

## P2138 APP SENSOR

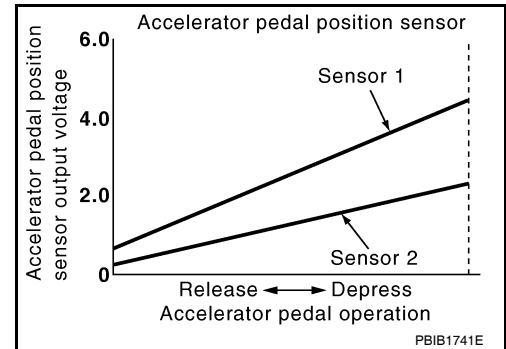
## Description

INFOID:000000004780333

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometer which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



## DTC Logic

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## DTC DETECTION LOGIC

**NOTE:**

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-358, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name                                      | DTC detecting condition   | Possible cause  |
|---------|---|---|---|
| P2138   | Accelerator pedal position sensor circuit range/performance | Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2. | <ul style="list-style-type: none"> <li>• Harness or connector (APP sensor 1 or 2 circuit is open or shorted.)<br/>[Crankshaft position sensor (POS) circuit is shorted.]<br/>(Refrigerant pressure sensor circuit is shorted.)<br/>(EVAP control system sensor circuit is shorted.)</li> <li>• Accelerator pedal position sensor (APP sensor 1 or 2)</li> <li>• Crankshaft position sensor (POS)</li> <li>• Refrigerant pressure sensor</li> <li>• EVAP control system pressure sensor</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.
2. Check DTC.

Is DTC detected?

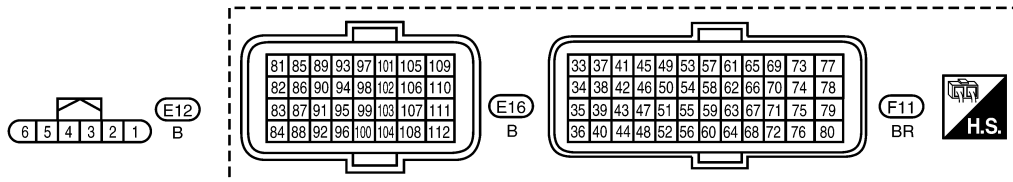
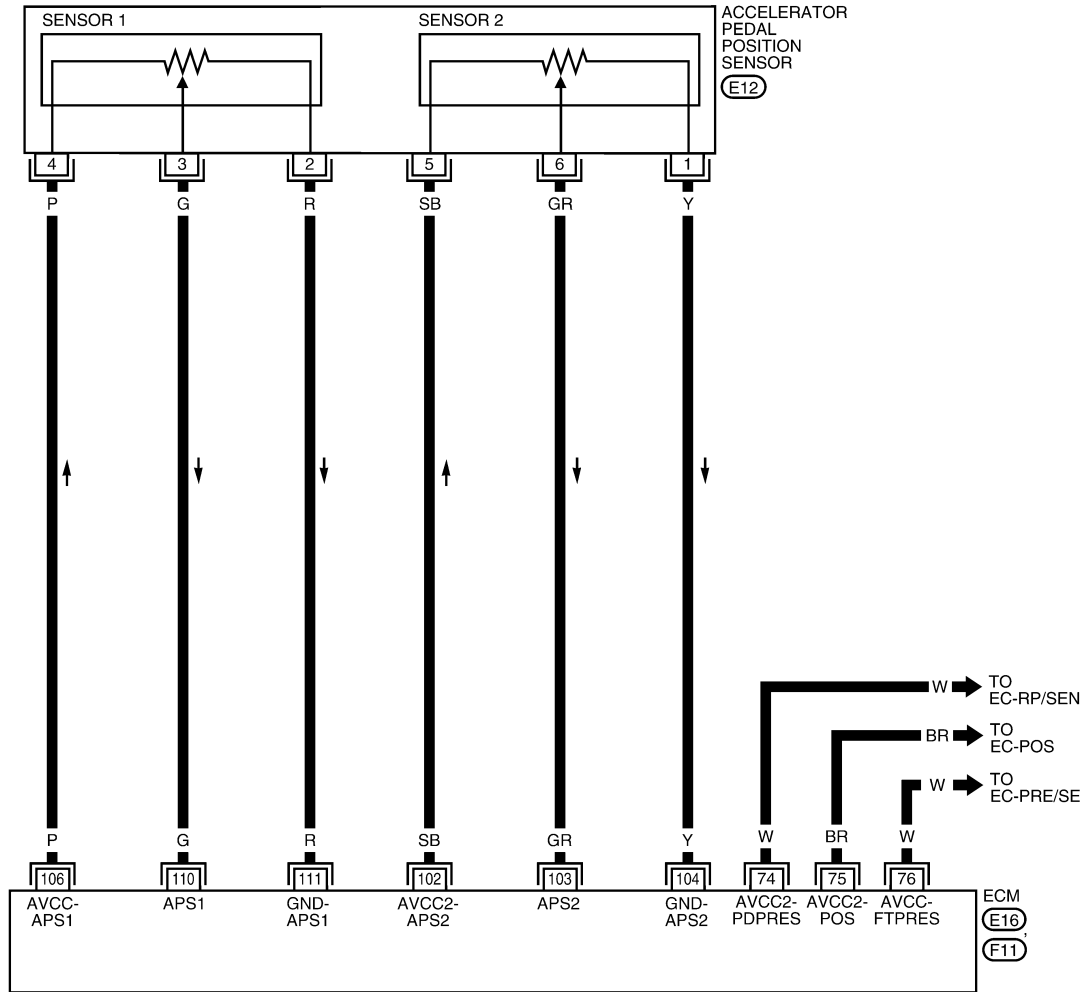
- YES >> Go to [EC-413, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

Wiring Diagram

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EC-APPS3-01

— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



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Diagnosis Procedure

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1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connections E15, E24. Refer to [EC-125, "Ground Inspection"](#).

