

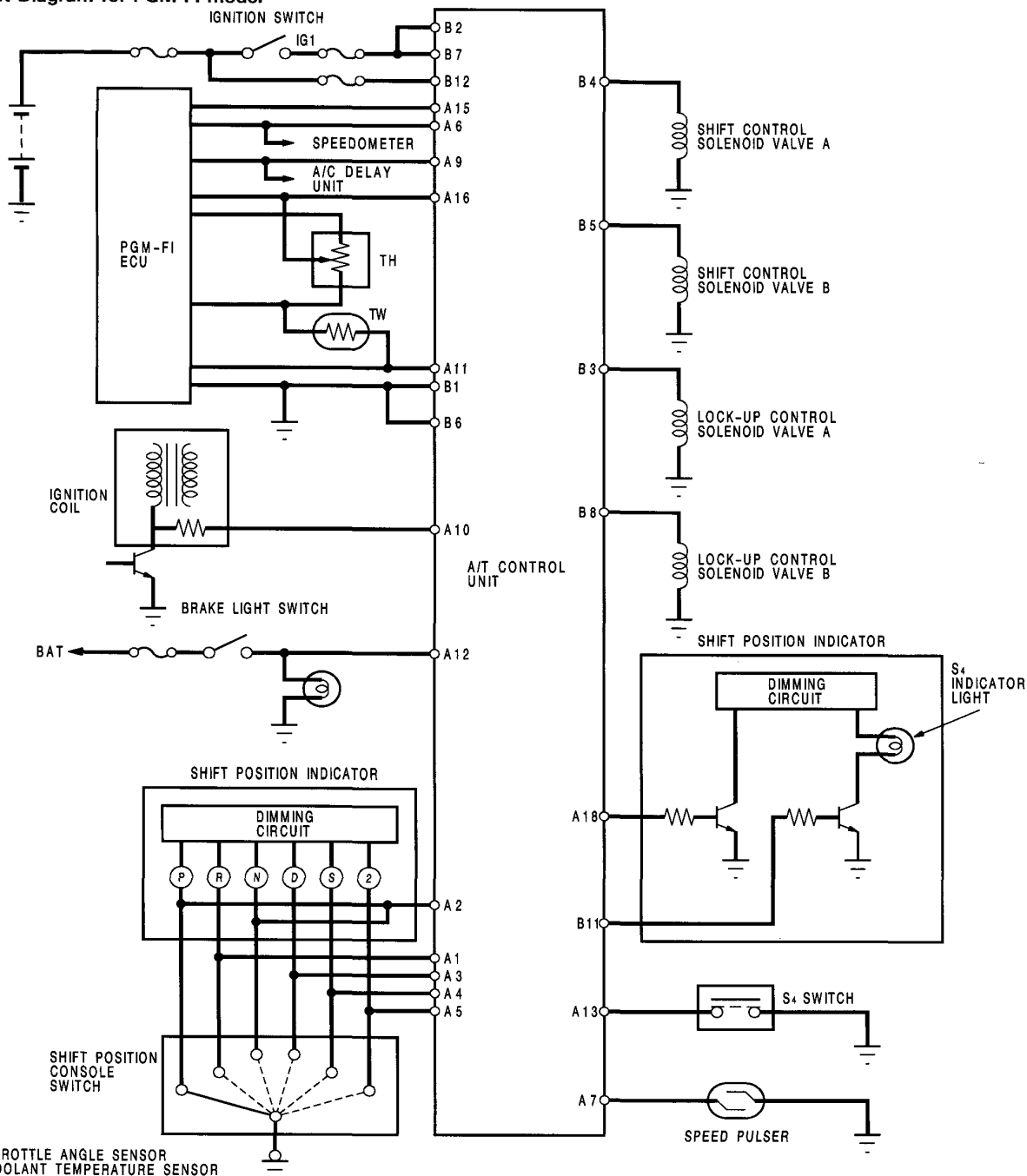


Description

A/T Control Unit

- From various input signals, the A/T control unit controls the shift control solenoid valves A and B and the lock-up control solenoid valves A and B.
- The A/T control unit is below the dash under the carpet on the passenger's side of the car.
- The A/T control unit has a self-diagnosis function that indicates the area of trouble with the number of blinks of the self-diagnosis indicator (LED).

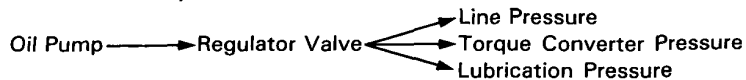
Circuit Diagram for PGM-FI model



Description
















Hydraulic Flow







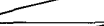
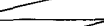

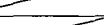





Generation of Hydraulic Pressure



Distribution of Hydraulic Pressure

- Manual Valve → to select Line Pressure
- Throttle Valve B → Throttle B Pressure
- 1-2 Shift Valve →
- 2-3 Shift Valve → Clutch Pressure
- 3-4 Shift Valve →
- Line Pressure → Servo Valve
- Line Pressure → Throttle Valve

No.	DESCRIPTION OF PRESSURE	PATTERN
1	LINE	
2	LINE	
3	LINE	
3'	LINE	
3''	LINE	
4	LINE	
4'	LINE	
4''	LINE	
4'''	LINE	
5	LINE	
6	MODULATE	
10	1ST CLUTCH	
11	1ST CLUTCH	
20	2ND CLUTCH	
25	2ND CLUTCH	

