

<b>DTC</b>	<b>P0751</b>	<b>Shift Solenoid "A" Performance (Shift Solenoid Valve S1)</b>
------------	--------------	---------------------------------------------------------------------

## SYSTEM 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 Condition	Trouble Area
P0751	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>Shift solenoid valve S1 remains open or closed</li> <li>Valve body is blocked</li> <li>Automatic transmission (clutch, brake or gear, etc.)</li> </ul>

## MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S1. The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

## MONITOR STRATEGY

Related DTCs	P0751	Shift solenoid valve S1/OFF malfunction
		Shift solenoid valve S1/ON malfunction
Required sensors/Components	Main	Shift solenoid valve S1
	Sub	Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous	
Duration	OFF malfunction (A) and (B)	0.4 sec.
	OFF malfunction (C)	Immediate
	ON malfunction (A), (B) and (C)	0.4 sec.
	ON malfunction (D)	3 sec.
	ON malfunction (E)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>All:</b>		
Turbine speed sensor circuit	Not circuit malfunction	
Output speed sensor circuit	Not circuit malfunction	
Shift solenoid valve S1 circuit	Not circuit malfunction	
Shift solenoid valve S2 circuit	Not circuit malfunction	
Shift solenoid valve SR circuit	Not circuit malfunction	
Shift solenoid valve SL1 circuit	Not circuit malfunction	

Shift solenoid valve SL2 circuit	Not circuit malfunction	
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction	
KCS sensor circuit	Not circuit malfunction	
ETCS (Electric throttle control system)	Not system down	
Transmission range	"D"	
ECT	40° C (104° F) or more	—
Spark advance from Max. retard timing by KCS control	0° CA or more	—
Engine	Starting	
Transfer range	"HIGH"*1	
Transfer range "HIGH" *1 (This condition is applied only 4WD)		
*1 Following conditions met		
Vehicle speed sensor circuit	Not circuit malfunction	
Output shaft speed sensor circuit	Not circuit malfunction	
Transfer output speed	143 rpm or more	—
NO/NOTf (Transfer input speed/Transfer output speed)	0.9 to 1.1	
OFF malfunction (A)		
ECM selected gear	1st	
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)	
Throttle valve opening angle	8% or more and 7.0% or more at 2,000 rpm (Conditions vary with engine speed)	—
OFF malfunction (B)		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Continuous time for ECM selecting 4th gear	2 sec. or more	—
Actual gear when ECM selected 4th gear	4th	
OFF malfunction (C)		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
ON malfunction (A)		
ECM selected gear	1st	
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)	
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)	—
ON malfunction (B)		
ECM selected gear	4th	
Vehicle speed	2 km/h (1.2 mph) or more	—
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)	—
ON malfunction (C)		
ECM selected gear	3rd	
Vehicle speed	2 km/h (1.2 mph) or more	—

Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)	–
<b>ON malfunction (D)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Vehicle speed (During transition from 4th to 5th gear)	–	Less than 100 km/h (62.2 mph)
<b>ON malfunction (E)</b>		
ECM selected gear	5th	
Engine speed – Turbine speed (NE – NT) (After transition from 4th to 5th gear)	–	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	–	Less than 100 km/h (62.2 mph)

## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>[OFF malfunction]</b>	
<b>All of the following conditions are met: Conditions (A), (B) and (C)</b>	
2 detections are necessary per driving cycle 1st detection; temporary flag ON 2nd detection; pending fault code ON	
<b>OFF malfunction (A)</b>	
Turbine speed/Output speed	0.93 to 1.07
<b>OFF malfunction (B)</b>	
Turbine speed/Output speed	0.65 to 0.79
<b>OFF malfunction (C)</b>	
Output record from ECM for 4th → 5th upshifting	Recorded
<b>[ON malfunction]</b>	
<b>Either of the following conditions is met:</b> • ON malfunction (A) and (B) • ON malfunction (B) or (C), and ON malfunction (D) or (E)	
<b>ON malfunction (A) and (B)</b>	
Turbine speed/Output speed	3.30 to 7.50
<b>ON malfunction (C)</b>	
Turbine speed/Output speed	1.91 to 2.35
<b>ON malfunction (D)</b>	
Turbine speed – Output speed x 4th gear ratio (NT – NO x 4th gear ratio)	1,000 rpm or more
<b>ON malfunction (E)</b>	
Turbine speed – Output speed x 5th gear ratio (NT – NO x 5th gear ratio)	1,000 rpm or more

## INSPECTION PROCEDURE

### HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

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

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

### HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (See page [DI-1150](#)).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

### HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings 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 hand-held tester.
- The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve S1	ON	ON	OFF	OFF	OFF

<b>1</b>	<b>Check other DTCs output (in addition to DTC P0751).</b>
----------	------------------------------------------------------------

**PREPARATION:**

- (a) Turn the ignition switch off.
- (b) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position.
- (d) Turn on the tester.
- (e) Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".

**CHECK:**

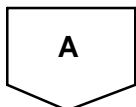
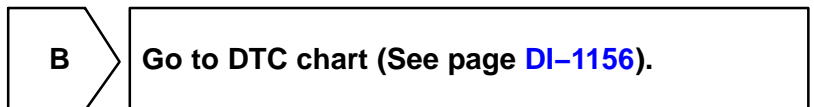
Read the DTCs using the OBD II scan tool or the hand-held tester.

**RESULT:**

Display (DTC output)	Proceed to
Only "P0751" is output	A
"P0751" and other DTCs	B

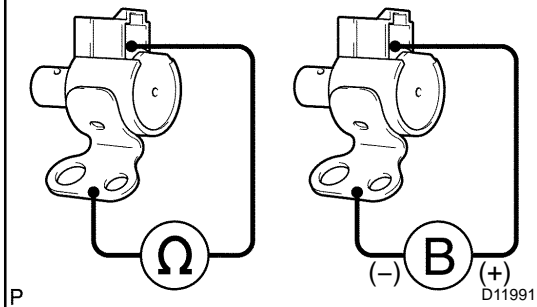
**HINT:**

If any other codes besides "P0751" are output, perform troubleshooting for those DTCs first.



## 2 Check shift solenoid valve S1 operation.

Shift solenoid S1:

**PREPARATION:**

Remove the shift solenoid valve S1 (See page [AT-12](#)).

**CHECK:**

Measure the resistance according to the value(s) in the table below.

**OK:**

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S1) – Solenoid Body (S1)	11 to 15 Ω

**CHECK:**

Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (–) lead to the solenoid body.

**OK:**

The solenoid makes an operating sound.

NG

Replace shift solenoid valve S1  
(See page [AT-12](#)).

OK

## 3 Inspect valve body (See page [AT-12](#)).

**OK:**

There are no foreign objects on each valve.

NG

Repair or replace valve body.

OK

Repair or replace transmission (See page [AT-34](#)).