

<b>DTC</b>	<b>P2121</b>	<b>THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT RANGE/PERFORMANCE</b>
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**HINT:**

This is repair procedure for the "accelerator pedal position sensor".

**CIRCUIT DESCRIPTION**

Refer to DTC P2120 on page [05-256](#).

DTC No.	DTC Detection Condition	Trouble Area
P2121	Conditions (a) and (b) continue for 0.06 seconds: (a) Difference between VPA and VPA2 deviate from the standard (b) IDL is OFF	<ul style="list-style-type: none"> <li>• Accelerator pedal position sensor circuit</li> <li>• Accelerator pedal position sensor</li> <li>• ECM</li> </ul>

**MONITOR DESCRIPTION**

The accelerator pedal position sensor is mounted on the accelerator pedal bracket. The accelerator pedal position sensor has 2 sensor elements/signal outputs: VPA1 and VPA2. VPA1 is used to detect the actual accelerator pedal angle (used for engine control) and VPA2 is used to detect malfunctions in VPA1. When the difference between the voltage outputs of VPA1 and VPA2 deviate from the standard, the ECM concludes the accelerator pedal position sensor has a malfunction. The ECM turns on the MIL and a DTC is set.

**FAIL SAFE**

The accelerator pedal position sensor has 2 (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 2 sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving.

If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

**MONITOR STRATEGY**

Related DTCs	P2121: APP sensor malfunction
Required sensors/ components (Main)	APP sensor
Required sensors/ components (Related)	–
Frequency of operation	Continuous
Duration	0.5 seconds
MIL operation	Immediate
Sequence operation	None

**TYPICAL ENABLING CONDITIONS**

The monitor will run whenever this DTC is not present	See page <a href="#">05-16</a>
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**TYPICAL MALFUNCTION THRESHOLDS**

Difference between VPA1 and VPA2 voltage	Less than 0.4 V, or more than 1.2 V
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## WIRING DIAGRAM

Refer to DTC P2120 on page 05-256.

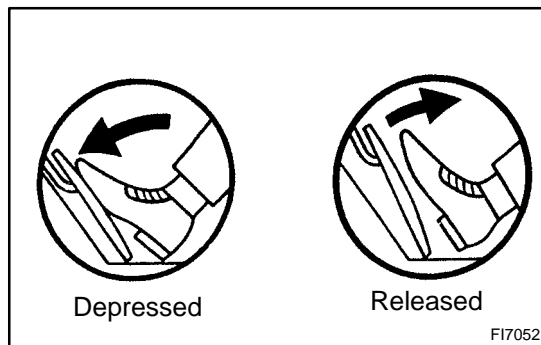
## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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.

### Hand-held tester:

#### 1 READ VALUE OF HAND-HELD TESTER (ACCEL POS #1, ACCEL POS #2)



- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON.
- On the hand-held tester enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2. Read the values.

#### Standard:

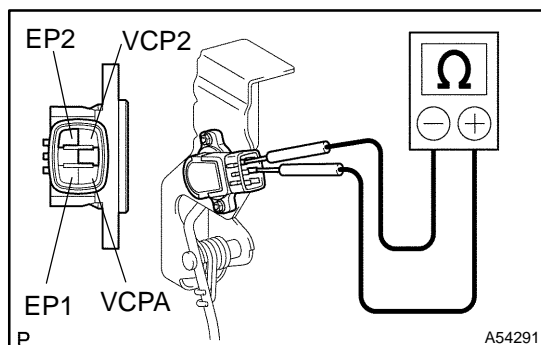
Accelerator Pedal	ACCEL POS #1	ACCEL POS #2
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.3 V

OK

REPLACE ECM (See page 10-9)

NG

#### 2 INSPECT ACCELERATOR PEDAL ASSY (ACCELERATOR PEDAL POSITION SENSOR)



- Disconnect the A18 sensor connector.
- Check the resistance of the sensor terminals.

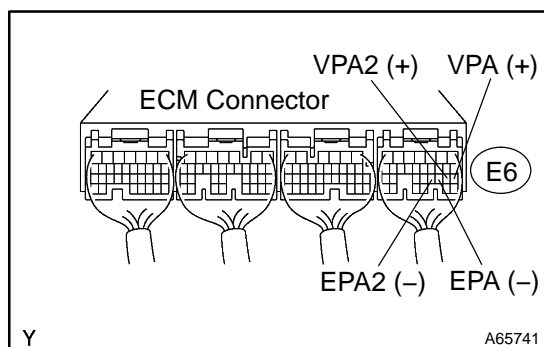
#### Standard:

Tester Connection	Condition	Specified Condition
3 (EP1) – 6 (VCPA) 1 (EP2) – 4 (VCP2)	20°C (68°F)	2.25 to 4.75 kΩ

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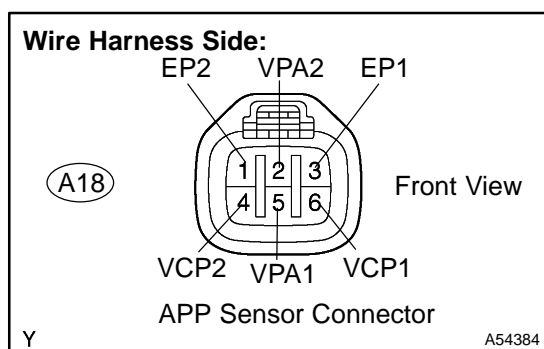
REPLACE ACCELERATOR PEDAL ASSY

OK

**3 INSPECT ECM (VPA, VPA2 VOLTAGE)**

- (a) Turn the ignition switch ON.  
 (b) Check the voltage of the E6 ECM connector.