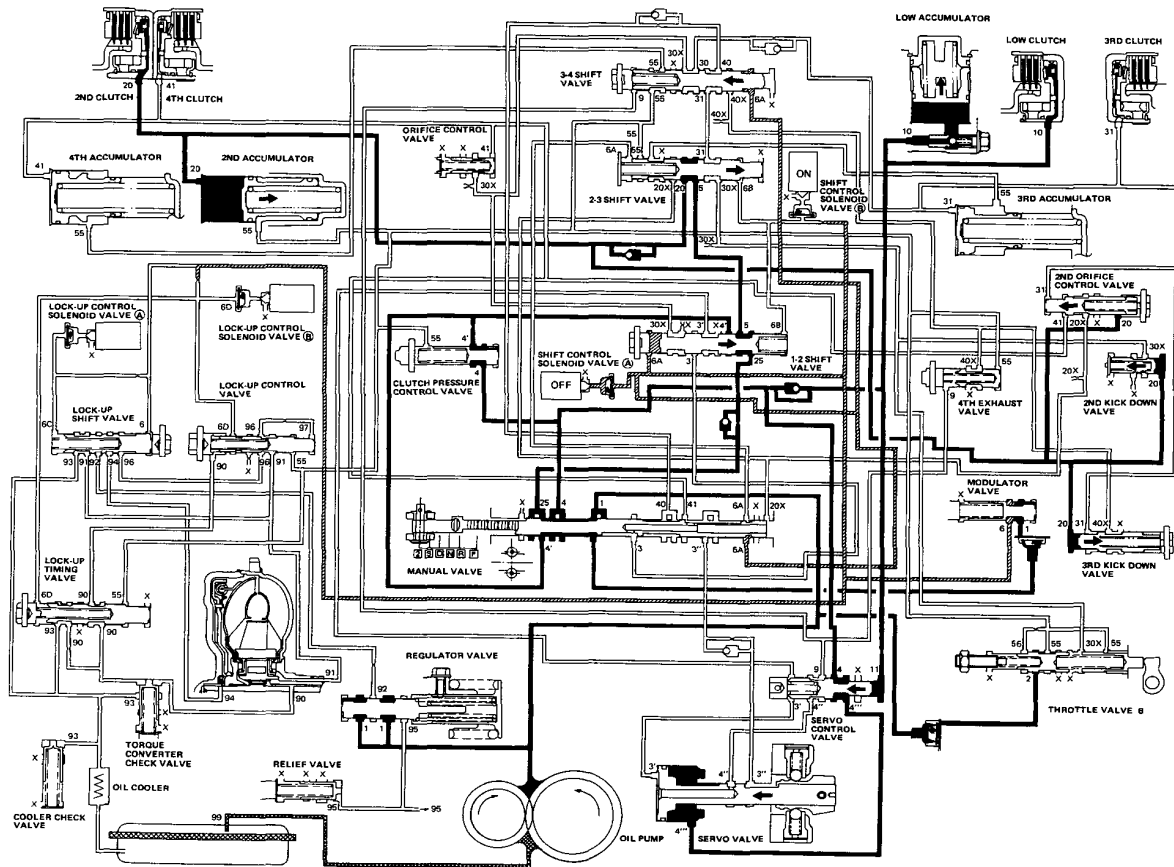
No.	DESCRIPTION OF PRESSURE	PATTERN
30	3RD CLUTCH	
31	3RD CLUTCH	
40	4TH CLUTCH	
41	4TH CLUTCH	
55	THROTTLE B	
56	THROTTLE B	
90	TORQUE CONVERTER	
91	TORQUE CONVERTER	
92	TORQUE CONVERTER	
93	OIL COOLER	
94	TORQUE CONVERTER	
95	LUBRICATION	
96	TORQUE CONVERTER	
99	SUCTION	
x	LEAK	

Description

Hydraulic Flow (cont'd)

2 Position

The line pressure (1) becomes the 2nd clutch pressure (25) as it passes through the manual valve. The 2nd clutch pressure (25) changes at the 1-2 shift valve to the line pressure (5), it changes to the 2nd clutch pressure (20) at the 2-3 shift valve. And then it goes to the 2nd clutch. Also, the line pressure (1) goes to the modulator valve through the filter and becomes the modulator pressure (6). The modulator pressure (6) is supplied to the 1-2, 2-3 and 3-4 shift valves. The line pressure (2) also flows to the throttle valve B.





S or **D** Position

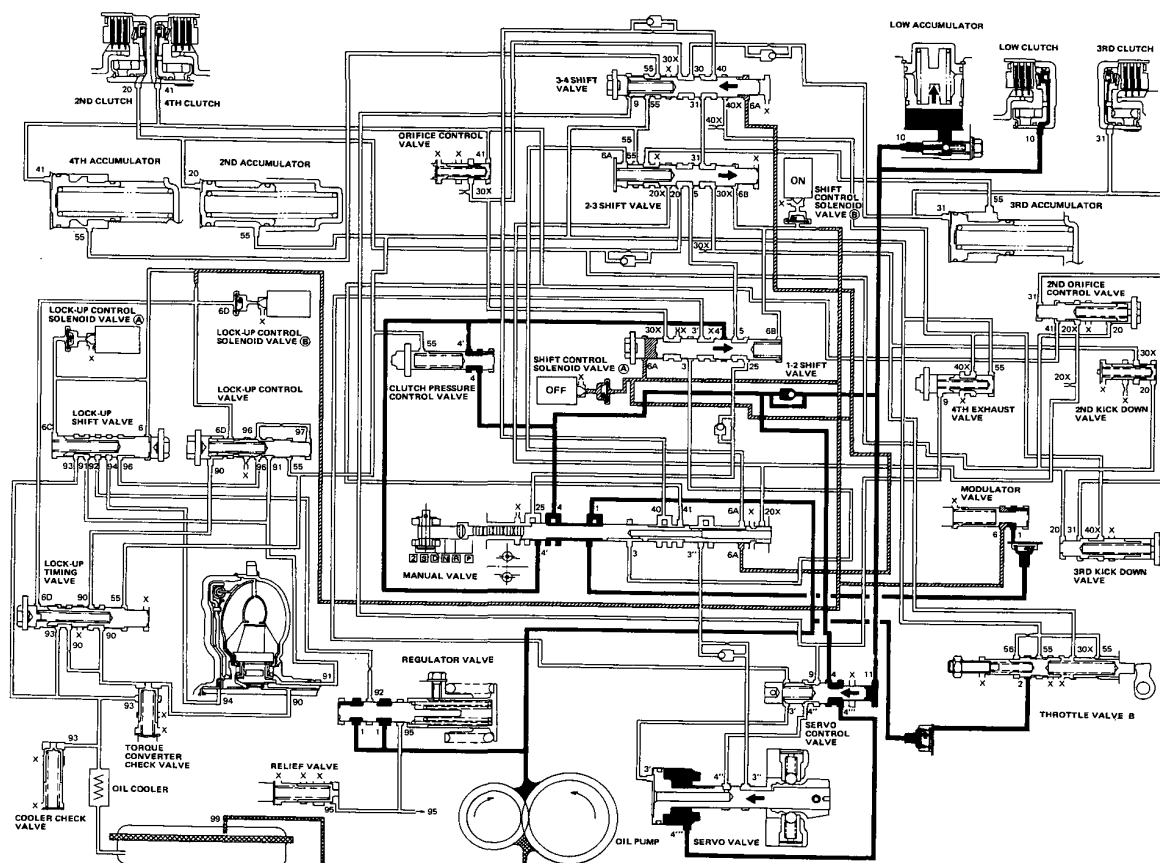
1. 1st Speed

The flow of fluid through the torque converter is the same as in **N** position.

