DTC	P2120	Throttle/Pedal Position Sensor/Switch ”D” Circuit

DTC	P2122	Throttle/Pedal Position Sensor/Switch ”D” Circuit Low Input

DTC	P2123	Throttle/Pedal Position Sensor/Switch ”D” Circuit High Input

DTC	P2125	Throttle/Pedal Position Sensor/Switch ”E” Circuit

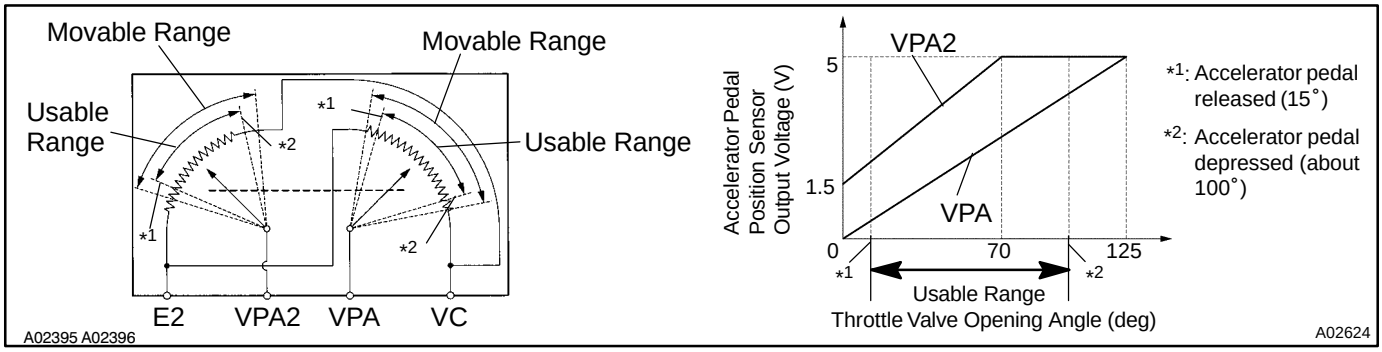
DTC	P2127	Throttle/Pedal Position Sensor/Switch ”E” Circuit Low Input

DTC	P2128	Throttle/Pedal Position Sensor/Switch ”E” Circuit High Input

DTC	P2138	Throttle/Pedal Position Sensor/Switch ”D”/”E” Voltage Correlation

CIRCUIT DESCRIPTION

The Accelerator pedal position sensor is mounted on the throttle body and it has the 2 sensors to detects the accelerator position and a malfunction of the accelerator position's own.
The accelerator pedal position sensor is connected with the accelerator pedal by the accelerator wire and the voltage applied to the terminals VPA and VPA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal. The VPA is a signal to indicate the actual accelerator pedal opening angle which is used for the engine control, and the VPA2 is a signal to indicate the information about the opening angle which is used for detecting a malfunction.
The ECM judges the current opening angle of the accelerator pedal from these signals input from terminals VPA and VPA2 and the ECM controls the throttle motor based on these signals.
If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