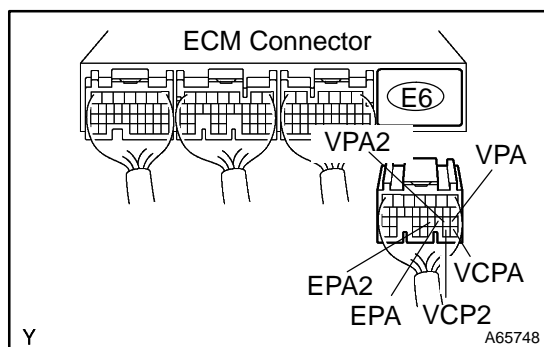
Tester Condition	Accelerator Pedal Condition	Specified Condition
E6-18 (VPA) – E6-20 (EPA)	Released	0.5 to 1.1 V
E6-18 (VPA) – E6-20 (EPA)	Depressed	2.6 to 4.5 V
E6-19 (VPA2) – E6-21 (EPA2)	Released	1.2 to 2.0 V
E6-19 (VPA2) – E6-21 (EPA2)	Depressed	3.4 to 5.3 V

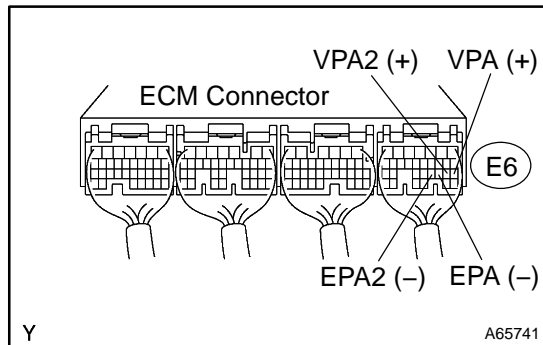
**OK****REPLACE ECM (See page 10-9)****NG****4 CHECK WIRE HARNESS (ACCELERATOR PEDAL POSITION SENSOR – ECM)**

- (a) Disconnect the A18 sensor connector.  
 (b) Disconnect the E6 ECM connector.  
 (c) Check the resistance of the wire harness side connectors.

**Standard:**

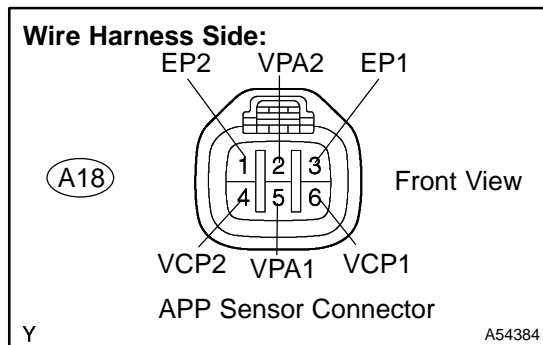
Tester Connection	Specified Condition
A18-5 (VPA1) – E6-18 (VPA) A18-3 (EP1) – E6-20 (EPA) A18-6 (VCPA) – E6-26 (VCPA) A18-2 (VPA2) – E6-19 (VPA2) A18-1 (EP2) – E6-21 (EPA2) A18-4 (VCP2) – E6-27 (VCP2)	Below 1 $\Omega$
A18-5 (VPA1) or E6-18 (VPA) – Body ground A18-3 (EP1) or E6-20 (EPA) – Body ground A18-6 (VCPA) or E6-26 (VCPA) – Body ground A18-2 (VPA2) or E6-19 (VPA2) – Body ground A18-1 (EP2) or E6-21 (EPA2) – Body ground A18-4 (VCP2) or E6-27 (VCP2) – Body ground	10 k $\Omega$ or higher

**NG****REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPLACE ACCELERATOR PEDAL ASSY (See page 10-11)**

**OBD II scan tool (excluding hand-held tester):****1 INSPECT ECM (VPA, VPA2 VOLTAGE)**

- (a) Turn the ignition switch ON.  
 (b) Check the voltage of the E6 ECM connector.

Tester Condition	Accelerator Pedal Condition	Specified Condition
E6-18 (VPA) – E6-20 (EPA)	Released	0.5 to 1.1 V
E6-18 (VPA) – E6-20 (EPA)	Depressed	2.6 to 4.5 V
E6-19 (VPA2) – E6-21 (EPA2)	Released	1.2 to 2.0 V
E6-19 (VPA2) – E6-21 (EPA2)	Depressed	3.4 to 5.3 V

**OK****REPLACE ECM (See page 10-9)****NG****2 CHECK WIRE HARNESS (ACCELERATOR PEDAL POSITION SENSOR – ECM)**

- (a) Disconnect the A18 sensor connector.  
 (b) Disconnect the E6 ECM connector.  
 (c) Check the resistance of the wire harness side connectors.

**Standard:**

Tester Connection	Specified Condition
A18-5 (VPA1) – E6-18 (VPA) A18-3 (EP1) – E6-20 (EPA) A18-6 (VCPA) – E6-26 (VCPA) A18-2 (VPA2) – E6-19 (VPA2) A18-1 (EP2) – E6-21 (EPA2) A18-4 (VCP2) – E6-27 (VCP2)	Below 1 $\Omega$
A18-5 (VPA1) or E6-18 (VPA) – Body ground A18-3 (EP1) or E6-20 (EPA) – Body ground A18-6 (VCPA) or E6-26 (VCPA) – Body ground A18-2 (VPA2) or E6-19 (VPA2) – Body ground A18-1 (EP2) or E6-21 (EPA2) – Body ground A18-4 (VCP2) or E6-27 (VCP2) – Body ground	10 k $\Omega$ or higher

**NG****REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPLACE ACCELERATOR PEDAL ASSY (See page 10-11)**