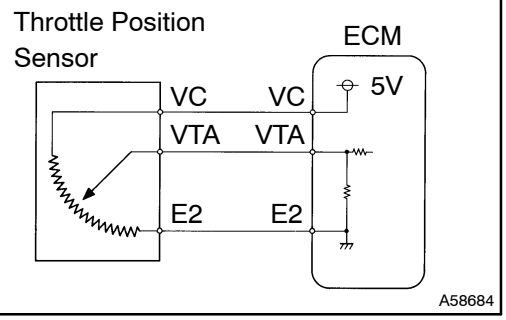
DTC	P0120/41	THROTTLE/PEDAL POSITION SENSOR/SWITCH ”A” CIRCUIT

CIRCUIT DESCRIPTION



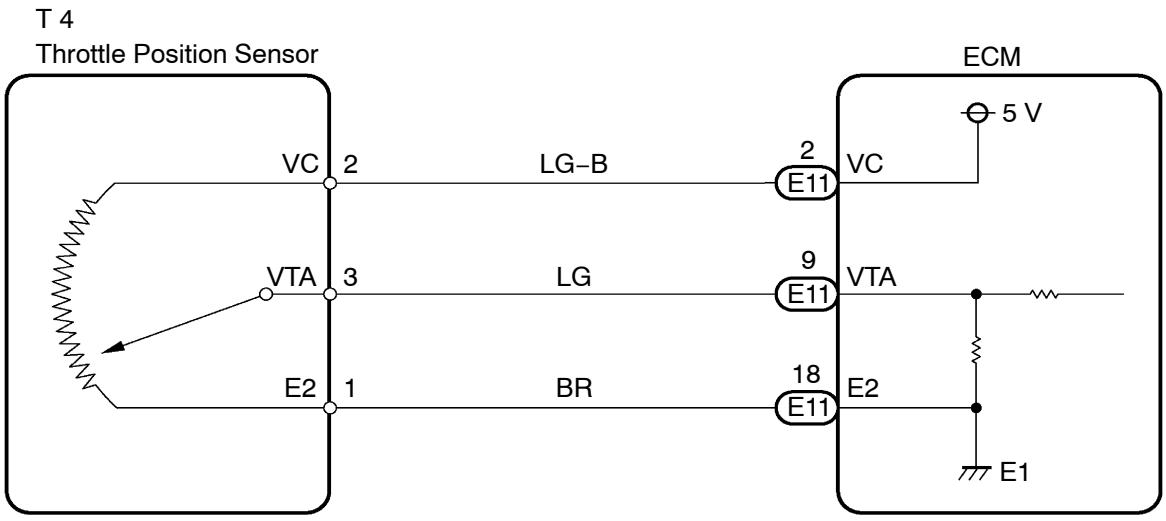
The throttle position sensor is mounted on the throttle body and detect the throttle valve opening angle.
When the throttle valve is fully closed, a voltage of approximately 0.3 – 0.8 V is applied to terminal VTA of the ECM. When the throttle valve is opened, the voltage applied to the terminal VTA of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 3.2 – 4.9 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions from these signals input from terminal VTA, uses them as one of the conditions for deciding the air–fuel ratio correction, power increase correction and fuel–cut control etc.

DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (a) or (b) continues with more than 5 sec. (c) VTA < 0.1 V (d) VTA > 4.9 V	• Open or short in throttle position sensor circuit • Throttle position senor • ECM

HINT:
After confirming DTC P0120/41 use the hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Throttle valve opening position expressed as percentage		Trouble Area
Throttle valve fully closed	Throttle valve fully open	
0 %	0 %	VC circuit open VTA circuit open or short
Approx. 100 %	Approx. 100 %	E2 circuit open

WIRING DIAGRAM



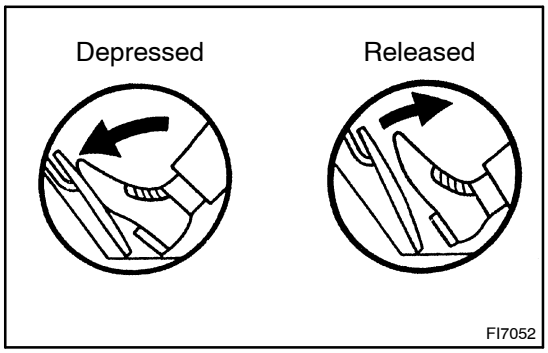
INSPECTION PROCEDURE

HINT:

- Read freed frame data using hand–held tester, 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.
- 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.

