DI9S0–01

DTC	19 (1)	Accelerator Pedal Position Sensor Circuit Malfunction (Open/Short)

CIRCUIT DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal and detects the accelerator pedal opening angle. When the accelerator pedal is fully closed, a voltage of approximately 1.6 V is applied to terminals VPA1 and VPA2 of the engine ECU. The voltage applied to terminals VPA1 and (VPA2) of the engine ECU increases in proportion to the opening angle of the accelerator pedal and becomes approximately 3.8 V when the accelerator pedal is fully opened. The engine ECU judges the vehicle driving conditions from these signals input from terminals VPA1 and (VPA2) and uses them as one of the conditions to control the injection volume and diesel throttle valve position. This system has 2 way accelerator pedal position sensor for fail–safe.

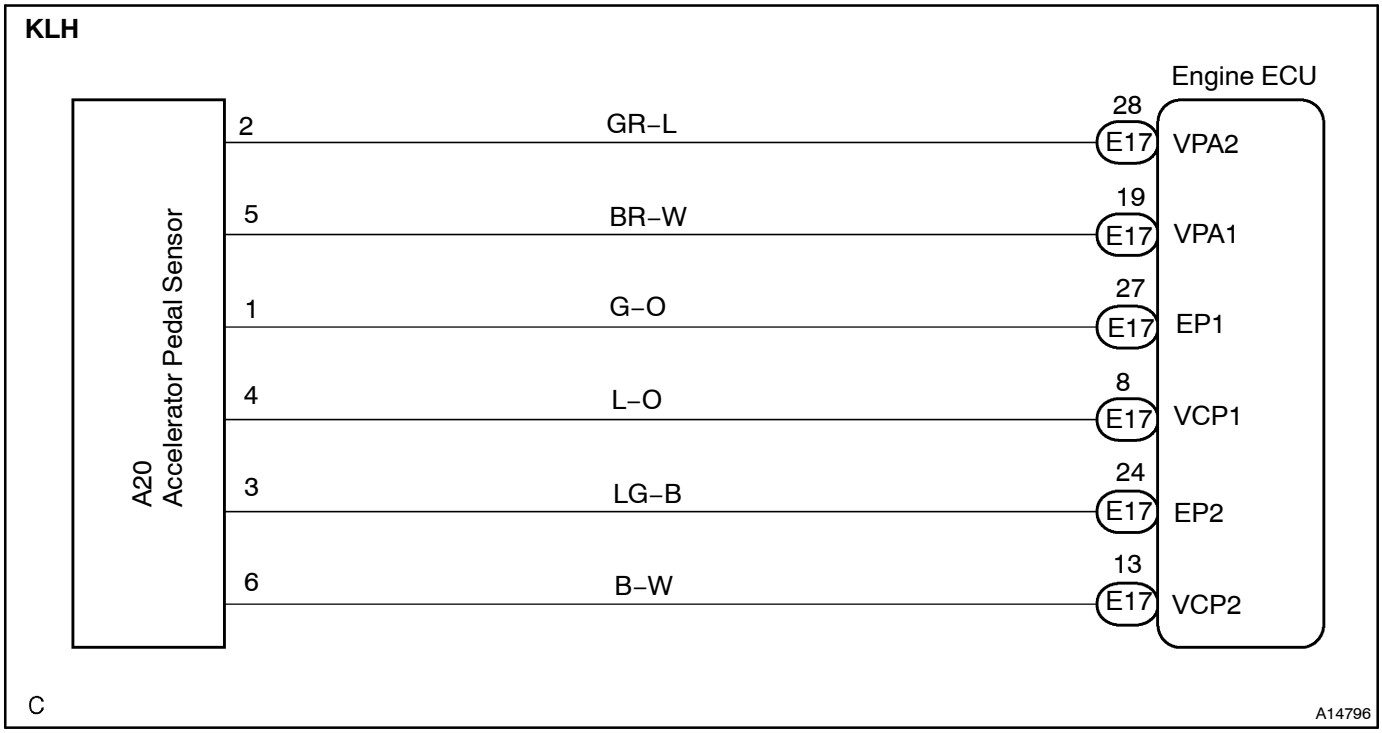
DTC No.	DTC Detecting Condition	Trouble Area
19(1)	Condition (a) or (b) continues for 0.5 sec. or more: (a) VPA1 ≦ 0.2 V when accelerator pedal is depressed (b) VPA2 ≦ 0.5 V when accelerator pedal is depressed	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU
	Conditions (a) and (c) continue 2.0 sec. or more: (a) VPA1 ≧ 4.8 V (b) 0.2V ≦ VPA1 ≦ 3.45 V and VPA2 ≧ 4.8 V (c) (VPA1 – VAS) ≦ 0.02V	

