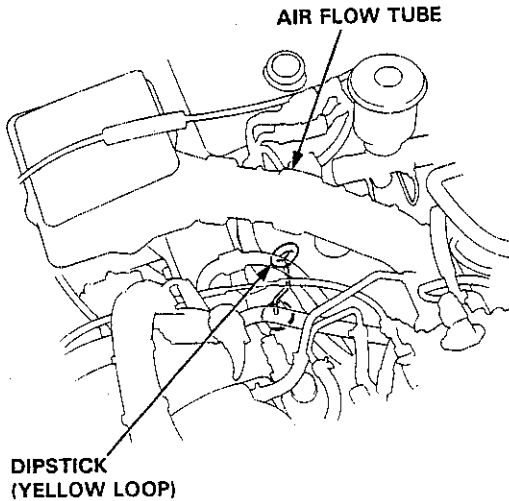
Fluid Level

Checking/Changing

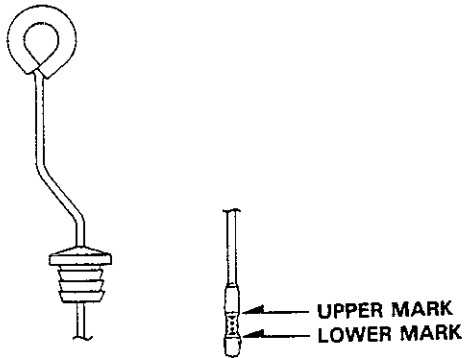
Checking

NOTE: Check the fluid level with the engine at normal operating temperature

1. Park the car on level ground. Shut off the engine.
2. Remove the dipstick (yellow loop) from the transmission and wipe it with a clean cloth.
3. Insert the dipstick into the transmission.



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



5. If the level is below the lower mark, add fluid into the tube to bring it to the upper mark. Use Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON® II Automatic Transmission Fluid (ATF) only.
6. Insert the dipstick back in the transmission.

Changing

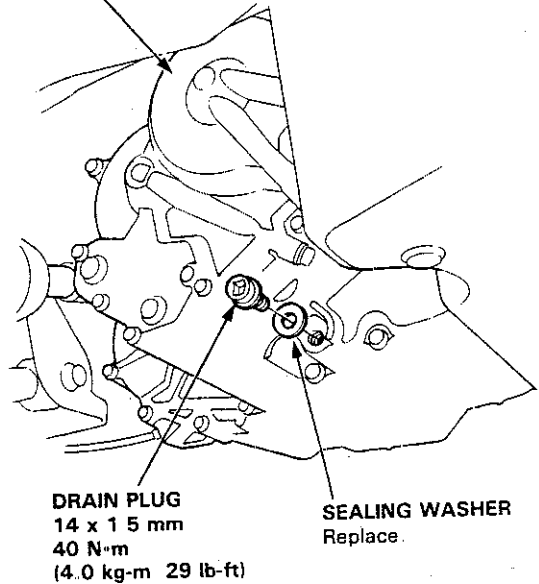
1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug
2. Reinstall the drain plug with a new washer, then refill the transmission to the upper mark on the dipstick

Automatic Transmission Fluid Capacity:

2.7 l (2.8 US qt., 2.4 Imp qt.) at change

5.9 l (6.2 US qt., 5.2 Imp qt.) after overhaul

TRANSMISSION R SIDE COVER



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.

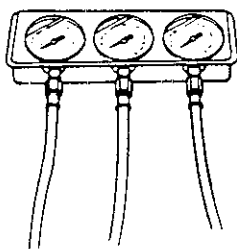
- 1 Raise the car (see Section 1)
- 2 Warm up the engine, then stop the engine and connect a tachometer.
- 3 Connect the oil pressure gauge to each inspection hole(s)

TORQUE: 18 N·m (1.8 kg·m, 12 lb·ft)

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

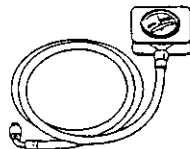
A/T OIL PRESSURE GAUGE SET
07406-002003
(includes pressure hose set
07406-0020201)

**A/T OIL PRESSURE
GAUGE HOSE
ASSEMBLY**
07MAJ-PY40100



**OIL PRESSURE
GAUGE HOSE**
07MAJ-PY40110

**OIL PRESSURE
JOINT**
07MAJ-PY40120



**A/T LOW
PRESSURE
GAUGE**
07406-0070000

NOTE: Use the A/T Oil Pressure Gauge Set or A/T Low Pressure Gauge replacing the oil pressure gauge hose assembly. The A/T Oil Pressure Gauge Hose (07406-0020201) may also be used.

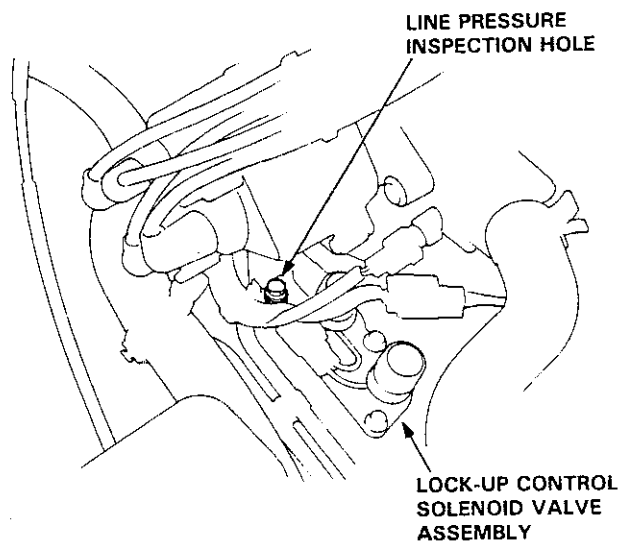
- 4 Start the engine and measure the respective pressure as follows
 - Line Pressure
 - Clutch Pressure
 - Clutch Low/High Pressure
 - Throttle A/Throttle B Pressure
 - Governor Pressure
- 5 Install a new washer and the sealing bolt in the inspection hole and tighten to the specified torque

TORQUE: 18 N·m (1.8 kg·m, 12 lb·ft)

NOTE: Do not reuse old aluminum washers.

• Line Pressure

1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 2,000 min⁻¹ (rpm)
3. Shift the select lever to **N** or **P**.
4. Measure line pressure



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump.	850-900 kPa (8.5-9.0 kg/cm ² , 121-128 psi)	800 kPa (8.0 kg/cm ² 114 psi)

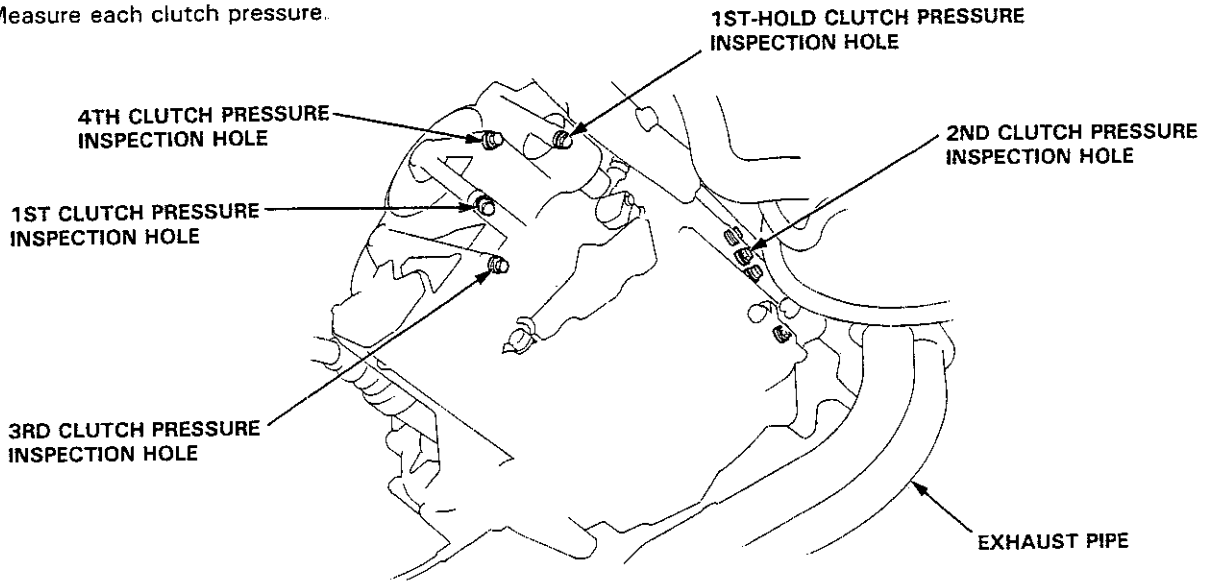
NOTE: Higher pressures may be indicated if measurements are made in selector positions other than **N** or **P**



● Clutch Pressure Measurement

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

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



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	1 or D₄	No or low 1st pressure	1st Clutch	850–900 kPa (8.5–9.0 kg/cm ² , 121–128 psi)	800 kPa (8.0 kg/cm ² , 114 psi)
1st-hold Clutch	1	No or low 1st-hold pressure	1st-hold Clutch		
2nd Clutch	2	No or low 2nd pressure	2nd Clutch		
2nd Clutch	D₄	No or low 2nd pressure	2nd Clutch	400 kPa (4.0 kg/cm ² , 57 psi) (throttle fully closed)	350 kPa (3.5 kg/cm ² , 50 psi) (throttle fully closed)
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	R		Servo Valve or 4th Clutch	850–900 kPa (8.5–9.0 kg/cm ² , 121–128 psi)	800 kPa (8.0 kg/cm ² , 114 psi)

(cont'd)

Pressure Testing

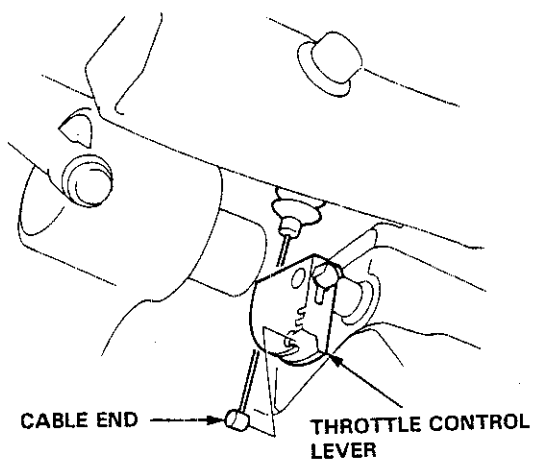
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● Clutch Low/High Pressure Measurement

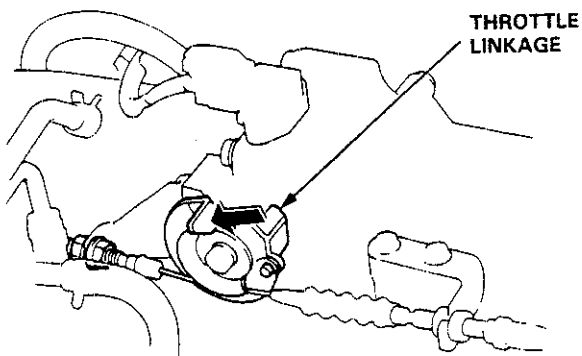
▲WARNING While testing, be careful of the rotating front wheels.

- 1. Allow the front wheels to rotate freely.
- 2. Remove the cable end of the throttle control cable from the throttle control lever.

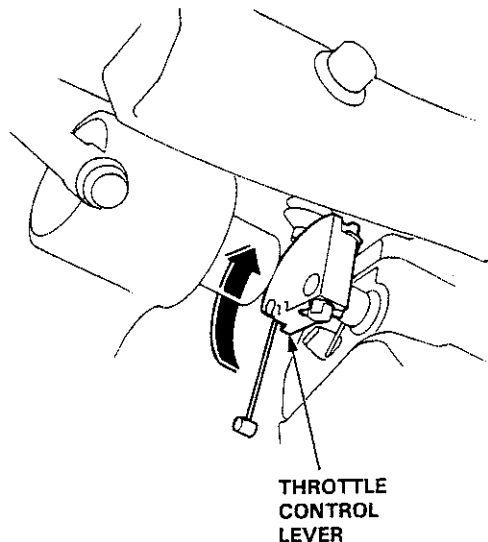
NOTE: Do not loosen the locknuts, simply unhook the cable end.

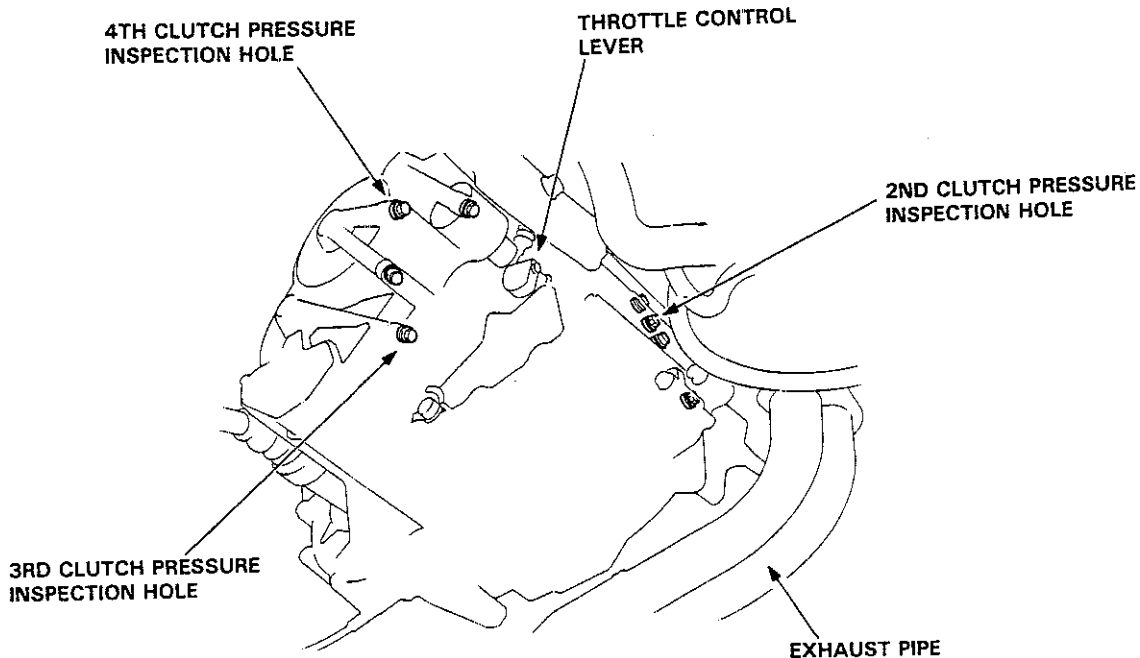


- 3. Start the engine and let it idle.
- 4. Shift the select lever to **D₄** position
- 5. Slowly move the throttle linkage to increase engine rpm until pressure is indicated on the oil pressure gauge
Then release the throttle linkage, allowing the engine to return to an idle, and measure the pressure reading.



- 6. With the engine idling, lift the throttle control lever up approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the gauge, then measure the highest pressure reading obtained.
- 7. Repeat steps 5 and 6 for each clutch pressure being inspected.





PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D4	No or low 2nd pressure	2nd Clutch	400--900 kPa (4.0--9.0 kg/cm ² , 57--128 psi) varies with throttle opening	350 kPa (3.5 kg/cm ² , 50 psi) with throttle control lever released 800 kPa (8.0 kg/cm ² , 114 psi) with throttle control lever more than 1/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		

(cont'd)

Pressure Testing

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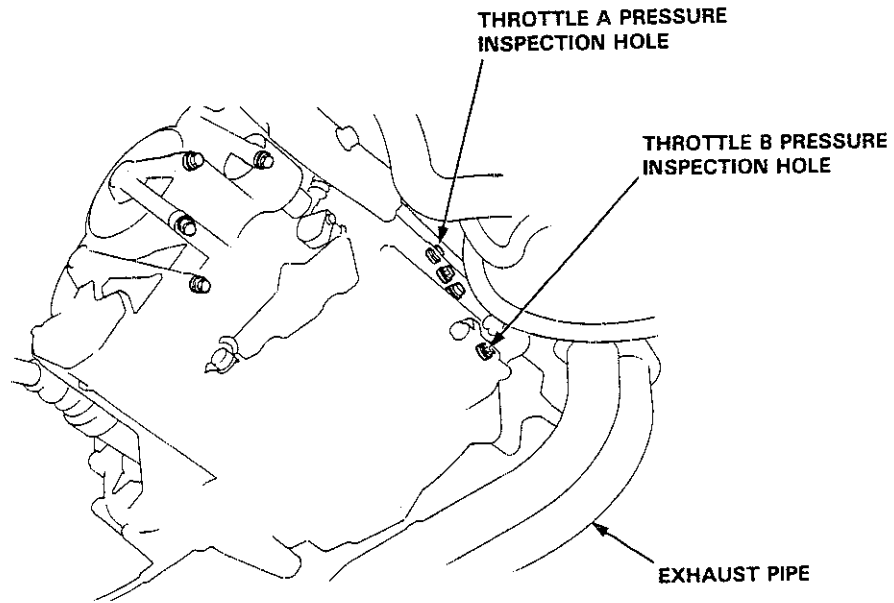
● Throttle A/Throttle B Pressure Measurement

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

- 1 Allow the front wheels to rotate freely.
- 2 Remove the cable end of the throttle control cable from the throttle control lever.

NOTE: Do not loosen the locknuts, simply unhook the cable end.

- 3 Shift the selector lever to **D4** or **D3** position.
- 4 Run the engine at 1,000 min⁻¹ (rpm).
- 5 Measure full-closed throttle A/B pressure
- 6 Move the throttle control lever to full-opened throttle position.
- 7 Measure full-opened throttle A/B pressure.



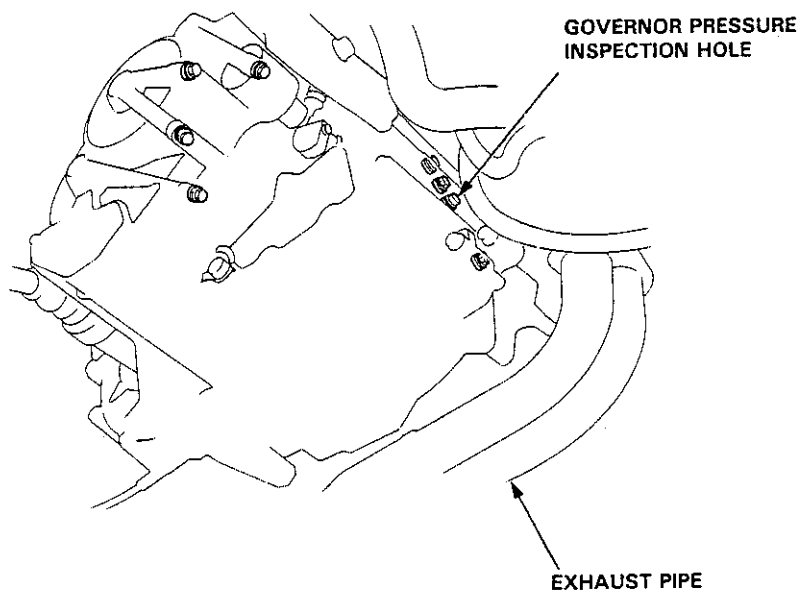
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle A	D4 or D3	Pressure too high	Throttle Valve A Modulator valve	0–5 kPa (0–0.05 kg/cm ² , 0–0.7 psi) throttle full closed	—
		No or low Throttle A pressure		505–520 kPa (5.05–5.2 kg/cm ² , 72–74 psi) throttle full opened	500 kPa (5.0 kg/cm ² , 71 psi) throttle full opened
Throttle B	D4 or D3	Pressure too high	Throttle Valve B	0–15 kPa (0–0.15 kg/cm ² , 0–2 psi) throttle full closed	—
		No or low Throttle B pressure		850–900 kPa (8.5–9.0 kg/cm ² , 121–128 psi) throttle full opened	800 kPa (8.0 kg/cm ² , 114 psi) throttle full opened



● Governor Pressure Measurement

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

- 1. Allow the front wheels to rotate freely
- 2. Run the vehicle at 60 km/h (38 mph).
- 3. Measure the governor pressure



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Governor	D ₄ or D ₃	No or low governor pressure	Governor Valve	180–190 kPa (1.8–1.9 kg/cm ² , 26–27 psi)	175 kPa (1.75 kg/cm ² 25 psi)

Transmission

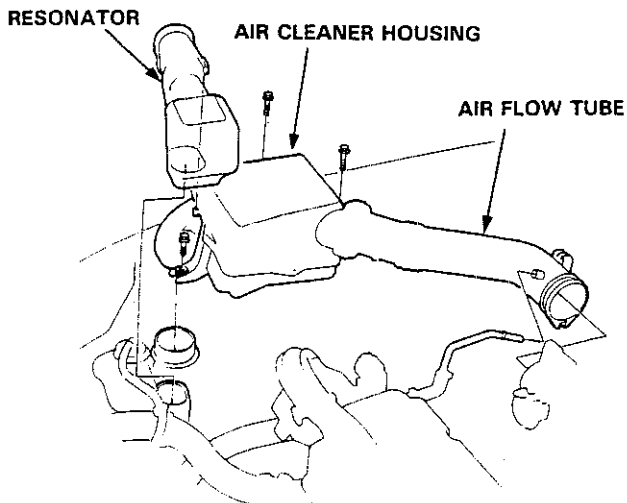
Removal

⚠ WARNING

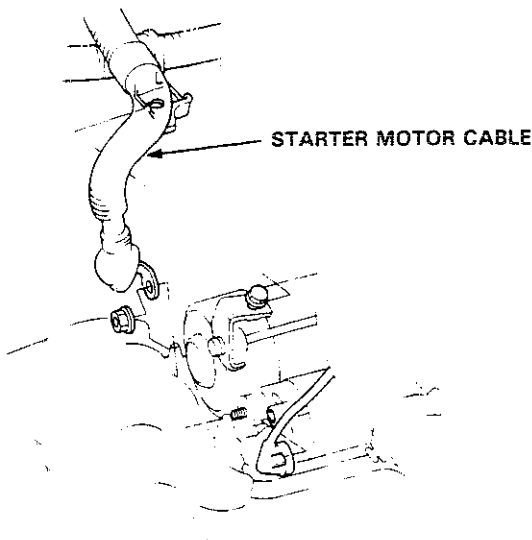
- Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see Section 1).
- Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.

CAUTION: Use fender covers to avoid damaging painted surfaces.

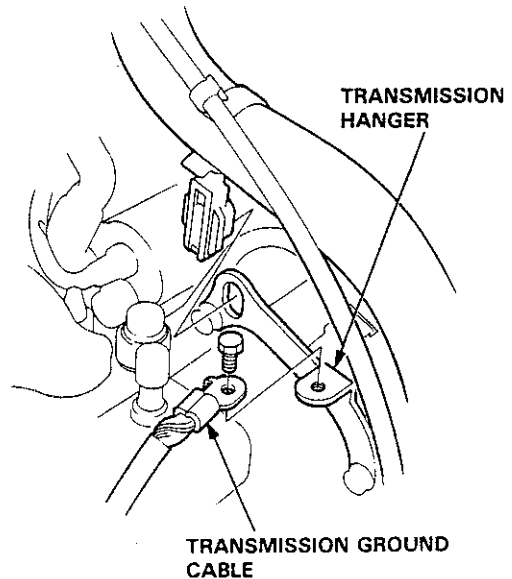
- 1 Disconnect the battery negative (-) and positive (+) cables from the battery.
- 2 Remove the resonator, air flow tube and air cleaner housing.



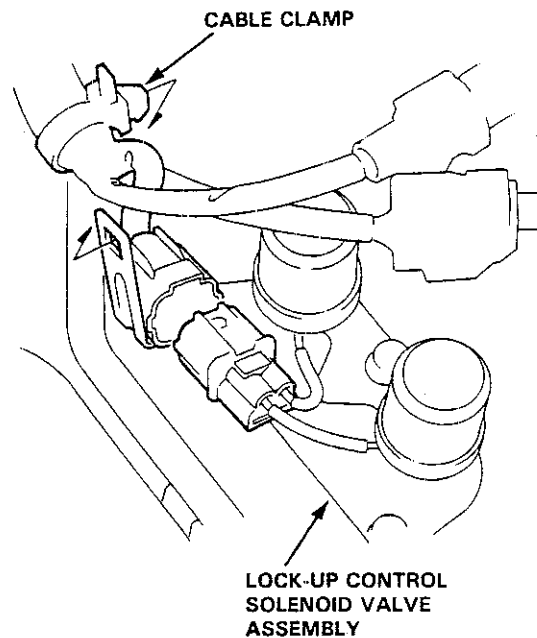
- 3 Remove the starter motor cable and cable holder from the starter motor.



- 4 Remove the transmission ground cable from the transmission hanger.

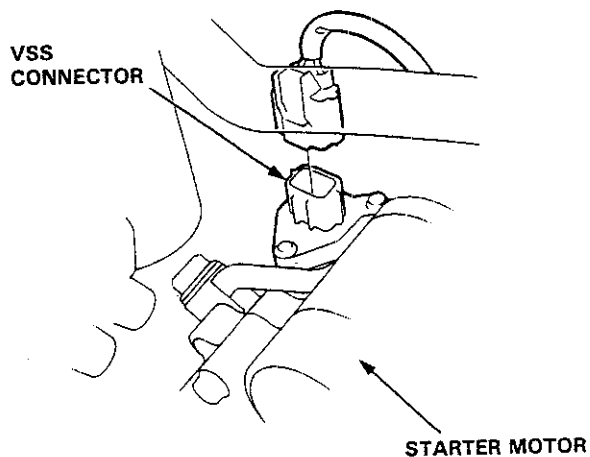


- 5 Disconnect the lock-up control solenoid valve connector and remove the cable clamp from the lockup control solenoid connector stay.

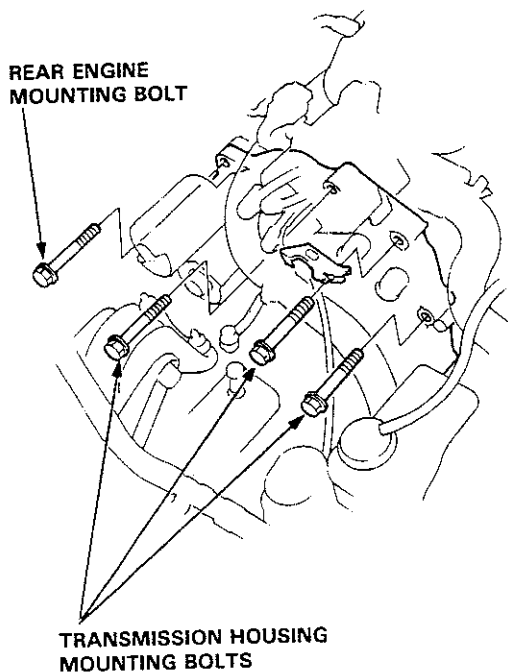




6. Disconnect the vehicle speed sensor (VSS) connector.



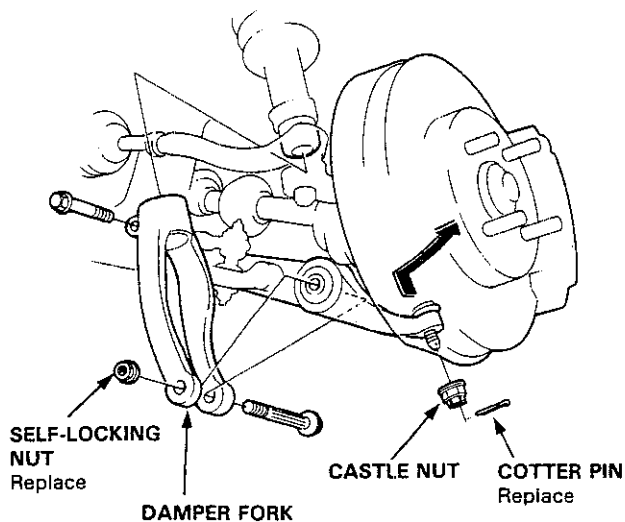
7. Remove the transmission housing mounting bolts and rear engine mounting bolt.



8. Remove the drain plug and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer (see page 14-49).

9. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arm (see Section 18)

10. Remove the damper fork bolts, then separate the damper fork and damper.

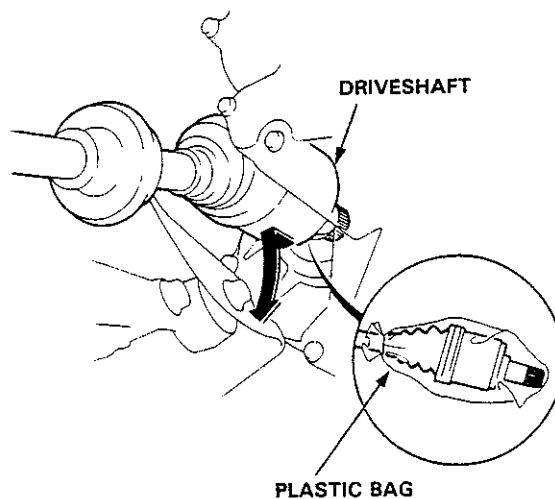


11. Pry the right and left driveshafts out of the differential.

12. Pull on the inboard joint and remove the right and left driveshafts (see Section 16).

13. Tie plastic bags over the driveshaft ends

NOTE: Coat all precision finished surfaces with clean engine oil or grease

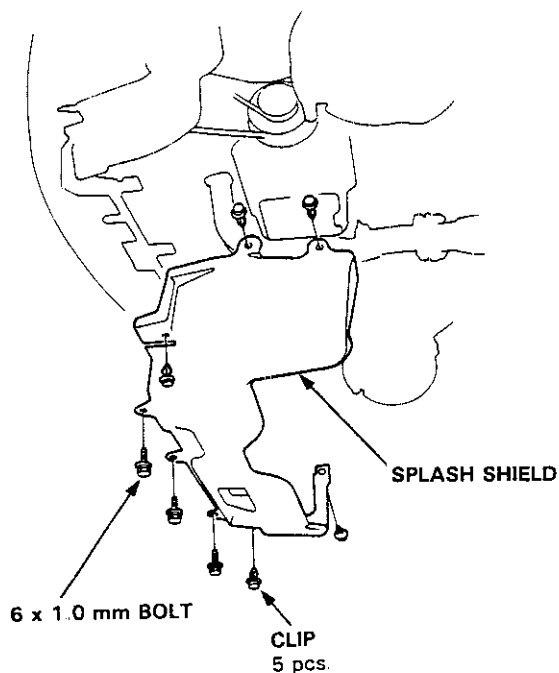


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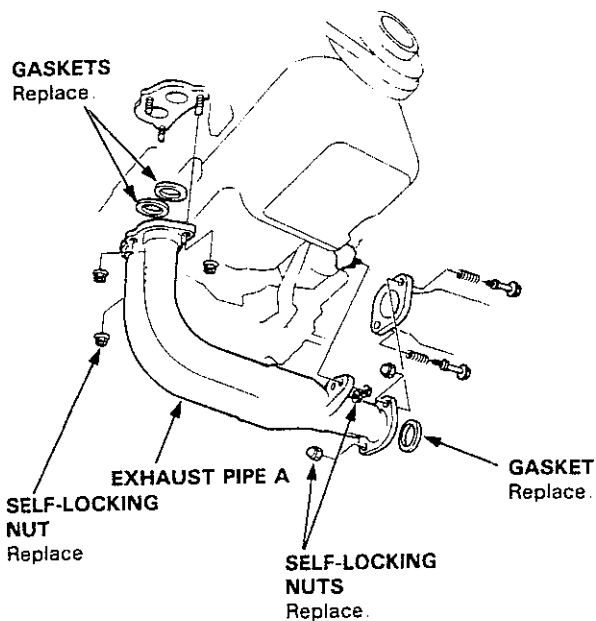
Transmission

Removal (cont'd)

14. Remove the splash shield.

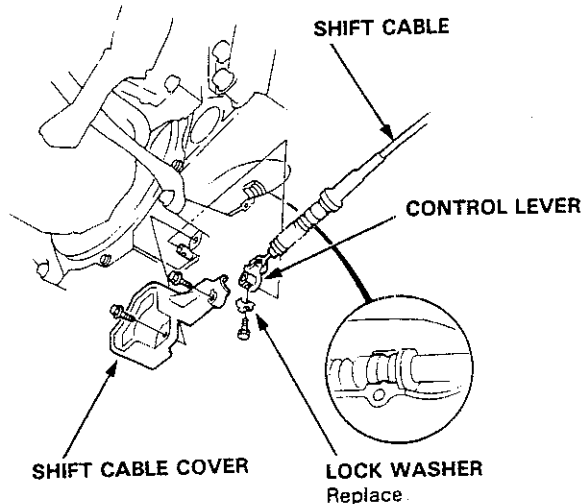


15. Remove the exhaust pipe A.



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

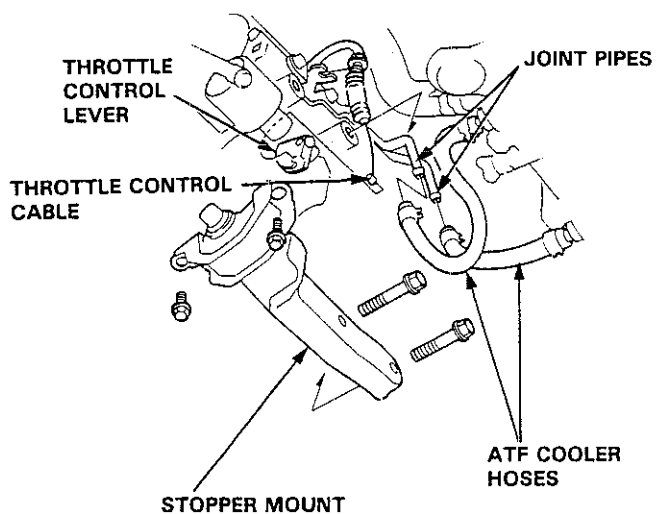
CAUTION: Take care not to bend the shift control cable while removing it.



17. Remove the stopper mount, then remove the end of the throttle control cable from the throttle control lever.

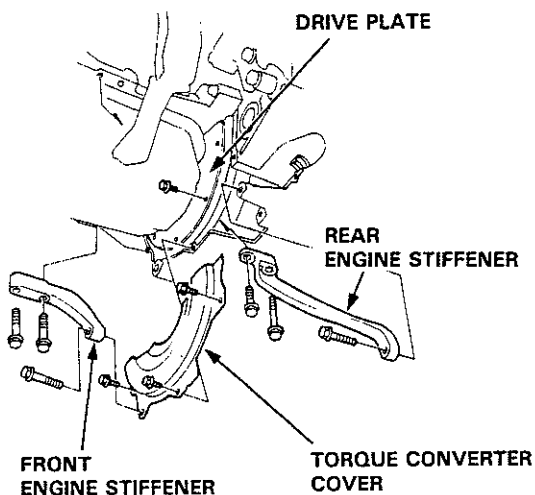
18. Remove the ATF cooler hoses at the joint pipes. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the joint pipes.