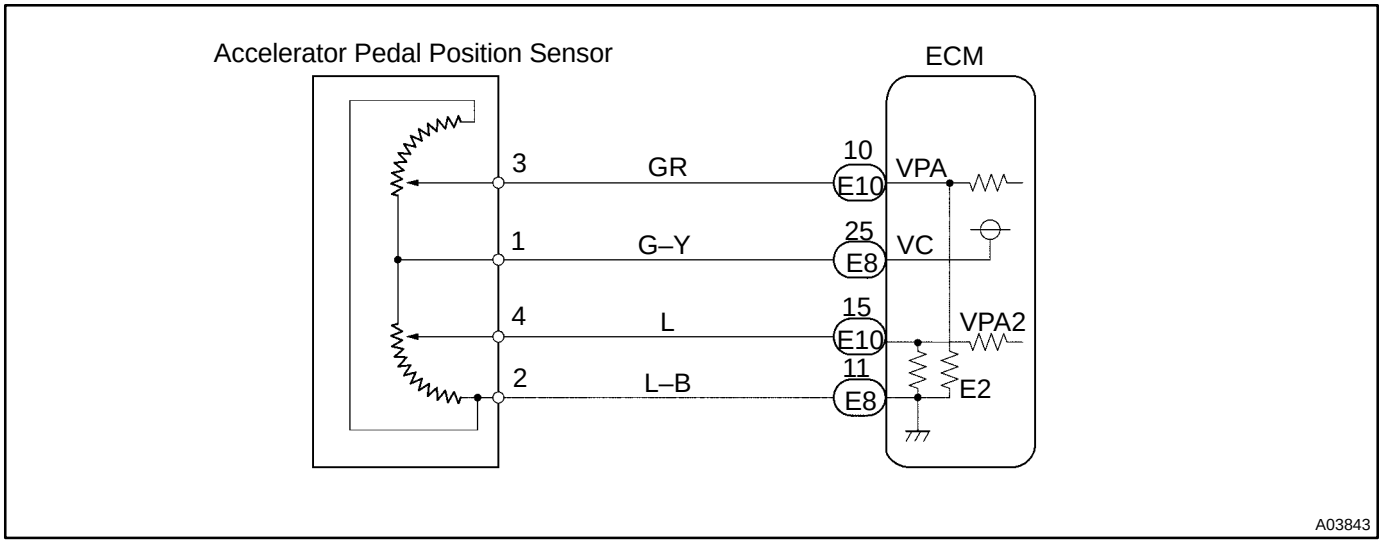


DTC No.	DTC Detection Condition	Trouble Area
P2120	Condition (a) continues for 2.0 sec. or more: (a) VPA1 ≦ 0.2 V and VPA2 ≧ 0.97 deg, or VPA1 ≧ 4.7 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM
P2122	Condition (a) and (b) continues for 0.5 sec. or more: (a) VPA1 ≦ 0.2 V (b) VPA2 ≧ 0.97 deg	
P2123	Condition (a) and (b) continues for 2.0 sec. or more: (a) VPA1 ≧ 4.7 V	
P2125	Condition (a) continues for 2.0 sec. or more: (a) (VPA2 ≦ 0.5 V and VPA1 ≧ 0.97 deg), or (VPA2 ≧ 4.7 V and 0.2 V ≦ VPA1 ≦ 1.8 V)	
P2127	Condition (a) and (b) continues for 0.5 sec. or more: (a) VPA2 ≦ 0.5 V (b) VPA1 ≧ 0.97 deg	
P2128	Condition (a) and (b) continues for 2.0 sec. or more: (a) VPA2 ≧ 4.97 V (b) 0.2 V ≦ VPA1 ≦ 1.8 V	
P2138	Condition (a) or (b) continues for 2.0 sec. or more: (a) |VPA1 – VPA2| ≦ 0.02 V (b) VPA1 ≦ 0.2 V and VPA2 ≦ 0.5 V	

HINT:
After confirming DTC P2120, P2122, P2123, P2125, P2127, P2128 and P2138 use the OBD II scan tool or the hand–held tester to confirm the throttle valve opening percentage.

Trouble area	Accelerator pedal position expressed as voltage			
	Accelerator pedal released		Accelerator pedal depressed	
	ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2
VC circuit open	0 V	0 V	0 V	0 V
VPA circuit open or ground short	0 V	0.9 – 2.3 V	0 V	3.4 – 5.0 V
VPA2 circuit open or ground short	0.5 – 1.1 V	0 V	3.0 – 4.6 V	0 V
E2 circuit open	5 V	5 V	5 V	5 V

WIRING DIAGRAM



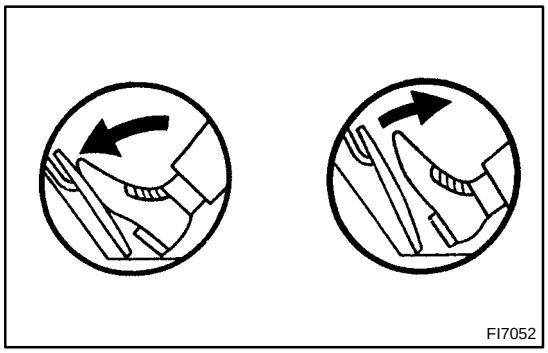
INSPECTION PROCEDURE

HINT:

- If different DTCs that are related to different systems are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.
- Read freeze frame data using the hand–held tester or the OBD II scan tool, as freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Hand–held tester:

1	**Connect hand–held tester, and read the voltage for accelerator pedal position sensor data.**



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the voltage for the accelerator pedal position sensor data.