When using hand–held tester:

1	READ VALUE OF HAND–HELD TESTER (THROTTLE POS)



(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/THROTTLE POS” and read its value displayed hand–held tester.

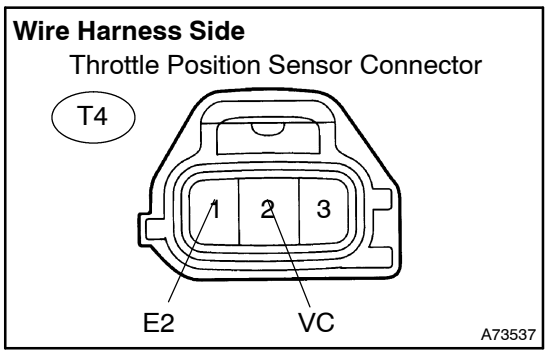
Result:

Accelerator pedal	Throttle valve opening position expressed as percentage
Fully depressed	Approx. 75 %
Fully released	Approx. 10 %

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

NG

2	CHECK HARNESS AND CONNECTOR (VC VOLTAGE)



(a) Disconnect the T4 throttle position sensor connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the throttle position sensor wire harness side connector.

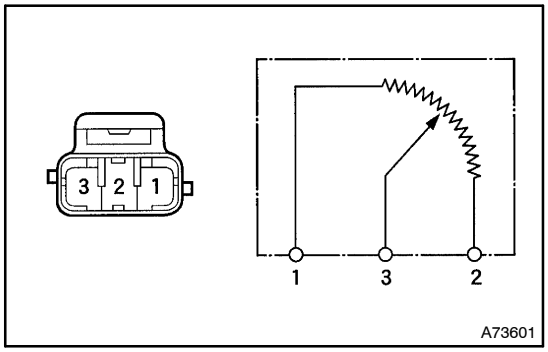
Voltage:

Symbols (Terminal No.)	Specified condition
VC (T4–2) ⇔ E2 (T4–1)	4.5 – 5.5 V

NG → **Go to step 6**

OK

3 INSPECT THROTTLE POSITION SENSOR



(a) Measure the resistance between the terminals.

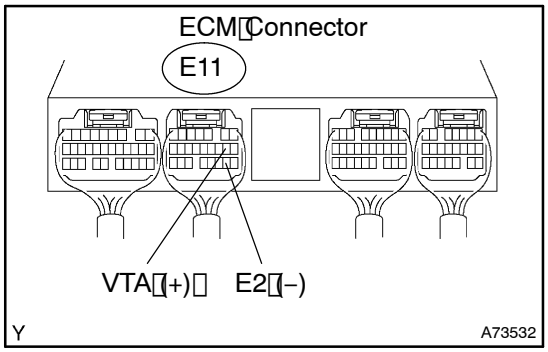
Resistance:

Terminal No.	Throttle valve	Specified condition
1 ⇔ 2	–	2.5 – 6.0 kΩ
1 ⇔ 3	Fully open	0.2 – 5.7 kΩ
	Fully closed	2.0 – 10.2 kΩ

NG → **REPLACE THROTTLE POSITION SENSOR (See page 10–10)**

OK

4 CHECK ECM (VTA VOLTAGE)



(a) Turn the ignition switch.

(b) Measure the voltage between the terminals of the E11 ECM connector.