Is the inspection result normal?

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[HR16DE]

## < COMPONENT DIAGNOSIS >

- YES >> GO TO 2.  
NO >> Repair or replace ground connection.

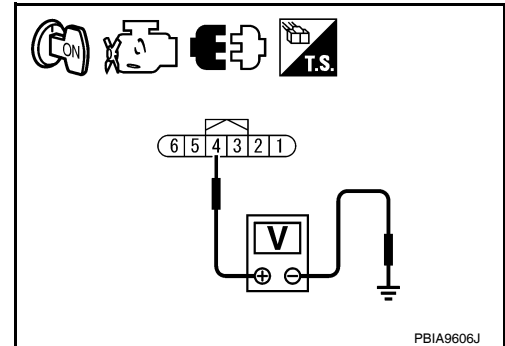
### 2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between APP sensor harness connector and ground.

| APP sensor |          | Ground | Voltage     |
|------------|----------|--------|-------------|
| Connector  | Terminal |        |             |
| E12        | 4        | Ground | Approx. 5 V |

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.



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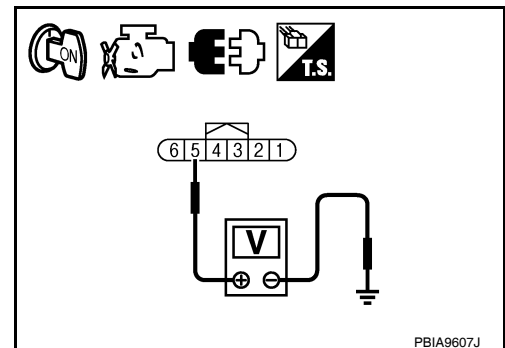
### 3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Check the voltage between APP sensor harness connector and ground.

| APP sensor |          | Ground | Voltage     |
|------------|----------|--------|-------------|
| Connector  | Terminal |        |             |
| E12        | 5        | Ground | Approx. 5 V |

Is the inspection result normal?

- YES >> GO TO 7.  
NO >> GO TO 4.



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### 4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

| APP sensor |          | ECM       |          | Continuity |
|------------|----------|-----------|----------|------------|
| Connector  | Terminal | Connector | Terminal |            |
| E12        | 4        | E16       | 106      | Existed    |

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

### 5.CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

| ECM       |          | Sensor                              |           |          |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name                                | Connector | Terminal |
| F11       | 74       | Refrigerant pressure sensor         | E17       | 3        |
|           | 75       | CKP sensor (POS)                    | F15       | 1        |
|           | 76       | EVAP control system pressure sensor | B104      | 3        |
| E16       | 102      | APP sensor                          | E12       | 5        |

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Repair short to ground or short to power in harness or connectors.

## &lt; COMPONENT DIAGNOSIS &gt;

**6. CHECK COMPONENTS**

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-267, "Component Inspection".](#))
- EVAP control system pressure sensor (Refer to [EC-314, "Component Inspection".](#))
- Refrigerant pressure sensor (Refer to [EC-458, "Diagnosis Procedure".](#))

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

**7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector as per the following.

| APP sensor |          | ECM       |          | Continuity |
|------------|----------|-----------|----------|------------|
| Connector  | Terminal | Connector | Terminal |            |
| E12        | 2        | E16       | 111      | Existed    |
|            | 1        |           | 104      |            |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check the continuity between APP sensor harness connector and ECM harness connector as per the following.

| APP sensor |          | ECM       |          | Continuity |
|------------|----------|-----------|----------|------------|
| Connector  | Terminal | Connector | Terminal |            |
| E12        | 3        | E16       | 110      | Existed    |
|            | 6        |           | 103      |            |

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK APP SENSOR**

Refer to [EC-416, "Component Inspection".](#)

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

**10. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-416, "Special Repair Requirement".](#)

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

Refer to [EC-120, "Diagnosis Procedure".](#)

>> INSPECTION END

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< COMPONENT DIAGNOSIS >

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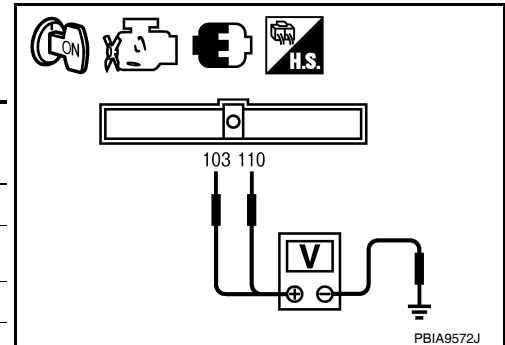
## Component Inspection

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### 1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

| ECM       |                                 | Ground | Condition            |                 | Voltage      |
|-----------|---------------------------------|--------|----------------------|-----------------|--------------|
| Connector | Terminal                        |        |                      |                 |              |
| E16       | 110<br>(APP sensor<br>1 signal) | Ground | Accelerator<br>pedal | Fully released  | 0.6 - 0.9 V  |
|           |                                 |        |                      | Fully depressed | 3.9 - 4.7 V  |
|           | 103<br>(APP sensor<br>2 signal) |        |                      | Fully released  | 0.3 - 0.6 V  |
|           |                                 |        |                      | Fully depressed | 1.95 - 2.4 V |



Is the inspection result normal?

- YES >> INSPECTION END  
NO >> GO TO 2.

### 2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-416. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000004780337

### 1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-31. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-31. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

### 3.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-32. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END