

<b>DTC</b>	<b>P0120</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction</b>
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## CIRCUIT DESCRIPTION

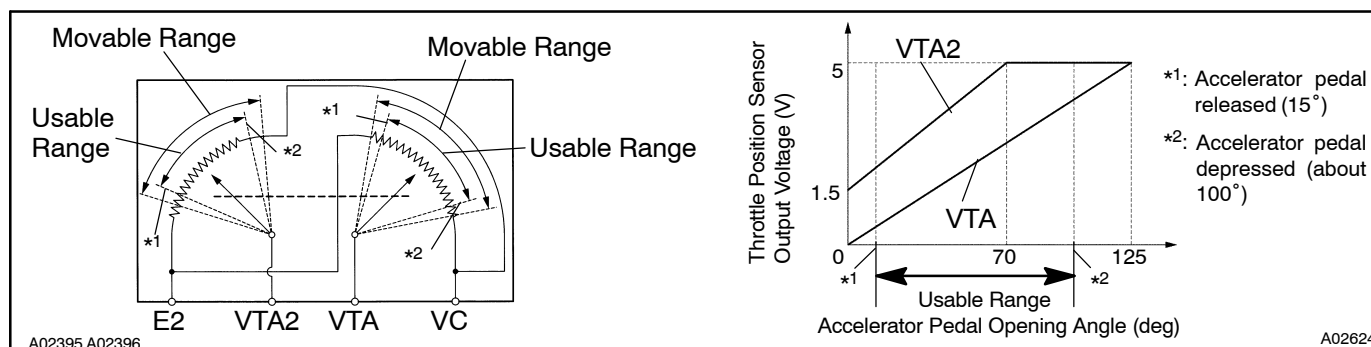
Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.

The voltage applied to the terminals VTA and VTA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.

The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driving condition.

If this DTC is stored, the ECM shuts down the power for the throttle motor and the electromagnetic 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.



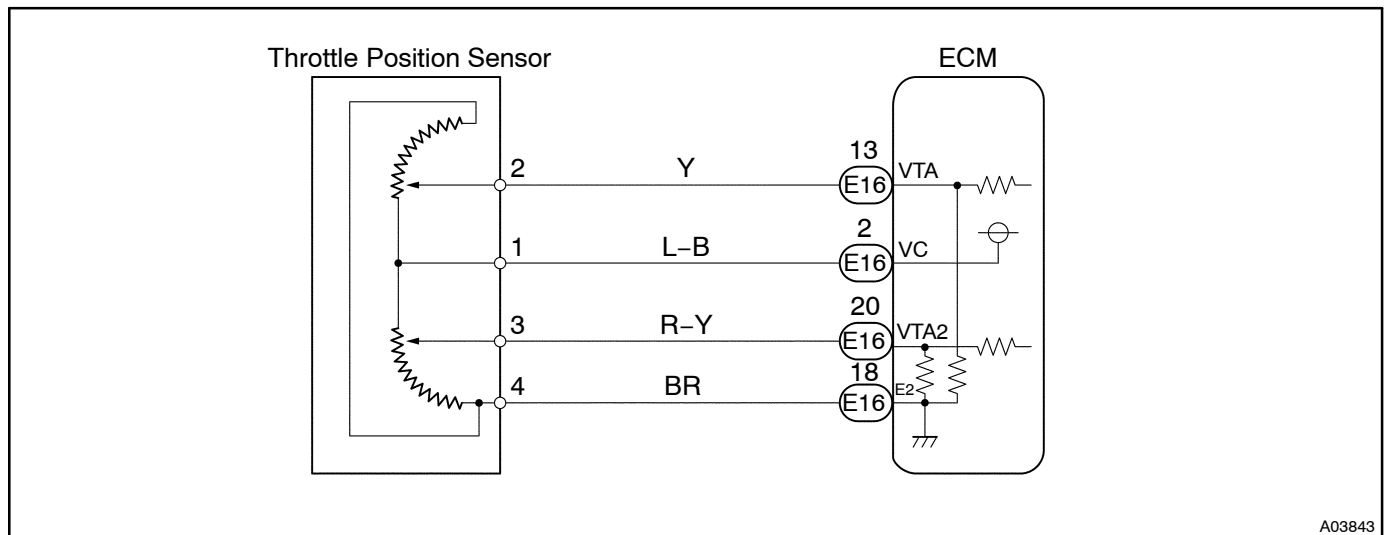
DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) $VTA \leq 0.2 \text{ V}$ (b) $VTA2 \leq 0.5 \text{ V}$ (c) $VTA \geq 4.8 \text{ V}$ (d) When $VTA \geq 0.2 \text{ V}$ and $\leq 2.0 \text{ V}$ , and VTA (e) $VTA - VTA2 \leq 0.02 \text{ V}$	<ul style="list-style-type: none"> <li>• Open or short in throttle position sensor circuit</li> <li>• Throttle position sensor</li> <li>• ECM</li> </ul>
	Condition (a) continues for 0.4 seconds: (a) $VTA \leq 0.2 \text{ V}$ and $VTA2 \leq 0.5 \text{ V}$	

### HINT:

After confirming DTC P0120, use the OBD II scan tool or LEXUS hand-held tester to confirm the throttle valve opening percentage.