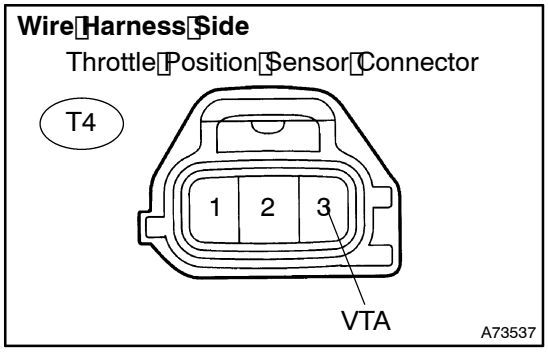
Voltage:

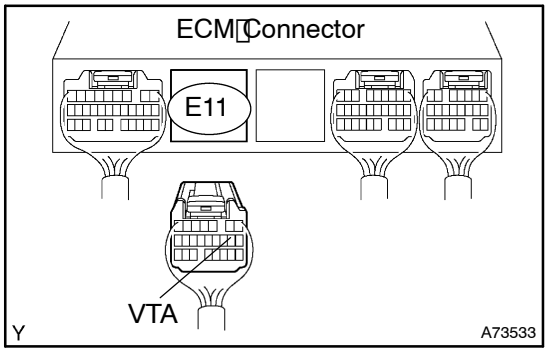
Symbols (Terminal No.)	Throttle valve	Specified condition
VTA (E11–9) ⇔ E2 (E11–18)	Fully closed	0.3 – 0.8 V
	Fully open	3.2 – 4.9 V

OK → **CHECK AND REPLACE ECM (See page 01–36)**

NG

5 CHECK HARNESS AND CONNECTOR (THROTTLE POSITION SENSOR ⇔ ECM)





(a) Disconnect the T4 throttle position sensor connector.

(b) Disconnect the E11 ECM connector.

(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VTA (T4–3) ⇔ VTA (E11–9)	Continuity

Standard (Check for short):

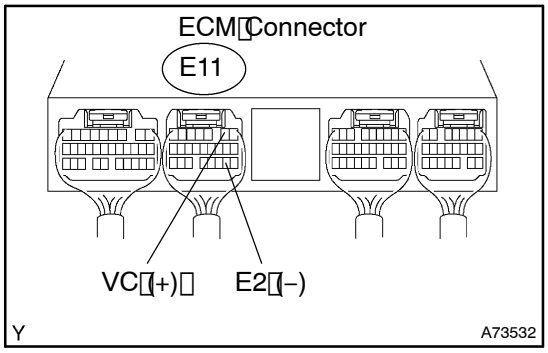
Symbols (Terminal No.)	Specified condition
VTA (T4–3) or VTA (E11–9) ⇔ Other terminals and body ground	No continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM (See page 01–36)

6 CHECK ECM (VC VOLTAGE)



(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the E11 ECM connector.

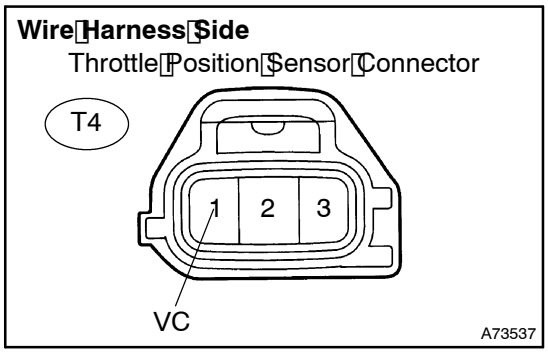
Voltage:

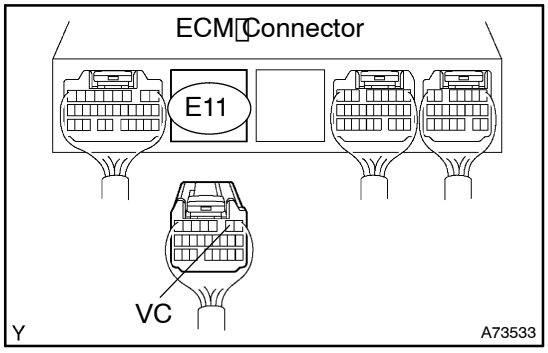
Symbols (Terminal No.)	Specified condition
VC (E11–2) ⇔ E2 (E11–18)	4.5 – 5.5 V

NG → CHECK AND REPLACE ECM (See page 01–36)

OK

7 CHECK HARNESS AND CONNECTOR (THROTTLE POSITION SENSOR ⇔ ECM)





(a) Disconnect the T4 throttle position sensor connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VC (T4–1) ⇔ VC (E11–2)	Continuity

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
VC (T4–1) or VC (E11–2) ⇔ Other terminals and body ground	No continuity