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

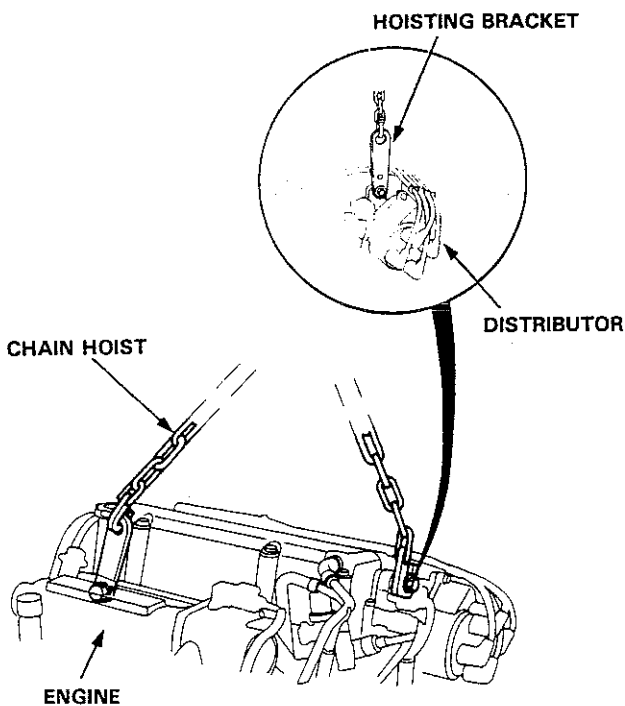




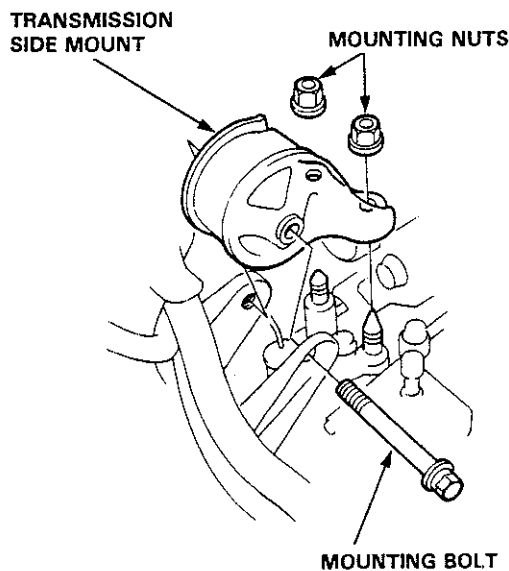
19. Remove the engine stiffeners and torque converter cover.
20. Remove the 8 drive plate bolts one at a time while rotating the crankshaft pulley



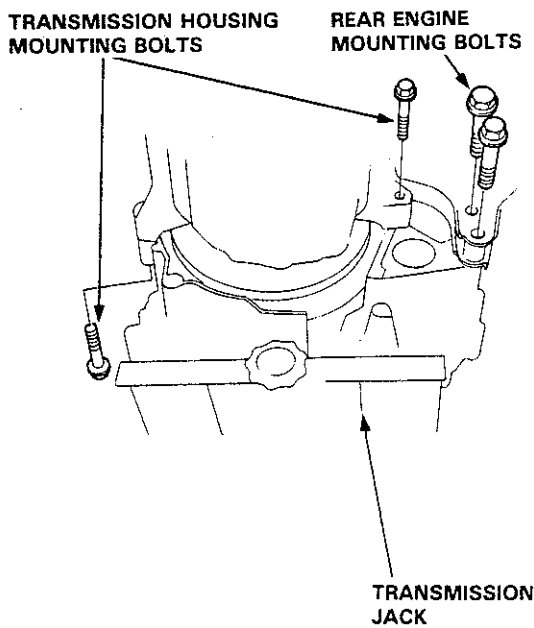
21. Attach a hoisting bracket to the engine using the distributor mounting bolt, then lift the engine slightly



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

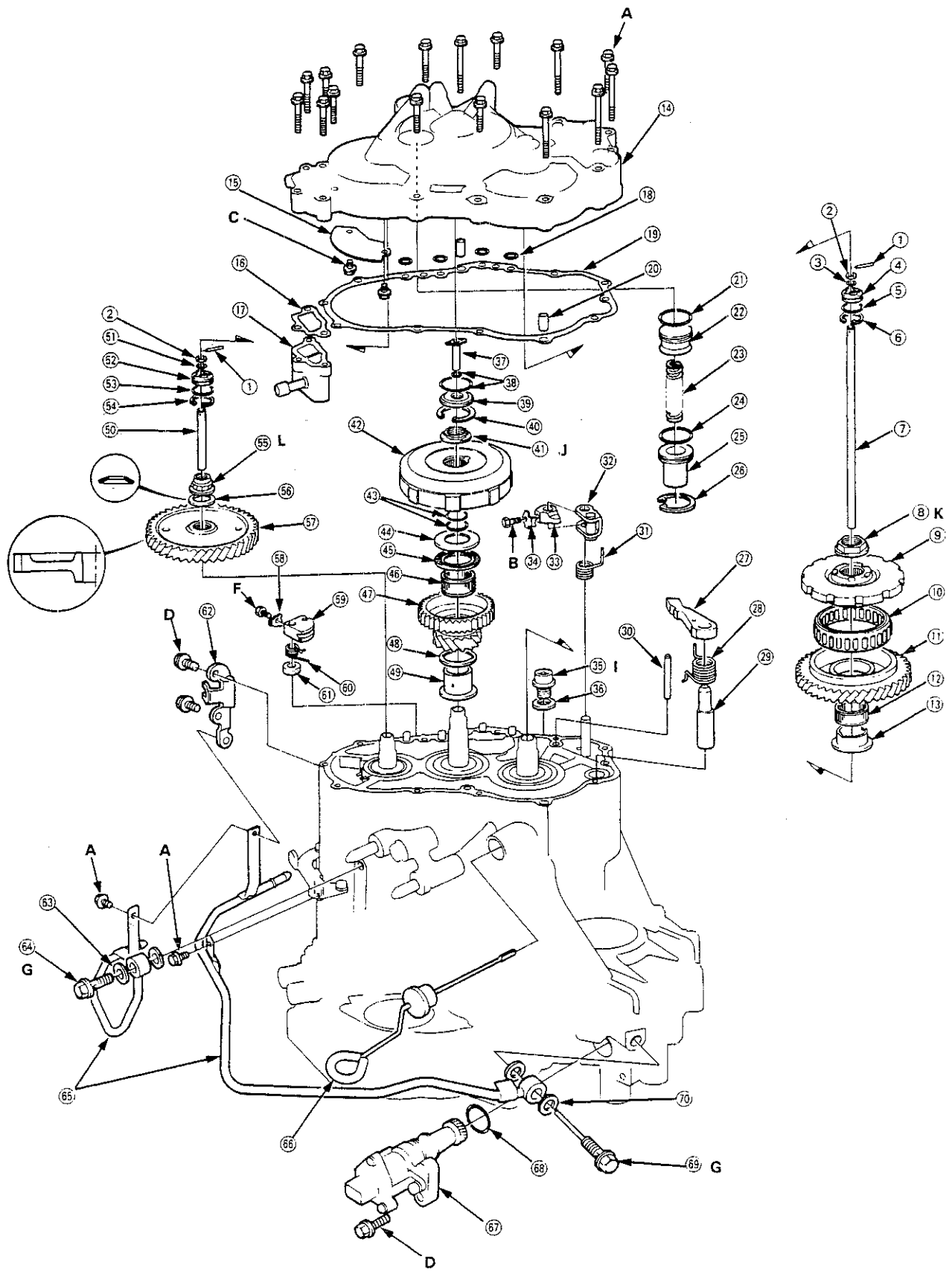


23. Remove the transmission housing mounting bolts and rear engine mounting bolts
24. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.



Illustrated Index

R. Side Cover





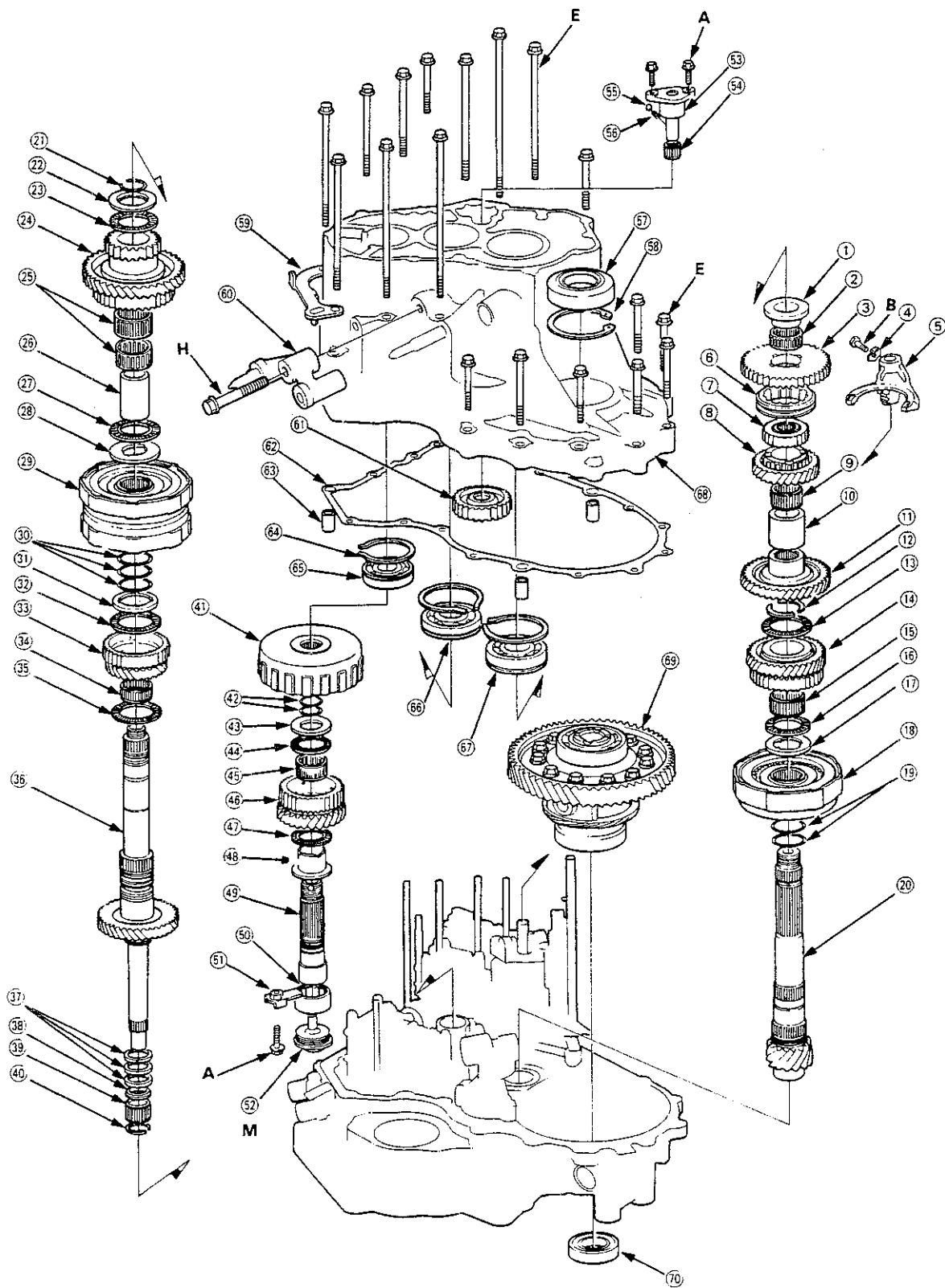
- | | |
|---|---|
| <ul style="list-style-type: none"> ① ROLLER ② COLLAR ③ O-RING Replace. ④ FEED PIPE FLANGE ⑤ O-RING Replace ⑥ CIRCLIP ⑦ 3RD CLUTCH FEED PIPE ⑧ COUNTERSHAFT LOCKNUT (FLANGE NUT) Replace ⑨ PARKING GEAR ⑩ ONE-WAY CLUTCH ASSEMBLY ⑪ COUNTERSHAFT 1ST GEAR ⑫ NEEDLE BEARING ⑬ COUNTERSHAFT 1ST GEAR COLLAR ⑭ R. SIDE COVER ⑮ BREATHER COVER ⑯ BREATHER CHAMBER GASKET Replace ⑰ BREATHER CHAMBER ⑱ O-RINGS Replace. ⑲ R. SIDE COVER GASKET Replace. ⑳ DOWEL PINS ㉑ O-RING Replace. ㉒ 1ST-HOLD ACCUMULATOR PISTON ㉓ 1ST-HOLD ACCUMULATOR SPRING ㉔ O-RING Replace. ㉕ 1ST-HOLD ACCUMULATOR COVER ㉖ CIRCLIP ㉗ PARKING BRAKE PAWL ㉘ PARKING BRAKE PAWL SPRING ㉙ PARKING BRAKE PAWL SHAFT ㉚ PARKING BRAKE PAWL STOPPER ㉛ PARKING BRAKE LEVER SPRING ㉜ PARKING BRAKE LEVER ㉝ PARKING BRAKE STOPPER ㉞ LOCK WASHER Replace ㉟ DRAIN PLUG ㊱ SEALING WASHER Replace | <ul style="list-style-type: none"> ㊲ 1ST CLUTCH FEED PIPE ㊳ O-RINGS Replace. ㊴ FEED PIPE GUIDE ㊵ CIRCLIP ㊶ MAINSHAFT LOCKNUT (FLANGE NUT) Replace ㊷ 1ST CLUTCH ASSEMBLY ㊸ O-RINGS Replace. ㊹ THRUST WASHER ㊺ THRUST NEEDLE BEARING ㊻ NEEDLE BEARING ㊼ MAINSHAFT 1ST GEAR ㊽ THRUST WASHER ㊾ MAINSHAFT 1ST GEAR COLLAR ㊿ 1ST-HOLD CLUTCH FEED PIPE ① O-RING Replace. ② FEED PIPE GUIDE ③ O-RING Replace. ④ CIRCLIP ⑤ SUB-SHAFT LOCKNUT (FLANGE NUT) Replace. ⑥ SUB-SHAFT DISC SPRING Replace ⑦ SUB-SHAFT 1ST GEAR ⑧ LOCK WASHER Replace. ⑨ THROTTLE CONTROL LEVER ⑩ THROTTLE CONTROL LEVER SPRING ⑪ OIL SEAL Replace. ⑫ THROTTLE CONTROL CABLE HOLDER ⑬ SEALING WASHERS Replace. ⑭ ATF COOLER PIPE JOINT BOLT ⑮ ATF COOLER PIPES ⑯ ATF LEVEL GAUGE ⑰ VEHICLE SPEED SENSOR ⑱ O-RING Replace. ⑲ ATF COOLER PIPE JOINT BOLT ⑳ SEALING WASHERS Replace. |
|---|---|

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
B	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt
C	11 N·m (1.1 kg-m, 8 lb-ft)	6 x 1.0 mm	
D	22 N·m (2.2 kg-m, 16 lb-ft)	8 x 1.25 mm	
F	8 N·m (0.8 kg-m, 6 lb-ft)	5 x 0.8 mm	
G	29 N·m (2.9 kg-m, 21 lb-ft)	12 x 1.25 mm	ATF cooler pipe joint bolt
I	40 N·m (4.0 kg-m, 29 lb-ft)	14 x 1.5 mm	Drain plug
J	95 N·m (9.5 kg-m, 69 lb-ft)	19 x 1.25 mm	Mainshaft locknut (flange nut): Left-hand threads
K	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	23 x 1.25 mm	Countershaft locknut (flange nut)
L	95 N·m (9.5 kg-m, 69 lb-ft)	19 x 1.25 mm	Sub-shaft locknut (flange nut)

Illustrated Index

Transmission Housing





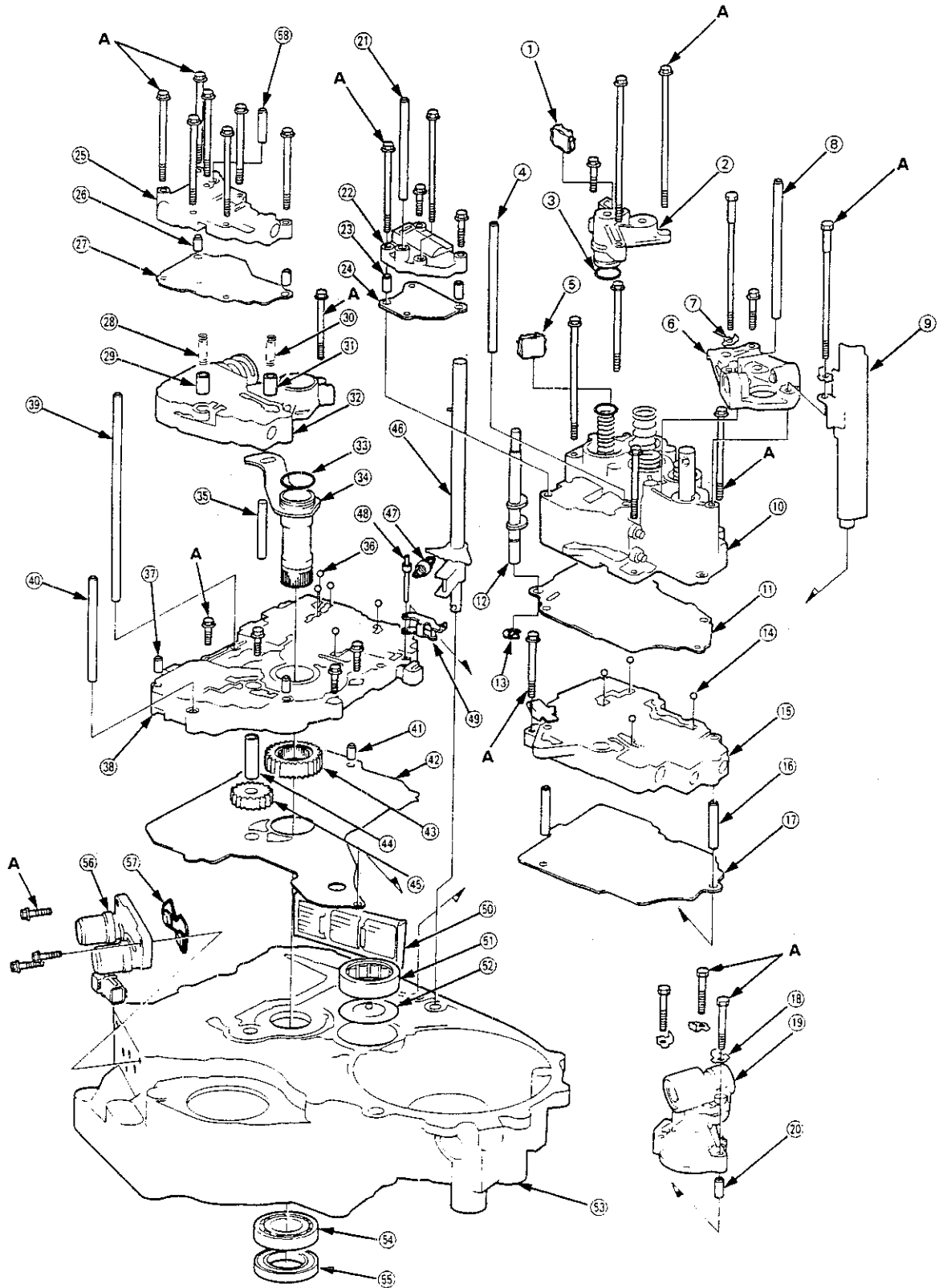
- ① COUNTERSHAFT REVERSE GEAR COLLAR
- ② NEEDLE BEARING
- ③ COUNTERSHAFT REVERSE GEAR
- ④ LOCK WASHER Replace.
- ⑤ REVERSE SHIFT FORK
- ⑥ REVERSE SELECTOR
- ⑦ REVERSE SELECTOR HUB
- NOTE: Transmission, numbered on and after M24A-1066871, has a press fitting reverse selector hub.
- ⑧ COUNTERSHAFT 4TH GEAR
- ⑨ NEEDLE BEARING
- ⑩ DISTANCE COLLAR, 28 mm
- ⑪ COUNTERSHAFT 2ND GEAR
- ⑫ COTTERS
- ⑬ THRUST NEEDLE BEARING
- ⑭ COUNTERSHAFT 3RD GEAR
- ⑮ NEEDLE BEARING
- ⑯ THRUST NEEDLE BEARING
- ⑰ SPLINED WASHER Selective part
- ⑱ 3RD CLUTCH ASSEMBLY
- ⑲ O-RINGS Replace
- ⑳ COUNTERSHAFT
- ㉑ CIRCLIP
- ㉒ THRUST SHIM
- ㉓ THRUST NEEDLE BEARING
- ㉔ MAINSHAFT 4TH/REVERSE GEAR
- ㉕ NEEDLE BEARINGS
- ㉖ 4TH/REVERSE GEAR COLLAR
- ㉗ THRUST NEEDLE BEARING
- ㉘ THRUST SHIM
- ㉙ 2ND/4TH CLUTCH ASSEMBLY
- ㉚ O-RINGS Replace.
- ㉛ THRUST WASHER, 36.5 x 51 mm
Selective part
- ㉜ THRUST NEEDLE BEARING
- ㉝ MAINSHAFT 2ND GEAR
- ㉞ NEEDLE BEARING
- ㉟ THRUST NEEDLE BEARING
- ㊱ MAINSHAFT
- ㊲ SEALING RINGS, 35 mm
- ㊳ SEALING RING, 29 mm
- ㊴ NEEDLE BEARING
- ㊵ SET RING
- ㊶ 1ST-HOLD CLUTCH ASSEMBLY
- ㊷ O-RINGS Replace
- ㊸ THRUST SHIM
- ㊹ THRUST NEEDLE BEARING
- ㊺ NEEDLE BEARING
- ㊻ SUB-SHAFT 4TH GEAR
- ㊼ THRUST NEEDLE BEARING
- ㊽ SUB-SHAFT 4TH GEAR COLLAR
- ㊾ SUB-SHAFT
- ㊿ NEEDLE BEARING
- ① NEEDLE BEARING STOPPER
- ② OIL GUIDE CAP
- ③ REVERSE IDLER GEAR SHAFT/HOLDER
- ④ NEEDLE BEARING
- ⑤ STEEL BALL
- ⑥ REVERSE IDLER GEAR SHAFT SPRING
- ⑦ OIL SEAL Replace
- ⑧ SET RING, 80 mm Selective part
- ⑨ TRANSMISSION HANGER
- ⑩ TRANSMISSION MOUNT BRACKET
- ⑪ REVERSE IDLER GEAR
- ⑫ TRANSMISSION HOUSING GASKET Replace
- ⑬ DOWEL PIN
- ⑭ SNAP RINGS
- ⑮ TRANSMISSION HOUSING SUB-SHAFT BEARING
- ⑯ TRANSMISSION HOUSING MAINSHAFT BEARING
- ⑰ TRANSMISSION HOUSING COUNTERSHAFT BEARING
- ⑱ TRANSMISSION HOUSING
- ⑲ DIFFERENTIAL ASSEMBLY
- ㉑ OIL SEAL Replace.

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	Special bolt
B	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	
E	34 N·m (3.4 kg-m, 25 lb-ft)	8 x 1.25 mm	
H	50 N·m (5.0 kg-m, 36 lb-ft)	12 x 1.25 mm	Oil guide cap
M	40 N·m (4.0 kg-m, 29 lb-ft)	30 x 1.5 mm	

Illustrated Index

Torque Converter Housing/Valve Body





- | | |
|--|---|
| <ul style="list-style-type: none"> ① ATF MAGNET Clean. ② ACCUMULATOR COVER ③ O-RING Replace ④ OIL FEED PIPE ⑤ ATF MAGNET Clean. ⑥ DENTENT BASE ⑦ LOCK WASHERS Replace ⑧ OIL FEED PIPE ⑨ BAFFLE PLATE ⑩ SERVO BODY ⑪ SERVO SEPARATOR PLATE ⑫ THROTTLE CONTROL SHAFT ⑬ E-RING ⑭ CHECK BALLS ⑮ SECONDARY VALVE BODY ⑯ DOWEL PINS ⑰ SECONDARY SEPARATOR PLATE ⑱ LOCK WASHERS Replace. ⑲ GOVERNOR BODY ⑳ DOWEL PIN ㉑ OIL FEED PIPE ㉒ MODULATOR VALVE BODY ㉓ DOWEL PINS ㉔ MODULATOR SEPARATOR PLATE ㉕ LOCK-UP VALVE BODY ㉖ DOWEL PINS ㉗ LOCK-UP SEPARATOR PLATE ㉘ TORQUE CONVERTER CHECK VALVE SPRING ㉙ TORQUE CONVERTER CHECK VALVE ㉚ COOLER CHECK VALVE SPRING ㉛ COOLER CHECK VALVE | <ul style="list-style-type: none"> ㉜ REGULATOR VALVE BODY ㉝ O-RING Replace. ㉞ STATOR SHAFT ㉟ STOPPER SHAFT ㊱ CHECK BALLS ㊲ DOWEL PINS ㊳ MAIN VALVE BODY ㊴ OIL FEED PIPE ㊵ OIL FEED PIPE ㊶ DOWEL PIN ㊷ MAIN SEPARATOR PLATE ㊸ OIL PUMP DRIVE GEAR ㊹ OIL PUMP DRIVEN GEAR SHAFT ㊺ OIL PUMP DRIVEN GEAR ㊻ CONTROL SHAFT ㊼ DETENT SPRING ㊽ DETENT ARM SHAFT ㊾ DETENT ARM ㊿ ATF STRAINER Clean or replace. ① TORQUE CONVERTER HOUSING COUNTERSHAFT ② NEEDLE BEARING ③ OIL GUIDE PLATE Replace. ④ TORQUE CONVERTER HOUSING ⑤ TORQUE CONVERTER HOUSING MAINSHAFT ⑥ BALL BEARING ⑦ OIL SEAL Replace. ⑧ LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY ⑨ LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace. ⑩ OIL FEED PIPE |
|--|---|

TORQUE SPECIFICATIONS

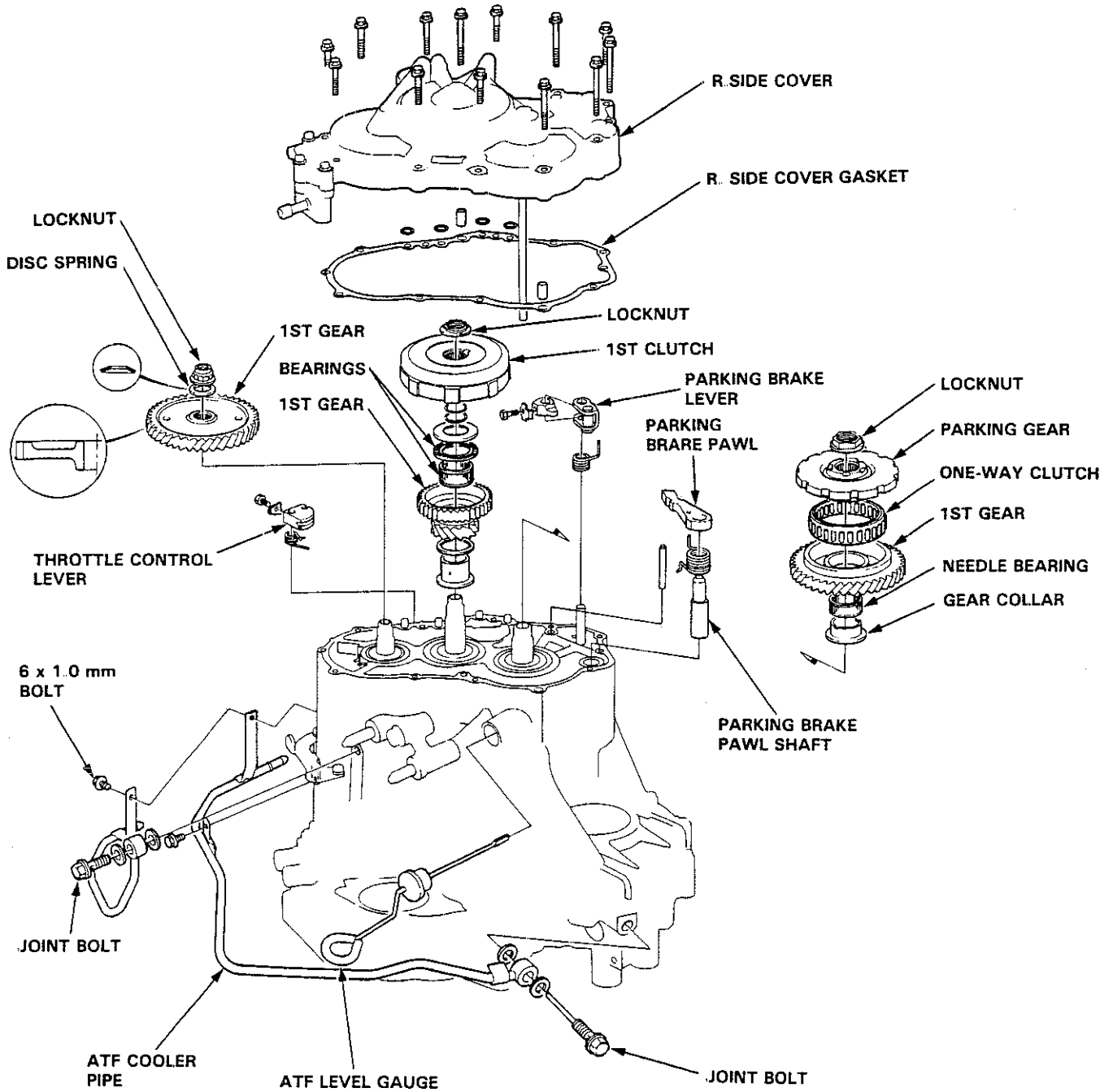
Ref No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	

R. Side Cover

Removal

NOTE:

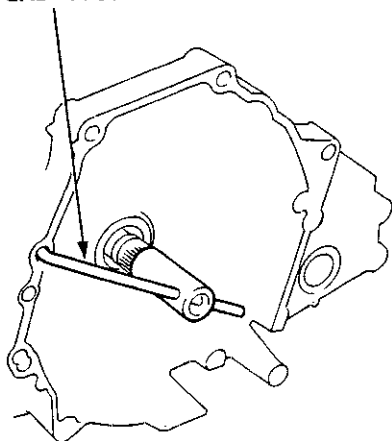
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air
- Blow out all passages.
- When removing the transmission R. side cover, replace the following:
 - R. side cover gasket
 - Lock washers
 - O-rings
 - Each shaft locknut
 - Disc spring
 - Sealing washers



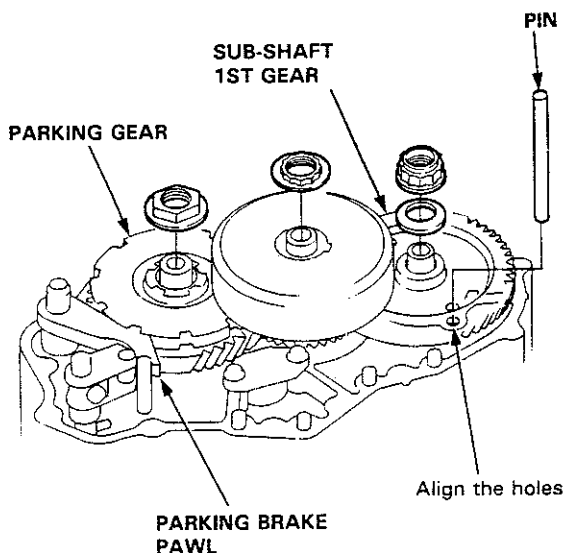


- 1 Remove the 16 bolts securing the R. side cover, then remove the cover.
- 2 Slip the special tool onto the mainshaft.

MAINSHAFT HOLDER
07GAB—PF50101



- 3 Engage the parking brake pawl with the parking gear.
- 4 Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to lock the sub-shaft while removing the sub-shaft locknut.

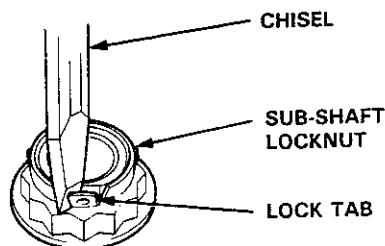


- 5 Pry the lock tabs of the mainshaft and countershaft locknuts.
- 6 Cut the lock tab of the sub-shaft locknut using a chisel as shown. Then remove the locknut from each shaft.

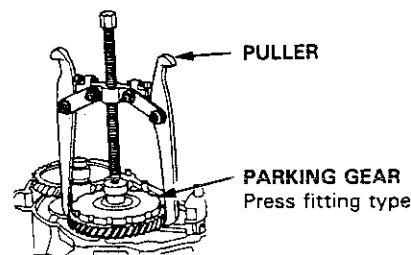
NOTE:

- Mainshaft locknut has left-hand threads.
- Clean the old countershaft locknut, it is used when installing to press the press fitting parking gear on the countershaft.

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



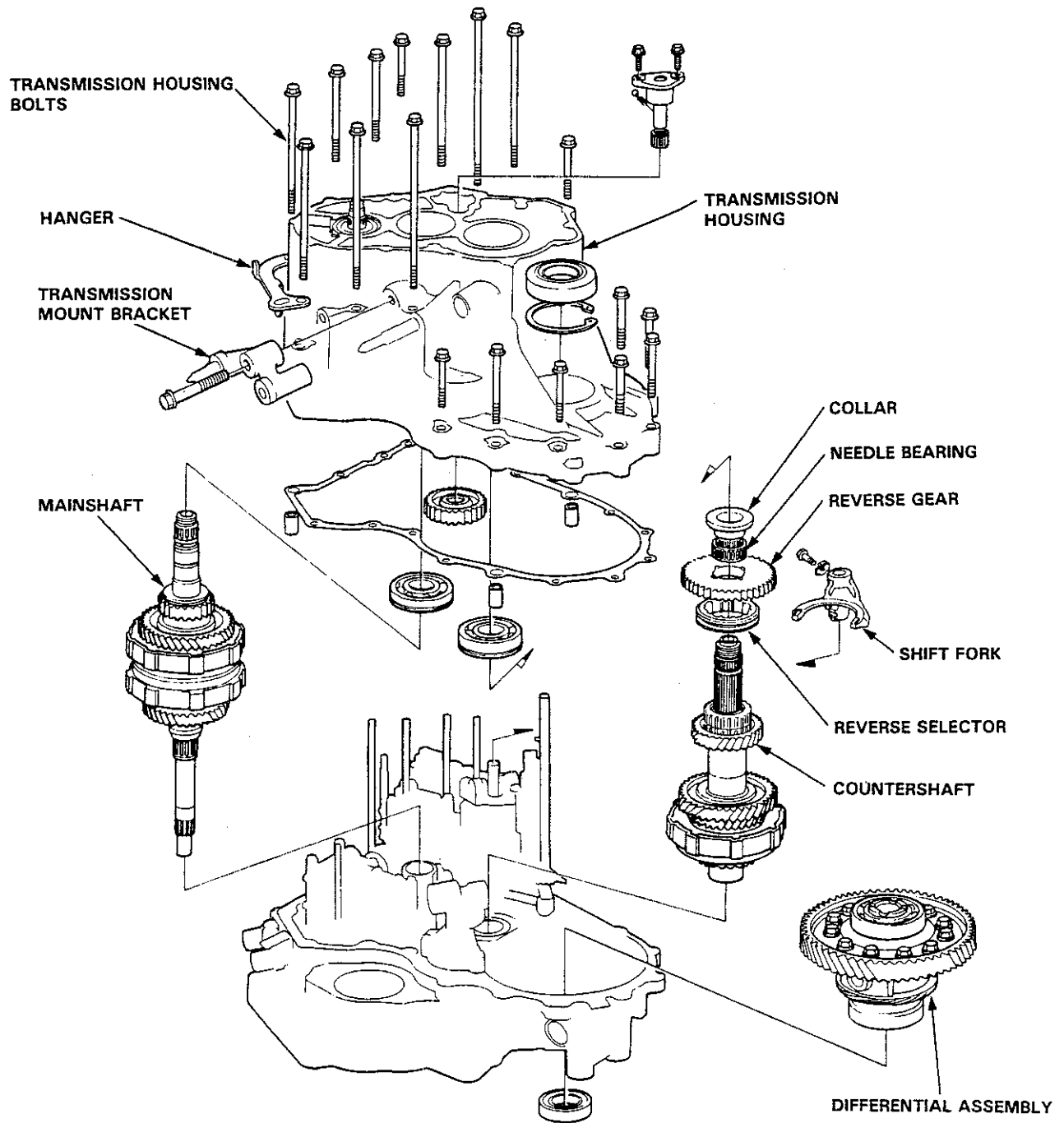
- 7 Remove the special tool from the mainshaft after removing the locknut.
- 8 Remove the 1st clutch and mainshaft 1st gear assembly from the mainshaft.
- 9 Remove the sub-shaft 1st gear.
- 10 Remove the parking brake pawl.
- 11 Remove the parking gear, one-way clutch and countershaft 1st gear assembly. Use a puller for press fitting parking gear as shown.



