

DTC	P0120	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction
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CIRCUIT DESCRIPTION

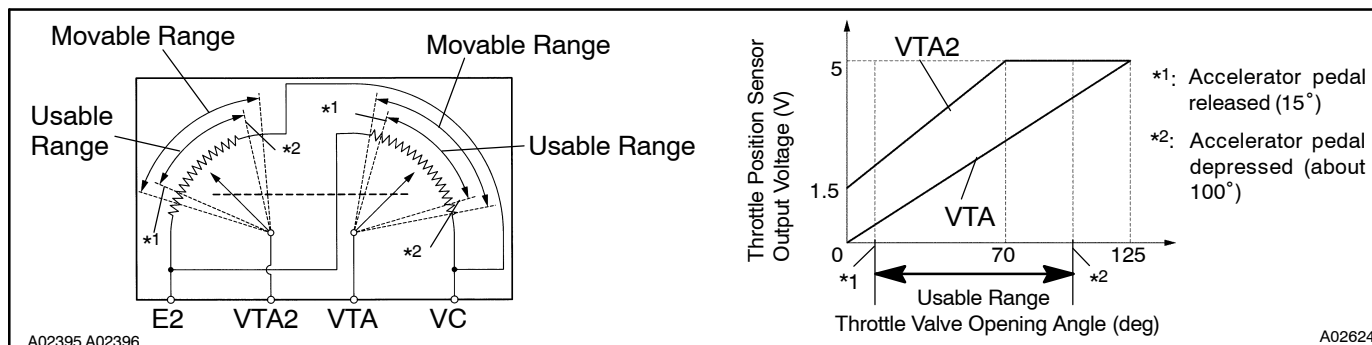
Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.

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.



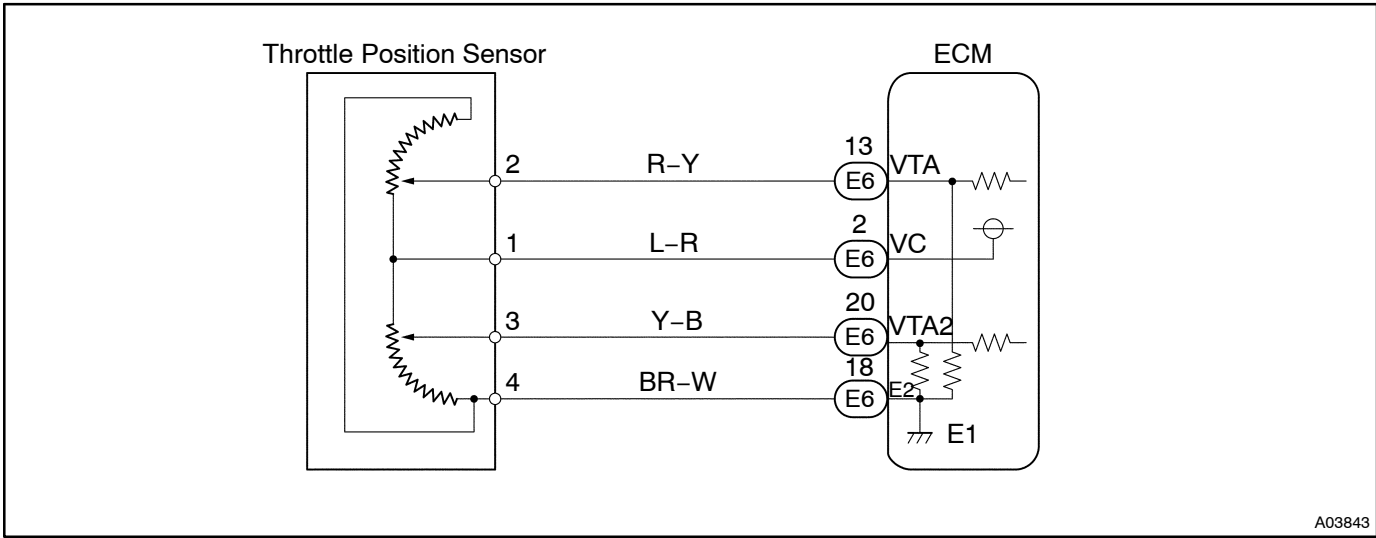
DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) $VTA \leq 0.2 \text{ V}$ (b) $VTA2 \leq 0.5 \text{ V}$ (c) $VTA \geq 4.8 \text{ V}$ (d) When $VTA \geq 0.2 \text{ V}$ and $\leq 2.0 \text{ V}$, and $VTA2 \geq 4.97 \text{ V}$ (e) $VTA - VTA2 \leq 0.02 \text{ V}$, or $VTA2 - VTA \geq 0.02 \text{ V}$	• Open or short in throttle position sensor circuit • Throttle position sensor • ECM
	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 TOYOTA hand-held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

