

PRODEMAND

YMMS: 2006 Lexus GS 300
 Engine: 3.0L Eng
 VIN:

May 2, 2024
 License:
 Odometer:

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

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, 5th or 6th 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 DETECTION CONDITION CHART

DTC No.	DTC Detection Condition	Trouble Area
P0751	S1 stuck ON malfunction*1 : The ECM determines there is a malfunction when the following conditions are both met. (2-trip detection logic) a. When the ECM directs the gearshift to switch to 1st gear, the actual gear is shifted to 2nd. b. When the ECM directs the gearshift to switch to 5th gear, the actual gear is also shifted to 5th.	<ul style="list-style-type: none"> Shift solenoid valve S1 remains open Valve body is blocked Automatic transmission (clutch, brake or gear, etc.)
	S1 stuck OFF malfunction*2 : The ECM determines there is a malfunction when the following conditions are both met. (2-trip detection logic) a. When the ECM directs the gearshift to switch to 2nd gear, the actual gear is shifted to 1st. b. When the ECM directs the gearshift to switch to 5th gear, the actual gear is also shifted to 5th.	<ul style="list-style-type: none"> Shift solenoid valve S1 remains closed Shift solenoid valve SLT remains open or closed Valve body is blocked No.2 brake malfunction (Driving is difficult.) Automatic transmission (clutch, brake or gear, etc.)

HINT:

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

ECM COMMAND GEARSHIFT SPECIFICATION

ECM command gearshift	1st	2nd				6th
*1: Actual gear position under S1 stuck ON malfunction	2nd	2nd	3rd	4th	5th	
2: Actual gear position under S1 stuck OFF malfunction	1st	1st				N

N*: Neutral

- Gear position during fail-safe operation:

If any malfunction is detected, the ECM changes into the fail-safe mode to shift into the gear positions as shown in the table below.

GEAR POSITION DURING FAIL-SAFE OPERATION

Gear position under normal conditions	1st	2nd		4th	5th	6th
*1: Actual gear position under fail safe mode when S1 stuck ON malfunction	2nd	2nd	3rd			
*2: Actual gear position under fail safe mode when S1 stuck OFF malfunction	1st ^{*3}	1st ^{*3}		3rd	3rd	3rd

*3: Under engine braking downshifting to 1st or 2nd gear is prohibited.

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

MONITOR STRATEGY CHART

Related DTCs	P0751: Shift solenoid valve S1/OFF malfunction Shift solenoid valve S1/ON malfunction
Required sensors/Components	Shift solenoid valve S1, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE), Throttle position sensor MAF
Frequency of operation	Continuous
Duration	OFF malfunction (A), (B) and ON malfunction (A), (B) 0.4 sec. OFF malfunction (C) 3 sec. OFF malfunction (D) 1 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

TYPICAL ENABLING CONDITIONS CHART

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for Closed Loop) P0500 (VSS) P0748 - P0798 (Trans solenoid (range))
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 S3 circuit	Not circuit malfunction
Shift solenoid valve S4 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°C/A or more
Engine	Starting

OFF malfunction (A)**TYPICAL ENABLING CONDITIONS CHART**

ECM selected gear	5th
Vehicle speed	0.6 mph (1 km/h) or more
Throttle valve opening angle	6.5% or more at 2,000 RPM (Conditions vary with engine speed)

OFF malfunction (B)**TYPICAL ENABLING CONDITIONS CHART**

ECM selected gear	2nd
Vehicle speed	0.6 mph (1 km/h) or more
Output speed	2nd --> 1st down shift point or more
Throttle valve opening angle	6.5% or more at 2,000 RPM (Conditions vary with engine speed)

OFF malfunction (C)**TYPICAL ENABLING CONDITIONS CHART**

Current ECM selected gear	6th
Last ECM selected gear	5th
Vehicle speed (During transition from 5th to 6th gear)	Less than 62.2 mph (100 km/h)

