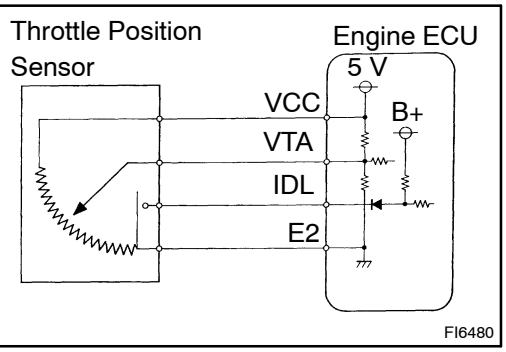
DTC	P0120/41	Throttle Position Sensor/Switch Circuit Malfunction

CIRCUIT DESCRIPTION



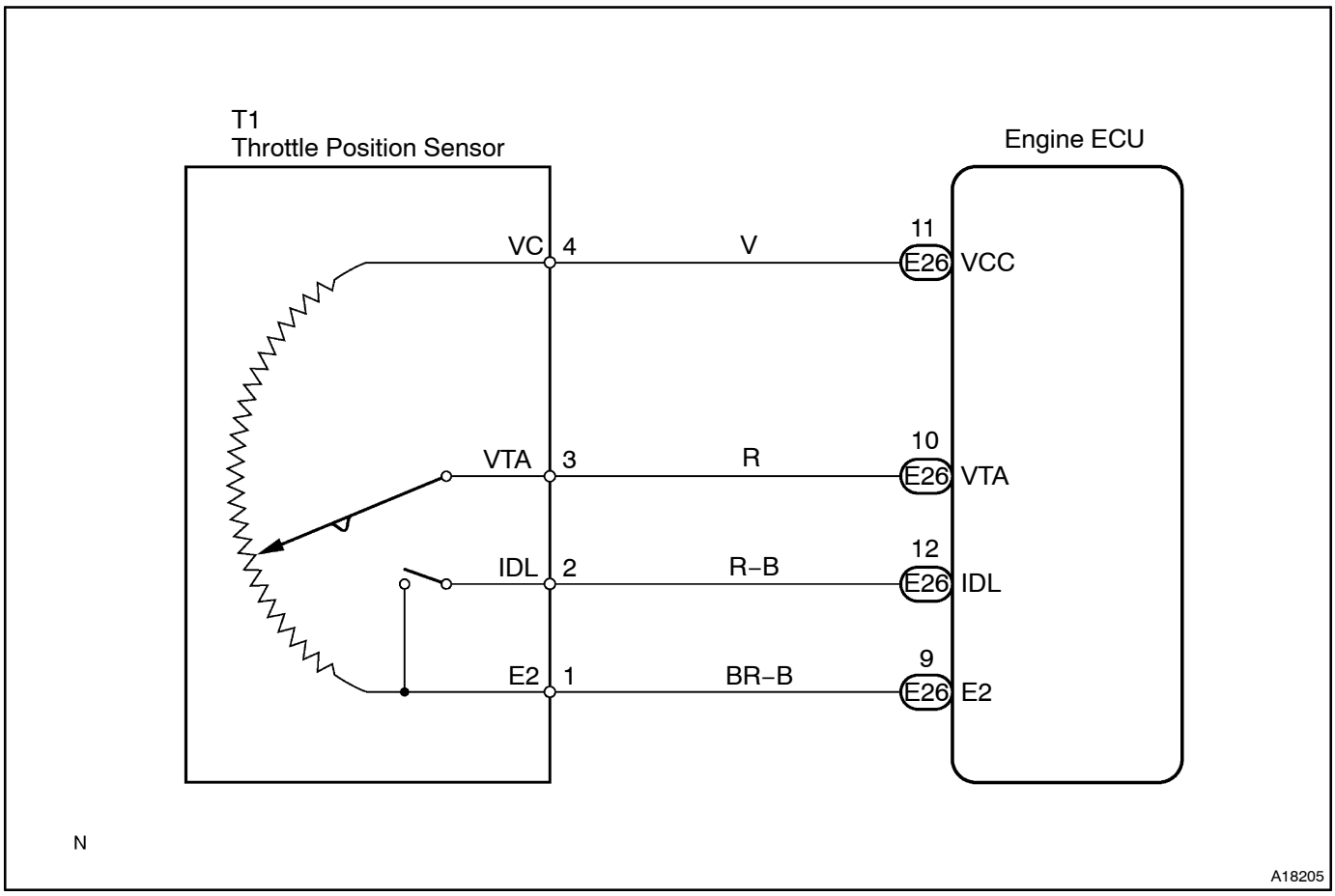
The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle.
When the throttle valve opening angle is less than 5°, the IDL contacts in the throttle position sensor are on, so the voltage at the terminal IDL of the engine ECU becomes 0 V. At this time, a voltage of approximately 0.6 V is applied to terminal VTA of the engine ECU. When the throttle valve is opened, the IDL contacts go off and thus the power source voltage of approximately 12 V in the engine ECU is applied to the terminal IDL of the engine ECU. The voltage applied to the terminal VTA of the engine ECU 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 engine ECU judges the vehicle driving conditions from these signals input from terminals VTA and IDL, and 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	Open or short in throttle position sensor circuit for 0.5 sec. or more	• Open or short in throttle position sensor • Throttle position senor • Engine 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



