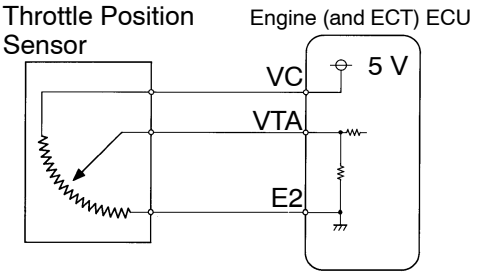
DIAFZ–01

DTC	P0120/41	Throttle/Pedal Position Sensor/Switch ”A” Circuit Malfunction

CIRCUIT DESCRIPTION



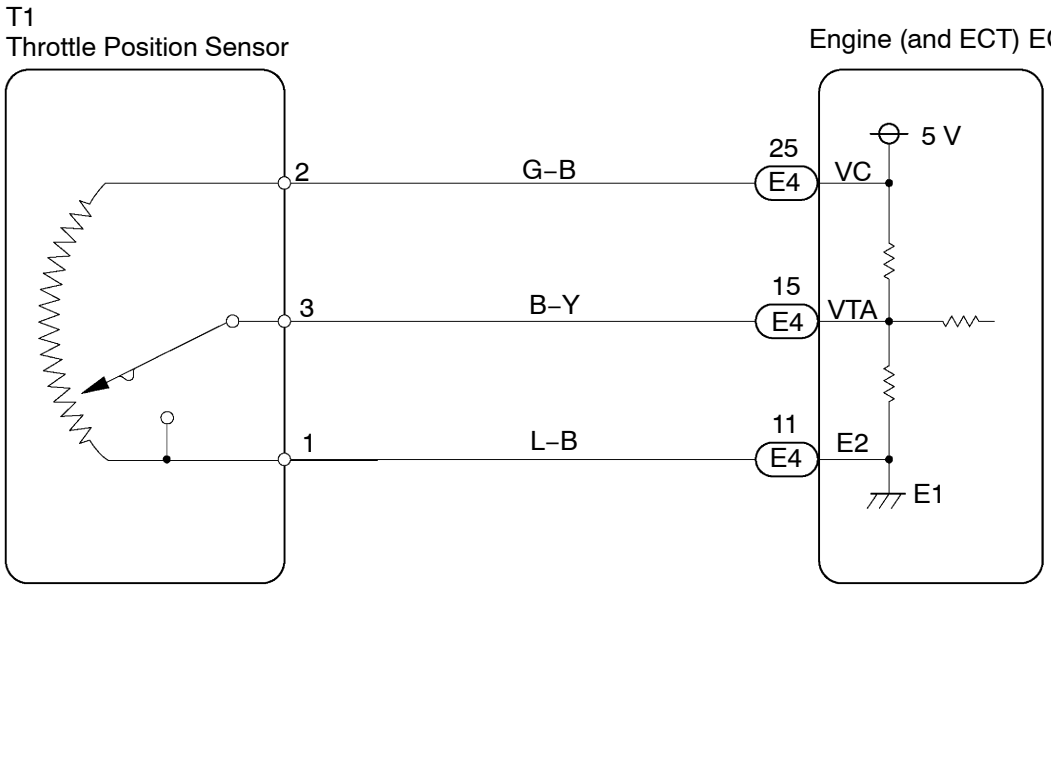
The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle. When the throttle valve is fully closed, a voltage of approximately 0.3 – 1.0 V is applied to terminal VTA of the engine (and ECT) ECU. The voltage applied to terminals VTA of the engine (and ECT) ECU increases in proportion to opening angle of the throttle valve and becomes approximately 2.7 – 5.2 V when the throttle valve is fully opened. The engine (and ECT) ECU judges the vehicle driving conditions from these signal inputs from terminals VTA and uses them as one of the conditions for deciding the air–fuel ratio correction, the power increase correction and the fuel–cut control etc.

DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (1) or (2) continues with more than 5 seconds: 1. VTA < 0.1 V 2. VTA > 4.9 V	• Open or short in throttle position sensor circuit • Throttle position senor • Engine (and ECT) ECU

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 line open VTA line open or short
Approx. 100 %	Approx. 100 %	E2 line open

WIRING DIAGRAM



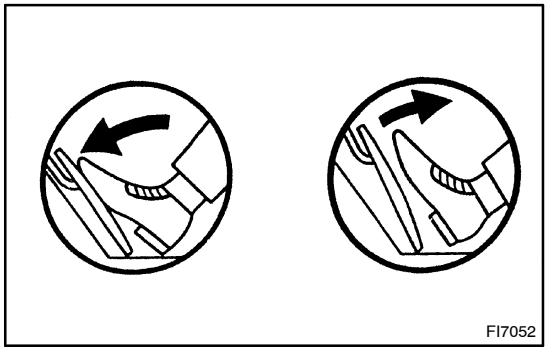
INSPECTION PROCEDURE

HINT:

- If DTC P0110/24, P0115/22, P0120/41 are output simultaneously, E2 (Sensor Ground) may be open.
- Read the freed frame data using hand–held tester, which is recorded when a malfunction is detected on the engine. When troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Connect the hand–held tester and read the throttle valve opening percentage.**



PREPARATION:

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

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

CHECK:

Read the throttle valve opening percentage.

