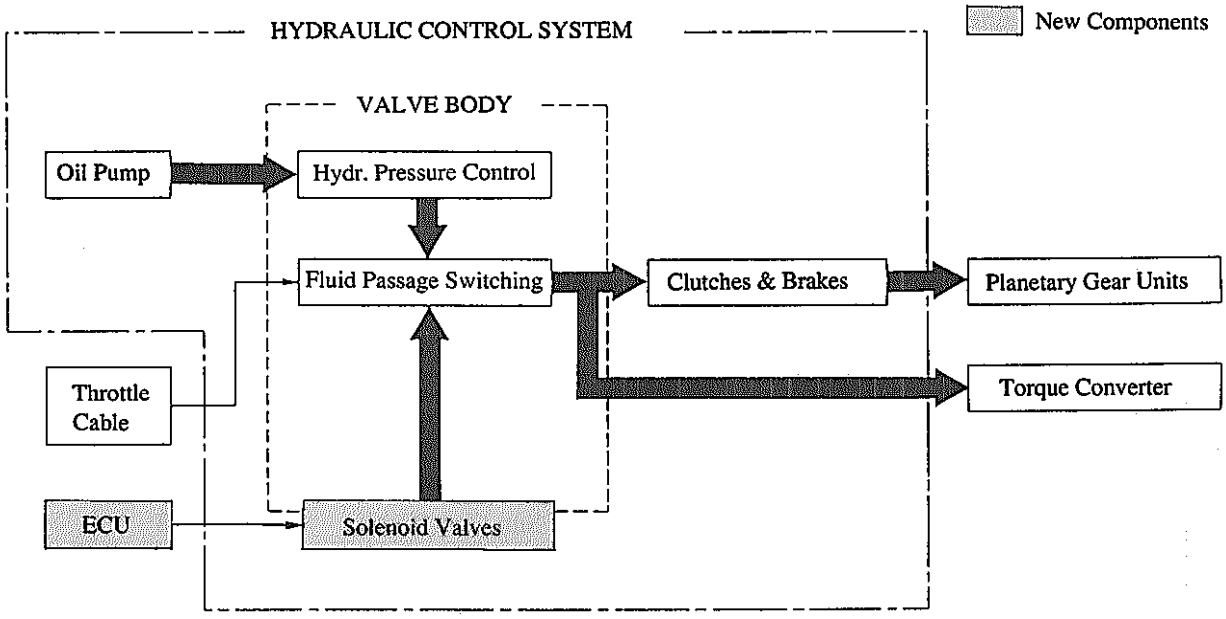
■ HYDRAULIC CONTROL SYSTEM

1. General

The hydraulic control system of the A441E automatic transmission consists of an oil pump, valve body, solenoid valves, clutches and brakes. The construction and operation of its valve body differs from the A441L in the number of solenoid valves. In addition, the governor valve has been replaced by the speed sensor which provides the vehicle speed signal (SP_2) to the ECU.