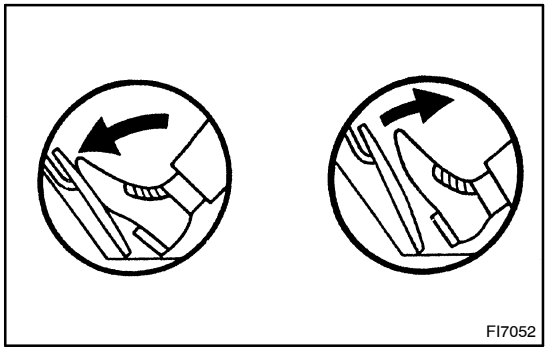
INSPECTION PROCEDURE

HINT:

- Read freed frame data using hand–held tester. 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 warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.
- If DTC ”P0105/31” (Vacuum Sensor Circuit Malfunction), ”P0110/24” (Intake Air Temp. Circuit Malfunction), ”P0115/22” (Water Temp. Circuit Malfunction), ”P0120/41” (Throttle Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

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.

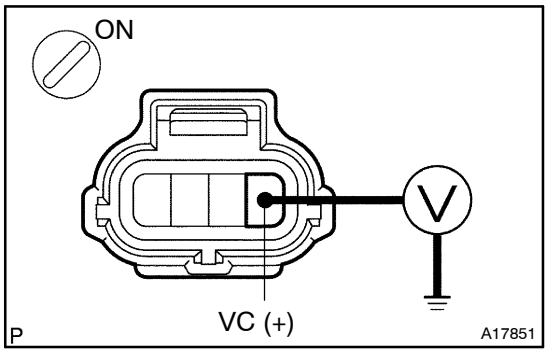
OK:

Throttle valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 70 %
Fully closed	Approx. 10 %

OK → **Check for intermittent problems (See page DI–18).**

NG

2	**Check voltage between terminal 4 (VC) of wire harness side connector and body ground.**



PREPARATION:

(a) Disconnect the throttle position sensor connector.

(b) Turn ignition switch ON.

CHECK:

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

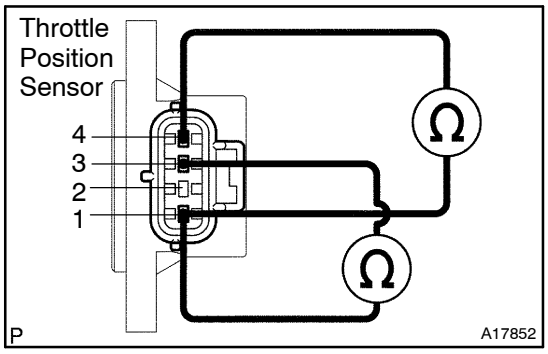
OK:

Voltage 4.5 ~ 5.5 V

NG → **Go to step 5.**

OK

3	Check throttle position sensor.



PREPARATION:

Disconnect the throttle position sensor connector.

CHECK:

Measure resistance between terminals 1, 3 and 4 of the throttle position sensor.

