# SECTION ECE ENGINE CONTROL SYSTEM C

THROTTLE VALVE CLOSED POSITION

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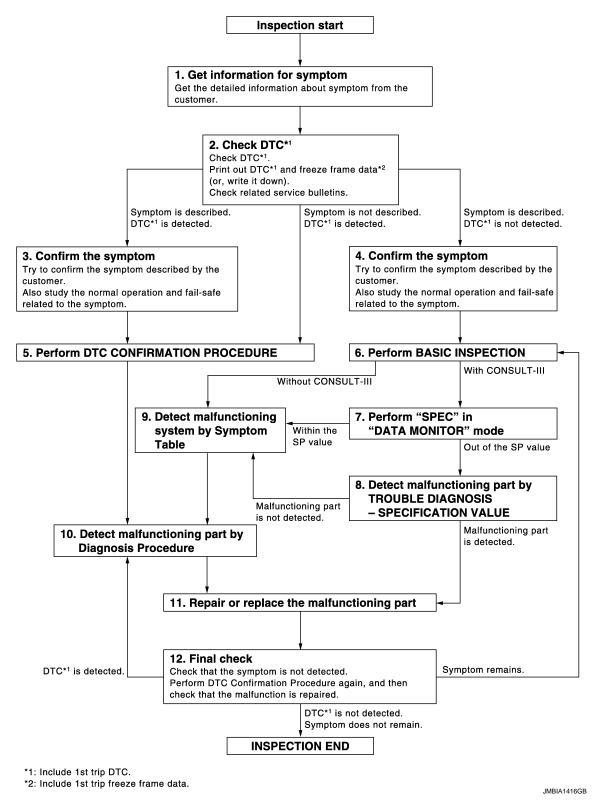
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BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

#### **OVERALL SEQUENCE**



[VQ35DE]

INFOID:000000003387866

Revision: 2008 October

DETAILED FLOW

< BASIC INSPECTION >

[VQ35DE]

| 1.GET INFORMATION FOR SYMPTOM   |
|---|
| Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to <u>EC-11, "Diagnostic Work Sheet"</u> .) |
| >> GO TO 2.   |
| 2.CHECK DTC   |
| 1. Check DTC.   |
| <ol> <li>Perform the following procedure if DTC is displayed.</li> <li>Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)</li> </ol>   |
| <ul> <li>Erase DTC. (Refer to <u>EC-102, "Diagnosis Description"</u>.)</li> </ul>   |
| - Study the relationship between the cause detected by DTC and the symptom described by the customer.   |
| <ul> <li>(Symptom Table is useful. Refer to <u>EC-533, "Symptom Table"</u>.)</li> <li>Check related service bulletins for information.</li> </ul>   |
| Is any symptom described and any DTC detected?  |
| Symptom is described, DTC is displayed>>GO TO 3.  |
| Symptom is described, DTC is not displayed>>GO TO 4.<br>Symptom is not described, DTC is displayed>>GO TO 5.  |
| <b>3.</b> CONFIRM THE SYMPTOM   |
|   |
| Try to confirm the symptom described by the customer (except MIL ON).<br>Also study the normal operation and fail safe related to the symptom. Refer to <u>EC-537</u> , " <u>Description</u> " and <u>EC-517</u> , "Fail-safe".   |
| Diagnosis Work Sheet is useful to verify the incident.  |
| Verify relation between the symptom and the condition when the symptom is detected.   |
| >> GO TO 5.   |
| 4.CONFIRM THE SYMPTOM   |
| Try to confirm the symptom described by the customer.   |
| Also study the normal operation and fail safe related to the symptom. Refer to EC-537, "Description" and EC-  |
| 517. "Fail-safe".<br>Diagnosis Work Sheet is useful to verify the incident.   |
| Verify relation between the symptom and the condition when the symptom is detected.   |
| >> GO TO 6.   |
| 5. PERFORM DTC CONFIRMATION PROCEDURE   |
| Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then check that DTC is detected   |
| again.  |
| If two or more DTCs are detected, refer to <u>EC-519, "DTC Inspection Priority Chart"</u> and determine trouble diagnosis order.  |
| NOTE:   |
| <ul> <li>Freeze frame data is useful if the DTC is not detected.</li> <li>Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service</li> </ul>  |
| Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.  |
| If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-<br>MATION PROCEDURE.   |
| Is DTC detected?  |
| YES >> GO TO 10.  |
| NO >> Check according to <u>GI-40, "Intermittent Incident"</u> .<br>6.PERFORM BASIC INSPECTION  |
|   |
| Perform <u>EC-12, "BASIC INSPECTION : Special Repair Requirement"</u> .<br><u>Will CONSULT-III be used?</u>   |
|   |

< BASIC INSPECTION >

YES >> GO TO 7. NO >> GO TO 9.

**7.**PERFORM "SPEC" OF "DATA MONITOR" MODE

(I) With CONSULT-III

Check that "MAS A/F SE-B1", "B/FUEL SCHDL", "A/F ALPHA-B1" and "A/F ALPHA-B2" are within the SP value using "SPEC" of "DATA MONITOR" mode with CONSULT-III. Refer to <u>EC-127</u>, "Component Function <u>Check"</u>.

Are they within the SP value?

YES >> GO TO 9. NO >> GO TO 8.

 $\mathbf{8}$ . DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to <u>EC-128</u>, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.

NO >> GO TO 9.

**9.** DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to <u>EC-533, "Symptom Table"</u> based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

#### >> GO TO 10.

#### **10.** DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.

#### NOTE:

The Diagnostic Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to "Circuit Inspection" in <u>GI-43</u>, "Circuit Inspection".

Is malfunctioning part detected?

- YES >> GO TO 11.
- NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CON-SULT-III. Refer to <u>EC-470, "Reference Value"</u>.

**11.**REPAIR OR REPLACE THE MALFUNCTIONING PART

- 1. Repair or replace the malfunctioning part.
- 2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
- 3. Check DTC. If DTC is displayed, erase it, refer to <u>EC-102</u>, "Diagnosis Description".

>> GO TO 12.

#### 12.FINAL CHECK

When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then check that the malfunction have been repaired securely. When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Is DTC detected and does symptom remain?

- YES-1 >> DTC is detected: GO TO 10.
- YES-2 >> Symptom remains: GO TO 6.
- NO >> Before returning the vehicle to the customer, erase unnecessary DTC in ECM and TCM (Transmission Control Module) certainly. (Refer to <u>EC-102, "Diagnosis Description"</u>.) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in <u>EC-524</u>, <u>"How to Set SRT Code"</u>.

#### DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

#### **Diagnostic Work Sheet**

#### DESCRIPTION

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about symptoms. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the WORKSHEET SAMPLE below in order to organize all the information for troubleshooting. Some conditions may cause the MIL to illuminate or blink, and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

#### WORKSHEET SAMPLE

| Customer nar                                 | ne MR/MS               | Model & Year   | VIN  |
|--|------------------------|--|--|
| Engine #                                     |                        | Trans.   | Mileage                                    |
| Incident Date                                |                        | Manuf. Date  | In Service Date                            |
| Fuel and fuel                                | el and fuel filler cap |  |  |
|  | ☐ Startability         | ☐ Impossible to start ☐ No combus<br>☐ Partial combustion affected by th<br>☐ Partial combustion NOT affected<br>☐ Possible but hard to start ☐ Othe     | hrottle position<br>d by throttle position |
| Symptoms .                                   | 🗌 Idling               | □ No fast idle □ Unstable □ H<br>□ Others [  | High idle 🛛 Low idle<br>]                  |
|  | Driveability           | Stumble Surge Knock Lack of power Intake backfire Exhaust backfire Others [ ]  |  |
|  | Engine stall           | At the time of start       While idling         While accelerating       While dece         Just after stopping       While load                         | elerating                                  |
| Incident occurrence                          |                        | ☐ Just after delivery ☐ Recently<br>☐ In the morning ☐ At night [  | ☐ In the daytime                           |
| Frequency 🗌 All the time 🗌 Under certain con |                        | ditions 🗌 Sometimes  |  |
| Weather conditions                           |                        | □ Not affected   |  |
|  | Weather                | 🗌 Fine 🔲 Raining 🗌 Snowing   | Others [ ]                                 |
|  | Temperature            | 🗌 Hot 🗌 Warm 🗌 Cool 🗌  | ] Cold 🔲 Humid °F                          |
|  |                        | Cold During warm-up  | After warm-up                              |
| Engine conditions                            |                        | Engine speed<br>0 2,000  | 4,000 6,000 8,000 rpm                      |
| Road conditions                              |                        | 🗌 In town 🔄 In suburbs 🗌 Hig   | ghway 🗌 Off road (up/down)                 |
| Driving conditions                           |                        | <ul> <li>Not affected</li> <li>At starting</li> <li>While idling</li> <li>While accelerating</li> <li>While decelerating</li> <li>While turni</li> </ul> | -  |
|  |                        | Vehicle speed  | <u>,   ,   ,   ,  </u><br>30 40 50 60 MPH  |
| Malfunction indicator lamp                   |                        | Turned on Not turned on  |  |

MTBL0017

 WHAT
 ...... Vehicle & engine model

 WHAT
 ...... Date, Frequencies

 WHERE
 ...... Road conditions

 HOW
 ...... Operating conditions, Weather conditions, Symptoms

Revision: 2008 October

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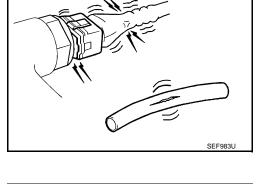
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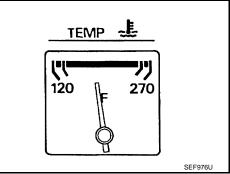
# INSPECTION AND ADJUSTMENT BASIC INSPECTION

#### **BASIC INSPECTION : Special Repair Requirement**

**1.**INSPECTION START

- 1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
- 2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leakage
- Air cleaner clogging
- Gasket
- 3. Check that electrical or mechanical loads are not applied.
- Head lamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.
- Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Check that engine stays below 1,000 rpm.

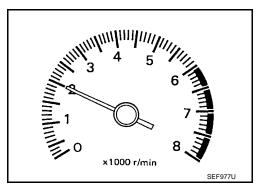




- 5. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.
- Check that no DTC is displayed with CONSULT-III or GST.

Are any DTCs detected?

YES >> GO TO 2. NO >> GO TO 3.



### 2.REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3

#### 3.CHECK TARGET IDLE SPEED

1. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.

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#### < BASIC INSPECTION >

#### [VQ35DE]

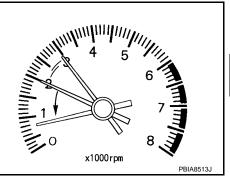
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- 2. Rev engine (2,000 to 3,000 rpm) 2 or 3 times under no load, then run engine at idle speed for approximately 1 minute. 3. Check idle speed.
- For procedure, refer to EC-15, "IDLE SPEED : Special Repair Requirement". For specification, refer to EC-551, "Idle Speed".

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> GO TO 4.



| ×1000 rpm PBIA8513J   |   |
|---|---|
| 4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING   | D |
| <ol> <li>Stop engine.</li> <li>Perform <u>EC-17, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"</u>.</li> </ol>  | E |
| >> GO TO 5. <b>5.</b> PERFORM THROTTLE VALVE CLOSED POSITION LEARNING   | F |
| Perform EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".  | ~ |
| >> GO TO 6.   | G |
| Perform EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".   |   |
| <u>Is Idle Air Volume Learning carried out successfully?</u><br>YES >> GO TO 7.<br>NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.  |   |
| 7. CHECK IDLE SPEED AGAIN   | J |
| <ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Check idle speed.<br/>For procedure, refer to <u>EC-15, "IDLE SPEED : Special Repair Requirement"</u>.<br/>For specification, refer to <u>EC-551, "Idle Speed"</u>.</li> </ol>   | K |
| Is the inspection result normal?<br>YES >> GO TO 10.<br>NO >> GO TO 8.<br>8.DETECT MALFUNCTIONING PART  | L |
|   | M |
| YES >> GO TO 9.<br>NO >> Repair or replace malfunctioning part. Then GO TO 4.   | Ν |
|   | 0 |
| <ol> <li>Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, although this is rare.)</li> <li>Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>SEC-11, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"</u>.</li> </ol> | Ρ |

- >> GO TO 4.
- **10.**CHECK IGNITION TIMING
- 1. Run engine at idle.
- Check ignition timing with a timing light. 2.

< BASIC INSPECTION >

For procedure, refer to <u>EC-16, "IGNITION TIMING : Special Repair Requirement"</u>. For specification, refer to <u>EC-551, "Ignition Timing"</u>.

Is the inspection result normal?

YES >> GO TO 19.

NO >> GO TO 11.

11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.

 Perform EC-17, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

**13.** PERFORM IDLE AIR VOLUME LEARNING

Perform EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 14.

NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

14. CHECK IDLE SPEED AGAIN

- 1. Start engine and warm it up to normal operating temperature.
- Check idle speed. For procedure, refer to <u>EC-15, "IDLE SPEED : Special Repair Requirement"</u>. For specification, refer to <u>EC-551, "Idle Speed"</u>.

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

- 1. Run engine at idle.
- Check ignition timing with a timing light. For procedure, refer to <u>EC-16</u>, "IGNITION TIMING : Special Repair Requirement". For specification, refer to <u>EC-551</u>, "Ignition Timing".

Is the inspection result normal?

- YES >> GO TO 19.
- NO >> GO TO 16.

**16.**CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-54, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair the timing chain installation. Then GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-265, "Diagnosis Procedure"</u>.
- Check crankshaft position sensor (POS) and circuit. Refer to EC-261, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace malfunctioning part. Then GO TO 4.

**18.**CHECK ECM FUNCTION

| <pre>INSPECTION AND ADJUSTMENT &lt; BASIC INSPECTION &gt;</pre>  | [VQ35DE]               |
|--|------------------------|
| 1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the c   | ause of the incident,  |
| <ul> <li>although this is rare.)</li> <li>Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignit<br/>EC-15. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Replacement</li> </ul> |                        |
| >> GO TO 4.  |                        |
| 19.INSPECTION END  |                        |
| If ECM is replaced during this BASIC INSPECTION procedure, perform <u>EC-15, "ADE</u><br>WHEN REPLACING CONTROL UNIT : Special Repair Requirement".  | DITIONAL SERVICE       |
| >> INSPECTION END<br>ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT  |                        |
| ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Desc  |                        |
| When replacing ECM, the following procedure must be performed.   |                        |
| ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Spec<br>quirement   |                        |
| 1.perform initialization of nVIS (NATS) SYSTEM and registration of all tion key IDS  | _ NVIS (NATS) IGNI-    |
| Refer to SEC-11, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement  |                        |
| >> GO TO 2.  |                        |
| 2.PERFORM VIN REGISTRATION   |                        |
| Refer to EC-16, "VIN REGISTRATION : Special Repair Requirement".   |                        |
| >> GO TO 3.  |                        |
| 3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING  |                        |
| Refer to EC-17, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special R  | Repair Requirement".   |
| >> GO TO 4.  |                        |
| 4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING   |                        |
| Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair R  | equirement".           |
| >> GO TO 5.  |                        |
| 5. PERFORM IDLE AIR VOLUME LEARNING  |                        |
| Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".   |                        |
| >> END   |                        |
| IDLE SPEED   |                        |
| DLE SPEED : Description  | INFOID:000000003387871 |
|  | structions in "BASIC   |
| This describes how to check the idle speed. For the actual procedure, follow the ins<br>INSPECTION".   |                        |
|  | INFOID:000000003387872 |

< BASIC INSPECTION >

#### (R) With CONSULT-III

Check idle speed in "DATA MONITOR" mode with CONSULT-III. With GST Check idle speed with Service \$01 of GST.

#### >> INSPECTION END **IGNITION TIMING**

#### **IGNITION TIMING : Description**

This describes how to check the ignition timing. For the actual procedure, follow the instructions in "BASIC INSPECTION".

**IGNITION TIMING : Special Repair Requirement** 

#### **1.**CHECK IGNITION TIMING

- Attach timing light to loop wires as shown. 1.
- Timing light (A)
- ⇒: Vehicle front

2. Check ignition timing.

>> INSPECTION END

#### VIN REGISTRATION

#### VIN REGISTRATION : Description

VIN Registration is an operation to register VIN in ECM. It must be performed each time ECM is replaced. NOTE:

Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

VIN REGISTRATION : Special Repair Requirement

#### 1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-23, "Information About Identification or Model Code".

>> GO TO 2.

2. PERFORM VIN REGISTRATION

#### (R)With CONSULT-III

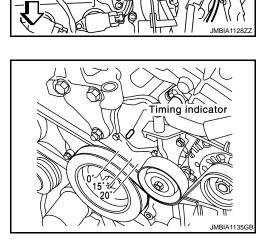
Turn ignition switch ON with engine stopped.

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INFOID:00000003387874



2009 Murano



INFOID:000000003387875

INFOID:000000003387876

| 2. | Select "VIN REGISTRATION" in "WORK SUPPORT" mode.   |  |
|----|---|--|
| 3. | Follow the instructions on the CONSULT-III display. |  |

# >> END ACCELERATOR PEDAL RELEASED POSITION LEARNING ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOLD-00000003387877

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time the harness connector of the accelerator pedal position sensor or ECM is disconnected.

#### ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

#### 1.START

< BASIC INSPECTION >

- 1. Check that accelerator pedal is fully released.
- 2. Turn ignition switch ON and wait at least 2 seconds.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON and wait at least 2 seconds.
- 5. Turn ignition switch OFF and wait at least 10 seconds.

#### >> END THROTTLE VALVE CLOSED POSITION LEARNING

#### THROTTLE VALVE CLOSED POSITION LEARNING : Description

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time the harness connector of electric throttle control actuator or ECM is disconnected.

# THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

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INFOID:000000003387879

| 1.start   | Κ |
|---|---|
| 1. Check that accelerator pedal is fully released.  |   |
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.<br/>Check that throttle valve moves during the above 10 seconds by confirming the operating sound.</li> </ol>   | L |
| >> END<br>IDLE AIR VOLUME LEARNING  | Μ |
|   |   |
| IDLE AIR VOLUME LEARNING : Description  | Ν |
| <ul> <li>Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps engine idle speed within the specific range. It must be performed under the following conditions:</li> <li>Each time the electric throttle control actuator or ECM is replaced.</li> <li>Idle speed or ignition timing is out of the specification.</li> </ul> | 0 |
| IDLE AIR VOLUME LEARNING : Special Repair Requirement   | Ρ |
| 1.preconditioning   |   |
| <ul> <li>Check that all of the following conditions are satisfied.</li> <li>Learning will be cancelled if any of the following conditions are missed for even a moment.</li> <li>Battery voltage: More than 12.9 V (At idle)</li> <li>Engine coolant temperature: 70 - 100°C (158 - 212°F)</li> <li>Selector lever position: P or N</li> </ul>                |   |

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< BASIC INSPECTION >

- Electric load switch: OFF
  - (Air conditioner, head lamp, rear window defogger)

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the head lamp will not illuminate.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- With CONSULT-III: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V.

- Without CONSULT-III: Drive vehicle for 10 minutes.

Will CONSULT-III be used?

YES >> GO TO 2.

NO >> GO TO 3.

2.PERFORM IDLE AIR VOLUME LEARNING

#### With CONSULT-III

- Perform <u>EC-17, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Require-</u> ment".
- 2. Perform EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 3. Start engine and warm it up to normal operating temperature.
- 4. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
- 5. Touch "START" and wait 20 seconds.

Is "CMPLT" displayed on CONSULT-III screen?

YES >> GO TO 4.

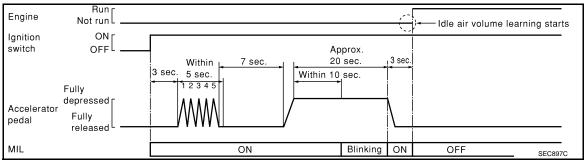
NO >> GO TO 5.

**3.** PERFORM IDLE AIR VOLUME LEARNING

#### Without CONSULT-III

#### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- 1. Perform <u>EC-17</u>, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
- 2. Perform EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 3. Start engine and warm it up to normal operating temperature.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 6. Repeat the following procedure quickly 5 times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 7. Wait 7 seconds, fully depress the accelerator pedal for approx. 20 seconds until the MIL stops blinking and turns ON.
- 8. Fully release the accelerator pedal within 3 seconds after the MIL turns ON.
- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



>> GO TO 4.

< BASIC INSPECTION >

[VQ35DE]

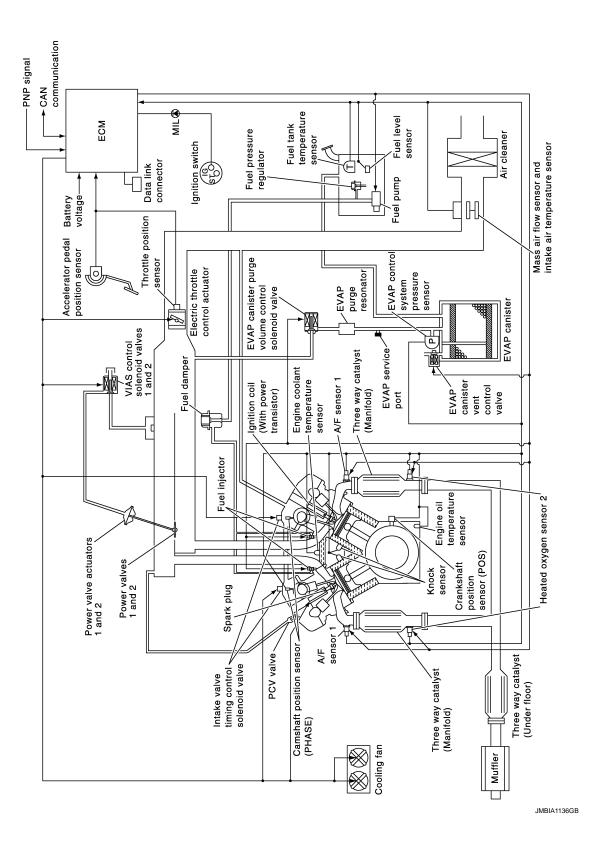
| 4. CHECK IDLE SPEED AND IGNITION TIMING   | Δ    |
|---|------|
| Rev up the engine 2 or 3 times and check that idle speed and ignition timing are within the specifications.<br>For procedure, refer to <u>EC-15, "IDLE SPEED : Special Repair Requirement"</u> and <u>EC-16, "IGNITION TIMING :</u><br><u>Special Repair Requirement</u> ".   |      |
| For specifications, refer to EC-551, role Speed, and EC-551, rightion filming.  | EC   |
| Is the inspection result normal?<br>YES >> INSPECTION END<br>NO >> GO TO 5.   | С    |
| 5. DETECT MALFUNCTIONING PART-I   |      |
| <ul> <li>Check the following</li> <li>Check that throttle valve is fully closed.</li> <li>Check PCV valve operation.</li> <li>Check that downstream of throttle valve is free from air leakage.</li> </ul>  | D    |
| Is the inspection result normal?  |      |
| YES >> GO TO 6.<br>NO >> Repair or replace malfunctioning part.   | F    |
| 6.DETECT MALFUNCTIONING PART-II   |      |
| Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.  | G    |
| <ul> <li>It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to <u>EC-127</u>, "<u>Description</u>".</li> <li>If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning again:</li> <li>Engine stalls.</li> <li>Incorrect idle.</li> </ul> | Н    |
|   | I    |
| >> INSPECTION END<br>MIXTURE RATIO SELF-LEARNING VALUE CLEAR  | I    |
| MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description   | J    |
| This describes show to erase the mixture ratio self-learning value. For the actual procedure, follow the instruc-<br>tions in "Diagnosis Procedure".  | K    |
| MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement  |      |
| 1.START   | L    |
| With CONSULT-III  | D. 4 |
| <ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.</li> <li>Clear mixture ratio self-learning value by touching "CLEAR".</li> </ol>  | Μ    |
| With GST <ol> <li>Start engine and warm it up to normal operating temperature.</li> </ol>   | Ν    |
| <ol> <li>Turn ignition switch OFF.</li> <li>Disconnect mass air flow sensor harness connector.</li> </ol>   | 0    |
| <ol><li>Restart engine and let it idle for at least 5 seconds.</li></ol>  | 0    |
| <ol> <li>Stop engine and reconnect mass air flow sensor harness connector.</li> <li>Select Service \$03 with GST. Check that DTC P0102 is detected.</li> <li>Select Service \$04 with GST to erase the DTC P0102.</li> </ol>  | Ρ    |
|   |      |

>> END

# FUNCTION DIAGNOSIS ENGINE CONTROL SYSTEM

#### System Diagram

INFOID:000000003387885



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< FUNCTION DIAGNOSIS >

#### System Description

ECM performs various controls such as fuel injection control and ignition timing control.

#### Component Parts Location

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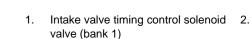
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- 4. Fuel injector (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air 17. Electric throttle control actuator temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

Intake valve timing control solenoid valve (bank 2)

(7) (8) (9) (1)

- 5. A/F sensor 1 (bank 2)
- Camshaft position sensor (PHASE) 8. (bank 2)
- 11. Cooling fan motor-1
- 14. Battery current sensor
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve

**EC-21** 

- 23. A/F sensor 1 (bank 1)



control solenoid valve

Cooling fan motor-2

24. Fuel injector (bank 1)

(bank 1)

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Electronic controlled engine mount

Crankshaft position sensor (POS)

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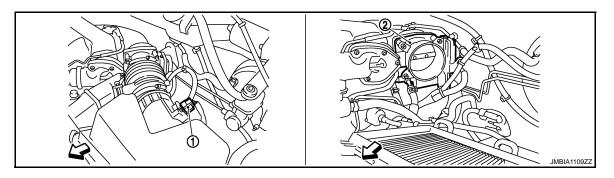
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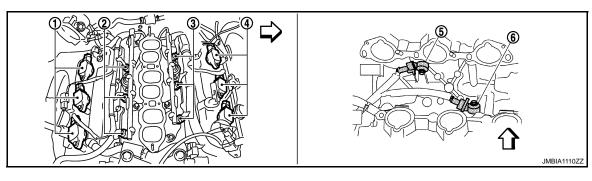
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#### [VQ35DE]

#### < FUNCTION DIAGNOSIS >



- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



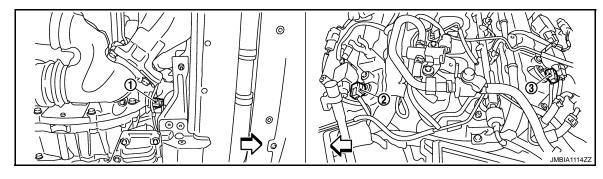
- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
- Ignition coil (with power transistor)

3.

3.

- 4. and spark plug (bank 2) : Vehicle front
- 5. Knock sensor (bank 2)
- Knock sensor (bank 1) 6.

Fuel injector (bank 2)

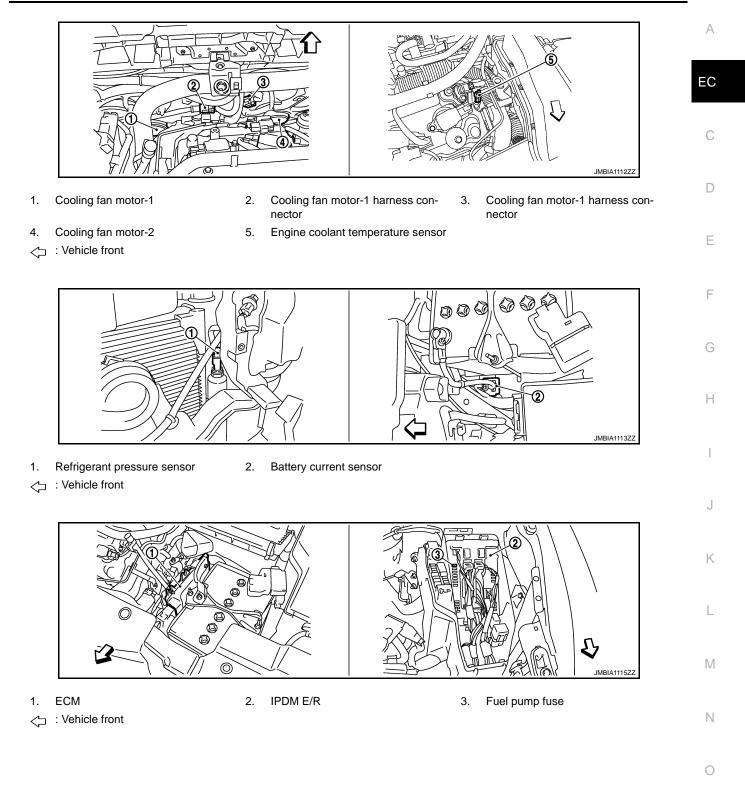


- Crankshaft position sensor (POS) 2. 1.
- Camshaft position sensor (PHASE) (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

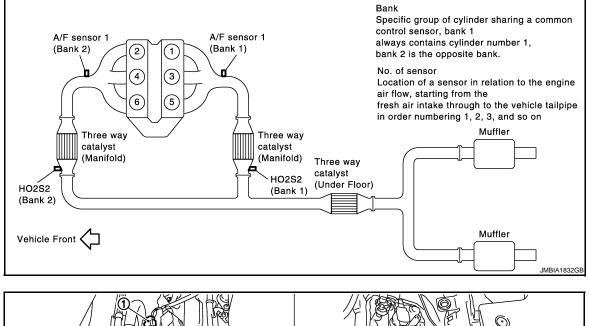
: Vehicle front

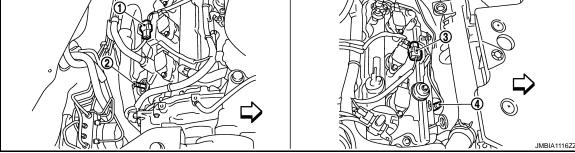
#### < FUNCTION DIAGNOSIS >

#### [VQ35DE]



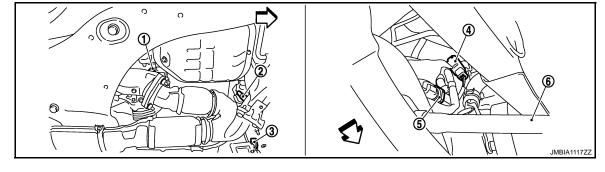
#### < FUNCTION DIAGNOSIS >





- 1. A/F sensor 1 (bank 1) harness con- 2. A/F sensor 1 (bank 1) nector
- 4. A/F sensor 1 (bank 2)
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector



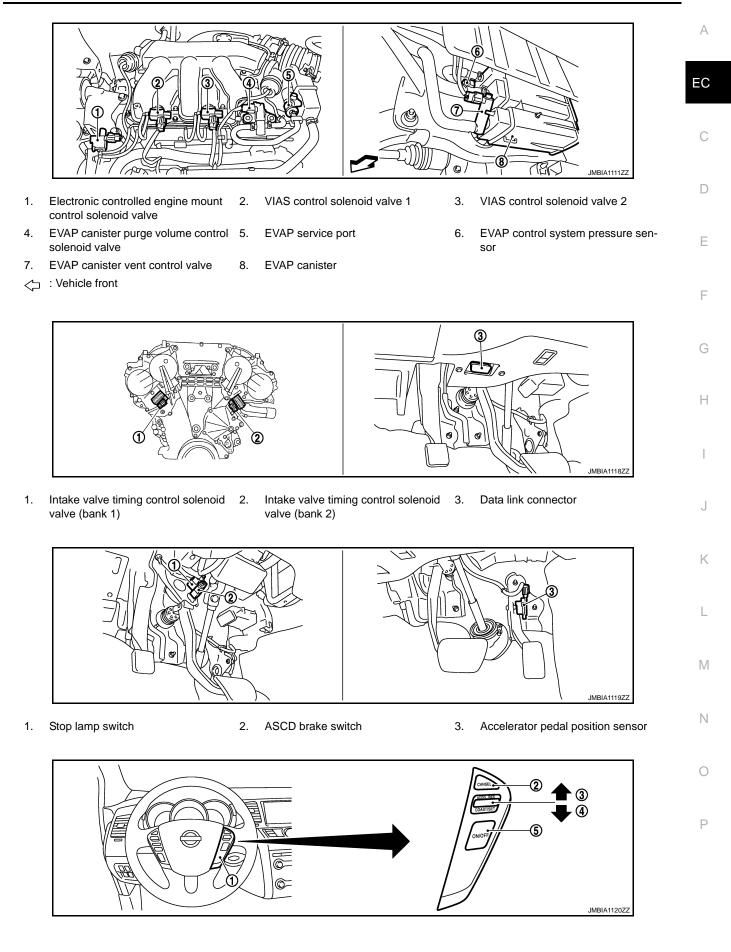
- 1. HO2S2 (bank 1)
  - HO2S2 (bank 1) harness connector 5. Pow
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

: Vehicle front

4.