- 12 Remove the parking brake lever from the control shaft.
- 13 Remove the throttle control lever from the throttle control shaft.
- 14 Remove the ATF cooler pipes.
- 15 Remove the ATF level gauge.

Transmission Housing

Removal

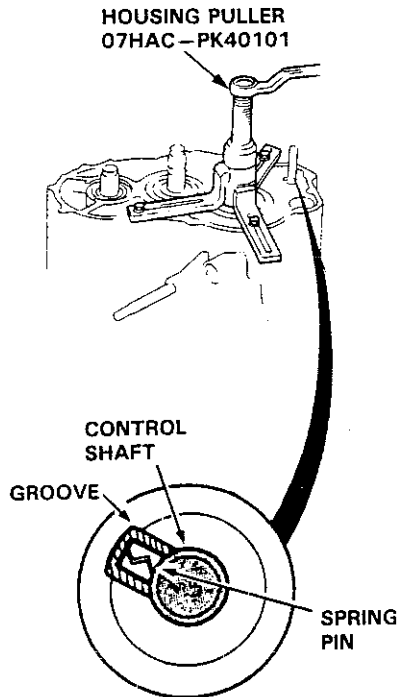




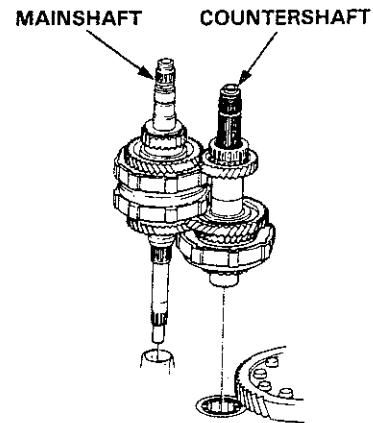
NOTE:

- 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:
 - Transmission housing gasket
 - Lock washer

- 1 Remove the transmission mount bracket.
- 2 Remove the transmission housing mounting bolts and hanger.
- 3 Align the spring pin of 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.



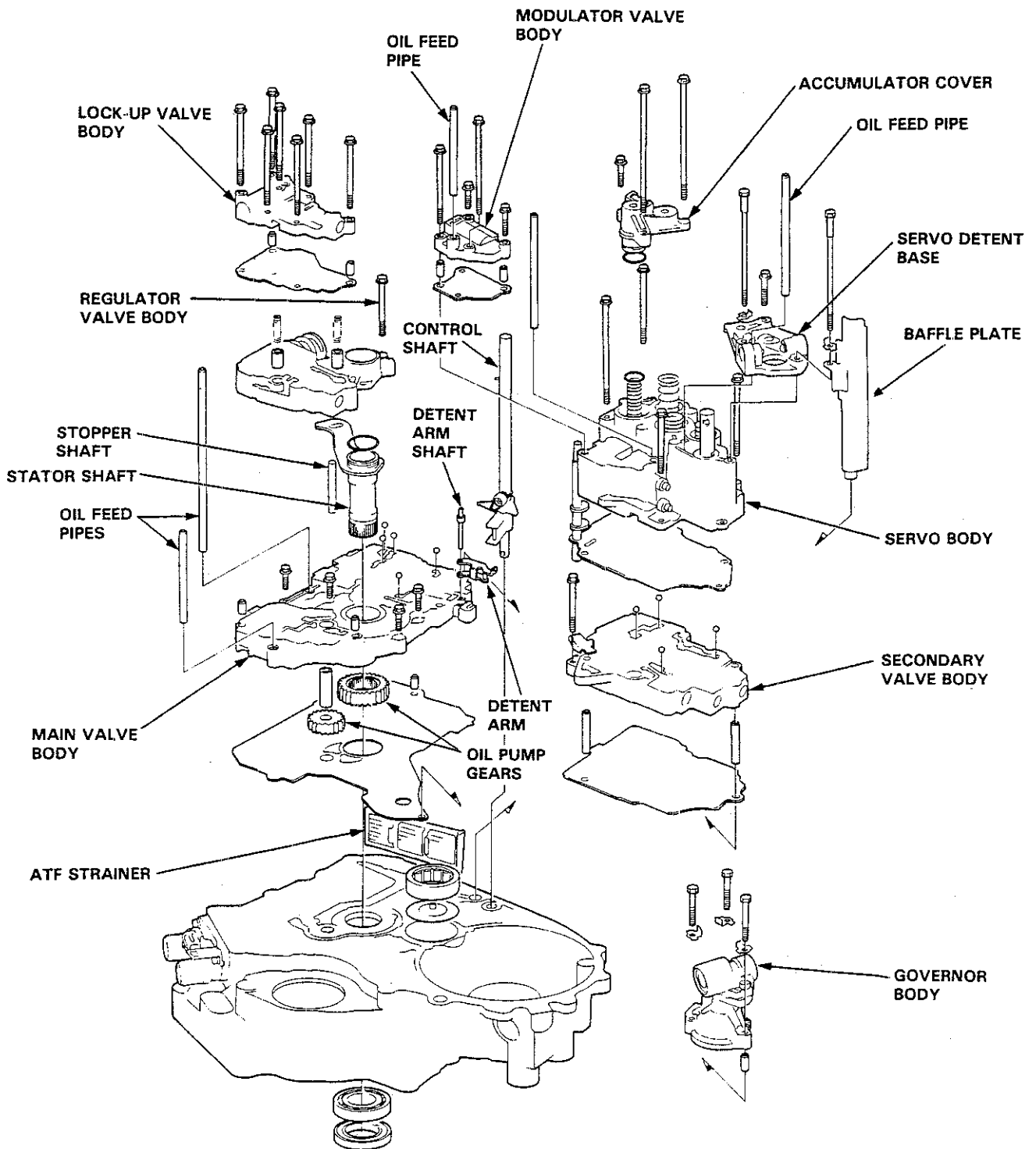
5. Remove the countershaft reverse gear with the collar and needle bearing
6. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.
- 7 Remove the countershaft and mainshaft sub-assembly together.



- 8 Remove the differential assembly.

Torque Converter Housing/Valve Body

Removal





NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- When removing the valve body replace the following:
 - O-rings
 - Lock washers

1. Remove the oil feed pipes from the servo body, modulator valve body and main valve body
2. Remove the 3 bolts securing the accumulator cover, then remove the accumulator cover
3. Remove the 3 bolts securing the servo detent base, then remove the servo detent base and baffle plate.
4. Remove the 4 bolts securing the modulator valve body, then remove the modulator valve body and separator plate.
5. Remove the 4 bolts securing the servo body, then remove the servo body and separator plate
6. Remove the 1 bolts securing the secondary valve body, then remove the secondary valve body and separator plate.
7. Remove the 7 bolts securing the lock-up valve body. then remove the lock-up valve body and separator plate.
8. Remove the 1 bolt securing the regulator valve body, then remove the regulator valve body
9. Remove the stator shaft and stopper shaft.
10. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.
11. Remove the detent arm and detent arm shaft from the main valve body.
12. Remove the 4 bolts securing the main valve body, then remove the main valve body
13. Remove the oil pump driven gear shaft, then remove the oil pump gears.
14. Remove the 3 bolts securing the governor body, then remove the governor body
15. Remove the main separator plate with 2 dowel pins
16. Remove the ATF strainer.

Valve Caps

Description

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

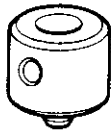
Toward outside of valve body



Toward spring

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

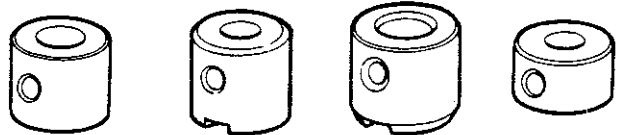
Toward outside of valve body



Toward spring

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

Toward outside of valve body



Toward spring

- Caps with flat ends and a groove around cap are installed with the groove side toward the spring.

Toward outside of valve body



Toward spring



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.

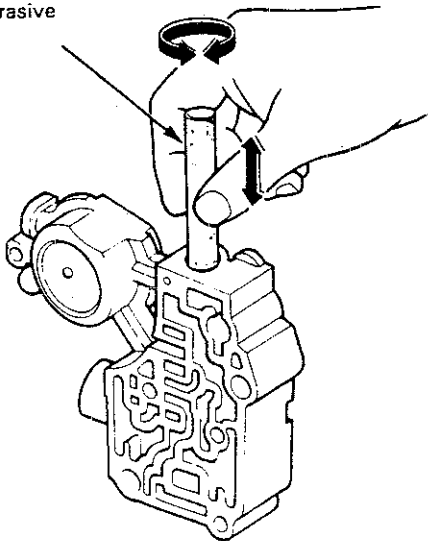
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

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.

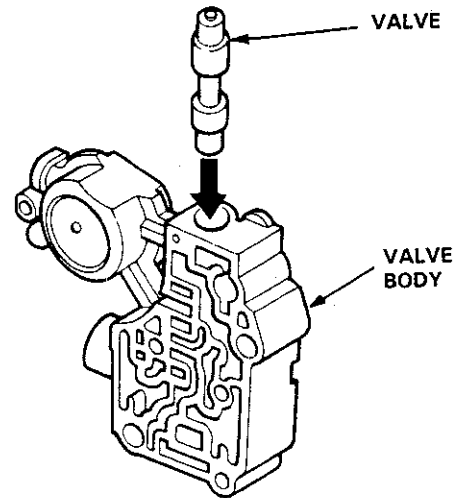
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked paper and insert it in the valve bore of the sticking valve. Twist the paper slightly,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

ATF-soaked
#600 abrasive
paper



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



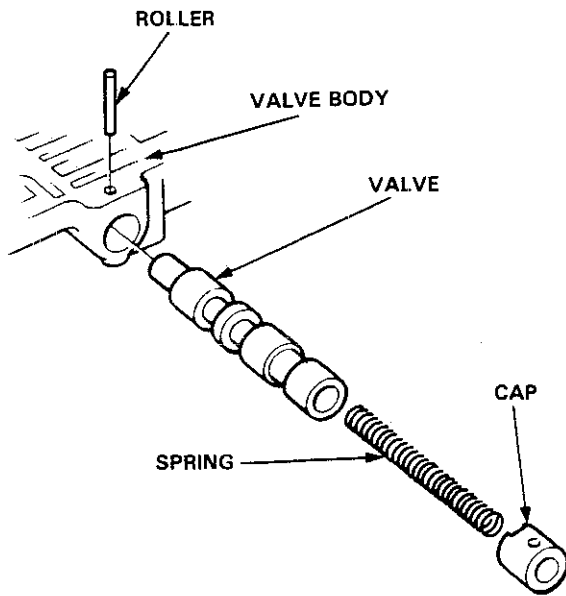
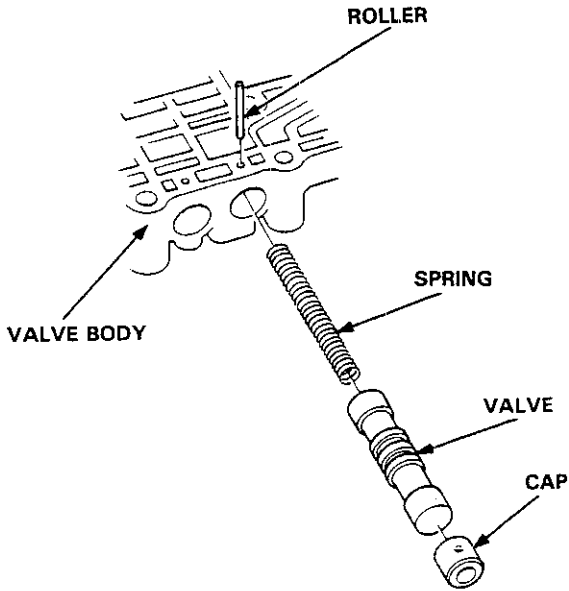
7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

Valve

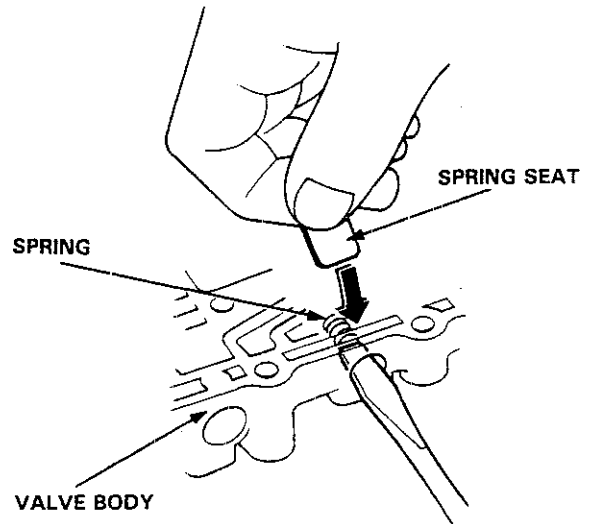
Assembly

NOTE: Coat all parts with ATF before assembly.

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

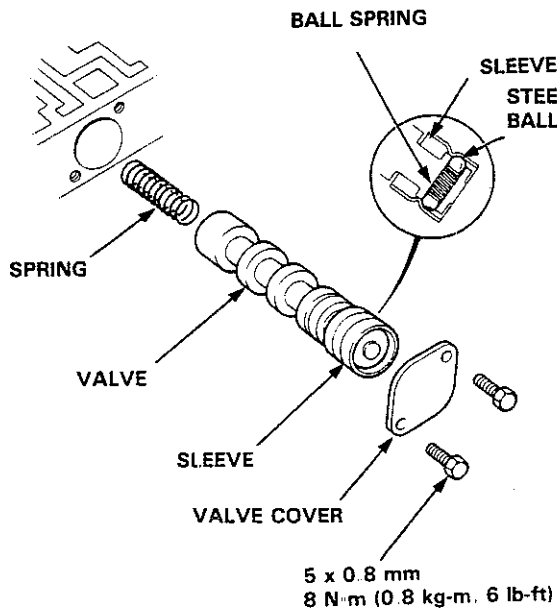


- Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.

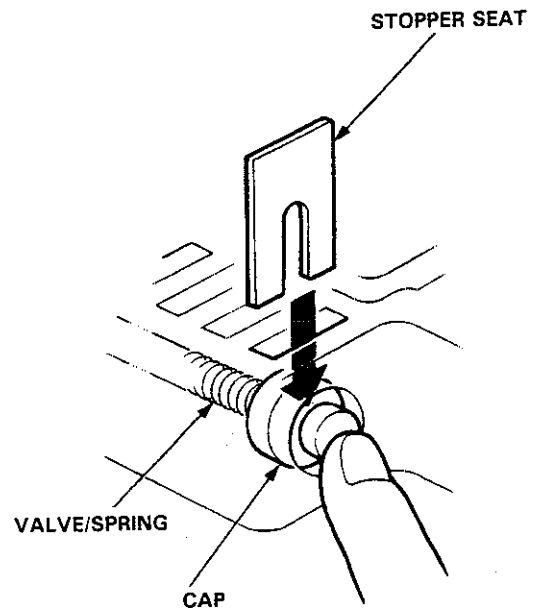




- Slide the spring into the hole in the big end of the shift valve. While holding the steel balls with the tips of your fingers, put the sleeve over the shift valve. Place the shift spring in the shift valve, then slip it into the valve body and install the valve cover.



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



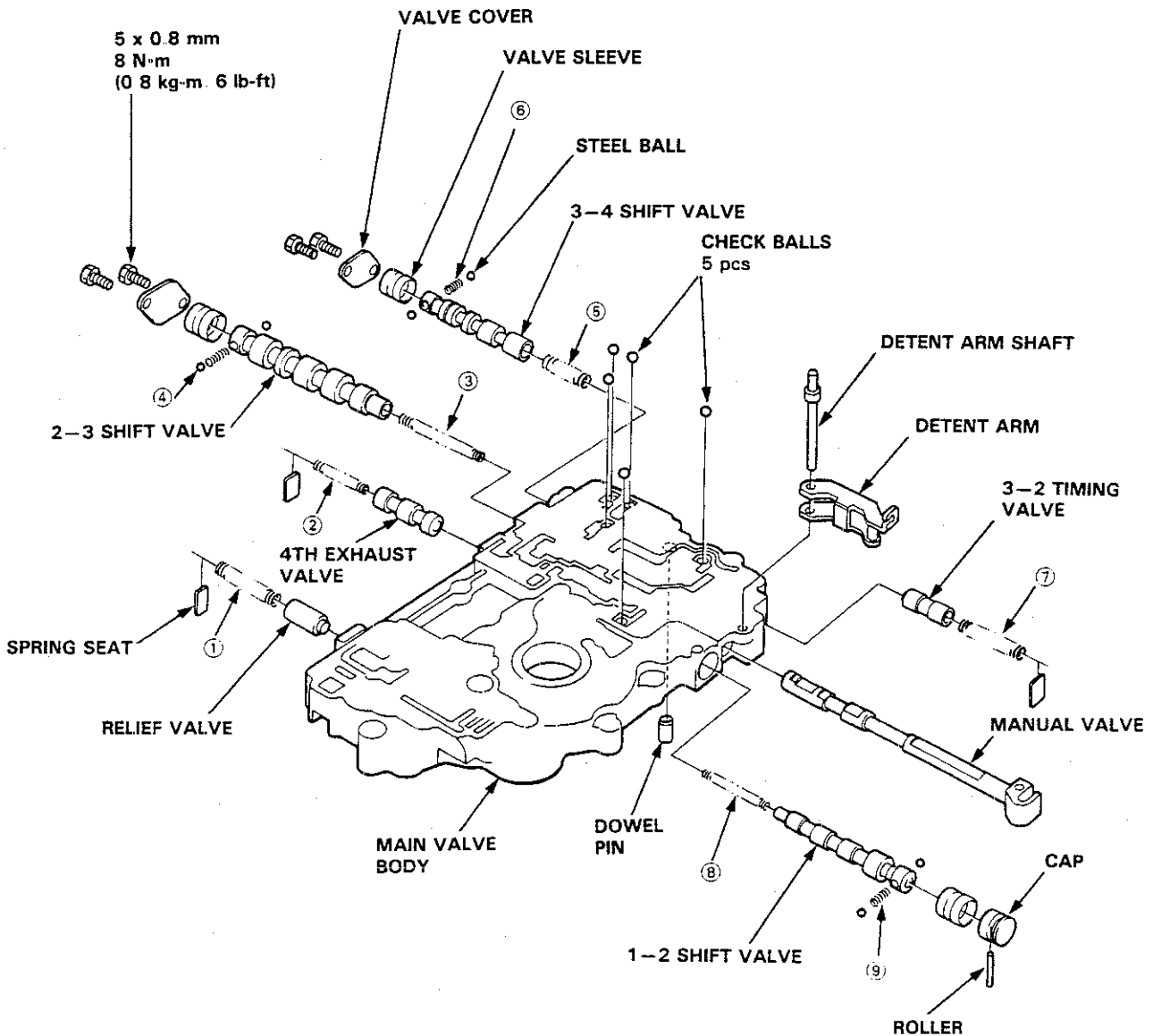
Main Valve Body

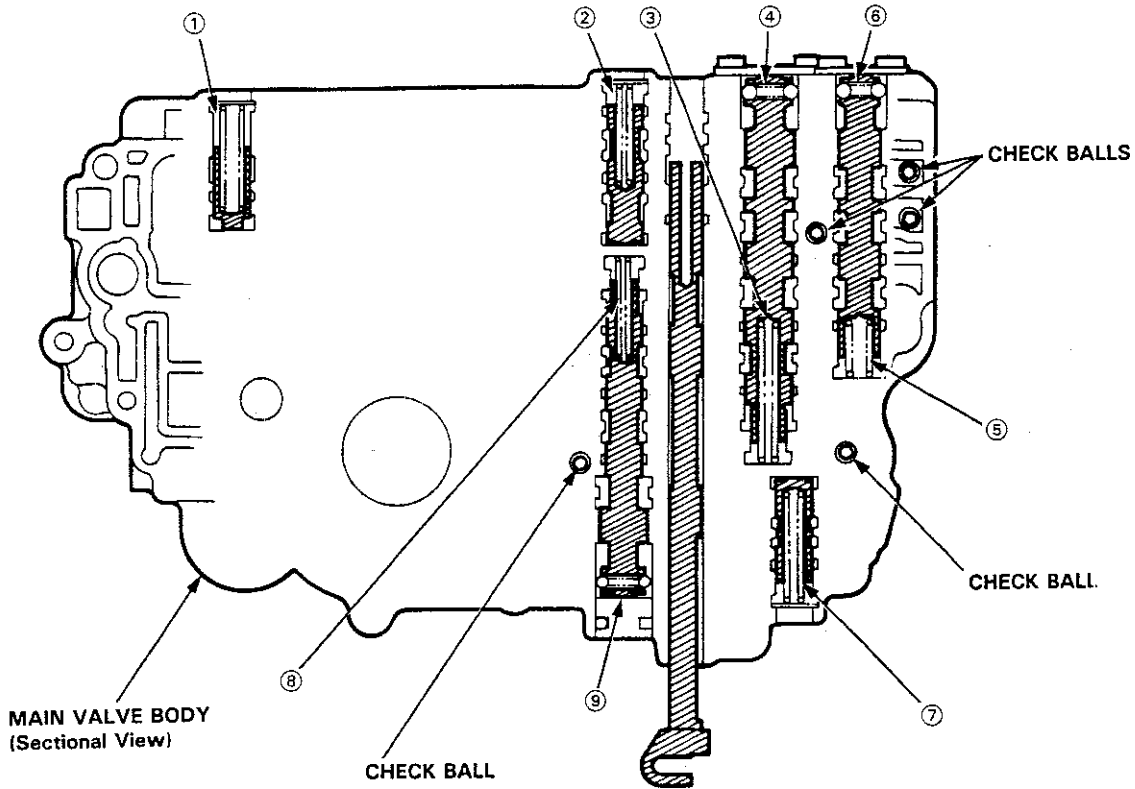
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air
- Blow out all passages.
- Replace 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 14-73.
- Coat all parts with ATF before reassembly

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





SPRING SPECIFICATIONS

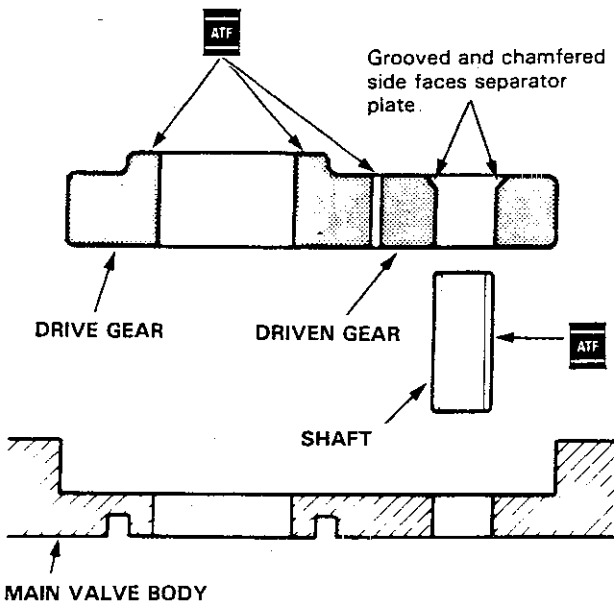
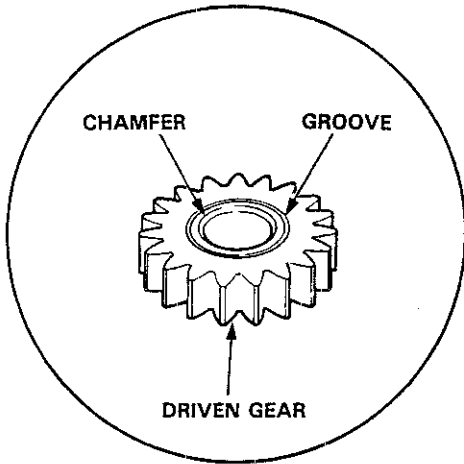
Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia	O.D	Free Length	No of Coils
①	Relief valve spring	1.1 (0.043)	8.6 (0.339)	37.1 (1.461)	13.4
②	4th exhaust valve spring	0.9 (0.035)	6.6 (0.260)	43.3 (1.705)	22.0
③	2-3 shift valve spring	0.9 (0.035)	7.1 (0.280)	64.7 (2.547)	32.1
④	2-3 shift ball spring	0.4 (0.016)	4.5 (0.177)	14.7 (0.579)	7.3
⑤	3-4 shift valve spring	0.9 (0.035)	9.6 (0.378)	32.5 (1.280)	10.3
⑥	3-4 shift ball spring	0.5 (0.020)	4.5 (0.177)	11.3 (0.445)	7.4
⑦	3-2 timing valve spring	1.2 (0.047)	8.6 (0.339)	46.9 (1.847)	15.2
⑧	1-2 shift valve spring	0.45 (0.018)	5.1 (0.201)	52.8 (2.079)	29.0
⑨	1-2 shift ball spring	0.45 (0.018)	4.5 (0.177)	10.7 (0.421)	12.7

Oil Pump

Inspection

- 1 Install the pump gears and shaft in the main valve body



- 2 Install the oil pump shaft and measure the side clearance of the drive and driven gears

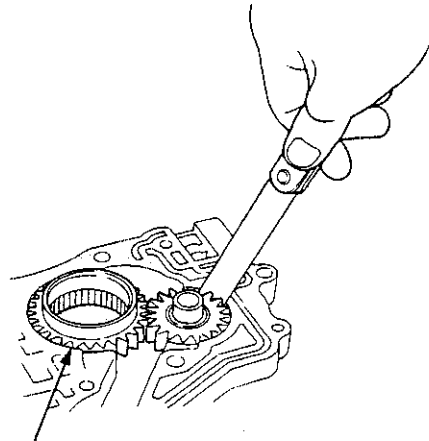
Pump Gears Side (Radial) Clearance:

Standard (New): Drive gear

0.210–0.265 mm
(0.0083–0.0104 in)

Driven gear

0.07–0.125 mm
(0.0028–0.0049 in)



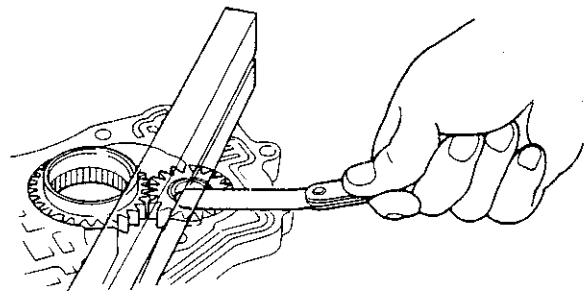
DRIVE GEAR
Inspect teeth for wear or damage.

- 3 Measure the thrust clearance of the driven gear-to-main valve body

Drive/Driven Gear thrust (Axial) Clearance:

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

Service Limit: 0.07 mm (0.0028 in)





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 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 14-73.

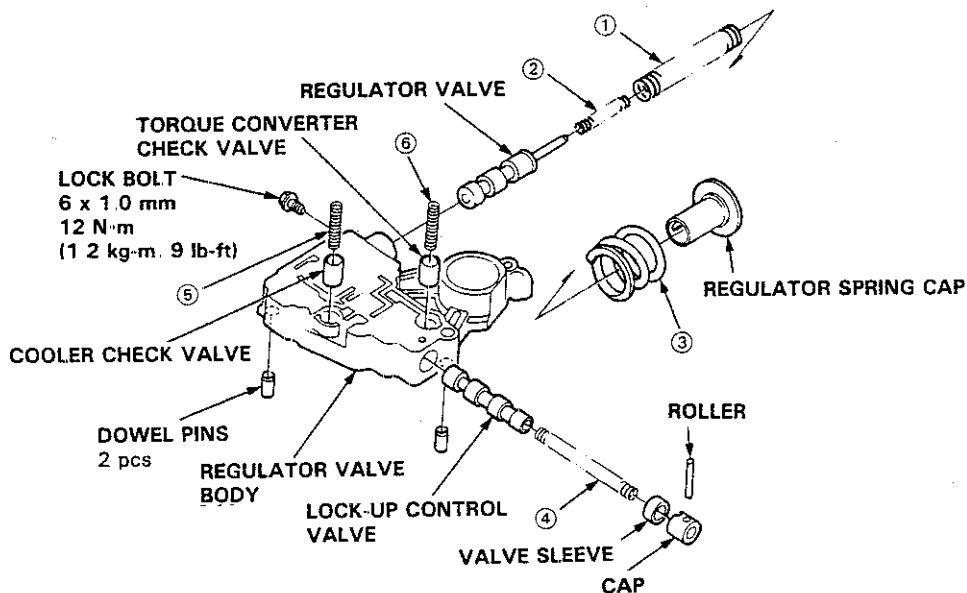
1. Hold the regulator spring cap in place while removing the lock bolt. Once the bolt is removed, release the spring cap slowly.

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

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

NOTE:

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



SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O D	Free Length	No. of Coils
①	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	88.6 (3.488)	16.5
②	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	7.5
③	Stator reaction spring	5.5 (0.217)	*26.4 (1.039)	30.3 (1.193)	2.1
④	Lock-up control valve spring	0.9 (0.035)	6.6 (0.260)	41.0 (1.614)	23.3
⑤	Cooler check valve spring	1.1 (0.043)	8.4 (0.331)	33.8 (1.331)	12.5
⑥	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	33.8 (1.331)	12.5

*: Inside Diameter

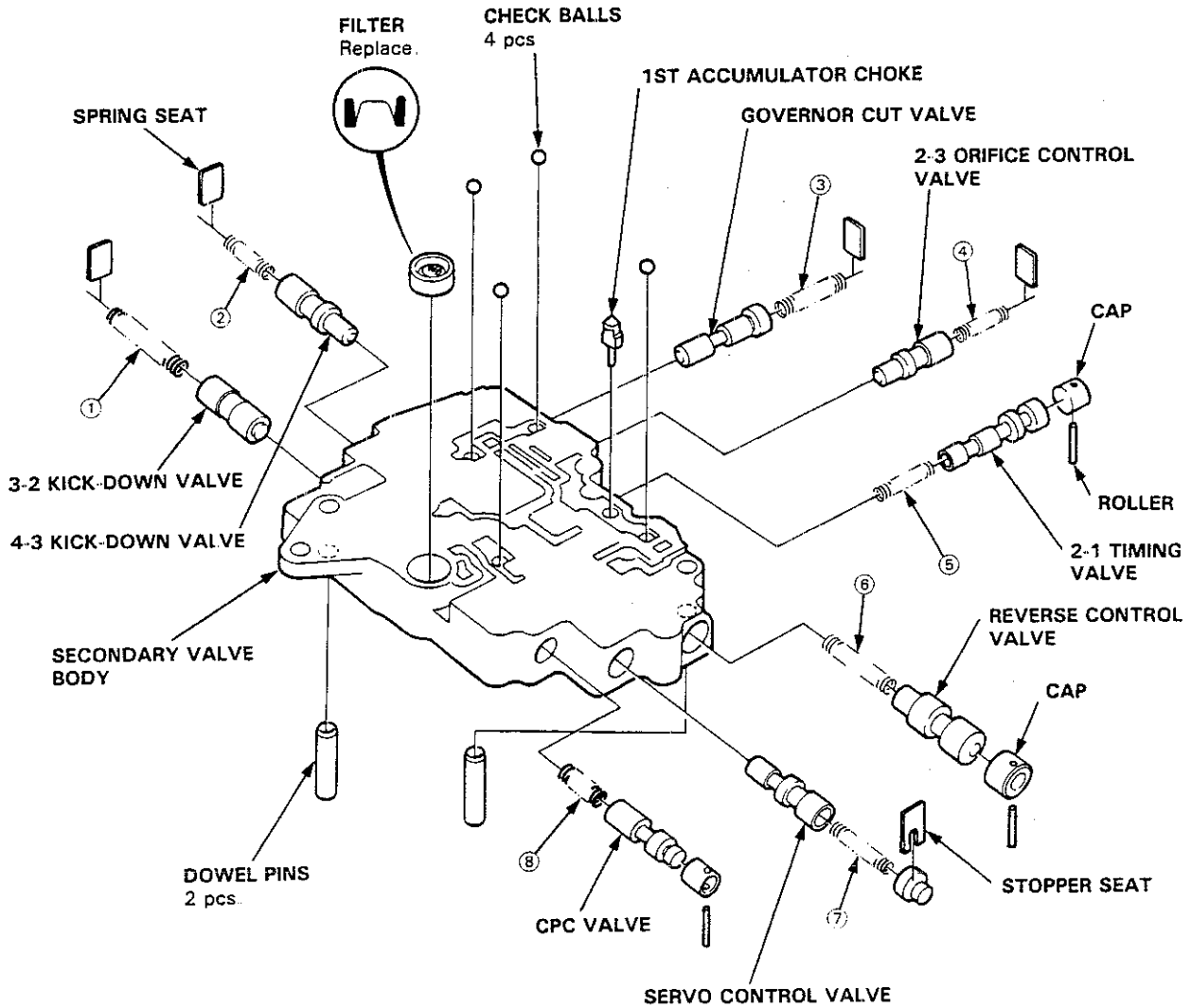
Secondary Valve Body

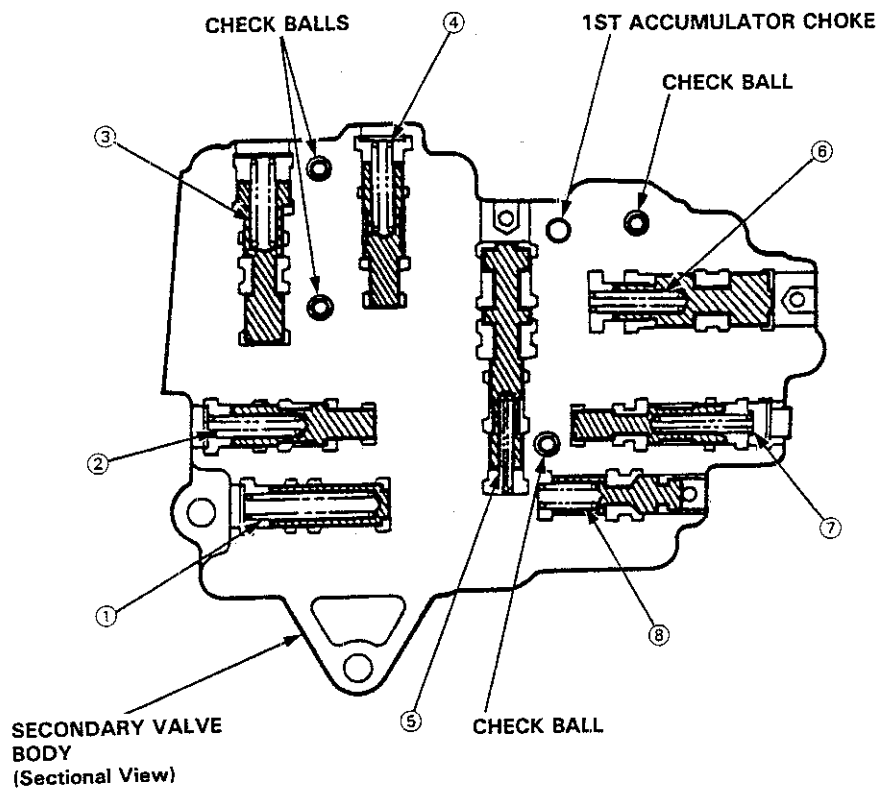
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air
- Blow out all passages.
- Replace 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 14-73.
- Coat all parts with ATF before reassembly.