OFF malfunction (D)**TYPICAL ENABLING CONDITIONS CHART**

ECM selected gear	6th
-------------------	-----

Engine speed-Turbine speed (NE-NT) (After transition from 5th to 6th gear)	150 RPM or less
Vehicle speed	Less than 62.2 mph (100 km/h)

ON malfunction (A)
TYPICAL ENABLING CONDITIONS CHART

ECM selected gear	1st
Vehicle speed	0.6 mph (1 km/h) or more and less than 24.9 mph (40 km/h)
Engine speed-Turbine speed (NE-NT)	150 RPM or more

ON malfunction (B)
TYPICAL ENABLING CONDITIONS CHART

ECM selected gear	5th
Vehicle speed	0.6 mph (1 km/h) or more
Throttle valve opening angle	6.5% or more at 2,000 RPM (Conditions vary with engine speed)

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

Both of the following conditions are met:

OFF malfunction (A)

OFF malfunction (B), (C) or (D)

OFF malfunction (A)

TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed/Output speed (NT/NO)	0.65 or more, and 0.79 or less (This means actual gear is 5th)
------------------------------------	--

OFF malfunction (B)
TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed/Output speed (NT/NO)	3.40 or more, and 7.50 or less (This means actual gear is 1st)
------------------------------------	--

OFF malfunction (C)
TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed-Output speed x 5th gear ratio (NT-NO x 5th gear ratio)	1,000 RPM or more
--	-------------------

OFF malfunction (D)
TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed-Output speed x 6th gear ratio (NT-NO x 6th gear ratio)	1,000 RPM or more
--	-------------------

[ON malfunction]

Both of the following conditions are met: ON malfunction (A) and (B)

2 detections are necessary per driving cycle:

1st detection; temporary flag ON
 2nd detection; pending fault code ON

ON malfunction (A)

TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed/Output speed (NT/NO)	1.91 or more, and 3.30 or less (This means actual gear is 2nd)
------------------------------------	--

ON malfunction (B)

TYPICAL MALFUNCTION THRESHOLDS CHART

Turbine speed/Output speed (NT/NO)	0.65 or more, and 0.79 or less (This means actual gear is 5th)
------------------------------------	--

1. ACTIVE TEST

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.

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

HINT:

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

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see DIAGNOSIS SYSTEM).

ITEM DIAGNOSTIC CHART

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

HINT:

- a. This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.

- b. The 4th to 5th and 5th to 6th up-shiftings must be performed with the accelerator pedal released.
- c. The 6th to 5th and 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- d. Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- e. The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the intelligent tester.
- f. The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

ECM COMMAND GEARSHIFT SPECIFICATION

ECM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S1	OFF	ON	ON	ON	ON	ON

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

- a. Connect the OBD II scan tool or the intelligent tester to the DLC3.
- b. Turn the engine switch on (IG) position and push the OBD II scan tool or the intelligent tester main switch ON.
- c. When you use intelligent tester: 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

DTC OUTPUT CHART

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.

B : GO TO DTC CHART

A : GO TO NEXT STEP

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.