The line pressure (1) becomes the line pressure (4) and it becomes the 1st clutch pressure (10). The 1st clutch pressure is applied to the 1st clutch and 1st accumulator, consequently the vehicle can run as the engine power is transmitted.

The line pressure (1) become the modulator pressure (6) by the modulator valve and it goes to each shift valve. The 1-2 shift valve is moved to the right side because the shift control solenoid valve A is turned off and B is on by the A/T control unit. This valve stops 2nd clutch pressure and the power is not transmitted to the 2nd clutch.

The line pressure (3) and (4) flow to the servo valve, and the line pressure (2) flows to the throttle valve B.



(cont'd)

Description

Hydraulic Flow (cont'd)

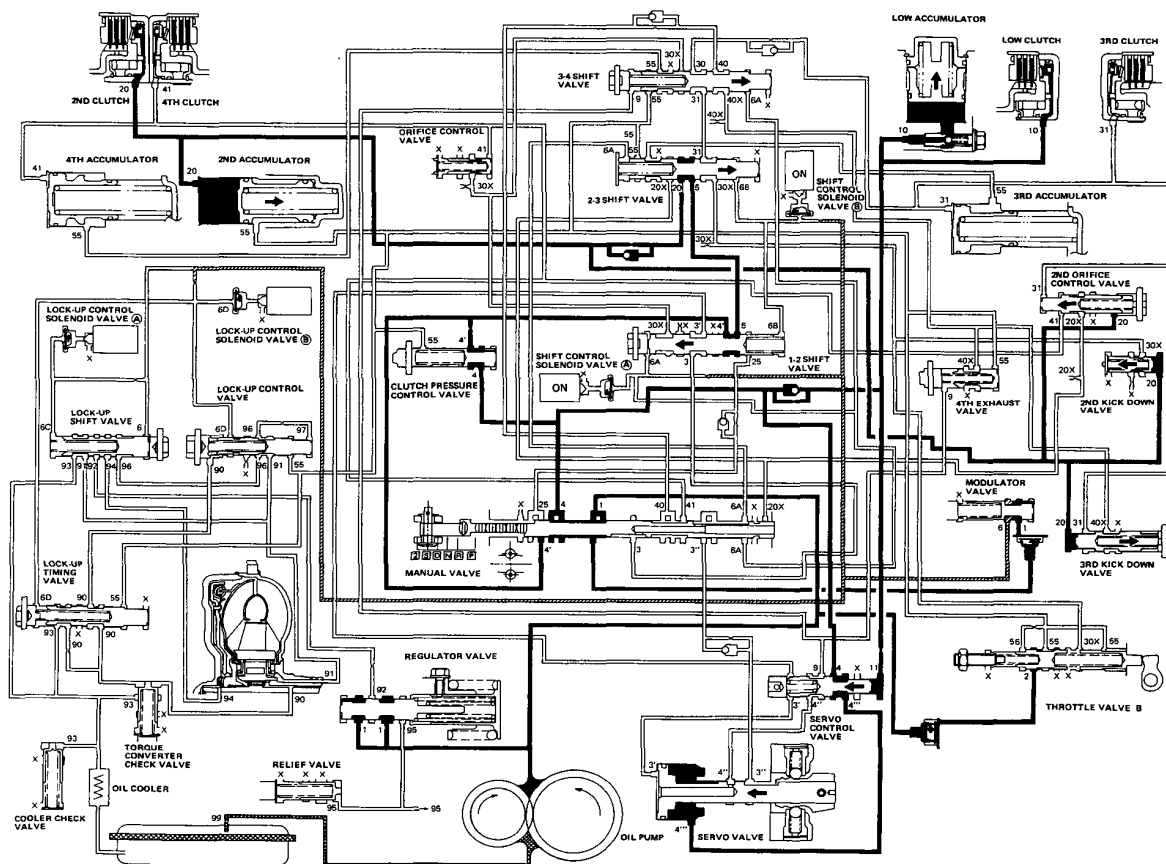
2. 2nd Speed

The flow of fluid up to the 1-2 and 2-3 shift valves is the same as in the 1st speed. When the vehicle speed is increased and reaches the prescribed value, the solenoid valve A is turned on by means of the control unit. As a result, the 1-2 shift valve is moved to the left and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged.

The fluid flows by way of:

Line Pressure (1) → Manual Valve-Line Pressure (4) → Clutch Pressure Control Valve → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-2nd Clutch Pressure → 2nd Clutch

The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one-way clutch.



Description

Hydraulic Flow (cont'd)