OK:

Accelerator Pedal	VPA	VPA2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK	**Check and replace ECM (See page IN–28).**

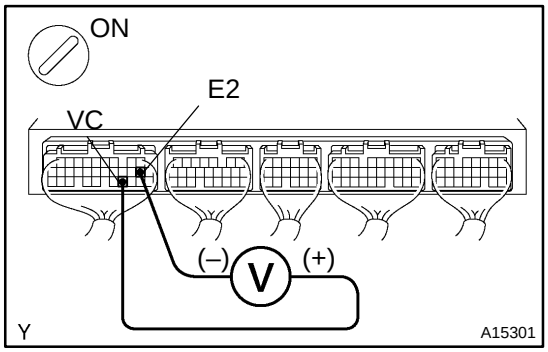
NG

2	**Check accelerator pedal position sensor (See page SF–28).**

NG	**Replace accelerator pedal position sensor (See page SF–30).**

OK

3	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:

(a) Remove the glove compartment (See page SF–63).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

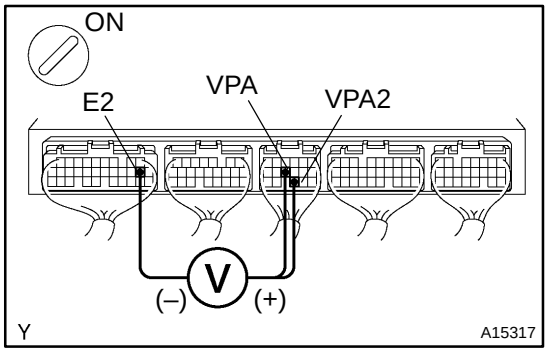
OK:

Voltage: 4.5 – 5.5 V

NG	**Check and replace ECM (See page IN–28).**

OK

4	Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connectors.



PREPARATION:

(a) Remove the glove compartment (See page SF–63).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the ECM connectors.

OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → Check and replace ECM (See page IN–28).

NG

5	Check for open and short in harness and connector in VC VPA, VPA2 and E2 circuits between ECM and accelerator pedal sensor (See page IN–28).

NG → Repair or replace harness or connector.

OK

Check and replace ECM (See page IN–28).

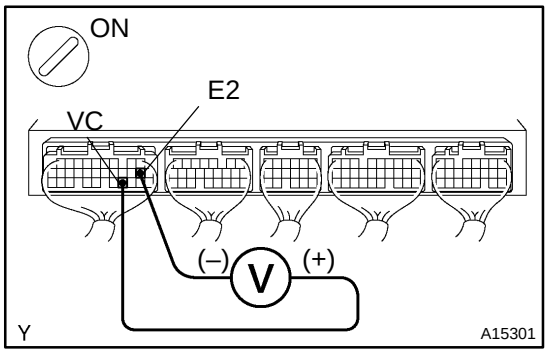
OBD II scan tool (excluding hand–held tester):

1	**Check accelerator pedal position sensor (See page SF–28).**

NG → **Replace accelerator pedal position sensor (See page SF–30).**

OK

2	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment (See page SF–63).
(b) Turn the ignition switch ON.

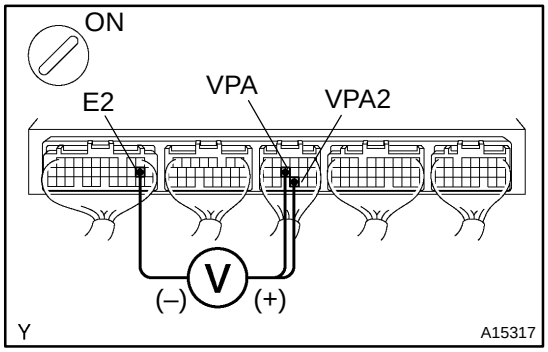
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 – 5.5 V

NG → **Check and replace ECM (See page IN–28).**

OK

3	**Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment (See page SF–63).
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the ECM connectors.

OK:

Accelerator pedal	Voltage	
	VPA – E2	VPA2 – E2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → Check and replace ECM (See page IN–28).

NG

4	Check for open and short in harness and connector in VC VPA, VPA2 and E2 circuits between ECM and accelerator pedal sensor (See page IN–28).

NG → Repair or replace harness or connector.

OK

Check and replace ECM (See page IN–28).