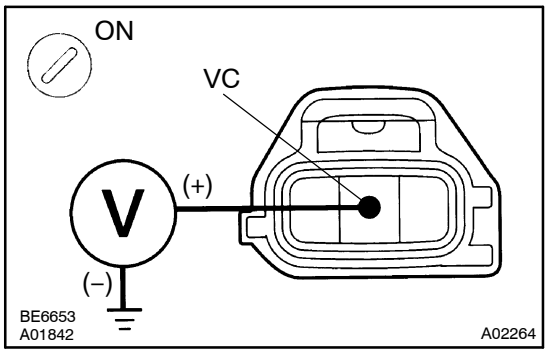
OK:

Throttle valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 75 %
Fully closed	Approx. 10 %

OK → **Check for intermittent problems (See page DI–4).**

NG

2	**Check voltage between terminal VC of wire harness side connector and body ground.**



PREPARATION:

(a) Disconnect the throttle position sensor connector.

(b) Turn ignition switch ON.

CHECK:

Measure the voltage between terminals VC of wire harness side connector and body ground.

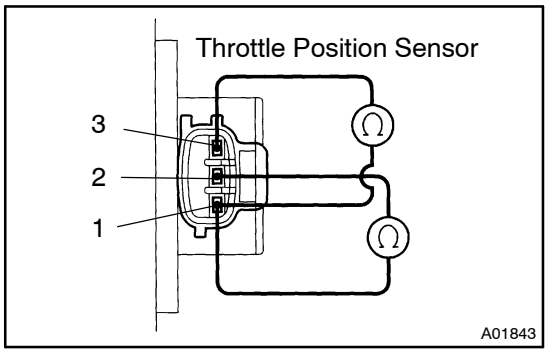
OK:

Voltage: 4.5 – 5.5 V

NG → **Go to step 6.**

OK

3	Check throttle position sensor.



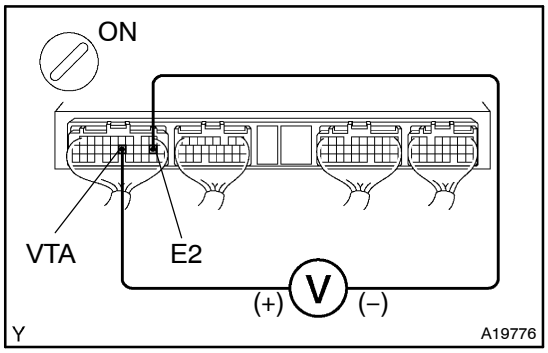
PREPARATION:
Disconnect the throttle position sensor connector.
CHECK:
Measure the resistance between terminals 1, 3 and 2 of the throttle position sensor.
OK:

Terminals	Throttle valve	Resistance kΩ
1 – 2	—	2.5 – 6.0
1 – 3	Fully closed	0.4 – 11.0
	Fully open	1.9 – 15.0

NG → **Replace throttle position sensor.**

OK

4	Check voltage between terminals VTA and E2 of engine (and ECT) ECU connector.



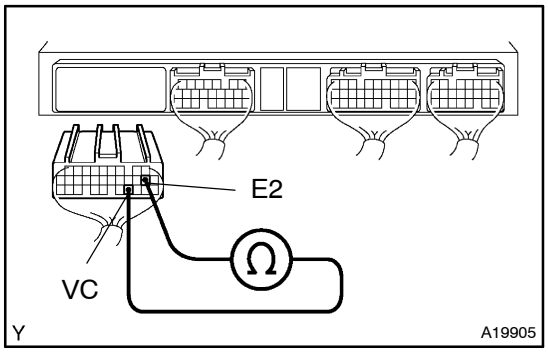
PREPARATION:
(a) Remove the glove compartment door.
(b) Turn ignition switch ON.
CHECK:
Measure the voltage between terminals VTA and E2 of the engine (and ECT) ECU connector.
OK:

Throttle valve	Voltage V
Fully closed	0.3 – 1.0
Fully open	2.7 – 5.2

OK → **Check and replace engine (and ECT) ECU (See page IN–20).**

NG

5	Check continuity between terminals VC and E2 of engine (and ECT) ECU connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E4 connecter of the engine (and ECT) ECU.