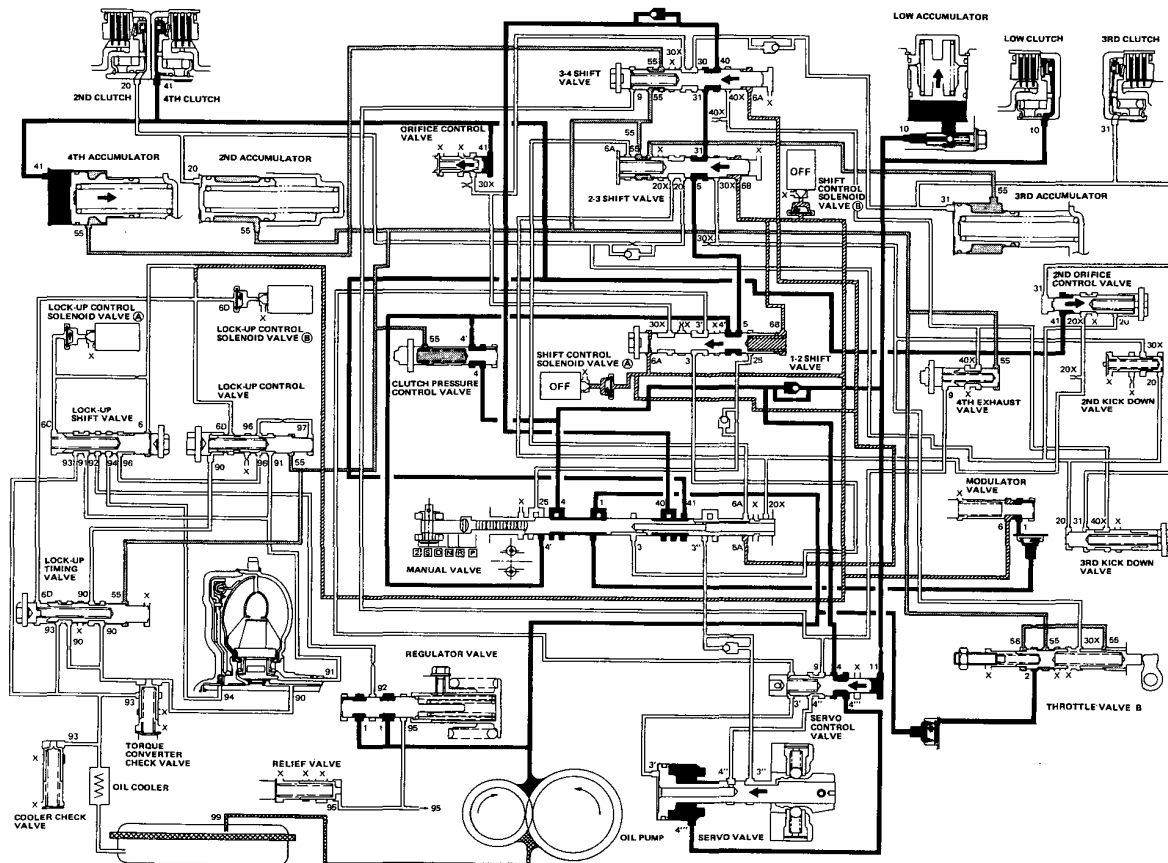
4. 4th Speed

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as in the 3rd speed. When the speed of the car reaches the prescribed value, the shift control solenoid valve A is turned off (shift control solenoid valve B remains off). As this takes place, 3-4 shift valve is moved to the left 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 the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by ways of:

Line Pressure (1) → Manual Valve-Line Pressure (4) → Clutch Pressure Control Valve → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (31) → 3-4 Shift Valve-4th Clutch Pressure (40) → Manual Valve-4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one-way clutch as in 2nd and 3rd speed.



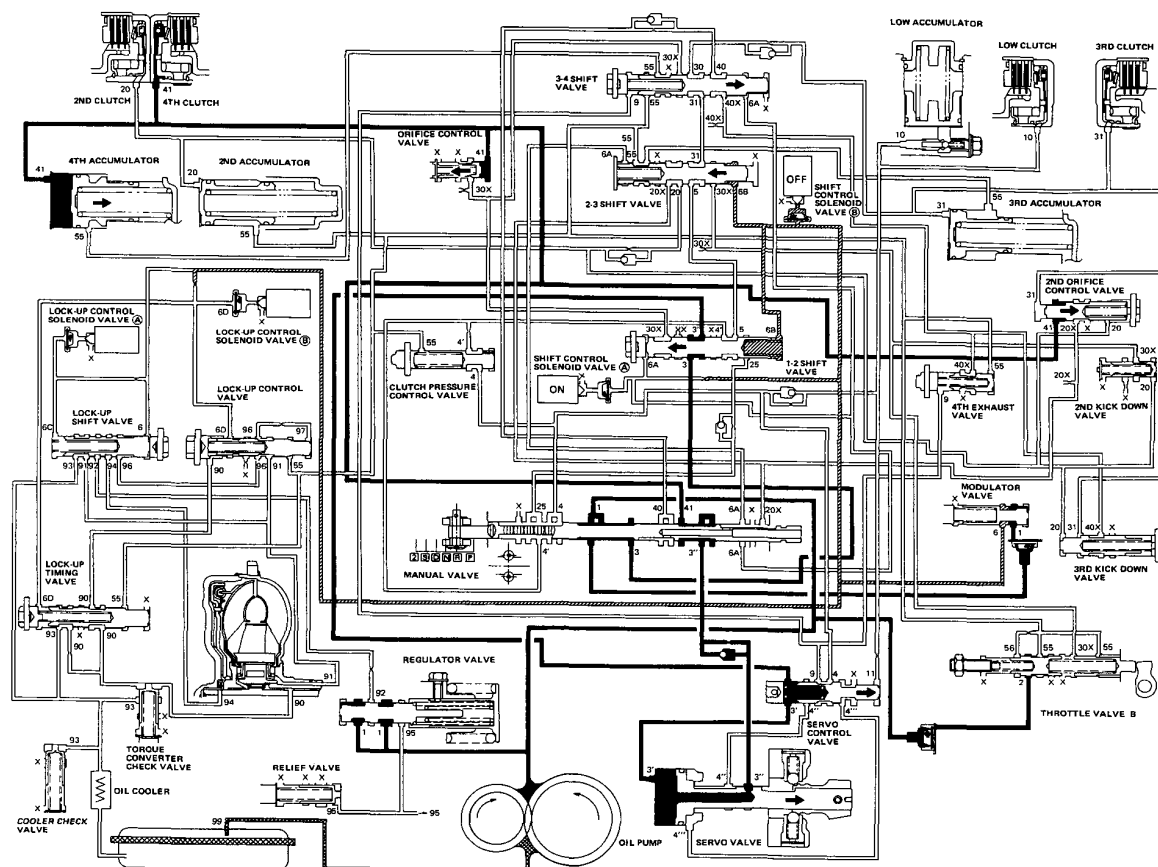


R Position

The flow of fluid through the torque converter circuit is the same as in the **N**. The fluid (1) from the oil pump flows through the manual valve and becomes the line pressure (3). It then flows through the 1-2 shift valve and servo control valve to the servo valve (3), causing the shift fork shaft to be moved in the reverse direction. Under this condition, the shift control solenoid valve on whereas the valve B is turned off as in 3rd. As a result, the 1-2 Shift valve is also moved to the left. The Fluid (3'') will flow through the servo valve and manual valve to the 4th clutch; power is transmitted through the 4th clutch.