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





SPRING SPECIFICATIONS

Unit of length: mm (in)

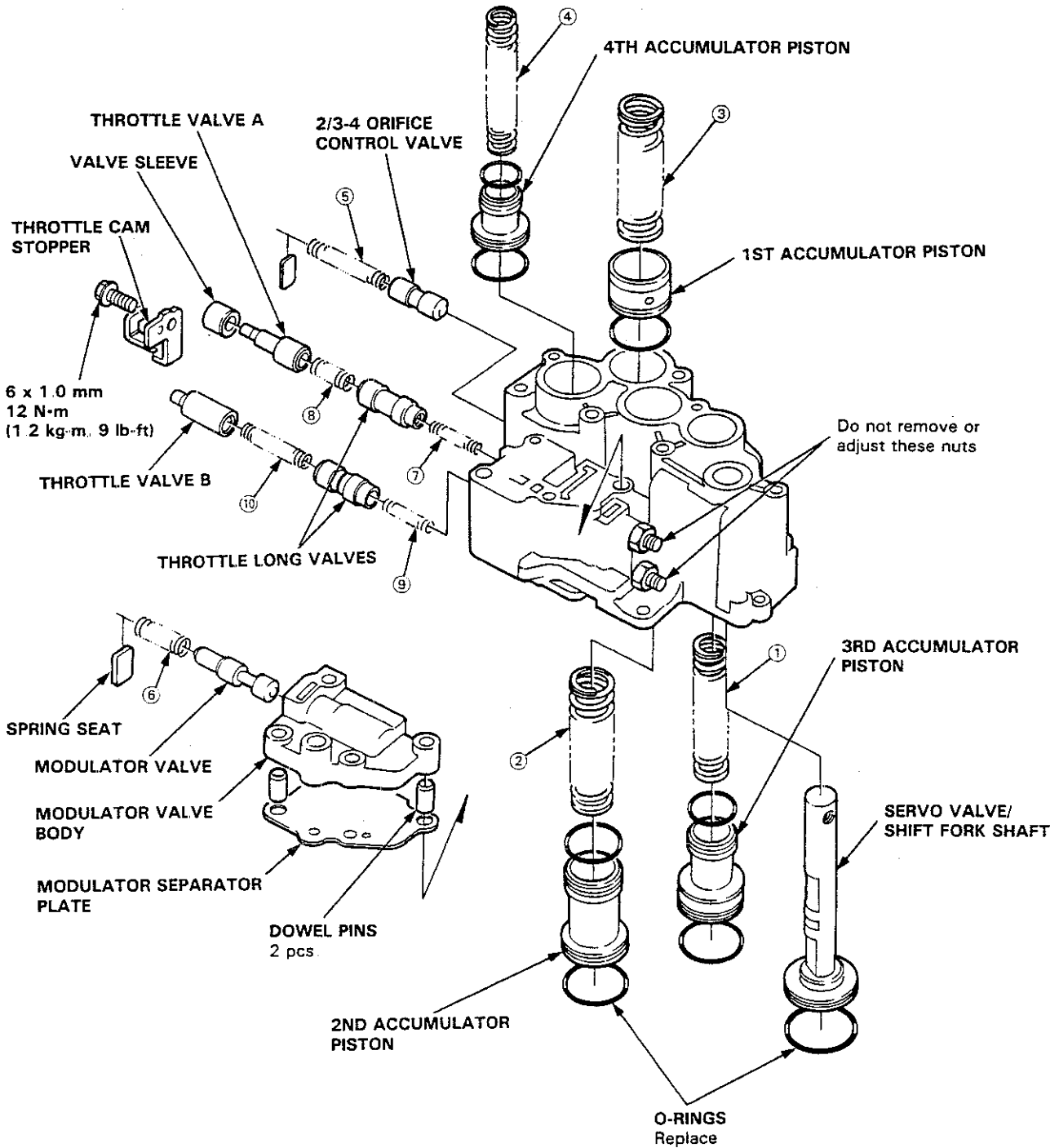
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-2 kick-down valve spring	1.3 (0.051)	8.6 (0.339)	45.6 (1.795)	17.0
②	4-3 kick-down valve spring	1.0 (0.039)	6.6 (0.260)	29.9 (1.177)	14.7
③	Governor cut valve spring	0.8 (0.031)	7.6 (0.299)	44.5 (1.752)	17.0
④	2-3 orifice control valve spring	0.9 (0.035)	6.6 (0.260)	33.2 (1.307)	14.9
⑤	2-1 timing valve spring	0.7 (0.028)	5.6 (0.220)	33.0 (1.299)	21.7
⑥	Reverse control valve spring	0.7 (0.028)	7.1 (0.280)	40.0 (1.575)	20.8
⑦	Servo control valve spring	0.9 (0.035)	6.4 (0.252)	34.1 (1.343)	17.5
⑧	CPC (Clutch Pressure Control) valve spring	0.9 (0.035)	8.4 (0.331)	24.9 (0.980)	9.8

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 valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF before reassembly.
- Replace the O-rings and filters





SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O. D.	Free Length	No. of Coils
①	3rd accumulator spring	2.6 (0.102)	17.5 (0.689)	91.8 (3.614)	15.8
②	2nd accumulator spring	3.5 (0.138)	22.0 (0.866)	75.4 (2.968)	8.7
③	1st accumulator spring	2.6 (0.102)	24.3 (0.957)	79.8 (3.142)	8.5
④	4th accumulator spring	2.6 (0.102)	16.0 (0.630)	89.4 (3.520)	16.2
⑤	2/3-4 orifice control valve spring	1.0 (0.039)	8.6 (0.339)	51.9 (2.043)	19.8
⑥	Modulator valve spring	1.2 (0.047)	*7.0 (0.276)	27.2 (1.071)	8.0
⑦	Throttle valve A adjusting spring	0.8 (0.031)	6.2 (0.244)	27.0 (1.063)	8.5
⑧	Throttle valve A spring	1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	8.1
		1.0 (0.039)	8.5 (0.335)	22.2 (0.874)	6.0
		1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	7.6
		1.0 (0.039)	8.5 (0.335)	22.1 (0.870)	5.5
⑨	Throttle valve B adjusting spring	0.8 (0.031)	6.2 (0.244)	30.0 (1.181)	8.0
⑩	Throttle valve B spring	1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	10.5
		1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	11.2
		1.4 (1.653)	8.5 (0.335)	41.6 (1.638)	12.4

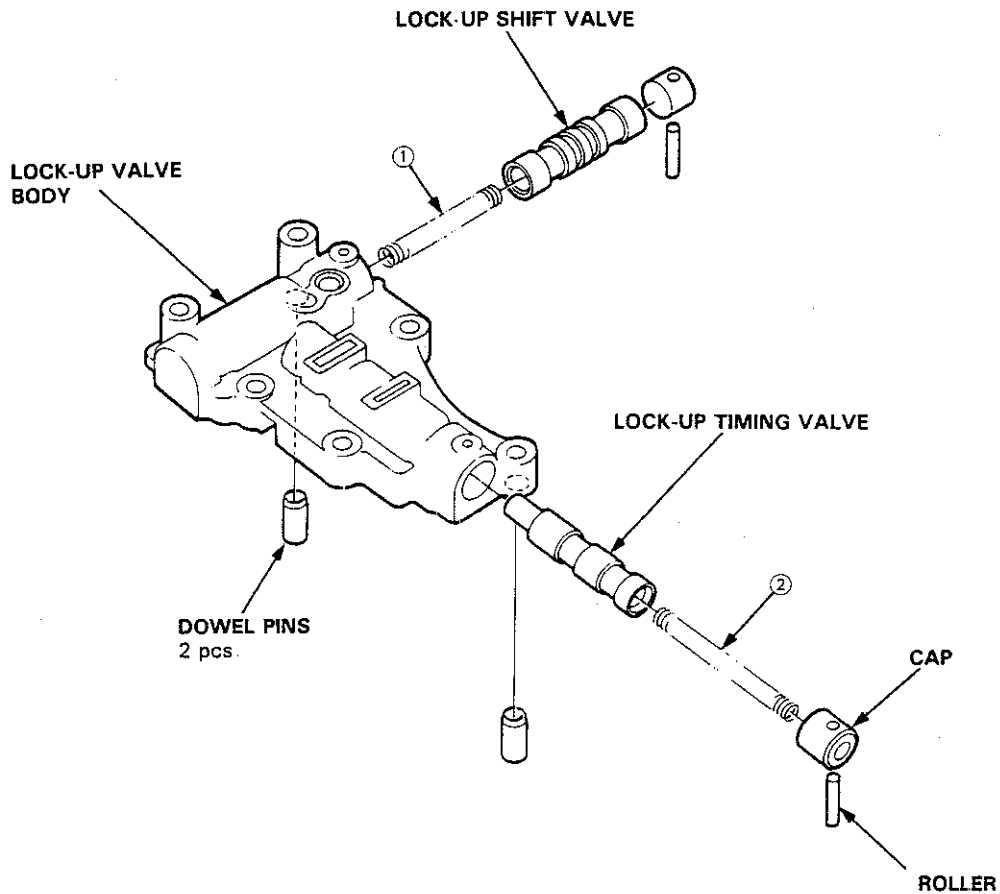
*: Inside diameter

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 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 14-73.
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

Unit of length: mm (in)

No	Spring	Standard (New)			
		Wire Dia.	O D.	Free Length	No. of Coils
①	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
②	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	61.5 (2.421)	27.6

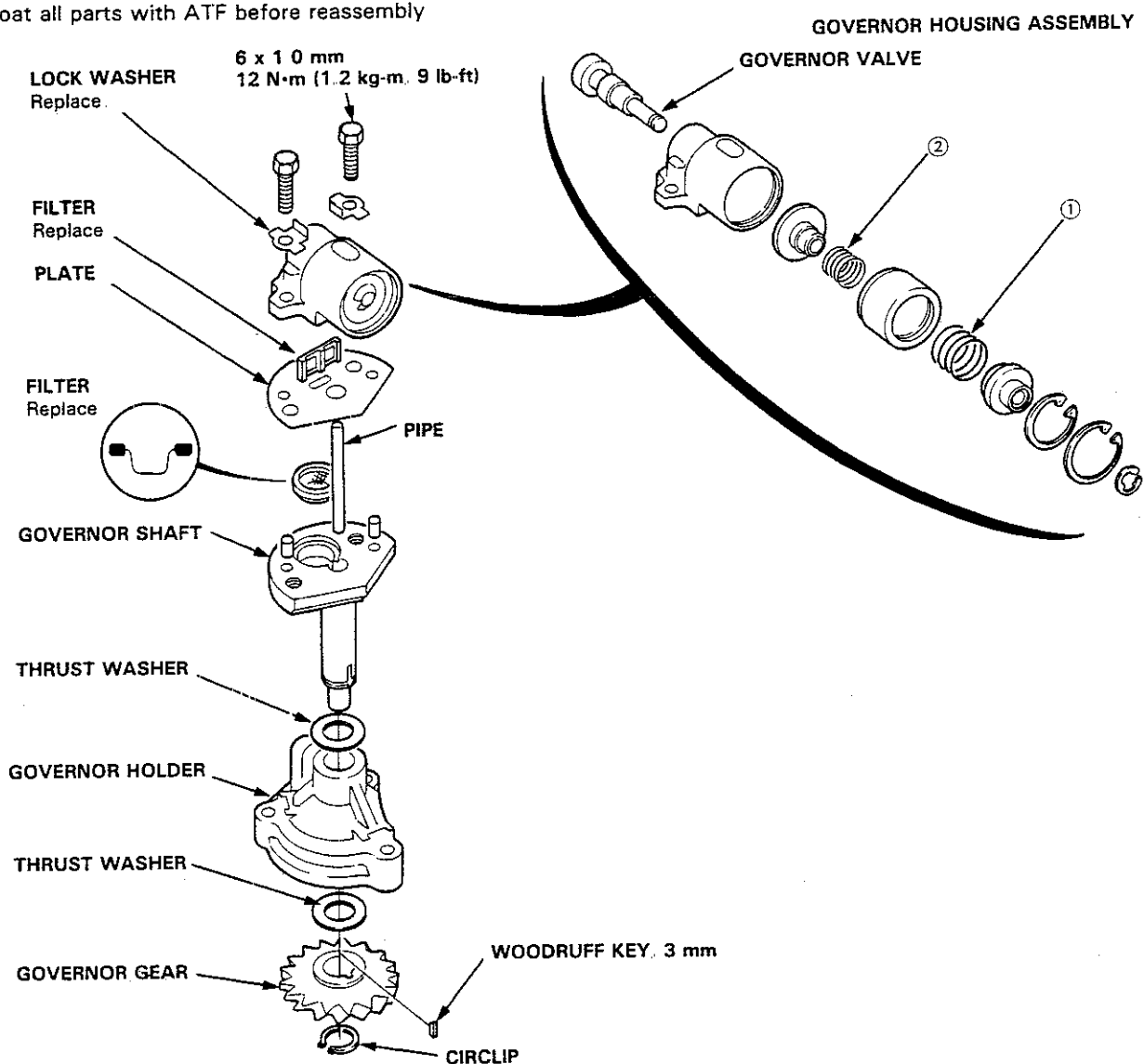


Governor Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air
- Blow out all passages.
- Check that the governor works smoothly; replace it if it does not
- Coat all parts with ATF before reassembly



SPRING SPECIFICATIONS

Unit of length: mm (in)

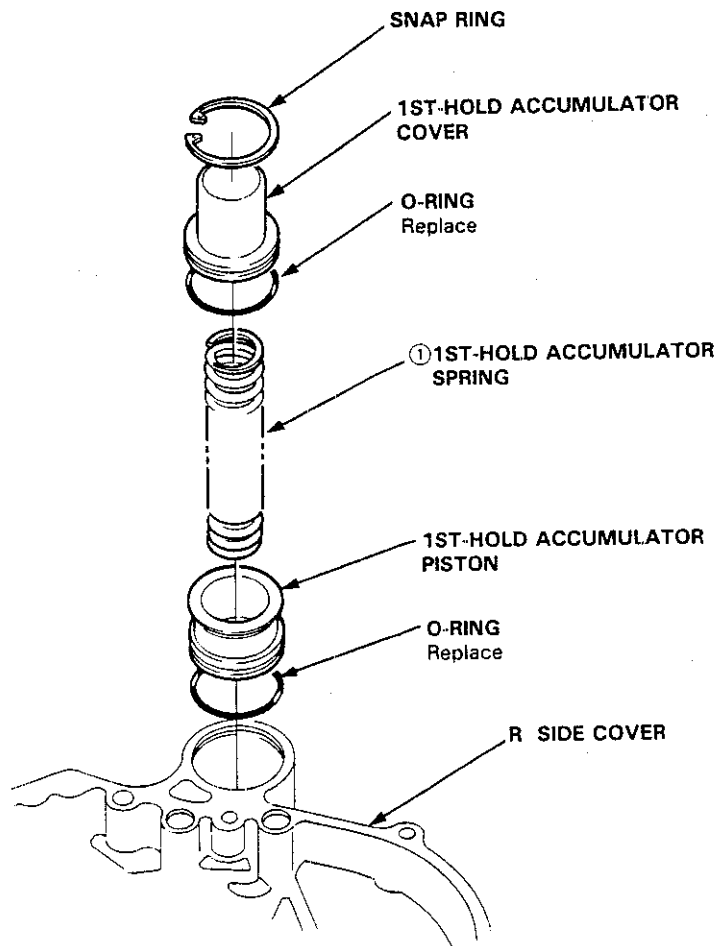
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Governor spring A	1.0 (0.039)	18.8 (0.740)	32.9 (1.295)	4.1
②	Governor spring B	0.9 (0.035)	11.8 (0.465)	27.8 (1.094)	6.0
		0.9 (0.035)	11.8 (0.465)	29.1 (1.146)	6.0

1st-hold Accumulator/R. Side Cover

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 ATF before reassembly



SPRING SPECIFICATIONS

Unit of length: mm (in)

No	Spring	Standard (New)			
		Wire Dia	O D.	Free Length	No. of Coils
①	1st-hold accumulator spring	4.0 (0.157)	21.5 (0.846)	71.7 (2.823)	8.3

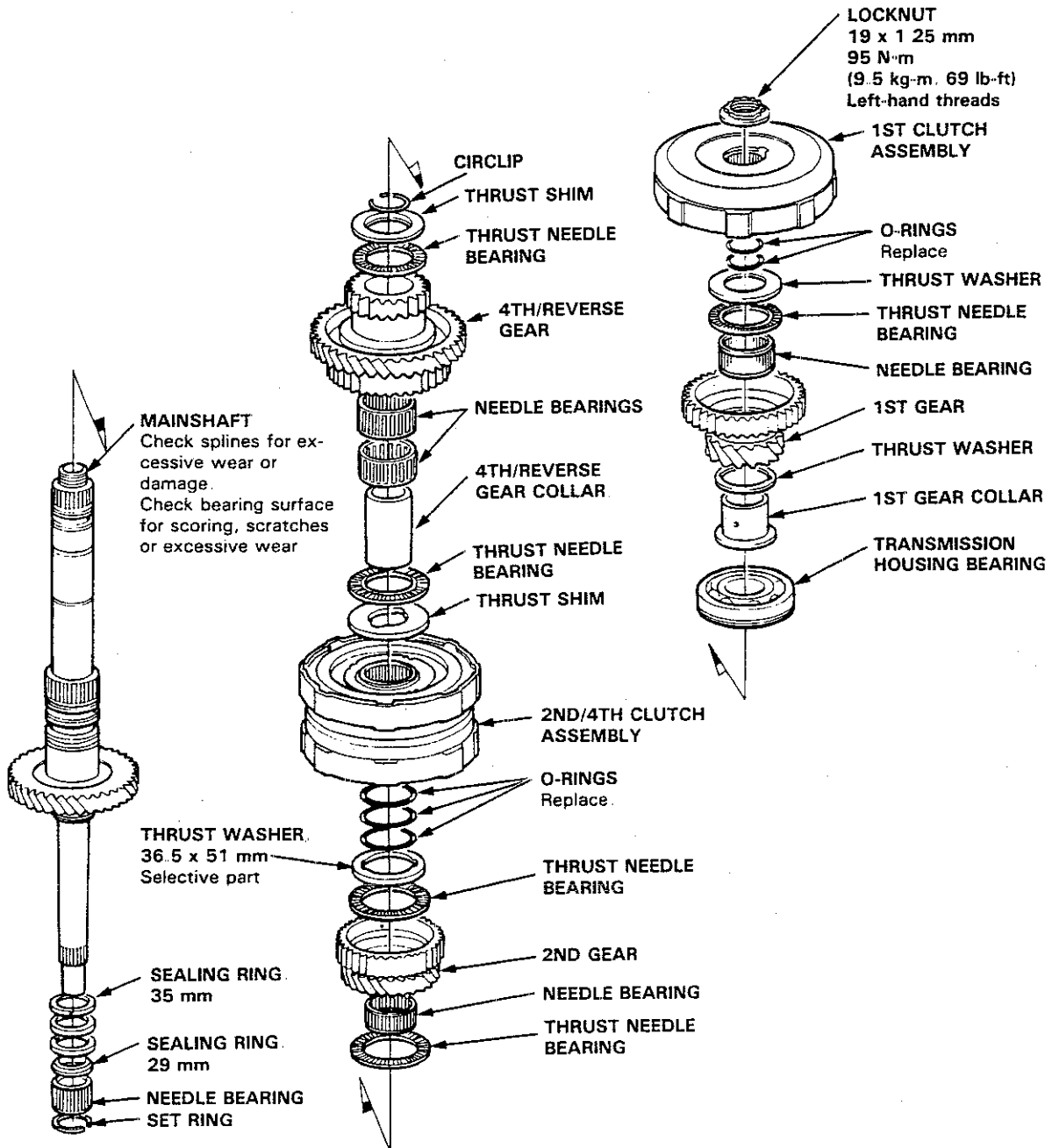


Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

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



Mainshaft

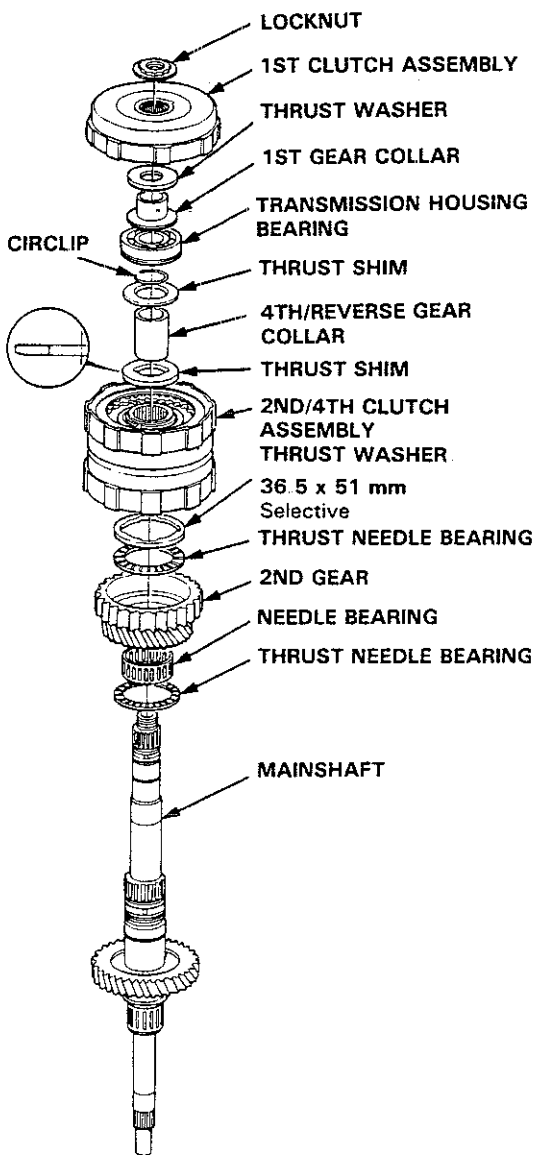
Inspection

- Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

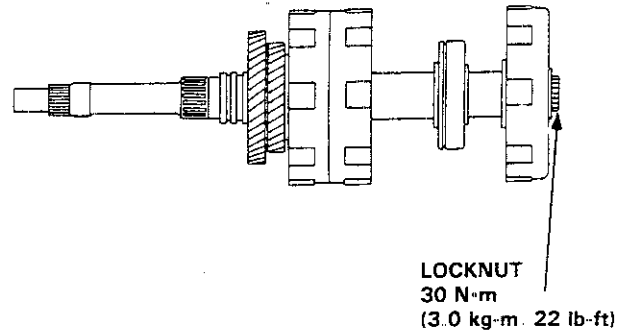
- 1 Remove the mainshaft bearing from the transmission housing (see page 14-109)
- 2 Assemble the parts below on the mainshaft

NOTE: Do not assemble the O-rings while inspecting.



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

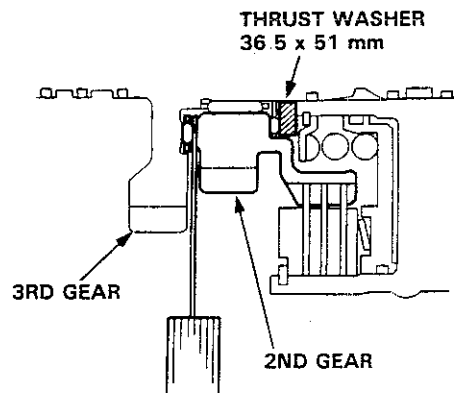
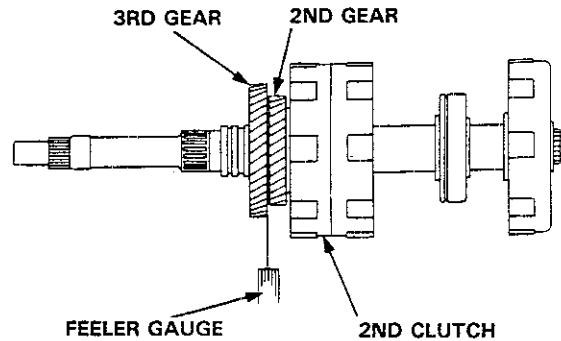
NOTE: Mainshaft locknut has left-hand threads.



- 4 Hold the 2nd gear against the 2nd clutch. Measure the clearance between the 2nd gear and the 3rd gear with a feeler gauge.

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

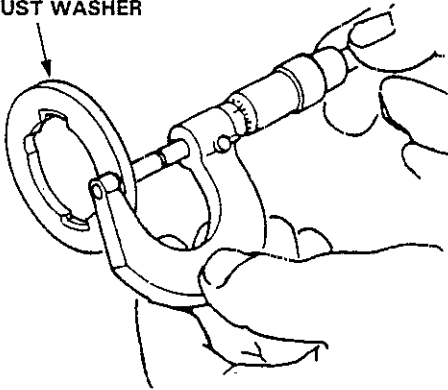
STANDARD: 0.05–0.13 mm (0.002–0.005 in)





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 51 mm

No	Part Number	Thickness
1	90441-PC9-010	3.50 mm (0.138 in)
2	90442-PC9-010	3.55 mm (0.140 in)
3	90443-PC9-010	3.60 mm (0.142 in)
4	90444-PC9-010	3.65 mm (0.144 in)
5	90445-PC9-010	3.70 mm (0.146 in)
6	90446-PC9-010	3.75 mm (0.148 in)
7	90447-PC9-010	3.80 mm (0.150 in)
8	90448-PC9-010	3.85 mm (0.152 in)
9	90449-PC9-010	3.90 mm (0.154 in)

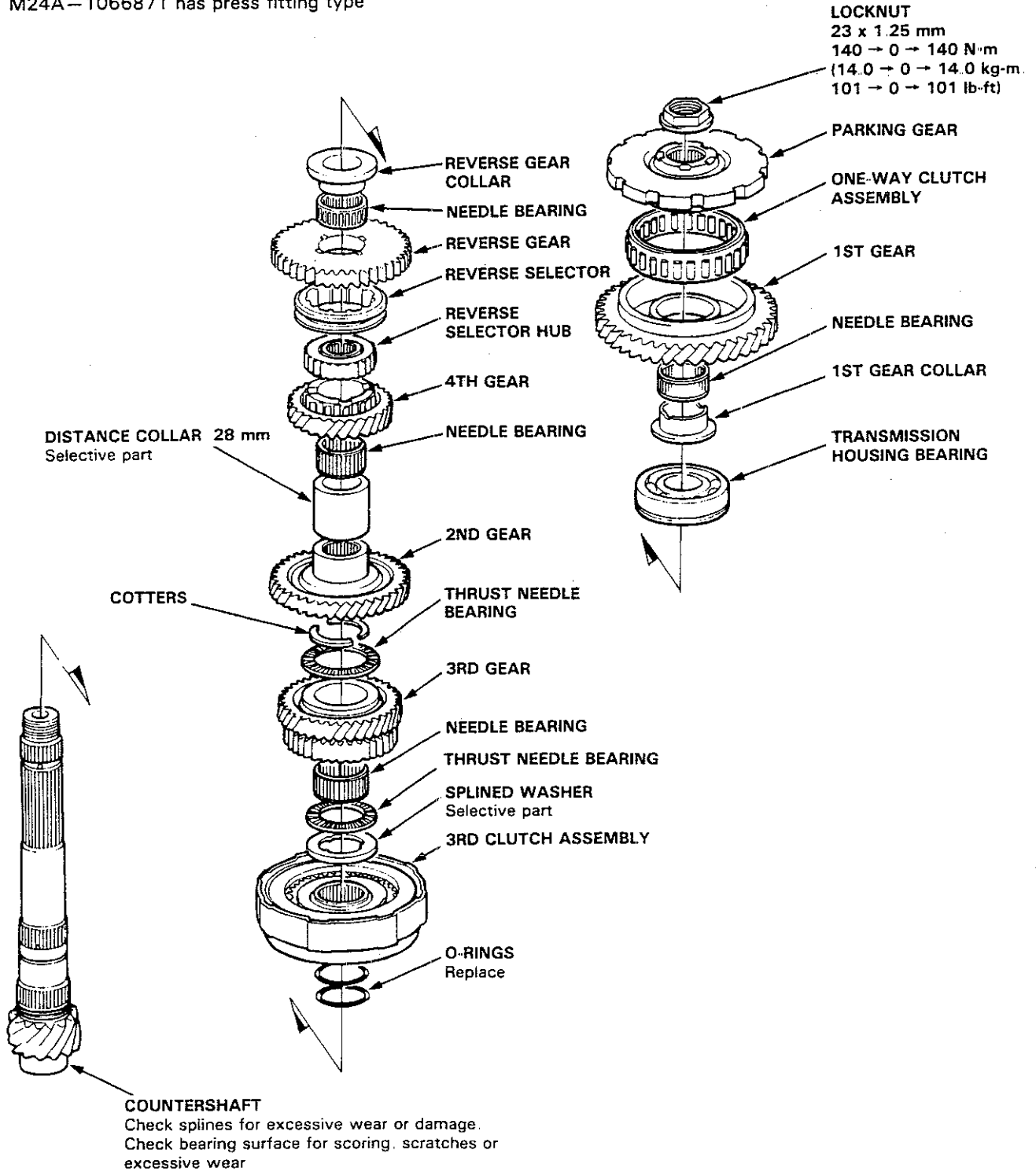
7. After replacing the thrust washer, make sure the clearance is within tolerance.

Countershaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF before reassembly
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings
- Reverse selector hub is two kinds: loose fitting type and press fitting type. Transmission numbered on and after M24A-1066871 has press fitting type





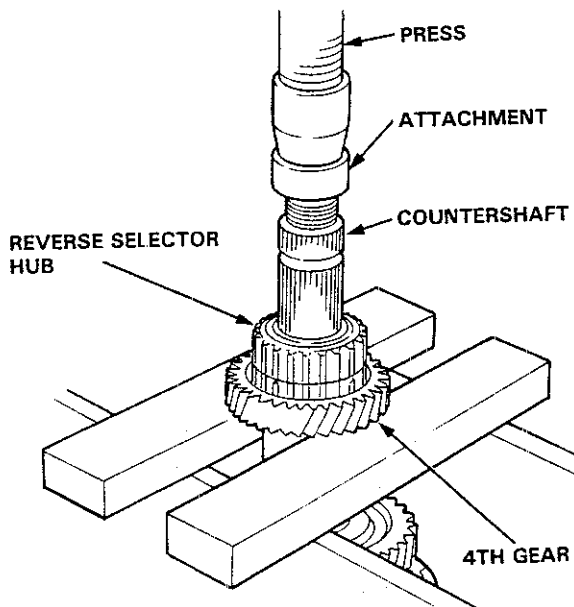
Disassembly/Reassembly

NOTE: Transmission numbered on and after M24A-1066871 has press fitting reverse selector hub. When disassembling the press fitting reverse selector hub, use this procedure

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

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

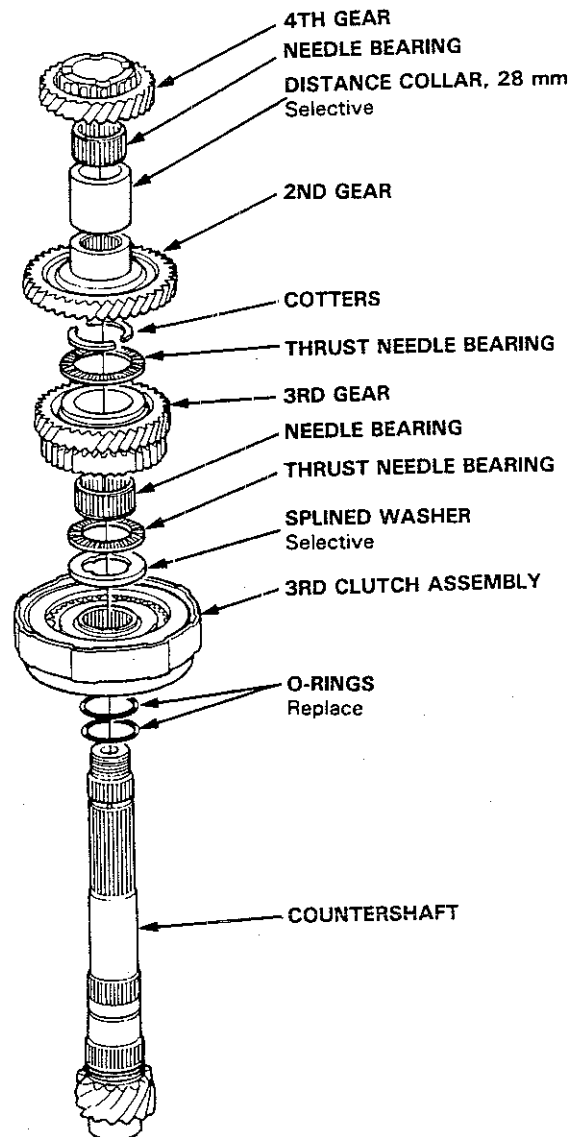
CAUTION: Do not fall off the countershaft.



