DTC	P0751	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and crankshaft position sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect the mechanical problems of the shift solenoid valves, the valve body or automatic transaxle (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)	• Shift solenoid valve S1 remains open or closed • Valve body is blocked • Shift solenoid valve S1 • Automatic transaxle (clutch, brake or gear etc.) • ECM

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution, and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or O/D gear position). When the gear position commanded by the ECM and the actual gear position are not 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	Shift solenoid valve S1
Frequency of operation	Continuous
Duration	0.065 sec.
MIL operation	2 driving cycles
Sequence of operation	None

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TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0500 (VSS) P0751, P0756 (Shift solenoid valve (range))
ECT (Engine coolant temperature)	55°C (131°F) or more and Less than 105°C (221°F)
IAT (only for malfunction)	-10°C (14°F) or more and Less than 70°C (158°F)
Transmission range	"D"
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
Battery voltage	10 V or more
Spark retard by KCS control	0° CA or more

OFF malfunction (A):

ECM selected gear	1st
Throttle valve opening angle	30% or more

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OFF malfunction (B):

Current ECM selected gear	2nd
Last ECM selected gear	1st
Throttle valve opening angle	7% or more
Closing change of throttle valve opening angle	-5% or more and Less than 5%
TH last - TH current TH last: Throttle valve opening angle at last ECM selected gear TH current: Throttle valve opening angle at current ECM selected gear	-20% or more and Less than 20%

OFF malfunction (C), (D) and (E):

Engine idling	OFF
Braking	OFF
ECM selected gear	2nd
Throttle valve opening angle	7% or more and Less than 60%

OFF malfunction (F) and (G):

Engine idling	OFF
Braking	OFF
ECM selected gear	3rd
Throttle valve opening angle	5% or more and Less than 60%

OFF malfunction (H) and (I):

Engine idling	OFF
Braking	OFF
ECM selected gear	4th
Throttle valve opening angle	5% or more and Less than 60%

OFF malfunction (J):

Engine idling	ON
Braking	ON
Throttle valve opening angle (ECM selected gear 2nd)	65% or more or Less than 5%
Throttle valve opening angle (ECM selected gear 3rd)	65% or more or Less than 3%
Throttle valve opening angle (ECM selected gear 4th)	65% or more or Less than 3%
TH current - TH2ndstep TH current: Throttle valve opening angle at current ECM selected gear TH2ndstep: Throttle valve opening angle at 2nd judgment step	Less than -10% or 10% or more
Closing change of throttle valve opening angle	Less than -10% or 10% or more

ON malfunction:

ECM selected gear	4th
Throttle valve opening angle	12% or more and Less than 35%

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

There are 2 judgment steps/driving cycle
1st judgment step: when following conditions met, temporary flag becomes ON.
OFF malfunction (A) or (B)
It is necessary 2 judgments/driving cycle
2nd judgment step: when following conditions met, pending fault code becomes ON.
(OFF malfunction (E) and (G) and (H)) or (OFF malfunction (C) and (D) and (F) and (I))

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OFF malfunction (A):

Engine speed	Less than 2 x NO + 1,300 rpm NO: Transmission output speed

OFF malfunction (B):

NE last - NE current NE last: Engine speed at last ECM selected gear NE current: Engine speed at current ECM selected gear	Less than 512.5 rpm at throttle valve opening angle 40% (condition vary with throttle valve opening angle)

OFF malfunction (C):

Engine speed	Less than 1st gear ratio x NO + 50 rpm NO: Transmission output speed

OFF malfunction (D):

Engine speed	2nd gear ratio x NO + 50 rpm or more or Less than 2nd gear ratio x NO - 50 rpm NO: Transmission output speed

OFF malfunction (E) and (F):

Engine speed	Less than 3rd gear ratio x NO + 50 rpm and 3rd gear ratio x NO - 50 rpm or more NO: Transmission output speed

OFF malfunction (G):

Engine speed	4th gear ratio x NO + 50 rpm or more or Less than 4th gear ratio x NO - 50 rpm NO: Transmission output speed

OFF malfunction (H):

Engine speed	3rd gear ratio x NO + 50 rpm or more or Less than 3rd gear ratio x NO - 50 rpm NO: Transmission output speed

OFF malfunction (I):

Engine speed	Less than 4th gear ratio x NO + 50 rpm and 4th gear ratio x NO - 50 rpm or more NO: Transmission output speed

OFF malfunction (J):

When one of following secondary parameter conditions met, 2nd judgment is stopped.	(See secondary parameters and condition)

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[ON malfunction]
ON malfunction:

Engine speed	2 x NO + 1,300 rpm or more NO: Transmission output speed

INSPECTION PROCEDURE

HINT:
Performing the ACTIVE TEST using the intelligent 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.

1. PERFORM ACTIVE TEST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the on position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / ACTIVE TEST / SHIFT".
(g) According to the display on the tester, perform the "ACTIVE TEST".

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

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Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (See page AX-27).

Tester Display	Test Part	Control Range	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	1st/2nd/3rd/4th	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 shift position commanded by the ECM is shown in the DATA LIST/SHIFT display on the intelligent tester.

1 CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0751)

(a) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the on position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent 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 the troubleshooting for those DTCs first.

B → **GO TO RELEVANT DTC CHART**

A

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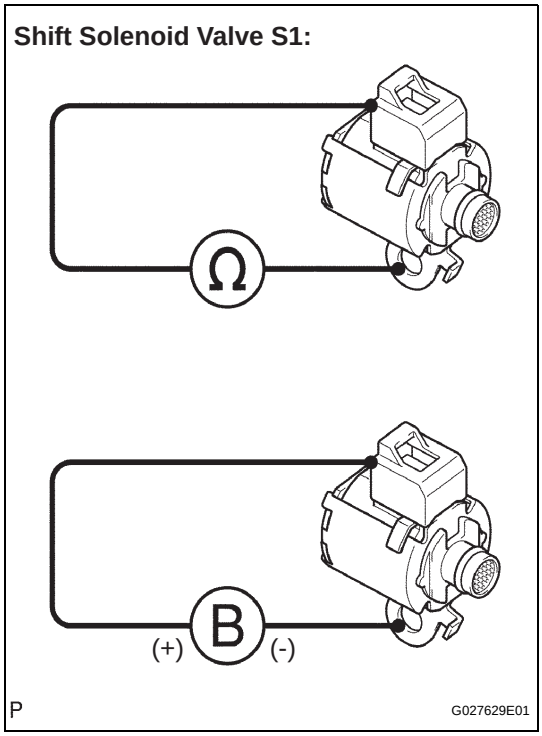
2 INSPECT SHIFT SOLENOID VALVE (S1)



(a) Remove the shift solenoid valve S1.

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

Standard resistance

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

(c) 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)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSEMBLY

OK:

There are no foreign objects on each valve and they operate smoothly.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSEMBLY

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