Reverse Inhibitor Control

When the **R** position is selected while the vehicle is moving forward at a speed over 10 km/h, the control unit outputs 1st signal (A: OFF, B: ON), the 1-2 shift valve is moved to the right. The line pressure (3) is intercepted by the 1-2 shift valve, consequently the power is not transmitted as the 4th clutch and servo valve are not operated.



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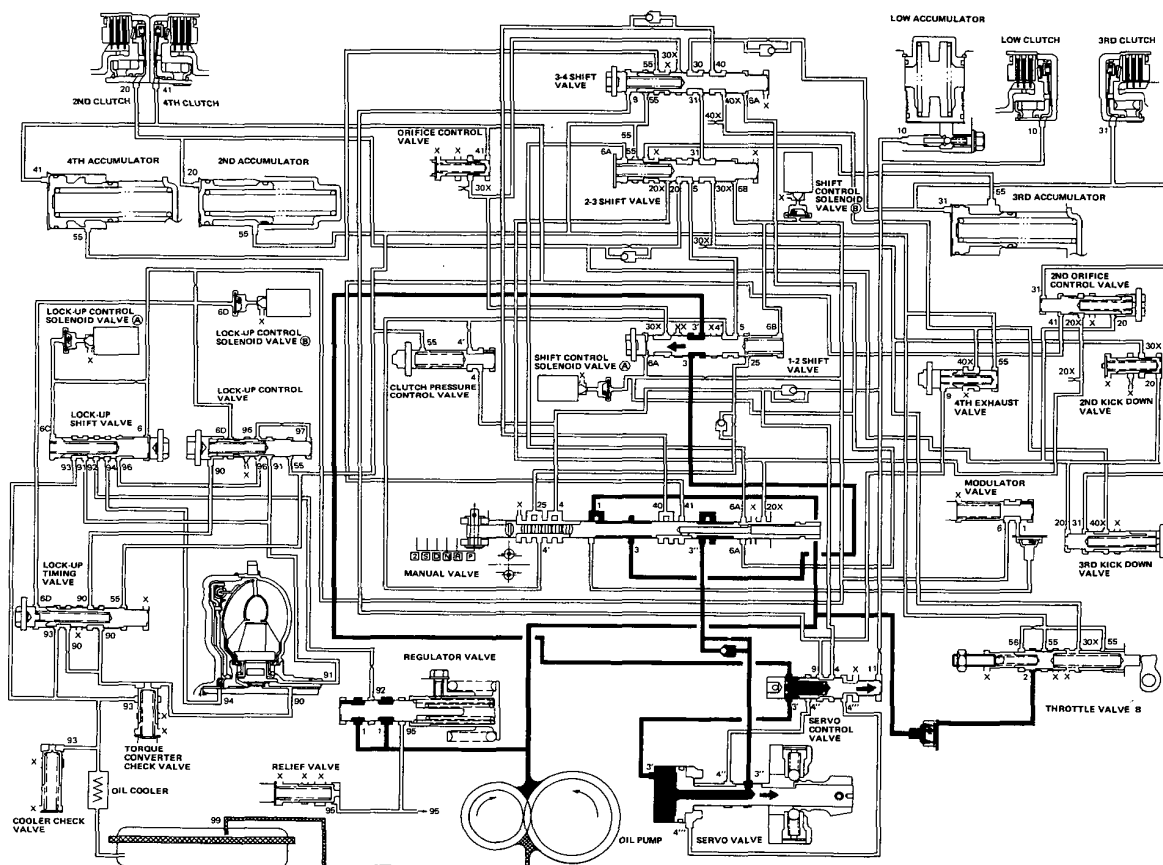
Description

Hydraulic Flow (cont'd)

P Position

The flow of fluid through the torque converter is the same in **N** position.

The line pressure (1) is intercepted by the manual valve, and is not supplied to the clutches. The power is not transmitted.