2. Assemble the parts below on the countershaft.

NOTE:

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

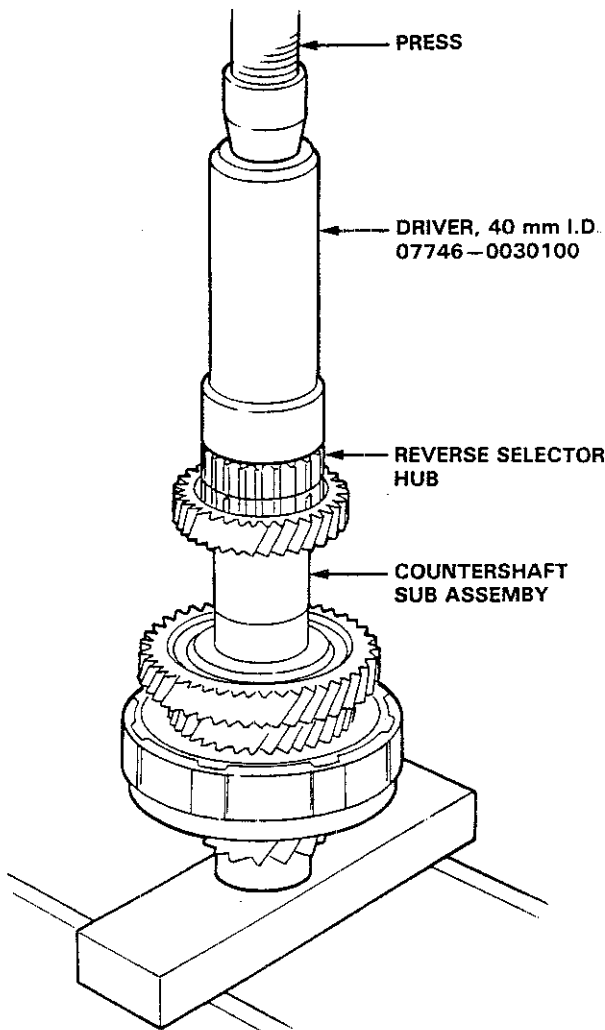


(cont'd)

Countershaft

Disassembly/Reassembly (cont'd)

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



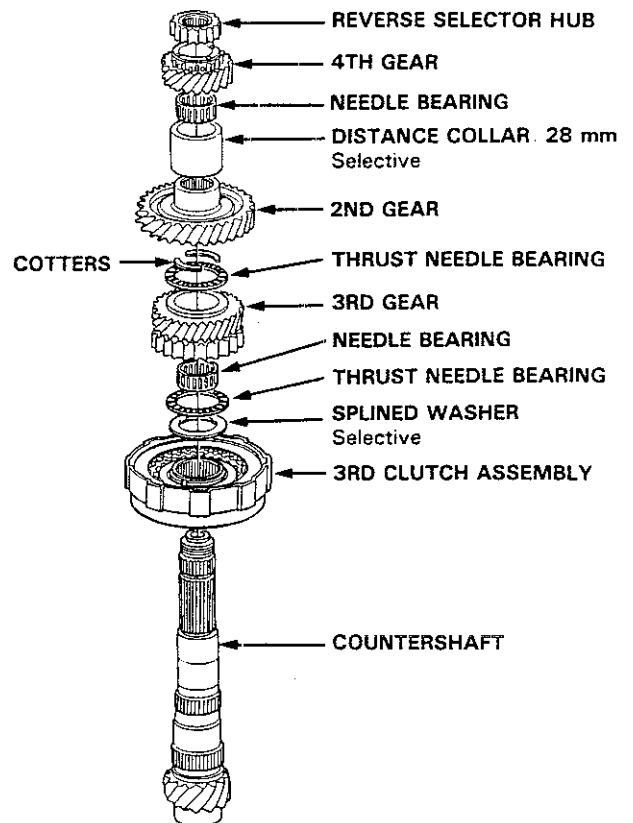
Inspection

● Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly

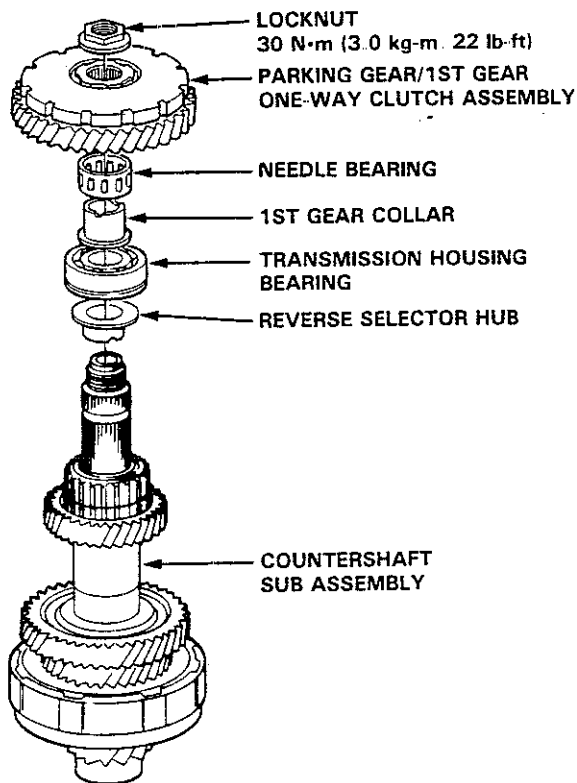
1. Remove the countershaft bearing from the transmission housing (see page 14-109)
2. Assemble the parts below on the countershaft. If the reverse selector hub is press fitting type, use the special tool and a press as described on this page.

NOTE: Do not assemble the O-rings while inspecting.





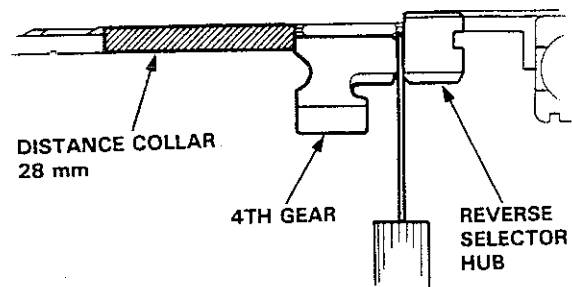
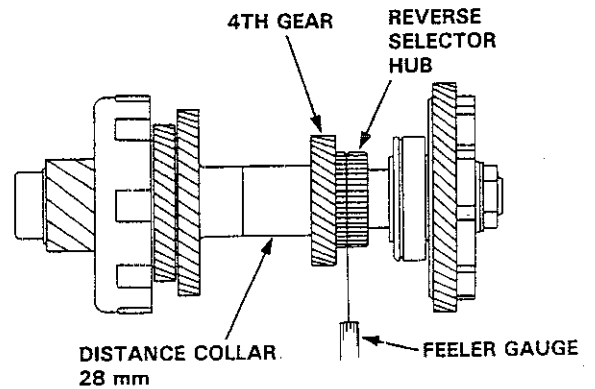
3. Install the parts below on the countershaft sub assembly, then torque the locknut to 30 N·m (3.0 kg·m, 22 lb·ft).



4. Measure the clearance between the 4th gear and the reverse selector hub with a feeler gauge

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

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



(cont'd)

Countershaft

Inspection (cont'd)

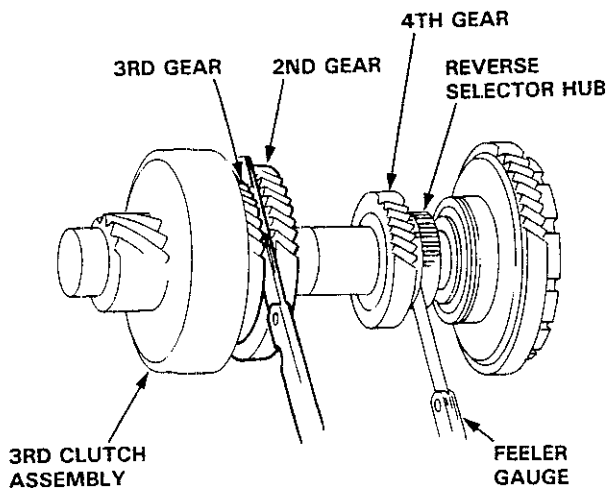
- 5 Measure the clearance between the 3rd gear and 2nd gear with a feeler gauge, with the feeler gauge from step 4 between the 4th gear and reverse selector hub.

- 1 Measure the clearance with the 3rd gear pushed towards the 3rd clutch
- 2 Measure the clearance with the 3rd gear pushed towards the 2nd gear.

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

- 3. Subtract the measurements of step -2. from step -3., and you have the clearance between the 3rd gear and 2nd gear

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



6. If the clearance is out of tolerance, remove the splined washer and/or distance collar and measure the thickness and/or the width
7. Select and install a new distance collar then recheck.

DISTANCE COLLAR 28 mm

No.	Part Number	Thickness
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)

8. After replacing the distance collar, make sure the clearance is within tolerance.
- 9 Select and install a new splined washer then recheck

SPLINED WASHER 35 x 52 mm

No.	Part Number	Thickness
1	90411-PF4-000	3.00 mm (0.118 in)
2	90412-PF4-000	3.05 mm (0.120 in)
3	90413-PF4-000	3.10 mm (0.122 in)
4	90414-PF4-000	3.15 mm (0.124 in)
5	90415-PF4-000	3.20 mm (0.126 in)
6	90416-PF4-000	3.25 mm (0.128 in)
7	90417-PF4-000	3.30 mm (0.130 in)
8	90418-PF4-000	3.35 mm (0.132 in)
9	90419-PF4-000	3.40 mm (0.134 in)
10	90411-P24-J00	3.45 mm (0.136 in)
11	90412-P24-J00	3.50 mm (0.138 in)
12	90413-P24-J00	3.55 mm (0.140 in)

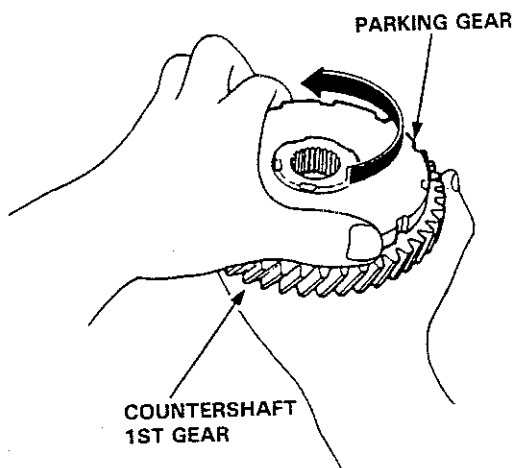
10. After replacing the splined washer, make sure the clearance is within tolerance.



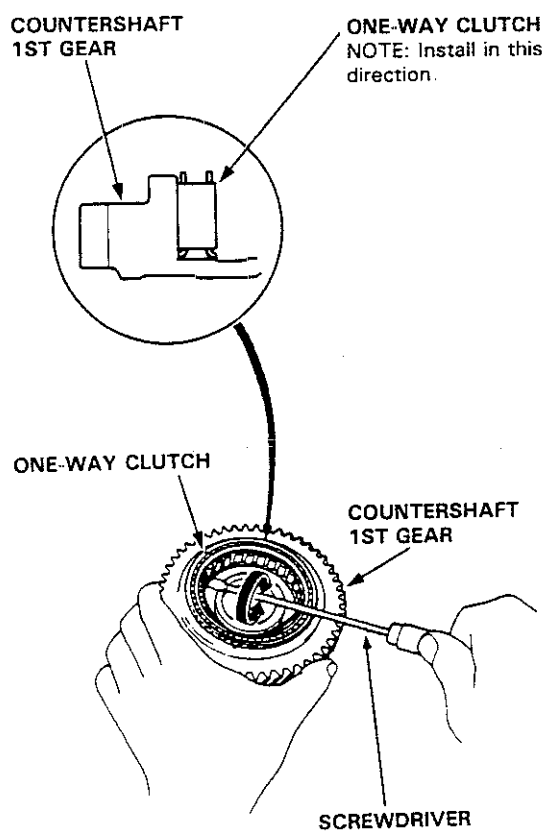
One-Way Clutch/Parking Gear

Disassembly and Inspection

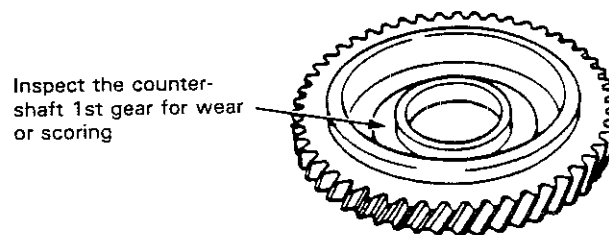
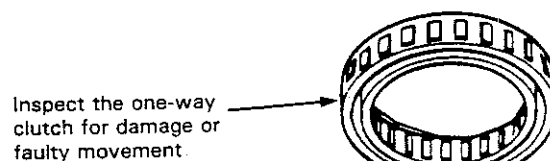
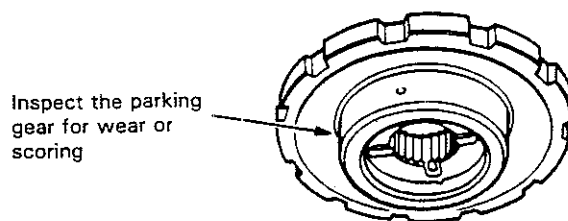
1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



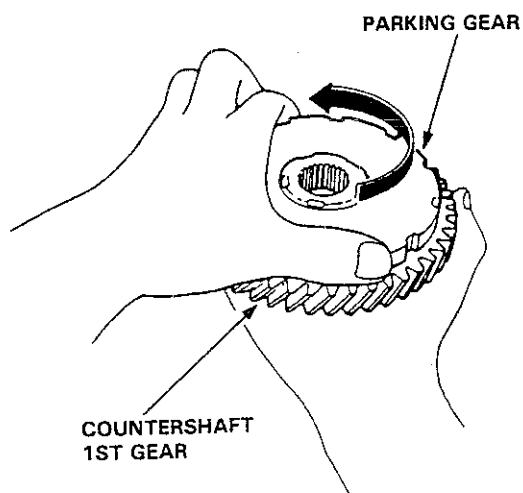
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



Inspect the parts as follows:



3. After the parts are assembled, hold the countershaft 1st gear and turn the parking gear in the direction shown to be sure it turns freely.



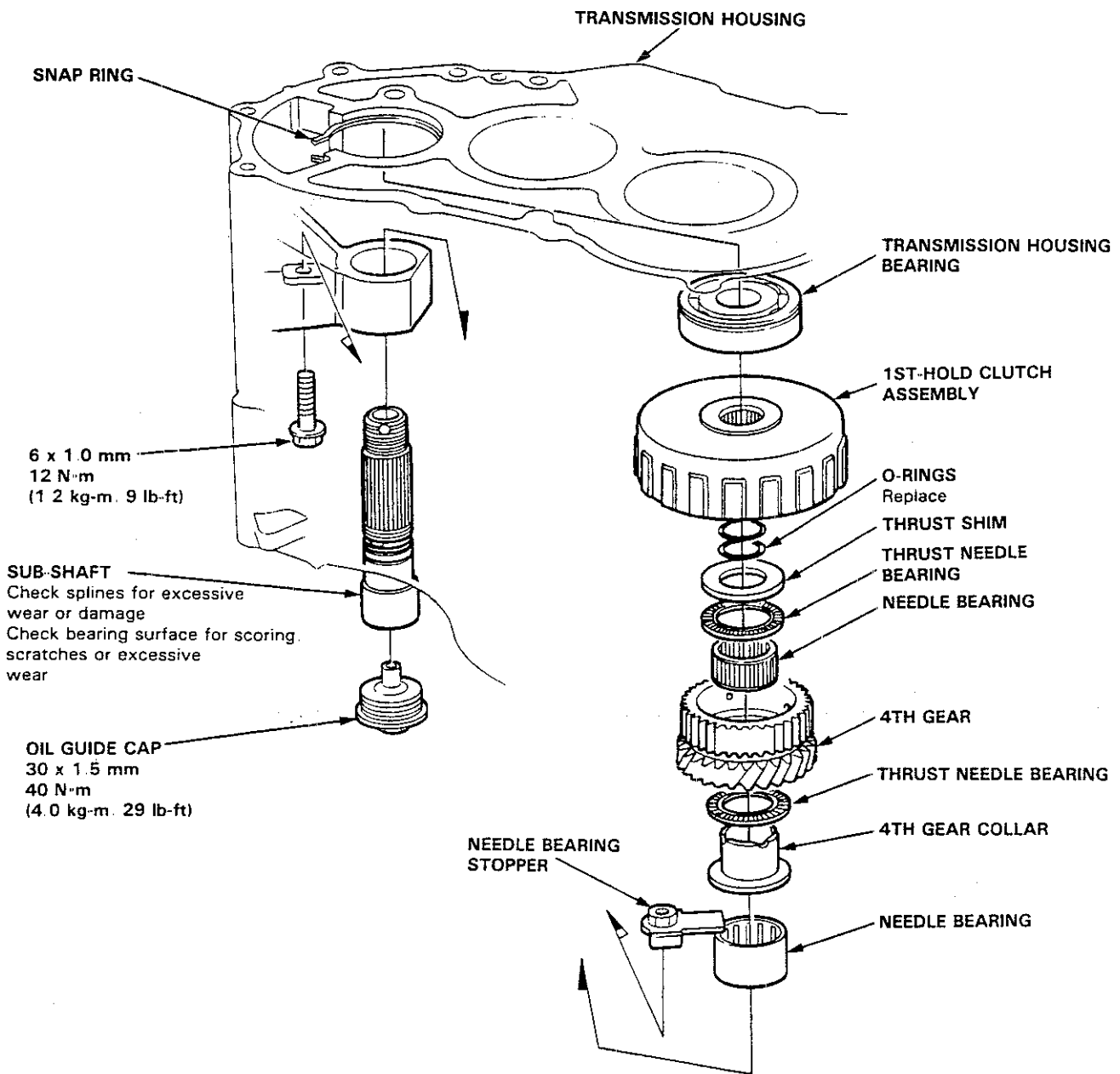
Sub-shaft

Disassembly/Inspection/Reassembly

NOTE:

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

1. Remove the oil guide cap.
2. Remove the sub-shaft, 1st-hold clutch assembly and 4th gear assembly.
3. Assemble the sub-shaft in the reverse order of removal.



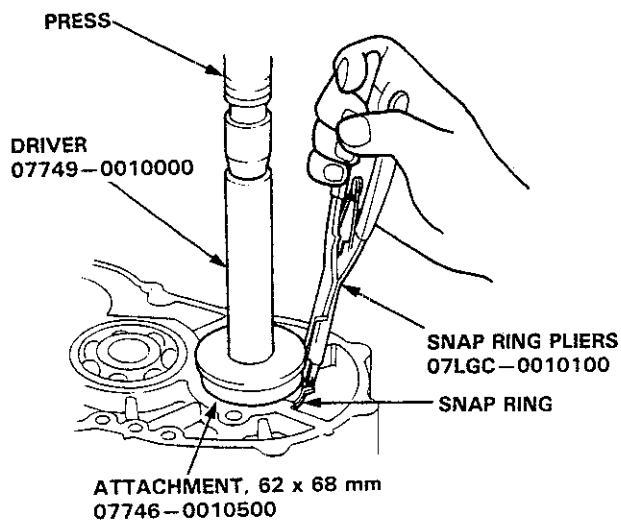


Sub-shaft Bearings

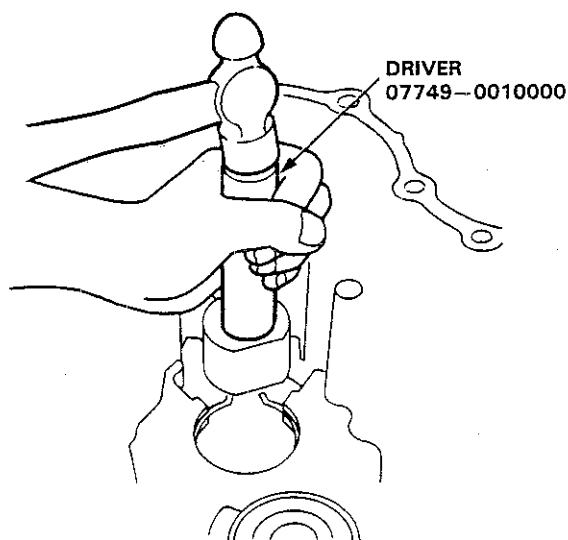
Replacement

NOTE: Lubricate all parts with ATF before reassembly.

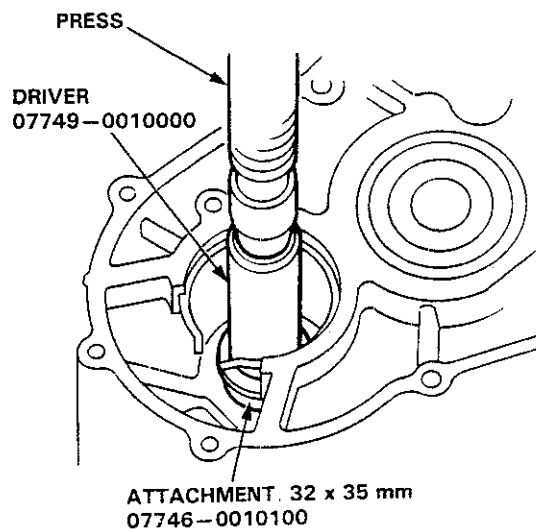
1. To remove the sub-shaft ball bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tool and a press as shown.



2. Remove the needle bearing stopper
3. Remove the needle bearing from the transmission housing using the special tool.

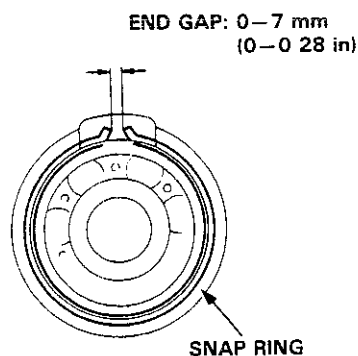


4. Install the new needle bearing in the transmission housing using the special tools and a press as shown.



5. Expand the snap ring with snap ring pliers, then insert the ball bearing part-way into the housing using the special tool and a press as described on step 1. Install the bearing with the groove facing outside the housing.
6. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.
7. After installing the ball bearing verify the following:

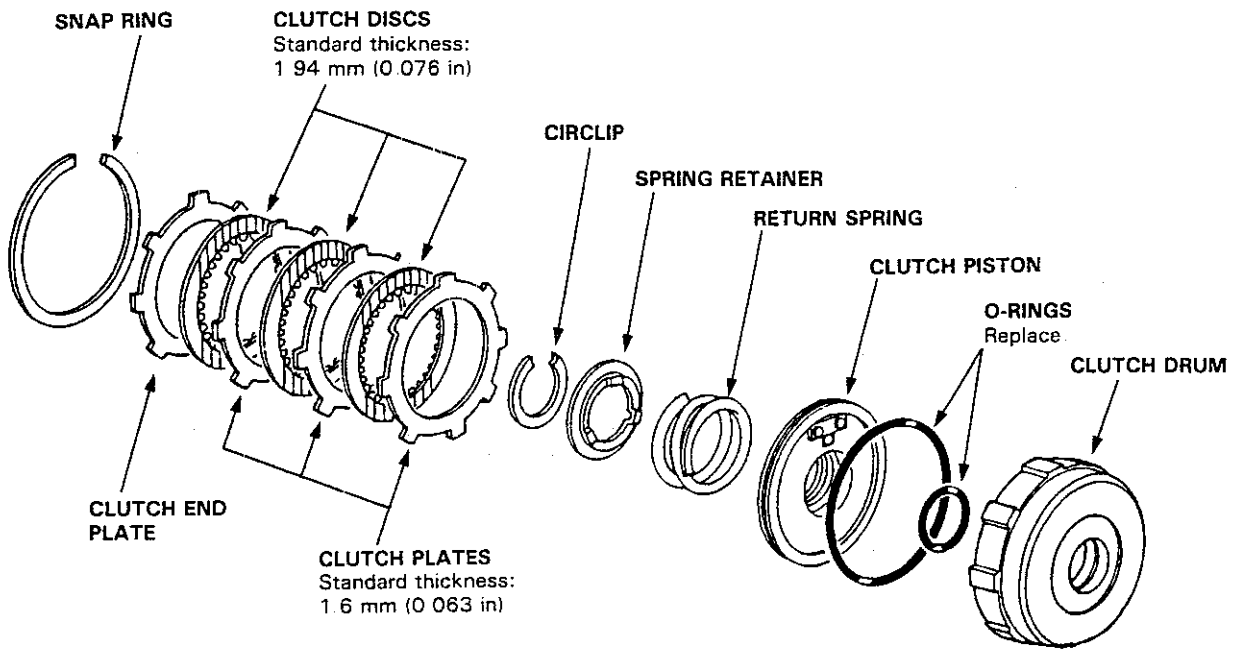
- The snap ring is seated in the bearing and housing grooves
- The snap ring operates.
- The ring end gap is correct



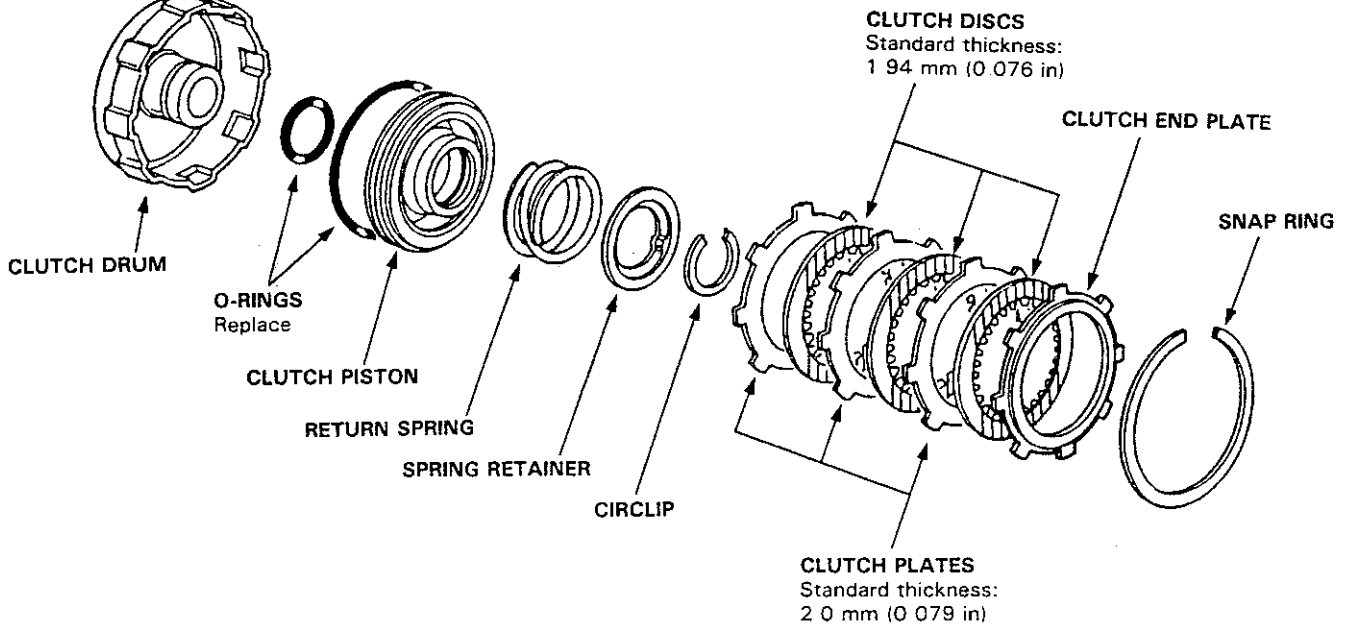
Clutch

Illustrated Index

1ST CLUTCH

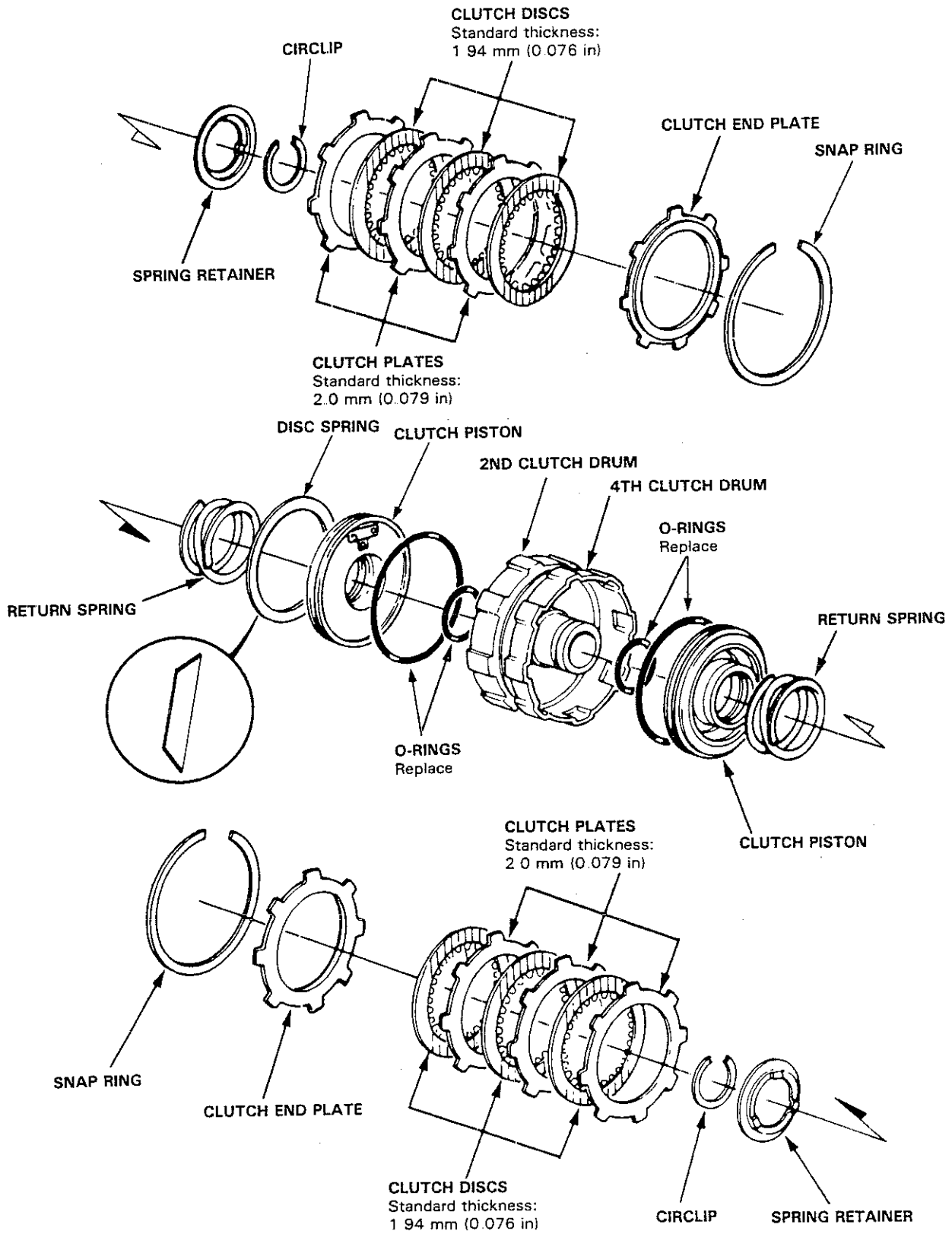


3RD CLUTCH





2ND/4TH CLUTCH

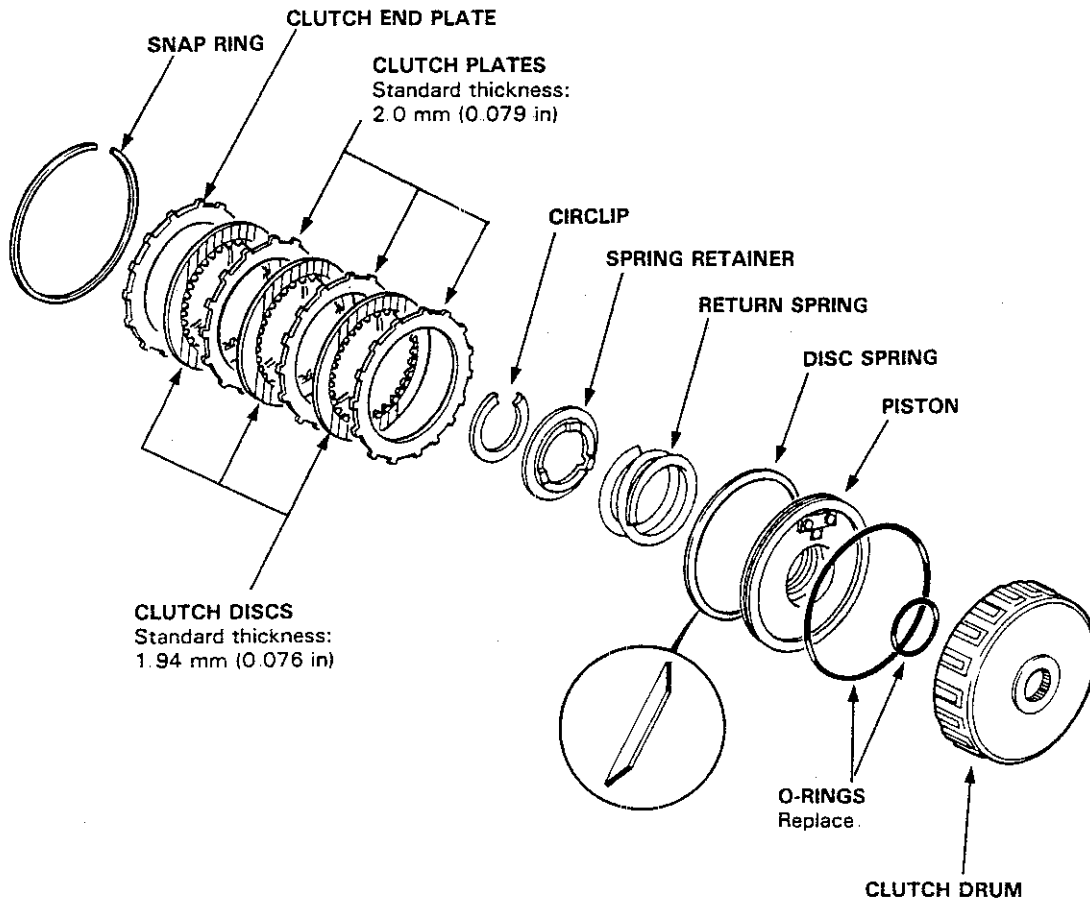


(cont'd)

Clutch

Illustrated Index (cont'd)

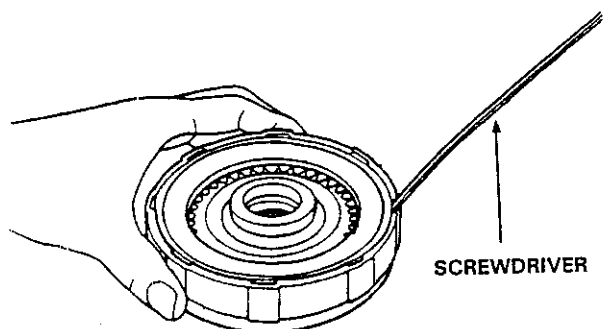
1ST-HOLD CLUTCH





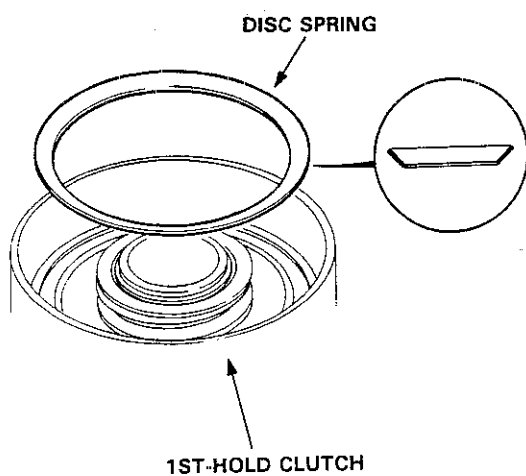
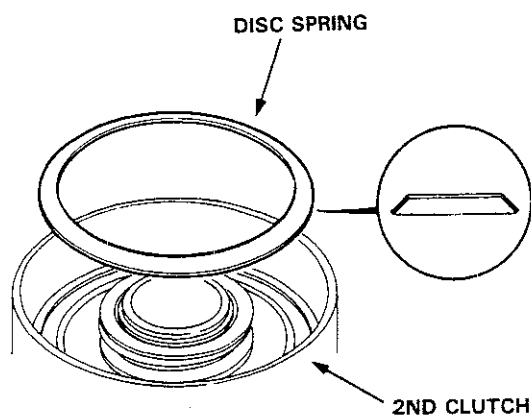
Disassembly

