

<b>DTC</b>	<b>P0776</b>	<b>Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)</b>
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## DESCRIPTION

The ECM uses signals from the output shaft speed sensor and input speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC No.	DTC Detection Conditions	Trouble Areas
P0776	SL2 stuck ON malfunction*1: The ECM determines that there is a malfunction when the following conditions are met (2-trip detection logic): (a) When the ECM directs the gearshift to switch to 4th gear, the actual gear is also shifted to 4th. (b) When the ECM directs the gearshift to switch to 5th gear, the engine overruns (clutch slips)	<ul style="list-style-type: none"> <li>• Shift solenoid valve SL2 remains open</li> <li>• Shift solenoid valve SLT remains open or closed</li> <li>• Valve body is blocked</li> <li>• Automatic transmission (clutch, brake or gear, etc.)</li> </ul>

## HINT:

Gear positions in the event of a solenoid valve mechanical problem:

Gearshift controlled by ECM	1st	2nd	3rd	4th	5th
*1: Actual gear position under SL2 stuck ON malfunction	1st	2nd	3rd	4th	N*

N\*: Neutral

## MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" of the shift solenoid valve SL2.

The ECM controls the gearshifts by turning the shift solenoid valves "ON/OFF". When the gear position directed by the ECM and the actual gear position do not match, the ECM illuminates the MIL and stores the DTC.

## MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/ON malfunction
Required sensors/Components (Main)	Shift solenoid valve SL2
Required sensors/Components (Related)	Speed sensor (NT), Speed sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	ON malfunctions (A), (B) and (C): 0.4 seconds ON malfunction (D): 3 seconds ON malfunction (E): 0.5 seconds
MIL operation	2 driving cycles
Sequence of operation	None

## TYPICAL ENABLING CONDITIONS

The following conditions are common to all ON malfunctions (A), (B), (C), (D) and (E).

The monitor will run whenever the following DTCs are not present.	P0115 - P0118: ECT sensor P0125: Insufficient ECT for Closed Loop P0500: VSS P0748 - P0799: Trans solenoid (range)
Turbine speed sensor (NT) circuit	Functioning normally
Output speed sensor (SP2) circuit	Functioning normally
Shift solenoid "A" (S1) circuit	Functioning normally

Shift solenoid "B" (S2) circuit	Functioning normally
Shift solenoid "E" (SR) circuit	Functioning normally
Pressure control solenoid "A" (SL1) circuit	Functioning normally
Pressure control solenoid "B" (SL2) circuit	Functioning normally
ECT (Engine coolant temperature) sensor circuit	Functioning normally
Knock sensor circuit	Functioning normally
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

\*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

### ON malfunction (A)

ECM selected gear	1st
Vehicle speed	1.2 to 24.9 mph (2 to 40 km/h)
Throttle valve opening angle	6.5 % or more at engine speed of 2,000 rpm (Conditions vary with engine speed)

### ON malfunction (B)

ECM selected gear	3rd
Vehicle speed	1.2 mph (2 km/h) or more
Throttle valve opening angle	6.5 % or more at engine speed of 2,000 rpm (Conditions vary with engine speed)

### ON malfunction (C)

ECM selected gear	4th
Vehicle speed	1.2 mph (2 km/h) or more
Throttle valve opening angle	6.5 % or more at engine speed of 2,000 rpm (Conditions vary with engine speed)

### ON malfunction (D)

Current ECM selected gear	5th
Last ECM selected gear	4th
Vehicle speed (During transition from 4th to 5th gear)	Less than 62.2 mph (100 km/h)

### ON malfunction (E)

ECM selected gear	5th
Engine speed - Turbine speed (NE - NT) (After transition from 4th to 5th gear)	150 rpm or less
Vehicle speed (After transition from 4th to 5th gear)	Less than 62.2 mph (100 km/h)

## TYPICAL MALFUNCTION THRESHOLDS

[ON malfunction]

Both of the following conditions are met:

- ON malfunctions (A) and (B), or ON malfunction (C)

- ON malfunction (D) or (E)

**ON malfunction (A)**

Turbine speed/Output speed	3.30 to 7.50 (Actual gear is 1st)
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**ON malfunction (B)**

Turbine speed/Output speed	1.28 to 1.53 (Actual gear is 3rd)
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**ON malfunction (C)**

Turbine speed/Output speed	0.93 to 1.07 (Actual gear is 4th)
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**ON malfunction (D)**

Turbine speed - Output speed x 4th gear ratio	1,000 rpm or more
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**ON malfunction (E)**

Turbine speed - Output speed x 5th gear ratio	1,000 rpm or more
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**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/ SHIFT".
8. According to the display on the tester, perform the "ACTIVE TEST".

**HINT:**

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

Comparing the shift position directed by the ACTIVE TEST with the actual shift position enables the problem to be confirmed (See page AT-32).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set each shift position manually. [Vehicle Condition] Vehicle Speed: Less than 30 mph (50 km/h) [Others] • Press → button: Shift up • Press ← button: Shift down	Possible to check the operation of the shift solenoid valves. HINT: Shifting to the 5th gear is possible only when the vehicle is stationary with the engine idling.

**HINT:**

- This test can be conducted when the vehicle speed is 30 mph (50 km/h) or less.
- The 4th to 5th up-shifting must be performed with the accelerator pedal released.
- The 5th to 4th down-shifting 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 directed by the ECM is shown in the DATA LIST/ SHIFT display on the intelligent tester.
- The shift solenoid valve SL2 is turned on/off normally when the shift lever is in the D position:

Gearshift controlled by ECM	1st	2nd	3rd	4th	5th
Shift solenoid valve SL2	ON	ON	ON	ON	OFF

AT

AT

**1 CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0776)**

- (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:**

Display (DTC Output)	Proceed to
Only "P0776" is output	A
"P0776" and other DTCs	B

**HINT:**

If any codes besides "P0776" are output, perform troubleshooting for those DTCs first.

**B** → **GO TO DTC CHART**

**A**

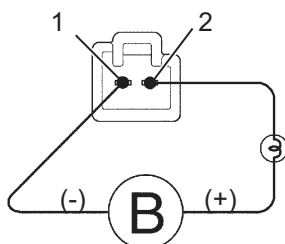
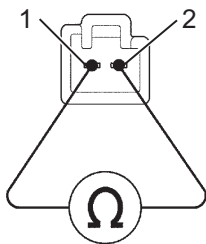
**2 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (LINE PRESS UP) (See page AT-82)**

**NG** → **REPLACE SHIFT SOLENOID VALVE SLT**

**OK**

**3 INSPECT SHIFT SOLENOID VALVE SL2**

**Shift Solenoid Valve SL2:**



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- (a) Remove the shift solenoid valve SL2.
- (b) Measure the resistance.

**Standard resistance**

Tester Connection	Specified Condition
1 - 2	5.0 to 5.6 Ω at 20°C (68°F)

- (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 SL2**

OK

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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

REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY

AT