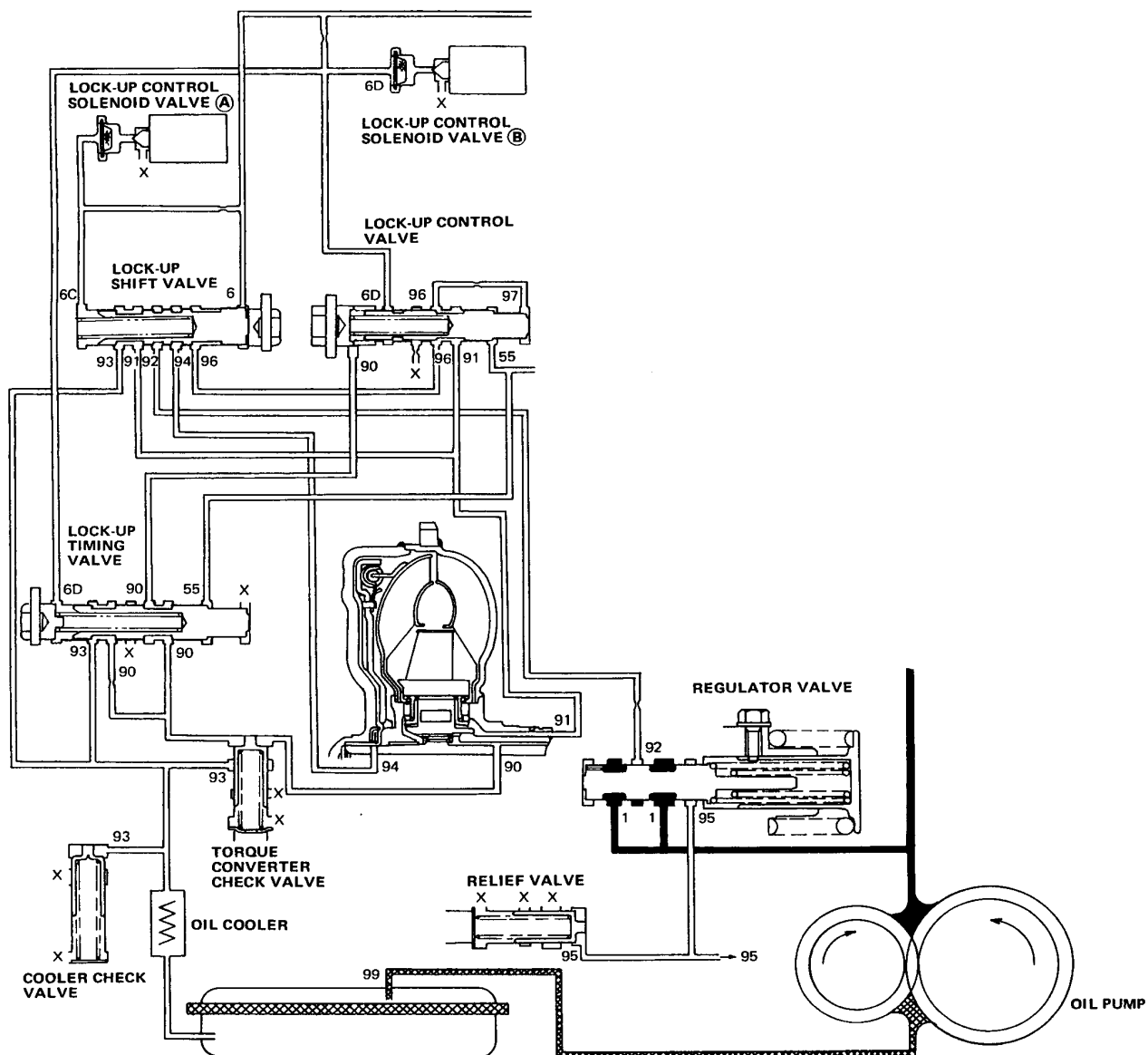




Lock-Up System

In **S4** or **D**, 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, an electronic control unit optimizes the timing of the lock-up system. Under certain condition, the lock-up operation is applied during the deceleration, in 3rd and 4th speed.

The lock-up shift valve body controls the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. 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 A/T control unit.



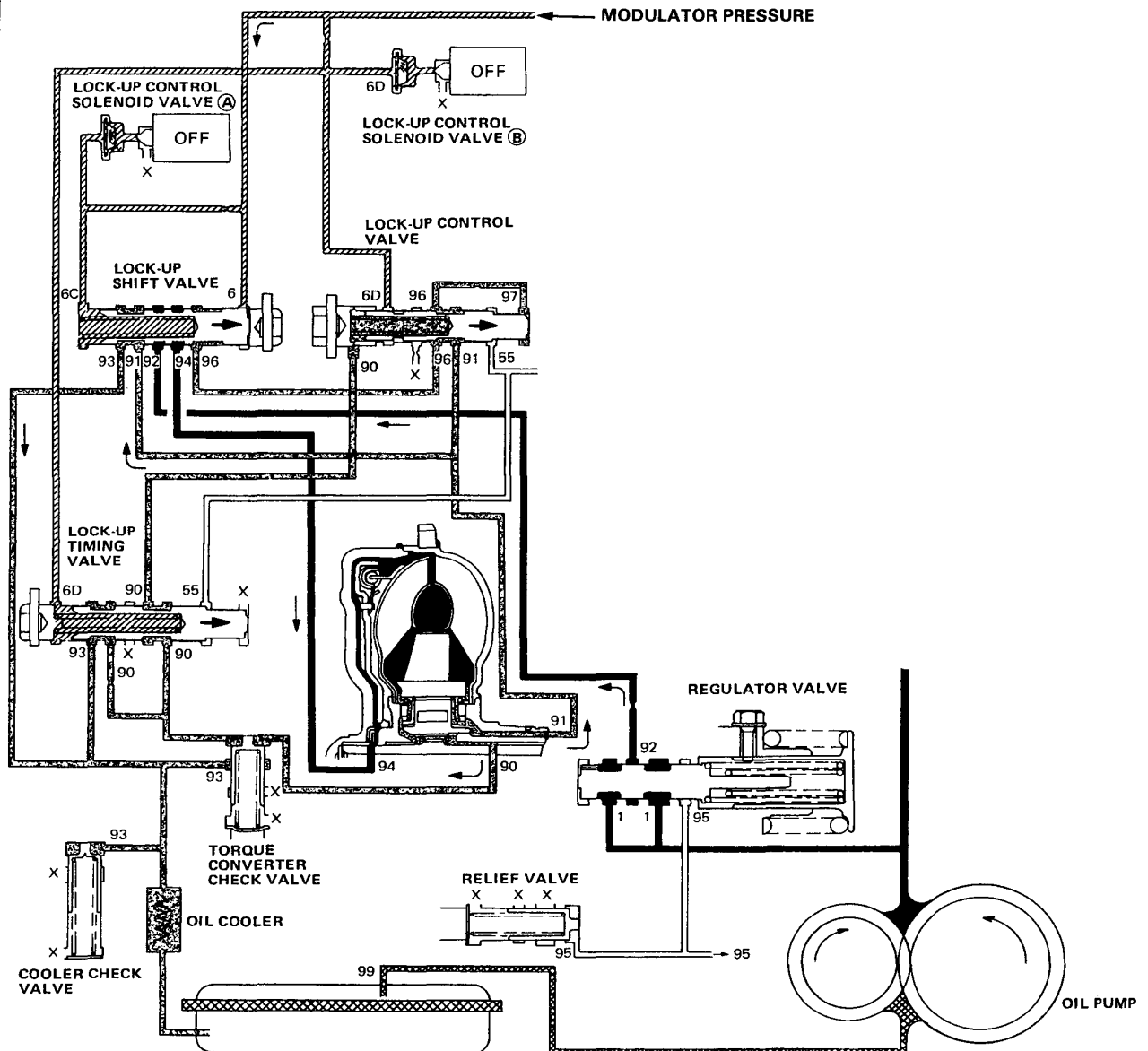
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Description

Lock-Up System (cont'd)

No Lock-Up

The pressurized 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 pressures working on both ends of the lock-up shift valve are equal, the shift valve is moved to the right 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 in OFF condition.



