

<b>DTC</b>	<b>P0741</b>	<b>Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve DSL)</b>
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## DESCRIPTION

The ECM uses the signals from the throttle position sensor, air-flow meter, turbine (input) speed sensor, intermediate (counter) shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement conditions of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical problems of the shift solenoid valve DSL, valve body and torque converter clutch.

DTC No.	DTC Detection Condition	Trouble Area
P0741	Lock-up does not occur when driving in lock-up range Lock-up remains ON in lock-up OFF range (2 trip detection logic)	<ul style="list-style-type: none"> <li>Shift solenoid valve DSL remains open or closed</li> <li>Valve body is blocked</li> <li>Shift solenoid valve DSL</li> <li>Torque converter clutch</li> <li>Automatic transaxle (clutch, brake, gear, etc.)</li> <li>Line pressure is too low</li> <li>ECM</li> </ul>

## MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the speed sensor (NT), speed sensor (NC), engine rpm, engine load, engine temperature, vehicle speed, transmission temperature and gear selection.

The ECM determines the lock-up status of the torque converter by comparing the engine rpm (NE) to the input turbine rpm (NT). The ECM calculates the actual transmission gear by comparing input turbine rpm control voltage to counter gear rpm (NC). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to the shift solenoid valve DSL. When the DSL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter clutch.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in the shift solenoid valve DSL or lock-up system performance.

The ECM will illuminate the MIL and store the DTC.

Example:

When any of the following is met, the system judges it as a malfunction.

1. There is a difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.  
(Engine speed is at least 100 rpm greater than input turbine speed.)
2. There is no difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up OFF.  
(The difference between engine speed and input turbine speed is less than 35 rpm.)

## MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve DSL/OFF malfunction Shift solenoid valve DSL/ON malfunction
Required sensors/Components	Shift solenoid valve DSL, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow sensor (MAF), Transmission temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous

Duration	OFF malfunction 3.5 sec. ON malfunction 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

## TYPICAL ENABLING CONDITIONS

### All

The monitor will run whenever this DTC is present	P0115-P0118: ECT sensor P0125: Insufficient ECT for Closed Loop P0500: VSS P0748-P0799: Trans solenoid (range)
Transmission range	"D"
ECT (Engine coolant temperature)	60°C (140°F) or higher
ATF temperature	-20°C (-4°F) or higher
ATF temperature sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Shift solenoid valve DSL circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

### OFF malfunction

ECM lock-up command	ON
ECM selected gear	3rd or 4th
Vehicle speed	25 km/h (15.5 mph) or more

### ON malfunction

ECM lock-up command	OFF
ECM selected gear	3rd or 4th
Vehicle speed	25 to 60 km/h (15.5 to 37.2 mph)
Throttle valve opening angle	8% or more

## TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met: OFF malfunction or ON malfunction

### OFF malfunction

Engine speed - input (turbine) speed	100 rpm or more
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### ON malfunction

2 detections are necessary per driving cycle:

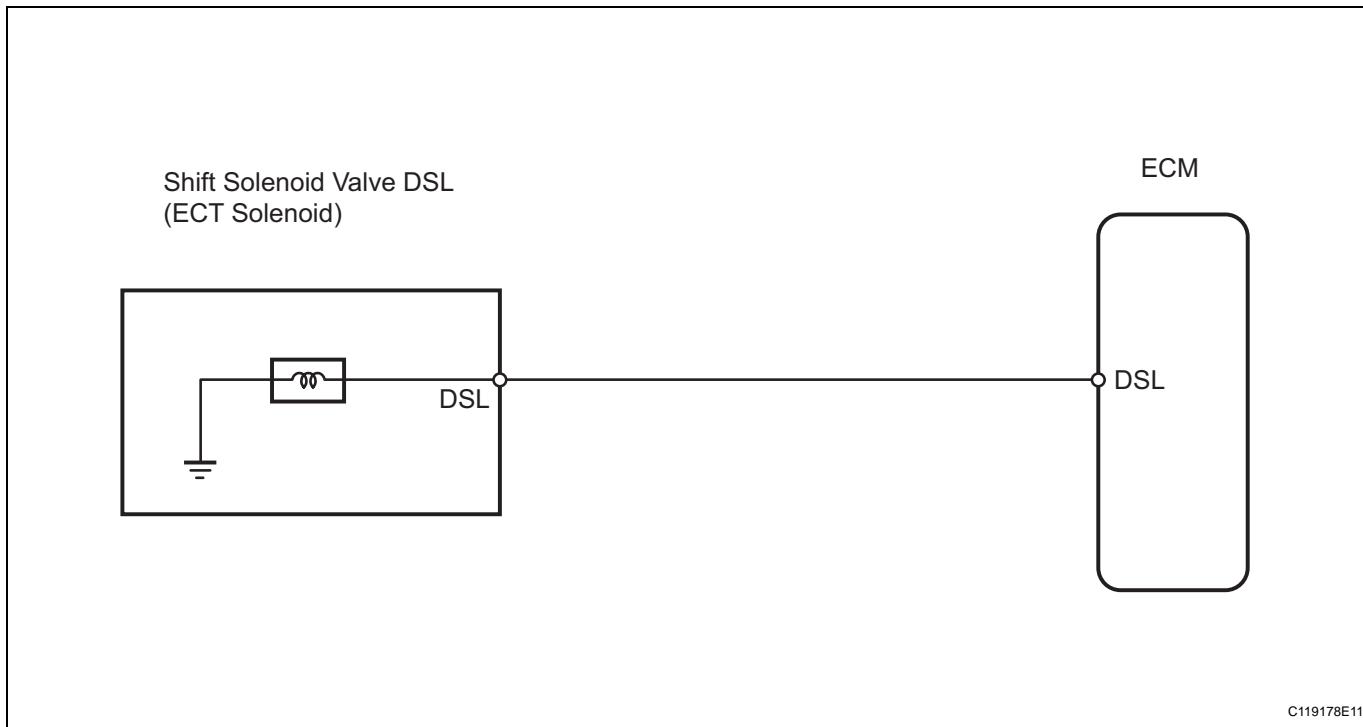
1st detection: temporary flag ON

2nd detection: pending fault code ON

Vehicle speed must be under 10 km/h (6.2 mph) once before 2nd detection

Difference between engine speed and input (turbine) speed	Less than 35 rpm
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## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time.

The DATA LIST can be displayed during the ACTIVE TEST.

1. Warm up the engine.
2. Turn the ignition switch OFF.
3. Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
4. Turn the ignition switch ON and turn the tester ON.
5. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
6. Follow the instructions on the tester and read the ACTIVE TEST.

Item	Test Detail	Diagnostic Note
LOCK UP	<p>[Test Details] Control shift solenoid DSL to set automatic transaxle to the lock-up condition</p> <p>[Vehicle Condition]</p> <ul style="list-style-type: none"> <li>• Throttle valve opening angle: Less than 35%</li> <li>• Vehicle speed: 60 km/h (36 mph) or more</li> </ul>	Possible to check shift solenoid valve DSL operation

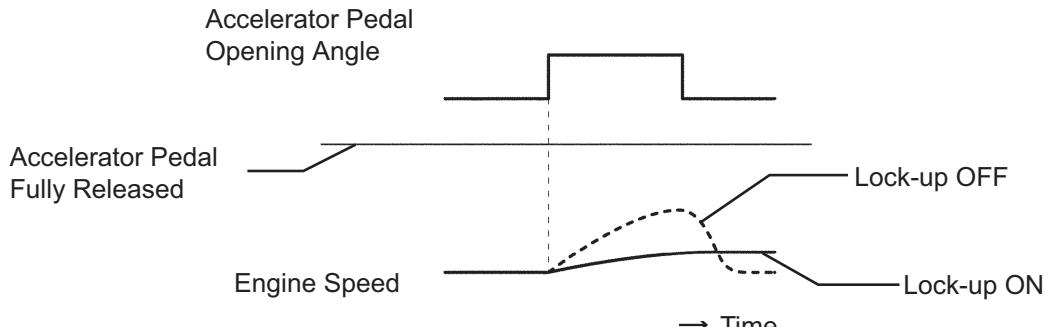
### HINT:

- This test can be conducted when the vehicle speed is 60 km/h (36 mph) or more.
- This test can be conducted in the 3rd or O/D gear.

7. Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

### HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is ON.
- Slowly release the accelerator pedal in order to decelerate. (Do not fully release the pedal as that will close the throttle valve and lock-up may be turned OFF.)



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## 1 CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0741)

- Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
- Turn the ignition switch ON and turn the tester ON.
- Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read the DTCs using the tester.

### Result

Display (DTC output)	Proceed to
Only P0741 is output	A
P0741 and other DTCs are output	B

### HINT:

If any other codes besides P0741 are output, perform troubleshooting for those DTCs first.