CHECK:

Measure the resistance between terminals VC and E2 of the engine (and ECT) ECU connector.

OK:

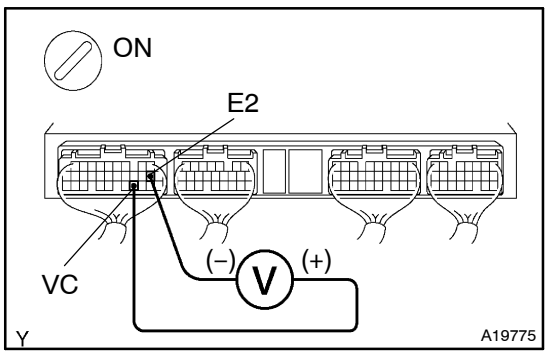
Resistance: 2.5 – 5.9 kΩ

NG	Check for open and short in harness and connector between engine ECU and throttle position sensor (E2 line) (See page IN–20).

OK

Check for open and short in harness and connector between engine (and ECT) ECU and throttle position sensor (VTA line) (See page IN–20).

6	Check voltage between terminals VC and E2 of engine (and ECT) ECU connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of engine (and ECT) ECU connector.

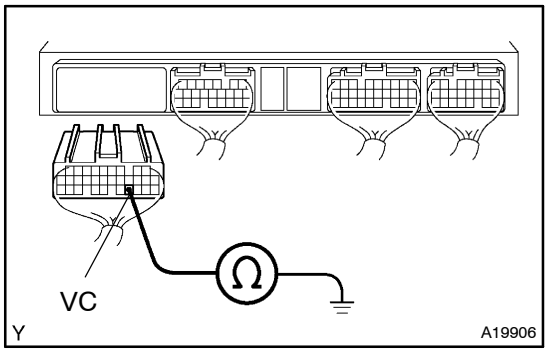
OK:

Voltage: 4.5 – 5.5 V

OK	Check for open in harness and connector between engine (and ECT) ECU and sensor (VC line) (See page IN–20).

NG

7	Check continuity between terminals VC of engine (and ECT) ECU connector and body ground.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E4 connector of the engine (and ECT) ECU.

CHECK:

Measure the resistance between terminals VC of the engine (and ECT) ECU connector and the body ground.

OK:

Resistance: No continuity

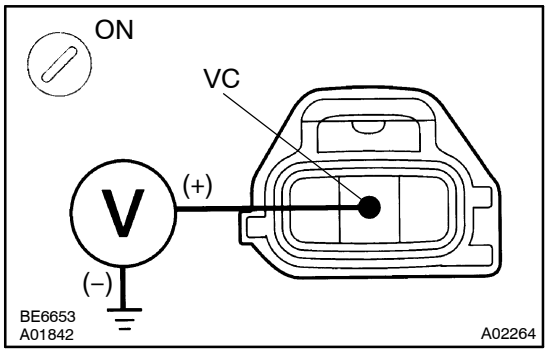
NG	Repair or replace harness and connector. (VC line).

OK

Check and replace engine (and ECT) ECU (See page IN–20).

When not using hand–held tester

1	Check voltage between terminal VC of wire harness side connector and body ground.



PREPARATION:

(a) Disconnect the throttle position sensor connector.

(b) Turn ignition switch ON.

CHECK:

Measure the voltage between terminals VC of wire harness side connector and the body ground.

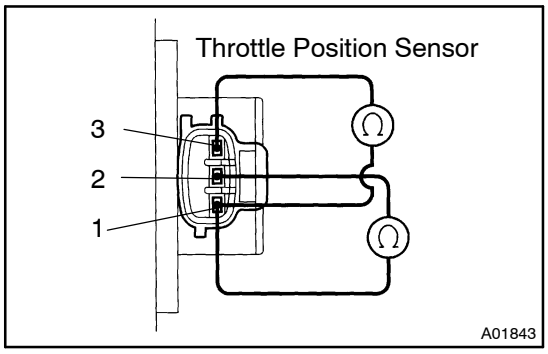
OK:

Voltage: 4.5 – 5.5 V

NG	Go to step 5.

