| | | |
|---|---|---|
| DTC | P2122/104 | THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT LOW INPUT |

| | | |
|---|---|---|
| DTC | P2123/105 | THROTTLE/PEDAL POSITION SENSOR/SWITCH ”D” CIRCUIT HIGH INPUT |

| | | |
|---|---|---|
| DTC | P2127/107 | THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT LOW INPUT |

| | | |
|---|---|---|
| DTC | P2128/108 | THROTTLE/PEDAL POSITION SENSOR/SWITCH ”E” CIRCUIT HIGH INPUT |

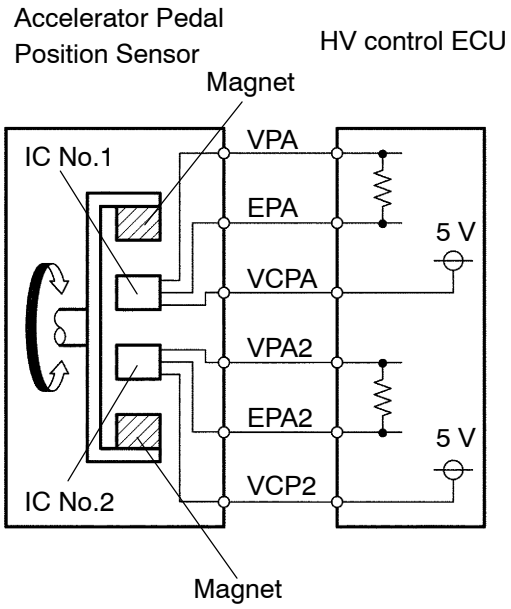
HINT:
This is the repair procedure for the accelerator pedal position sensor.

## CIRCUIT DESCRIPTION

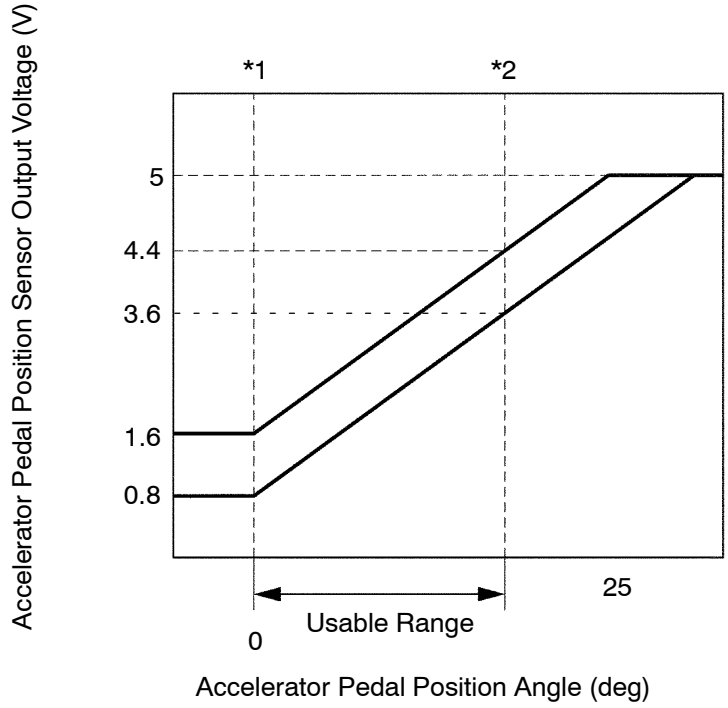
HINT:

- This electrical throttle system does not use a throttle cable.
- This accelerator pedal position sensor is a non–contact type.

The accelerator pedal position sensor is mounted on the accelerator pedal to detect how much it is depressed. It has 2 sensor terminals (VPA and VPA2) to detect the accelerator pedal position and a malfunction of the accelerator pedal position sensor itself. Since this sensor is electronically controlled with hall elements, accurate control and reliability can be obtained.
In the accelerator pedal position sensor, the voltage applied to terminals VPA and VPA2 of the HV control ECU changes between 0 V and 5 V in proportion to the degree of depressing the accelerator pedal. The VPA is a signal to indicate the actual accelerator pedal position angle which is used for the HV system control, and the VPA2 is a signal to indicate the actual accelerator pedal position angle which is used for detecting a malfunction of the sensor itself (terminal VPA).
The HV control ECU judges how much the accelerator pedal is being depressed from the VPA and VPA2 signals, and controls the HV system based on the signals.