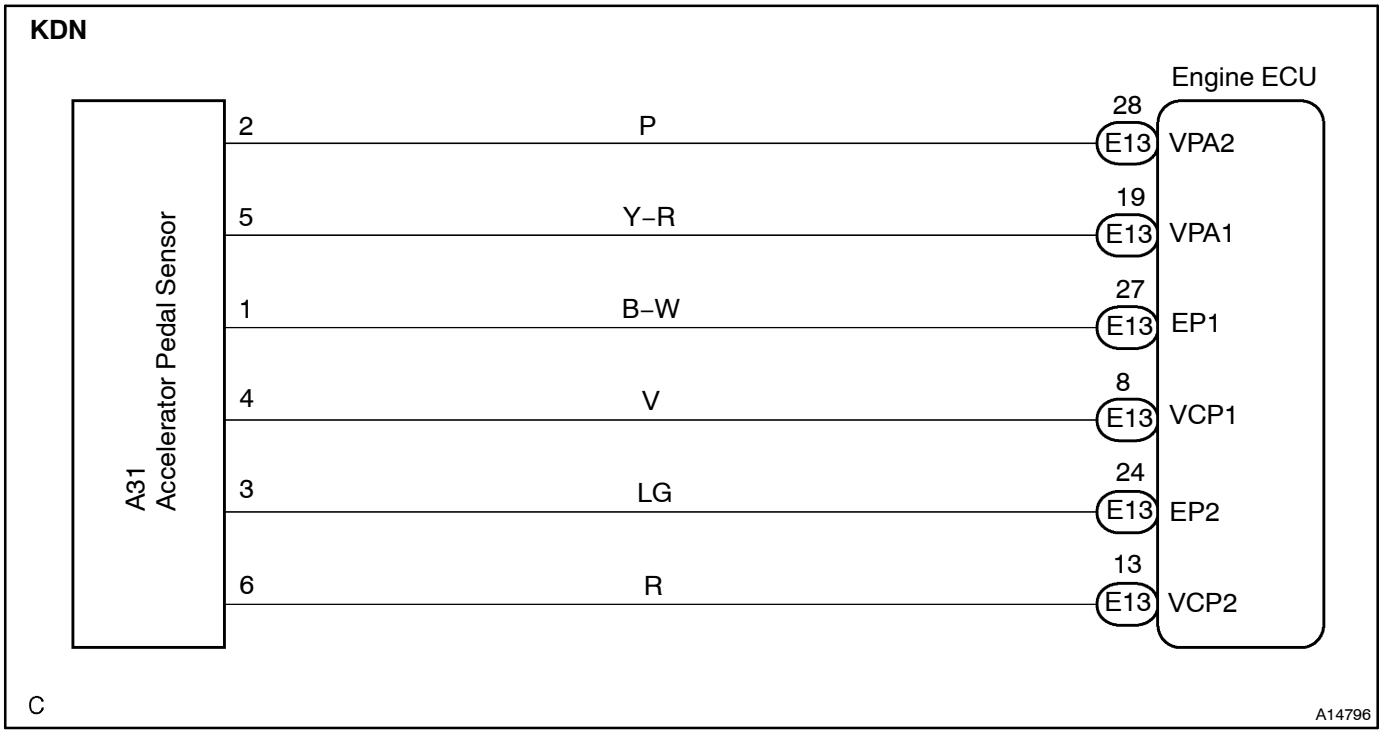
HINT:

After confirming DTC 19 (1), use the hand–held tester to confirm the accelerator pedal opening percentage and accelerator pedal close position switch condition.

Accelerator pedal opening position expressed as percentage		Trouble area
Accelerator pedal fully closed	Accelerator pedal fully open	
0 %	0 %	• VCC circuit open • VPA1, VPA2 circuit open or short
Approx. 100 %	Approx. 100 %	• E2C circuit open

WIRING DIAGRAM





INSPECTION PROCEDURE

HINT:

Read freeze frame data on the hand–held tester. Because freeze frame data 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, etc. at the time of the malfunction.

