The linear solenoid valve (SLT) controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the duty ratio* of the SLT solenoid valve output signal to control the hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.

*: The duty ratio is the ratio of the period of continuity in one cycle.

For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then Duty Ratio=A/(A+B) x 100 (%)

---

<table>
<thead>
<tr>
<th>DTC No.</th>
<th>DTC Detection Condition</th>
<th>Troublem Area</th>
</tr>
</thead>
</table>
| P2714   | ECM detects malfunctions on SLT (ON side) according to the revolution difference between the turbine and the output shaft, and also by monitoring the oil pressure. (2 trip detection logic) | - Shift solenoid valve SLT remains open or closed  
- Shift solenoid valve S1, S2, SR, SL1 or SL2 remains open or closed  
- Valve body is blocked  
- Automatic transmission (clutch, brake or gear, etc.) |
MONITOR DESCRIPTION
The ECM calculates the amount of heat absorbed by the friction material based on the difference in revolution (clutch slippage) between the turbine and output shaft. The ECM turns on the MIL and outputs this DTC when the amount of heat absorption exceeds the specified value.

When the shift solenoid valve SLT remains on, the oil pressure goes down and the clutch engagement force decreases.

NOTE: If driving continues under these conditions, the clutch will burn out and the vehicle will no longer be drivable.

MONITOR STRATEGY

<table>
<thead>
<tr>
<th>Related DTCs</th>
<th>P2714 : Shift solenoid valve SLT/ON malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required sensors/Components (Main)</td>
<td>Shift solenoid valve SLT</td>
</tr>
<tr>
<td>Required sensors/Components (Related)</td>
<td>Valve body, ATF temperature sensor, Speed sensor (NT), Speed sensor (SP2)</td>
</tr>
<tr>
<td>Frequency of operation</td>
<td>Continuous</td>
</tr>
<tr>
<td>Duration</td>
<td>Immediate</td>
</tr>
<tr>
<td>MIL operation</td>
<td>2 driving cycles</td>
</tr>
<tr>
<td>Sequence of operation</td>
<td>None</td>
</tr>
</tbody>
</table>

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present. None

- Turbine speed sensor (NT) circuit
- Output speed sensor (SP2) circuit
- Transmission fluid temperature sensor “A” circuit
- Shift solenoid “A” (S1) circuit
- Shift solenoid “B” (S2) circuit
- Shift solenoid “E” (SR) circuit
- Pressure control solenoid “A” (SL1) circuit
- Pressure control solenoid “B” (SL2) circuit
- Pressure control solenoid “D” (SLT) circuit
- ECT (Engine coolant temperature) sensor circuit
- Knock sensor circuit
- ETCS (Electronic throttle control system) System not down
- Transmission shift position “D”
- ECT 40°C (104°F) or more
- Spark advance from max. retard timing by knock sensor control 0° CA or more
- Engine Starting
- Transfer range “High”*1
- ATF temperature 10°C (50°F) or more

*1: Following conditions are met

- Vehicle speed sensor “A” circuit Functioning normally
- Output speed sensor circuit Functioning normally
- Transfer output speed 143 rpm or more
- Transfer input speed/Transfer output speed 0.9 to 1.1

TYPICAL MALFUNCTION_THRESHOLDS

| Summation of C1 clutch heat generations = SUM (Turbine speed - Output speed x Temporary gear ratio) | Specified value |

**HINT:**
Performing the ACTIVE TEST using the intelligent tester allows components, such as the relay, VSV, and actuator, to be operated without removing any parts. Performing the ACTIVE TEST as a first step of troubleshooting is one method of shortening labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

1. Warm up the engine.
2. Turn the ignition switch off.
3. Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
4. Turn the ignition switch to the ON position.
5. Push the "ON" button of the tester.
6. Clear the DTC.
7. Select the items "DIAGNOSIS/ ENHANCED OBD II/ ACTIVE TEST/ LINE PRESS UP".
8. According to the display on the tester, perform the "ACTIVE TEST".

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE PRESS UP *</td>
<td>[Test Details] Operate the shift solenoid SLT to raise the line pressure. [Vehicle Condition]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Vehicle Stopped</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IDL: ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[HINT] OFF: Line pressure up (When the active test of &quot;LINE PRESS UP&quot; is performed the ECM commands the SLT solenoid to turn off). ON: No action (normal operation)</td>
<td></td>
</tr>
</tbody>
</table>

*: "LINE PRESS UP" in the ACTIVE TEST is performed to check the line pressure changes by connecting SST to the automatic transmission, which is used in the HYDRAULIC TEST (See page AT-16) as well.

**HINT:**
- The pressure values in ACTIVE TEST and HYDRAULIC TEST are different from each other.
- Normally, the line pressure detected in the ACTIVE TEST is approximately half of the value detected in the HYDRAULIC TEST's stall test.

### 1 CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P2714)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and push the intelligent tester main switch ON.
(c) Select the items "DIAGNOSIS/ ENHANCED OBD II/ DTC INFO/ CURRENT CODES".
(d) Read the DTCs using the intelligent tester.