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

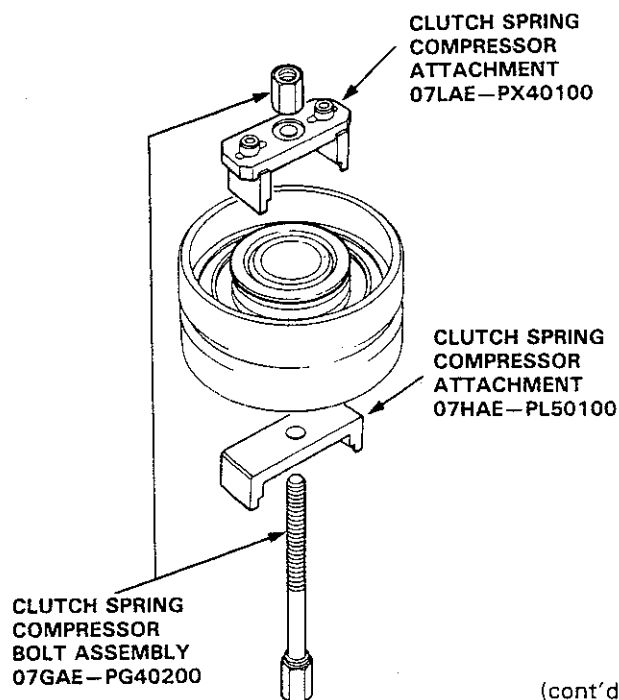
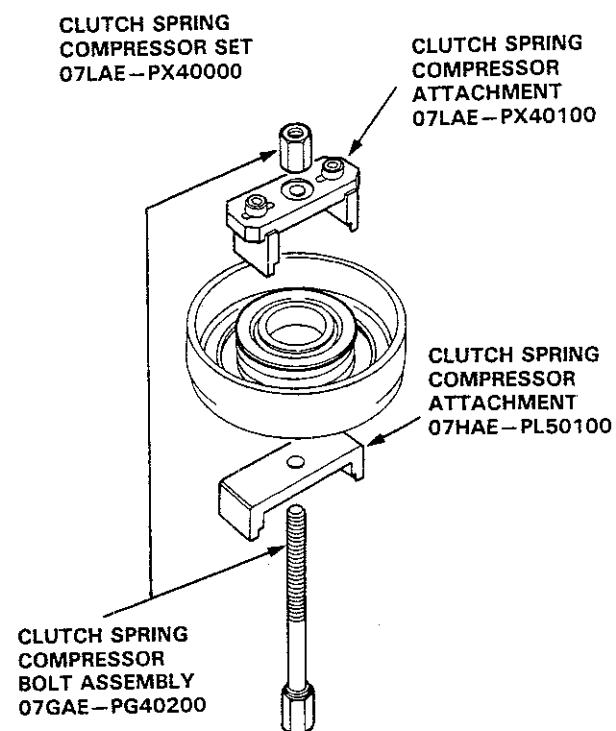


2. Remove the disc spring.

NOTE: For 1st-hold, and 2nd clutches



3. Install the special tools as shown

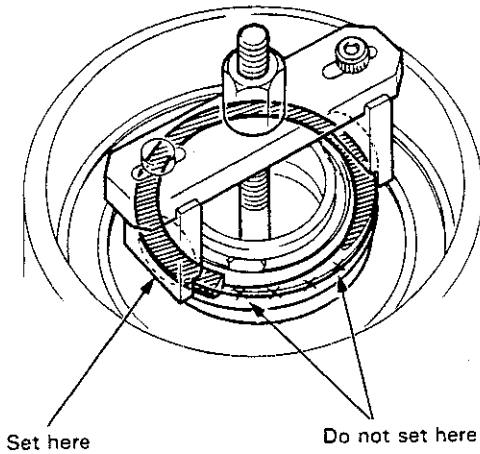


(cont'd)

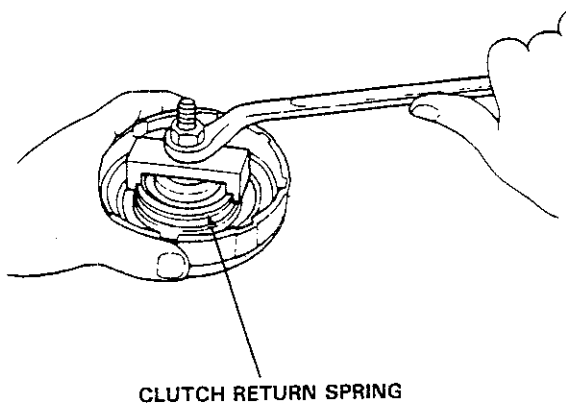
Clutch

Disassembly (cont'd)

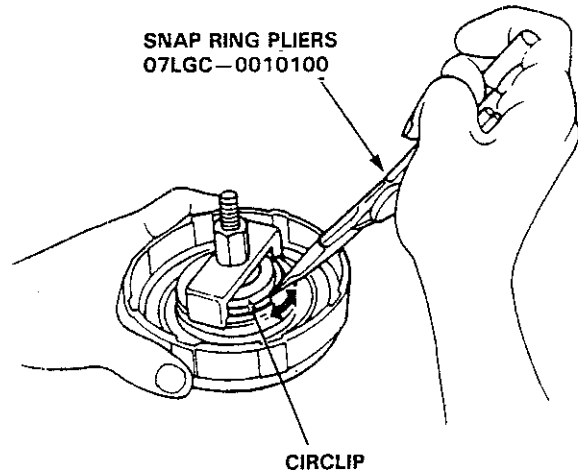
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



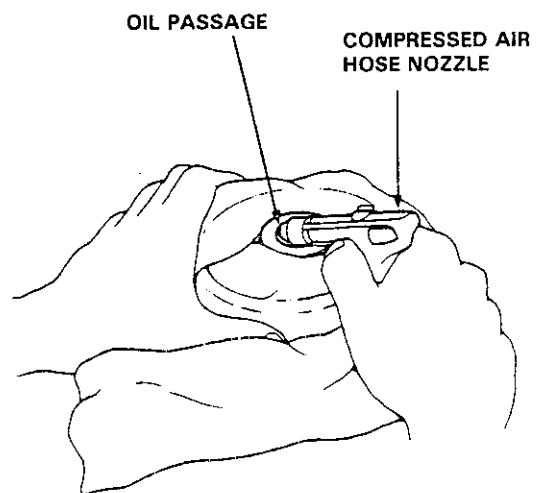
4. Compress the clutch return spring.



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



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



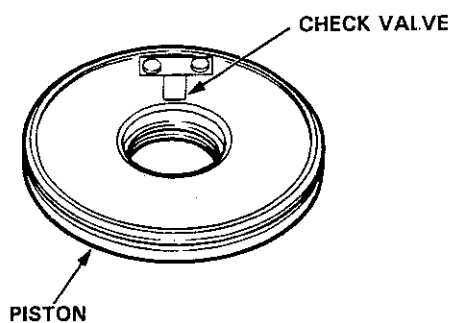


Reassembly

NOTE:

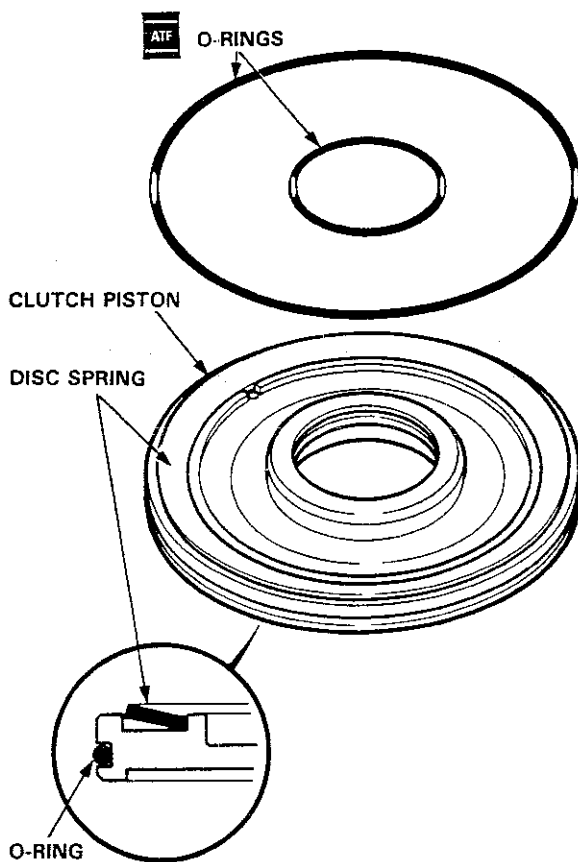
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before reassembly.

1. Inspect for a loose check valve.



2. Install a new O-ring on the clutch piston
3. Be sure that the disc spring is securely staked

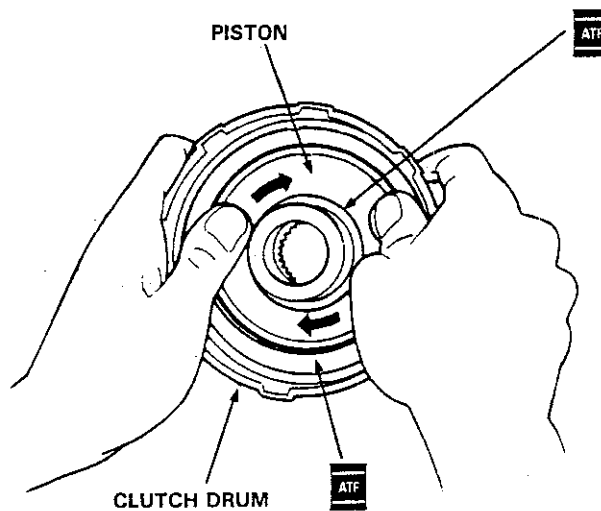
NOTE: For 1st, 3rd and 4th clutches.



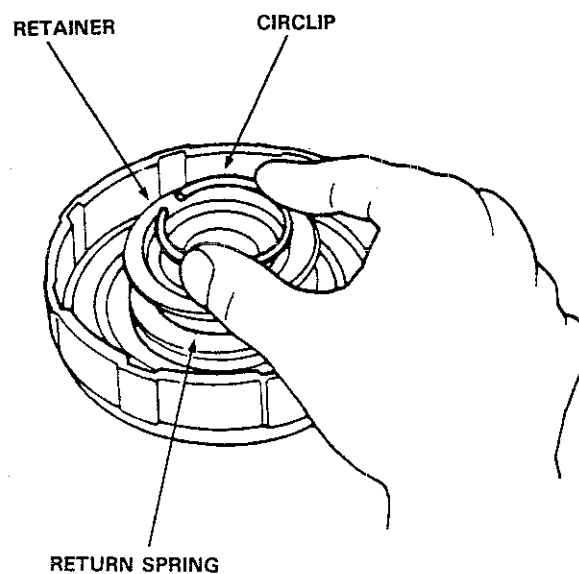
4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

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

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



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



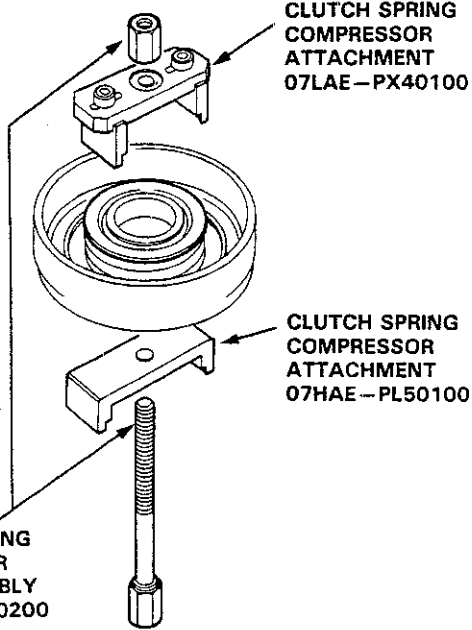
(cont'd)

Clutch

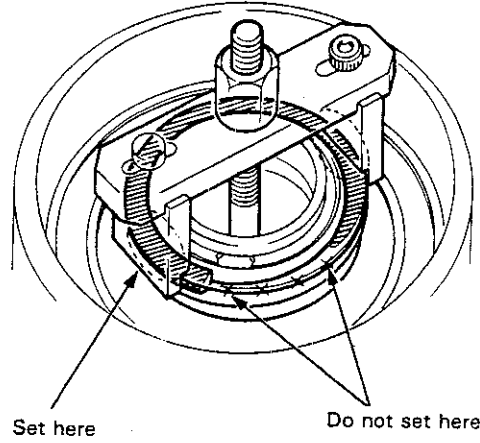
Reassembly (cont'd)

6. Install the special tools as shown.

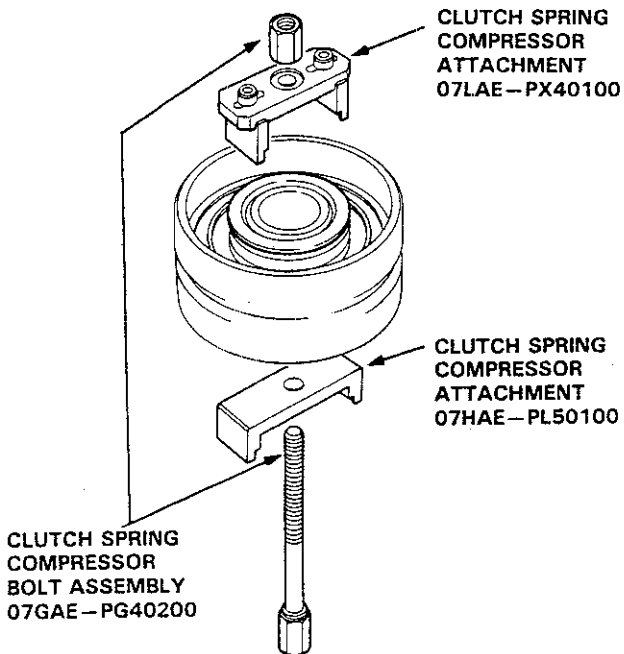
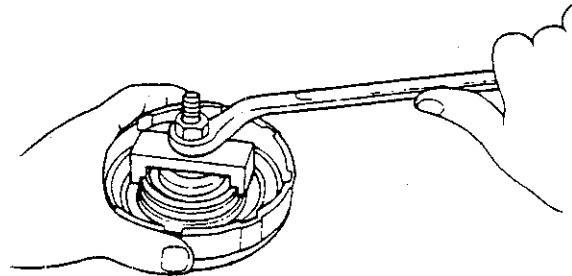
CLUTCH SPRING
COMPRESSOR SET
07LAE-PX40000



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

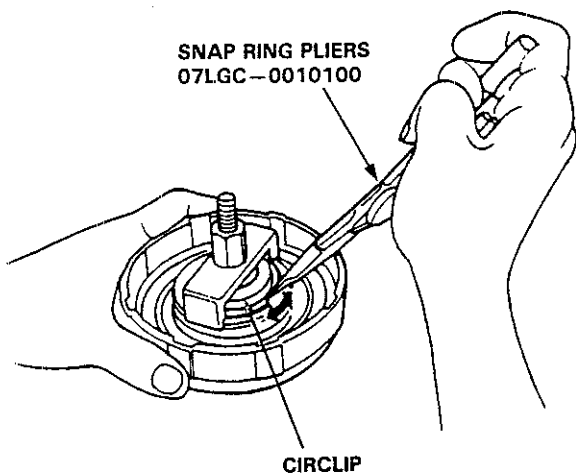


7. Compress the clutch return spring





8. Install the circlip.

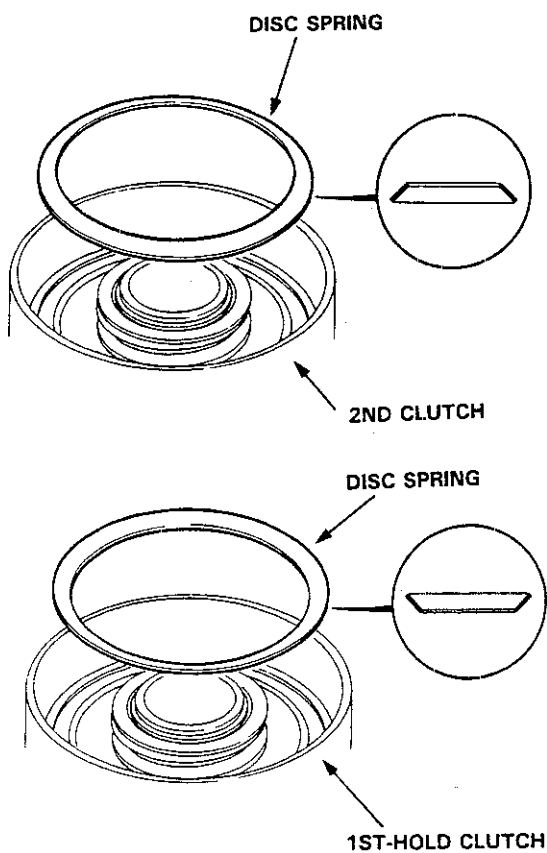


9. Remove the special tools.

10. Install the disc spring.

NOTE:

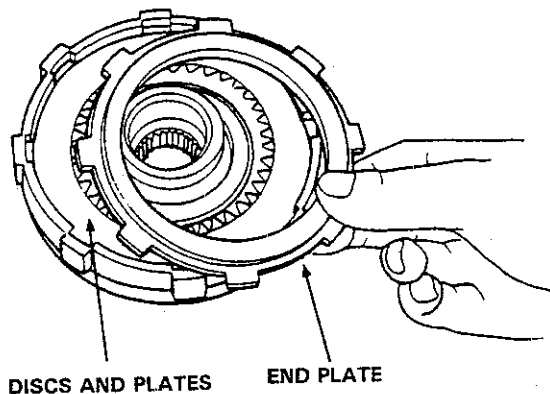
- For 1st-hold and 2nd clutches.
- Install the disc spring in the direction shown.



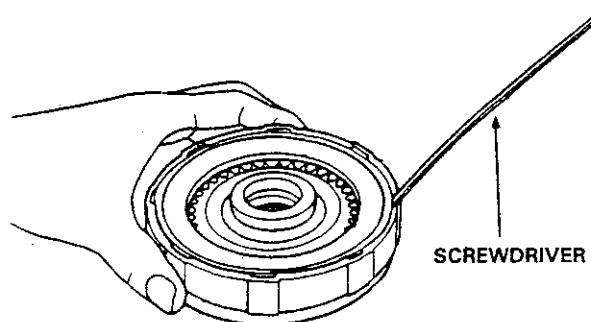
11. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes

12. 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.



13. Install the snap ring.



(cont'd)

Clutch

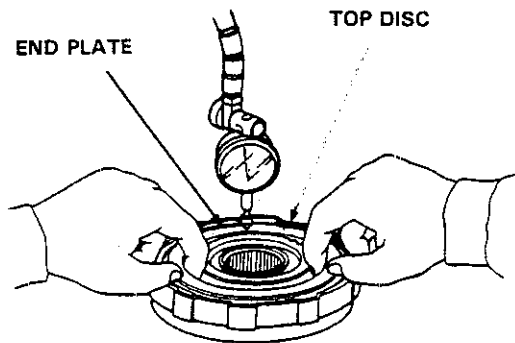
Reassembly (cont'd)

- 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: Measure at three locations.

End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65–0.85 mm (0.026–0.033 in)
2nd	0.65–0.85 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)
1st-Hold	0.50–0.80 mm (0.020–0.031 in)



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

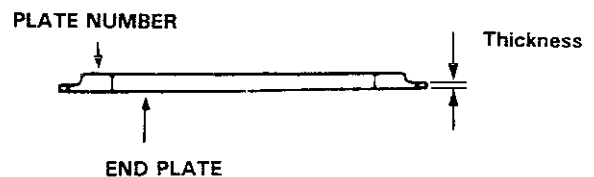
NOTE: If the thickest clutch end plate is installed but the clearance is still over the standard, replace the clutch discs and clutch plates.

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

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)

1ST-HOLD CLUTCH

Plate No.	Part Number	Thickness
1	22551-PS5-003	2.1 mm (0.082 in)
2	22552-PS5-003	2.2 mm (0.086 in)
3	22553-PS5-003	2.3 mm (0.090 in)
4	22554-PS5-003	2.4 mm (0.094 in)
5 (No mark)	22555-PS5-003	2.5 mm (0.098 in)
6	22556-PS5-003	2.6 mm (0.102 in)
7	22557-PS5-003	2.7 mm (0.106 in)

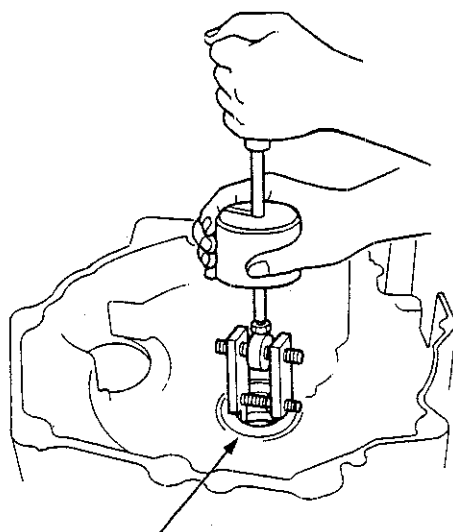




Torque Converter Housing Bearings

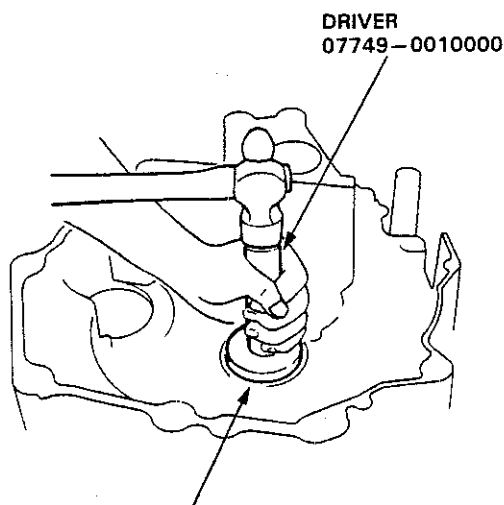
Mainshaft Bearing Replacement

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



ADJUSTABLE BEARING
REMOVER SET
07JAC-PH80000

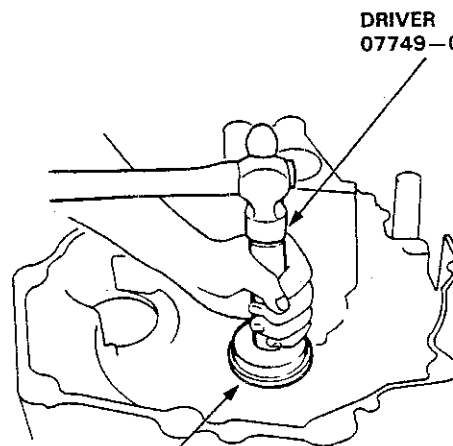
2. Drive in the new mainshaft bearing until it bottoms in the housing, using the special tools as shown.



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

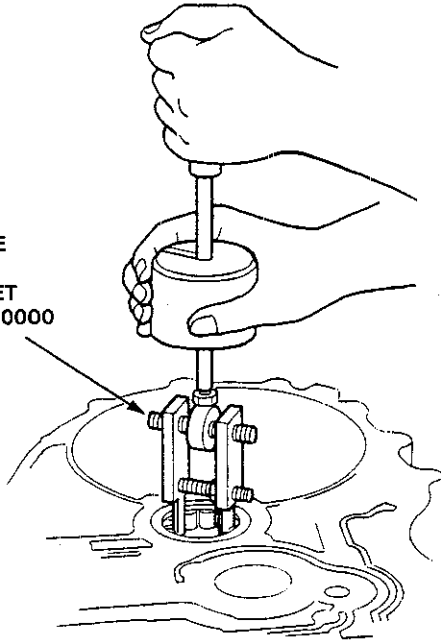
ATTACHMENT, 72 x 75 mm
07746-0010600

Torque Converter Housing Bearings

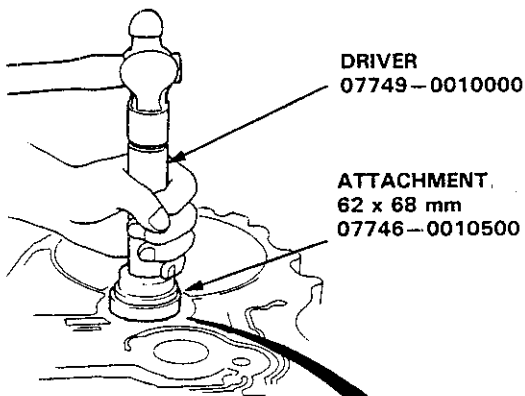
Countershaft Bearing Replacement

- 1 Remove the countershaft bearing using the special tool.

ADJUSTABLE
BEARING
REMOVER SET
07JAC-PH80000

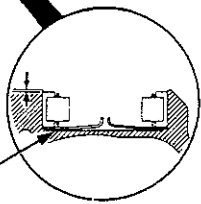


2. Replace the oil guide plate.
3. Drive the new bearing into the housing using the special tools as shown



0-0.03 mm
(0-0.001 in)

OIL GUIDE PLATE
Replace.



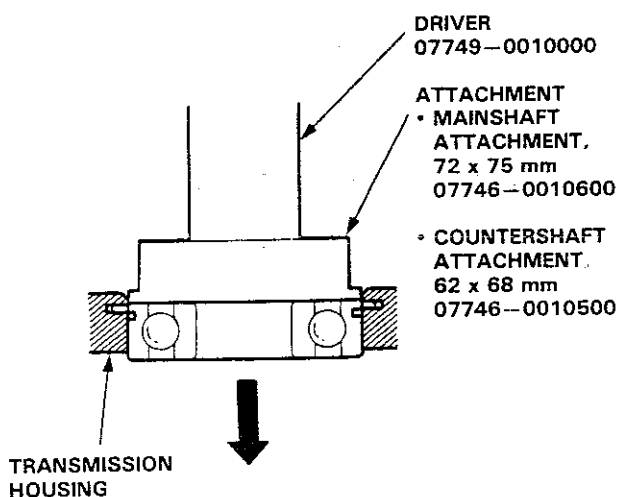
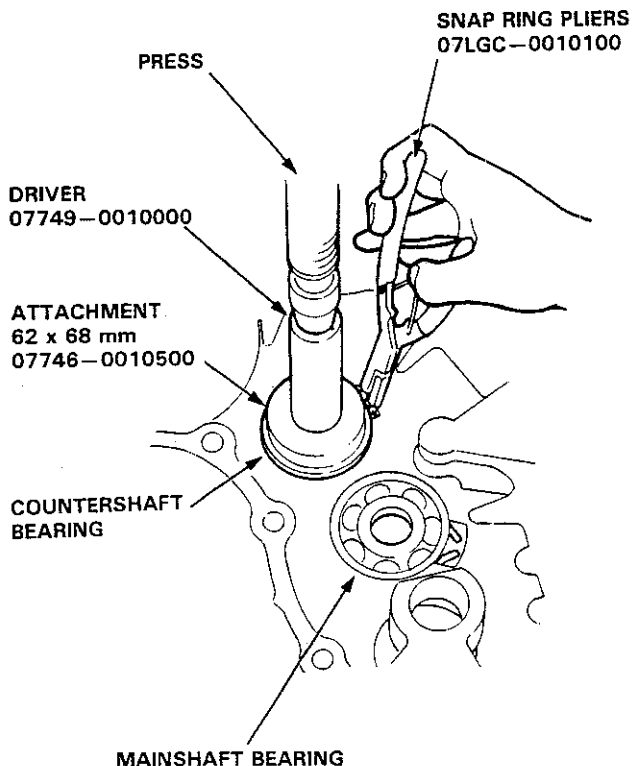


Transmission Housing Bearings

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

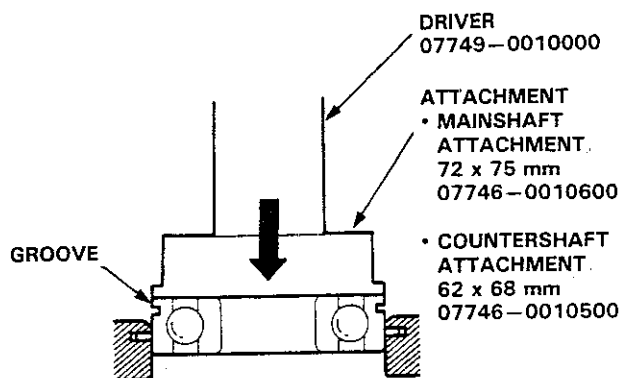
NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing



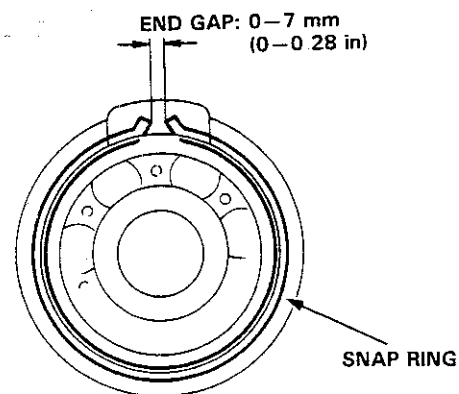
2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing

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.



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

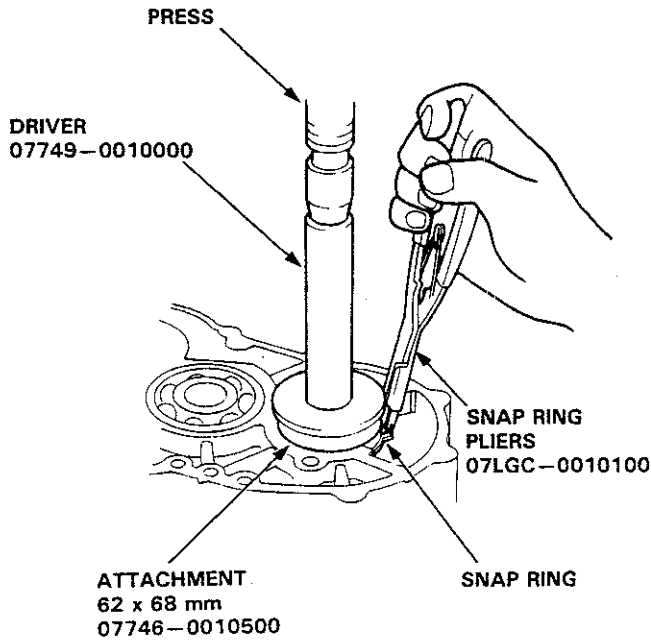


Transmission Housing Bearing

Sub-shaft Bearing Replacement

1. To remove the sub-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.

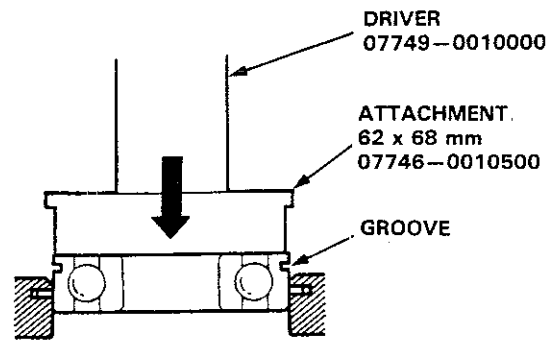
NOTE: Do not remove the snap ring unless it's necessary to clean the groove in the housing



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.

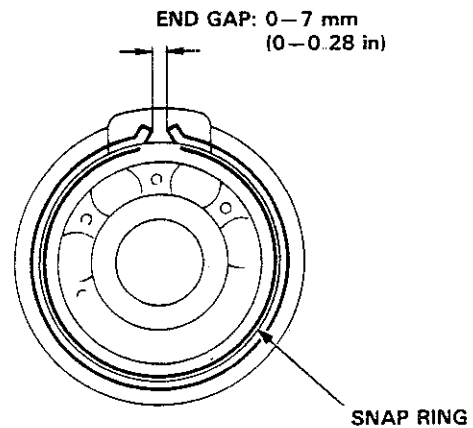
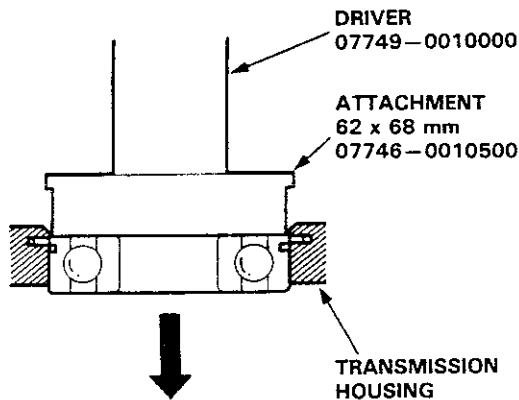
NOTE: Coat all parts with ATF.

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



4. After installing the bearing verify the following:

- The snap ring is seated in the bearing and housing grooves.
- The snap ring operates.
- The ring end gap is correct.