When using hand–held tester:

1	**Read accelerator pedal opening percentage on hand–held tester.**

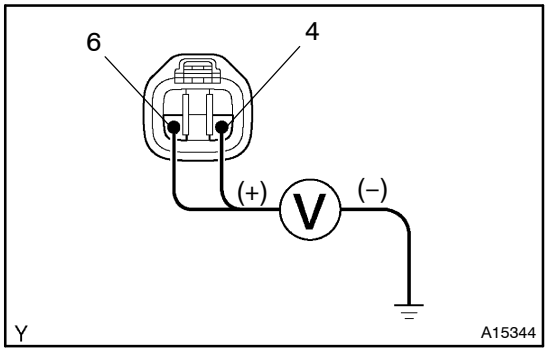
OK:

Accelerator pedal	Accelerator pedal opening position expressed as percentage
Fully open	0 – 20 %
Fully closed	80 – 100 %

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

NG

2	**Check VCP1 and VCP2 voltage.**



PREPARATION:
(a) Disconnect the accelerator pedal position sensor connector.
(b) Turn the ignition switch ON.

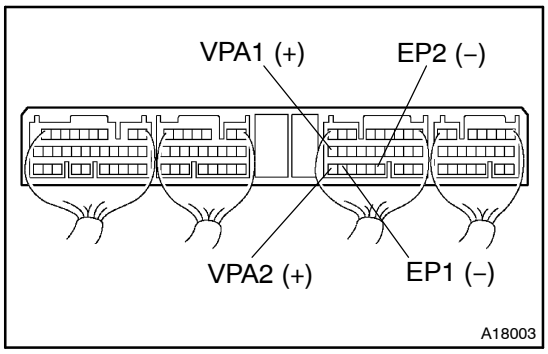
CHECK:
Measure the voltage between terminal 4, 6 of the wire harness side connector and the body ground.

OK:
Voltage: 4.5 – 5.5 V

NG → **Go to step 5.**

OK

3	**Check voltage between terminals VPA1–EP1 and VPA2–EP2 of engine ECU connector.**



PREPARATION:
(a) Remove the glove compartment box.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals.

OK:

Accelerator pedal	Voltage meter connection (Positive – Negative)	Standard voltage
Fully closed	VPA1 – EP1	0.4 – 1.4 V
	VPA2 – EP2	1.2 – 2.2 V
Fully open	VPA1 – EP1	3.0 – 4.6 V
	VPA2 – EP2	3.8 – 4.8 V

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

NG

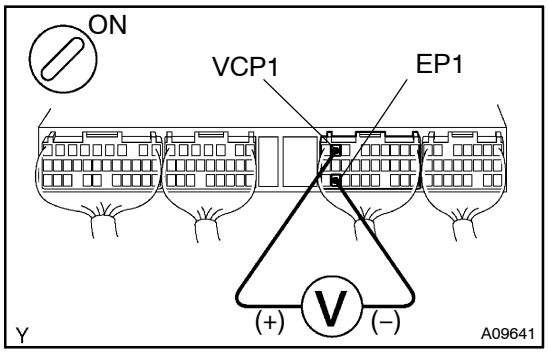
4	Check for open and short in harness and connector in VPA circuit between engine ECU and accelerator pedal position sensor (See page IN–20).

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

OK

Replace accelerator pedal assembly.

5	Check voltage between terminals VCP1 and EP1 of engine ECU connector.



PREPARATION:

(a) Remove the glove compartment box.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between the terminals VCP1 and EP1.

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 in VCP circuit between engine ECU and accelerator pedal position sensor (See page IN–20).

When not using hand–held tester:

1	Check VCP1 and VCP2 voltage (See step 2 when using hand–held tester).

NG → Go to step 4.

OK

2	Check voltage between terminals VPA1 – EP1 and VPA2 – EP2 of engine ECU connector (See step 3 when using hand–held tester).

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

NG

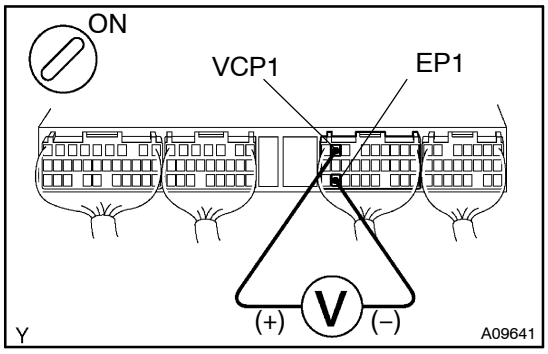
3	Check for open and short in harness and connector in VPA circuit between engine ECU and accelerator pedal position sensor (See page IN–20).

NG → Repair or replace harness or connector.

OK

Replace accelerator pedal assembly.

4	Check voltage between terminals VCP1 and EP1 of engine ECU connector.



PREPARATION:

(a) Remove the glove compartment box.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals of the 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 in VCP circuit between engine ECU and accelerator pedal position sensor (See page IN–20).