

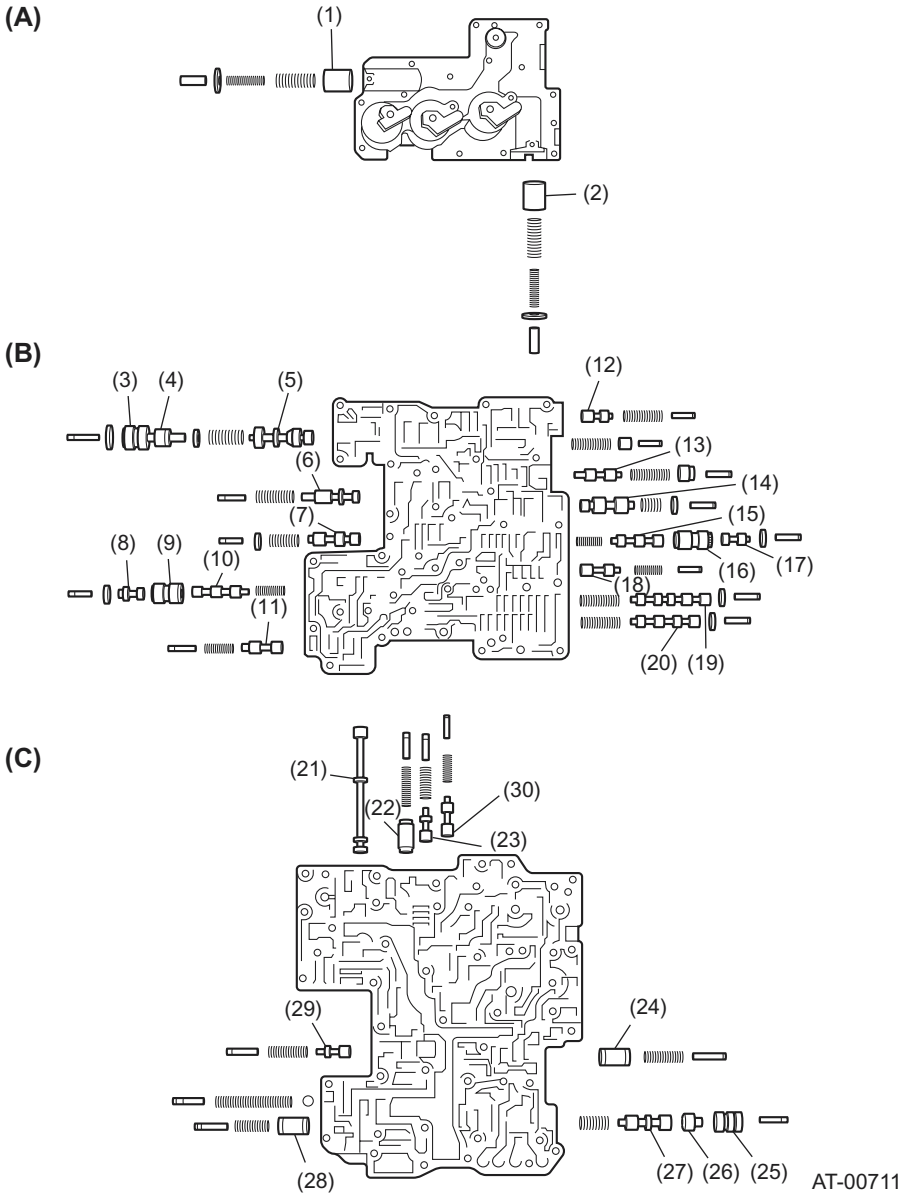
HYDRAULIC CONTROL VALVE

Automatic Transmission

8. Hydraulic Control Valve

The hydraulic control system of the automatic transmission consists of an oil pump, valve bodies containing valves, clutches, fluid passages and pipes. The operation of the system is initiated by driver's manual inputs and electric inputs from the TCM.

A: CONSTRUCTION



HYDRAULIC CONTROL VALVE

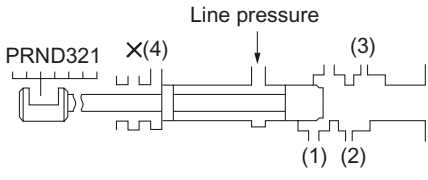
Automatic Transmission

- | | | |
|--------------------------------------|---------------------------------------|--|
| (1) High clutch accumulator piston B | (12) Torque converter regulator valve | (23) 1st reducing valve |
| (2) 2-4 brake accumulator piston B | (13) Pressure modifier valve | (24) Throttle accumulator piston A |
| (3) Pressure regulator sleeve | (14) Accumulator control valve A | (25) Lock-up control sleeve |
| (4) Pressure regulator plug | (15) Low clutch timing valve A | (26) Lock-up control plug |
| (5) Pressure regulator valve | (16) Low clutch timing sleeve A | (27) Lock-up control valve |
| (6) Reverse inhibitor valve | (17) Low clutch timing plug A | (28) Modifier accumulator piston |
| (7) Accumulator control valve B | (18) Low clutch timing valve B | (29) Pilot valve |
| (8) 2-4 brake timing plug A | (19) Shift valve B | (30) Sports shift control valve (vehicles with sports shift) |
| (9) 2-4 brake timing sleeve A | (20) Shift valve A | (A) Upper valve body |
| (10) 2-4 brake timing valve A | (21) Manual valve | (B) Middle valve body |
| (11) 2-4 brake timing valve B | (22) Throttle accumulator piston B | (C) Lower valve body |