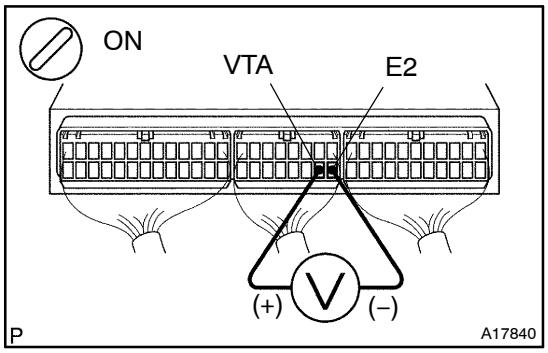
OK:

Terminals	Throttle valve	Resistance kΩ
1 – 4	—	3.5 – 6.5
1 – 3	Fully closed	0.2 – 5.7
	Fully open	2.0 – 10.2

NG → **Replace throttle position sensor.**

OK

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



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VTA and E2 of engine ECU connector.

OK:

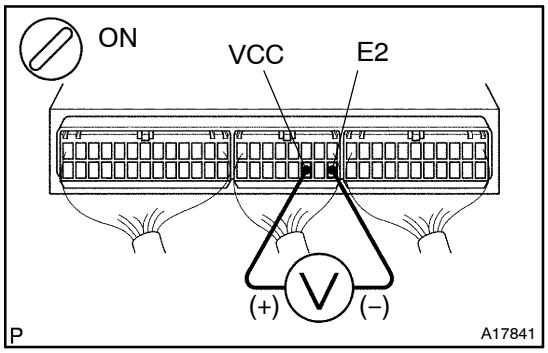
Throttle valve	Voltage
Fully closed	0.3 – 1.0 V
Fully open	3.2 – 4.9 V

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

OK

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

5	Check voltage between terminals VCC and E2 of engine ECU connector.



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VCC and E2 of engine ECU connector.

OK:

Voltage 4.5 – 5.5 V

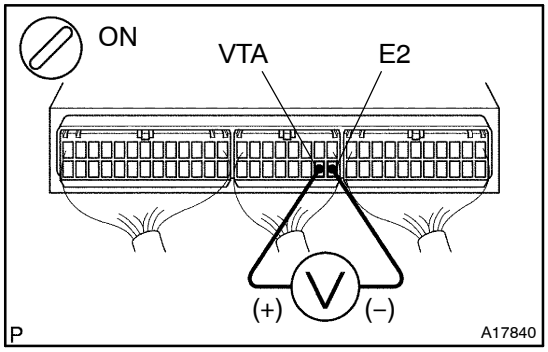
NG → **Check and replace engine ECU (See page IN–20).**

OK

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

When not using hand–held tester

1	Check voltage between terminals VTA and E2 of engine ECU.



PREPARATION:

(a) Remove the side trim bracket. (See page FU–48)

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VTA and E2 of engine ECU.

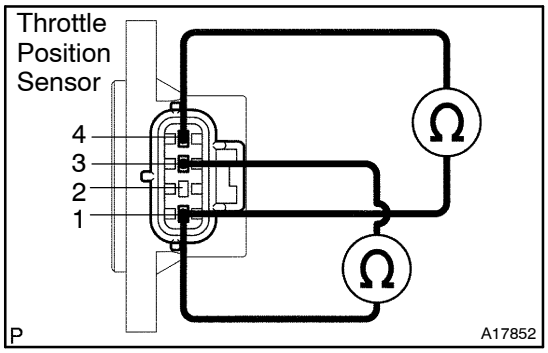
OK:

Throttle valve	Voltage V
Fully open	0.3 – 1.0
Fully closed	3.2 – 4.9

OK → **Check for intermittent problems (See page DI–18).**

NG

2	Check throttle position sensor.



PREPARATION:

Disconnect the throttle position sensor connector.

CHECK:

Measure resistance between terminals 1, 3 and 4 of throttle position sensor.

OK:

terminals	Throttle valve	Resistance kΩ
1 – 4	–	2.5 – 5.9
1 – 3	Fully closed	0.2 – 5.7
	Fully open	2.0 – 10.2

NG → **Replace throttle position sensor.**

OK ↓

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

NG → **Repair or replace harness or connector.**

OK ↓

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