OK

2	Check throttle position sensor.



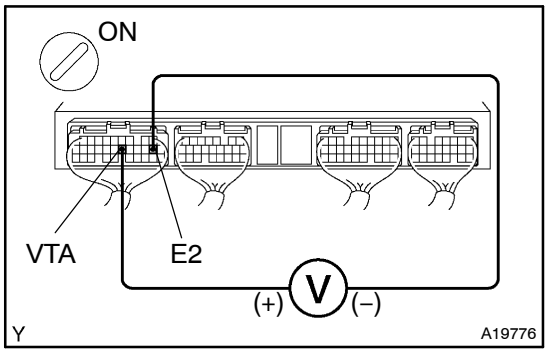
PREPARATION:
Disconnect the throttle position sensor connector.
CHECK:
Measure the resistance between terminals 1, 3 and 2 of throttle position sensor.
OK:

Terminals	Throttle valve	Resistance kΩ
1 – 2	–	2.5 – 6.0
2 – 3	Fully closed	0.4 – 11.0
	Fully open	1.9 – 15.0

NG → **Replace throttle position sensor.**

OK

3	Check voltage between terminals VTA and E2 of engine (and ECT) ECU connector.



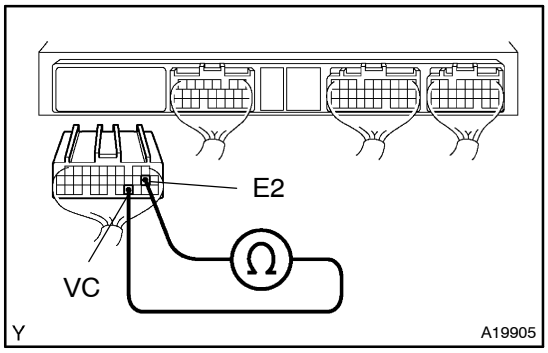
PREPARATION:
(a) Remove the glove compartment door.
(b) Turn ignition switch ON.
CHECK:
Measure the voltage between terminals VTA and E2 of the engine (and ECT) ECU.
OK:

Throttle valve	Voltage V
Fully open	0.3 – 1.0
Fully closed	2.7 – 5.2

OK → **Check and replace engine (and ECT) ECU (See page IN–20).**

NG

4	Check continuity between terminals VC and E2 of engine (and ECT) ECU connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E4 connecter of the engine (and ECT) ECU.

CHECK:

Measure the resistance between terminals VC and E2 of the engine (and ECT) ECU connector.

OK:

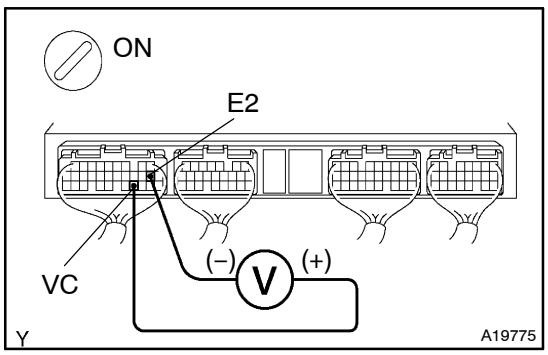
Resistance: 2.5 – 5.9 kΩ

NG	Check for open and short in harness and connector between engine ECU and throttle position sensor (VC line) (See page IN–20).

OK

Check for open and short in harness and connector between engine (and ECT) ECU and throttle position sensor (VTA line) (See page IN–20).

5	Check voltage between terminals VC and E2 of engine (and ECT) ECU connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the engine (and ECT) ECU connector.

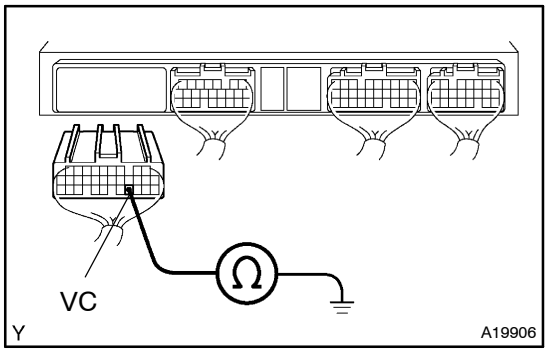
OK:

Voltage: 4.5 – 5.5 V

OK	Check for open in harness and connector between engine (and ECT) ECU and sensor (VC line) (See page IN–20).

NG

6	Check continuity between terminals VC of engine (and ECT) ECU connector and body ground.



PREPARATION:

(a) Remove the glove compartment door.

(b) Disconnect the E4 connector of the engine (and ECT) ECU.

CHECK:

Measure the resistance between terminals VC of the engine (and ECT) ECU connector and the body ground.

OK:

Resistance: No continuity

NG → **Repair or replace harness and connector. (VC line).**

OK

Check and replace engine (and ECT) ECU (See page IN–20).