

|            |              |                                                              |
|------------|--------------|--------------------------------------------------------------|
| <b>DTC</b> | <b>P1120</b> | <b>Accelerator Pedal Position Sensor Circuit Malfunction</b> |
|------------|--------------|--------------------------------------------------------------|

## CIRCUIT DESCRIPTION

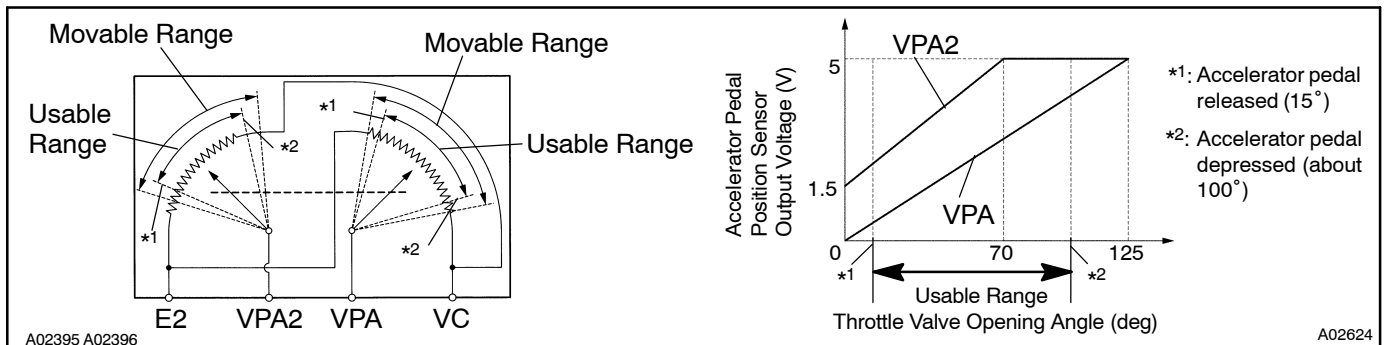
Accelerator pedal position sensor is mounted on the throttle body and it has the 2 sensors to detect the accelerator position and a malfunction of the accelerator position's own.

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 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.



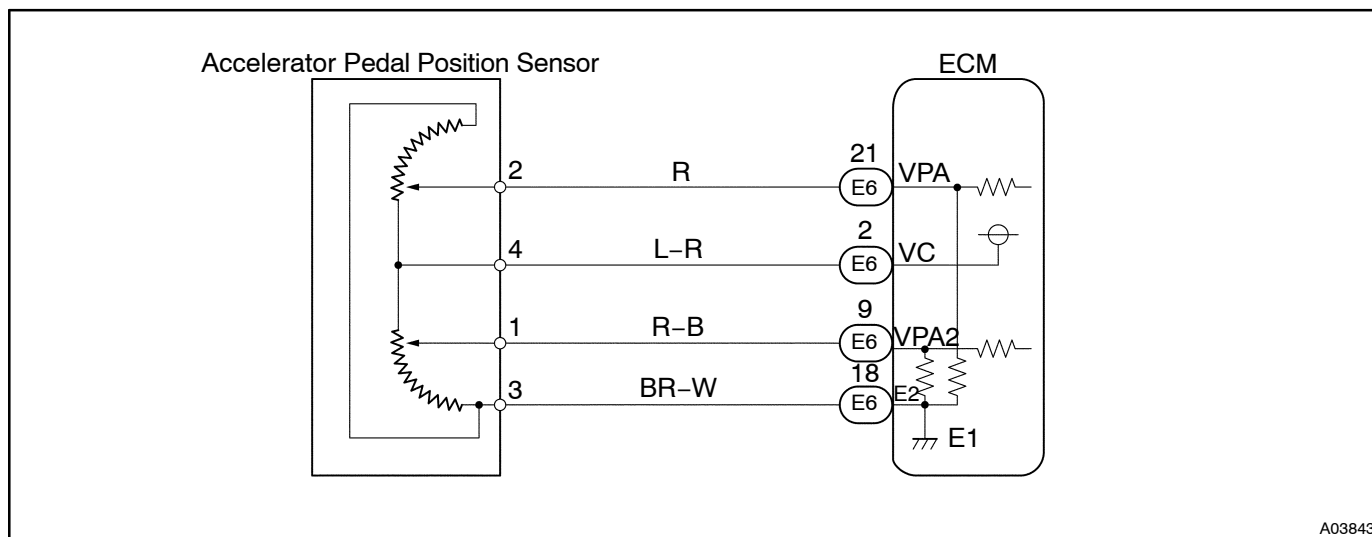
| DTC No. | DTC Detecting Condition                                                                                                                                                                                                                                                                                                                      | Trouble Area                                                                                                                                                               |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1120   | Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds:<br>(a) $VPA \leq 0.2 \text{ V}$<br>(b) $VPA2 \leq 0.5 \text{ V}$<br>(c) $VPA \geq 4.8 \text{ V}$<br>(d) When $VPA \geq 0.2 \text{ V}$ and $\leq 1.8 \text{ V}$ , and $VPA2 \geq 4.97 \text{ V}$<br>(e) $VPA - VPA2 \leq 0.02 \text{ V}$ , or $VPA2 - VPA \leq 0.02 \text{ V}$ | <ul style="list-style-type: none"> <li>• Open or short in accelerator pedal position sensor circuit</li> <li>• Accelerator pedal position sensor</li> <li>• ECM</li> </ul> |
|         | Condition (a) continues for 0.4 seconds:<br>(a) $VPA \leq 0.2 \text{ V}$ and $VPA2 \leq 0.5 \text{ V}$                                                                                                                                                                                                                                       |                                                                                                                                                                            |