B

GO TO DTC CHART

A

## 2 INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE DSL)

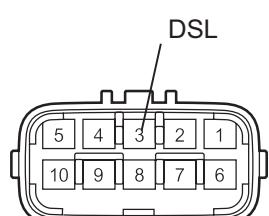
- Disconnect the B27 wire connector.
- Measure the resistance of the transmission wire.

### Standard resistance

Tester Connection	Condition	Specified Condition
3 (DSL) - Body ground	20°C (68°F)	11 to 13 Ω

NG

Go to step 4

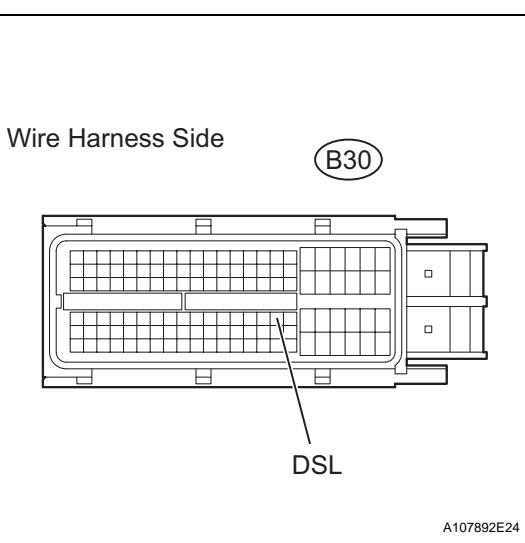


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OK

AX

### 3 CHECK WIRE HARNESS (TRANSMISSION WIRE - ECM)



- (a) Disconnect the B30 ECM connector.
- (b) Measure the resistance of the wire harness side connector.

#### Standard resistance

Tester Connection	Condition	Specified Condition
B30-79 (DSL) - Body ground	20°C (68°F)	11 to 13 Ω

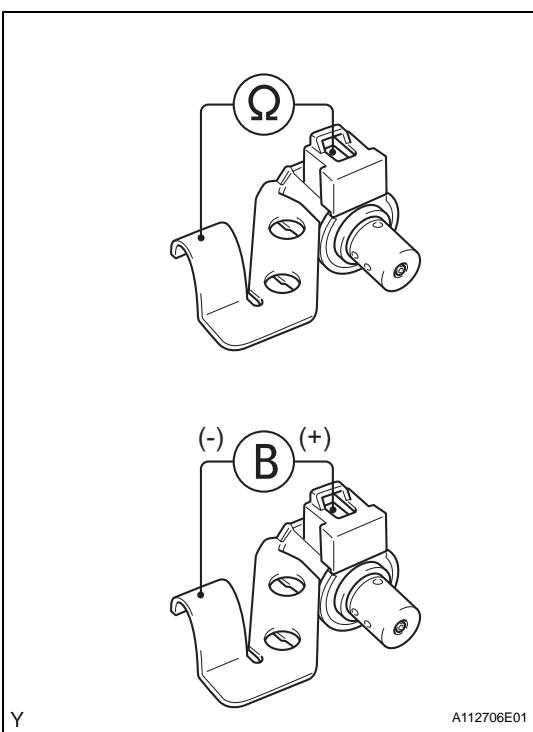
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**REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

**REPLACE ECM**

### 4 INSPECT SHIFT SOLENOID VALVE DSL



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

#### Standard resistance:

**11 to 13 Ω at 20°C (68°F)**

- (c) Connect the battery's positive (+) lead to the terminal of the solenoid valve connector, and the negative (-) lead to the solenoid body. Then check that the valve moves and makes an operating noise.

#### OK:

**Valve moves and makes operating noise.**

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**REPLACE SHIFT SOLENOID VALVE DSL**

AX

OK

**5 | CHECK TRANSMISSION WIRE****OK:**

The connectors and pins are securely installed.  
There is no open or short on the wire harness.

**NG****REPAIR OR REPLACE TRANSMISSION WIRE****OK****6 | INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly.

**OK:**

There are no foreign objects on each valve.

**NG****REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY****OK****7 | INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY**

(a) Check the torque converter clutch assembly (see page [AX-153](#)).

**OK:**

The torque converter clutch operates normally.

**NG****REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY****OK****REPAIR AUTOMATIC TRANSAXLE ASSEMBLY**