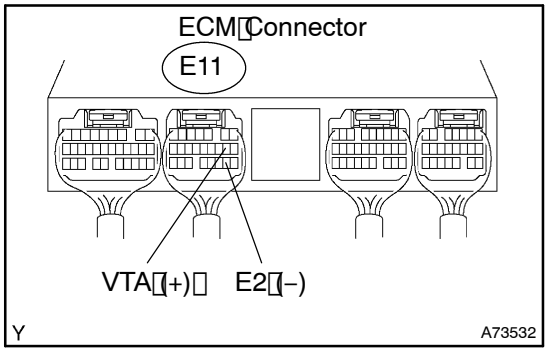
NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM (See page 01–36)

When not using hand–held tester:

1 CHECK ECM (VTA VOLTAGE)



(a) Turn the ignition switch.
(b) Measure the voltage between the terminals of the E11 ECM connector.

Voltage:

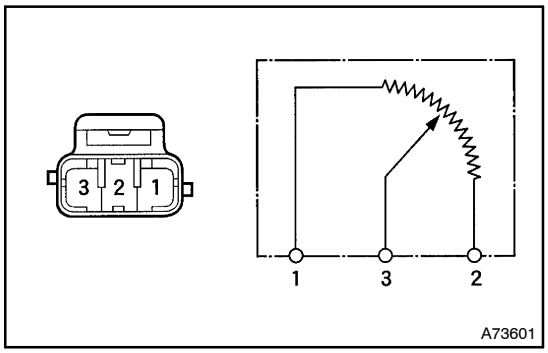
Symbols (Terminal No.)	Throttle valve	Specified condition
VTA (E11–9) ⇔ E2 (E11–18)	Fully closed	0.3 – 0.8 V
	Fully open	3.2 – 4.9 V

HINT:
The voltage should increase steadily in proportion to the throttle valve opening angle.

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

NG

2 INSPECT THROTTLE POSITION SENSOR



(a) Measure the resistance between the terminals.

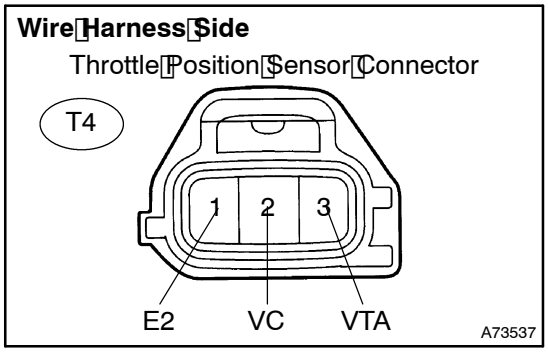
Resistance:

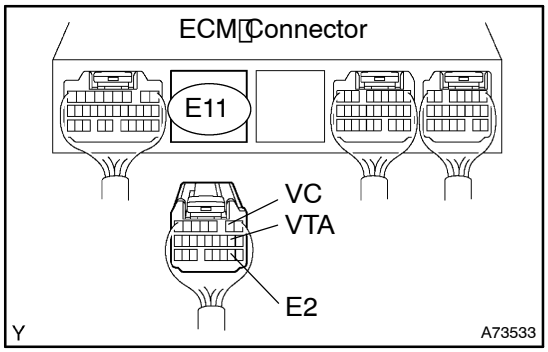
Terminal No.	Throttle valve	Specified condition
1 ⇔ 2	–	2.5 – 6.0 kΩ
1 ⇔ 3	Fully open	0.2 – 5.7 kΩ
	Fully closed	2.0 – 10.2 kΩ

NG → **REPLACE THROTTLE POSITION SENSOR (See page 10–10)**

OK

3 CHECK HARNESS AND CONNECTOR (THROTTLE POSITION SENSOR ⇔ ECM)





(a) Disconnect the T4 throttle position sensor connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connector.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
E2 (T4–1) ⇔ E2 (E11–18)	Continuity
VC (T4–2) ⇔ VC (E11–2)	
VTA (T4–3) ⇔ VTA (E11–9)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
VC (T4–2) or VC (E11–2) ⇔ Other terminals and body ground	No continuity
VTA (T4–3) or VTA (E11–9) ⇔ Other terminals and body ground	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE ECM (See page 01–36)