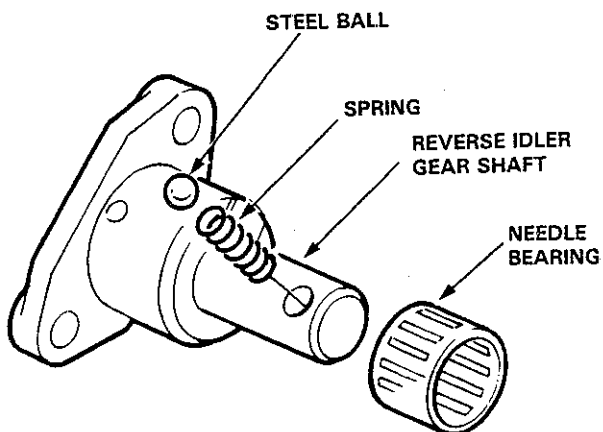


Reverse Idler Gear

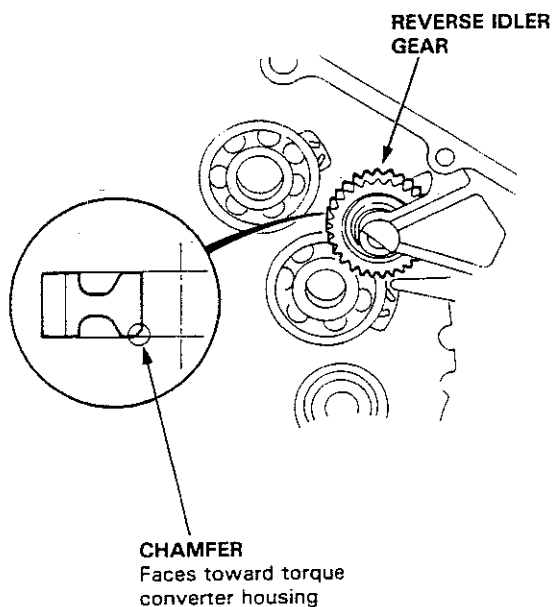
Installation

1. Set the spring in the reverse idler shaft. Push the spring in with the steel ball then install the needle bearing.

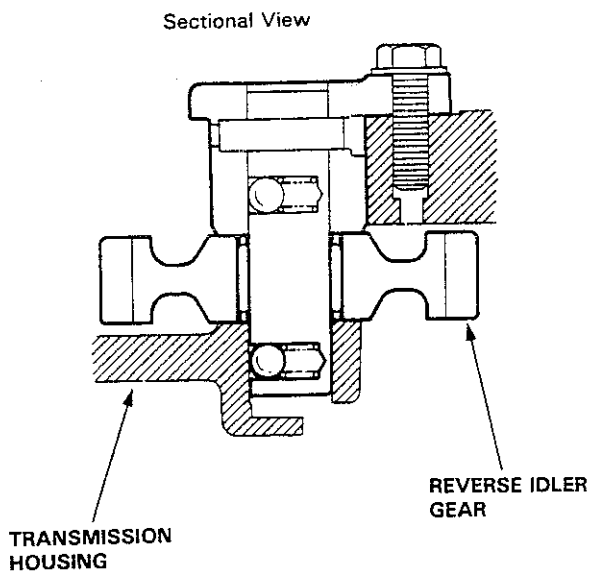
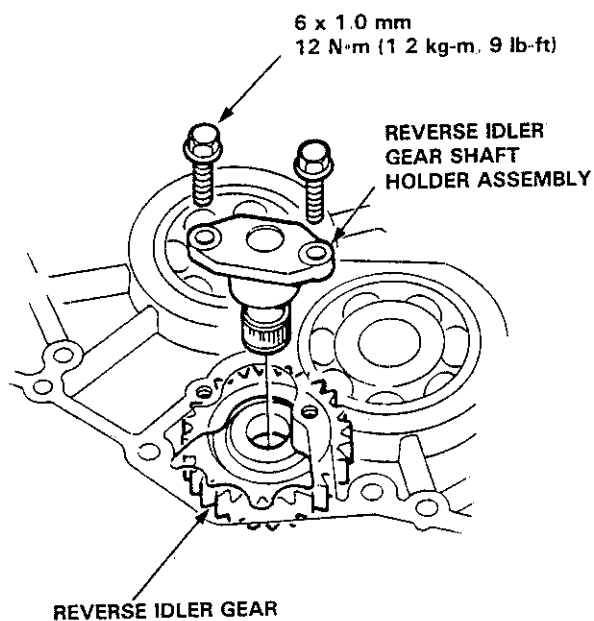
NOTE: The steel ball is under spring pressure. Take care not to let it pop out.



2. Install the reverse idler gear with the large chamfer on the shaft bore facing the torque converter housing.



3. Install the reverse idler shaft holder into the transmission housing, then tighten the bolts.



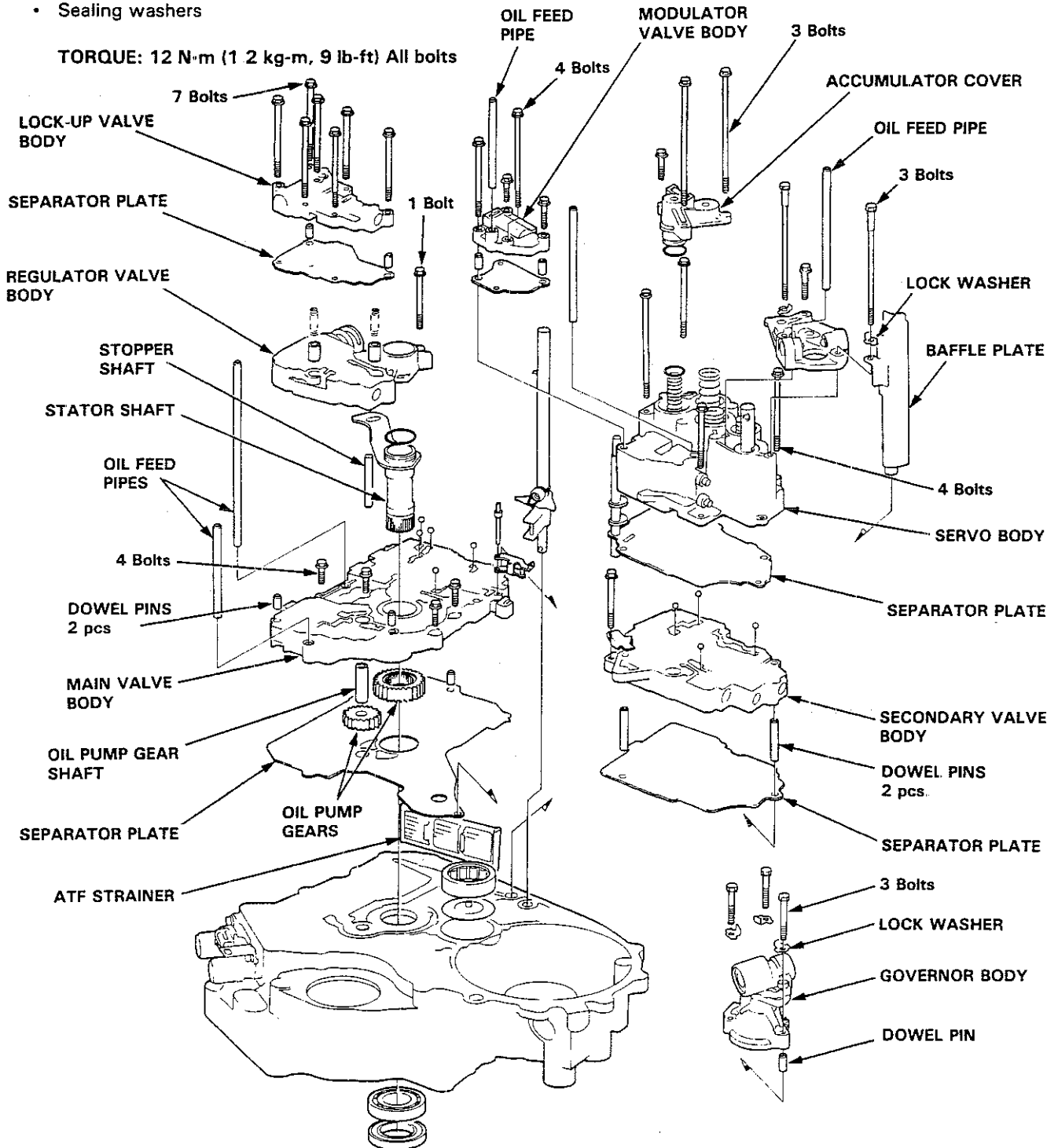
Transmission/Valve Body

Reassembly

NOTE:

- Coat all parts with ATF
- Replace the below parts:
 - O-rings
 - Lock washers
 - Gaskets
 - Locknuts
 - Spring washer
 - Sealing washers

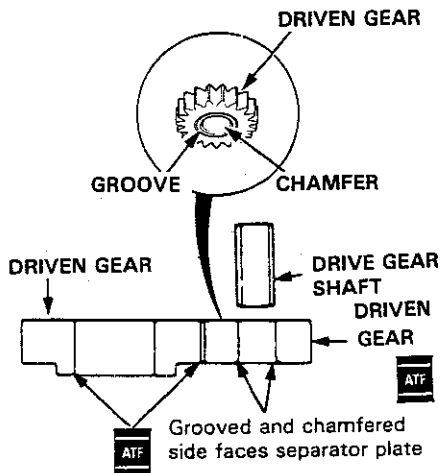
TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft) All bolts





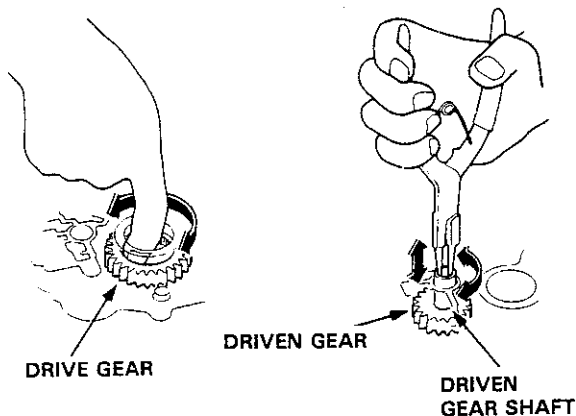
1. Install the ATF strainer in the torque converter housing
2. Install the main separator plate with 2 dowel pins on the torque converter housing. Then install the oil pump drive gear, driven gear and driven gear shaft.

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

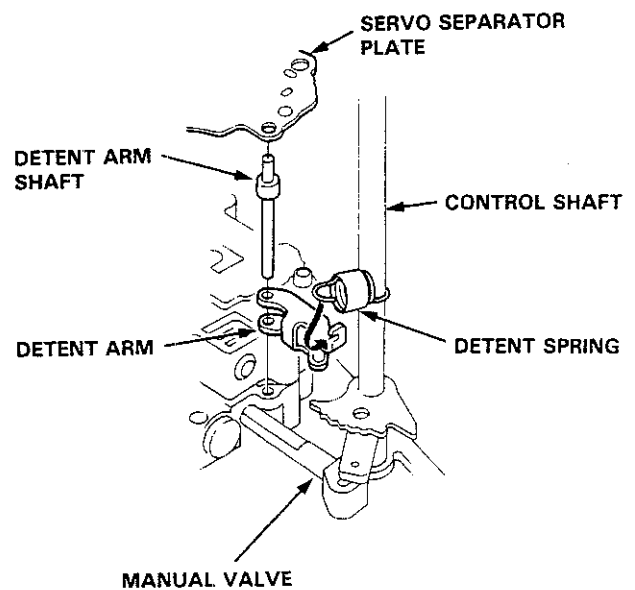


3. Install the main valve body with 4 bolts. And make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in the axial and normal operating directions.
4. If the pump gear and pump shaft do not move freely, loosen the valve body bolts, realign the shaft, and then retighten to the specified torque.

CAUTION: Failure to align the pump shaft correctly will result in seized pump gear or pump shaft.



5. Install the stator shaft and stopper shaft.
6. Install the regulator valve body with one bolt.
7. Install the lock-up valve body, separator plate and 2 dowel pins with 7 bolts.
8. Install the secondary valve body, separator plate and 2 dowel pins with 1 bolt.
9. Install the control shaft in the housing, with the control shaft and manual valve together.
10. Install the detent arm and arm shaft in the main valve body, then hook the detent spring to the detent arm.

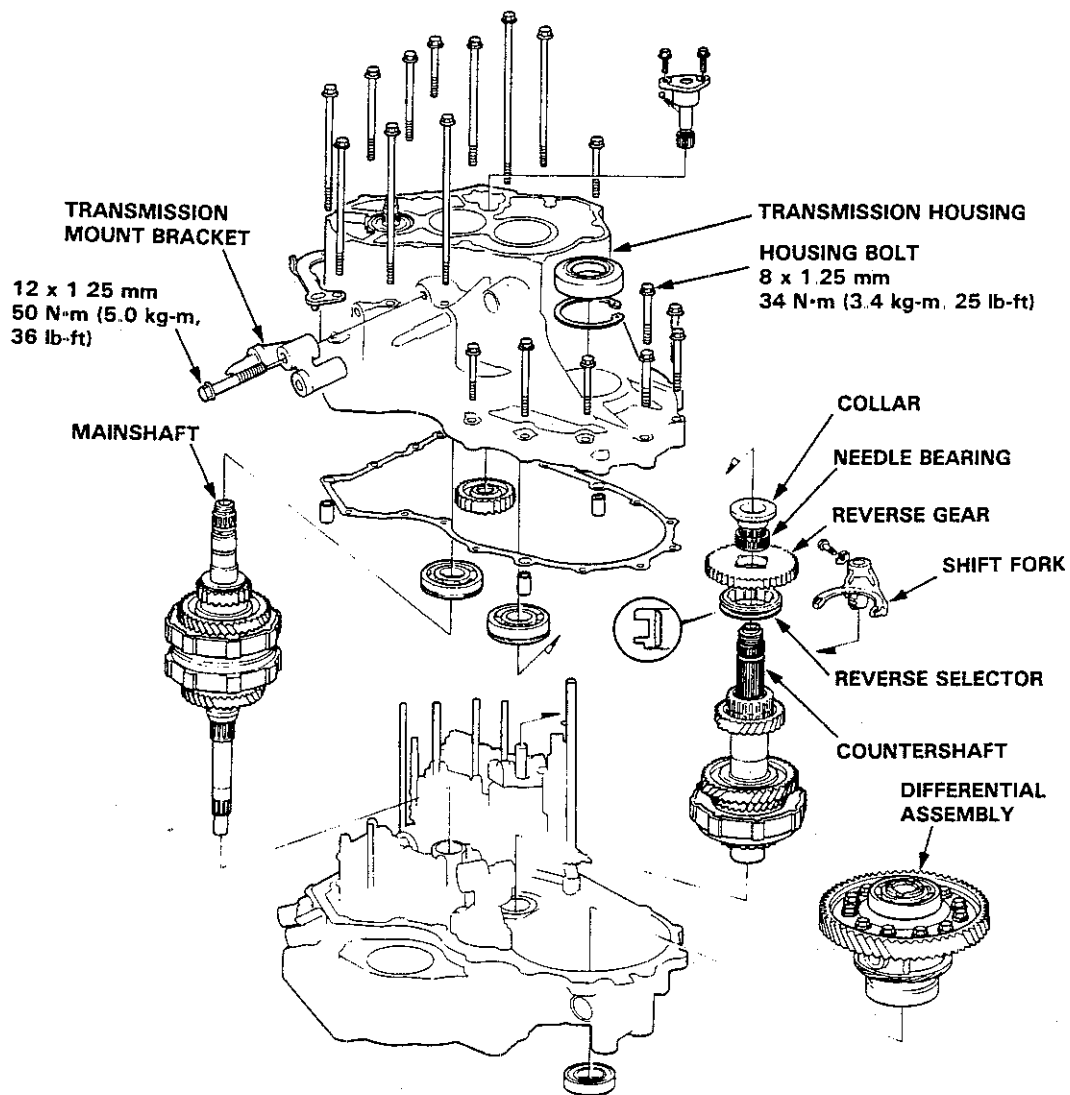


11. Install the servo body and separator plate with 4 bolts.
12. Install the modulator valve body, separator plate and 2 dowel pins with 4 bolts.
13. Install the accumulator cover with 3 bolts.
14. Install the detent base baffle plate with 3 bolts and new lock washers.
15. Install the governor body with 3 bolts and new lock washers.
16. Install the oil feed pipes.

(cont'd)

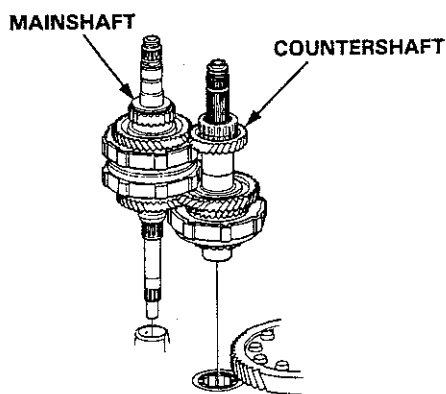
Transmission/Transmission Housing

Reassembly (cont'd)

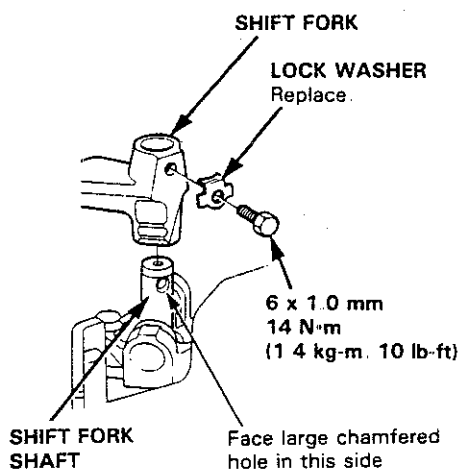




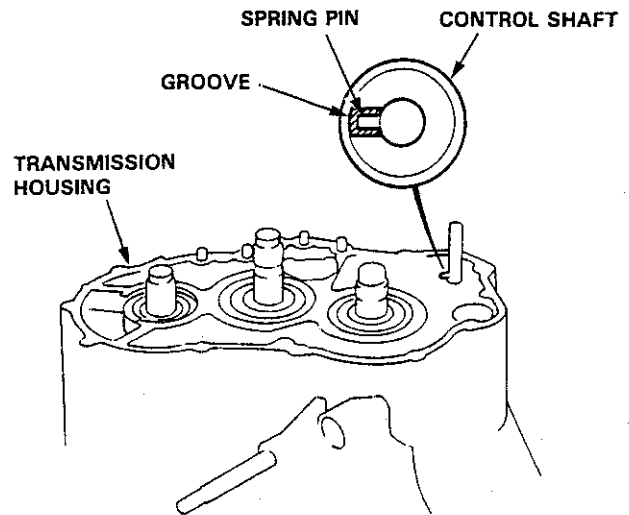
17. Install the sub-shaft assembly in the transmission housing (page 14-96).
 18. Install the reverse idler gear and gear shaft holder (page 14-111).
 19. Install the differential assembly in the torque converter housing.
- CAUTION:** Take care not to damage the governor body.
20. Install the mainshaft and countershaft sub-assembly together in the torque converter housing.



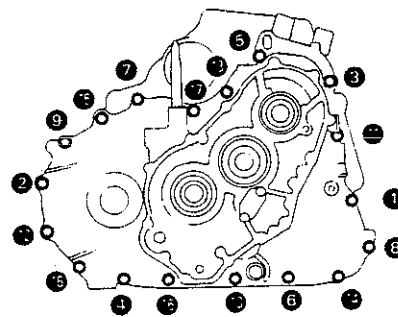
21. Turn the shift fork so large chamfered hole facing fork bolt hole, then install the shift fork with the reverse selector and torque the lock bolt. Bend the lock tab against the bolt head.



22. Install the reverse gear with the collar and needle bearing on the countershaft.
23. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.
24. Place the transmission housing on the torque converter housing with a new gasket and the dowel pins.



25. Install the transmission housing bolts and transmission hanger, then torque bolts to 34 N·m (3.4 kg-m, 25 lb-ft) in two or more steps as shown.



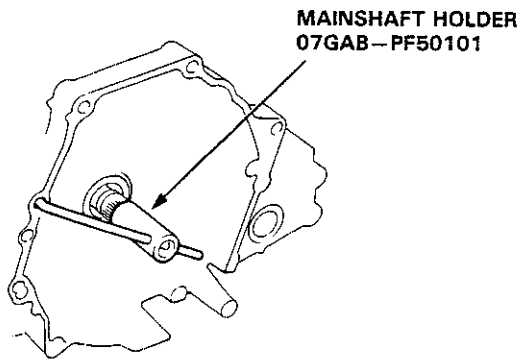
26. Install the transmission mount bracket on the transmission housing

(cont'd)

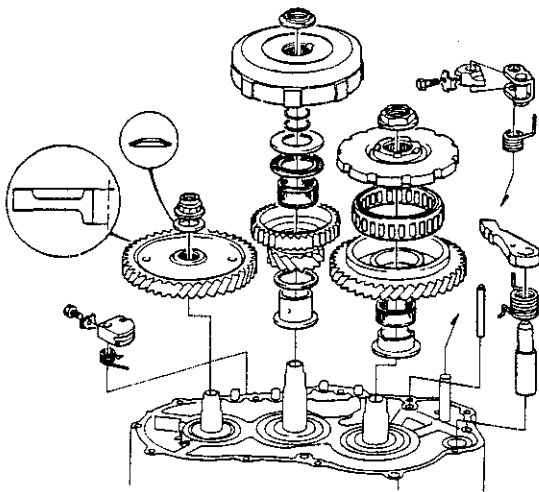
Transmission/R. Side Cover

Reassembly (cont'd)

27. Slip the special tool onto the mainshaft.

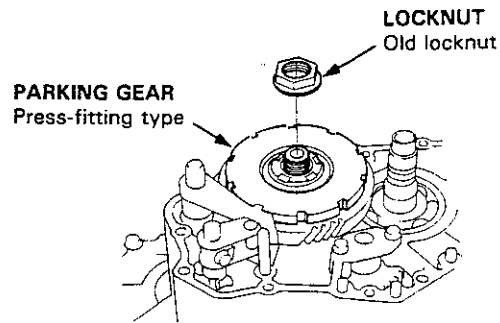


28. Install the parking brake lever on the control shaft.
29. Install the parking gear, countershaft 1st gear and one-way clutch assembly on the countershaft.
30. Install the parking brake pawl in the transmission housing, then engage it with the parking gear.



31. Tighten the old locknut to press the press fitting parking gear to specified torque, then loosen it.

TORQUE: 140 N·m (14.0 kg-m, 101 lb-ft)



32. Install the mainshaft 1st gear and 1st clutch assembly on the mainshaft, and sub-shaft 1st gear on the sub-shaft.
33. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to lock the sub-shaft while tightening the sub-shaft locknut.
34. Install the disc spring on the sub-shaft, and new locknuts on each shaft.

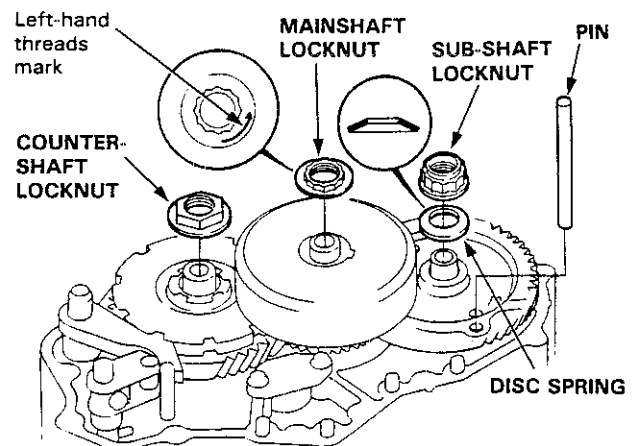
CAUTION: Install the disc spring in the direction shown.

35. Tighten the locknuts to specified torque.

TORQUE:

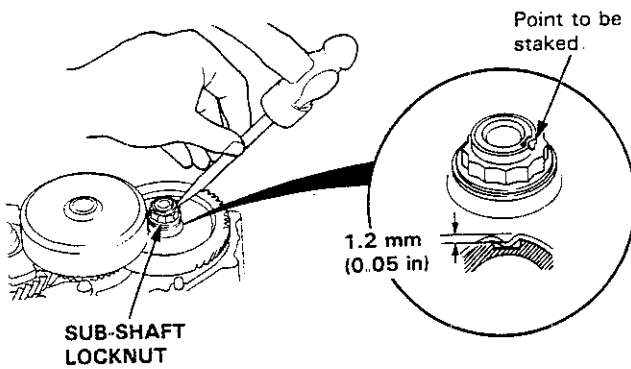
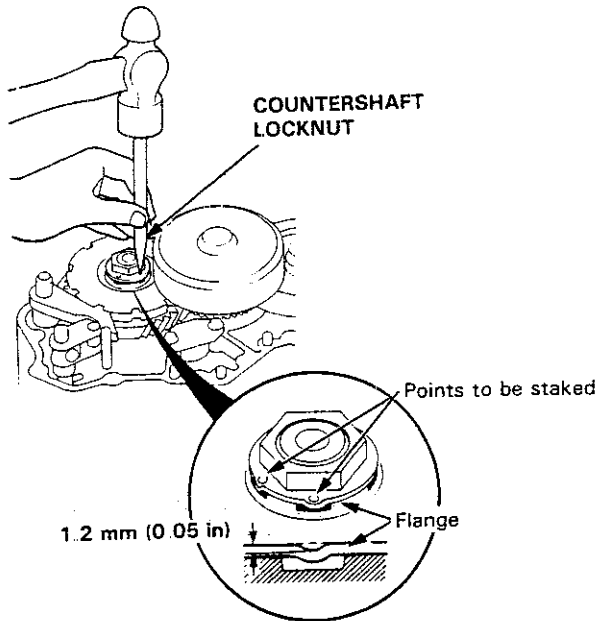
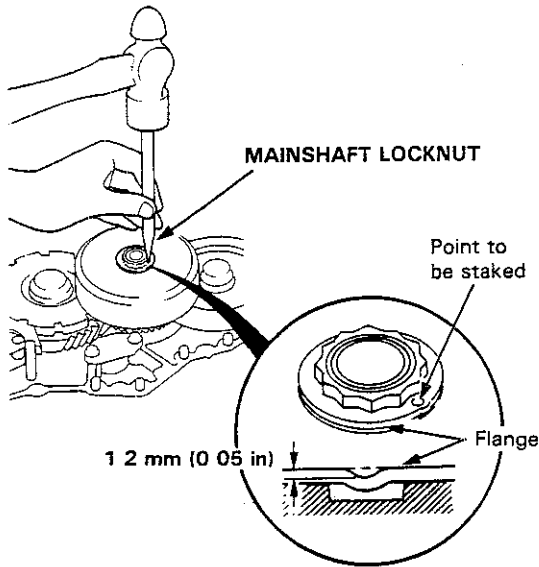
- MAINSHAFT 95 N·m (9.5 kg-m, 69 lb-ft)
- COUNTERSHAFT 140 N·m (14.0 kg-m, 101 lb-ft)
- SUB-SHAFT 95 N·m (9.5 kg-m, 69 lb-ft)

NOTE: Mainshaft locknut has left-hand threads.





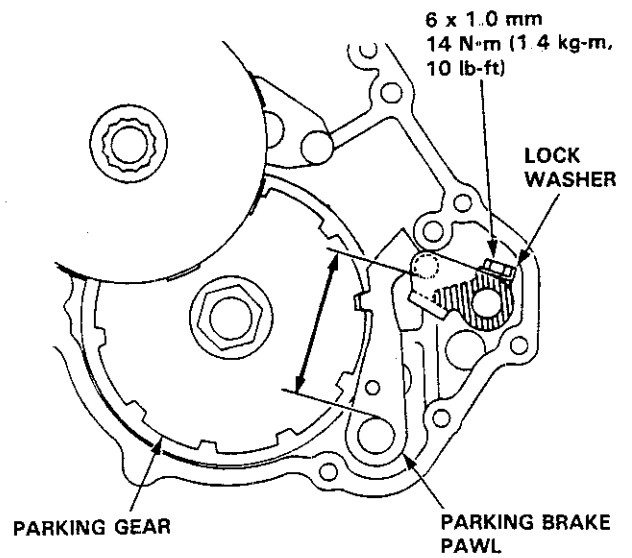
36. Stake each locknut using a 3 5 mm punch



37. Set the parking brake lever in the PARK position, then verify that the parking brake pawl engages to the parking gear.

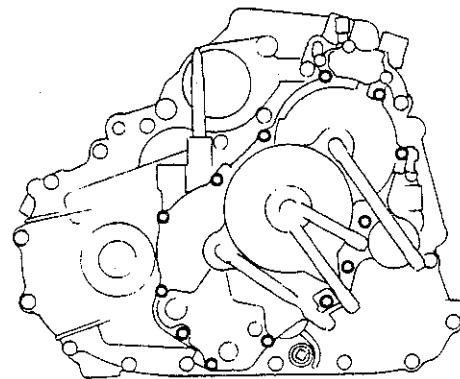
38. If the pawl does not engage fully, check the parking brake pawl stopper clearance as described on page 14-118

39. Tighten the lock bolt and bend the lock tab.



40. Install the R. side cover.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



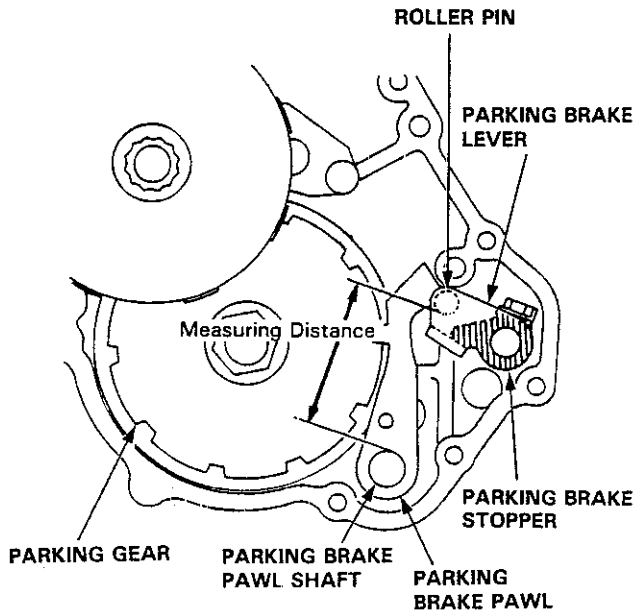
41. Install the ATF cooler pipes and ATF level gauge.

Parking Brake Stopper

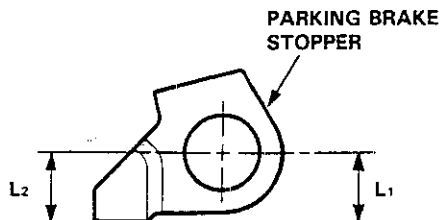
Inspection/Adjustment

1. Set the parking brake lever in the Park position
2. Measure the distance between the face of the parking brake pawl shaft and face of the parking brake lever roller pin as shown.

STANDARD: 67.25–68.25 mm (2.65–2.69 in)



3. If the measurement is out of tolerance, select and install the appropriate parking brake stopper from the table below.



PARKING BRAKE STOPPER

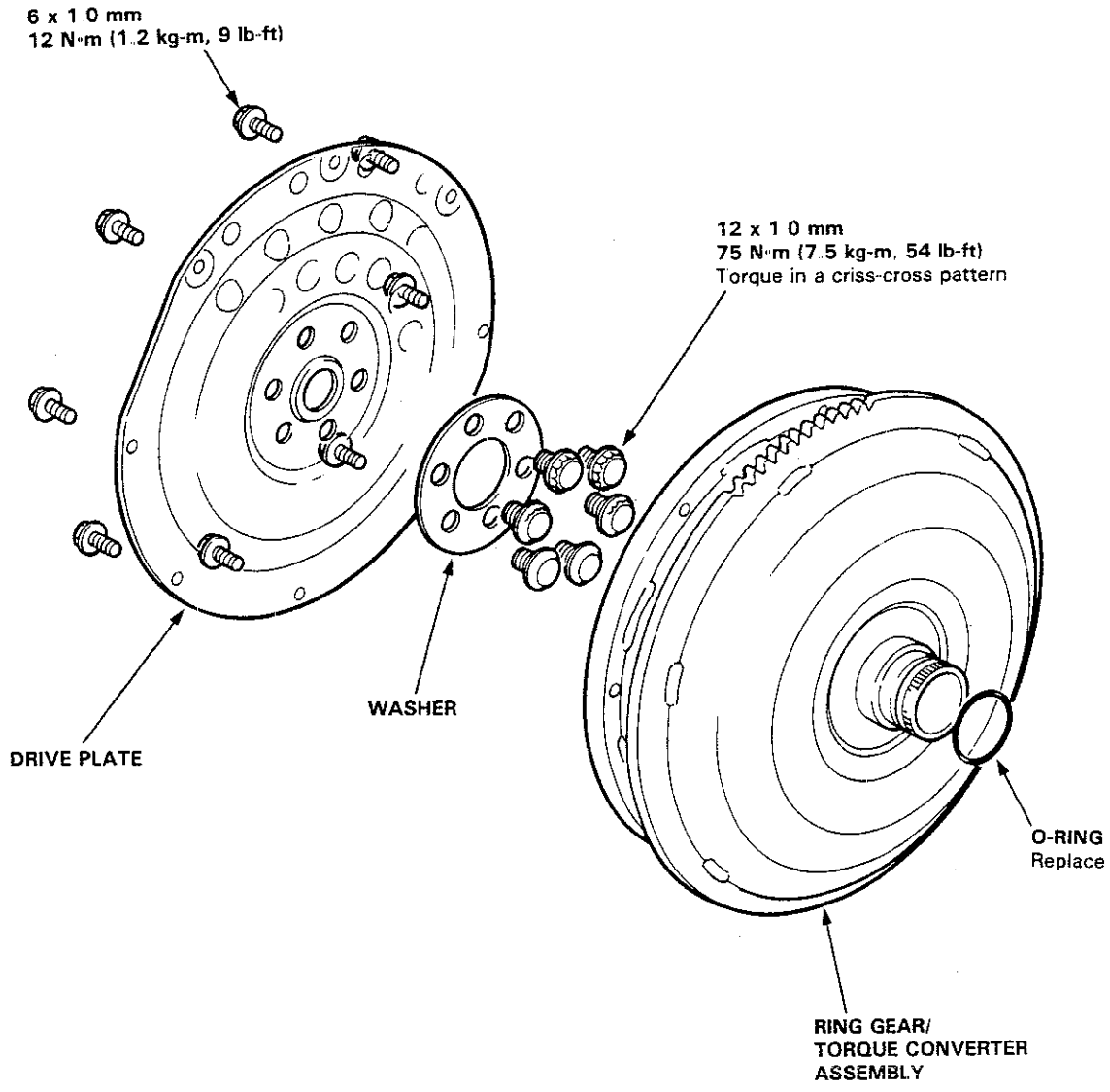
Mark	Part Number	L ₁	L ₂
1	24537-PA9-003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538-PA9-003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539-PA9-003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the parking brake stopper, make sure the distance is within tolerance.



Torque Converter

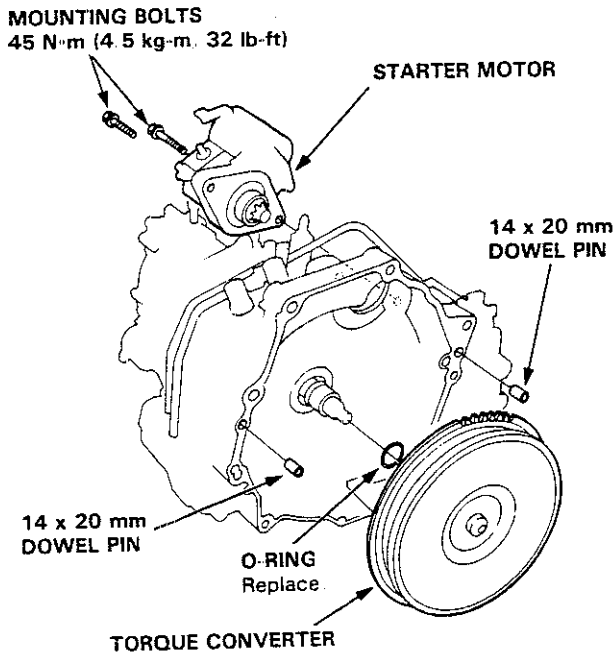
Disassembly



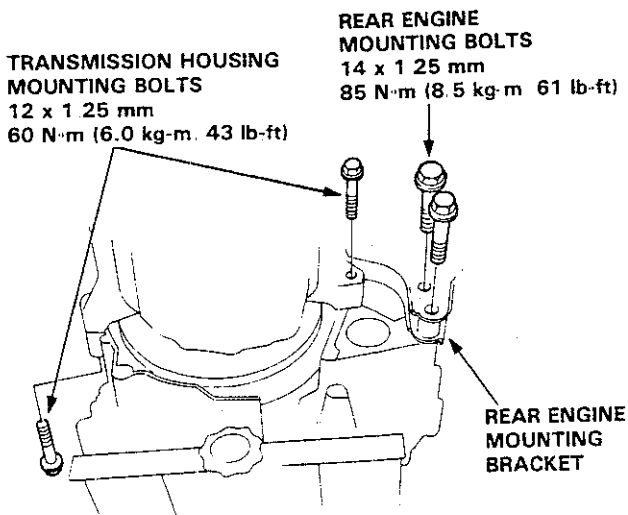
Transmission

Installation

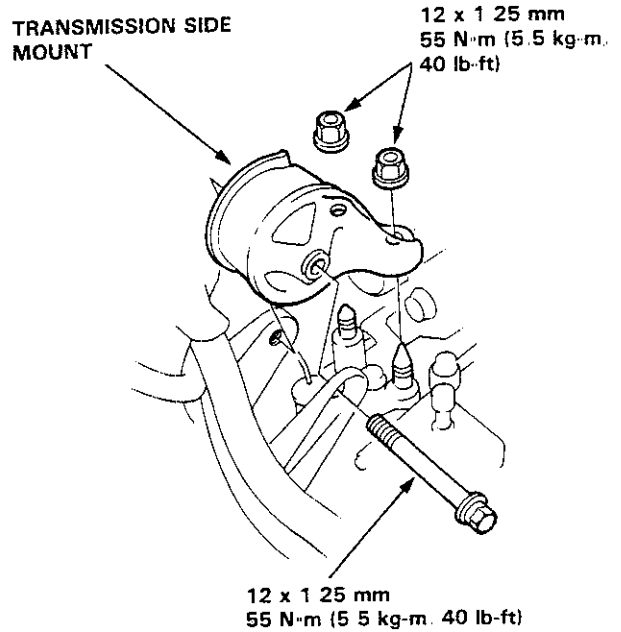
1. Install the starter motor on the torque converter housing, then install the 14 mm dowel pins in the torque converter housing.