Description

Lock-Up System (cont'd)

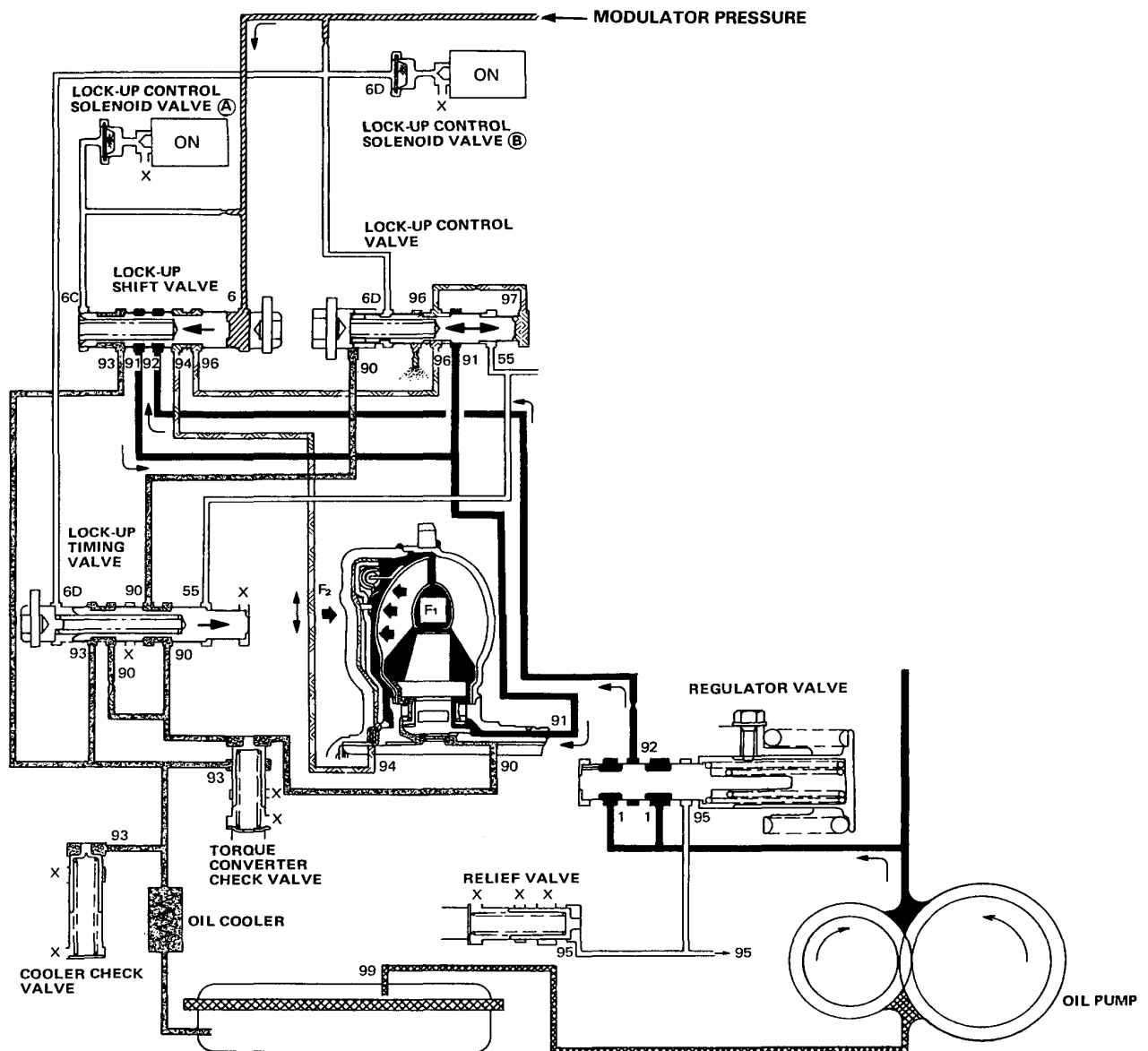
Half Lock-Up

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 valve is low. However the throttle B pressure is still low at this time, consequently the lock-up timing valve is kept on the left 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 to be engaged fully.