#### < FUNCTION DIAGNOSIS >

#### [VQ35DE]

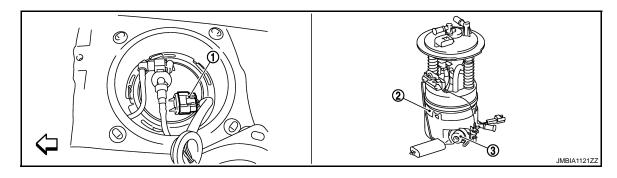


#### < FUNCTION DIAGNOSIS >

- 1. ASCD steering switch SET/COAST switch 4.
- 2. CANSEL switch MAIN switch

5.

3. **RESUME/ACCELERATE** switch



Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator 1. harness connector

: Vehicle front

# **Component Description**

INFOID:000000003387888

| Component   | Reference             |  |  |
|---|-----------------------|--|--|
| A/F sensor 1                                      | EC-186, "Description" |  |  |
| A/F sensor 1 heater                               | EC-145, "Description" |  |  |
| Accelerator pedal position sensor                 | EC-413, "Description" |  |  |
| ASCD brake switch                                 | EC-380, "Description" |  |  |
| ASCD steering switch                              | EC-377, "Description" |  |  |
| Battery current sensor                            | EC-365, "Description" |  |  |
| Camshaft position sensor (PHASE)                  | EC-264, "Description" |  |  |
| Cooling fan motor                                 | EC-434, "Description" |  |  |
| Crankshaft position sensor (POS)                  | EC-260, "Description" |  |  |
| Electric throttle control actuator                | EC-411, "Description" |  |  |
| Electronic controlled engine mount                | EC-441, "Description" |  |  |
| Engine coolant temperature sensor                 | EC-170, "Description" |  |  |
| Engine oil temperature sensor                     | EC-242, "Description" |  |  |
| EVAP canister purge volume control solenoid valve | EC-284, "Description" |  |  |
| EVAP canister vent control valve                  | EC-292, "Description" |  |  |
| EVAP control system pressure sensor               | EC-300, "Description" |  |  |
| Fuel injector                                     | EC-444, "Description" |  |  |
| Fuel level sensor                                 | EC-327, "Description" |  |  |
| Fuel pump   | EC-447, "Description" |  |  |
| Fuel tank temperature sensor                      | EC-236, "Description" |  |  |
| Heated oxygen sensor 2                            | EC-203, "Description" |  |  |
| Heated oxygen sensor 2 heater                     | EC-148. "Description" |  |  |
| Ignition coil with power transistor               | EC-451, "Description" |  |  |
| Intake air temperature sensor                     | EC-167, "Description" |  |  |
| Intake valve timing control solenoid valve        | EC-151, "Description" |  |  |
| Knock sensor                                      | EC-257, "Description" |  |  |
| Mass air flow sensor                              | EC-154, "Description" |  |  |

Revision: 2008 October

#### < FUNCTION DIAGNOSIS >

[VQ35DE]

| Component                      | Reference             |    |
|--------------------------------|-----------------------|----|
| PCV valve                      | EC-462, "Description" | A  |
| Power steering pressure sensor | EC-339, "Description" |    |
| Power valves 1 and 2           | EC-466, "Description" | EC |
| Refrigerant pressure sensor    | EC-463. "Description" |    |
| Stop lamp switch               | EC-399, "Description" |    |
| ТСМ                            | EC-350, "Description" | С  |
| Throttle control motor         | EC-408. "Description" |    |
| Throttle control motor relay   | EC-402, "Description" | D  |
| Throttle position sensor       | EC-175, "Description" |    |
| VIAS control solenoid valve 1  | EC-393, "Description" |    |
| VIAS control solenoid valve 2  | EC-396, "Description" | E  |

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#### < FUNCTION DIAGNOSIS >

# MULTIPORT FUEL INJECTION SYSTEM

#### System Diagram

| Crankshaft position sensor (POS)              | Engine speed <sup>*2</sup> & Piston position  |       |                       |
|---|---|-------|-----------------------|
| Camshaft position sensor (PHASE)              |   |       |                       |
| Mass air flow sensor                          | Amount of intake air                          |       |                       |
| Intake air temperature sensor                 | Intake air temperature                        |       |                       |
| Engine coolant temperature sensor             | Engine coolant temperature                    |       |                       |
| Air fuel ratio (A/F) sensor 1                 | Density of oxygen in exhaust gas              |       |                       |
| Throttle position sensor                      | Throttle position                             |       |                       |
| Accelerator pedal position sensor             | Accelerator pedal position                    |       | Fuel injection &      |
| ТСМ   | Gear position                                 | ЕСМ   | control Fuel injector |
| Battery                                       | Battery voltage <sup>*2</sup>                 |       |                       |
| Knock sensor                                  | Engine knocking condition                     |       |                       |
| Power steering pressure sensor                | Power steering operation                      |       |                       |
| Heated oxygen sensor 2*1                      | Density of oxygen in exhaust gas              |       |                       |
| ABS actuator and electric unit (control unit) | VDC/TCS operation command                     |       |                       |
| Combination meter                             | Vehicle speed                                 |       |                       |
| BCM   | Air conditioner operation                     |       |                       |
| *1 : This sensor is not used to control the e | ngine system under normal conditions          |       |                       |
|   | by the signals of engine speed and battery vo | tage. |                       |
|   | mmunication line.                             |       | JMBIA1833G            |

#### System Description

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#### INPUT/OUTPUT SIGNAL CHART

| Sensor  | Input signal to ECM                     | ECM function                             | Actuator      |
|---|---|--|---------------|
| Crankshaft position sensor (POS)              | Engine speed*3                          |  |               |
| Camshaft position sensor (PHASE)              | Piston position                         |  |               |
| Mass air flow sensor                          | Amount of intake air                    |  |               |
| Intake air temperature sensor                 | Intake air temperature                  | gine coolant temperature                 |               |
| Engine coolant temperature sensor             | Engine coolant temperature              |  |               |
| Air fuel ratio (A/F) sensor 1                 | Density of oxygen in exhaust gas        |  |               |
| Throttle position sensor                      | Throttle position                       |  |               |
| Accelerator pedal position sensor             | Accelerator pedal position              | Fuel injection                           |               |
| ТСМ   | Gear position                           | & mixture ratio Fuel injector<br>control | Fuel injector |
| Battery                                       | Battery voltage*3                       |  |               |
| Knock sensor                                  | Engine knocking condition               |  |               |
| Power steering pressure sensor                | Power steering operation                |  |               |
| Heated oxygen sensor 2*1                      | Density of oxygen in exhaust gas        |  |               |
| ABS actuator and electric unit (control unit) | VDC/TCS operation command*2             |  |               |
| Combination meter                             | Vehicle speed*2                         |  |               |
| BCM   | Air conditioner operation* <sup>2</sup> |  |               |

\*1: This sensor is not used to control the engine system under normal conditions.

\*2: This signal is sent to the ECM via the CAN communication line.

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#### < FUNCTION DIAGNOSIS >

\*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

#### SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

#### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

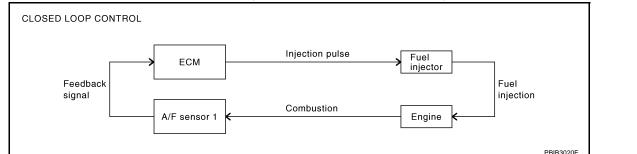
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever position is changed from N to D
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

#### MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for drive ability and emission control. The three way catalyst (manifold) can better reduce CO, HC and NOx emissions. This system uses A/F sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about A/F sensor 1, refer to <u>EC-186</u>, "<u>Description</u>". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of A/F sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback ontrol stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of A/F sensor 1 or its circuit
- Insufficient activation of A/F sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D
- When starting the engine

#### MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from A/F sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally

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#### < FUNCTION DIAGNOSIS >

designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes "short-term fuel trim" and "long-term fuel trim".

"Short-term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from A/F sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long-term fuel trim" is overall fuel compensation carried out over time to compensate for continual deviation of the "short-term fuel trim" from the central value. Continual deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

#### FUEL INJECTION TIMING

| lo 1 ovlindor -            |                      |
|----------------------------|----------------------|
| No. 1 cylinder – I         |                      |
| lo. 2 cylinder             | No. 2 cylinder – J L |
| lo. 3 cylinder ——————————— | No. 3 cylinder – J L |
| lo. 4 cylinder — L         | No. 4 cylinder – L   |
| lo. 5 cylinder             | No. 5 cylinder — [   |

Two types of systems are used.

• Sequential Multiport Fuel Injection System Fuel is injected into each cylinder during each engine cycle according to the ignition order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System
Fuel is injected simultaneously into all six cylinders twice each engine cycle. In other words, pulse signals of
the same width are simultaneously transmitted from the ECM.
The six injectors will then receive the signals 2 times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

#### FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

#### < FUNCTION DIAGNOSIS >

#### **Component Parts Location**

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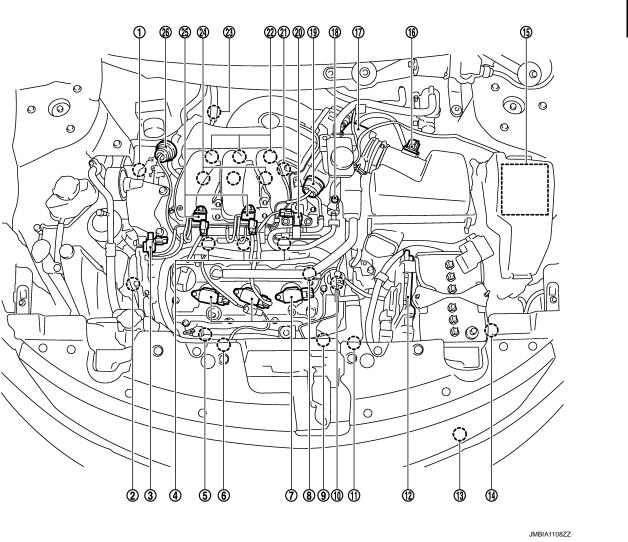
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.

2.

- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- Battery current sensor 14.
- 17. Electric throttle control actuator
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)
- Electronic controlled engine mount control solenoid valve Cooling fan motor-2 Crankshaft position sensor (POS) 12. ECM 15. IPDM E/R
- 18. EVAP service port

3.

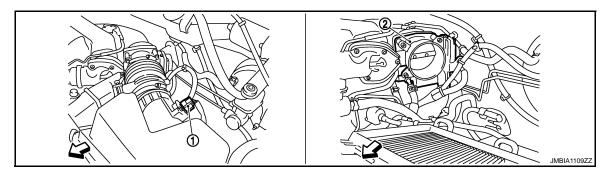
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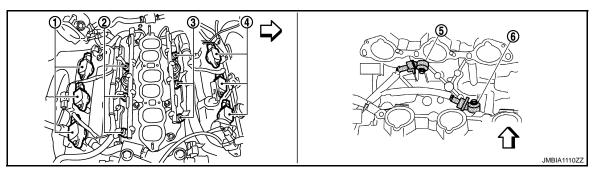
- (bank 1)
- 24. Fuel injector (bank 1)

#### < FUNCTION DIAGNOSIS >

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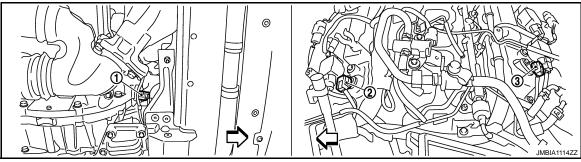


- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
- Ignition coil (with power transistor) 4. and spark plug (bank 2)
- 5. Knock sensor (bank 2)
- 3. Fuel injector (bank 2)
- Knock sensor (bank 1) 6.

: Vehicle front



Crankshaft position sensor (POS) 1.

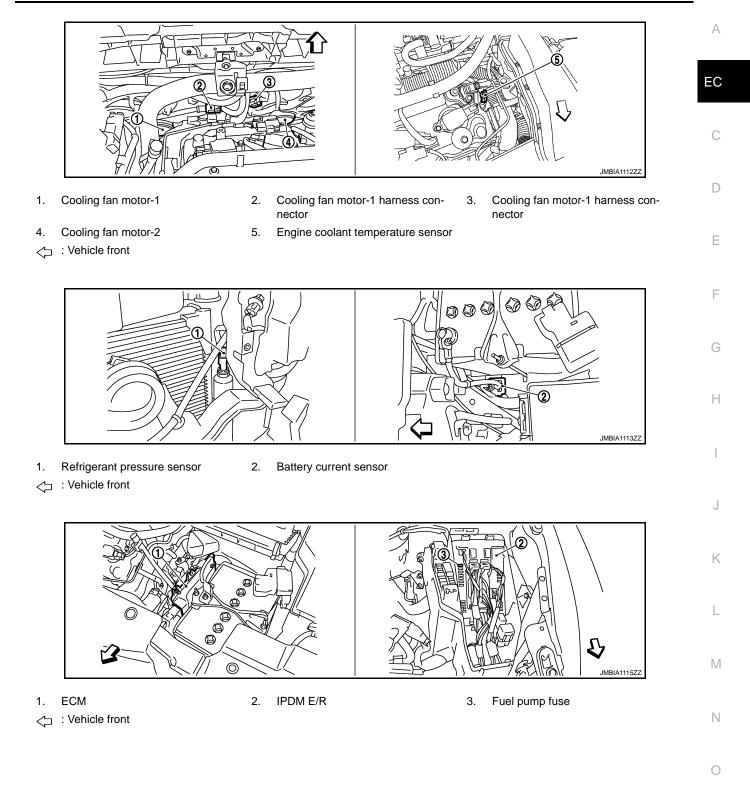
2.

- Camshaft position sensor (PHASE) 3. (bank 1)
  - Camshaft position sensor (PHASE) (bank 2)

: Vehicle front

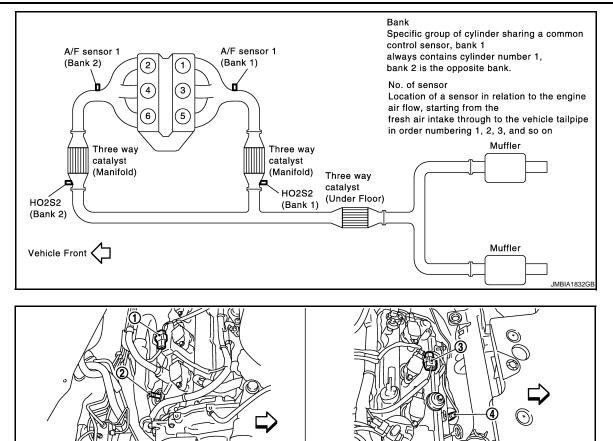
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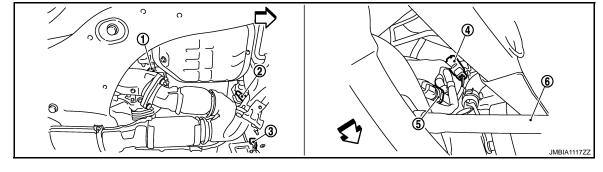
#### < FUNCTION DIAGNOSIS >



- 1. A/F sensor 1 (bank 1) harness con- 2. A/F sensor 1 (bank 1) nector
- 4. A/F sensor 1 (bank 2)
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector

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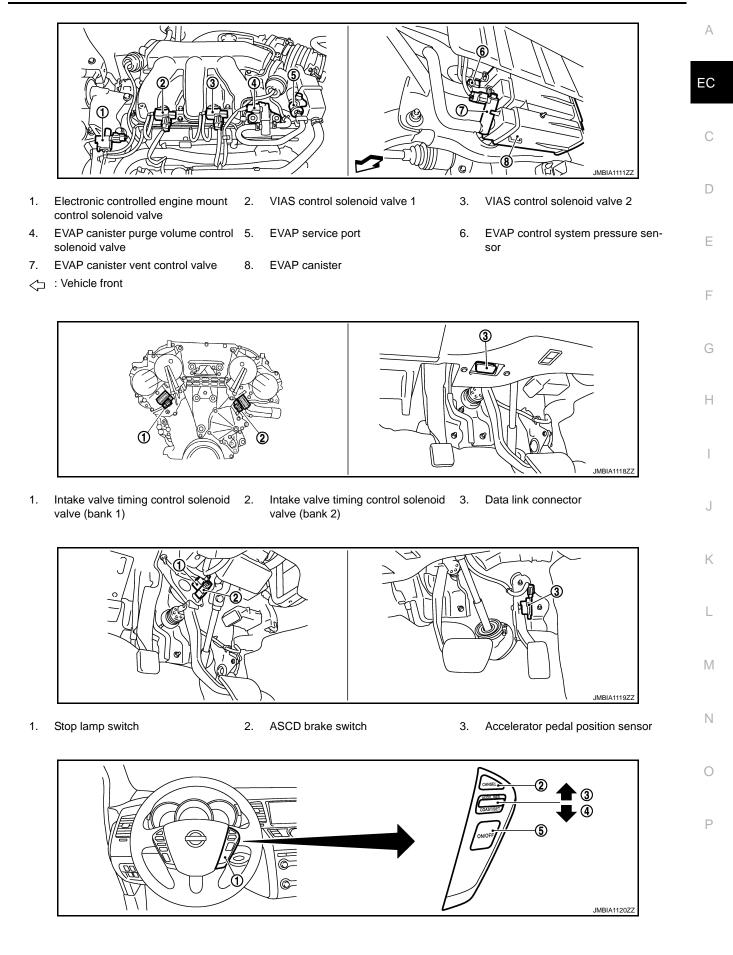


- 1. HO2S2 (bank 1)
  - HO2S2 (bank 1) harness connector 5. F
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

4.

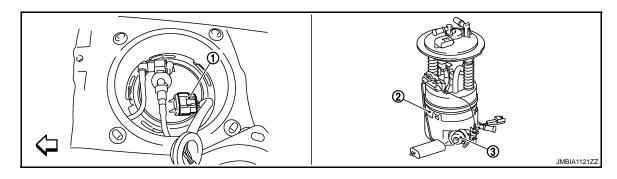
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#### < FUNCTION DIAGNOSIS >

- ASCD steering switch
   SET/COAST switch
- 2. CANSEL switch
- 5. MAIN switch
- 3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- ∠ : Vehicle front

# **Component Description**

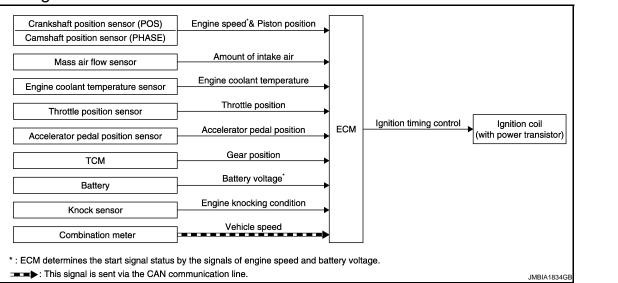
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| Component                         | Reference             |
|-----------------------------------|-----------------------|
| A/F sensor 1                      | EC-186, "Description" |
| Accelerator pedal position sensor | EC-413, "Description" |
| Camshaft position sensor (PHASE)  | EC-264, "Description" |
| Crankshaft position sensor (POS)  | EC-260, "Description" |
| Engine coolant temperature sensor | EC-170, "Description" |
| Fuel injector                     | EC-444, "Description" |
| Heated oxygen sensor 2            | EC-203, "Description" |
| Intake air temperature sensor     | EC-167, "Description" |
| Knock sensor                      | EC-257, "Description" |
| Mass air flow sensor              | EC-154, "Description" |
| Power steering pressure sensor    | EC-339, "Description" |
| ТСМ                               | EC-350, "Description" |
| Throttle position sensor          | EC-175, "Description" |

### < FUNCTION DIAGNOSIS >

# ELECTRIC IGNITION SYSTEM

## System Diagram



# System Description

INFOID:000000003387894

# INPUT/OUTPUT SIGNAL CHART

| Sensor                            | Input signal to ECM         | ECM function    | Actuator                |  |
|-----------------------------------|-----------------------------|-----------------|-------------------------|--|
| Crankshaft position sensor (POS)  | Engine speed* <sup>2</sup>  |                 |                         |  |
| Camshaft position sensor (PHASE)  | Piston position             |                 |                         |  |
| Mass air flow sensor              | Amount of intake air        |                 |                         |  |
| Engine coolant temperature sensor | Engine coolant temperature  |                 |                         |  |
| Throttle position sensor          | Throttle position           | Ignition timing | Ignition coil           |  |
| Accelerator pedal position sensor | Accelerator pedal position  | control         | (with power transistor) |  |
| ТСМ                               | Gear position               |                 |                         |  |
| Battery                           | Battery voltage*2           |                 |                         |  |
| Knock sensor                      | Engine knocking             |                 |                         |  |
| Combination meter                 | Vehicle speed* <sup>1</sup> |                 |                         |  |

\*1: This signal is sent to the ECM via the CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION

Ignition order: 1 - 2 - 3 - 4 - 5 - 6

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not

Revision: 2008 October



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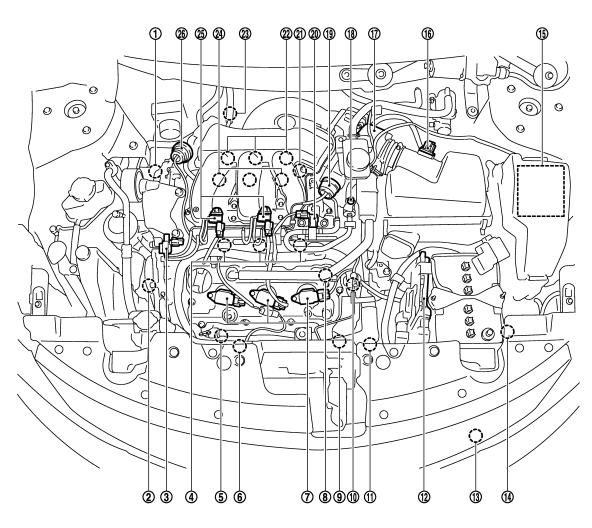
#### < FUNCTION DIAGNOSIS >

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operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

### **Component Parts Location**

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JMBIA1108ZZ

- Intake valve timing control solenoid 1. valve (bank 1)
  - Fuel injector (bank 2) 4.
  - 7. Ignition coil (with power transistor) and spark plug (bank 2)
  - 10. Engine coolant temperature sensor
  - 13. Refrigerant pressure sensor
  - 16. Mass air flow sensor (with intake air temperature sensor)
  - 19. Power valve actuator 2
  - 22. Ignition coil (with power transistor) and spark plug (bank 1)
  - 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- 2. Intake valve timing control solenoid 3. valve (bank 2)
- 5. A/F sensor 1 (bank 2)
- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- 14. Battery current sensor
- 17. Electric throttle control actuator
- solenoid valve
- 23. A/F sensor 1 (bank 1)

- Electronic controlled engine mount control solenoid valve
- Cooling fan motor-2 6.
- 9. Crankshaft position sensor (POS)
- 12. ECM
- 15. IPDM E/R
- 18. EVAP service port
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) (bank 1)
  - 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >

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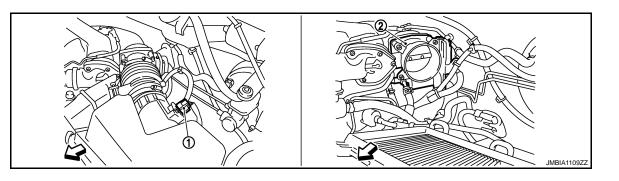
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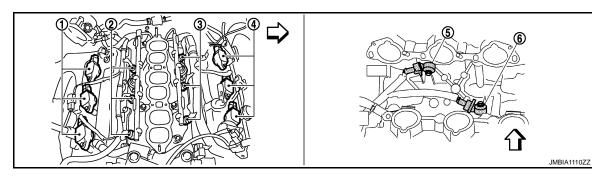
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front



- 1. Ignition coil (with power transistor) and spark plug (bank 1)
- 2. Fuel injector (bank 1)

5.

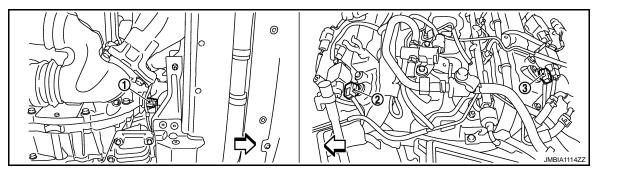
2.

(bank 1)

- Knock sensor (bank 2)
- Fuel injector (bank 2)
   Knock sensor (bank 1)

Camshaft position sensor (PHASE)

- 4. Ignition coil (with power transistor) and spark plug (bank 2)
- C : Vehicle front



Camshaft position sensor (PHASE)

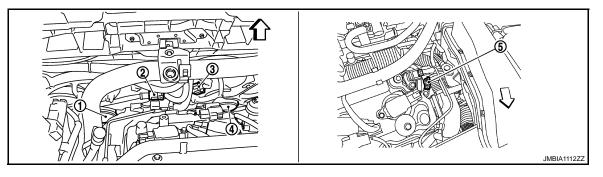
3.

(bank 2)

- 1. Crankshaft position sensor (POS)

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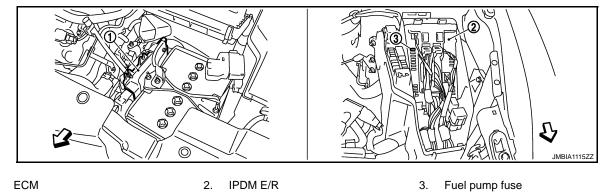
- Cooling fan motor-1 1.
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

3.

- 4. Cooling fan motor-2
- 5. Engine coolant temperature sensor

- : Vehicle front
  - Ø 60 000 2 JMBIA1113ZZ
- Refrigerant pressure sensor 1.
- 2. Battery current sensor

: Vehicle front



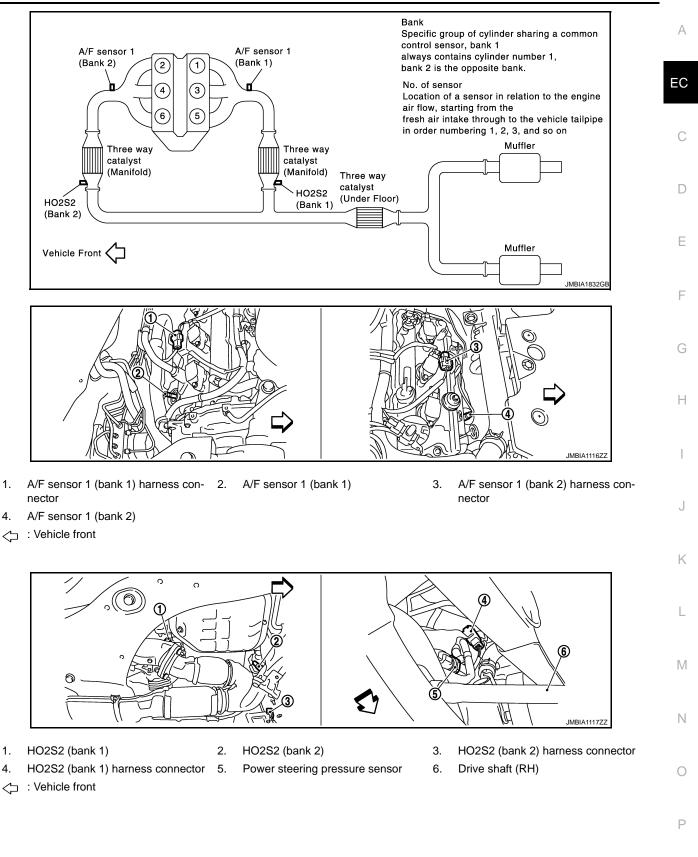
ECM 1.

- 2. IPDM E/R
- : Vehicle front  $\triangleleft$

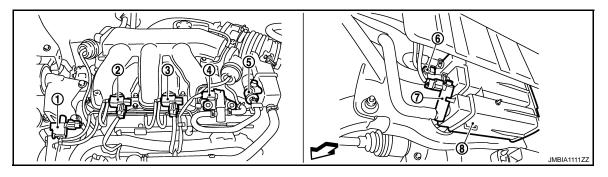
Revision: 2008 October

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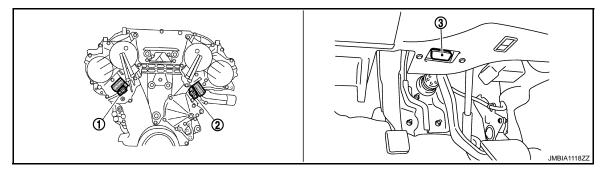
VIAS control solenoid valve 1

- 1. Electronic controlled engine mount 2. control solenoid valve
  - 5. EVAP service port
- 3. VIAS control solenoid valve 2

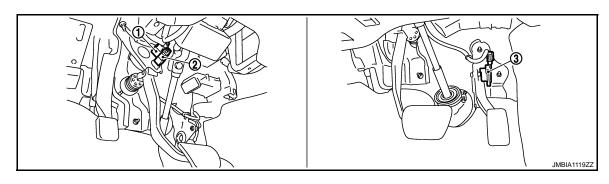
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

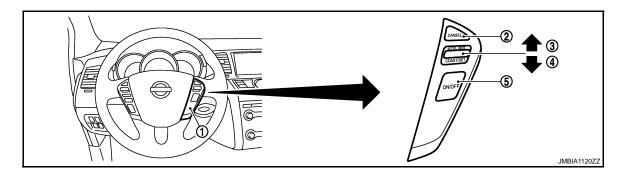
- 7. EVAP canister vent control valve
- : Vehicle front



- 1. Intake valve timing control solenoid 2. valve (bank 1)
- Intake valve timing control solenoid 3. Data link connector valve (bank 2)



- 1. Stop lamp switch
- 2. ASCD brake switch
- 3. Accelerator pedal position sensor



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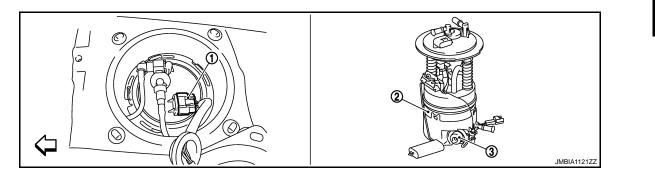
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- 1. ASCD steering switch
- 2. CANSEL switch
- SET/COAST switch 4.
- 5.
  - MAIN switch

3. **RESUME/ACCELERATE** switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- : Vehicle front

# **Component Description**

INFOID:000000003387896

| Component                         | Reference             |   |
|-----------------------------------|-----------------------|---|
| Accelerator pedal position sensor | EC-413, "Description" |   |
| Camshaft position sensor (PHASE)  | EC-264, "Description" | ſ |
| Crankshaft position sensor (POS)  | EC-260, "Description" |   |
| Engine coolant temperature sensor | EC-170, "Description" |   |
| Ignition signal                   | EC-451, "Description" |   |
| Knock sensor                      | EC-257, "Description" |   |
| Mass air flow sensor              | EC-154, "Description" |   |
| ТСМ                               | EC-350, "Description" |   |
| Throttle position sensor          | EC-175, "Description" | ŀ |

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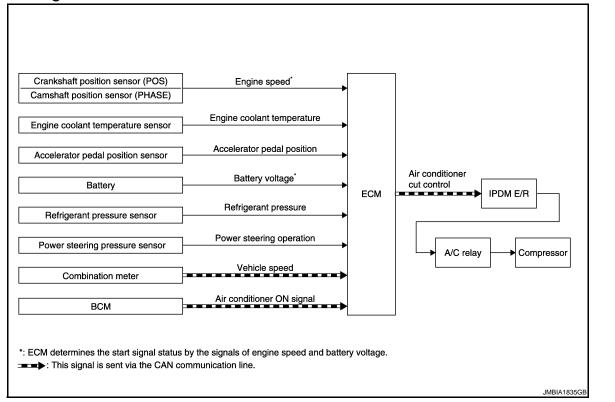
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### < FUNCTION DIAGNOSIS >

# **AIR CONDITIONING CUT CONTROL**

### System Diagram



# System Description

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### **INPUT/OUTPUT SIGNAL CHART**

| Sensor   | Input signal to ECM                     | ECM function    | Actuator                   |  |
|--|---|-----------------|----------------------------|--|
| Crankshaft position sensor (POS)<br>Camshaft position sensor (PHASE) | Engine speed*2                          |                 |                            |  |
| Engine coolant temperature sensor                                    | Engine coolant temperature              |                 |                            |  |
| Accelerator pedal position sensor                                    | Accelerator pedal position              | IF              | IPDM E/R                   |  |
| Battery  | Battery voltage*2                       | Air conditioner | ↓<br>Air conditioner relay |  |
| Refrigerant pressure sensor  | Refrigerant pressure                    | cut control     | ↓<br>,                     |  |
| Power steering pressure sensor                                       | Power steering operation                |                 | Compressor                 |  |
| Combination meter  | Vehicle speed*1                         |                 |                            |  |
| BCM  | Air conditioner ON signal* <sup>1</sup> |                 |                            |  |

\*1: This signal is sent to the ECM via the CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used.