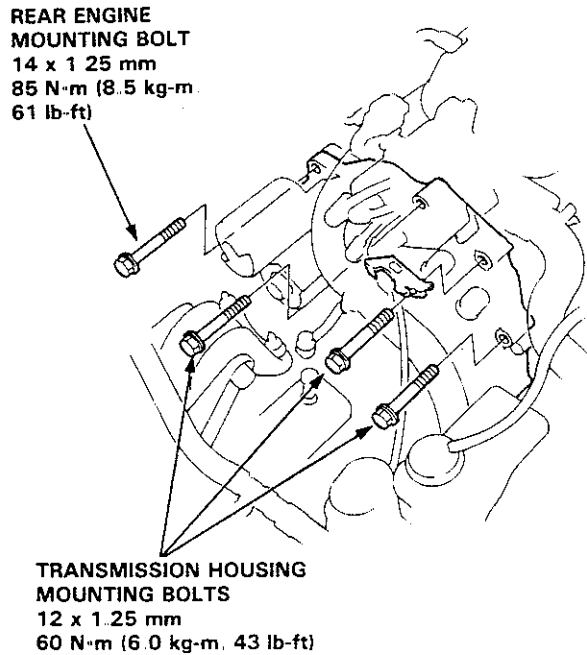
2. Place the transmission on a transmission jack, and raise to the engine level.
3. Attach the transmission to the engine then install two transmission housing mounting bolts and two rear engine mounting bolts



4. Install the transmission side mount.



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

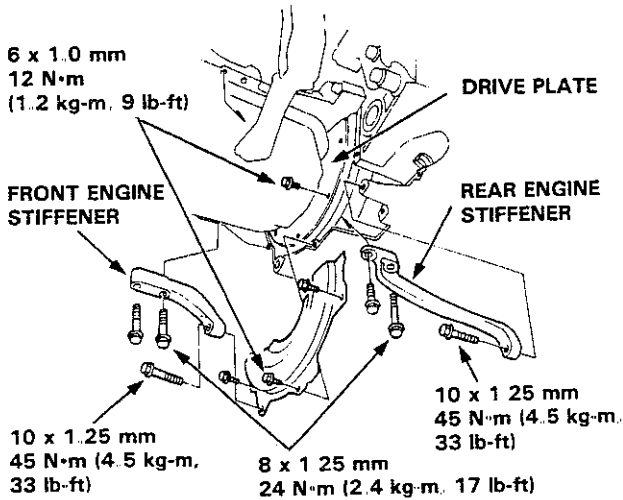


6. Remove the transmission jack and the hoist from the engine



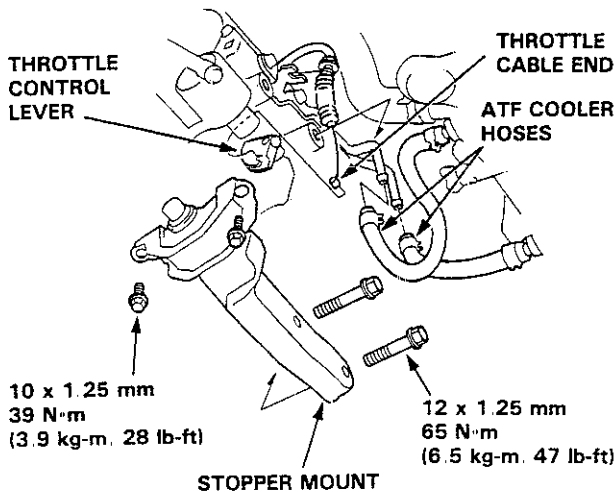
7 Attach the torque converter to the drive plate with 8 bolts and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then final torque, in a criss-cross pattern. Check for free rotation after tightening the last bolt.

8 Install the torque converter cover and engine stiffeners.



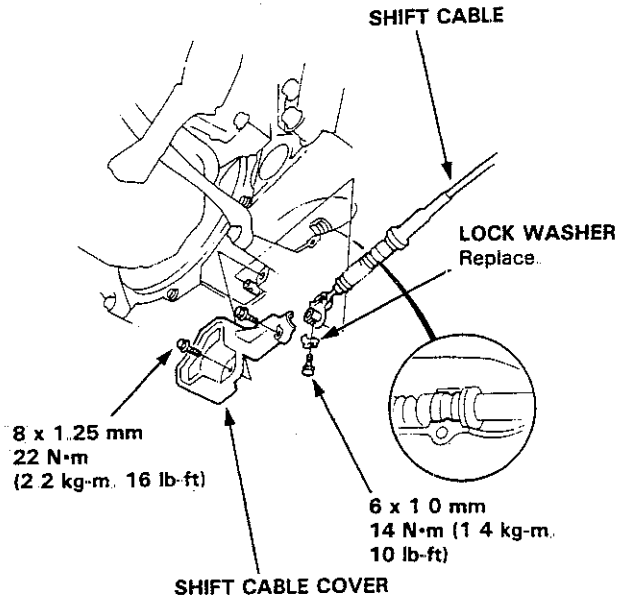
9. Connect the ATF cooler hoses to the joint pipes.

10 Connect the throttle control cable and install the stopper mount.

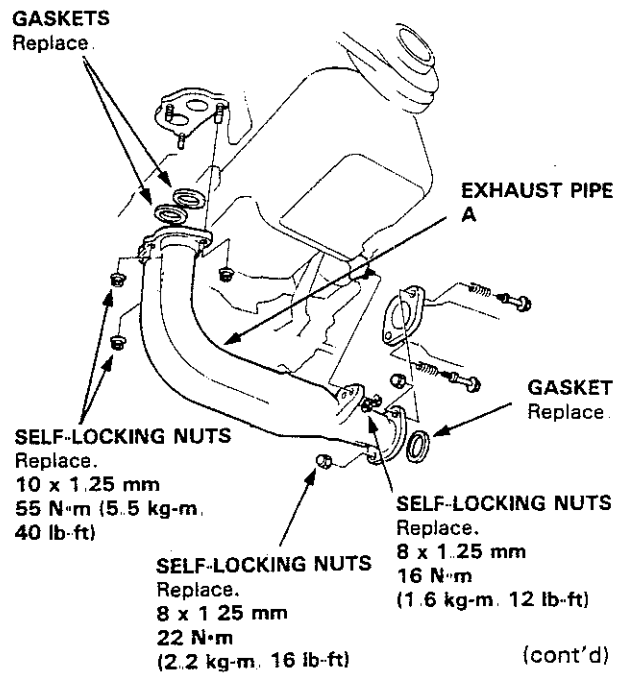


11. Install the control lever with a new lock washer to the control shaft, then install the shift cable cover

CAUTION: Take care not to bend the shift cable.



12. Install the exhaust pipe A.



Transmission

Installation (cont'd)

13. Install a new set ring on the end of the each driveshaft.

14. Install the right and left driveshafts (see Section 16)

NOTE: Turn the right and left steering knuckle fully outward, and axial into the differential until you feel its spring clip engage the side gear.

15. Install the damper fork, then install the ball joint to the lower arm with castle nuts and new cotter pins

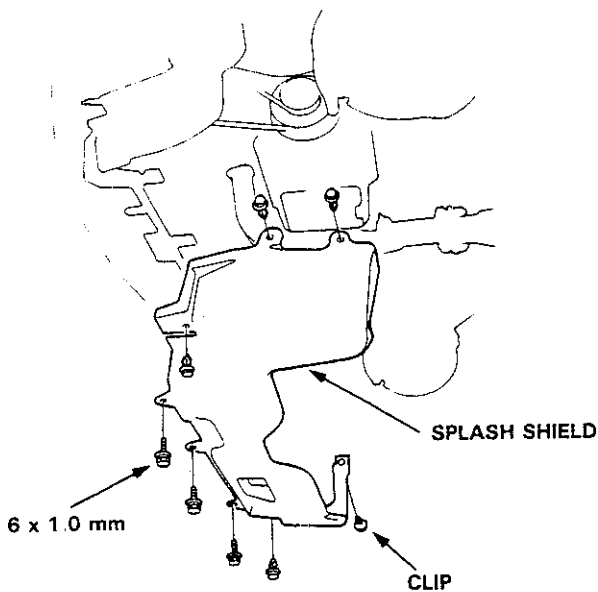
10 x 1.25 mm
44 N·m
(4.4 kg-m, 32 lb-ft)

SELF-LOCKING NUT
Replace.
12 x 1.25 mm
65 N·m
(6.5 kg-m, 47 lb-ft)

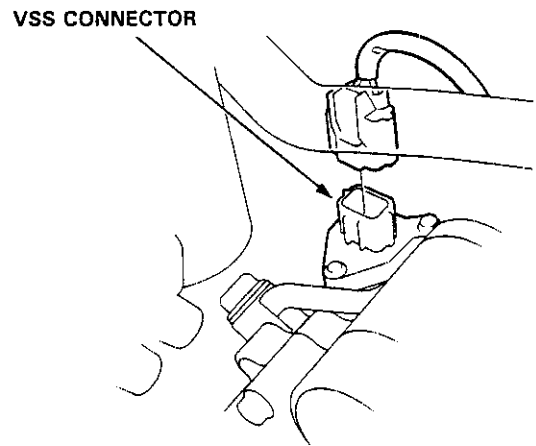
CASTLE NUT
12 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

COTTER PIN
Replace.

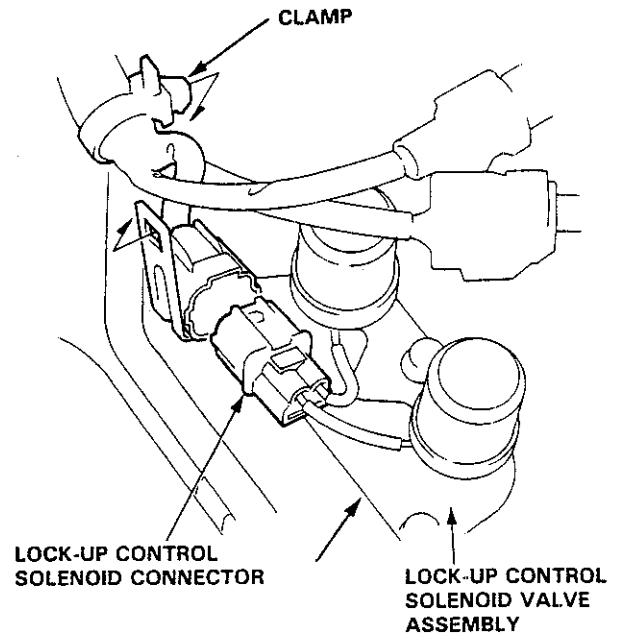
16. Install the splash shield.



17. Connect the vehicle speed sensor (VSS) connector.

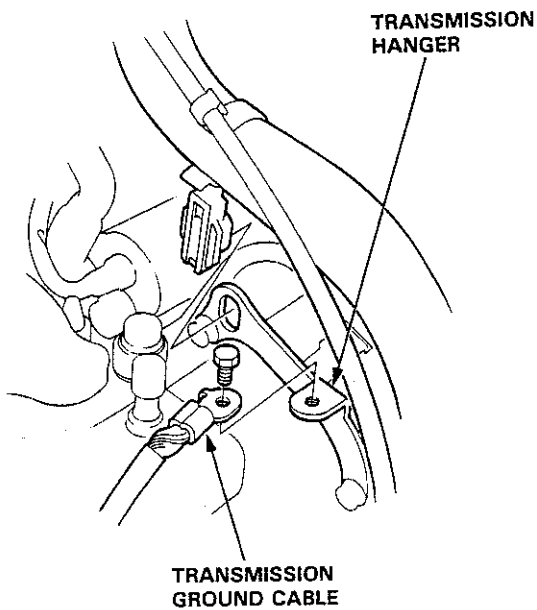


18. Connect the lock-up control solenoid connector, and clamp the harness on the lock-up control solenoid connector stay.

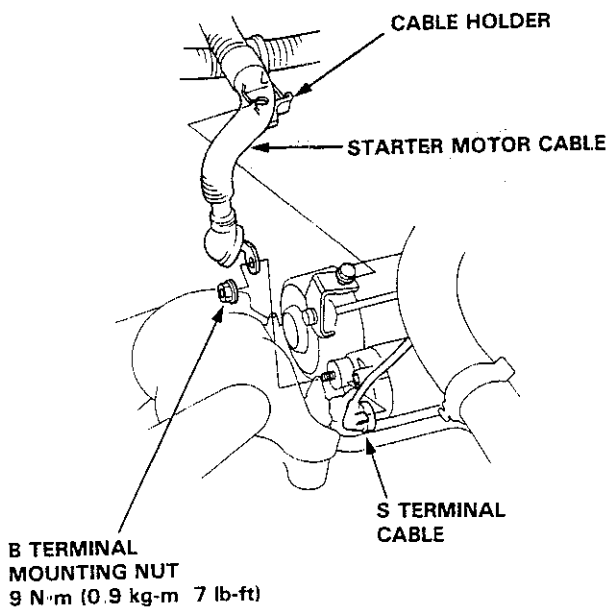




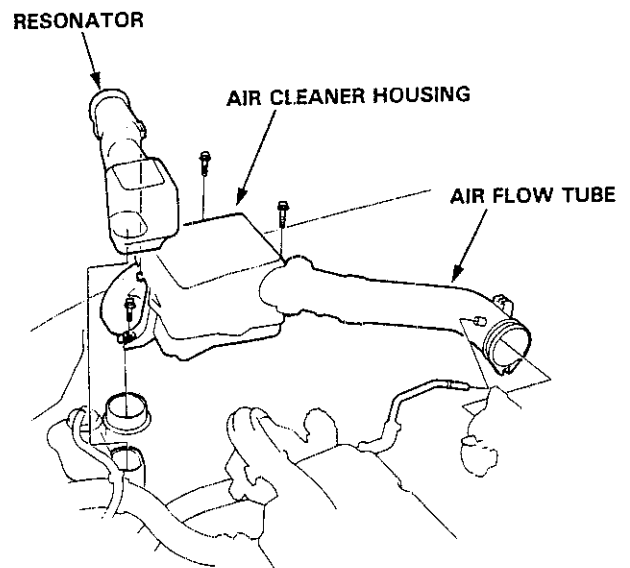
19. Connect the transmission ground cable.



20. Connect the stater motor cable on the stater motor, and install the cable holder



21. Install the air cleaner housing, air flow tube and resonator



22. Refill the transmission with ATF (see page 14-49).

23. Connect the battery positive (+) and negative (-) cables to the battery.

24. Check the ignition timing (see Section 23).

25. Start the engine. Set the parking brake, and shift the transmission through all gear three times. Check for proper shift cable adjustment.

26. Let the engine reach operating temperature with the transmission in Neutral or Park, then turn it off and check fluid level

27. Road test as described on pages 14-46 and 47

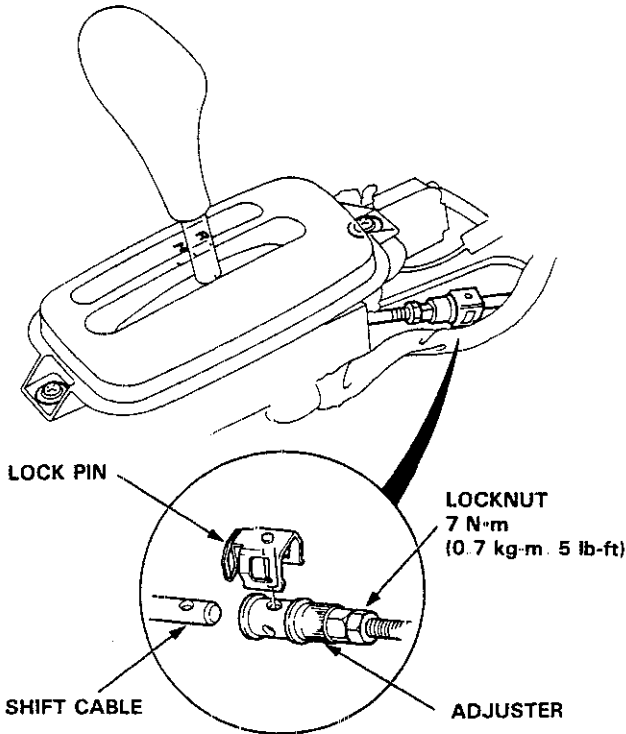
Shift Cable

Removal/Installation

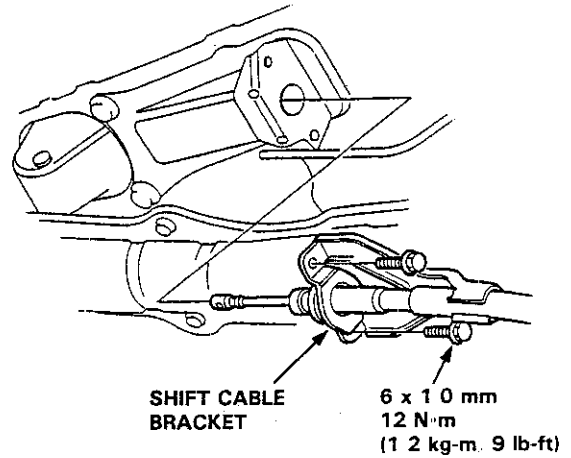
▲ WARNING Make sure lifts are placed properly (see Section 1).

NOTE: LHD is shown; RHD is similar

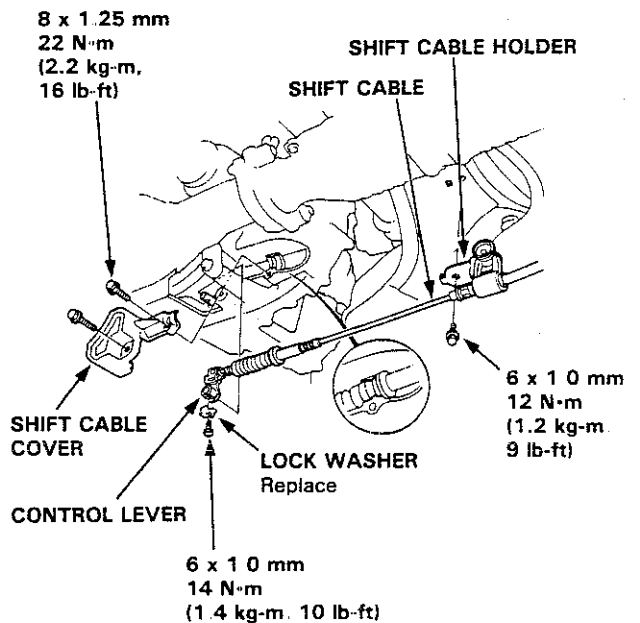
- 1 Remove the center console (see Section 20).
- 2 Shift to **N** position, then remove the lock pin from the cable adjuster.



- 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, on the next page.

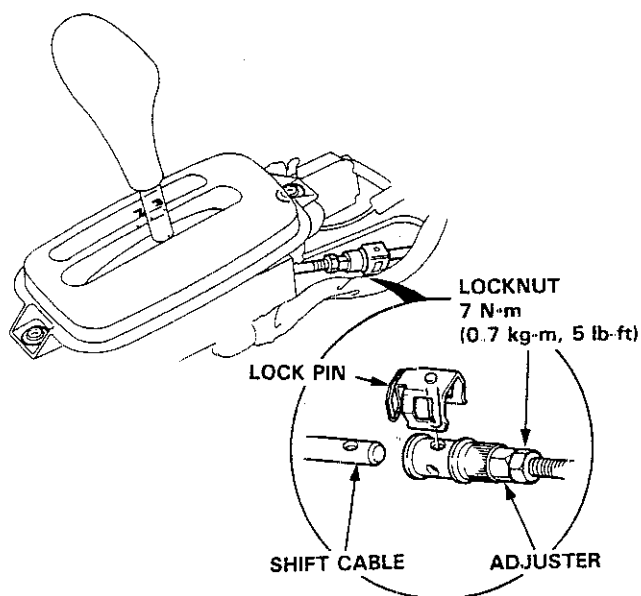


Adjustment

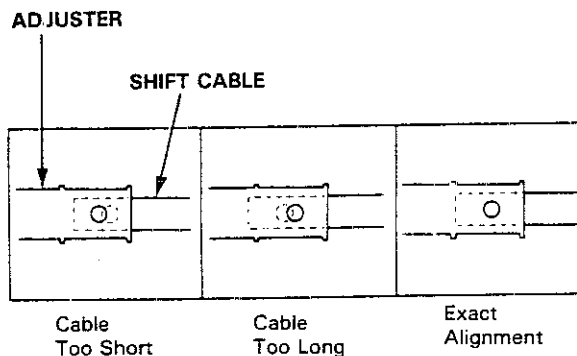
⚠ WARNING Make sure lifts are placed properly (see Section 1).

NOTE: LHD is shown; RHD is similar.

1. Start the engine. Shift to **P** position to see if the reverse gear engages. If not, refer to troubleshooting on page 14-42 thru 45.
2. With the engine off, remove the center console (see Section 20).
3. Shift to **N** position, then remove the lock pin from the cable adjuster.



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



5. If not perfectly aligned, loosen the locknut on shift cable and adjust as required.
6. Tighten the locknut to 7 N·m (0.7 kg·m, 5 lb·ft).
7. 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.
8. Move the select to each gear and verify that the shift position indicator follows the shift position console switch.
9. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 14-42 thru 45.

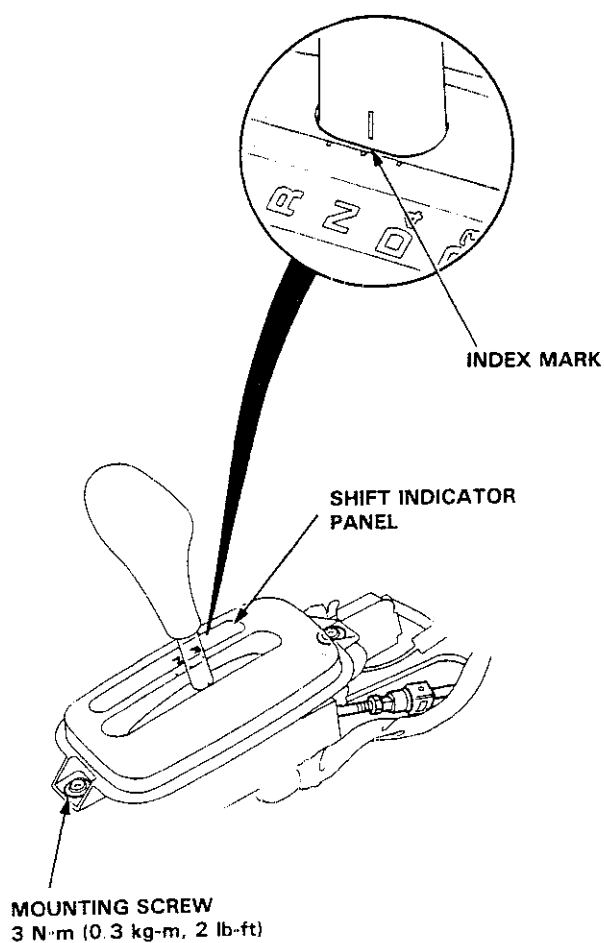
Shift Indicator Panel

Adjustment

NOTE: LHD is shown; RHD is similar.

1. Check that the index mark of the indicator aligns with the **[N]** mark of the shift indicator panel with the transmission in NEUTRAL.
2. If not aligned, remove the center 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.

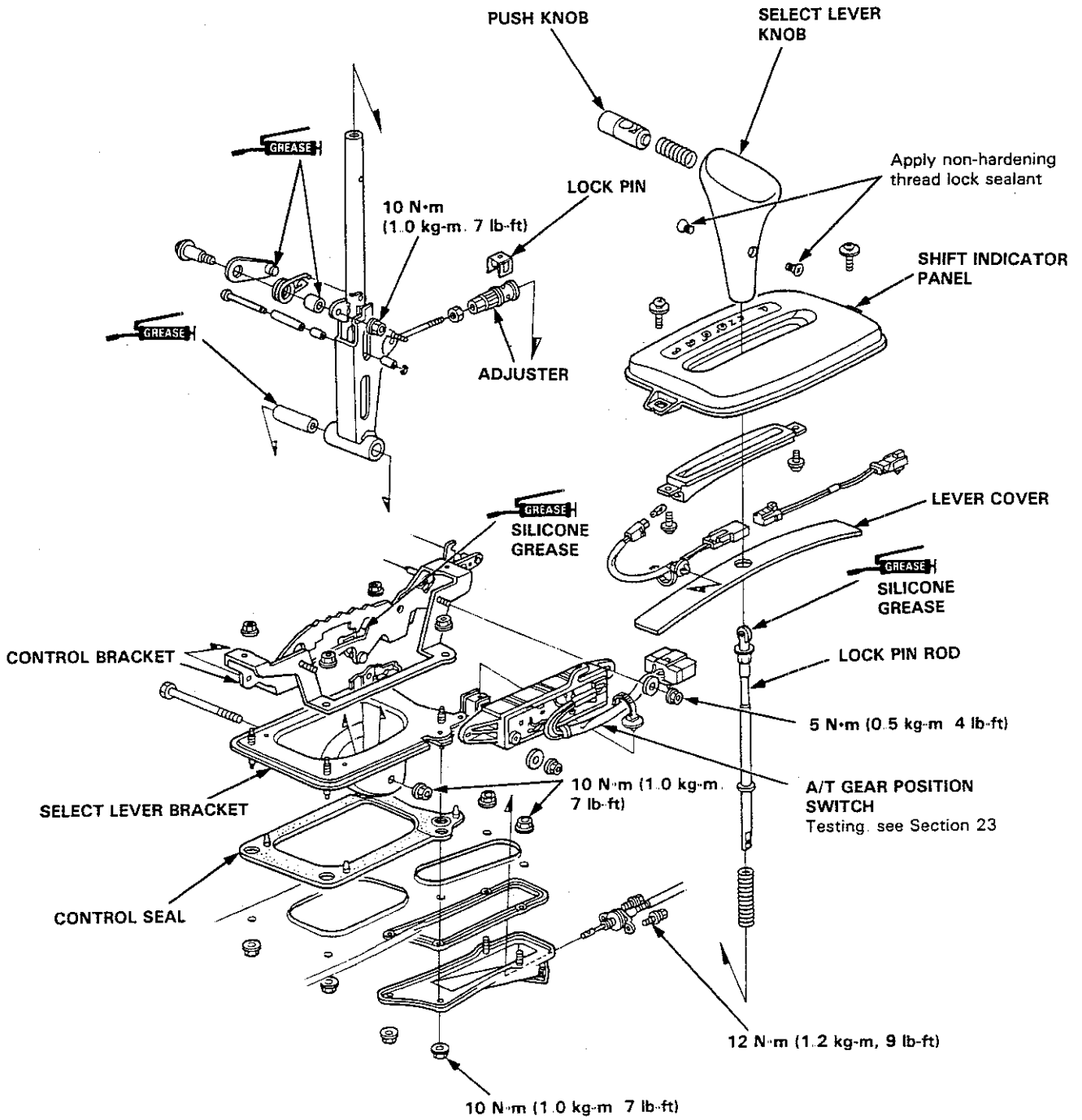




Gearshift Selector

Disassembly/Reassembly

NOTE: LHD is shown; RHD is symmetrical.



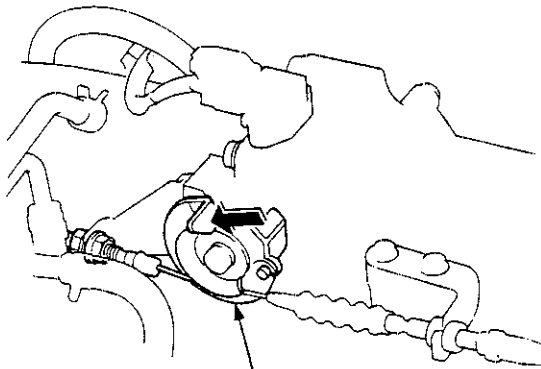
Throttle Control Cable

Inspection

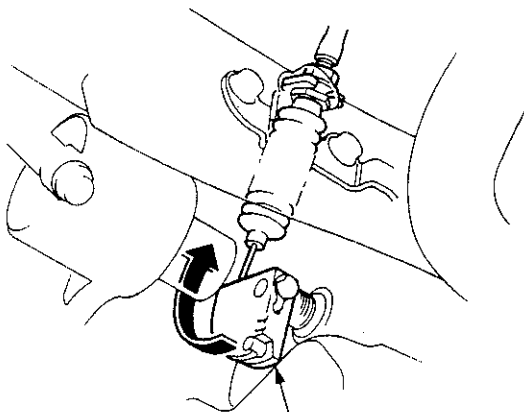
NOTE: Before inspecting the throttle control cable, make sure;

- Throttle cable free play is correct (see Section 11).
- Idle speed is correct (see Section 11)
- To warm up the engine to normal operating temperature (cooling fan comes on)

1. Verify that the throttle control lever is synchronized with the throttle linkage while depressing and releasing the accelerator pedal.
2. If the throttle control lever is not synchronized with the throttle linkage, adjust the throttle control cable.

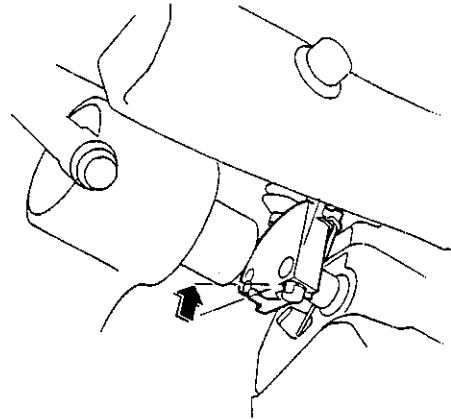


THROTTLE LINKAGE

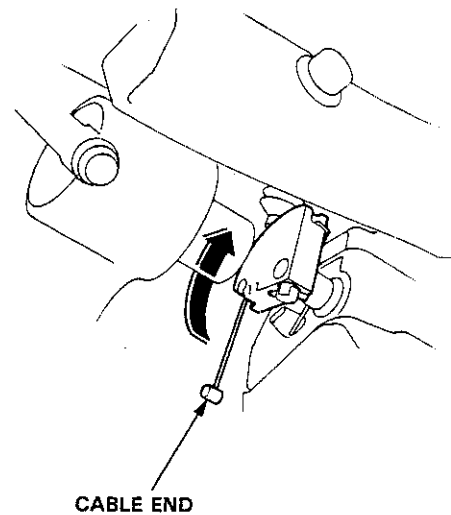


THROTTLE CONTROL LEVER

3. Check that there is play in the throttle control lever while depressing the accelerator pedal to the full-throttle position.



4. Remove the cable end of the throttle control cable from the throttle control lever.
5. Check that the throttle control lever moves smoothly



CABLE END

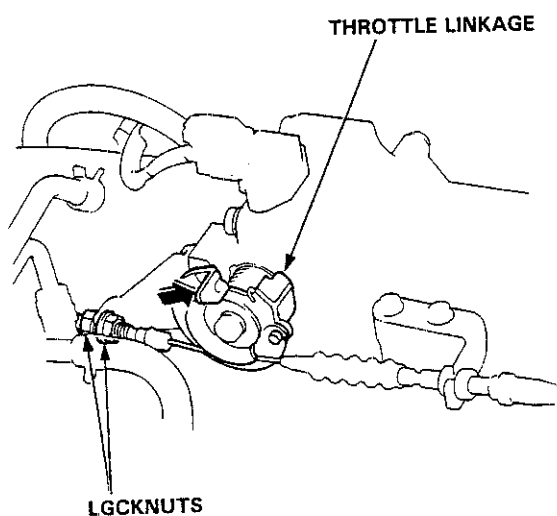


Adjustment

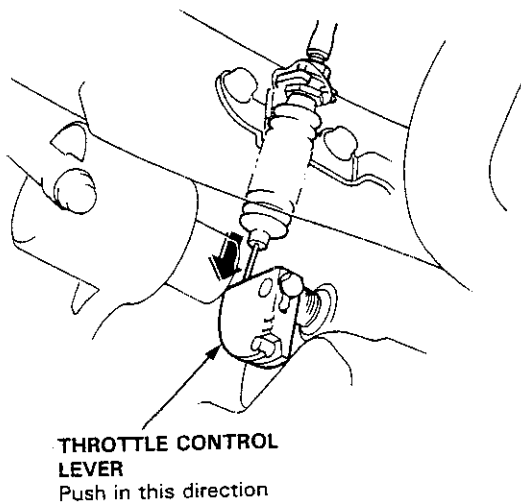
NOTE: Before adjusting the throttle control cable, make sure;

- Throttle cable free play is correct (see Section 11).
- Idle speed is correct (see Section 11).
- To warm up the engine to normal operating temperature (cooling fan comes on).

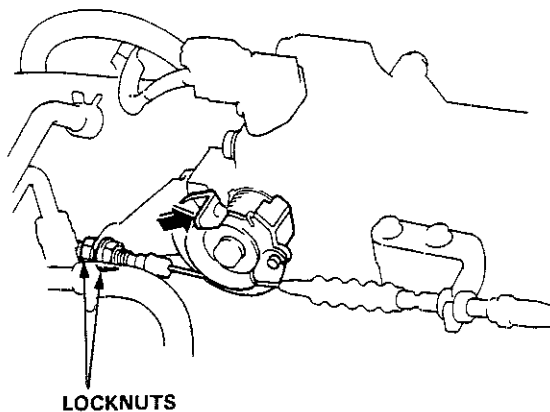
1. Verify that the throttle linkage is in the full-closed position.
2. Loosen the locknut of the throttle control cable at the throttle linkage.



3. Remove the free play of the throttle control cable with the locknut, while pushing the throttle control lever to the full-closed position as shown.



4. Tighten the locknut.



5. After tightening the locknuts, inspect the synchronization and throttle control lever movement.