A19694

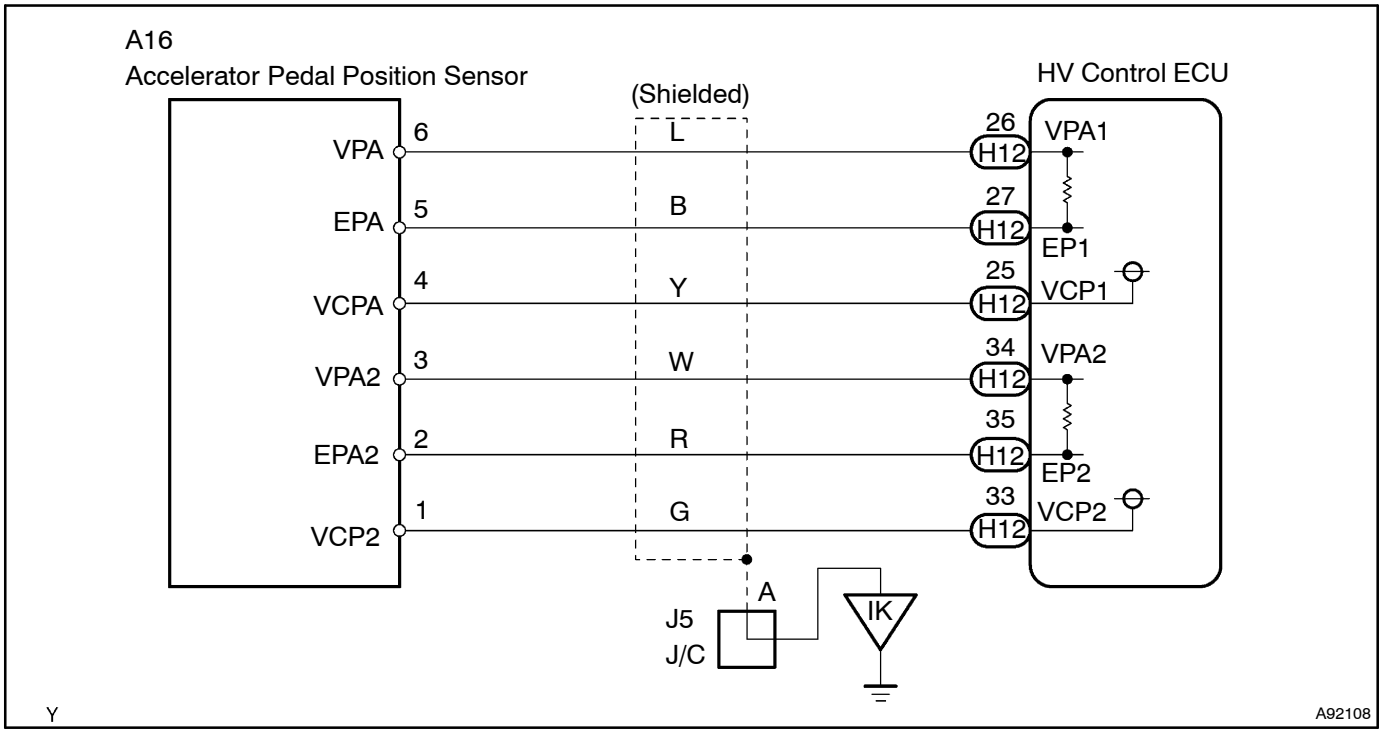



*1: Accelerator Pedal Released
*2: Accelerator Pedal Fully Depressed

A19803

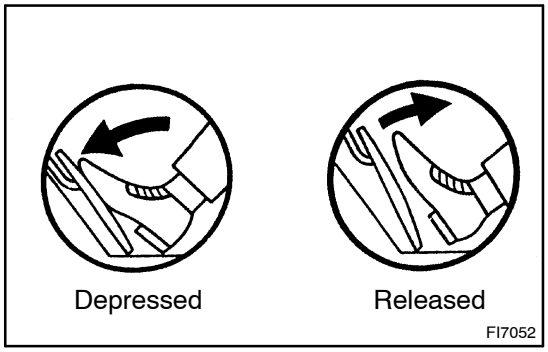
| DTC No. | INF Code | DTC Detection Condition | Trouble Area |
|---|---|---|---|
| P2122 | 104 | Open or GND short in accelerator pedal position main sensor circuit | • Wire harness or connector<br>• Accelerator pedal rod assembly<br>• HV control ECU |
| P2123 | 105 | +B short in accelerator pedal position main sensor circuit | • Wire harness or connector<br>• Accelerator pedal rod assembly<br>• HV control ECU |
| P2127 | 107 | Open or GND short in accelerator pedal position sub sensor circuit | • Wire harness or connector<br>• Accelerator pedal rod assembly<br>• HV control ECU |
| P2128 | 108 | +B short in accelerator pedal position sub sensor circuit | • Wire harness or connector<br>• Accelerator pedal rod assembly<br>• HV control ECU |

## WIRING DIAGRAM




## INSPECTION PROCEDURE

| 1 | READ VALUE OF INTELLIGENT TESTER II(ACCEL PEDAL POS #1 AND #2) |
|---|---|

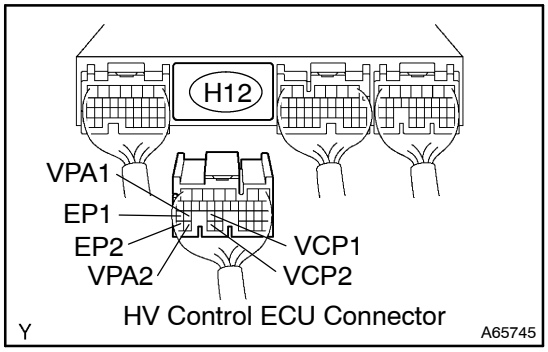


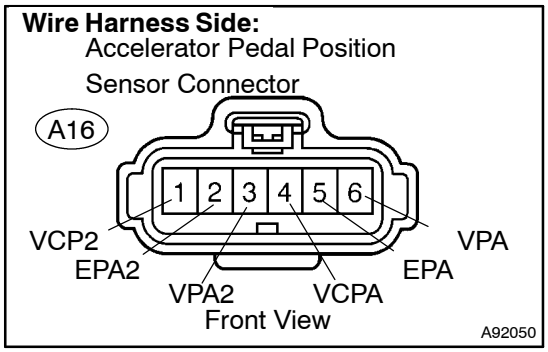

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, enter the following menus: Powertrain / Hybrid Control / Data List.
(e) Read the Accelerator Pedal Pos #1 and #2 values on the intelligent tester II with the engine stopped.
**OK: Changes with accelerator pedal pressure**

| OK | Go to step 5 |
|---|---|

**NG**

## 2 CHECK HARNESS AND CONNECTOR(HYBRID VEHICLE CONTROL ECU – ACCELERATOR PEDAL POSITION SENSOR)




(a) Disconnect the H12 HV control ECU connector.
(b) Disconnect the A16 accelerator pedal position sensor connector.
(c) Turn the power switch ON (IG).
(d) Measure the voltage between the terminals of the HV control ECU connector and body ground.

**Standard:**

| Tester Connection | Specified Condition |
|---|---|
| VPA1 (H12–26) – Body ground | Below 1 V |
| VCP1 (H12–25) – Body ground | Below 1 V |
| EP1 (H12–27) – Body ground | Below 1 V |
| VPA2 (H12–34) – Body ground | Below 1 V |
| VCP2 (H12–33) – Body ground | Below 1 V |
| EP2 (H12–35) – Body ground | Below 1 V |

(e) Turn the power switch OFF.
(f) Check the resistance between the wire harness side connectors.