Under the following conditions, the air conditioner is turned OFF.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

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#### < FUNCTION DIAGNOSIS >

### **Component Parts Location**

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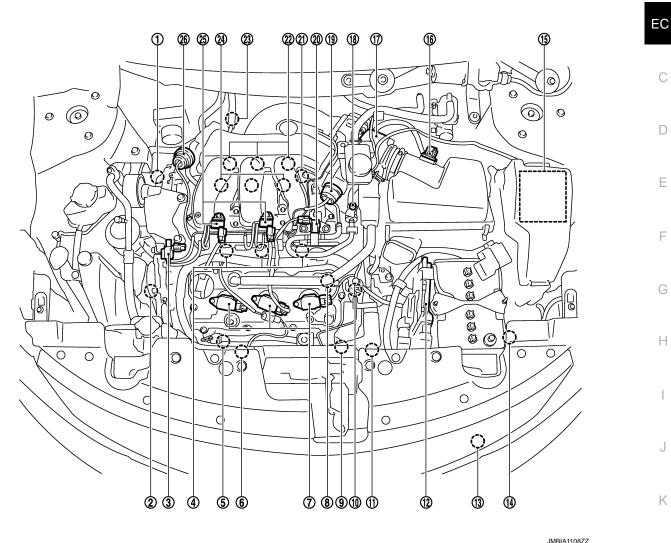
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.

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- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- Battery current sensor 14.
- 17. Electric throttle control actuator
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)
- Electronic controlled engine mount control solenoid valve Cooling fan motor-2 Crankshaft position sensor (POS) 12. ECM 15. IPDM E/R
- 18. EVAP service port

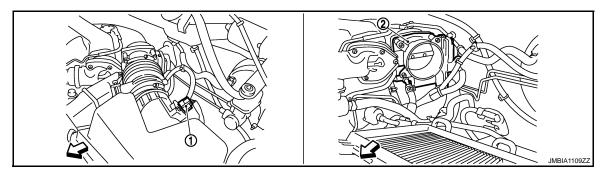
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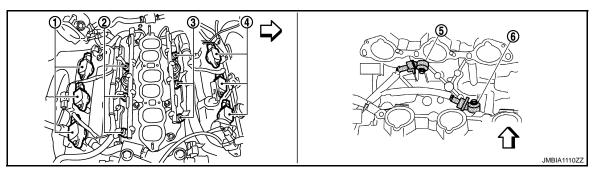
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- (bank 1)
- 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >



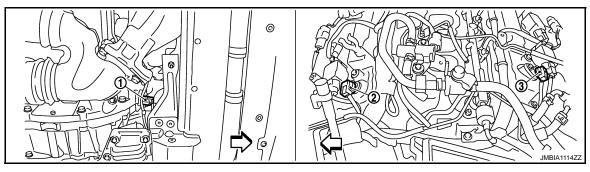
- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
- 3. Fuel injector (bank 2)

- Ignition coil (with power transistor) 4. and spark plug (bank 2)
- 5. Knock sensor (bank 2)
- Knock sensor (bank 1) 6.

: Vehicle front



Crankshaft position sensor (POS) 1.

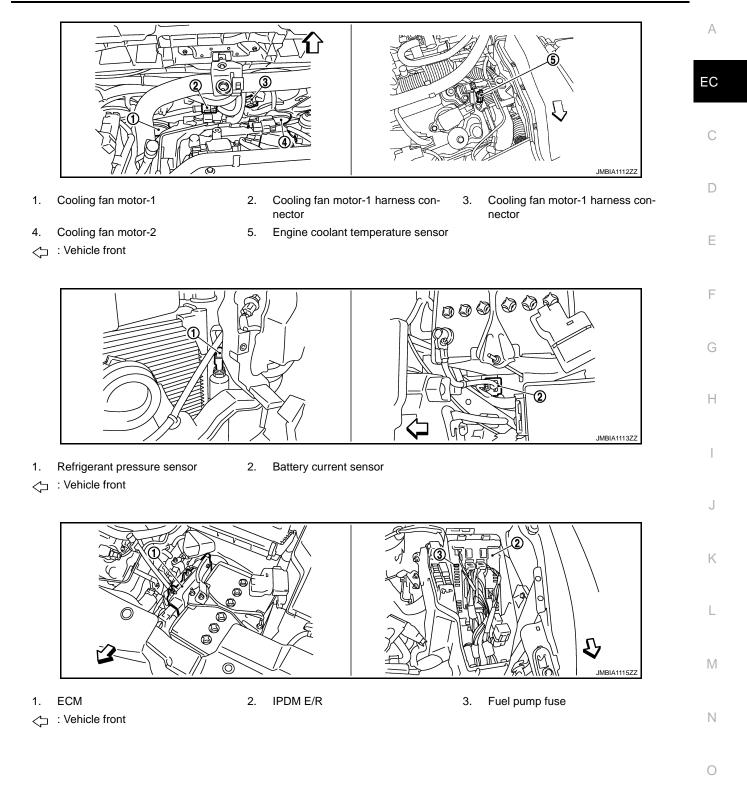
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- Camshaft position sensor (PHASE) 3. (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

: Vehicle front

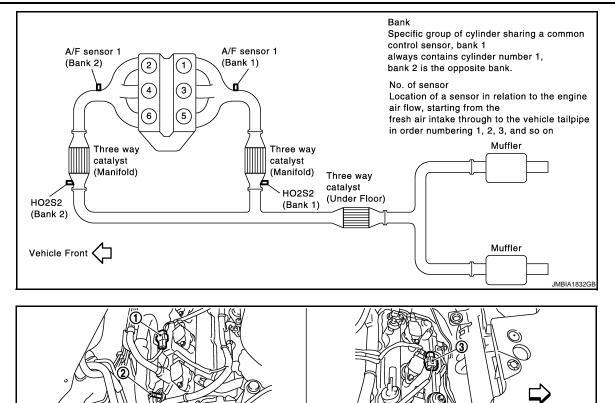
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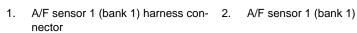
### [VQ35DE]



Revision: 2008 October

#### < FUNCTION DIAGNOSIS >

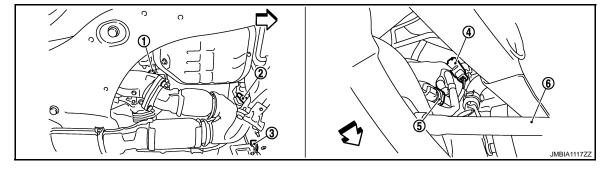




- 4. A/F sensor 1 (bank 2)
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector

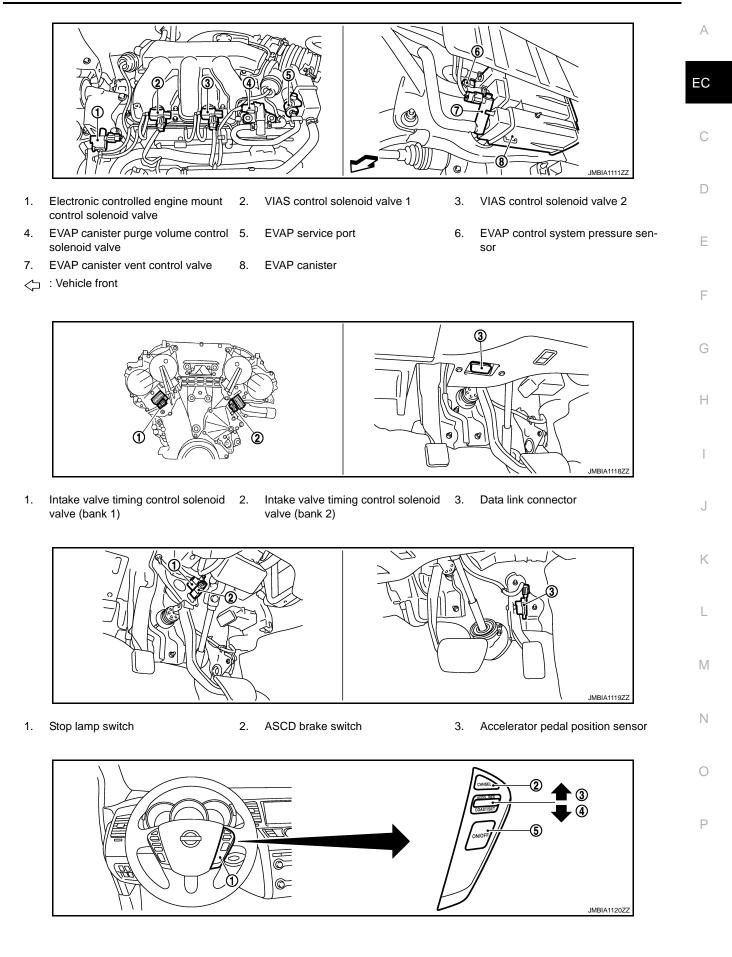
JMBIA1116ZZ



- 1. HO2S2 (bank 1)
- 4. HO2S2 (bank 1) harness connector 5.
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

#### < FUNCTION DIAGNOSIS >

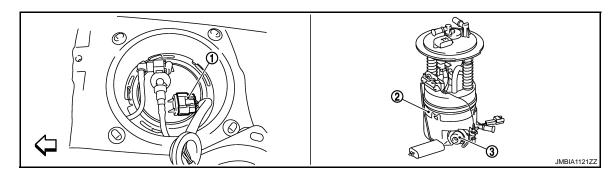
### [VQ35DE]



### < FUNCTION DIAGNOSIS >

- 1. ASCD steering switch 4.
- 2. CANSEL switch
- SET/COAST switch
- 5. MAIN switch

3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- : Vehicle front

# **Component Description**

| Component                         | Reference             |
|-----------------------------------|-----------------------|
| Accelerator pedal position sensor | EC-413, "Description" |
| Camshaft position sensor (PHASE)  | EC-264, "Description" |
| Crankshaft position sensor (POS)  | EC-260, "Description" |
| Engine coolant temperature sensor | EC-170, "Description" |
| Power steering pressure sensor    | EC-339, "Description" |
| Refrigerant pressure sensor       | EC-463, "Description" |

### < FUNCTION DIAGNOSIS >

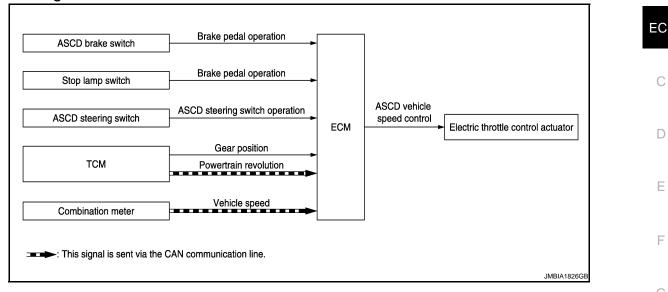
# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

### [VQ35DE]

INFOID:00000003387901

INFOID:00000003387902





# System Description

### **INPUT/OUTPUT SIGNAL CHART**

| Sensor               | Input signal to ECM            | ECM function               | Actuator                  |  |
|----------------------|--------------------------------|----------------------------|---------------------------|--|
| ASCD brake switch    | Brake pedal operation          |                            |                           |  |
| Stop lamp switch     | Brake pedal operation          |                            |                           |  |
| ASCD steering switch | ASCD steering switch operation |                            | Electric throttle control |  |
| TOM                  | Gear position                  | ASCD vehicle speed control | actuator                  |  |
| ТСМ                  | Powertrain revolution*         |                            |                           |  |
| Combination meter    | Vehicle speed*                 |                            |                           |  |

\*: This signal is sent to the ECM via the CAN communication line

#### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/ h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE on combination meter. If any malfunction occurs in the ASCD system, it automatically deactivates control.

#### NOTE:

Always drive vehicle in a safe manner according to traffic conditions and obey all traffic laws.

#### SET OPERATION

Press MAIN switch. (The CRUISE on combination meter illuminates.) When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET/COAST switch.

### ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system. And then ASCD will maintain the new set speed.

### CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.



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#### < FUNCTION DIAGNOSIS >

- CANCEL switch is pressed
- More than 2 switches on ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Selector lever position changed to N, P or R
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated
- CVT control system has a malfunction. Refer to EC-388, "Description".
- Engine coolant temperature is slightly higher than the normal operating temperature

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

• Malfunction for some self-diagnoses regarding ASCD control: CRUISE will blink quickly.

If MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

#### COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will maintain the new set speed.

#### **RESUME OPERATION**

When the RESUME/ACCELERATE switch is pressed after canceling operation other than pressing the MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released
- Selector lever position is other than P and N
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

### < FUNCTION DIAGNOSIS >

### **Component Parts Location**

# [VQ35DE]

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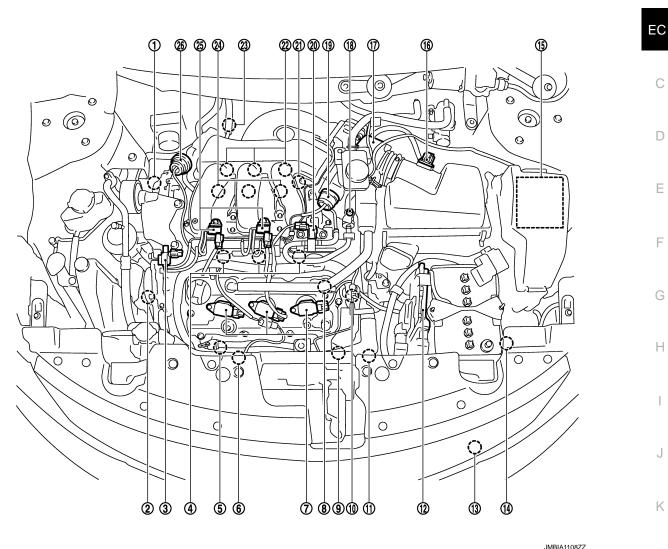
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.

2.

- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- Battery current sensor 14.
- 17. Electric throttle control actuator
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)
- Electronic controlled engine mount control solenoid valve Cooling fan motor-2 Crankshaft position sensor (POS) 12. ECM 15. IPDM E/R
- 18. EVAP service port

3.

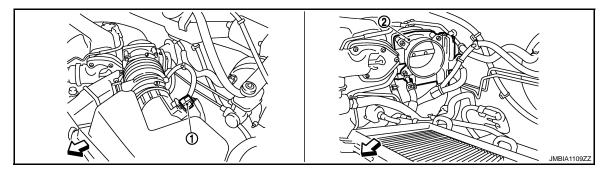
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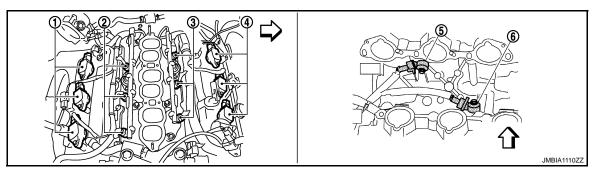
- (bank 1)
- 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >

[VQ35DE]



- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
- Fuel injector (bank 2) 3.

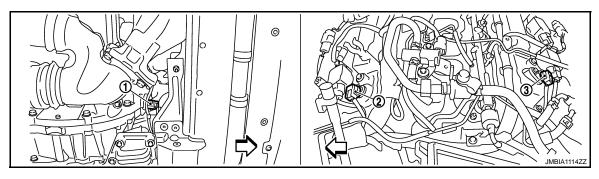
- Ignition coil (with power transistor) 4.

- and spark plug (bank 2)
- 5. Knock sensor (bank 2)

2.

Knock sensor (bank 1) 6.

: Vehicle front



- Crankshaft position sensor (POS) 1.
- Camshaft position sensor (PHASE) (bank 1)

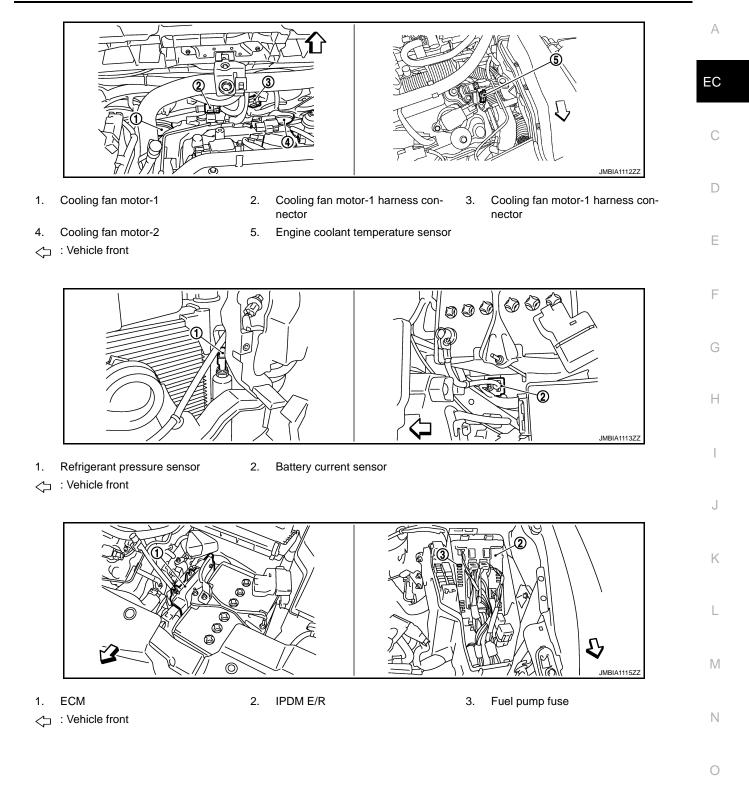
3.

Camshaft position sensor (PHASE) (bank 2)

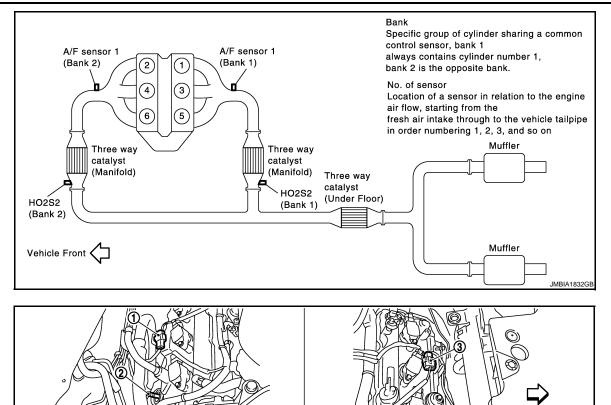
: Vehicle front

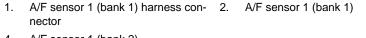
### < FUNCTION DIAGNOSIS >

### [VQ35DE]



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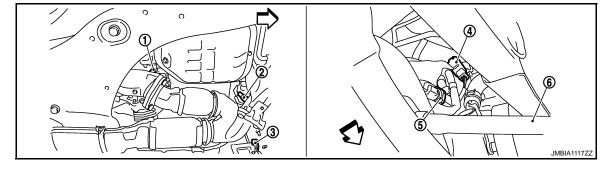




- 4. A/F sensor 1 (bank 2)
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector

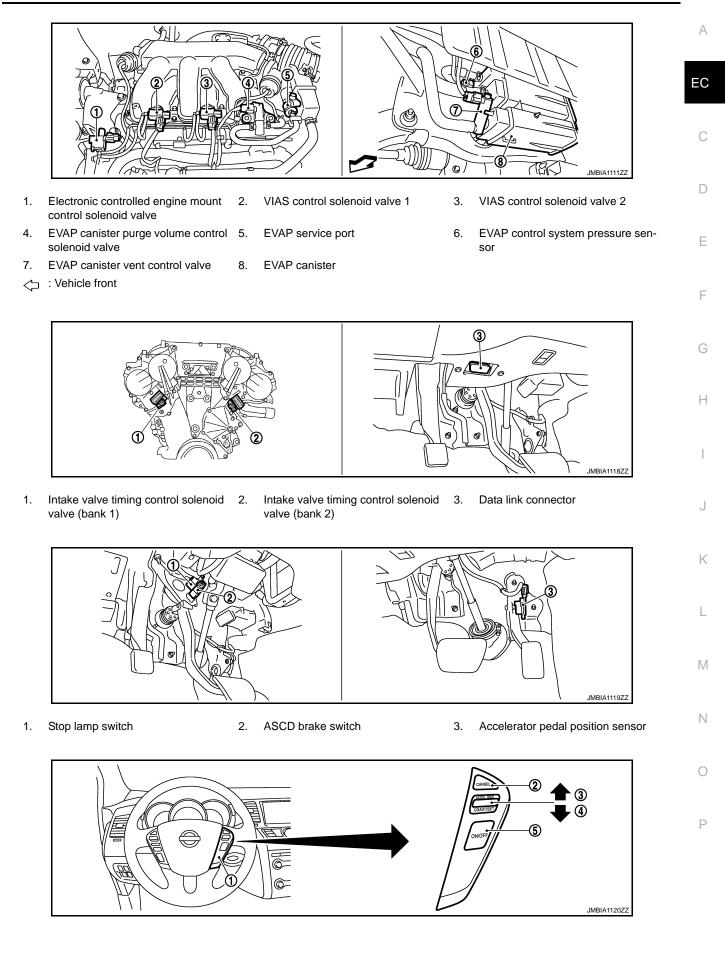
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- 1. HO2S2 (bank 1)
- 4. HO2S2 (bank 1) harness connector 5.
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

### < FUNCTION DIAGNOSIS >

[VQ35DE]

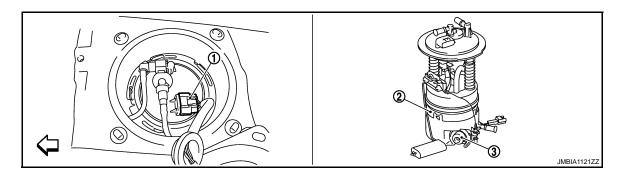


### < FUNCTION DIAGNOSIS >

- ASCD steering switch 1. SET/COAST switch 4.
- 2. CANSEL switch MAIN switch

5.

3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- : Vehicle front

# **Component Description**

| Component                          | Reference             |
|------------------------------------|-----------------------|
| ASCD brake switch                  | EC-380, "Description" |
| ASCD indicator                     | EC-433, "Description" |
| ASCD steering switch               | EC-377, "Description" |
| Electric throttle control actuator | EC-411, "Description" |
| Stop lamp switch                   | EC-399. "Description" |

# CAN COMMUNICATION

### System Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle mul-EC tiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-25, "CAN Communication Signal Chart", about CAN communication for detail.

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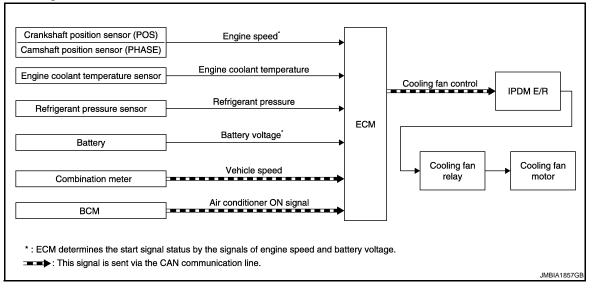
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[VQ35DE]

### < FUNCTION DIAGNOSIS >

# COOLING FAN CONTROL

## System Diagram



# System Description

INFOID:000000003387907

## INPUT/OUTPUT SIGNAL CHART

| Sensor   | Input signal to ECM                           | ECM function                  | Actuator          |
|--|---|-------------------------------|-------------------|
| Crankshaft position sensor (POS)<br>Camshaft position sensor (PHASE) | Engine speed* <sup>1</sup><br>Piston position |                               |                   |
| Engine coolant temperature sensor                                    | Engine coolant temperature                    |                               | IPDM E/R          |
| Refrigerant pressure sensor  | Refrigerant pressure                          | Cooling fan Cooling fan relay | -                 |
| Battery  | Battery voltage*1                             | control                       | ↓ Ū J             |
| Combination meter  | Vehicle speed*2                               |                               | Cooling fan motor |
| BCM  | Air conditioner ON signal* <sup>2</sup>       |                               |                   |

\*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

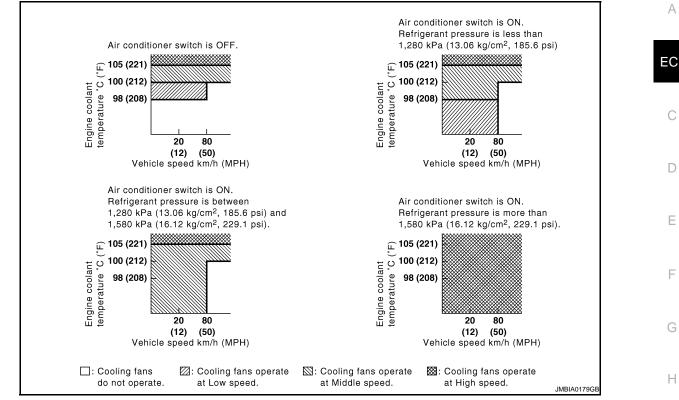
\*2: This signal is sent to ECM via the CAN communication line.

#### SYSTEM DESCRIPTION

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

### < FUNCTION DIAGNOSIS >

#### **Cooling Fan Operation**



#### **Cooling Fan Relay Operation**

The ECM controls cooling fan relays in the IPDM E/R through CAN communication line.

| Cooling fan speed | Cooling fan relay |     |     |  |
|-------------------|-------------------|-----|-----|--|
|                   | 1                 | 2   | 3   |  |
| Stop (OFF)        | OFF               | OFF | OFF |  |
| Low (LOW)         | ON                | OFF | OFF |  |
| Middle (MID)      | OFF               | ON  | OFF |  |
| High (HI)         | OFF               | ON  | ON  |  |

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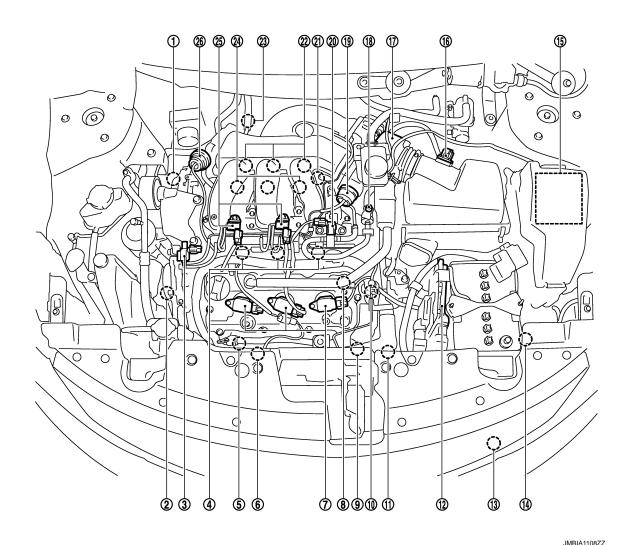
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#### < FUNCTION DIAGNOSIS >

## **Component Parts Location**

INFOID:000000003573788

[VQ35DE]



- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air 17. Electric throttle control actuator temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid 2. valve (bank 2)
- A/F sensor 1 (bank 2) 5.
- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- 14. Battery current sensor
- solenoid valve
- 23. A/F sensor 1 (bank 1)

- 3. Electronic controlled engine mount control solenoid valve
- Cooling fan motor-2 6.
- 9. Crankshaft position sensor (POS)
- 12. ECM
- 15. IPDM E/R
- 18. EVAP service port
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) (bank 1)
  - 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >

### [VQ35DE]

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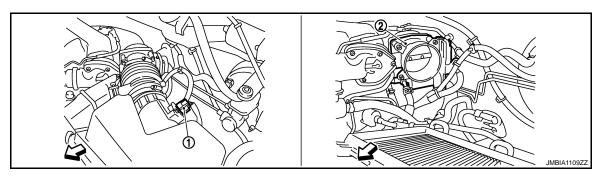
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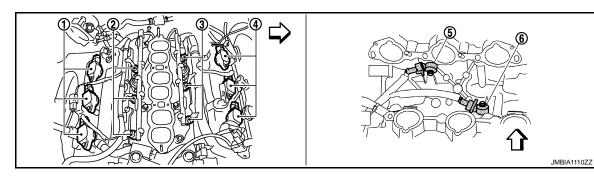
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front

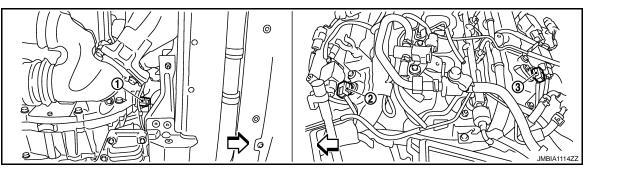


- 1. Ignition coil (with power transistor) and spark plug (bank 1)
- 2. Fuel injector (bank 1)

5.

- Knock sensor (bank 2)
- Fuel injector (bank 2)
   Knock sensor (bank 1)

- 4. Ignition coil (with power transistor) and spark plug (bank 2)
- and spark plug (b

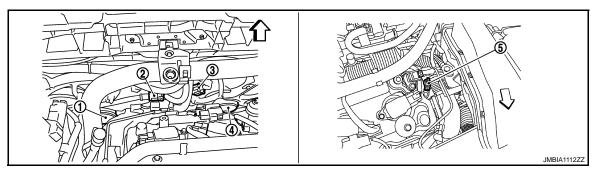


- 1. Crankshaft position sensor (POS)
  - sensor (POS) 2. Camshaft position sensor (PHASE) (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

3.

: Vehicle front

### < FUNCTION DIAGNOSIS >



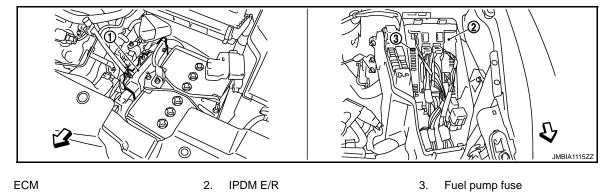
- Cooling fan motor-1 1.
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

3.

- 4. Cooling fan motor-2
- 5. Engine coolant temperature sensor

- : Vehicle front
  - Ø 60 000 2 JMBIA1113ZZ
- 1. Refrigerant pressure sensor
- 2. Battery current sensor

: Vehicle front



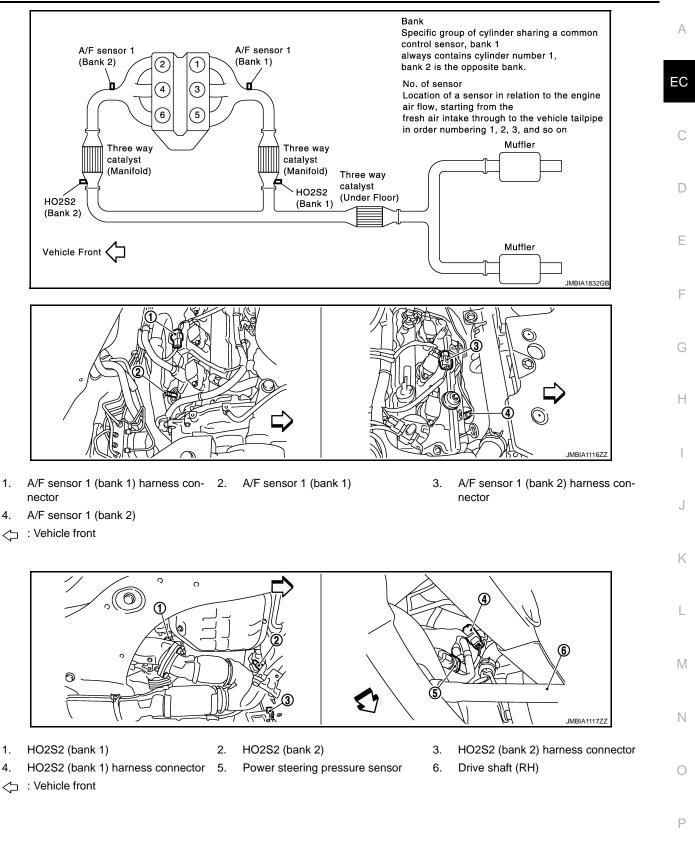
ECM 1.