### HINT:

After confirming DTC P1120, use the OBD II scan tool or TOYOTA hand-held tester to confirm the throttle valve opening percentage.

| Accelerator pedal position expressed as voltage |              |                             |              | Trouble area                      |
|-------------------------------------------------|--------------|-----------------------------|--------------|-----------------------------------|
| Accelerator pedal released                      |              | Accelerator pedal depressed |              |                                   |
| ACCEL POS #1                                    | ACCEL POS #2 | ACCEL POS #1                | ACCEL POS #2 |                                   |
| 0 V                                             | 0 V          | 0 V                         | 0 V          | VC circuit open                   |
| 0 V                                             | 1.8 – 2.7 V  | 0 V                         | 4.7 – 5.1 V  | VPA circuit open or ground short  |
| 0.3 – 0.9 V                                     | 0 V          | 3.2 – 4.8 V                 | 0 V          | VPA2 circuit open or ground short |
| 5 V                                             | 5 V          | 5 V                         | 5 V          | E2 circuit open                   |

## WIRING DIAGRAM



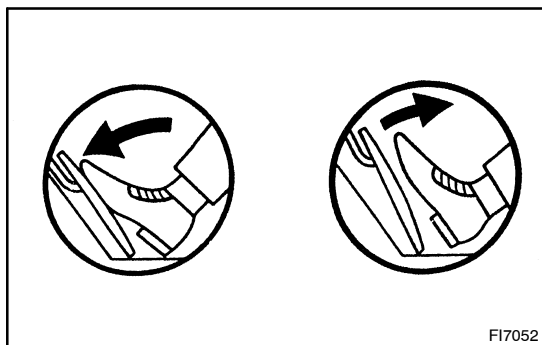
## INSPECTION PROCEDURE

### HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the 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.

### TOYOTA hand-held tester:

|   |                                                                                                          |
|---|----------------------------------------------------------------------------------------------------------|
| 1 | <b>Connect TOYOTA hand-held tester, and read the voltage for accelerator pedal position sensor data.</b> |
|---|----------------------------------------------------------------------------------------------------------|



### PREPARATION:

- Connect the TOYOTA hand-held tester to the DLC3.
- Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

### CHECK:

Read the voltage for the accelerator pedal position sensor data.