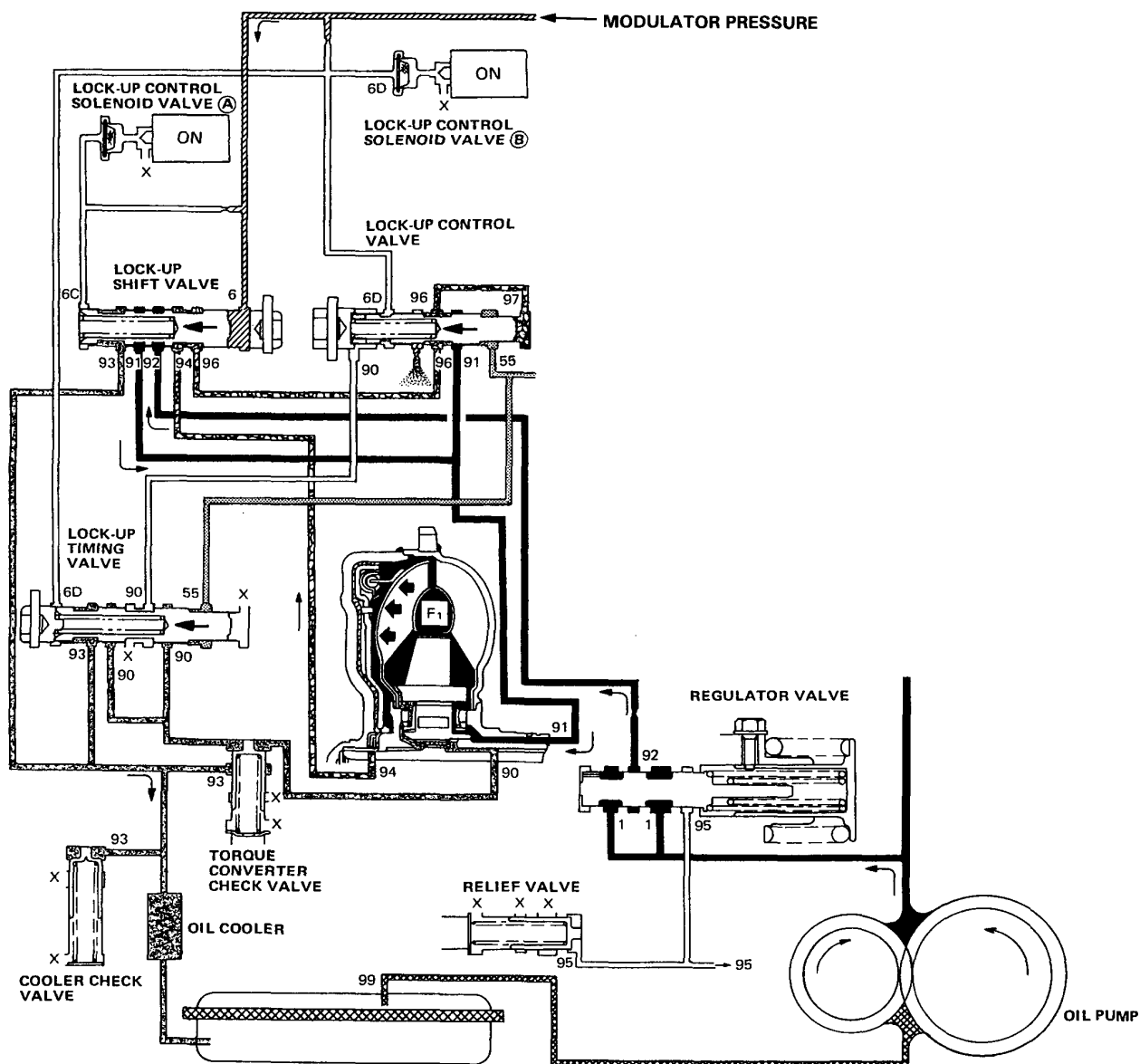
Full Lock-Up

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

When the vehicle speed further increases, the throttle valve B pressure is increased in accordance with the throttle opening.

The lock-up timing valve overcomes the spring force and moves to the right 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 end 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. As this happens, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.



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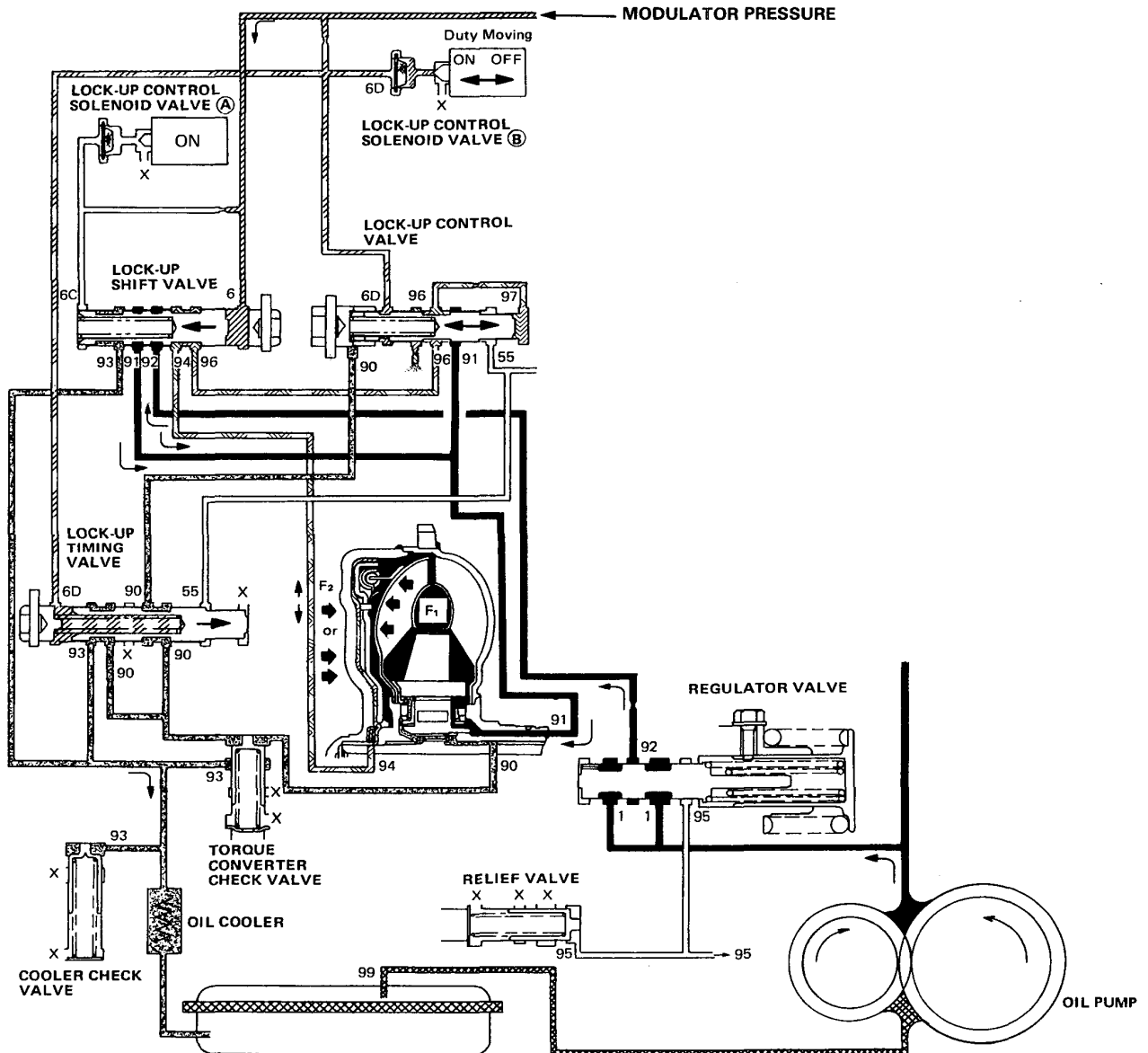
Description

Lock-Up System (cont'd)

Deceleration Lock-Up

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

The A/T control unit switches the solenoid valve B to on and off alternately in high speed under certain condition. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.





Hydraulic Control

In the hydraulic control unit, the regulator valve, manual valve and oil pump connected to the torque converter are unified and contained inside the valve body. The valve body includes the main valve body, the regulator valve body, the secondary valve body, the servo body, and the lock-up timing valve body.

The oil pump is driven by splines on the right end of 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, and servo body, directing pressure to each of the clutches.