**Standard (Check for open):**

| Tester Connection | Specified Condition |
|---|---|
| VPA1 (H12–26) – VPA (A16–6) | Below 1 Ω |
| VCP1 (H12–25) – VCPA (A16–4) | Below 1 Ω |
| EP1 (H12–27) – EPA (A16–5) | Below 1 Ω |
| VPA2 (H12–34) – VPA2 (A16–3) | Below 1 Ω |
| VCP2 (H12–33) – VCP2 (A16–1) | Below 1 Ω |
| EP2 (H12–35) – EPA2 (A16–2) | Below 1 Ω |

**Standard (Check for short):**

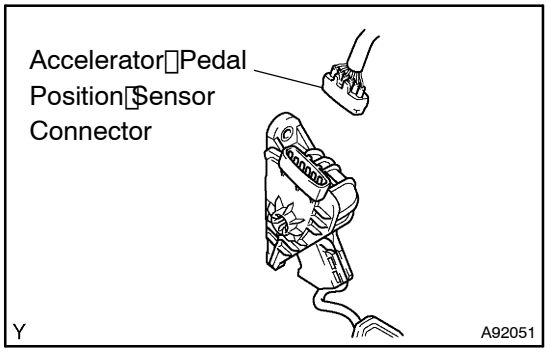
| Tester Connection | Specified Condition |
|---|---|
| VPA1 (H12–26) or VPA (A16–6) – Body ground | 10 kΩ or higher |
| VCP1 (H12–25) or VCPA (A16–4) – Body ground | 10 kΩ or higher |
| EP1 (H12–27) or EPA (A16–5) – Body ground | 10 kΩ or higher |
| VPA2 (H12–34) or VPA2 (A16–3) – Body ground | 10 kΩ or higher |
| VCP2 (H12–33) or VCP2 (A16–1) – Body ground | 10 kΩ or higher |
| EP2 (H12–35) or EPA2 (A16–2) – Body ground | 10 kΩ or higher |

(g) Reconnect the accelerator pedal position sensor connector.
(h) Reconnect the HV control ECU connector.

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

**OK**

| 3 | INSPECT HYBRID VEHICLE CONTROL ECU (VCP1 OR VCP2 VOLTAGE) |
|---|---|

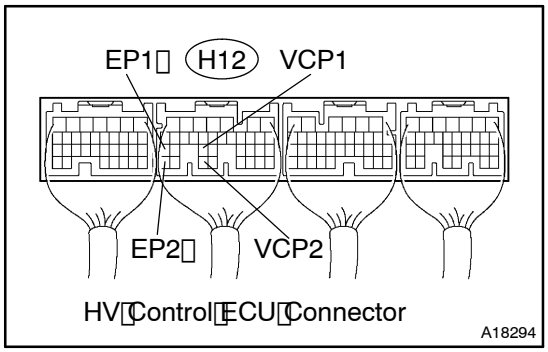



(a) Disconnect the A16 accelerator pedal position sensor connector.
(b) Turn the power switch ON (IG).
(c) Measure the voltage between the terminals of the HV control ECU connector.

**Standard:**

| Tester Connection | Specified Condition |
|---|---|
| VCP1 (H12–25) – EP1 (H12–27) | 4.5 to 5.5 V |
| VCP2 (H12–33) – EP2 (H12–35) | 4.5 to 5.5 V |

(d) Reconnect the accelerator pedal position sensor connector.




NG → **REPLACE HYBRID VEHICLE CONTROL ECU (See page 21–128)**

**OK**

| 4 | REPLACE ACCELERATOR PEDAL ROD ASSY (See page 21–131) |
|---|---|

**GO**

| 5 | CHECK IF DTC OUTPUT RECURS (DTC P2122, P2123, P2127 OR P2128) |
|---|---|

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, enter the following menus: Powertrain / Hybrid Control / DTC.
(e) Perform a simulation test.
(f) Read DTCs.

**Result: DTC P2122, P2123, P2127 or P2128 is not output again**

YES → **SYSTEM OK**

**NO**

**REPLACE HYBRID VEHICLE CONTROL ECU (See page 21–128)**