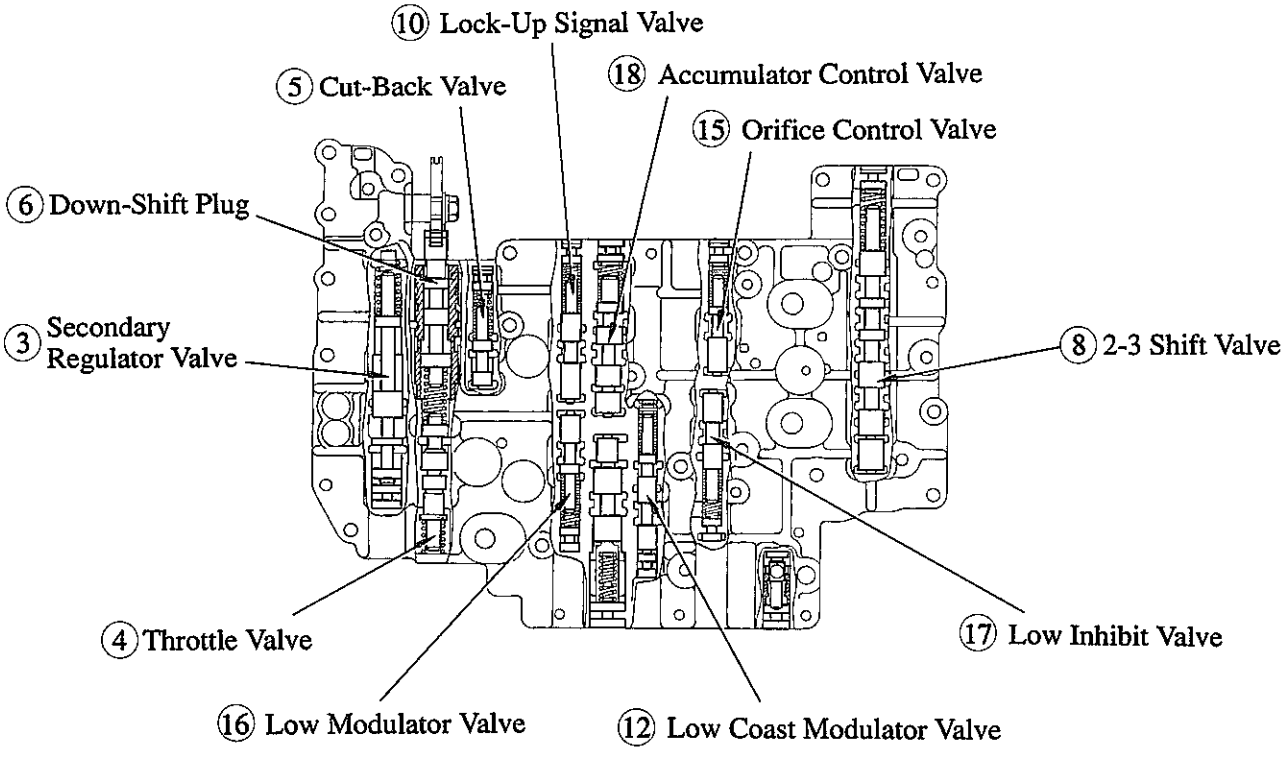
2. Valve Body

Construction

While the A441L valve body consists of 3 valve body sections, the front upper, rear upper, and lower, the A441E consists of 2 valve body sections, the upper and lower.

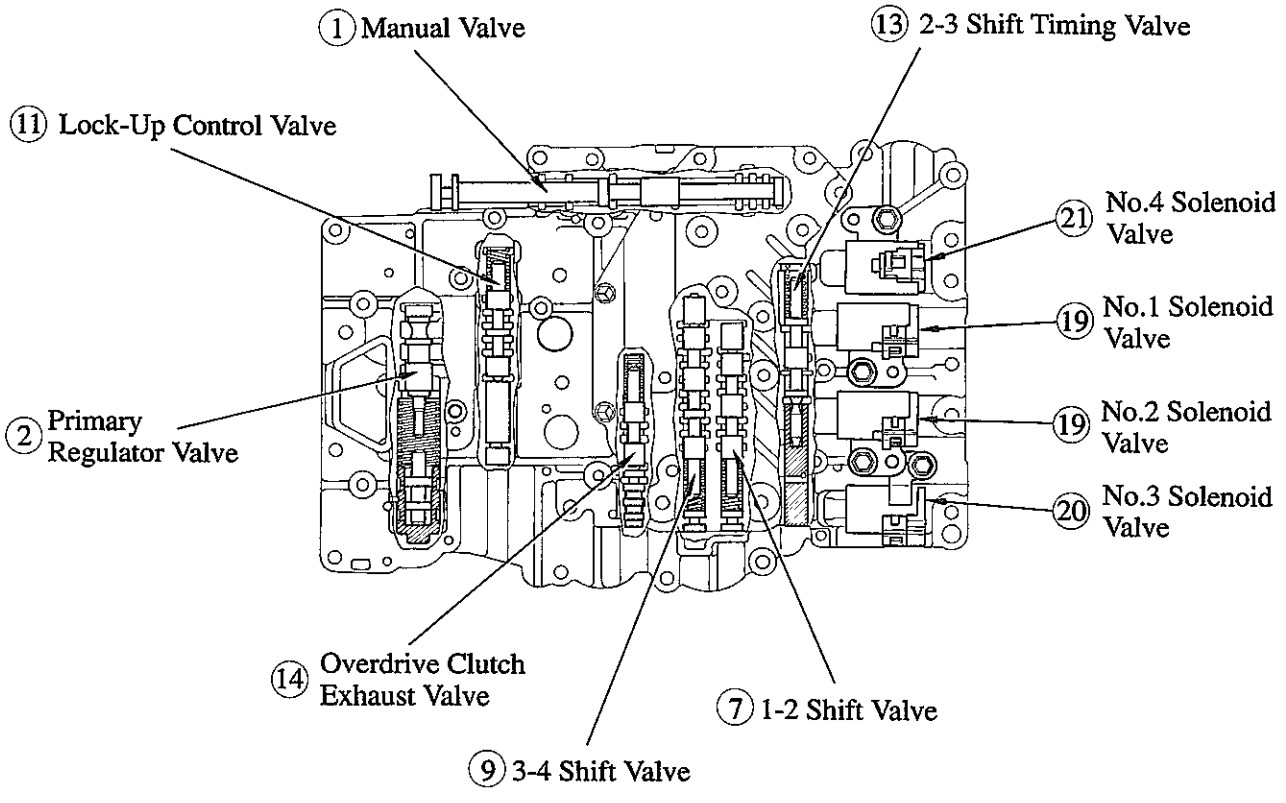
The lower valve body houses 4 solenoids which control speed changes as well as the lock-up function. The control valves in the valve body have been reduced from the previous 25 to 18, resulting in a simplified system.