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B: FUNCTION

| Name | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---------|-----|-----|-----|-----|-------|--|--|--|--|---|--|--|--|--|---|--|--|--|---|---|--|--|--|--|---|---|--|--|--|---|---|--|--|--|---|---|---|--|--|---|---|---|---|--|
| Pressure regulator valve | Regulates the pressure of ATF delivered from the oil pump to an optimum level (line pressure) corresponding to vehicle running conditions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pressure modifier valve | Adjusts the pressure modifier output pressure depending on the driving condition to keep the line pressure at the optimum level. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pressure modifier accumulator piston | Cushions the pressure modifier valve output pressure to remove pulsation in line pressure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Line pressure relief valve | Prevents excessive rise of the line pressure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Manual valve | <p>Allows the line pressure to the circuit corresponding to the selected range.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Circuit</th> <th style="text-align: center;">(1)</th> <th style="text-align: center;">(2)</th> <th style="text-align: center;">(3)</th> <th style="text-align: center;">(4)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Range</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">P</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">R</td> <td></td> <td></td> <td></td> <td style="text-align: center;">○</td> </tr> <tr> <td style="text-align: center;">N</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">D</td> <td style="text-align: center;">○</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">○</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td></td> </tr> </tbody> </table>  <p style="text-align: right; margin-right: 50px;">AT-00473</p> <p>When the valve is placed in the position allowing the line pressure to go nowhere, the pressure is released.</p> | Circuit | (1) | (2) | (3) | (4) | Range | | | | | P | | | | | R | | | | ○ | N | | | | | D | ○ | | | | 3 | ○ | | | | 2 | ○ | ○ | | | 1 | ○ | ○ | ○ | |
| Circuit | (1) | (2) | (3) | (4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | | | | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pilot valve | Reduces the line pressure to create a constant pressure (pilot pressure) for use in controlling the line pressure, lock-up pressure, and shifting and transfer clutch/brake pressures. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Torque converter clutch regulator valve | Prevents excessive rise of torque converter clutch pressure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lock-up control valve | Engages or disengages the lock-up clutch. Also regulates the lock-up clutch engaging pressure to prevent lock-up shocks. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shift valve A | Simultaneously changes three different ATF passages using shift solenoid 1 output pressure which varies according to such operating condition factors as vehicle speed and throttle position. In combination with shift valve B, this valve creates 1st, 2nd, 3rd, and 4th speeds. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shift valve B | Simultaneously changes three different ATF passages using shift solenoid 2 output pressure which varies according to such operating condition factors as vehicle speed and throttle position. In combination with shift valve A, this valve creates 1st, 2nd, 3rd, and 4th speeds. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low clutch timing valve A | Switches the ATF passages when the 2-4 brake pressure rises to a certain level during 3rd-to-4th upshifting in order to drain the low clutch accumulator back-pressure and to release the low clutch. This ensures smoother shifting. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low clutch timing valve B | Returns the low clutch timing valve A to the original position after 3rd-to-4th upshifting. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-4 brake timing valve A | Switches the ATF passages when the high clutch pressure rises to a certain level during 2nd-to-3rd upshifting in order to drain the 2-4 brake accumulator A back-pressure and to release the 2-4 brake. This ensures smoother shifting. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-4 brake timing valve B | Returns the 2-4 brake timing valve A to the original position after 2nd-to-3rd upshifting. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reverse inhibitor valve | Allows the ATF in the low & reverse brake circuit to drain during forward driving at a speed higher than the predetermined value, preventing shifting into the reverse even when R range is selected. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1st reducing valve | Reduces the low & reverse brake pressure so as to reduce engine braking shock when changing from the 2nd to the 1st in the 2 range. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Name | Function |
|---|---|
| Accumulator control valve A | Regulates the accumulator control A pressure (low clutch accumulator A back-pressure, high clutch accumulator A back-pressure, 2-4 brake timing control signal pressure) depending upon driving conditions. |
| Accumulator control valve B | Regulates the accumulator control B pressure (2-4 brake accumulator A back-pressure, low clutch timing control signal pressure) depending upon driving conditions. |
| Low clutch accumulator | Modulates the low clutch pressure gradually to damp shifting shocks when the low clutch is engaged and disengaged. |
| 2-4 brake accumulator A | Modulates the 2-4 brake clutch pressure gradually to damp shifting shocks when the 2-4 brake clutch is engaged and disengaged. |
| 2-4 brake accumulator B | Slows down the 2-4 brake clutch pressure increase rate during 3rd-to-4th upshifting to prevent timing variation which may occur when the low clutch timing valve A is switched (to damp shifting shocks). |
| High clutch accumulator A | Modulates the high clutch pressure gradually to damp shifting shocks when the high clutch is engaged and disengaged. |
| High clutch accumulator B | Slows down the high clutch pressure increase rate during 2nd-to-3rd upshifting to prevent timing variation which may occur when the 2-4 brake clutch timing valve A is switched (to damp shifting shocks). |
| Throttle accumulator A | Cushions the output pressure of the line pressure duty solenoid valve to remove pulsation. |
| Throttle accumulator B | Cushions the output pressure of the 2-4 brake duty solenoid valve to remove pulsation. |
| Sports shift control valve (vehicles with sports shift) | Engages the low & reverse brake when 1st speed is selected in sports shift mode. |