DTC	P2121	Throttle / Pedal Position Sensor / Switch "D" Circuit Range / Performance

HINT:
This DTC relates to the Accelerator Pedal Position (APP) sensor.

DESCRIPTION

Refer to DTC P2120 (See page ES-301).

DTC No.	DTC Detection Condition	Trouble Area
P2121	Difference between VPA and VPA2 exceeds threshold for 0.5 seconds	• Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM

ES

MONITOR DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal bracket. The accelerator pedal position sensor has 2 sensor elements and 2 signal outputs: VPA and VPA2. VPA is used to detect the actual accelerator pedal angle (used for engine control) and VPA2 is used to detect malfunctions in VPA. When the difference between the voltage outputs of VPA and VPA2 deviates from the standard, the ECM determines that the accelerator pedal position sensor is malfunctioning. The ECM turns on the MIL and the DTC is set.

MONITOR STRATEGY

Related DTCs	P2121: Accelerator pedal position sensor malfunction
Required Sensors/Components (Main)	Accelerator pedal position sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None

TYPICAL MALFUNCTION THRESHOLDS

Either of following conditions met:	
Difference between VTA sensor 1 voltage (learned value) and VTA2 sensor 2 voltage (learned value)	Less than 0.4 V, or more than 1.2 V

FAIL-SAFE

The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the functioning circuit is used to calculate the accelerator pedal opening angle to allow the vehicle to continue driving. If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal as being fully closed. In this case, the throttle valve remains closed as if the engine is idling.
If a pass condition is detected and then the ignition switch is turned to OFF, the fail-safe operation stops and the system returns to a normal condition.

WIRING DIAGRAM

HINT:
Read freeze frame data using an intelligent tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1	READ VALUE USING INTELLIGENT TESTER (ACCEL POS #1 AND ACCEL POS #2)

Depressed　　　Released

FI07052E05
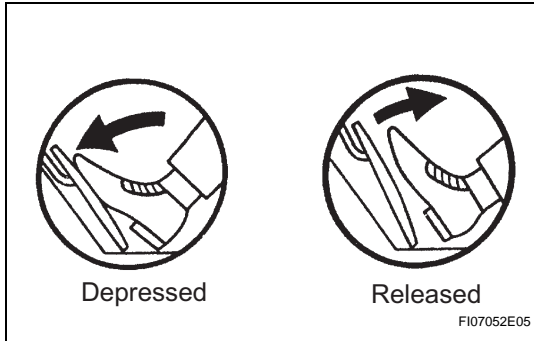
(a) Connect an intelligent tester to the DLC3.
(b) Turn the ignition switch to ON and turn the tester ON.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2.
(d) Read the values displayed on the tester.
    Standard Voltage

Accelerator Pedal Operations	ACCEL POS #1 (AP #1)	ACCEL POS #2 (AP #2)
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.0 V

OK $>$	Go to step 3

NG $\downarrow$

2	CHECK HARNESS AND CONNECTOR (ACCELERATOR PEDAL POSITION SENSOR - ECM)

Wire Harness Side:

EPA2　VPA2　VCPA　EPA
VCP2　　　　　　　　　VPA
1　2　3　4　5　6
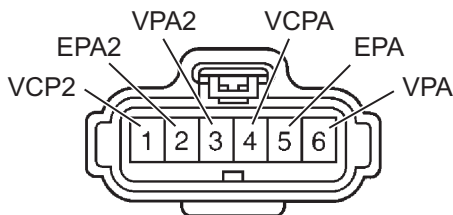
(A19) Accelerator Pedal Position Sensor Connector

ECM Connector

(E8)

VPA
EPA2
EPA　　VCPA
VPA2　VCP2
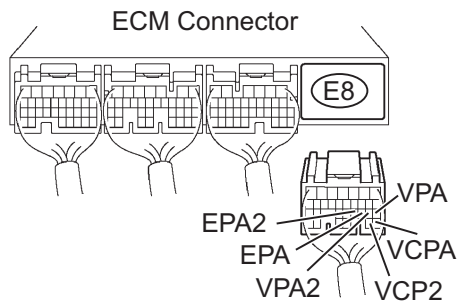
Y　　　　　　A115621E01

(a) Disconnect the A19 Accelerator Pedal Position (APP) sensor connector.
(b) Disconnect the E8 ECM connector.
(c) Check the resistance.
    Standard Resistance (Check for open)

Tester Connections	Specified Conditions
VPA (A19-6) - VPA (E8-18)	Below 1 Ω
EPA (A19-5) - EPA (E8-20)	Below 1 Ω
VCPA (A19-4) - VCPA (E8-26)	Below 1 Ω
VPA2 (A19-3) - VPA2 (E8-19)	Below 1 Ω
EPA2 (A19-2) - EPA2 (E8-21)	Below 1 Ω
VCP2 (A19-1) - VCP2 (E8-27)	Below 1 Ω

Standard Resistance (Check for short)

Tester Connections	Specified Conditions
VPA (A19-6) or VPA (E8-18) - Body ground	10 kΩ or higher
EPA (A19-5) or EPA (E8-20) - Body ground	10 kΩ or higher
VCPA (A19-4) or VCPA (E8-26) - Body ground	10 kΩ or higher
VPA2 (A19-3) or VPA2 (E8-19) - Body ground	10 kΩ or higher

ES

Tester Connections	Specified Conditions
EPA2 (A19-2) or EPA2 (E8-21) - Body ground	**10 kΩ or higher**
VCP2 (A19-1) or VCP2 (E8-27) - Body ground	**10 kΩ or higher**

(d) Reconnect the APP sensor connector.
(e) Reconnect the ECM connector.

NG >	**REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	**REPLACE ACCELERATOR PEDAL ROD ASSEMBLY**

ES

NEXT

4	**CHECK WHETHER DTC OUTPUT RECURS (ACCELERATOR PEDAL POSITION SENSOR DTCS)**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to ON and turn the tester ON.
(c) Clear the DTC (see page ES-40).
(d) Start the engine.
(e) Allow the engine to idle for 15 seconds.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(g) Read DTCs.

Result

Display (DTC output)	Proceed to
P2121	**A**
No output	**B**

B >	**SYSTEM OK**

A

REPLACE ECM