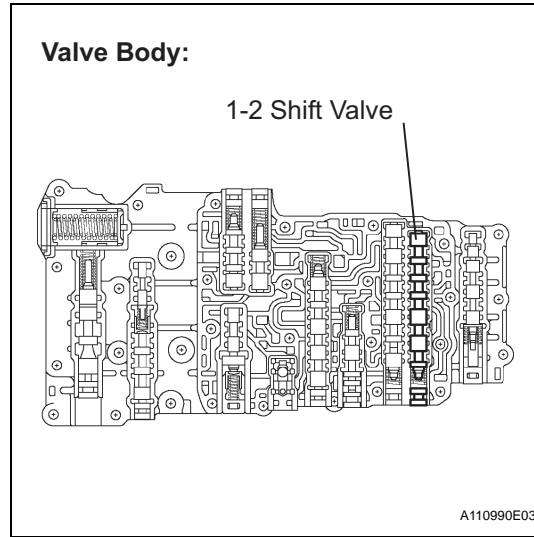


DTC	P0781	1-2 Shift (1-2 Shift Valve)
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DESCRIPTION



The 1-2 shift valve performs shifting to 1st gear and other gears.

DTC No.	DTC Detection Conditions	Trouble Areas
P0781	1-2 shift valve malfunction: The ECM determines that there is a malfunction when the following conditions (a) and (b), or (a) and (c) are 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 4th gear, the actual gear is shifted to 3rd. (c) When the ECM directs the gearshift to switch to 5th gear, the engine overruns (clutch slips)	<ul style="list-style-type: none"> • Valve body is blocked up or stuck (1-2 shift valve) • Shift solenoid valve SLT remains open or closed • Automatic transmission (clutch, brake or gear, etc.)

HINT:

Gear positions in the event of a 1-2 shift valve mechanical problem:

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

N*: Neutral

MONITOR DESCRIPTION

This DTC indicates that the 1-2 shift valve in the valve body is locked in the direction of the spring compression. The ECM controls the gearshifts by turning the shift solenoid valves "ON/OFF" and switching oil pressure to the valves in the valve body.

The ECM calculates the "actual" transmission gear by comparing the signals from the input speed sensor (NT) and the output speed sensor (SP2). The ECM can detect many mechanical problems in the shift solenoids, valve body, and the transmission clutches, brakes, and gears. If the ECM detects that the actual gear position and the commanded gear position are different, it will illuminate the MIL and store the DTC .

MONITOR STRATEGY

Related DTCs	P0781: Valve body/Rationality check
Required sensors/Components (Main)	Valve body
Required sensors/Components (Related)	Automatic transmission assembly, Speed sensor (NT), Speed sensor (SP2), Vehicle speed sensor, Throttle position sensor

Frequency of operation	Continuous
Duration	Conditions (A) and (B) 0.4 seconds Condition (C) 3 seconds Condition (D) 0.5 seconds
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

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

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	No circuit malfunction
Output speed sensor (SP2) circuit	No circuit malfunction
Shift solenoid "A" (S1) circuit	No circuit malfunction
Shift solenoid "B" (S2) circuit	No circuit malfunction
Shift solenoid "E" (SR) circuit	No circuit malfunction
Pressure control solenoid "A" (SL1) circuit	No circuit malfunction
Pressure control solenoid "B" (SL2) circuit	No circuit malfunction
ECT (Engine Coolant Temperature) sensor circuit	No circuit malfunction
Knock sensor circuit	No circuit malfunction
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	No circuit malfunction
Output speed sensor circuit	No circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed/Transfer output speed	0.9 to 1.1

Condition (A)

ECM selected gear	2nd
Vehicle speed	1.2 mph (2 km/h) or more
Output speed	2nd → 1st down shift point or more
Throttle valve opening angle	6.5 % or more at engine speed of 2,000 rpm (Conditions vary with engine speed)

Condition (B)

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)

Condition (C)

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)
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Condition (D)

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

Condition (A) and Conditions (B), (C) or (D) are met:

Condition (A)

Turbine speed/Output speed	3.30 to 7.50 (Actual gear is 1st)
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Condition (B)

Turbine speed/Output speed	1.28 to 1.53 (Actual gear is 3rd)
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Condition (C)

Turbine speed - Output speed x 4th gear ratio	1,000 rpm or more
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Condition (D)

Turbine speed - Output speed x 5th gear ratio	1,000 rpm or more
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INSPECTION PROCEDURE

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0781)
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- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the main switch ON.
- (c) Select the items "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCs using the intelligent tester.

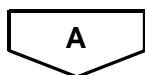
Result:

Display (DTC Output)	Proceed to
Only "P0781" is output	A
"P0781" and other DTCs	B

HINT:

If any codes besides "P0781" are output, perform troubleshooting for those DTCs first.

B	GO TO DTC CHART
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2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (SHIFT)
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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-35](#)).

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] <ul style="list-style-type: none"> • 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.

AT

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

Gearshift operated by tester	1st	2nd	3rd	4th	5th
Actual gear position under malfunction	1st	1st	3rd	3rd	N*

N*: Neutral

OK:

Gear position changes in accordance with the tester operation.

NG

REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK

3

PERFORM ACTIVE TEST USING INTELLIGENT TESTER (SOLENOID (SLT)) (See page AT-86)

NG

REPLACE SHIFT SOLENOID VALVE SLT

OK

4

CLEAR DTC AND PERFORM RUNNING TEST

- (a) Clear the DTC, and check for the DTC again after conducting the "MONITOR DRIVE PATTERN FOR ECT TEST" (See page AT-21).

OK:

No DTC

NG

REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK

END