Resistance

TESTER CONNECTION SPECIFIED CONDITION CHART

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

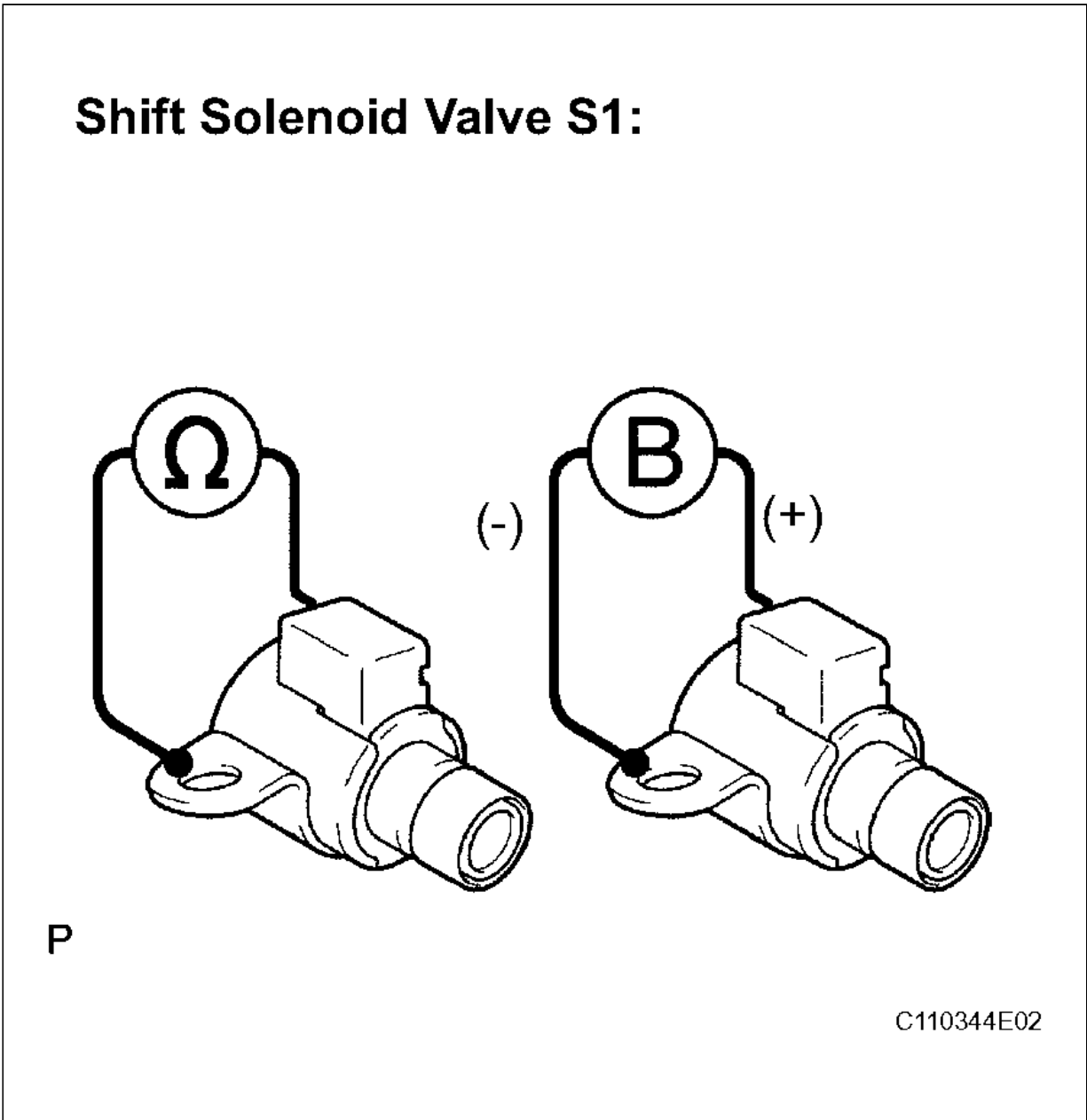
- c. Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG : REPLACE SHIFT SOLENOID VALVE S1

Fig 1: Inspecting Shift Solenoid Valve



Courtesy of © TOYOTA, LICENSE AGREEMENT TMS1002

OK : Go to next steps**3. INSPECT SHIFT SOLENOID VALVE SLT**

- a. Remove the shift solenoid valve SLT.
- b. Measure the resistance according to the value(s) in the table below.

Resistance**TESTER CONNECTION SPECIFIED CONDITION CHART**

Tester Connection	Specified Condition 20°C (68°F)
-------------------	---------------------------------