- 2. IPDM E/R
- : Vehicle front  $\triangleleft$

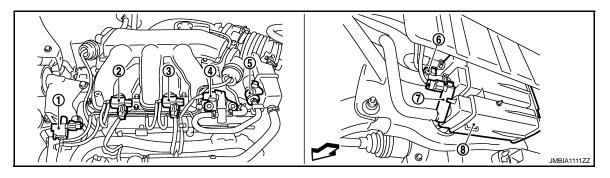
Revision: 2008 October

#### < FUNCTION DIAGNOSIS >

#### [VQ35DE]



### < FUNCTION DIAGNOSIS >



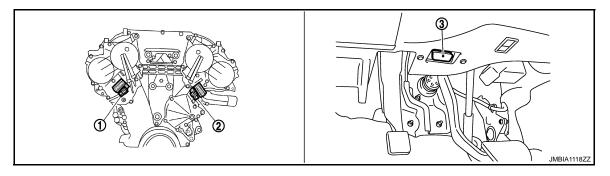
VIAS control solenoid valve 1

- 1. Electronic controlled engine mount 2. control solenoid valve
  - 5. EVAP service port
- 3. VIAS control solenoid valve 2

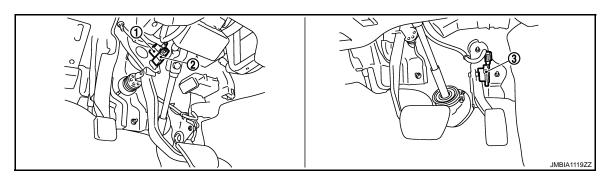
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

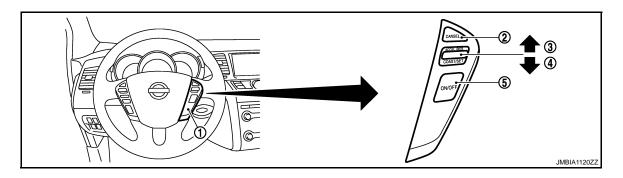
- 7. EVAP canister vent control valve
- : Vehicle front



- 1. Intake valve timing control solenoid 2. valve (bank 1)
- Intake valve timing control solenoid 3. Data link connector valve (bank 2)



- 1. Stop lamp switch
- 2. ASCD brake switch
- 3. Accelerator pedal position sensor



### < FUNCTION DIAGNOSIS >

### [VQ35DE]

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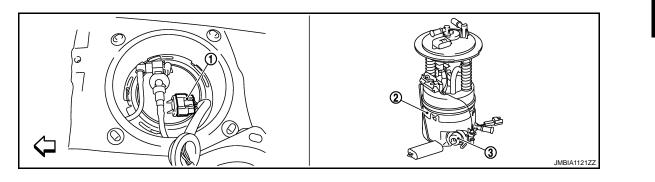
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- 1. ASCD steering switch
- 2. CANSEL switch
- SET/COAST switch 4.
- 5. MAIN switch

3. **RESUME/ACCELERATE** switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- : Vehicle front

# **Component Description**

| Component                         | Reference             |  |
|-----------------------------------|-----------------------|--|
| Camshaft position sensor (PHASE)  | EC-264, "Description" |  |
| Cooling fan motor                 | EC-434, "Description" |  |
| Crankshaft position sensor (POS)  | EC-260, "Description" |  |
| Engine coolant temperature sensor | EC-170, "Description" |  |
| Refrigerant pressure sensor       | EC-463, "Description" |  |

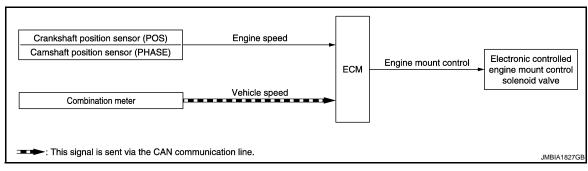
### < FUNCTION DIAGNOSIS >

# ELECTRONIC CONTROLLED ENGINE MOUNT

## System Diagram

INFOID:000000003387910

[VQ35DE]



## System Description

INFOID:000000003387911

## INPUT/OUTPUT SIGNAL CHART

| Sensor   | Input signal to ECM | ECM function | Actuator   |  |
|--|---------------------|--------------|--|--|
| Crankshaft position sensor (POS)<br>Camshaft position sensor (PHASE) | Engine speed        | Engine mount | Electronic controlled en-<br>gine mount control solenoid |  |
| Combination meter  | Vehicle speed*      | control      | valve  |  |

\*: This signal is sent to the ECM via the CAN communication line.

#### SYSTEM DESCRIPTION

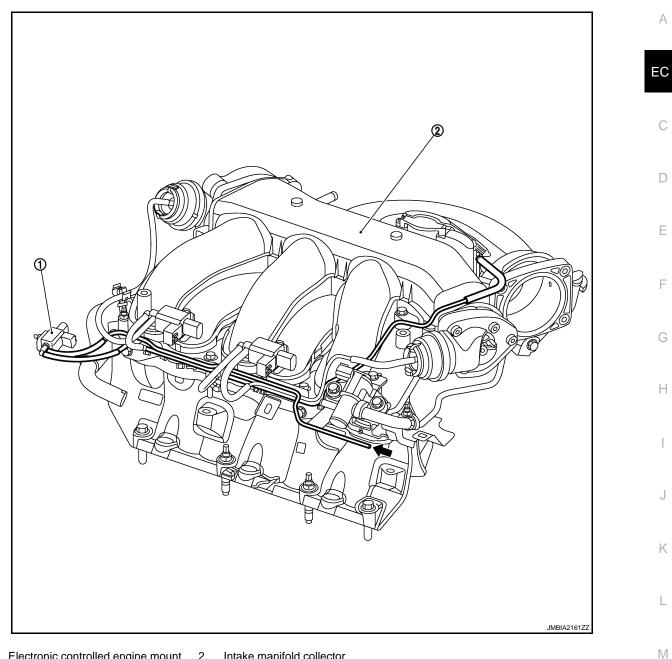
The ECM controls the engine mount operation corresponding to the engine speed. The control system has a 2-step control [Soft/Hard]

| Vehicle condition           | Engine mount control |
|-----------------------------|----------------------|
| Engine speed: Below 950 rpm | Soft                 |
| Engine speed: Above 950 rpm | Hard                 |

ELECTRONIC CONTROLLED ENGINE MOUNT LINE DRAWING

### < FUNCTION DIAGNOSIS >

## [VQ35DE]

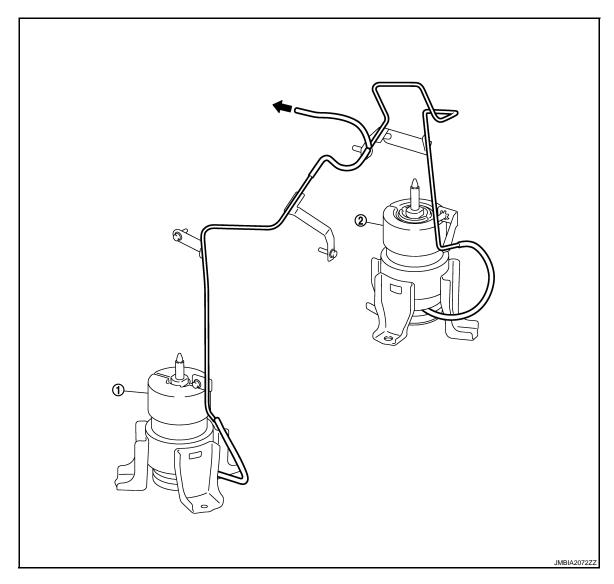


- 1. Electronic controlled engine mount 2. Intake manifold collector control solenoid valve
- 🖕 : From next figure

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### < FUNCTION DIAGNOSIS >



- 1. Front electronic controlled engine mount 2. Rear electronic controlled engine mount
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#### NOTE:

Do not use soapy water or any type of solvent while installing vacuum hose.

#### < FUNCTION DIAGNOSIS >

### **Component Parts Location**

[VQ35DE]

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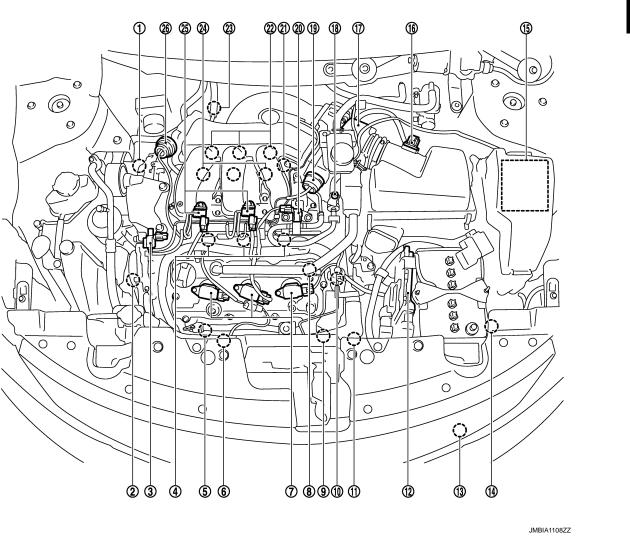
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.

2.

- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- Battery current sensor 14.
- 17. Electric throttle control actuator
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)

# Electronic controlled engine mount control solenoid valve Cooling fan motor-2 Crankshaft position sensor (POS)

#### 12. ECM Ν 15. IPDM E/R 18. EVAP service port

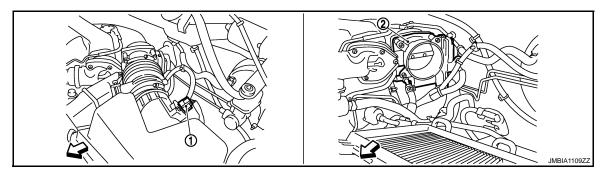
- (bank 1)
- 24. Fuel injector (bank 1)

3.

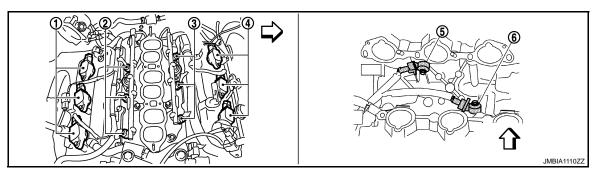
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### < FUNCTION DIAGNOSIS >



- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
- 3. Fuel injector (bank 2)

3.

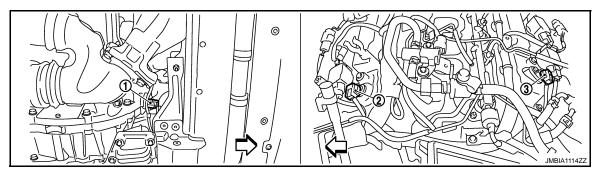
- Ignition coil (with power transistor) 4. and spark plug (bank 2)

- 5. Knock sensor (bank 2)

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Knock sensor (bank 1) 6.

: Vehicle front

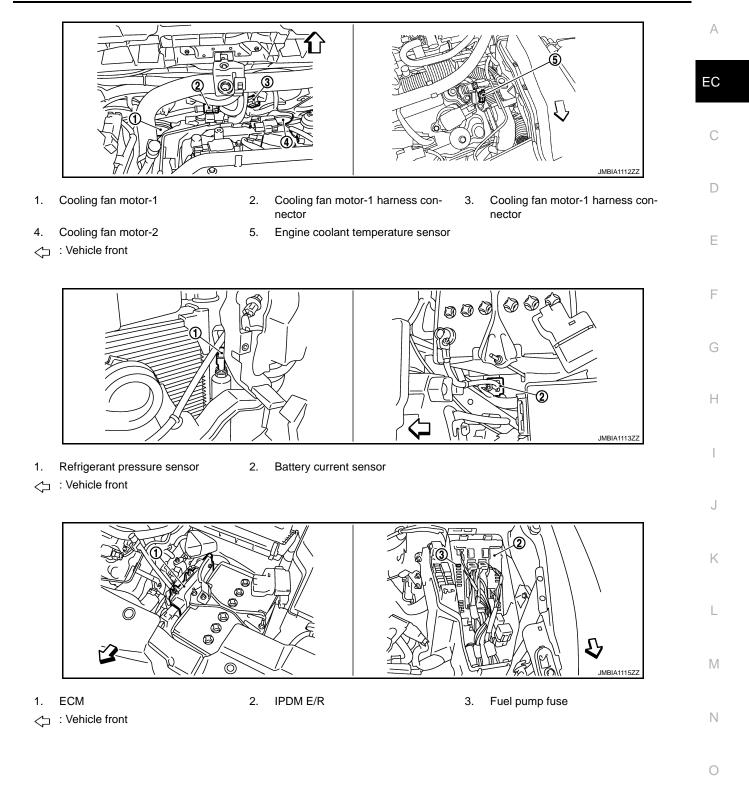


- Crankshaft position sensor (POS) 1.
- Camshaft position sensor (PHASE) (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

: Vehicle front

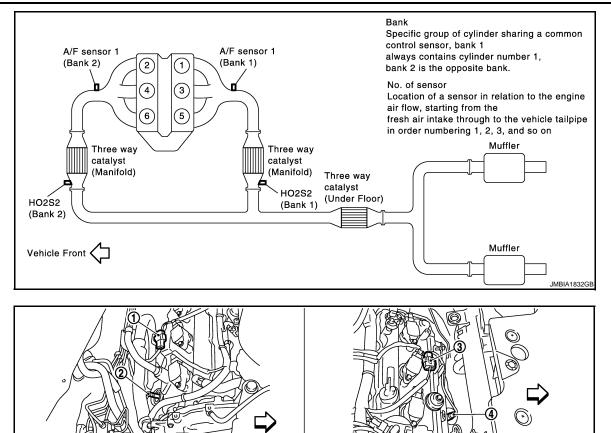
### < FUNCTION DIAGNOSIS >

## [VQ35DE]



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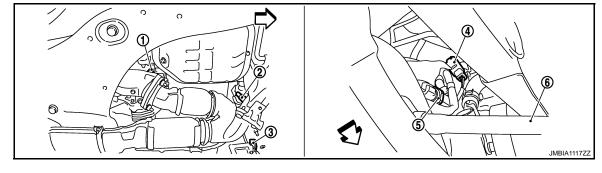
#### < FUNCTION DIAGNOSIS >



- 1. A/F sensor 1 (bank 1) harness con- 2. A/F sensor 1 (bank 1) nector
- 4. A/F sensor 1 (bank 2)
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector

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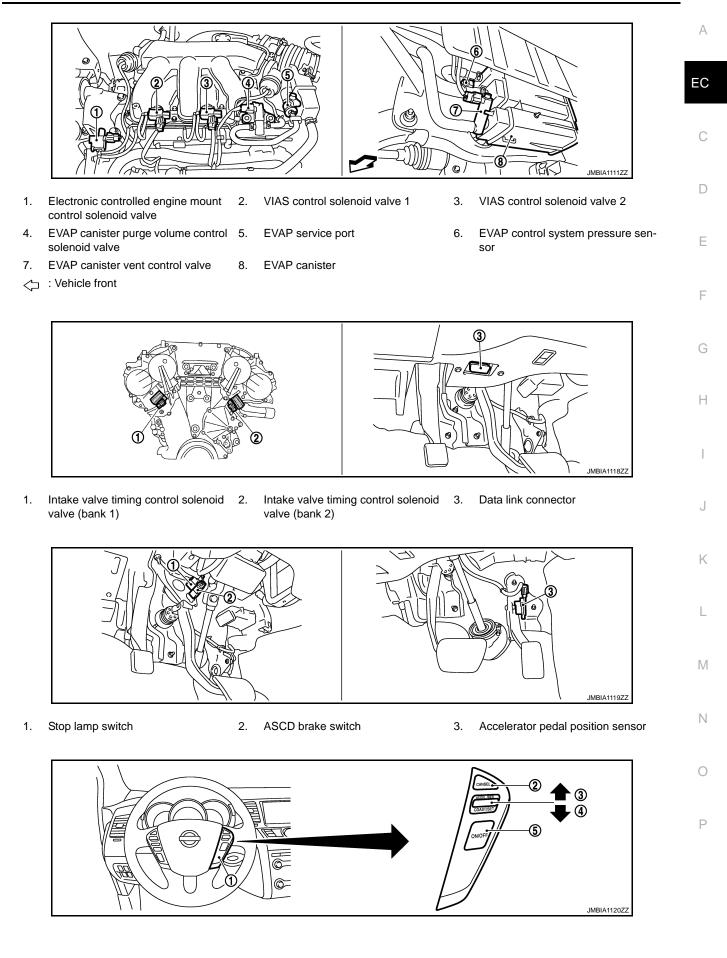


- 1. HO2S2 (bank 1)
  - HO2S2 (bank 1) harness connector 5.
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

4.

### < FUNCTION DIAGNOSIS >

[VQ35DE]

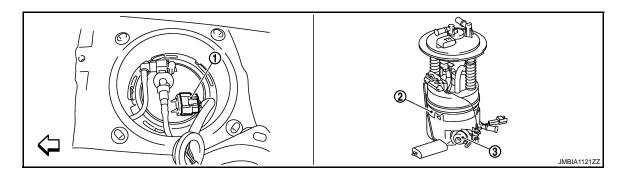


### < FUNCTION DIAGNOSIS >

- 1. ASCD steering switch SET/COAST switch 4.
- 2. CANSEL switch MAIN switch

5.

3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- : Vehicle front

# **Component Description**

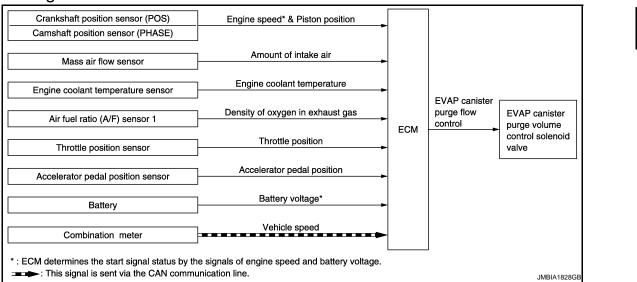
INFOID:000000003387913

| Component   | Reference             |
|---|-----------------------|
| Camshaft position sensor (PHASE)                          | EC-264, "Description" |
| Crankshaft position sensor (POS)                          | EC-260, "Description" |
| Electronic controlled engine mount control solenoid valve | EC-441, "Description" |

#### < FUNCTION DIAGNOSIS >

# EVAPORATIVE EMISSION SYSTEM

## System Diagram



# System Description

INFOID:000000003387915

## INPUT/OUTPUT SIGNAL CHART

| Sensor                            | Input signal to ECM  | ECM function                        | Actuator   |
|-----------------------------------|--|-------------------------------------|--|
| Crankshaft position sensor (POS)  | Engine speed*1   |                                     |  |
| Camshaft position sensor (PHASE)  | Piston position  |                                     |  |
| Mass air flow sensor              | Amount of intake air   |                                     |  |
| Engine coolant temperature sensor | Engine coolant temperature                                       |                                     |  |
| Air fuel ratio (A/F) sensor 1     | Density of oxygen in exhaust gas (Mixture ratio feedback signal) | EVAP canister<br>purge flow control | EVAP canister purge vol-<br>ume control solenoid valve |
| Throttle position sensor          | Throttle position  | _                                   |  |
| Accelerator pedal position sensor | Accelerator pedal position                                       |                                     |  |
| Battery                           | Battery voltage*1  |                                     |  |
| Combination meter                 | Vehicle speed*2  |                                     |  |

\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: This signal is sent to the ECM via the CAN communication line.

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[VQ35DE]

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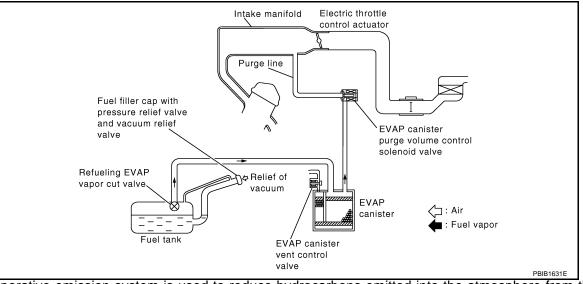
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### < FUNCTION DIAGNOSIS >

# SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.

The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

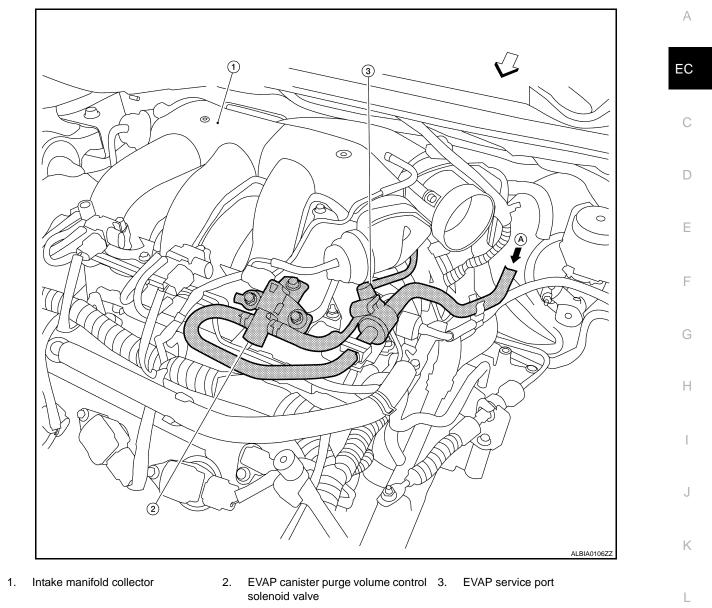
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

### EVAPORATIVE EMISSION LINE DRAWING

### < FUNCTION DIAGNOSIS >

[VQ35DE]



- A. From EVAP canister

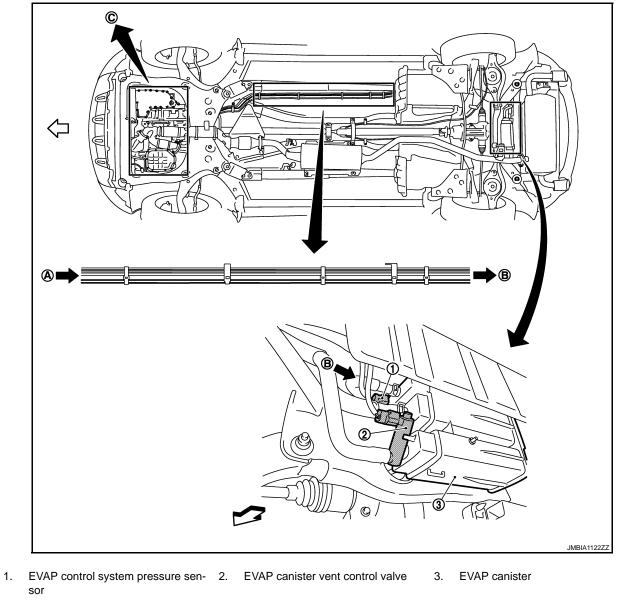
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#### < FUNCTION DIAGNOSIS >

[VQ35DE]



- A. To previous figure
- B. To/From B in this figure
- C. Refer to previous figure

∠ : Vehicle front

### NOTE:

Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

### < FUNCTION DIAGNOSIS >

## **Component Parts Location**

[VQ35DE] INFOID:000000003573791

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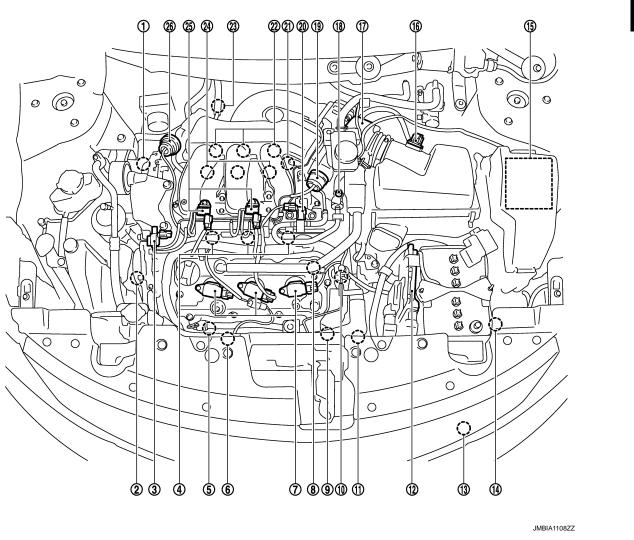
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

Intake valve timing control solenoid valve (bank 2)

3.

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9.

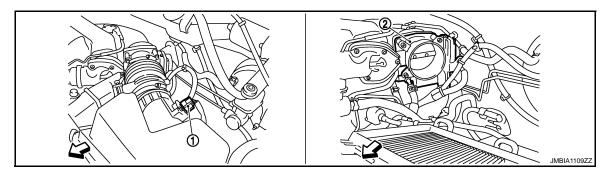
A/F sensor 1 (bank 2) 5.

2.

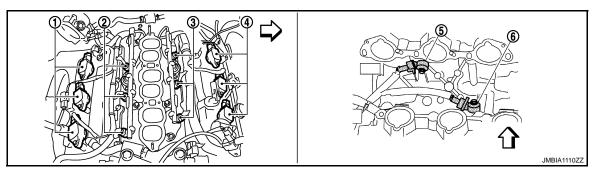
- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- Battery current sensor 14.
- 17. Electric throttle control actuator
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)

- Electronic controlled engine mount control solenoid valve Cooling fan motor-2 Crankshaft position sensor (POS) 12. ECM
- 15. IPDM E/R 18. EVAP service port (bank 1) 24. Fuel injector (bank 1) Ρ

### < FUNCTION DIAGNOSIS >



- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)



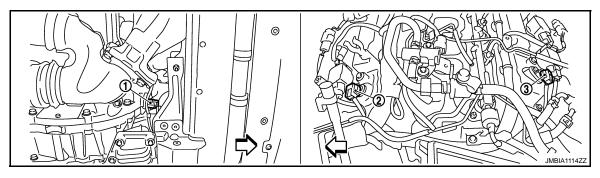
- 1. Ignition coil (with power transistor) and spark plug (bank 1)
- 2. Fuel injector (bank 1)

5.

2.

- Ignition coil (with power transistor) and spark plug (bank 2)
- . . ,
  - Knock sensor (bank 2)
- 3. Fuel injector (bank 2)
- 6. Knock sensor (bank 1)

4.



- 1. Crankshaft position sensor (POS)
- Camshaft position sensor (PHASE) (bank 1)

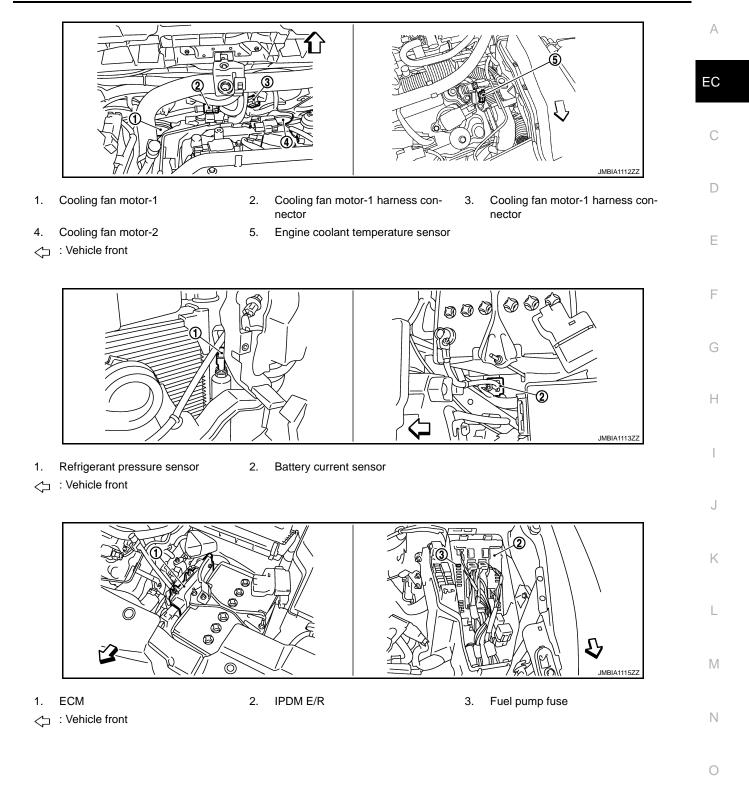
3.

Camshaft position sensor (PHASE) (bank 2)

 $\triangleleft$ : Vehicle front

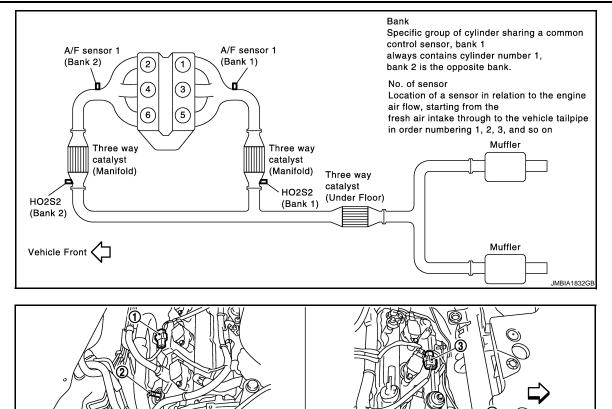
### < FUNCTION DIAGNOSIS >

## [VQ35DE]



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#### < FUNCTION DIAGNOSIS >

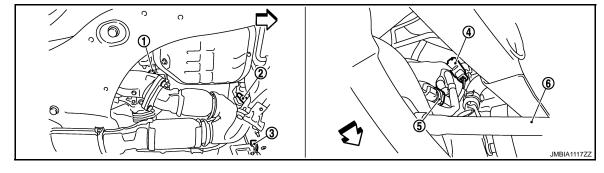


A/F sensor 1 (bank 1) harness con- 2. A/F sensor 1 (bank 1) 1. nector

- A/F sensor 1 (bank 2) 4.
- : Vehicle front

3. A/F sensor 1 (bank 2) harness connector

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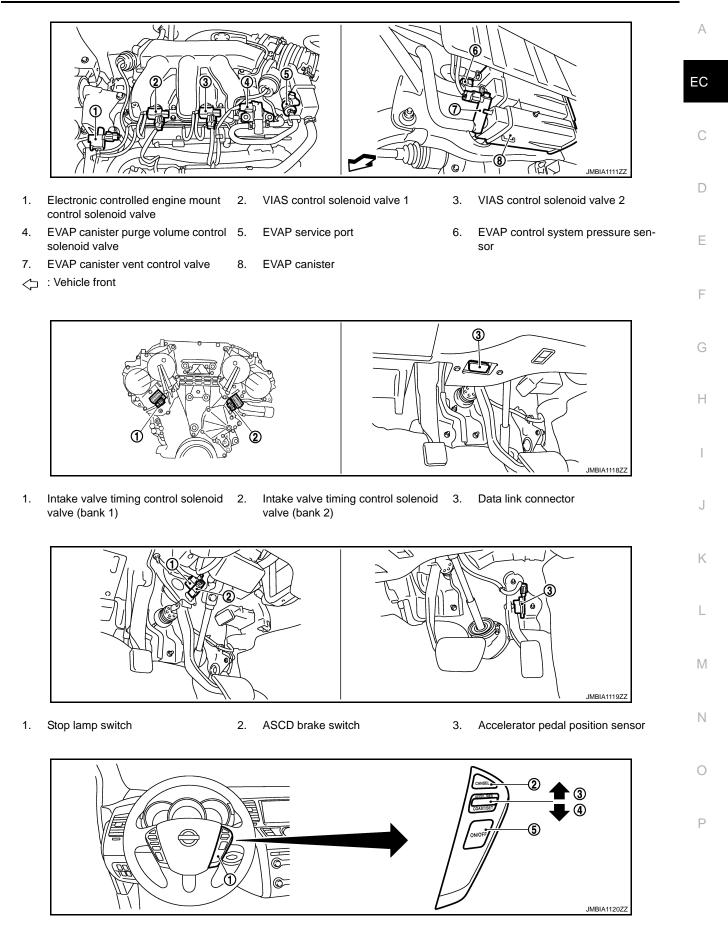
- HO2S2 (bank 1) 1.
  - 2. HO2S2 (bank 1) harness connector 5.
- HO2S2 (bank 2) Power steering pressure sensor
- HO2S2 (bank 2) harness connector 3.
- 6. Drive shaft (RH)

: Vehicle front

4.