**Result:**

<table>
<thead>
<tr>
<th>Display (DTC Output)</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only &quot;P2714&quot; is output</td>
<td>A</td>
</tr>
<tr>
<td>&quot;P2714&quot; and other DTCs</td>
<td>B</td>
</tr>
</tbody>
</table>

**HINT:**
If any codes besides "P2714" are output, perform troubleshooting for those DTCs first.
2 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (LINE PRESS UP) (See page AT-82)

NG Go to step 9

3 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (SHIFT)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Turn the intelligent tester ON.
(d) Clear the DTC (See page AT-31).
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
(f) Follow the instructions on the tester and perform the ACTIVE TEST.

HINT:
While driving, the shift position can be forcibly changed with the intelligent tester.

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Details</th>
<th>Diagnostic Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHIFT</td>
<td>[Test Details] Operate the shift solenoid valve and set each shift position.</td>
<td>The operation of the shift solenoid valves can be checked.</td>
</tr>
<tr>
<td>[Vehicle Condition]</td>
<td>• IDL: ON • Less than 30 mph (50 km/h)</td>
<td></td>
</tr>
<tr>
<td>[Other information]</td>
<td>• Press &quot;-&gt;&quot; button: Shift up  • Press &quot;&lt;-&quot; button: Shift down</td>
<td></td>
</tr>
</tbody>
</table>

HINT:
- This test can be conducted when the vehicle speed is 30 mph (50 km/h) or less.
- The 4th to 5th up-shift must be performed with the accelerator pedal released.
- The 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the intelligent tester.

(g) Compare the ECM gear shift command and the actual gear position.

<table>
<thead>
<tr>
<th>ECM gear shift command</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>Proceed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift solenoid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>S1 Stuck ON</td>
<td>1st</td>
<td>2nd</td>
<td>2nd</td>
<td>1st</td>
<td>N*1</td>
<td></td>
</tr>
<tr>
<td>S1 Stuck OFF</td>
<td>4th</td>
<td>3rd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
<td></td>
</tr>
<tr>
<td>Shift solenoid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>S2 Stuck ON</td>
<td>2nd</td>
<td>2nd</td>
<td>3rd</td>
<td>3rd</td>
<td>N*1</td>
<td></td>
</tr>
<tr>
<td>S2 Stuck OFF</td>
<td>1st</td>
<td>1st</td>
<td>4th</td>
<td>4th</td>
<td>5th</td>
<td></td>
</tr>
<tr>
<td>Shift solenoid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>SL2 Stuck ON</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>N*1</td>
<td></td>
</tr>
<tr>
<td>SL2 Stuck OFF</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
<td></td>
</tr>
<tr>
<td>Shift solenoid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>SR Stuck ON*2</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
<td></td>
</tr>
<tr>
<td>SR Stuck OFF</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>4th</td>
<td></td>
</tr>
</tbody>
</table>
HINT:
• *1: Neutral
• *2: Shift shock increases extremely when a malfunction occurs.
• Gear shift can be determined by paying attention to changes in rpm.

<table>
<thead>
<tr>
<th>B</th>
<th>Go to step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Go to step 6</td>
</tr>
<tr>
<td>D</td>
<td>Go to step 7</td>
</tr>
<tr>
<td>OK</td>
<td>Go to step 9</td>
</tr>
</tbody>
</table>

4. INSPECT SHIFT SOLENOID VALVE S1 (See page AT-111)

| OK | Go to step 10 |

NG

REPLACE SHIFT SOLENOID VALVE S1

5. INSPECT SHIFT SOLENOID VALVE S2 (See page AT-114)

| OK | Go to step 10 |

NG

REPLACE SHIFT SOLENOID VALVE S2

6. INSPECT SHIFT SOLENOID VALVE SL2 (See page AT-102)

| OK | Go to step 10 |

NG

REPLACE SHIFT SOLENOID VALVE SL2

7. INSPECT SHIFT SOLENOID VALVE SR (See page AT-118)

NG

REPLACE SHIFT SOLENOID VALVE SR
8 INSPECT SHIFT SOLENOID VALVE SL1 (See page AT-77)

(a) Remove the shift solenoid valve SLT.
(b) Measure the resistance.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>5.0 to 5.6 Ω at 20°C (68°F)</td>
</tr>
</tbody>
</table>

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:
The solenoid makes an operating noise.

NG  REPLACE SHIFT SOLENOID VALVE SLT

9 INSPECT SHIFT SOLENOID VALVE SLT

(a) Remove the shift solenoid valve SLT.
(b) Measure the resistance.

Standard resistance

<table>
<thead>
<tr>
<th>Tester Connection</th>
<th>Specified Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>5.0 to 5.6 Ω at 20°C (68°F)</td>
</tr>
</tbody>
</table>

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:
The solenoid makes an operating noise.

NG  REPLACE SHIFT SOLENOID VALVE SLT

10 INSPECT TRANSMISSION VALVE BODY ASSEMBLY (See chapter 2 in the problem symptoms table)

OK:
There are no foreign objects on any valves and they operate smoothly.

NG  REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK
# 11 INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY

(a) Check the torque converter clutch assembly (See page AT-169).

**OK:**
- The torque converter clutch operates normally.

**NG**
- REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY

---

**OK**

---

**REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**