▶ Upper Valve Body ◀



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▶ Lower Valve Body ◀



Function

Each valve has the following functions:

No.	Component	Function
①	Manual Valve	Switches the hydraulic circuit of the line pressure regulated by the primary regulator valve according to the transmission shift lever position.
②	Primary Regulator Valve	Regulates the hydraulic pressure generated by the oil pump to a line pressure appropriate for the engine load condition, by using the throttle modulator pressure. Under a heavy engine load condition, this valve increases the line pressure to effect a positive clutch and brake engagement. Under a light engine load, it reduces the line pressure to provide a smooth gear engagement.
③	Secondary Regulator Valve	Regulates the torque converter pressure and lubrication pressure by balancing the primary regulator valve hydraulic pressure and spring tension.
④	Throttle Valve	Generates throttle pressure, based on line pressure, depending on how much the accelerator pedal is pressed.
⑤	Cut-Back Valve	Regulates the cut-back pressure applied to the throttle valve by balancing the 1-2 shift valve line pressure and spring tension, in 2nd, 3rd and OD shift positions. The regulated cut-back pressure applied to the throttle valve reduces the throttle pressure; this prevents unnecessary power loss from the oil pump.
⑥	Down-Shift Plug	Cut-back pressure applied to this plug reduces the rotation force of the throttle cam.
⑦	1-2 Shift Valve	Allows shifting between 1st and 2nd, in conformity with the No.2 solenoid valve line pressure, while in the "D" or "2" range.
⑧	2-3 Shift Valve	Allows shifting between 2nd and 3rd, in conformity with the No.1 solenoid valve line pressure, while in the "D" range.
⑨	3-4 Shift Valve	Allows shifting between 3rd and OD, in conformity with the No.2 solenoid valve line pressure, while in the "D" range.
⑩	Lock-Up Signal Valve	Controls the line pressure applied to the lock-up control valve in conformity with the No.3 solenoid valve function.
⑪	Lock-Up Control Valve	Engages and disengages the torque converter lock-up clutch in conformity with the lock-up signal valve line pressure.
⑫	Low Coast Modulator Valve	Converts the line pressure applied to the 1st and reverse brake (B_3) to a low modulator pressure, to perform smooth gear engagement while in the "L" range.
⑬	2-3 Shift Timing Valve	Regulates the line pressure applied to the 2nd brake (B_2) by way of the 2-3 shift valve line pressure and modulator pressure, to perform smooth upshifting from 2nd to 3rd.
⑭	Overdrive Clutch Exhaust Valve	Reduces the line pressure applied to the OD clutch (C_0) by way of the 2-3 shift valve line pressure, to perform smooth downshifting from 3rd to 2nd.

No.	Component	Function
⑮	Orifice Control Valve	Regulates the line pressure applied to the 2nd brake (B_2) by way of the modulator pressure, to perform smooth upshifting from 1st to 2nd, or kickdown from 3rd to 2nd.
⑯	Low Modulator Valve	Produces modulator pressure based on the line pressure generated by the oil pump.
⑰	Low Inhibit Valve	Regulates the line pressure applied to the 2-3 valve, by way of the modulator pressure, to prevent downshifting into 2nd or 1st if the shift lever is ever engaged into "L" while driving in OD at high speeds.
⑱	Accumulator Control Valve	Reduces the accumulator control pressure applied to the back-pressure chamber of the accumulators, in conformity to the throttle pressure, so as to make the accumulators control pressure lower than the line pressure, and perform smooth gear engagement under a small throttle opening angle. However, under a large throttle opening angle, the accumulator control pressure is not lowered, but remains the same as the line pressure, to prevent the clutches and brakes from slipping.
⑲	No.1 and No.2 Solenoid Valves	Are turned on or off in conformity with Transmission ECU signals to control gear shifting.
⑳	No.3 Solenoid Valve	Are turned on and off in conformity with Transmission ECU signals to control lock-up operation.
㉑	No.4 Solenoid Valve	Are turned on and off in conformity with Transmission ECU signals to control modulator pressure.