### < FUNCTION DIAGNOSIS >

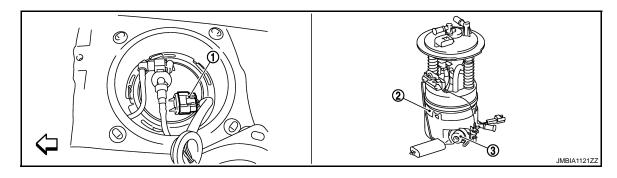
### [VQ35DE]



### < FUNCTION DIAGNOSIS >

- 1. ASCD steering switch
- 2. CANSEL switch
- 4. SET/COAST switch
- 5. MAIN switch

3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector
- ∠ : Vehicle front

# **Component Description**

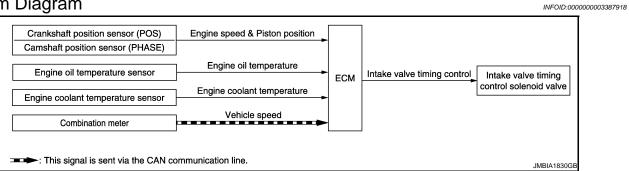
INFOID:000000003387917

| Component   | Reference             |
|---|-----------------------|
| A/F sensor 1                                      | EC-186. "Description" |
| Accelerator pedal position sensor                 | EC-413, "Description" |
| Camshaft position sensor (PHASE)                  | EC-264, "Description" |
| Crankshaft position sensor (POS)                  | EC-260. "Description" |
| Engine coolant temperature sensor                 | EC-170. "Description" |
| EVAP canister purge volume control solenoid valve | EC-284, "Description" |
| EVAP control system pressure sensor               | EC-300. "Description" |
| Fuel tank temperature sensor                      | EC-236. "Description" |
| Mass air flow sensor                              | EC-154, "Description" |
| Throttle position sensor                          | EC-175, "Description" |

### < FUNCTION DIAGNOSIS >

# INTAKE VALVE TIMING CONTROL

## System Diagram



# System Description

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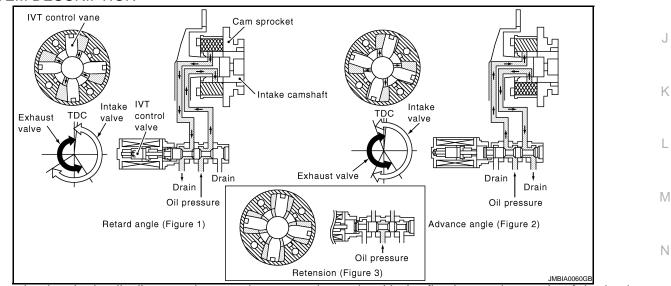
[VQ35DE]

# INPUT/OUTPUT SIGNAL CHART

| Sensor                            | Input signal to ECM              | ECM function                   | Actuator                                      |   |
|-----------------------------------|----------------------------------|--------------------------------|---|---|
| Crankshaft position sensor (POS)  | Engine speed and pictor position |                                |   |   |
| Camshaft position sensor (PHASE)  | Engine speed and piston position |                                |   | ( |
| Engine oil temperature sensor     | Engine oil temperature           | Intake valve<br>timing control | Intake valve timing control<br>solenoid valve |   |
| Engine coolant temperature sensor | Engine coolant temperature       |                                |   |   |
| Combination meter                 | Vehicle speed*                   |                                |   |   |

\*: This signal is sent to the ECM via the CAN communication line

## SYSTEM DESCRIPTION



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

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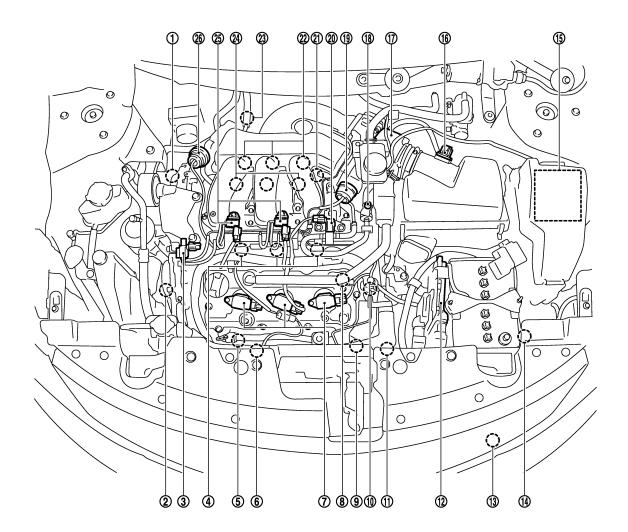
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#### < FUNCTION DIAGNOSIS >

**Component Parts Location** 

[VQ35DE] INFOID:000000003573792



- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air 17. Electric throttle control actuator temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.
- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1

2.

- 14. Battery current sensor
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)

Electronic controlled engine mount control solenoid valve

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- Cooling fan motor-2 6.
- 9. Crankshaft position sensor (POS)
- 12. ECM

3.

- 15. IPDM E/R
- 18. EVAP service port
  - (bank 1)
- 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >

## [VQ35DE]

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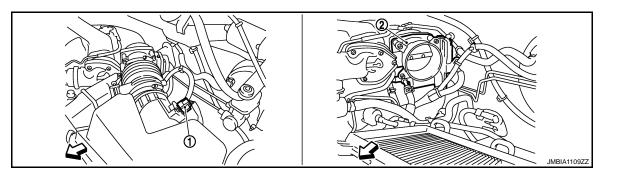
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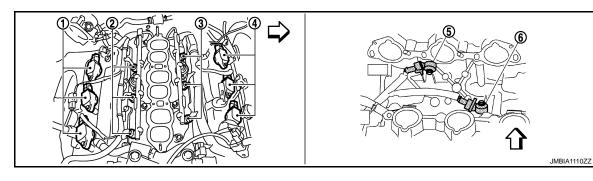
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front



1. Ignition coil (with power transistor) and spark plug (bank 1)

Ignition coil (with power transistor)

2. Fuel injector (bank 1)

5.

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(bank 1)

- Knock sensor (bank 2)
- 6. Knock sensor (bank 1)

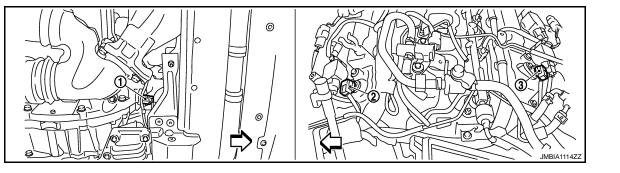
Fuel injector (bank 2)

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and spark plug (bank 2)

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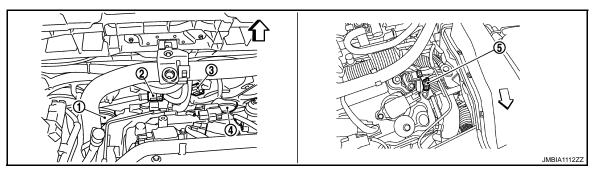


Camshaft position sensor (PHASE)

- 1. Crankshaft position sensor (POS)
- : Vehicle front

- Camshaft position sensor (PHASE) (bank 2)
- 0

### < FUNCTION DIAGNOSIS >



- 1. Cooling fan motor-1
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

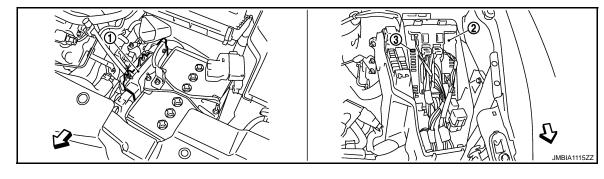
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- 4. Cooling fan motor-2
- 5. Engine coolant temperature sensor

- 1. Refrigerant pressure sensor
- 2. Battery current sensor

∠ : Vehicle front

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1. ECM

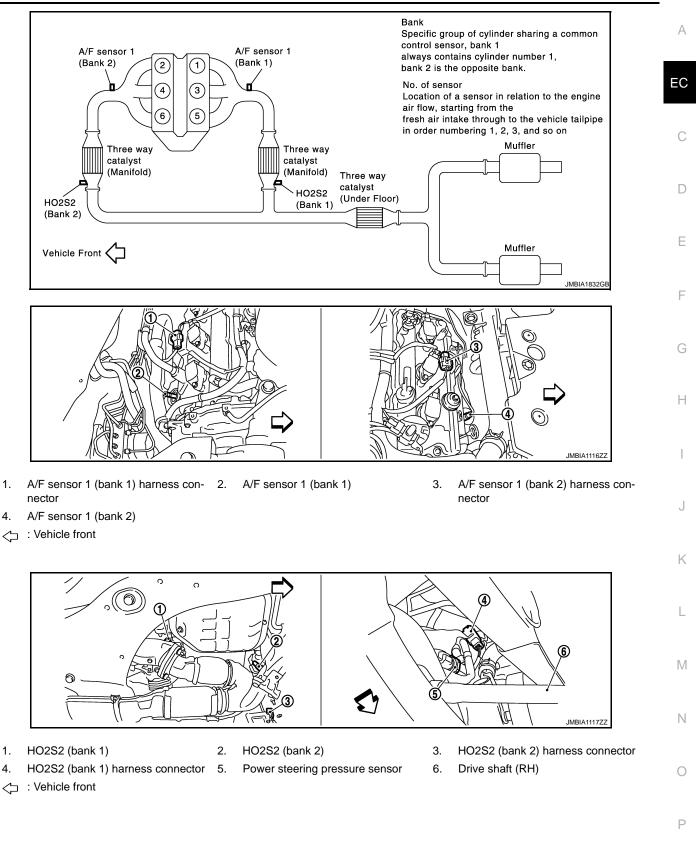
- 2. I
- ∠ : Vehicle front

2. IPDM E/R

3. Fuel pump fuse

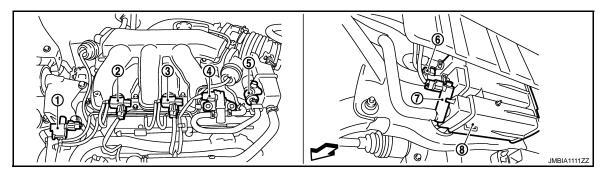
#### < FUNCTION DIAGNOSIS >





Revision: 2008 October

#### < FUNCTION DIAGNOSIS >



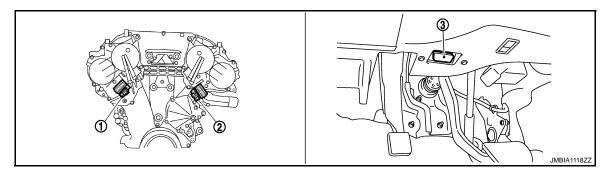
VIAS control solenoid valve 1

- 1. Electronic controlled engine mount 2. control solenoid valve
  - 5. EVAP service port
- 3. VIAS control solenoid valve 2

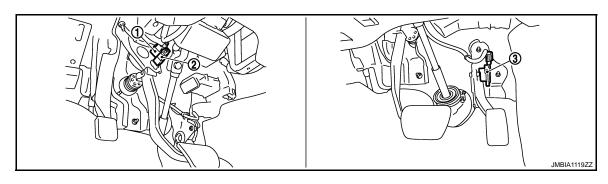
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

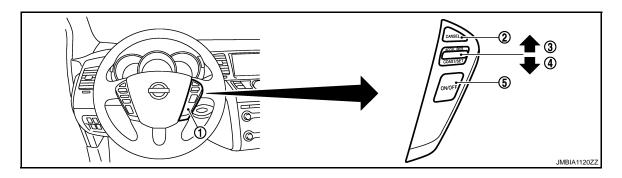
- 7. EVAP canister vent control valve
- : Vehicle front



- 1. Intake valve timing control solenoid 2. valve (bank 1)
- Intake valve timing control solenoid 3. Data link connector valve (bank 2)



- 1. Stop lamp switch
- 2. ASCD brake switch
- 3. Accelerator pedal position sensor



### < FUNCTION DIAGNOSIS >

## [VQ35DE]

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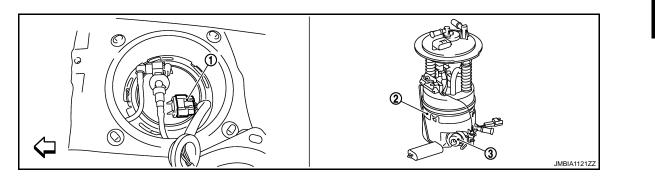
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- 1. ASCD steering switch
- 2. CANSEL switch
- 4. SET/COAST switch
- 5. MAIN switch

3. RESUME/ACCELERATE switch



- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector

# **Component Description**

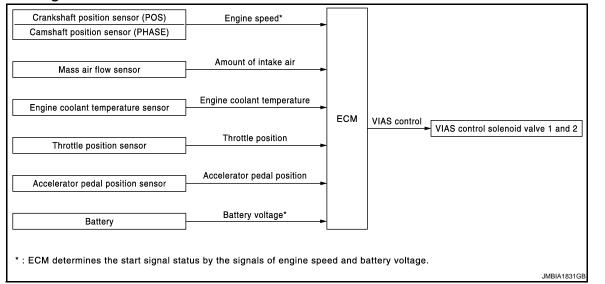
INFOID:000000003387921

| Component                                  | Reference             |  |
|--|-----------------------|--|
| Camshaft position sensor (PHASE)           | EC-264, "Description" |  |
| Crankshaft position sensor (POS)           | EC-260, "Description" |  |
| Engine coolant temperature sensor          | EC-170, "Description" |  |
| Engine oil temperature sensor              | EC-242, "Description" |  |
| Intake valve timing control solenoid valve | EC-151, "Description" |  |

### < FUNCTION DIAGNOSIS >

# VARIABLE INDUCTION AIR SYSTEM

## System Diagram



# System Description

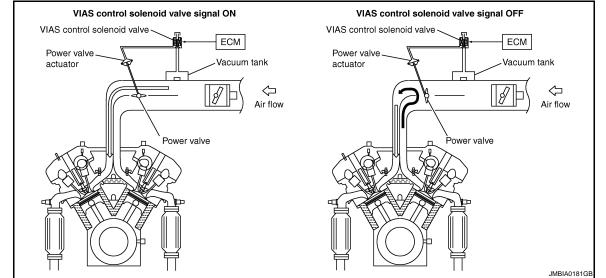
INFOID:000000003387923

# INPUT/OUTPUT SIGNAL CHART

| Sensor   | Input signal to ECM        | ECM function | Actuator   |
|--|----------------------------|--------------|--|
| Crankshaft position sensor (POS)<br>Camshaft position sensor (PHASE) | Engine speed*              |              |  |
| Mass air flow sensor   | Amount of intake air       | -            |  |
| Engine coolant temperature sensor                                    | Engine coolant temperature | VIAS control | VIAS control solenoid valve 1<br>VIAS control solenoid valve 2 |
| Throttle position sensor   | Throttle position          |              |  |
| Accelerator pedal position sensor                                    | Accelerator pedal position |              |  |
| Battery  | Battery voltage*           |              |  |

\*: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION



In the medium speed range, the ECM sends the ON signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore closes the power valve.

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#### < FUNCTION DIAGNOSIS >

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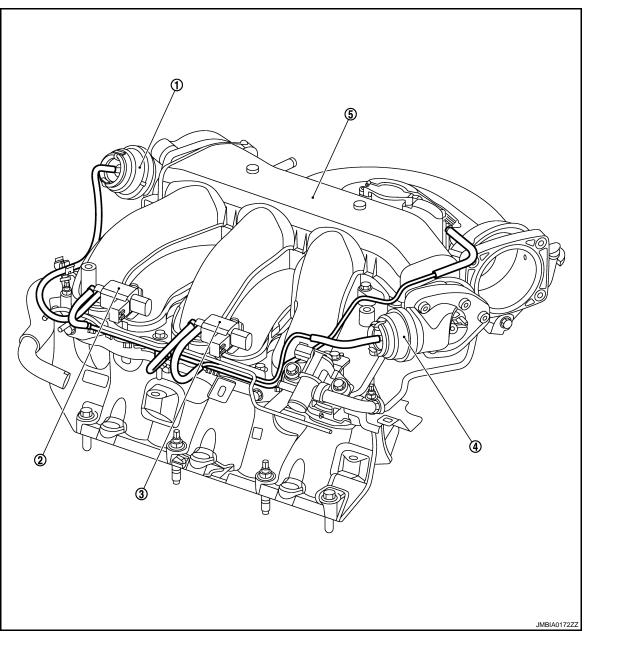
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Under this condition, the pressure waves of the exhaust stroke do not disturb the pressure waves of the intake stroke of each opposite bank. Therefore, charging efficiency is increased together with the effect of the long intake passage.

However, in the high speed range, the ECM sends the OFF signal to the VIAS control solenoid valve and the power valve is opened. Under this condition, the pressure waves of intake stroke are resonant with those of each opposite bank exhaust stroke. Therefore, charging efficiency is also increased.

In addition, both valves 1 and 2 are opened or closed in other ranges mentioned above. Thus maximum charging efficiency is obtained for the various driving conditions.

#### VACUUM HOSE DRAWING



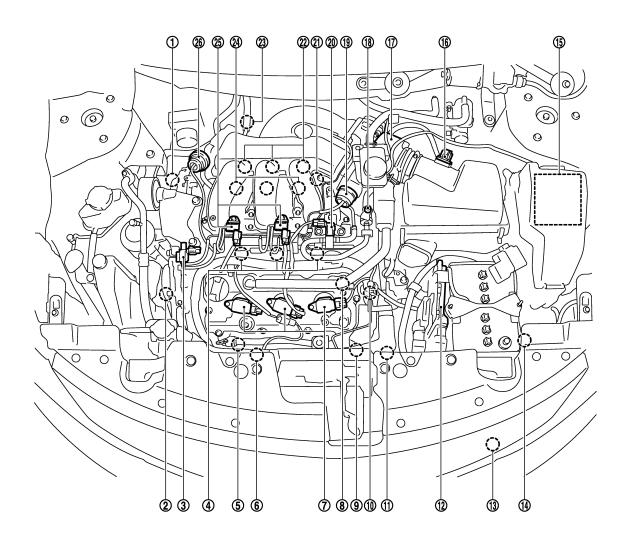
- 1. Power valve actuator 1
- Power valve actuator 2 4.
- 2. VIAS control solenoid valve 1
- 5. Intake manifold collector
- 3. VIAS control solenoid valve 2

#### < FUNCTION DIAGNOSIS >

**Component Parts Location** 

INFOID:000000003573795

[VQ35DE]



- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air 17. Electric throttle control actuator temperature sensor)
- 19. Power valve actuator 2
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1

- Intake valve timing control solenoid valve (bank 2)
- A/F sensor 1 (bank 2) 5.

2.

- 8. Camshaft position sensor (PHASE) (bank 2)
- 11. Cooling fan motor-1
- 14. Battery current sensor
- solenoid valve
- 23. A/F sensor 1 (bank 1)

3. Electronic controlled engine mount control solenoid valve

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- Cooling fan motor-2 6.
- 9. Crankshaft position sensor (POS)
- 12. ECM
- 15. IPDM E/R
- 18. EVAP service port
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) (bank 1)
  - 24. Fuel injector (bank 1)

### < FUNCTION DIAGNOSIS >

### [VQ35DE]

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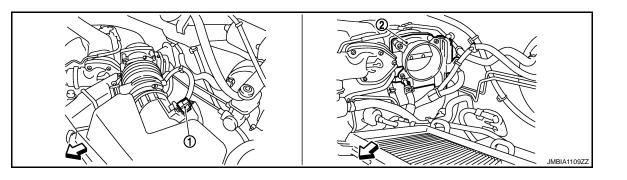
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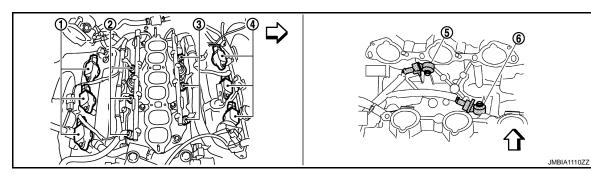
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front



- 1. Ignition coil (with power transistor) and spark plug (bank 1)
- 2. Fuel injector (bank 1)

5.

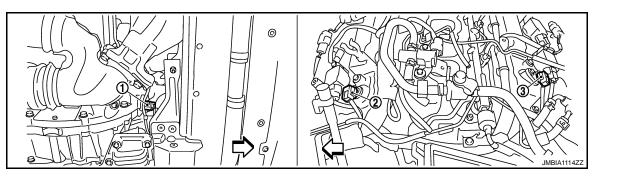
2.

(bank 1)

- Knock sensor (bank 2)
- Fuel injector (bank 2)
   Knock sensor (bank 1)

Camshaft position sensor (PHASE)

- 4. Ignition coil (with power transistor) and spark plug (bank 2)
- and spark plug (ba



Camshaft position sensor (PHASE)

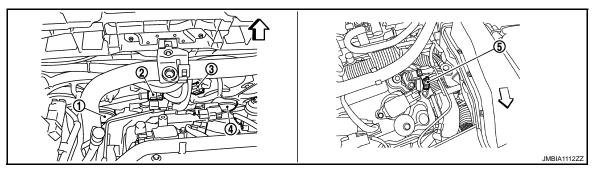
3.

(bank 2)

- 1. Crankshaft position sensor (POS)
- <□ : Vehicle front

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### < FUNCTION DIAGNOSIS >



- 1. Cooling fan motor-1
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

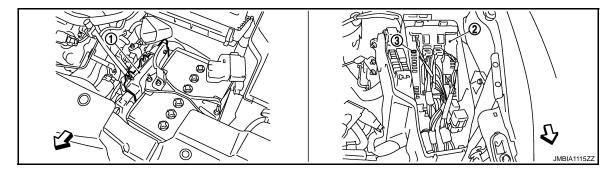
3.

- 4. Cooling fan motor-2
- 5. Engine coolant temperature sensor

- 1. Refrigerant pressure sensor
- 2. Battery current sensor

∠ : Vehicle front

,



1. ECM

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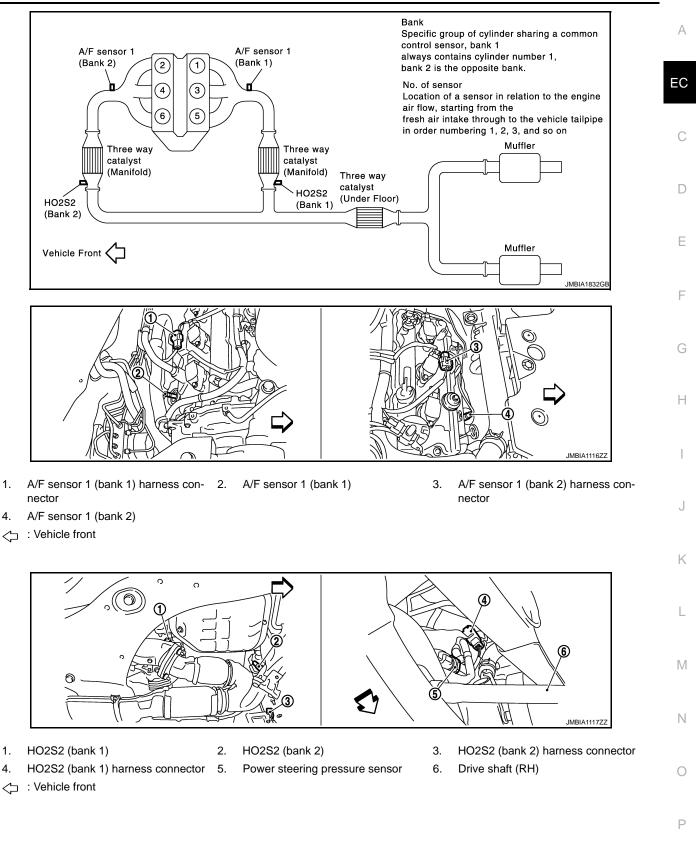
: Vehicle front

2. IPDM E/R

3. Fuel pump fuse

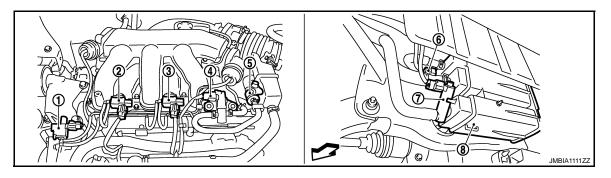
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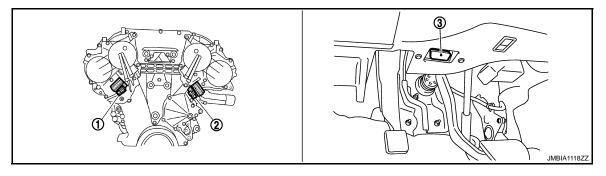
VIAS control solenoid valve 1

- 1. Electronic controlled engine mount 2. control solenoid valve
  - 5. EVAP service port
- 3. VIAS control solenoid valve 2

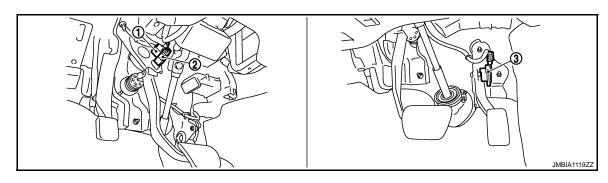
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

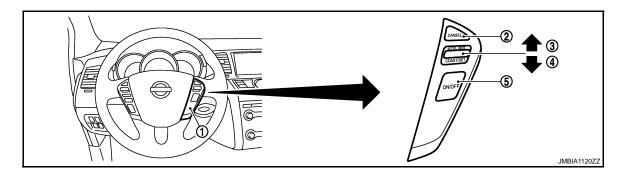
- 7. EVAP canister vent control valve
- : Vehicle front



- 1. Intake valve timing control solenoid 2. valve (bank 1)
- Intake valve timing control solenoid 3. Data link connector valve (bank 2)



- 1. Stop lamp switch
- 2. ASCD brake switch
- 3. Accelerator pedal position sensor



CANSEL switch

MAIN switch

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ASCD steering switch

SET/COAST switch

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- 3. RESUME/ACCELERATE switch
- 1. Fuel level sensor unit and fuel pump 2. Fuel level sensor unit and fuel pump 3. Fuel pressure regulator harness connector

# Component Description

INFOID:000000003387925

|                                   |                       | G |
|-----------------------------------|-----------------------|---|
| Component                         | Reference             |   |
| Accelerator pedal position sensor | EC-413. "Description" | Ц |
| Camshaft position sensor (PHASE)  | EC-264, "Description" |   |
| Crankshaft position sensor (POS)  | EC-260, "Description" |   |
| Engine coolant temperature sensor | EC-170. "Description" |   |
| Mass air flow sensor              | EC-154, "Description" |   |
| Power valve 1 and 2               | EC-466, "Description" |   |
| Throttle position sensor          | EC-175. "Description" | J |
| VIAS control solenoid valve 1     | EC-393. "Description" |   |
| VIAS control solenoid valve 2     | EC-396, "Description" | K |

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# ON BOARD DIAGNOSTIC (OBD) SYSTEM

## Diagnosis Description

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[VQ35DE]

### INTRODUCTION

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

| Emission-related diagnostic information         | Diagnostic service        |
|---|---------------------------|
| Diagnostic Trouble Code (DTC)                   | Service \$03 of SAE J1979 |
| Freeze Frame data                               | Service \$02 of SAE J1979 |
| System Readiness Test (SRT) code                | Service \$01 of SAE J1979 |
| 1st Trip Diagnostic Trouble Code (1st Trip DTC) | Service \$07 of SAE J1979 |
| 1st Trip Freeze Frame data                      | -                         |
| Test values and Test limits                     | Service \$06 of SAE J1979 |
| Calibration ID                                  | Service \$09 of SAE J1979 |

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

|             | DTC | 1st trip DTC | Freeze<br>Frame data | 1st trip Freeze<br>Frame data | SRT code | SRT status | Test value |
|-------------|-----|--------------|----------------------|-------------------------------|----------|------------|------------|
| CONSULT-III | ×   | ×            | ×                    | ×                             | ×        | ×          | _          |
| GST         | ×   | ×            | ×                    |                               | ×        | ×          | ×          |
| ECM         | ×   | ×*           | _                    |                               | _        | ×          | _          |

\*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel illuminates when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to <u>EC-517, "Fail-safe"</u>.)

### TWO TRIP DETECTION LOGIC

When a malfunction is detected for the 1st time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not illuminate at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL illuminates. The MIL illuminates at the same time when the DTC is stored. <2nd trip> The "trip" in the "Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to illuminate or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

 $\times$ : Applicable —: Not applicable

|   | MIL      |            |          |            | DTC      |            | 1st trip DTC |                 |
|---|----------|------------|----------|------------|----------|------------|--------------|-----------------|
| Items   | 1st trip |            | 2nd trip |            | 1st trip | 2nd trip   | 1st trip     | 2nd trip        |
|   | Blinking | illuminate | Blinking | illuminate |          | displaying | displaying   | display-<br>ing |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected | ×        | _          | _        | _          | _        | _          | ×            | _               |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected | _        |            | ×        | _          | _        | ×          | _            | _               |
| One trip detection diagnoses (Re-<br>fer to <u>EC-521, "DTC Index"</u> .)           |          | ×          |          | _          | ×        | _          |              | _               |
| Except above  | _        | _          | —        | ×          |          | ×          | ×            | _               |

### DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

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The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not recur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is saved in the ECM memory. The MIL will not illuminate (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL illuminates. In other words, the DTC is stored in the ECM memory and the MIL illuminates when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is saved and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or illuminate the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "How to Erase DTC and 1st Trip DTC".

For malfunctions in which 1st trip DTCs are displayed, refer to <u>EC-521, "DTC Index"</u>. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-III.

1st trip DTC is specified in Service \$07 of SAE J1979. 1st trip DTC detection occurs without illuminating the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to <u>EC-8, "Work Flow"</u>. Then perform DTC Confirmation Procedure or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

#### Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, absolute throttle position, base fuel schedule and intake air temperature at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM has the following priorities to update the data.

| Priority |                       | Items  |   |
|----------|-----------------------|--|---|
| 1        | Freeze frame data     | Misfire — DTC: P0300 - P0306<br>Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175 | L |
| 2        |                       | Except the above items (Includes CVT related items)  |   |
| 3        | 1st trip freeze frame | data   | M |

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was saved in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "How to Erase DTC and 1st Trip DTC".

How to Read DTC and 1st Trip DTC

#### (P) With CONSULT-III

CONSULT-III displays the DTC in "SELF DIAGNOSTIC RESULT" mode. Examples: P0340, P0850, P1148, etc.

These DTCs are prescribed by SAE J2012.

#### < FUNCTION DIAGNOSIS >

(CONSULT-III also displays the malfunctioning component or system.)

Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be [0].

If a 1st trip DTC is stored in the ECM, the time data will be [1t].

#### With GST

GST (Generic Scan Tool) displays the DTC in Diagnostic Service \$03. Examples: P0340, P0850, P1148, etc. These DTCs are prescribed by SAE J2012.

1st trip DTC is displayed in Diagnostic Service \$07.

#### No Tools

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 0850, 1148, etc.

These DTCs are controlled by NISSAN.

- 1st trip DTC No. is the same as DTC No.
- Output of a DTC indicates a malfunction. However, GST and the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.

How to Erase DTC and 1st Trip DTC

### B With CONSULT-III

### NOTE:

- If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- If the DTC is not for CVT related items (see <u>EC-521</u>), skip step 1.
- 1. Erase DTC in TCM. Refer to TM-32, "Diagnosis Description".
- 2. Select "ENGINE" with CONSULT-III.
- 3. Select "SELF-DIAG RESULTS".
- 4. Touch "ERASE". (DTC in ECM will be erased.)

### WITH GST

#### NOTE:

• If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

Select Service \$04 with GST (Generic Scan Tool).

### No Tools

### NOTE:

• If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).

- If the battery is disconnected, the emission-related diagnostic information will be cleared within 24 hours.
- The following data are cleared when the ECM memory is erased.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

### SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

#### < FUNCTION DIAGNOSIS >

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

#### NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

#### NOTE:

If MIL is ON during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

#### SRT Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

| SRT item<br>(CONSULT-III indication) | Performance<br>Priority* | Required self-diagnostic items to set the SRT to "CMPLT" | Corresponding<br>DTC No. |
|--------------------------------------|--------------------------|--|--------------------------|
| CATALYST                             | 2                        | Three way catalyst function                              | P0420, P0430             |
| EVAP SYSTEM                          | 2                        | EVAP control system purge flow monitoring                | P0441                    |
|                                      | 1                        | EVAP control system                                      | P0442                    |
|                                      | 2                        | EVAP control system                                      | P0456                    |
| HO2S                                 | 2                        | Air fuel ratio (A/F) sensor 1                            | P0133, P0153             |
|                                      |                          | Heated oxygen sensor 2                                   | P0137, P0157             |
|                                      |                          | Heated oxygen sensor 2                                   | P0138, P0158             |
|                                      |                          | Heated oxygen sensor 2                                   | P0139, P0159             |

\*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-III.

#### SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

| Self-diagnosis result |        | Example           |   |         |              |                           |
|-----------------------|--------|-------------------|---|---------|--------------|---------------------------|
|                       |        | Diagnosis         | $\begin{array}{rcl} \mbox{Ignition cycle} \\ \leftarrow \mbox{ON} \rightarrow & \mbox{OFF} & \leftarrow \mbox{ON} \rightarrow & \mbox{OFF} & \leftarrow \mbox{ON} \rightarrow \end{array} \\ \end{array}$ |         |              |                           |
| All OK                | Case 1 | P0400             | OK (1)  | — (1)   | OK (2)       | — (2)                     |
|                       |        | P0402             | OK (1)  | — (1)   | — (1)        | OK (2)                    |
|                       |        | P1402             | OK (1)  | OK (2)  | — (2)        | — (2)                     |
|                       |        | SRT of EGR        | "CMPLT"   | "CMPLT" | "CMPLT"      | "CMPLT"                   |
|                       | Case 2 | P0400             | OK (1)  | — (1)   | — (1)        | — (1)                     |
|                       |        | P0402             | — (0)   | — (0)   | OK (1)       | — (1)                     |
|                       |        | P1402             | OK (1)  | OK (2)  | — (2)        | — (2)                     |
|                       |        | SRT of EGR        | "INCMP"   | "INCMP" | "CMPLT"      | "CMPLT"                   |
| NG exists             | Case 3 | P0400             | OK  | OK      | —            | —                         |
|                       |        | P0402             | _   | —       | _            | _                         |
|                       |        | P1402             | NG  | _       | NG           | NG<br>(Consecutive<br>NG) |
|                       |        | (1st trip)<br>DTC | 1st trip DTC  | _       | 1st trip DTC | DTC<br>(= MIL ON)         |
|                       |        | SRT of EGR        | "INCMP"   | "INCMP" | "INCMP"      | "CMPLT"                   |

OK: Self-diagnosis is carried out and the result is OK.

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#### < FUNCTION DIAGNOSIS >

NG: Self-diagnosis is carried out and the result is NG.

-: Self-diagnosis is not carried out.

When all SRT related self-diagnoses show OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT".  $\rightarrow$  Case 1 above

When all SRT related self-diagnoses show OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result.  $\rightarrow$  Case 2 above

If one or more SRT related self-diagnoses show NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT".  $\rightarrow$  Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is the number one (1) for each self-diagnosis (Case 1 & 2) or the number two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- During SRT driving pattern, the 1st trip DTC (NG) is detected prior to "CMPLT" of SRT and the self-diagnosis memory must be erased from the ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP". NOTE:

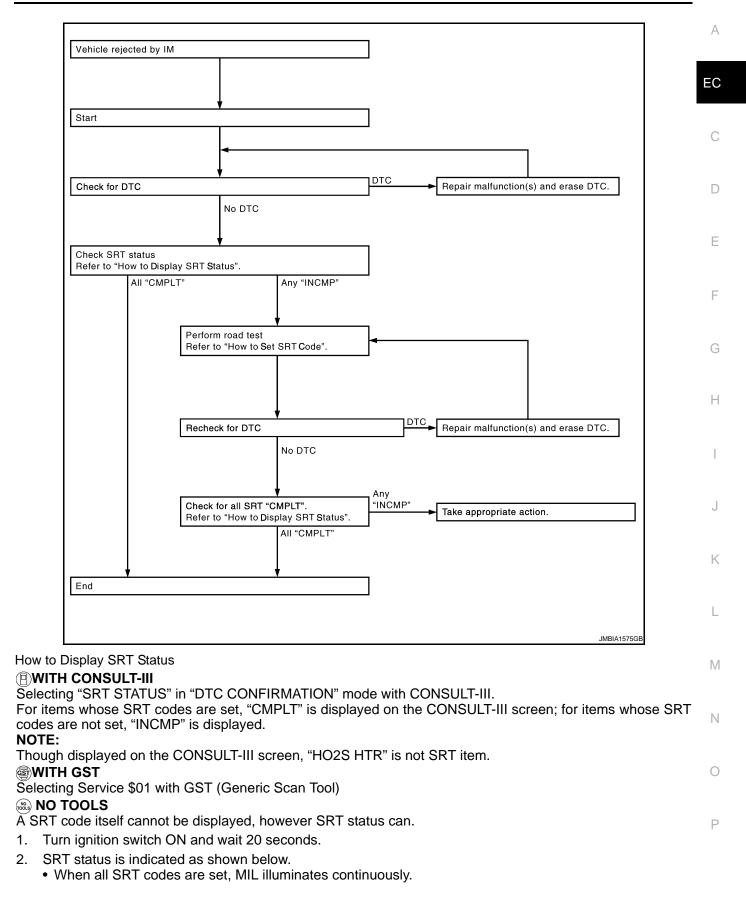
SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

#### SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.

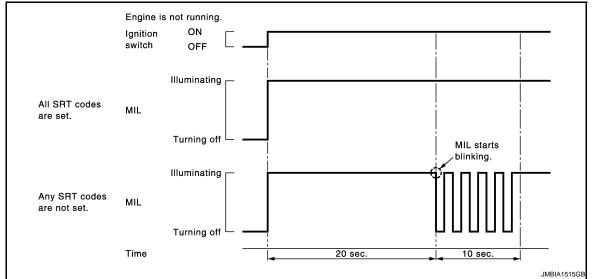
### < FUNCTION DIAGNOSIS >

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• When any SRT codes are not set, MIL will blink periodically for 10 seconds.

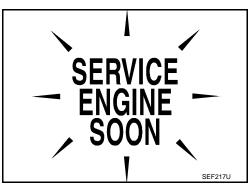


# MALFUNCTION INDICATOR LAMP (MIL)

#### Description

The MIL is located on the instrument panel.

- The MIL will illuminate when the ignition switch is turned ON without the engine running. This is a bulb check. If the MIL does not illuminate, check MIL circuit. Refer to <u>EC-456</u>. "Component Function Check".
- 2. When the engine is started, the MIL should turn off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



On Board Diagnostic System Function

The on board diagnostic system has the following three functions.

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#### < FUNCTION DIAGNOSIS >

## [VQ35DE]

| Diagnostic Test<br>Mode | KEY and ENG.<br>Status                                     | Function                   | Explanation of Function   | А            |
|-------------------------|--|----------------------------|---|--------------|
| Mode I                  | Ignition switch in<br>ON position<br>CON<br>Engine stopped | BULB CHECK                 | This function checks the MIL bulb for damage (blown, open<br>circuit, etc.).<br>If the MIL does not illuminate, check MIL circuit.  | EC<br>C<br>D |
|                         | Engine running   | MALFUNCTION<br>WARNING     | <ul> <li>When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will illuminate to inform the driver that a malfunction has been detected.</li> <li>The following malfunctions will illuminate or blink the MIL in the 1st trip.</li> <li>Misfire (Possible three way catalyst damage)</li> <li>One trip detection diagnoses</li> </ul> | E            |
| Mode II                 | Ignition switch in<br>ON position<br>CON<br>Engine stopped | SELF-DIAGNOSTIC<br>RESULTS | This function allows DTCs and 1st trip DTCs to be read.   | G            |

#### Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check MIL circuit. Refer to <u>EC-456, "Component Function Check"</u>.

#### Diagnostic Test Mode I — Malfunction Warning

| MIL | Condition                         | Κ |
|-----|-----------------------------------|---|
| ON  | When the malfunction is detected. |   |
| OFF | No malfunction.                   | 1 |

This DTC number is clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

Diagnostic Test Mode II — Self-diagnostic Results

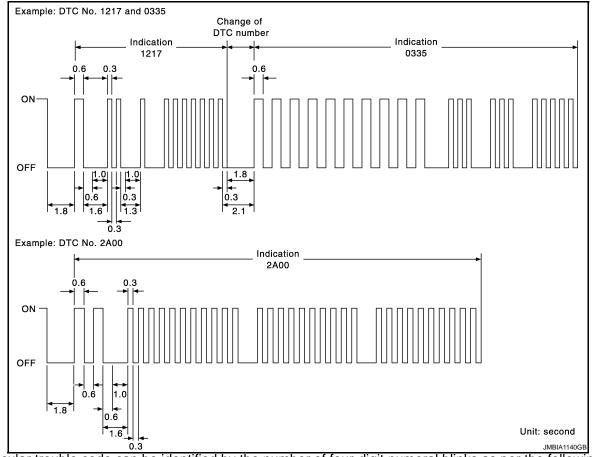
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These uniden

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tified codes can be identified by using the CONSULT-III or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral blinks as per the following.

| Number | 0  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Α  | В  | С  | D  | E  | F  |
|--------|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Blinks | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 14 | 15 | 16 |

The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-seconds) - OFF (0.6-seconds) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-seconds ON and 0.3-seconds OFF cycle. A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-seconds OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See <u>EC-521, "DTC Index"</u>)

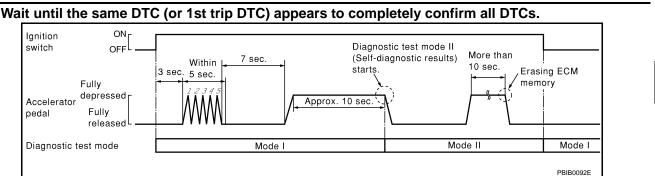
How to Switch Diagnostic Test Mode

NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- ECM always returns to Diagnostic Test Mode I after the ignition switch is turned OFF. HOW TO SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)
- 1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 2. Repeat the following procedure quickly 5 times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 3. Wait 7 seconds, fully depress the accelerator pedal and keep it depressed for approx. 10 seconds until the MIL starts blinking.
- Fully release the accelerator pedal. ECM has entered to Diagnostic Test Mode II (Self-diagnostic results). NOTE:

## EC-110

#### < FUNCTION DIAGNOSIS >



#### HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

- Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to "How to Set Diagnostic Test Mode II (Self-diagnostic Results)".
- 2. Fully depress the accelerator pedal and keep it depressed for more than 10 seconds.
- The emission-related diagnostic information has been erased from the backup memory in the ECM. 3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.
- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Do not erase the stored memory before starting trouble diagnoses.

#### **OBD** System Operation Chart

Relationship Between MIL, 1st Trip DTC, DTC, and Detectable Items

- When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on.
- The MIL will turn off after the vehicle is driven 3 times (driving pattern B) with no malfunction. A drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CON-SULT-III will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

| Summary ( | Chart |
|-----------|-------|
|-----------|-------|

| Items                                 | Fuel Injection System | Misfire           | Other          |   |
|---------------------------------------|-----------------------|-------------------|----------------|---|
| MIL (turns off)                       | 3 (pattern B)         | 3 (pattern B)     | 3 (pattern B)  |   |
| DTC, Freeze Frame Data (no display)   | 80 (pattern C)        | 80 (pattern C)    | 40 (pattern A) |   |
| 1st Trip DTC (clear)                  | 1 (pattern C), *1     | 1 (pattern C), *1 | 1 (pattern B)  |   |
| 1st Trip Freeze Frame Data<br>(clear) | *1, *2                | *1, *2            | 1 (pattern B)  | N |

For details about patterns B and C under "Fuel Injection System" and "Misfire", see "EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

For details about patterns A and B under Other, see "EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

\*1: Clear timing is at the moment OK is detected.

\*2: Clear timing is when the same malfunction is detected in the 2nd trip.

Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System"

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[VQ35DE]

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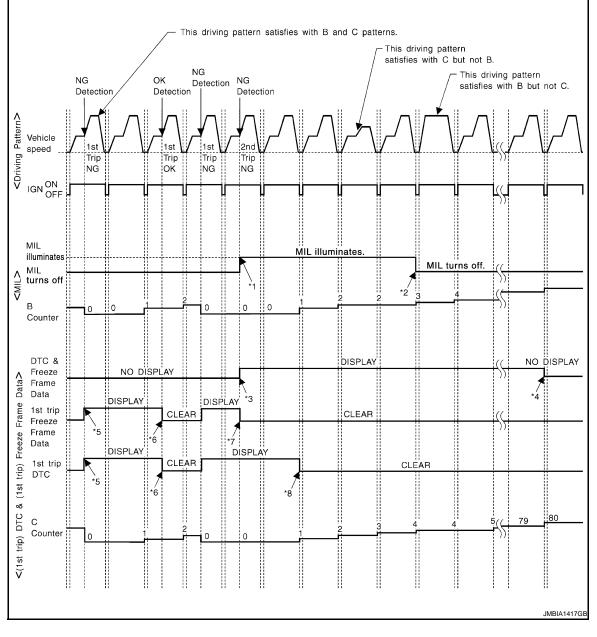
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#### < FUNCTION DIAGNOSIS >



- \*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.
- \*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- \*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

- \*2: MIL will turn off after vehicle is driven 3 times (pattern B) without any malfunctions.
- \*5: When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- \*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.
- \*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- \*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

Explanation for Driving Patterns for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System" <Driving Pattern B>

Driving pattern B means the vehicle operation as per the following:

All components and systems should be monitored at least once by the OBD system.

## EC-112

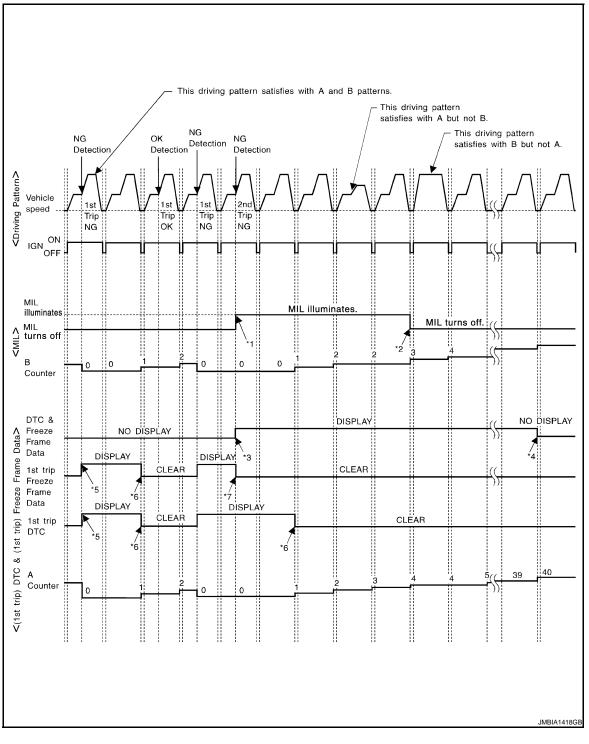
#### 2009 Murano

## FUNCTION DIAGNOSIS

| < FUNCTION DIAGNOSIS >  | [VQ35DE]         |    |
|---|------------------|----|
| <ul> <li>The B counter will be cleared when the malfunction is detected once regardless of the driving</li> <li>The B counter will be counted up when driving pattern B is satisfied without any malfunction.</li> <li>The MIL will turn off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHAP </li> <li>Driving Pattern C&gt;</li> </ul> | -                | A  |
| Driving pattern C means operating vehicle as per the following:<br>The following conditions should be satisfied at the same time:   |                  | EC |
| Engine speed: (Engine speed in the freeze frame data) $\pm$ 375 rpm<br>Calculated load value: (Calculated load value in the freeze frame data) x (1 $\pm$ 0.1) [%]  |                  |    |
| <ul> <li>Engine coolant temperature (T) condition:</li> <li>When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).</li> </ul>   | 58°F).           | С  |
| <ul> <li>When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher the 70°C (158°F).</li> </ul>   |                  |    |
| Example:  |                  | D  |
| If the stored freeze frame data is as per the following:<br>Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F  | )                |    |
| To be satisfied with driving pattern C, the vehicle should run under the following conditions:<br>Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: n   | nore than 70°C   | Е  |
| (158°F)   |                  |    |
| <ul> <li>The C counter will be cleared when the malfunction is detected regardless of vehicle condition</li> <li>The C counter will be counted up when vehicle conditions above are satisfied without the sam</li> <li>The DTC will not be displayed after C counter reaches 80.</li> </ul>   |                  | F  |
| <ul> <li>The 1st trip DTC will be cleared when C counter is counted once without the same malfunction<br/>stored in ECM.</li> </ul>   |                  | G  |
| Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns Except For "Misfire < Exhaust Qu tion>", "Fuel Injection System"   | ality Deteriora- | Ц  |
|   |                  | Н  |
|   |                  |    |
|   |                  |    |
|   |                  | I  |
|   |                  | J  |
|   |                  | K  |
|   |                  |    |
|   |                  | L  |
|   |                  |    |
|   |                  | M  |
|   |                  |    |
|   |                  | Ν  |
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|   |                  | 0  |
|   |                  |    |
|   |                  | Ρ  |
|   |                  |    |
|   |                  |    |

#### < FUNCTION DIAGNOSIS >

[VQ35DE]



- \*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.
- \*2: MIL will turn off after vehicle is driven \*3: When the same malfunction is de-3 times (pattern B) without any malfunctions.
- tected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

## < FUNCTION DIAGNOSIS >

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction.
(The DTC and the freeze frame data still remain in ECM.)

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

- \*5: When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- \*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

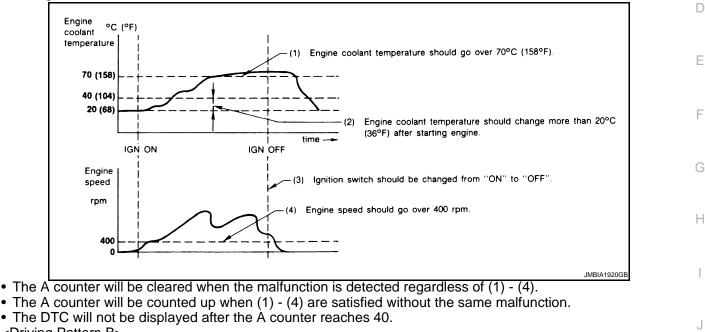
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Explanation for Driving Patterns Except for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System" <Driving Pattern A>



<Driving Pattern B>

Driving pattern B means operating vehicle as per the following:

- All components and systems should be monitored at least once by the OBD system.
- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will turn off when the B counter reaches 3 (\*2 in OBD SYSTEM OPERATION CHART).

## **CONSULT-III** Function

## FUNCTION

| Diagnostic test mode   | Function  |
|------------------------|---|
| Work Support           | This mode enables a technician to adjust some devices faster and more accurately by following the in-<br>dications on the CONSULT-III unit. |
| Self Diagnostic Result | Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*     |
| Data Monitor           | Input/Output data in the ECM can be read.   |
| Active Test            | Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECM and also shifts some parameters in a specified range.    |
| DTC & SRT Confirmation | The status of system monitoring tests and the self-diagnosis status/results can be confirmed.   |
| Function Test          | This mode is used to inform customers when the vehicle requires periodic maintenance.   |
| ECU Part Number        | ECM part number can be read.  |

\*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

Diagnostic trouble codes

• 1st trip diagnostic trouble codes

• Freeze frame data

INFOID-000000003387927

## < FUNCTION DIAGNOSIS >

1st trip freeze frame data

#### • System readiness test (SRT) codes

Test values

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

|                                |       |  | DIAGNOSTIC TEST MODE       |       |                           |                      |                |                  |                             |  |  |
|--------------------------------|-------|--|----------------------------|-------|---------------------------|----------------------|----------------|------------------|-----------------------------|--|--|
|                                |       |  | SELF-DIAGNOSTIC<br>RESULTS |       |                           | DATA                 |                | DTC 8<br>CONFIRI |                             |  |  |
|                                | Item  |  | WORK<br>SUPPORT            | DTC*1 | FREEZE<br>FRAME<br>DATA*2 | DATA<br>MONI-<br>TOR | ACTIVE<br>TEST | SRT STA-<br>TUS  | DTC<br>WORK<br>SUP-<br>PORT |  |  |
|                                |       | Crankshaft position sensor (POS)   |                            | ×     | ×                         | ×                    |                |                  |                             |  |  |
|                                |       | Camshaft position sensor (PHASE)   |                            | ×     | ×                         | ×                    |                |                  |                             |  |  |
|                                |       | Mass air flow sensor   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Engine coolant temperature sensor  |                            | ×     | ×                         | ×                    | ×              |                  |                             |  |  |
|                                |       | Engine oil temperature sensor  |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Air fuel ratio (A/F) sensor 1  |                            | ×     |                           | ×                    |                | ×                | ×                           |  |  |
|                                |       | Heated oxygen sensor 2   |                            | ×     |                           | ×                    |                | ×                | ×                           |  |  |
|                                |       | Vehicle speed signal   |                            | ×     | ×                         | ×                    |                |                  |                             |  |  |
| Ś                              |       | Accelerator pedal position sensor  |                            | ×     |                           | ×                    |                |                  |                             |  |  |
| ART                            |       | Throttle position sensor   |                            | ×     | ×                         | ×                    |                |                  |                             |  |  |
| LT<br>P                        |       | Fuel tank temperature sensor   |                            | ×     |                           | ×                    | ×              |                  |                             |  |  |
| NEN                            |       | EVAP control system pressure sensor  |                            | ×     |                           | ×                    |                |                  |                             |  |  |
| ИРО                            |       | Intake air temperature sensor  |                            | ×     | ×                         | ×                    |                |                  |                             |  |  |
| CON                            | INPUT | Knock sensor   |                            | ×     |                           |                      |                |                  |                             |  |  |
| oL                             | Ž     | Refrigerant pressure sensor  |                            |       |                           | ×                    |                |                  |                             |  |  |
| ENGINE CONTROL COMPONENT PARTS |       | Closed throttle position switch (accelerator pedal position sensor signal) |                            |       |                           | ×                    |                |                  |                             |  |  |
| ЦЩ                             |       | Air conditioner switch   |                            |       |                           | ×                    |                |                  |                             |  |  |
| <b>NGIN</b>                    |       | Park/neutral position (PNP) signal   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
| ΰ                              |       | Stop lamp switch   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Power steering pressure sensor   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Battery voltage  |                            |       |                           | ×                    |                |                  |                             |  |  |
|                                |       | Load signal  |                            |       |                           | ×                    |                |                  |                             |  |  |
|                                |       | Primary speed sensor   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Fuel level sensor  |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | Battery current sensor   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | ASCD steering switch   |                            | ×     |                           | ×                    |                |                  |                             |  |  |
|                                |       | ASCD brake switch  |                            | ×     |                           | ×                    |                |                  |                             |  |  |

#### < FUNCTION DIAGNOSIS >

#### [VQ35DE]

|                                |        |   |                 |       | DIAGNO                    | STIC TEST    | MODE           |                 |                             |          |
|--------------------------------|--------|---|-----------------|-------|---------------------------|--------------|----------------|-----------------|-----------------------------|----------|
|                                |        |   |                 | -     | AGNOSTIC<br>SULTS         | DATA         |                | DTC 8<br>CONFIR |                             | A        |
|                                | Item   |   | WORK<br>SUPPORT | DTC*1 | FREEZE<br>FRAME<br>DATA*2 | MONI-<br>TOR | ACTIVE<br>TEST | SRT STA-<br>TUS | DTC<br>WORK<br>SUP-<br>PORT | EC       |
|                                |        | Fuel injector                                     |                 |       |                           | ×            | ×              |                 |                             | С        |
|                                |        | Power transistor (Ignition timing)                |                 |       |                           | ×            | ×              |                 |                             | -        |
|                                |        | Throttle control motor relay                      |                 | ×     |                           | ×            |                |                 |                             | _        |
|                                |        | Throttle control motor                            |                 | ×     |                           |              |                |                 |                             | - D      |
| ENGINE CONTROL COMPONENT PARTS |        | EVAP canister purge volume control solenoid valve |                 | ×     |                           | ×            | ×              |                 | ×                           | -<br>- E |
| L L                            |        | Air conditioner relay                             |                 |       |                           | ×            |                |                 |                             |          |
| NE                             |        | Fuel pump relay                                   | ×               |       |                           | ×            | ×              |                 |                             | -        |
| MPO                            | F      | Cooling fan relay                                 |                 | ×     |                           | ×            | ×              |                 |                             | F        |
| 8                              | оитрит | Air fuel ratio (A/F) sensor 1 heater              |                 | ×     |                           | ×            |                | ×* <sup>3</sup> |                             | -        |
| ROL                            | 5      | Heated oxygen sensor 2 heater                     |                 | ×     |                           | ×            |                | ×* <sup>3</sup> |                             | G        |
|                                |        | EVAP canister vent control valve                  | ×               | ×     |                           | ×            | ×              |                 |                             | 0        |
| SINE C                         |        | Intake valve timing control solenoid valve        |                 | ×     |                           | ×            | ×              |                 |                             | Н        |
| EN                             |        | VIAS control solenoid valve 1                     |                 | ×     |                           | ×            | ×              |                 |                             | -        |
|                                |        | VIAS control solenoid valve 2                     |                 | ×     |                           | ×            | ×              |                 |                             | -        |
|                                |        | Electronic controlled engine mount                |                 |       |                           | ×            | ×              |                 |                             |          |
|                                |        | Alternator  |                 |       |                           | ×            | ×              |                 |                             | -        |
|                                |        | Calculated load value                             |                 |       | ×                         | ×            |                |                 |                             | -<br>. I |

X: Applicable

\*1: This item includes 1st trip DTCs.

\*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-III screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-102, "Diagnosis Description".

\*3: Always "CMPLT" is displayed.

## WORK SUPPORT MODE

#### Work Item

| WORK ITEM             | CONDITION   | USAGE   | [ |
|-----------------------|---|---|---|
| FUEL PRESSURE RELEASE | • FUEL PUMP WILL STOP BY TOUCHING "START" DUR-<br>ING IDLING.<br>CRANK A FEW TIMES AFTER ENGINE STALLS. | When releasing fuel pressure from fuel line         | ľ |
| IDLE AIR VOL LEARN    | THE IDLE AIR VOLUME THAT KEEPS THE ENGINE<br>WITHIN THE SPECIFIED RANGE IS MEMORIZED IN<br>ECM.         | When learning the idle air volume                   | C |
| SELF-LEARNING CONT    | • THE COEFFICIENT OF SELF-LEARNING CONTROL<br>MIXTURE RATIO RETURNS TO THE ORIGINAL COEF-<br>FICIENT.   | When clearing mixture ratio self-<br>learning value | - |

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< FUNCTION DIAGNOSIS >

[VQ35DE]

| WORK ITEM            | CONDITION  | USAGE   |
|----------------------|--|---|
| EVAP SYSTEM CLOSE    | <ul> <li>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN<br/>ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE<br/>FOLLOWING CONDITIONS.</li> <li>IGN SW ON</li> <li>ENGINE NOT RUNNING</li> <li>AMBIENT TEMPERATURE IS ABOVE 0°C (32°F).</li> <li>NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM</li> <li>FUEL TANK TEMP. IS MORE THAN 0°C (32°F).</li> <li>WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE"</li> <li>WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE"<br/>UNDER THE CONDITION EXCEPT ABOVE, CONSULT-<br/>III WILL DISCONTINUE IT AND DISPLAY APPROPRI-<br/>ATE INSTRUCTION.</li> <li>NOTE:</li> <li>WHEN STARTING ENGINE, CONSULT-III MAY DIS-<br/>PLAY "BATTERY VOLTAGE IS LOW. CHARGE BAT-<br/>TERY", EVEN WHEN USING A CHARGED BATTERY.</li> </ul> | When detecting EVAP vapor leak-<br>age in the EVAP system |
| VIN REGISTRATION     | IN THIS MODE, VIN IS REGISTERED IN ECM.  | When registering VIN in ECM                               |
| TARGET IDLE RPM ADJ* | IDLE CONDITION   | When setting target idle speed                            |
| TARGET IGN TIM ADJ*  | IDLE CONDITION   | When adjusting target ignition tim-<br>ing                |

\*: This function is not necessary in the usual service procedure.

#### SELF-DIAG RESULTS MODE

Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to EC-521, "DTC Index".

Freeze Frame Data and 1st Trip Freeze Frame Data

| Freeze frame data item*         | Description   |
|---------------------------------|---|
| DIAG TROUBLE CODE<br>[PXXXX]    | <ul> <li>The engine control component part/control system has a trouble code that is displayed as PXXXX. (Refer<br/>to <u>EC-521, "DTC Index"</u>.)</li> </ul>  |
| FUEL SYS-B1                     | "Fuel injection system status" at the moment a malfunction is detected is displayed.  |
| FUEL SYS-B2                     | <ul> <li>One of the following mode is displayed.</li> <li>Mode2: Open loop due to detected system malfunction</li> <li>Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment)</li> <li>Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>Mode5: Open loop - has not yet satisfied condition to go to closed loop</li> </ul> |
| CAL/LD VALUE [%]                | The calculated load value at the moment a malfunction is detected is displayed.   |
| COOLANT TEMP [°C] or<br>[°F]    | The engine coolant temperature at the moment a malfunction is detected is displayed.  |
| L-FUEL TRM-B1 [%]               | "Long-term fuel trim" at the moment a malfunction is detected is displayed.   |
| L-FUEL TRM-B2 [%]               | • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.  |
| S-FUEL TRM-B1 [%]               | "Short-term fuel trim" at the moment a malfunction is detected is displayed.  |
| S-FUEL TRM-B2 [%]               | The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.  |
| ENGINE SPEED [rpm]              | The engine speed at the moment a malfunction is detected is displayed.  |
| VEHICL SPEED<br>[km/h] or [mph] | The vehicle speed at the moment a malfunction is detected is displayed.   |
| ABSOL TH·P/S [%]                | The throttle valve opening angle at the moment a malfunction is detected is displayed.  |
| B/FUEL SCHDL [msec]             | The base fuel schedule at the moment a malfunction is detected is displayed.  |
| INT/A TEMP SE [°C] or<br>[°F]   | The intake air temperature at the moment a malfunction is detected is displayed.  |

## < FUNCTION DIAGNOSIS >

[VQ35DE]

| Freeze frame data item* | Description   |
|-------------------------|---|
| INT MANI PRES [kPa]     | These items are displayed but are not applicable to this model.   |
| COMBUST CONDITION       | • These items are displayed but are not applicable to this model. |

\*: The items are the same as those of 1st trip freeze frame data.

#### DATA MONITOR MODE

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| Monitored item | Unit        | Description  | ×: Applicable<br>Remarks  |
|----------------|-------------|--|---|
|                | 01111       | Decemption   |   |
| ENG SPEED      | rpm         | • Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).                                    | <ul> <li>Accuracy becomes poor if engine<br/>speed drops below the idle rpm.</li> <li>If the signal is interrupted while the<br/>engine is running, an abnormal value<br/>may be indicated.</li> </ul>          |
| MAS A/F SE-B1  | V           | <ul> <li>The signal voltage of the mass air flow sensor is<br/>displayed.</li> </ul>   | <ul> <li>When the engine is stopped, a certain value is indicated.</li> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>  |
| B/FUEL SCHDL   | msec        | • "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.   | When engine is running, specification range is indicated in "SPEC".   |
| A/F ALPHA-B1   |             |  | • When the engine is stopped, a certain   |
| A/F ALPHA-B2   | %           | The mean value of the air-fuel ratio feedback cor-<br>rection factor per cycle is indicated.   | <ul> <li>value is indicated.</li> <li>This data also includes the data for<br/>the air-fuel ratio learning control.</li> <li>When engine is running, specification<br/>range is indicated in "SPEC".</li> </ul> |
| COOLAN TEMP/S  | °C or °F    | • The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.   | • When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.  |
| A/F SEN1 (B1)  |             | • The A/F signal computed from the input signal of   |   |
| A/F SEN1 (B2)  | V           | the air fuel ratio (A/F) sensor 1 is displayed.  |   |
| HO2S2 (B1)     |             | The signal voltage of the heated oxygen sensor 2   |   |
| HO2S2 (B2)     | V           | is displayed.  |   |
| HO2S2 MNTR(B1) |             | Display of heated oxygen sensor 2 signal:  |   |
| HO2S2 MNTR(B2) | RICH/LEAN   | RICH: means the amount of oxygen after three<br>way catalyst is relatively small.<br>LEAN: means the amount of oxygen after three<br>way catalyst is relatively large. | • When the engine is stopped, a certain value is indicated.   |
| VHCL SPEED SE  | km/h or mph | • The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.   |   |
| BATTERY VOLT   | V           | • The power supply voltage of ECM is displayed.  |   |
| ACCEL SEN 1    |             | The accelerator pedal position sensor signal volt-   | ACCEL SEN 2 signal is converted by  |
| ACCEL SEN 2    | V           | age is displayed.  | ECM internally. Thus, it differs from<br>ECM terminal voltage signal.   |
| TP SEN 1-B1    |             | The throttle position sensor signal voltage is dis-  | • TP SEN 2-B1 signal is converted by  |
| TP SEN 2-B1    | V           | played.  | ECM internally. Thus, it differs from<br>ECM terminal voltage signal.   |
| FUEL T/TMP SE  | °C or °F    | The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed   |   |

displayed.

## < FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item | Unit     | Description   | Remarks   |
|----------------|----------|---|---|
| INT/A TEMP SE  | °C or °F | • The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.  |   |
| EVAP SYS PRES  | V        | • The signal voltage of EVAP control system pres-<br>sure sensor is displayed.  |   |
| FUEL LEVEL SE  | V        | • The signal voltage of the fuel level sensor is displayed.   |   |
| START SIGNAL   | ON/OFF   | • Indicates start signal status [ON/OFF] computed<br>by the ECM according to the signals of engine<br>speed and battery voltage.  | • After starting the engine, [OFF] is displayed regardless of the starter signal. |
| CLSD THL POS   | ON/OFF   | <ul> <li>Indicates idle position [ON/OFF] computed by<br/>ECM according to the accelerator pedal position<br/>sensor signal.</li> </ul>   |   |
| AIR COND SIG   | ON/OFF   | • Indicates [ON/OFF] condition of the air condition-<br>er switch as determined by the air conditioner sig-<br>nal.   |   |
| P/N POSI SW    | ON/OFF   | Indicates [ON/OFF] condition from the park/neu-<br>tral position (PNP) signal.  |   |
| PW/ST SIGNAL   | ON/OFF   | • [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor) is indicated.  |   |
| LOAD SIGNAL    | ON/OFF   | <ul> <li>Indicates [ON/OFF] condition from the electrical<br/>load signal.</li> <li>ON: Rear window defogger switch is ON and/or<br/>lighting switch is in 2nd position.</li> <li>OFF: Both rear window defogger switch and light-<br/>ing switch are OFF.</li> </ul> |   |
| IGNITION SW    | ON/OFF   | Indicates [ON/OFF] condition from ignition switch signal.   |   |
| HEATER FAN SW  | ON/OFF   | Indicates [ON/OFF] condition from the heater fan switch signal.   |   |
| BRAKE SW       | ON/OFF   | Indicates [ON/OFF] condition from the stop lamp switch signal.  |   |
| INJ PULSE-B1   |          | Indicates the actual fuel injection pulse width   | When the engine is stopped, a certain   |
| INJ PULSE-B2   | msec     | compensated by ECM according to the input signals.  | computed value is indicated.  |
| IGN TIMING     | BTDC     | • Indicates the ignition timing computed by ECM according to the input signals.   | • When the engine is stopped, a certain value is indicated.                       |
| CAL/LD VALUE   | %        | • "Calculated load value" indicates the value of the current air flow divided by peak air flow.   |   |
| MASS AIRFLOW   | g⋅m/s    | <ul> <li>Indicates the mass air flow computed by ECM ac-<br/>cording to the signal voltage of the mass air flow<br/>sensor.</li> </ul>  |   |
| PURG VOL C/V   | %        | <ul> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>   |   |
| INT/V TIM (B1) | °CA      | Indicates [°CA] of intake camshaft advance an-  |   |
| INT/V TIM (B2) |          | gle.  |   |
| INT/V SOL-B1   |          | • The control value of the intake valve timing con-   |   |
| INT/V SOL-B2   | %        | <ul><li>trol solenoid valve (determined by ECM according to the input signals) is indicated.</li><li>The advance angle becomes larger as the value increases.</li></ul>   |   |

## < FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item                   | Unit               | Description  | Remarks | Λ  |
|----------------------------------|--------------------|--|---------|----|
| VIAS S/V-1                       | ON/OFF             | <ul> <li>The control condition of the VIAS control solenoid<br/>valve 1 (determined by ECM according to the in-<br/>put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 1 is operating.</li> <li>OFF: VIAS control solenoid valve 1 is not operat-<br/>ing.</li> </ul> |         | EC |
| VIAS S/V-2                       | ON/OFF             | <ul> <li>The control condition of the VIAS control solenoid<br/>valve 2 (determined by ECM according to the in-<br/>put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 2 is operating.</li> <li>OFF: VIAS control solenoid valve 2 is not operat-<br/>ing.</li> </ul> |         | C  |
| AIR COND RLY                     | ON/OFF             | • The air conditioner relay control condition (deter-<br>mined by ECM according to the input signals) is<br>indicated.   |         | Е  |
| ENGINE MOUNT                     | IDLE/TRVL          | <ul> <li>The control condition of the electronic controlled<br/>engine mount (determined by ECM according to<br/>the input signals) is indicated.</li> <li>IDLE: Engine speed is below 950 rpm</li> <li>TRVL: Engine speed is above 950 rpm</li> </ul>                                 |         | F  |
| FUEL PUMP RLY                    | ON/OFF             | <ul> <li>Indicates the fuel pump relay control condition<br/>determined by ECM according to the input sig-<br/>nals.</li> </ul>  |         | G  |
| VENT CONT/V                      | ON/OFF             | <ul> <li>The control condition of the EVAP canister vent<br/>control valve (determined by ECM according to<br/>the input signals) is indicated.</li> <li>ON: Closed</li> <li>OFF: Open</li> </ul>  |         | Н  |
| THRTL RELAY                      | ON/OFF             | <ul> <li>Indicates the throttle control motor relay control<br/>condition determined by the ECM according to<br/>the input signals.</li> </ul>   |         | J  |
| COOLING FAN                      | HI/MID/LOW/<br>OFF | <ul> <li>The control condition of the cooling fan (determined by ECM according to the input signals) is indicated.</li> <li>HI: High speed operation</li> <li>MID: Middle speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>                              |         | K  |
| HO2S2 HTR (B1)<br>HO2S2 HTR (B2) | ON/OFF             | <ul> <li>Indicates [ON/OFF] condition of heated oxygen<br/>sensor 2 heater determined by ECM according to<br/>the input signals.</li> </ul>  |         | L  |
| I/P PULLY SPD                    | rpm                | Indicates the engine speed computed from the turbine revolution sensor signal.   |         | Μ  |
| VEHICLE SPEED                    | km/h or mph        | <ul> <li>The vehicle speed computed from the vehicle<br/>speed signal sent from TCM is displayed.</li> </ul>   |         | Ν  |
| IDL A/V LEARN                    | YET/CMPLT          | <ul> <li>Displays the condition of idle air volume learning<br/>YET: Idle Air Volume Learning has not been per-<br/>formed yet.</li> <li>CMPLT: Idle Air Volume Learning has already<br/>been performed successfully.</li> </ul>   |         | 0  |
| ENG OIL TEMP                     | °C or °F           | • The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed.   |         | Ρ  |
| TRVL AFTER MIL                   | km or mile         | Distance traveled while MIL is activated.  |         |    |
| A/F S1 HTR(B1)<br>A/F S1 HTR(B2) | %                  | <ul> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>  |         |    |

## < FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item | Unit        | Description  | Remarks |
|----------------|-------------|--|---------|
| AC PRESS SEN   | V           | • The signal voltage from the refrigerant pressure sensor is displayed.  |         |
| VHCL SPEED SE  | km/h or mph | • The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.   |         |
| SET VHCL SPD   | km/h or mph | The preset vehicle speed is displayed.   |         |
| MAIN SW        | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>  |         |
| CANCEL SW      | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition from CANCEL<br/>switch signal.</li> </ul>  |         |
| RESUME/ACC SW  | ON/OFF      | Indicates [ON/OFF] condition from RESUME/AC-<br>CELERATE switch signal.  |         |
| SET SW         | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition from SET/COAST<br/>switch signal.</li> </ul>   |         |
| BRAKE SW1      | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition from ASCD brake<br/>switch signal or ASCD clutch switch.</li> </ul>  |         |
| BRAKE SW2      | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>   |         |
| VHCL SPD CUT   | NON/CUT     | <ul> <li>Indicates the vehicle cruise condition.<br/>NON: Vehicle speed is maintained at the ASCD<br/>set speed.</li> <li>CUT: Vehicle speed decreased to excessively<br/>low compared with the ASCD set speed, and<br/>ASCD operation is cut off.</li> </ul>  |         |
| LO SPEED CUT   | NON/CUT     | <ul> <li>Indicates the vehicle cruise condition.</li> <li>NON: Vehicle speed is maintained at the ASCD set speed.</li> <li>CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.</li> </ul>  |         |
| AT OD MONITOR  | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition of CVT O/D ac-<br/>cording to the input signal from the TCM.</li> </ul>  |         |
| AT OD CANCEL   | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition of CVT O/D cancel request signal.</li> </ul>   |         |
| CRUISE LAMP    | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition of CRUISE lamp<br/>determined by the ECM according to the input<br/>signals.</li> </ul>  |         |
| SET LAMP       | ON/OFF      | <ul> <li>Indicates [ON/OFF] condition of SET lamp deter-<br/>mined by the ECM according to the input signals.</li> </ul>   |         |
| BAT CUR SEN    | mV          | <ul> <li>The signal voltage of battery current sensor is<br/>displayed.</li> </ul>   |         |
| ALT DUTY SIG   | ON/OFF      | <ul> <li>The control condition of the power generation<br/>voltage variable control (determined by ECM ac-<br/>cording to the input signals) is indicated.</li> <li>ON: Power generation voltage variable control is<br/>active.</li> <li>OFF: Power generation voltage variable control<br/>is inactive.</li> </ul> |         |
| A/F ADJ-B1     |             | • Indicates the correction of a factor stored in ECM.  |         |
| A/F ADJ-B2     | _           | The factor is calculated from the difference be-<br>tween the target air-fuel ratio stored in ECM and<br>the air-fuel ratio calculated from A/F sensor 1 sig-<br>nal.  |         |
| ALT DUTY       | %           | <ul> <li>Indicates the duty ratio of the power generation<br/>command value. The ratio is calculated by ECM<br/>based on the battery current sensor signal.</li> </ul>   |         |

NOTE:

## < FUNCTION DIAGNOSIS >

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

#### ACTIVE TEST MODE

## Test Item

| TEST ITEM            | CONDITION  | JUDGMENT  | CHECK ITEM (REMEDY)   | EC |
|----------------------|--|---|---|----|
| FUEL INJEC-<br>TION  | <ul> <li>Engine: Return to the original<br/>non-standard condition</li> <li>Change the amount of fuel injec-<br/>tion using CONSULT-III.</li> </ul>  | If malfunctioning symptom disap-<br>pears, see CHECK ITEM.    | <ul> <li>Harness and connectors</li> <li>Fuel injector</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>  | С  |
| IGNITION TIM-<br>ING | <ul> <li>Engine: Return to the original<br/>non-standard condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using<br/>CONSULT-III.</li> </ul>                                    | If malfunctioning symptom disap-<br>pears, see CHECK ITEM.    | Perform Idle Air Volume Learning.   | D  |
| POWER BAL-<br>ANCE   | <ul> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch OFF</li> <li>Selector lever: P or N position</li> <li>Cut off each injector signal one at a time using CONSULT-III.</li> </ul> | Engine runs rough or stops.                                   | <ul> <li>Harness and connectors</li> <li>Compression</li> <li>Fuel injector</li> <li>Power transistor</li> <li>Spark plug</li> <li>Ignition coil</li> </ul> | F  |
| COOLING FAN*         | <ul> <li>Ignition switch: ON</li> <li>Turn the cooling fan "HI", "MID",<br/>"LOW" and "OFF" using CON-<br/>SULT-III.</li> </ul>  | Cooling fan moves and stops.                                  | <ul> <li>Harness and connectors</li> <li>Cooling fan motor</li> <li>IPDM E/R</li> </ul>   | G  |
| ENG COOLANT<br>TEMP  | <ul> <li>Engine: Return to the original<br/>non-standard condition</li> <li>Change the engine coolant tem-<br/>perature using CONSULT-III.</li> </ul>  | If malfunctioning symptom disap-<br>pears, see CHECK ITEM.    | <ul> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>  | H  |
| FUEL PUMP RE-<br>LAY | <ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound.</li> </ul>   | Fuel pump relay makes the operat-<br>ing sound.               | <ul><li>Harness and connectors</li><li>Fuel pump relay</li></ul>  | J  |
| VIAS S/V-1           | <ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and<br/>"OFF" using CONSULT-III and listen to operating sound.</li> </ul>   | Solenoid valve makes the operating sound.                     | <ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>   | K  |
| VIAS S/V-2           | <ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and<br/>"OFF" using CONSULT-III and listen to operating sound.</li> </ul>   | Solenoid valve makes the operating sound.                     | <ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>   | L  |
| ENGINE<br>MOUNTING   | <ul> <li>Ignition switch: ON</li> <li>Turn electronic controlled engine<br/>mount "IDLE" and "TRVL" with<br/>CONSULT-III.</li> </ul>   | Electronic controlled engine mount makes the operating sound. | <ul><li>Harness and connectors</li><li>Electronic controlled engine mount</li></ul>   | M  |
| PURG VOL<br>CONT/V   | <ul> <li>Engine: After warming up, run engine at 1,500 rpm.</li> <li>Change the EVAP canister purge volume control solenoid valve opening percent using CON-SULT-III.</li> </ul>                       | Engine speed changes according to the opening percent.        | <ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>   | 0  |
| FUEL/T TEMP<br>SEN   | Change the fuel tank temperature   | using CONSULT-III.  | ·   | Ρ  |
| VENT CON-<br>TROL/V  | <ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound.</li> </ul>   | Solenoid valve makes an operating sound.                      | <ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>   |    |

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#### < FUNCTION DIAGNOSIS >

[VQ35DE]

| TEST ITEM               | CONDITION  | JUDGMENT  | CHECK ITEM (REMEDY)  |
|-------------------------|--|---|--|
| INT V/T ASSIGN<br>ANGLE | <ul> <li>Engine: Return to the original<br/>non-standard condition</li> <li>Change intake valve timing using<br/>CONSULT-III.</li> </ul> | If malfunctioning symptom disappears, see CHECK ITEM. | <ul> <li>Harness and connectors</li> <li>Intake valve timing control sole-<br/>noid valve</li> </ul> |
| ALTERNATOR<br>DUTY      | <ul> <li>Engine: Idle</li> <li>Change duty ratio using CON-<br/>SULT-III.</li> </ul>   | Battery voltage changes.                              | <ul> <li>Harness and connectors</li> <li>IPDM E/R</li> <li>Alternator</li> </ul>                     |

\*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

#### **DTC & SRT CONFIRMATION MODE**

SRT STATUS Mode For details, refer to <u>EC-102</u>, "Diagnosis Description".

#### SRT WORK SUPPORT Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

#### DTC WORK SUPPORT Mode

| Test mode          | Test item                  | Corresponding DTC No. | Reference page |
|--------------------|----------------------------|-----------------------|----------------|
|                    | EVP SML LEAK P0442/P1442*  | P0442                 | <u>EC-278</u>  |
|                    | EVF SIVIL LEAR PU442/P1442 | P0455                 | <u>EC-314</u>  |
| EVAPORATIVE SYSTEM | EVP V/S LEAK P0456/P1456*  | P0456                 | <u>EC-320</u>  |
|                    | PURG VOL CN/V P1444        | P0443                 | <u>EC-284</u>  |
|                    | PURG FLOW P0441            | P0441                 | <u>EC-273</u>  |
|                    | A/F SEN1(B1) P1278/P1279   | P0133                 | <u>EC-198</u>  |
| A/F SEN1           | A/F SEN1(B1) P1276         | P0130                 | <u>EC-186</u>  |
| VF SEINT           | A/F SEN1(B2) P1288/P1289   | P0153                 | <u>EC-198</u>  |
|                    | A/F SEN1(B2) P1286         | P0150                 | <u>EC-186</u>  |
|                    | HO2S2(B1) P1146            | P0138                 | <u>EC-210</u>  |
|                    | HO2S2(B1) P1147            | P0137                 | <u>EC-203</u>  |
| 10262              | HO2S2(B1) P0139            | P0139                 | <u>EC-219</u>  |
| HO2S2              | HO2S2(B2) P1166            | P0158                 | <u>EC-210</u>  |
|                    | HO2S2(B2) P1167            | P0157                 | <u>EC-203</u>  |
|                    | HO2S2(B2) P0159            | P0159                 | <u>EC-219</u>  |

\*: DTC P1442 and P1456 does not apply to this model but appears in DTC Work Support Mode screens.

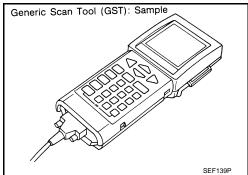
## Diagnosis Tool Function

## DESCRIPTION

Generic Scan Tool (OBD II scan tool) complying with SAE J1978 has several functions explained below.

ISO15765-4 is used as the protocol.

The name "GST" or "Generic Scan Tool" is used in this service manual.



FUNCTION

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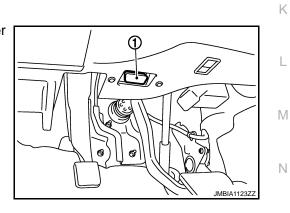
#### < FUNCTION DIAGNOSIS >

[VQ35DE]

| Diagnostic Service |                  | Function   |   |
|--------------------|------------------|--|---|
| Service \$01       | READINESS TESTS  | This diagnostic service gains access to current emission-related data values, including an-<br>alog inputs and outputs, digital inputs and outputs, and system status information.   |   |
| Service \$02       | (FREEZE DATA)    | This diagnostic service gains access to emission-related data value that were stored by ECM during the freeze frame. For details, refer to <u>EC-521</u> , " <u>DTC Index</u> ".   | Е |
| Service \$03       | DTCs             | This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.   |   |
| Service \$04       | CLEAR DIAG INFO  | <ul> <li>This diagnostic service can clear all emission-related diagnostic information. This includes:</li> <li>Clear number of diagnostic trouble codes (Service \$01)</li> <li>Clear diagnostic trouble codes (Service \$03)</li> <li>Clear trouble code for freeze frame data (Service \$01)</li> <li>Clear freeze frame data (Service \$02)</li> <li>Reset status of system monitoring test (Service \$01)</li> <li>Clear on board monitoring test results (Service \$06 and \$07)</li> </ul>  |   |
| Service \$06       | (ON BOARD TESTS) | This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.   |   |
| Service \$07       | (ON BOARD TESTS) | This diagnostic service enables the off board test drive to obtain test results for emission-<br>related powertrain components/systems that are continuously monitored during normal<br>driving conditions.  |   |
| Service \$08       | _                | <ul> <li>This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed.</li> <li>In the following conditions, this diagnostic service cannot function.</li> <li>Low ambient temperature</li> <li>Low battery voltage</li> <li>Engine running</li> <li>Ignition switch OFF</li> <li>Low fuel temperature</li> <li>Too much pressure is applied to EVAP system</li> </ul> |   |
| Service \$09       | (CALIBRATION ID) | This diagnostic service enables the off-board test device to request specific vehicle infor-<br>mation such as Vehicle Identification Number (VIN) and Calibration IDs.  |   |

## INSPECTION PROCEDURE

- 1. Turn ignition switch OFF.
- 2. Connect "GST" to data link connector (2), which is located under LH dash panel.



3. Turn ignition switch ON.

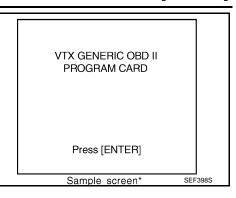
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## < FUNCTION DIAGNOSIS >

4.

Enter the program according to instruction on the screen or in the operation manual. (\*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.

| OBD II FUNCTIONS                 |         |
|----------------------------------|---------|
| F0: DATA LIST<br>F1: FREEZE DATA |         |
| F2: DTCs                         |         |
| F3: SNAPSHOT                     |         |
| F4: CLEAR DIAG INFO              |         |
| F6: READINESS TESTS              |         |
| F7: ON BOARD TESTS               |         |
| F8: EXPAND DIAG PROT             |         |
| F9: UNIT CONVERSION              |         |
| Sample screen*                   | SEF416S |
|                                  |         |

[VQ35DE]

## Revision: 2008 October

## TROUBLE DIAGNOSIS - SPECIFICATION VALUE

#### < COMPONENT DIAGNOSIS >

# COMPONENT DIAGNOSIS TROUBLE DIAGNOSIS - SPECIFICATION VALUE

## Description

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" in "DATA MONI-TOR" mode of CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" in "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" in "DATA MONITOR" mode is NOT within the SP value, the Engine Control System may have one or more malfunctions. The SP value is used to detect malfunctions that may affect the Engine Control System, but will not illuminate the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1/B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

## Component Function Check

## **1.**START

Check that all of the following conditions are satisfied.

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 104.3 kPa (1.003 1.064 kg/cm<sup>2</sup>, 14.25 15.12 psi)
- Atmospheric temperature: 20 30°C (68 86°F)
- Engine coolant temperature: 75 95°C (167 203°F)
- Transmission: Warmed-up
- After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- Electrical load: Not applied
- Rear window defogger switch, air conditioner switch lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

## >> GO TO 2.

## 2.PERFORM "SPEC" OF "DATA MONITOR" MODE

## With CONSULT-III

#### NOTE:

Perform "SPEC" in "DATA MONITOR" mode in maximum scale display.

Perform "<u>EC-12. "BASIC INSPECTION : Special Repair Requirement"</u>.
 Select "B/FUEL SCHDL", "A/F ALPHA-B1", "A/F ALPHA-B2" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT-III.
 Check that monitor items are within the SP value.
 Is the measurement value within the SP value?

EC-127

- YES >> INSPECTION END
- NO >> Go to EC-128, "Diagnosis Procedure".

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## [VQ35DE]

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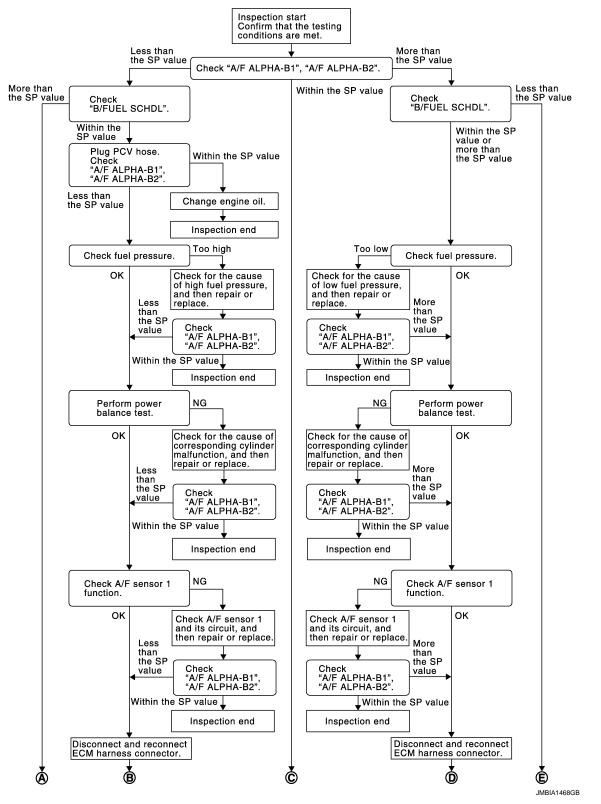
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## < COMPONENT DIAGNOSIS >

## Diagnosis Procedure

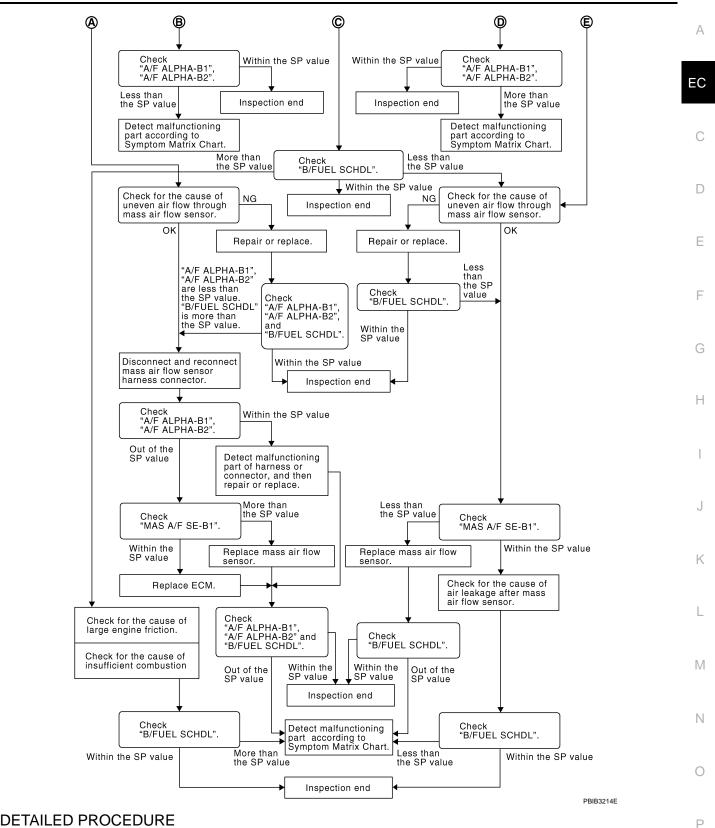
[VQ35DE] INFOID:000000003387931

## **OVERALL SEQUENCE**



#### < COMPONENT DIAGNOSIS >

[VQ35DE]



**1.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

## With CONSULT-III

- 1. Start engine.
- 2. Confirm that the testing conditions are met. Refer to EC-127, "Component Function Check".
- 3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

## EC-129

< COMPONENT DIAGNOSIS >

[VQ35DE]

#### NOTE:

Check "A/F ALPHA-B1", "A/F ALPHA-B2" for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

- YES >> GO TO 17.
- NO-1 >> Less than the SP value: GO TO 2.
- NO-2 >> More than the SP value: GO TO 3.

2.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

- YES >> GO TO 4.
- NO >> More than the SP value: GO TO 19.

**3.**CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.

NO-1 >> More than the SP value: GO TO 6.

NO-2 >> Less than the SP value: GO TO 25.

**4.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

- 1. Stop the engine.
- 2. Disconnect PCV hose, and then plug it.
- 3. Start engine.
- 4. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.

NO >> GO TO 6.

**5.**CHANGE ENGINE OIL

- 1. Stop the engine.
- 2. Change engine oil.

## NOTE:

This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving conditions.

>> INSPECTION END

## **6.**CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-545, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.

NO-1 >> Fuel pressure is too high: Replace "fuel filter and fuel pump assembly" and then. GO TO 8.

NO-2 >> Fuel pressure is too low: GO TO 7.

**I**.DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

- YES >> Replace "fuel filter and fuel pump assembly" and then GO TO 8.
- NO >> Repair or replace malfunctioning part and then GO TO 8.

**8.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

| < COMPONENT DIAGNOSIS >   | [VQ35DE]      |
|---|---------------|
| <ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check<br/>indication is within the SP value.</li> </ol>   | k that each A |
| Is the measurement value within the SP value?YES>> INSPECTION ENDNO>> GO TO 9.  | EC            |
| 9. PERFORM POWER BALANCE TEST   |               |
| <ol> <li>Perform "POWER BALANCE" in "ACTIVE TEST" mode.</li> <li>Check that the each cylinder produces a momentary engine speed drop.</li> </ol>  | C             |
| <u>Is the inspection result normal?</u><br>YES >> GO TO 12.   | D             |
| NO >> GO TO 10.<br>10.DETECT MALFUNCTIONING PART  |               |
| Check the following below.  | E             |
| <ul> <li>Ignition coil and its circuit (Refer to <u>EC-451, "Component Function Check"</u>.)</li> <li>Fuel injector and its circuit (Refer to <u>EC-444, "Component Function Check"</u>.)</li> <li>Intake air leakage</li> </ul>  | F             |
| Low compression pressure (Refer to <u>EM-23, "Inspection"</u> .)  |               |
| <u>Is the inspection result normal?</u><br>YES >> Replace fuel injector and then GO TO 11.<br>NO >> Repair or replace malfunctioning part and then GO TO 11.  | G             |
| <b>11.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"   | Н             |
| <ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check<br/>indication is within the SP value.</li> </ol>   | k that each   |
| Is the measurement value within the SP value?<br>YES >> INSPECTION END<br>NO >> GO TO 12.   | J             |
| 12.CHECK A/F SENSOR 1 FUNCTION  |               |
| <ul> <li>Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.</li> <li>For DTC P0130, P0150, refer to <u>EC-186, "DTC Logic"</u>.</li> <li>For DTC P0131, P0151, refer to <u>EC-190, "DTC Logic"</u>.</li> <li>For DTC P0132, P0152, refer to <u>EC-194, "DTC Logic"</u>.</li> </ul> | K             |
| <ul> <li>For DTC P0133, P0153, refer to <u>EC-198, "DTC Logic"</u>.</li> <li>For DTC P2A00, P2A03, refer to <u>EC-427, "DTC Logic"</u>.</li> </ul>  | L             |
| Are any DTCs detected?  | 1.4           |
| YES >> GO TO 15.<br>NO >> GO TO 13.   | M             |
| <b>13.</b> CHECK A/F SENSOR 1 CIRCUIT   |               |
| Perform Diagnostic Procedure according to corresponding DTC.  | N             |
| >> GO TO 14.  | 0             |
| <b>14.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"   | 0             |
| <ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check<br/>indication is within the SP value.</li> </ol>   | k that each   |
| Is the measurement value within the SP value?<br>YES >> INSPECTION END  |               |
| NO >> GO TO 15.   |               |
| 15.DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR         1. Stop the engine.   |               |
|   |               |

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2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

**16.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

- 1. Start engine.
- 2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-533. "Symptom Table"</u>.

**17.**CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO-1 >> More than the SP value: GO TO 18.

NO-2 >> Less than the SP value: GO TO 25.

**18.** DETECT MALFUNCTIONING PART

- 1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of power steering, alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
- 2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

## **19.**CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- · Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.

NO >> Repair or replace malfunctioning part, and then GO TO 20.

20.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"

Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> "B/FUEL SCHDL" is more, "A/F ALPHA-B1", "A/F ALPHA-B2" are less than the SP value: GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

| < COMPONENT DIAGNOSIS >  | [VQ35DE]               |
|--|------------------------|
| 22.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"  |                        |
| <ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, a indication is within the SP value.</li> </ol>  | and check that each    |
| Is the measurement value within the SP value?  |                        |
| <ul> <li>YES &gt;&gt; Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer<br/>sis Procedure". Then GO TO 29.</li> <li>NO &gt;&gt; GO TO 23.</li> </ul>   | to EC-163, "Diagno-    |
| <b>23.</b> CHECK "MAS A/F SE-B1"   |                        |
| Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indica value.  | ation is within the SP |
| Is the measurement value within the SP value?  |                        |
| YES >> GO TO 24.<br>NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.<br>24.REPLACE ECM   |                        |
| <ol> <li>Replace ECM.</li> <li>Refer to EC-15, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Specific control unit is the service of the service</li></ol> | ecial Repair Require-  |
| ment".   |                        |
|  |                        |
| >> GO TO 29.   |                        |
| 25. CHECK INTAKE SYSTEM  |                        |
| Check for the cause of uneven air flow through mass air flow sensor. Refer to the followin <ul> <li>Crushed air ducts</li> </ul>   | g.                     |
| <ul> <li>Malfunctioning seal in air cleaner element</li> </ul>   |                        |
| <ul> <li>Uneven dirt in air cleaner element</li> <li>Improper specification in intake air system</li> </ul>  |                        |
| Is the inspection result normal?   |                        |
| YES >> GO TO 27.   |                        |
| NO >> Repair or replace malfunctioning part, and then GO TO 26.  |                        |
| 26.CHECK "B/FUEL SCHDL"  |                        |
| Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indica<br>value.  | ation is within the SF |
| Is the measurement value within the SP value?  |                        |
| YES >> INSPECTION END  |                        |
| NO >> Less than the SP value: GO TO 27.  |                        |
| 27.CHECK "MAS A/F SE-B1"   |                        |
| Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indica<br>value.   | ation is within the SP |
| Is the measurement value within the SP value?  |                        |
| YES >> GO TO 28.   |                        |
| NO >> Less than the SP value: Replace mass air flow sensor, and then GO TO 30.   |                        |
| 28. CHECK INTAKE SYSTEM  |                        |
| <ul> <li>Check for the cause of air leakage after the mass air flow sensor. Refer to the following.</li> <li>Disconnection, looseness, and cracks in air duct</li> <li>Looseness of oil filler cap</li> </ul>  |                        |
| <ul> <li>Disconnection of oil level gauge</li> <li>Open stuck, breakage, hose disconnection, or cracks in PCV valve</li> </ul>   |                        |
| • Disconnection or cracks in EVAP purge hose, stuck open EVAP canister purge volu  | me control solenoid    |

- Disconnection or cracks in EVAP purge hose, stuck open EVAP canister purge volume control solenoid valve
- Malfunctioning seal in rocker cover gasket
- Disconnection, looseness, or cracks in hoses, such as a vacuum hose, connecting to intake air system parts

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• Malfunctioning seal in intake air system, etc.

>> GO TO 30.

**29.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"

Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to <u>EC-533, "Symptom Table"</u>.