Throttle valve opening position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC circuit open
0 %	2.0 – 2.9 V	0 %	4.6 – 5.1 V	VTA circuit open or ground short
8 – 20 %	0 V	64 – 96 %	0 V	VTA2 circuit open or ground short
100 %	5 V	100 %	5 V	E2 circuit open

## WIRING DIAGRAM



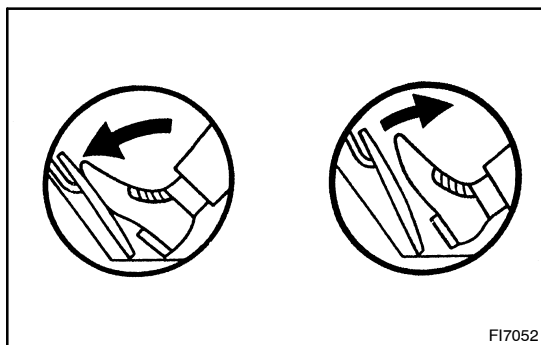
## INSPECTION PROCEDURE

### HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using LEXUS 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.

### LEXUS hand-held tester:

1	<b>Connect LEXUS hand-held tester, and read throttle valve opening percentage.</b>
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### PREPARATION:

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

### CHECK:

Read the throttle valve opening percentage for VTA circuit and read the voltage for VTA2 circuit.

### OK:

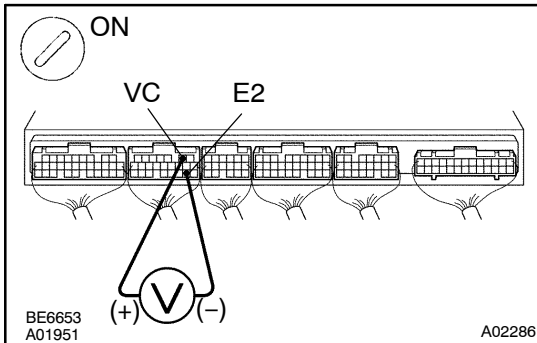
Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	64 - 96 %	4.6 - 5.1 V
Depressed	8 - 20 %	2.0 - 2.9 V

OK

**Check and replace ECM (See page [IN-30](#)).**

NG

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



### PREPARATION:

- Remove the ECM protector.
- Turn the ignition switch ON.

### CHECK:

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

### OK:

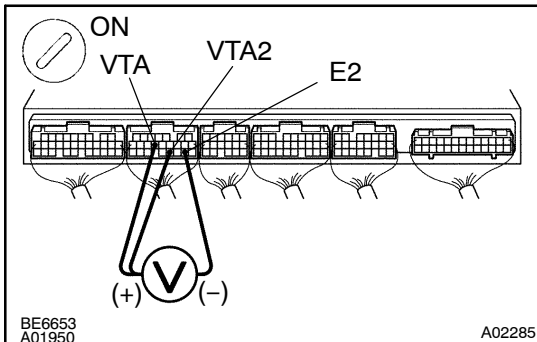
**Voltage: 4.5 – 5.5 V**

**NG**

**Check and replace ECM (See page [IN-30](#)).**

**OK**

## 3 Check voltage between terminals VTA and E2, and VTA2 and E2 of ECM connector.



### PREPARATION:

- Remove the ECM protector.
- Turn the ignition switch ON.

### CHECK:

Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the ECM connector.

### OK:

Accelerator Pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

**OK**

**Check and replace ECM (See page [IN-30](#)).**

**NG**

## 4 Check throttle position sensor (See page [SF-37](#)).

**NG**

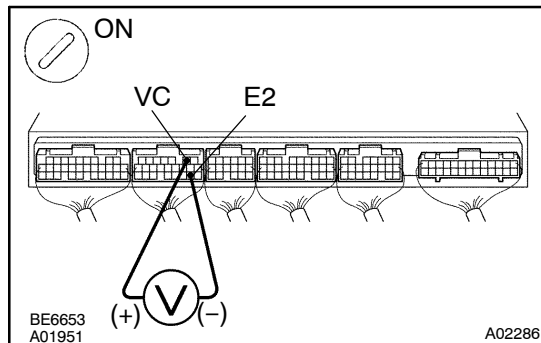
**Replace throttle position sensor (See page [SF-44](#)).**

**OK**

Check for open and short in harness and connector in VC, VTA VTA2 and E2 circuits between ECM and throttle position sensor (See page [IN-30](#)).

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

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



#### PREPARATION:

- (a) Remove the ECM protector.
- (b) Turn the ignition switch ON.

#### CHECK:

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

#### OK:

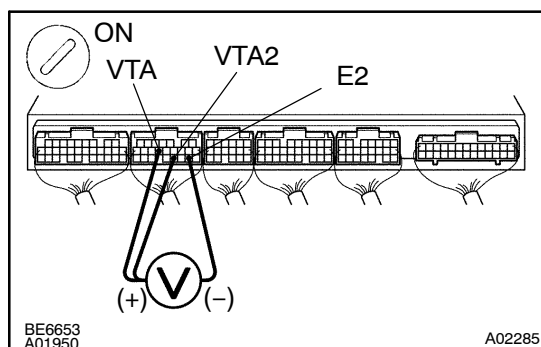
**Voltage: 4.5 – 5.5 V**

**NG**

**Check and replace ECM (See page [IN-30](#)).**

**OK**

### 2 Check voltage between terminals VTA and E2, and VTA2 and E2 of ECM connector.



#### PREPARATION:

- (a) Remove the ECM protector.
- (b) Turn the ignition switch ON.

#### CHECK:

Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the ECM connector.

#### OK:

Accelerator pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

**OK**

**Check and replace ECM (See page [IN-30](#)).**

**NG**

### 3 Check throttle position sensor (See page [SF-37](#)).

**NG****Replace throttle position sensor  
(See page [SF-44](#)).****OK****Check for open and short in harness and connector in VC, VTA VTA2 and E2 circuits between ECM and throttle position sensor (See page [IN-30](#)).**