### OK:

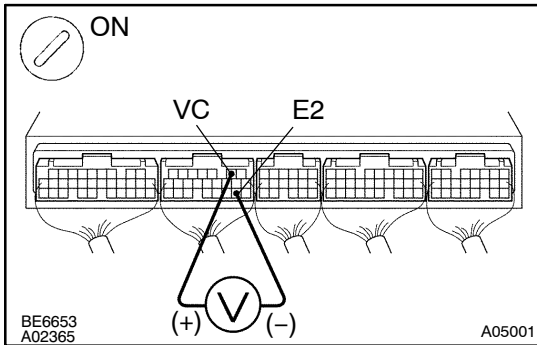
| Accelerator Pedal | VPA         | VPA2        |
|-------------------|-------------|-------------|
| Released          | 0.3 - 0.9 V | 1.8 - 2.7 V |
| Depressed         | 3.2 - 4.8 V | 4.7 - 5.1 V |

OK

**Check and replace ECM (See page [IN-34](#)).**

NG

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



### PREPARATION:

- Remove the glove compartment door.
- Turn the ignition switch ON.

### CHECK:

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

### OK:

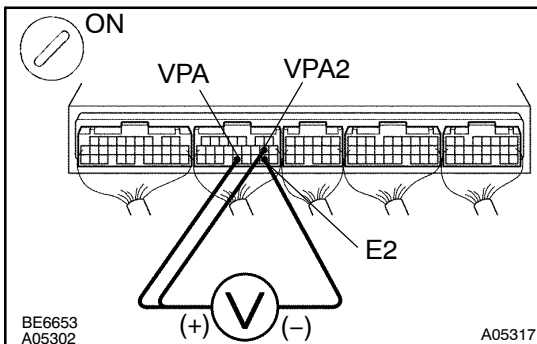
**Voltage: 4.5 – 5.5 V**

**NG**

**Check and replace ECM (See page [IN-34](#)).**

**OK**

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



### PREPARATION:

- Remove the glove compartment door.
- Turn the ignition switch ON.

### CHECK:

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

### 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-34](#)).**

**NG**

## 4 Check accelerator pedal position sensor (See page [SF-35](#)).

**NG**

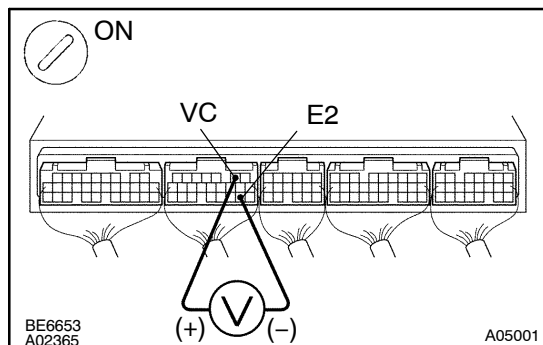
**Replace accelerator pedal position sensor (See page [SF-40](#)).**

**OK**

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page [IN-34](#)).

## OBD II scan tool (excluding TOYOTA hand-held tester):

### 1 Check voltage between terminals VC and E2 of ECM connector.



#### PREPARATION:

- (a) Remove the glove compartment door.
- (b) Turn the ignition switch ON.

#### CHECK:

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

#### OK:

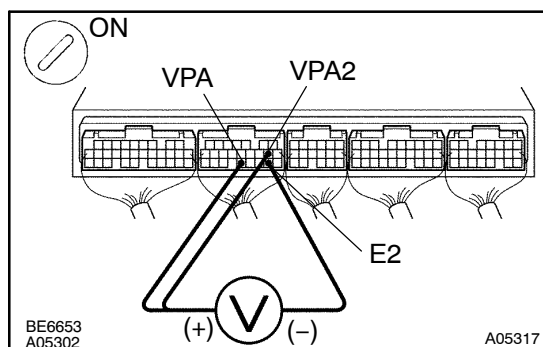
**Voltage: 4.5 – 5.5 V**

**NG**

Check and replace ECM (See page [IN-34](#)).

**OK**

### 2 Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connector.



#### PREPARATION:

- (a) Remove the glove compartment door.
- (b) Turn the ignition switch ON.

#### CHECK:

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

#### 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**

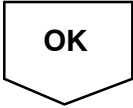
Check and replace ECM (See page [IN-34](#)).

**NG**

### 3 Check accelerator pedal position sensor (See page [SF-35](#)).

NG

Replace accelerator pedal position sensor (See page [SF-40](#)).

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page [IN-34](#)).