1 - 2

5.0 to 5.6 Ω

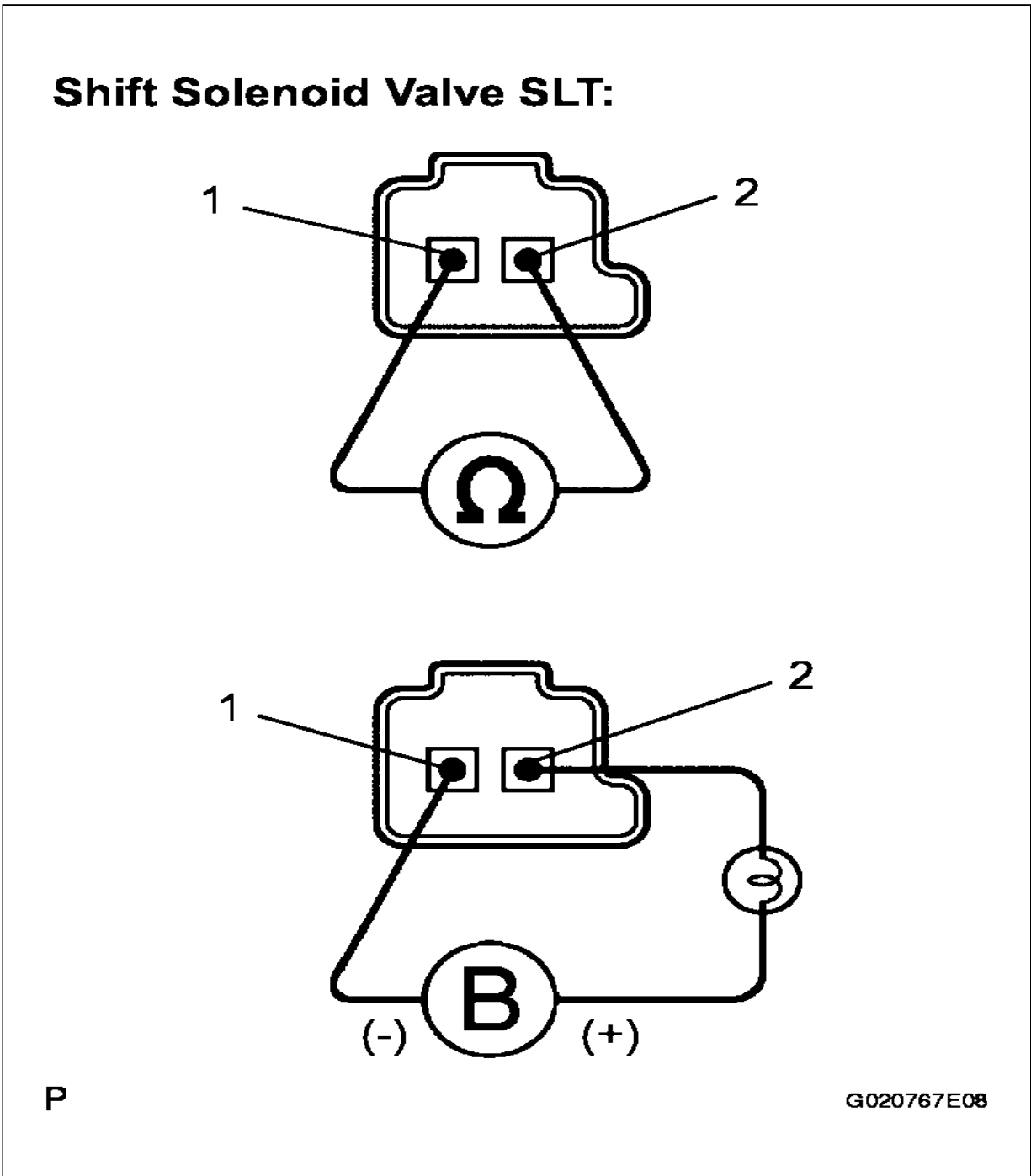
- c. Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG : REPLACE SHIFT SOLENOID VALVE SLT

Fig 2: Identifying Shift Solenoid Valve



Courtesy of © TOYOTA, LICENSE AGREEMENT TMS1002

OK : Go to next steps

4. INSPECT TRANSMISSION VALVE BODY ASSEMBLY

OK:

There are no foreign objects on each valve.

NG : REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK : REPLACE AUTOMATIC TRANSMISSION ASSEMBLY

Reprinted Under License from Toyota Motor Sales, U.S.A., Inc., License Agreement TMS1002