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 %	4.7 – 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



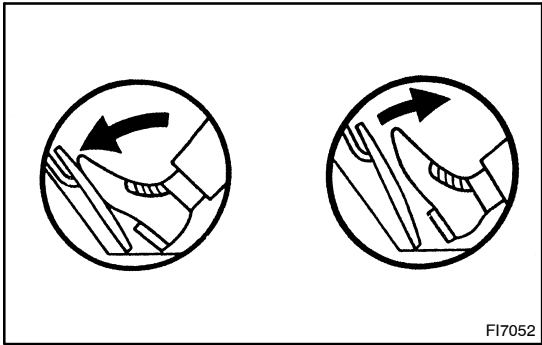
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using 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	Connect TOYOTA hand-held tester, and read throttle valve opening percentage.
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PREPARATION:

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

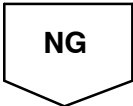
CHECK:

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

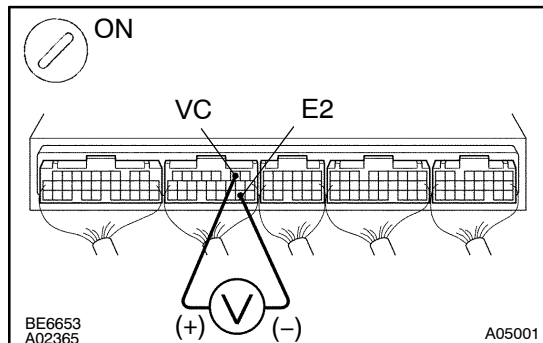
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 - 20 %	2.0 - 2.9 V
Depressed	64 - 96 %	4.7 - 5.1 V

OK	Check and replace ECM (See page IN-34).
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2 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:

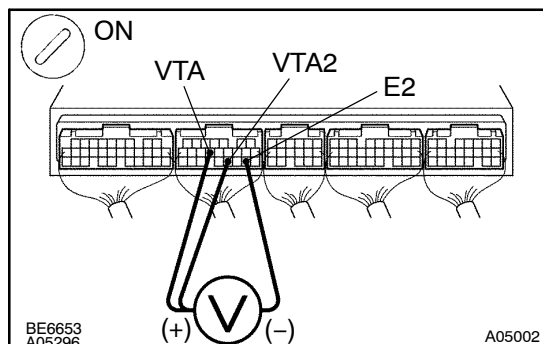
Voltage: 4.5 – 5.5 V

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

OK

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

**PREPARATION:**

- (a) Remove the glove compartment door.
- (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	4.7 – 5.1 V

OK

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

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

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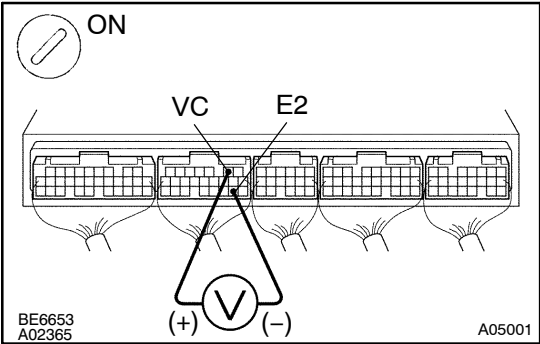
Replace throttle position sensor (See page [SF-40](#)).

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-34](#)).

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

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

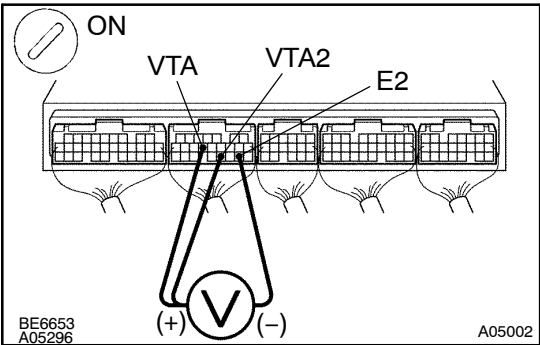
OK:

Voltage: 4.5 – 5.5 V

NG	Check and replace ECM (See page IN-34).
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OK

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

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

CHECK:

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

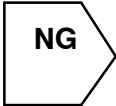
OK:

Accelerator pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK	Check and replace ECM (See page IN-34).
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3	Check throttle position sensor (See page SF-35).
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Replace throttle position sensor
(See page [SF-40](#)).

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-34](#)).