**30.**CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then check that the indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-533. "Symptom Table"</u>.

| < COMPONEN  | <b>POW</b><br>IT DIAGNOSIS :                                   |                 | PLY AND        | GROU       | ND CIRCUIT                 |            | [VQ35DE]               |   |
|---|--|-----------------|----------------|------------|----------------------------|------------|------------------------|---|
|   |  |                 | ND CIRC        | UIT        |                            |            | <u> </u>               |   |
| Diagnosis P   | rocedure   |                 |                |            |                            |            | INFOID:000000004752070 | A |
|   | OUND CONNEC  |                 |                |            |                            |            |                        | ~ |
|   | n switch OFF.  |                 |                |            |                            |            |                        | С |
| 2. Check grou   | and connection E   | 38. Refer to    | Ground Inspe   | ection in  | <u>GI-43, "Circuit Ins</u> | spection". |                        |   |
| •   | n result normal?<br>TO 2.                                      |                 |                |            |                            |            |                        | С |
| NO >> Re  | pair or replace gr   |                 |                |            |                            |            |                        |   |
|   | M GROUND CIR   |                 | OPEN AND SI    | HORT       |                            |            |                        | D |
|   | ECM harness co<br>continuity betwee                            |                 | ness connecto  | or and gro | ound.                      |            |                        | E |
|   | ECM  | Crown           | d Cor          | tiouity    | -                          |            |                        |   |
| Connector   | Terminal   | – Groun         | a Cor          | itinuity   | _                          |            |                        | F |
| F7  | 12   | _               |                |            |                            |            |                        |   |
|   | 16   |                 |                |            |                            |            | (                      | G |
|   | 107  | Groun           | d E>           | isted      |                            |            |                        |   |
| E16   | 111  | _               |                |            |                            |            |                        | Н |
|   | 112  | _               |                |            |                            |            |                        |   |
| YES >> GC<br>NO >> GC   | <u>n result normal?</u><br>) TO 4.<br>) TO 3.<br>ALFUNCTIONING | ) PART          |                |            |                            |            |                        | J |
|   | wing.<br>hectors F121, E7<br>pen or short betw                 | veen ECM a      | nd ground      |            |                            |            |                        | K |
|   | pair open circuit o<br>M POWER SUPP                            | -               |                | ss or cor  | nnectors.                  |            |                        | L |
| 2. Turn ignitio   | ECM harness co<br>n switch OFF and<br>voltage between          | d then ON.      | ss connector 1 | erminals   |                            |            | 1                      | M |
|   | ECM  |                 |                |            |                            |            |                        | Ν |
| Connector   | +  | _               | Voltage        |            |                            |            |                        |   |
| E16   | Terminal<br>93   | Terminal<br>112 | Battery voltag |            |                            |            | (                      | 0 |
|   | 93<br>n result normal?   | 112             |                |            |                            |            |                        |   |
| YES >> GC<br>NO >> GC   | ) TO 6.<br>) TO 5.   |                 |                |            |                            |            |                        | Ρ |
| <b>5.</b> DETECT M/   | ALFUNCTIONING  | B PART          |                |            |                            |            |                        |   |
| Check the follo<br>• IPDM E/R co<br>• 10 A fuse (No<br>• Harness for co | nnector E10  | veen ECM a      | nd IPDM E/R    |            |                            |            |                        |   |

## < COMPONENT DIAGNOSIS >

## >> Repair open circuit, short to ground or short to power in harness or connectors.

## 6.CHECK ECM POWER SUPPLY CIRCUIT-II

#### Check the voltage between ECM harness connector terminals.

|           | ECM      |          |                                      |  |
|-----------|----------|----------|--------------------------------------|--|
| Connector | +        | _        | Condition                            | Voltage  |
| Connector | Terminal | Terminal |                                      |  |
| E16       | 105      | 112      | Ignition switch $ON \rightarrow OFF$ | After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop to approximately 0 V. |

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 9.

#### **/**.CHECK ECM POWER SUPPLY CIRCUIT-III

#### 1. Turn ignition switch ON.

2. Check the voltage between IPDM E/R harness connector and ground.

| IPDN      | /I E/R   | Ground | Voltage         |
|-----------|----------|--------|-----------------|
| Connector | Terminal | Ground | voltage         |
| F12       | 49       | Ground | Battery voltage |
| 1.12      | 53       | Ground | Dattery voltage |

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace IPDM E/R.

## 8. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

## >> INSPECTION END

# 9. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Check the voltage between ECM harness connector terminals.

| -         | F        | -         | -        | Voltage         |
|-----------|----------|-----------|----------|-----------------|
| Connector | Terminal | Connector | Terminal | -               |
| F7        | 24       | E16       | 112      | Battery voltage |

#### Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 10.

# 10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| E         | CM       | IPDM E/R  |          | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| F7        | 24       | F12       | 69       | Existed    |

# DOWED SUDDI V AND COOLIND CIDCUIT

| <ul> <li>Also check harness for short to ground and short to power.</li> <li>athe inspection result normal?</li> <li>YES &gt;&gt; GO TO 11.</li> <li>NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li>1.CHECK 15 A FUSE</li> <li>Disconnect 15 A fuse (No. 50) from IPDM E/R.</li> <li>Check 15 A fuse.</li> <li>The inspection result normal?</li> <li>YES &gt;&gt; GO TO 13.</li> <li>NO &gt;&gt; Replace 15 A fuse.</li> <li>2.CHECK ECM POWER SUPPLY CIRCUIT-VI</li> <li>Disconnect ECM harness connector.</li> <li>Disconnect IPDM E/R harness connector.</li> <li>Disconnect IPDM E/R harness connector.</li> <li>Check the continuity between ECM harness connector and IPDM E/R harness connector.</li> <li>Connector Terminal Connector Terminal Continuity</li> <li>E16 105 E10 10 Existed</li> <li>Also check harness for short to ground and short to power.</li> <li>She inspection result normal?</li> <li>YES &gt;&gt; GO TO 13.</li> <li>NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li>3.CHECK INTERMITTENT INCIDENT</li> <li>tefer to G1-40. "Intermittent Incident".</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; Replace IPDM E/R.</li> <li>NO &gt;&gt; Repair or replace harness or connectors.</li> </ul>  |   |   |   | und and sho                               | rt to power                              |              |               | [VQ35 |  |
|--|---|---|---|---|--|--------------|---------------|-------|--|
| NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         1.CHECK 15 A FUSE         . Disconnect 15 A fuse (No. 50) from IPDM E/R.         . Check 15 A fuse.         a the inspection result normal?         YES         YES         >> GO TO 13.         NO         >> Replace 15 A fuse.         2.CHECK ECM POWER SUPPLY CIRCUIT-VI         . Disconnect ICM harness connector.         . Disconnect IPDM E/R harness connector.         . Check the continuity between ECM harness connector and IPDM E/R harness connector.         . Check the continuity between ECM harness connector and IPDM E/R harness connector.         . Connector       Terminal         Stein ispection result normal?         YES <td></td> <td></td> <td>-</td> <td>unu anu sho</td> <td>n to power.</td> <td></td> <td></td> <td></td> <td></td>   |   |   | -   | unu anu sho                               | n to power.                              |              |               |       |  |
| 1.CHECK 15 A FUSE         Disconnect 15 A fuse (No. 50) from IPDM E/R.         Check 15 A fuse.         a the inspection result normal?         YES       >> GO TO 13.         NO       >> Replace 15 A fuse.         2.CHECK ECM POWER SUPPLY CIRCUIT-VI         Disconnect IPDM E/R harness connector.         Disconnect IPDM E/R harness connector.         Check the continuity between ECM harness connector and IPDM E/R harness connector.         ECM       IPDM E/R         Connector       Terminal         State inspection result normal?         YES       >> Replace IPDM E/R.   |   |   |   |   |  |              |               |       |  |
| Instruction of the equation of the equatis and thetequation of the equation of the equation of |   |   | ircuit, short to  | o ground or s                             | hort to power                            | r in harness | s or connecto | ors.  |  |
| <ul> <li>Check 15 A fuse.</li> <li>Sthe inspection result normal?</li> <li>YES &gt;&gt; GO TO 13.</li> <li>NO &gt;&gt; Replace 15 A fuse.</li> <li><b>2.</b>CHECK ECM POWER SUPPLY CIRCUIT-VI</li> <li>Disconnect ECM harness connector.</li> <li>Disconnect IPDM E/R harness connector.</li> <li>Check the continuity between ECM harness connector and IPDM E/R harness connector.</li> </ul> ECM IPDM E/R Continuity Connector Terminal Connector Terminal E16 105 E10 10 Existed Also check harness for short to ground and short to power. Sthe inspection result normal? YES >> GO TO 13. NO >> Repair open circuit, short to ground or short to power in harness or connectors. <b>3.</b> CHECK INTERMITTENT INCIDENT Refer to GI-40, "Intermittent Incident". Sthe inspection result normal? YES >> Replace IPDM E/R.  |   |   |   |   |  |              |               |       |  |
| a the inspection result normal?         YES       >> GO TO 13.         NO       >> Replace 15 A fuse.         2.CHECK ECM POWER SUPPLY CIRCUIT-VI         • Disconnect ECM harness connector.         • Disconnect IPDM E/R harness connector.         • Check the continuity between ECM harness connector and IPDM E/R harness connector.         • Connector       IPDM E/R         Connector       Terminal         Connector       Terminal </td <td></td> <td></td> <td>(No. 50) from</td> <td>n IPDM E/R.</td> <td></td> <td></td> <td></td> <td></td> <td></td>   |   |   | (No. 50) from   | n IPDM E/R.                               |  |              |               |       |  |
| $\begin{array}{llllllllllllllllllllllllllllllllllll$   |   |   | mal?  |   |  |              |               |       |  |
| 2.CHECK ECM POWER SUPPLY CIRCUIT-VI         Disconnect ECM harness connector.         Disconnect IPDM E/R harness connector.         Check the continuity between ECM harness connector and IPDM E/R harness connector.         ECM       IPDM E/R         Connector       Terminal         Continuity       Continuity         Also check harness for short to ground and short to power.         the inspection result normal?         YES       >> Replace IPDM E/R.  |   |   |   |   |  |              |               |       |  |
| Disconnect ECM harness connector.         Disconnect IPDM E/R harness connector.         Check the continuity between ECM harness connector and IPDM E/R harness connector.         ECM       IPDM E/R         Connector       Terminal         Continuity       Continuity         Connector       Terminal         Contector       Terminal         Continuity       Continuity         Connector       Terminal         Connector       Terminal         Continuity       Continuity         Contector       Terminal         YES       Sepair open circuit, short to groun  |   |   |   |   |  |              |               |       |  |
| Disconnect IPDM E/R harness connector.<br>Check the continuity between ECM harness connector and IPDM E/R harness connector.<br>$\begin{array}{r rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$  | 2.CHECK EC  | M POWE  | R SUPPLY C  | CIRCUIT-VI                                |  |              |               |       |  |
| Check the continuity between ECM harness connector and IPDM E/R harness connector.         ECM IPDM E/R         Continuity         Contector Terminal         Continuity         Continuity         Continuity         Continuity         Continuity         Continuity         Continuity         Continuity         Continuity         Also check harness for short to ground and short to power.         Content is a content of power in harness or connectors.         CHECK INTERMITTENT INCIDENT         Colspan="2">Content is a content of content.         Colspan="2">Content is a content of content is a content of content of content is a content of content is content is a content of content is a content   |   |   |   |   |  |              |               |       |  |
| ECM       IPDM E/R       Continuity         Connector       Terminal       Connector         E16       105       E10       10       Existed         Also check harness for short to ground and short to power.       The inspection result normal?       Continuity         YES       >> GO TO 13.       NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         3.CHECK INTERMITTENT INCIDENT       Effer to GI-40, "Intermittent Incident".       The inspection result normal?         YES       >> Replace IPDM E/R.       Effection result normal?   |   |   |   |   | nnector and I                            | PDM F/R h    | arness conne  | ector |  |
| Connector       Terminal       Connector       Terminal         E16       105       E10       10       Existed         Also check harness for short to ground and short to power.       the inspection result normal?         YES       >> GO TO 13.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         3.CHECK INTERMITTENT INCIDENT         efer to GI-40, "Intermittent Incident".         the inspection result normal?         YES       >> Replace IPDM E/R.   |   |   |   |   |  | ,            |               |       |  |
| Connector       Terminal       Connector       Terminal         E16       105       E10       10       Existed         Also check harness for short to ground and short to power.       Image: Connector result normal?       Image: Connector result normal?         YES       >> GO TO 13.       Image: Connector result normal?       Image: Connector result normal?         YO       >> Repair open circuit, short to ground or short to power in harness or connectors.       Image: Connector result normal?         S.CHECK INTERMITTENT INCIDENT       Image: Connector result normal?       Image: Connector result normal?         efer to GI-40, "Intermittent Incident".       Image: Connector result normal?       Image: Connector result normal?         YES       >> Replace IPDM E/R.       Image: Connector result normal?       Image: Connector result normal?   | ECM   |   | IPDN  | /IE/R                                     |  |              |               |       |  |
| Also check harness for short to ground and short to power.<br>the inspection result normal?<br>YES >> GO TO 13.<br>NO >> Repair open circuit, short to ground or short to power in harness or connectors.<br><b>3.</b> CHECK INTERMITTENT INCIDENT<br>efer to <u>GI-40, "Intermittent Incident"</u> .<br>the inspection result normal?<br>YES >> Replace IPDM E/R.   |   |   |   |   | Continuity                               |              |               |       |  |
| the inspection result normal?         YES       >> GO TO 13.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         3.CHECK INTERMITTENT INCIDENT         efer to GI-40, "Intermittent Incident".         the inspection result normal?         YES       >> Replace IPDM E/R.   | Connector   | Terminal  | Connector   | Terminal                                  | Continuity                               | _            |               |       |  |
| YES >> GO TO 13.<br>NO >> Repair open circuit, short to ground or short to power in harness or connectors.<br><b>3.</b> CHECK INTERMITTENT INCIDENT<br>efer to <u>GI-40, "Intermittent Incident"</u> .<br><u>the inspection result normal?</u><br>YES >> Replace IPDM E/R.   |   |   |   |   |  |              |               |       |  |
| NO       >> Repair open circuit, short to ground or short to power in harness or connectors. <b>3.</b> CHECK INTERMITTENT INCIDENT         efer to GI-40, "Intermittent Incident".         the inspection result normal?         YES       >> Replace IPDM E/R.  | E16<br>Also check h   | 105<br>narness fo   | E10<br>r short to gro   | 10  | Existed                                  |              |               |       |  |
| 3.CHECK INTERMITTENT INCIDENT<br>efer to <u>GI-40, "Intermittent Incident"</u> .<br><u>the inspection result normal?</u><br>YES >> Replace IPDM E/R.   | E16<br>Also check h<br>the inspection   | 105<br>harness fo<br>result nor   | E10<br>r short to gro   | 10  | Existed                                  |              |               |       |  |
| efer to <u>GI-40, "Intermittent Incident"</u> .<br><u>the inspection result normal?</u><br>YES >> Replace IPDM E/R.  | E16<br>Also check h<br>the inspection<br>YES >> GO  | 105<br>narness fo<br>result nor<br>TO 13.   | E10<br>r short to gro<br>mal?   | 10<br>pund and sho                        | Existed<br>rt to power.                  | r in harness | s or connecto | ors.  |  |
| the inspection result normal?<br>YES >> Replace IPDM E/R.  | E16<br>Also check h<br>the inspection<br>YES >> GO<br>NO >> Repa  | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c   | E10<br>r short to gro<br>mal?<br>ircuit, short to   | 10<br>bund and sho<br>o ground or s       | Existed<br>rt to power.                  | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES >> GO<br>YO >> Repa<br><b>3.</b> CHECK INT   | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE   | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDE   | 10<br>bund and sho<br>o ground or s       | Existed<br>rt to power.                  | r in harness | s or connecto | ors.  |  |
| NO >> Repair or replace harness or connectors.   | E16<br>Also check h<br>the inspection<br>YES $>>$ GO<br>NO $>>$ Repa<br><b>3.</b> CHECK INT<br>efer to <u>GI-40, "</u>                              | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE   | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .                   | 10<br>bund and sho<br>o ground or s       | Existed<br>rt to power.                  | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES $>>$ GO<br>NO $>>$ Repa<br><b>3.</b> CHECK INT<br>efer to GI-40, "<br>the inspection<br>YES $>>$ Rep   | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES >> GO<br>NO >> Repa<br><b>3.</b> CHECK INT<br>efer to <u>GI-40, "</u><br>the inspection<br>YES >> Repl | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES >> GO<br>NO >> Repa<br><b>3.</b> CHECK INT<br>efer to <u>GI-40, "</u><br>the inspection<br>YES >> Repl | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES $>>$ GO<br>NO $>>$ Repa<br><b>3.</b> CHECK INT<br>efer to GI-40, "<br>the inspection<br>YES $>>$ Rep   | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES >> GO<br>NO >> Repa<br><b>3.</b> CHECK INT<br>efer to GI-40, "<br>the inspection<br>YES >> Repl        | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES $>>$ GO<br>NO $>>$ Repa<br><b>3.</b> CHECK INT<br>efer to GI-40, "<br>the inspection<br>YES $>>$ Rep   | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |
|  | E16<br>Also check h<br>the inspection<br>YES $>>$ GO<br>NO $>>$ Repart<br>CHECK INT<br>tefer to GI-40, "<br>the inspection<br>YES $>>$ Rep          | 105<br>narness fo<br>result nor<br>TO 13.<br>air open c<br>FERMITTE<br>Intermitter<br>result nor<br>lace IPDM | E10<br>r short to gro<br>mal?<br>ircuit, short to<br>ENT INCIDEI<br><u>nt Incident"</u> .<br>mal?<br>1 E/R. | 10<br>bund and sho<br>o ground or s<br>NT | Existed<br>rt to power.<br>hort to power | r in harness | s or connecto | ors.  |  |

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## **U0101 CAN COMM CIRCUIT**

## Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

INFOID:000000004734289

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## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name      | DTC detecting condition  | Possible cause   |
|---------|-----------------------------|--|--|
| U0101   | Lost communication with TCM | When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more. | <ul> <li>CAN communication line between<br/>TCM and ECM</li> <li>CAN communication line open or<br/>shorted</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.

2. Check DTC.

#### Is DTC detected?

- YES >> EC-138, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

Go to LAN-16, "Trouble Diagnosis Flow Chart".

INFOID:000000004734288

# **U0164 CAN COMM CIRCUIT**

## Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle mul-EC tiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

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## DTC DETECTION LOGIC

| DTC No.               | Trouble diagnosis name                                   | DTC detecting condition  | Possible cause  |
|-----------------------|--|--|---|
| U0164                 | Lost communication<br>with Unified meter and<br>A/C amp. | When ECM is not transmitting or receiving CAN com-<br>munication signal of OBD (emission related diagno-<br>sis) with Unified meter and A/C amp. for 2 seconds or<br>more. | <ul> <li>CAN communication line between<br/>Unified meter and A/C amp. and<br/>ECM</li> <li>CAN communication line open or<br/>shorted</li> </ul> |
| DTC CON               | FIRMATION PROC   | EDURE  |   |
| 1.perfo               | RM DTC CONFIRMA  | TION PROCEDURE   |   |
|                       |  | wait at least 3 seconds.   |   |
| 2. Check<br>s DTC det |  |  |   |
| YES >>                | > EC-139, "Diagnosis<br>> INSPECTION END                 | Procedure".  |   |
| Diagnosi              | is Procedure   |  | INFOID:000000004734293  |
| Go to <u>LAN</u> .    | -16, "Trouble Diagnos                                    | s Flow Chart".   |   |
|                       |  |  |   |
|                       |  |  |   |
|                       |  |  |   |
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## < COMPONENT DIAGNOSIS >

## U1000, U1001 CAN COMM CIRCUIT

## Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

INFOID:000000003387934

INFOID:000000003387935

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis<br>name | DTC detecting condition   | Possible cause   |
|---------|---------------------------|---|--|
| U1000   | CAN communication         | When ECM is not transmitting or receiving CAN com-<br>munication signal of OBD (emission related diagno-<br>sis) for 2 seconds or more.       | Harness or connectors     (CAN communication line is open or |
| U1001   | line                      | When ECM is not transmitting or receiving CAN com-<br>munication signal other than OBD (emission related<br>diagnosis) for 2 seconds or more. |  |

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 3 seconds.
- 2. Check DTC.

Is DTC detected?

- YES >> EC-140, "Diagnosis Procedure".
- NO >> INSPECTION END

## **Diagnosis** Procedure

Go to LAN-16, "Trouble Diagnosis Flow Chart".

INFOID:000000003387933

## P0011, P0021 IVT CONTROL

## < COMPONENT DIAGNOSIS >

## P0011, P0021 IVT CONTROL

## **DTC** Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform the trouble diagnosis for DTC P0075, P0081. Refer to EC-151, "DTC Logic".

| DTC No.               | Trouble diagnosis<br>name                              | DTC detecting condition  | Possible cause   |
|-----------------------|--|--|--|
| P0011                 | Intake valve timing<br>control performance<br>(bank 1) |  | <ul> <li>Crankshaft position sensor (POS)</li> <li>Camshaft position sensor (PHASE)</li> <li>Intake valve timing control solenoid valve</li> </ul>   |
| P0021                 | Intake valve timing<br>control performance<br>(bank 2) | <ul> <li>There is a gap between angle of target and<br/>phase-control angle degree.</li> </ul> | <ul> <li>Accumulation of debris to the signal pick-up<br/>portion of the camshaft</li> <li>Timing chain installation</li> <li>Foreign matter caught in the oil groove for in-<br/>take valve timing control</li> </ul> |
|                       | NFIRMATION PRO   | OCEDURE  |  |
| 1.PREC                | ONDITIONING  |  |  |
|                       |  | re has been previously conducted, alwa   | ys perform the following before conduct-   |
| ing the ne<br>1. Turn |  | and wait at least 10 seconds.  |  |
| 2. Turn               | gnition switch ON.                                     |  |  |
|                       | <b>CONDITION:</b>                                      | and wait at least 10 seconds.  |  |
| Before pe             |  | wing procedure, confirm that battery   | v voltage is between 10 V and 16 V at  |
| idle.                 |  |  |  |
| >                     | >> GO TO 2.  |  |  |
| •                     |  | MATION PROCEDURE-I   |  |
| With C                | ONSULT-III   |  |  |
| 1. Turn i             | gnition switch ON a                                    | and select "DATA MONITOR" mode with  |  |
|                       |  | up to the normal operating temperature.<br>nditions for at least 6 consecutive secon           | ds. Hold the accelerator pedal as steady   |
|                       | ssible.  |  |  |
| VHCL SPE              |  | 100 km/h (02 75 m k)   |  |
| ENG SPE               |  | 20 km/h (63 - 75 mph)<br>- 4,000 rpm   |  |
| COOLAN                |  | han 60°C (140°F)   |  |
| B/FUEL S              |  | han 7.3 msec   |  |
| Selector le           | ver D posi   | tion   |  |
| CAU                   | FION:  |  |  |
|                       | ys drive at a safe s                                   |  | da   |
|                       | k 1st trip DTC.  | running and let engine idle for 10 second  | us.  |
| With G                | ST   |  |  |
|                       | •  | ONSULT-III" above.   |  |
| <u>Is 1st trip</u>    | DTC detected?  |  |  |

#### YES >> Go to EC-142, "Diagnosis Procedure"

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

## **EC-141**

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## < COMPONENT DIAGNOSIS >

With CONSULT-III

1. Maintain the following conditions for at least 20 consecutive seconds.

| ENG SPEED               | 1,400 - 3,175 rpm (A constant rotation is maintained.)   |
|-------------------------|--|
| COOLAN TEMP/S           | More than 70°C (158°F)   |
| Selector lever          | 1st or 2nd position  |
| Driving location uphill | Driving vehicle uphill<br>(Increased engine load will help maintain the driving conditions re-<br>quired for this test.) |

## **CAUTION:**

#### Always drive at a safe speed.

2. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to <u>EC-142, "Diagnosis Procedure"</u> NO >> INSPECTION END

## Diagnosis Procedure

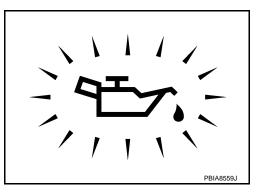
# 1.CHECK OIL PRESSURE WARNING LAMP

#### 1. Start engine.

2. Check oil pressure warning lamp and confirm it is not illuminated.

Is oil pressure warming lamp illuminated?

- YES >> Go to LU-7, "Inspection".
- NO >> GO TO 2.



## 2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-143, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace malfunctioning intake valve timing control solenoid valve.

## ${f 3.}$ CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-263, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace crankshaft position sensor (POS).

**4.**CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-266. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning camshaft position sensor (PHASE).

**5.**CHECK CAMSHAFT (INTAKE)

Check the following.

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## P0011, P0021 IVT CONTROL

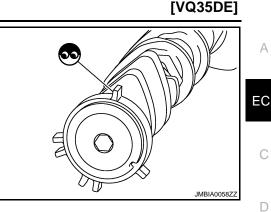
## < COMPONENT DIAGNOSIS >

- · Accumulation of debris on the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 6.

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



**6.**CHECK TIMING CHAIN INSTALLATION

| Check service records for any recent repairs that may cause timing chain misalignment. |         |
|--|---------|
| Are there any service records that may cause timing chain misalignment?                |         |
| YES >> Check timing chain installation. Refer to EM-54, "Removal and Installation".    |         |
| NO >> GO TO 7.   |         |
| 7.CHECK LUBRICATION CIRCUIT  |         |
| Refer to EM-18, "Inspection and Adjustment".   |         |
| Is the inspection result normal?   |         |
| YES >> GO TO 8.  |         |
| NO >> Clean lubrication line.  |         |
| 8. CHECK INTERMITTENT INCIDENT   |         |
| Refer to GI-40, "Intermittent Incident".   |         |
| >> INSPECTION END  |         |
| Component Inspection   | 3387941 |
| 1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I                                  |         |
| 1. Disconnect intake valve timing control solenoid valve harness connector.            |         |

2. Check resistance between intake valve timing control solenoid valve terminals as per the following.

| Terminals         | Resistance  |
|-------------------|---|
| 1 and 2           | 7.0 - 7.5 Ω [at 20°C (68°F)]                      |
| 1 or 2 and ground | ${}^{\infty\Omega}$ (Continuity should not exist) |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve.
- Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
   CAUTION:

Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.

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Is the inspection result normal?
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YES >> INSPECTION END
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# P0011, P0021 IVT CONTROL

## < COMPONENT DIAGNOSIS >

NO >> Replace malfunctioning intake valve timing control solenoid valve.

# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

### < COMPONENT DIAGNOSIS >

# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

# Description

INFOID:000000003387942

[VQ35DE]

### SYSTEM DESCRIPTION

| Sensor   | Input signal to ECM  | ECM function                                    | Actuator                                |  |
|--|----------------------|---|---|--|
| Camshaft position sensor (PHASE)<br>Crankshaft position sensor (POS) | Engine speed         | Air fuel ratio (A/F) sensor 1<br>heater control | Air fuel ratio (A/F) sensor 1<br>heater |  |
| Mass air flow sensor   | Amount of intake air |   | neater                                  |  |

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element within the specified range.

# **DTC Logic**

INFOID:000000003387943

# DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P0031   | Air fuel ratio (A/F) sensor<br>1 heater (bank 1) control<br>circuit low  | The current amperage in the A/F sensor 1 heater<br>circuit is out of the normal range.<br>(An excessively low voltage signal is sent to ECM<br>through the A/F sensor 1 heater.)  | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 heater circuit is<br/>open or shorted.)</li> <li>A/F sensor 1 heater</li> </ul> |
| P0032   | Air fuel ratio (A/F) sensor<br>1 heater (bank 1) control<br>circuit high | The current amperage in the A/F sensor 1 heater<br>circuit is out of the normal range.<br>(An excessively high voltage signal is sent to ECM<br>through the A/F sensor 1 heater.) | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 heater circuit is<br/>shorted.)</li> <li>A/F sensor 1 heater</li> </ul>         |
| P0051   | Air fuel ratio (A/F) sensor<br>1 heater (bank 2) control<br>circuit low  | The current amperage in the A/F sensor 1 heater<br>circuit is out of the normal range.<br>(An excessively low voltage signal is sent to ECM<br>through the A/F sensor 1 heater.)  | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 heater circuit is<br/>open or shorted.)</li> <li>A/F sensor 1 heater</li> </ul> |
| P0052   | Air fuel ratio (A/F) sensor<br>1 heater (bank 2) control<br>circuit high | The current amperage in the A/F sensor 1 heater<br>circuit is out of the normal range.<br>(An excessively high voltage signal is sent to ECM<br>through the A/F sensor 1 heater.) | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 heater circuit is<br/>shorted.)</li> <li>A/F sensor 1 heater</li> </ul>         |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 10 seconds.
- 2. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Go to EC-145, "Diagnosis Procedure".

NG >> INSPECTION END

### Diagnosis Procedure

1.CHECK GROUND CONNECTION

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# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

### < COMPONENT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

**2.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect air fuel ratio (A/F) sensor 1 harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between A/F sensor 1 harness connector and ground.

| DTC          |      | A/F sensor 1       |   | Ground | Voltage         |  |
|--------------|------|--------------------|---|--------|-----------------|--|
| ыс           | Bank | Connector Terminal |   | Ground | voltage         |  |
| P0031, P0032 | 1    | F27                | 4 | Ground | Battery voltage |  |
| P0051, P0052 | 2    | F64                | 4 | Giouna |                 |  |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.** DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F12
- 15 A fuse (No. 46)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

### **4.**CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC          |      | A/F sensor 1 |          | E         | CM       | Continuity |
|--------------|------|--------------|----------|-----------|----------|------------|
| ыс           | Bank | Connector    | Terminal | Connector | Terminal | Continuity |
| P0031, P0032 | 1    | F27          | 3        | F7        | 4        | Existed    |
| P0051, P0052 | 2    | F64          | 3        | 1 1-7     | 8        | LAISIEU    |

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK A/F SENSOR 1 HEATER

Refer to EC-147, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

6.REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1.

### **CAUTION:**

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

| .CHECK INTERMITTENT INCIDENT         erform GI-40. "Intermittent Incident".         >> INSPECTION END         omponent Inspection         .CHECK AIR FUEL RATIO (A/F) SENSOR 1         heck resistance between A/F sensor terminals as per the following.         Terminal No.       Resistance         3 and 4       1.8 - 2.44 Ω [at 25°C (77°F)]         3 and 1, 2       ∞ Ω         4 and 1, 2       (Continuity should not exist)         the inspection result normal?       (Continuity should not exist)         the inspection result normal?          (ES       > INSPECTION END         NO       > GO TO 2.         .REPLACE AIR FUEL RATIO (A/F) SENSOR 1         eplace malfunctioning air fuel ratio (A/F) sensor 1.         Auttion:         Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.         Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).         >> INSPECTION END |
|---|
| >> INSPECTION END         omponent Inspection         .CHECK AIR FUEL RATIO (A/F) SENSOR 1         heck resistance between A/F sensor terminals as per the following.   |
| omponent Inspection   |
| •CHECK AIR FUEL RATIO (A/F) SENSOR 1         heck resistance between A/F sensor terminals as per the following. <ul> <li>Terminal No.</li> <li>Resistance</li> <li>3 and 4</li> <li>1.8 - 2.44 Ω [at 25°C (77°F)]</li> <li>3 and 1, 2</li> <li>∞ Ω</li> <li>4 and 1, 2</li> <li>(Continuity should not exist)</li> </ul> the inspection result normal?             (FS >> INSPECTION END NO >> GO TO 2.             • REPLACE AIR FUEL RATIO (A/F) SENSOR 1             eplace malfunctioning air fuel ratio (A/F) sensor 1.           AUTION:             Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.           Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).   |
| heck resistance between A/F sensor terminals as per the following.         Terminal No.       Resistance         3 and 4       1.8 - 2.44 $\Omega$ [at 25°C (77°F)]         3 and 1, 2 $\infty \Omega$ 4 and 1, 2       (Continuity should not exist)         the inspection result normal?         YES       >> INSPECTION END         NO       >> GO TO 2.         .REPLACE AIR FUEL RATIO (A/F) SENSOR 1         eplace malfunctioning air fuel ratio (A/F) sensor 1.         AUTION:         Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.         Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor         Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).   |
| Terminal No.       Resistance         3 and 4       1.8 - 2.44 $\Omega$ [at 25°C (77°F)]         3 and 1, 2 $\infty \Omega$ 4 and 1, 2       (Continuity should not exist)         the inspection result normal?       (Continuity should not exist)         VO       >> GO TO 2.         .REPLACE AIR FUEL RATIO (A/F) SENSOR 1         eplace malfunctioning air fuel ratio (A/F) sensor 1.         AUTION:         Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.         Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).  |
| 3 and 4       1.8 - 2.44 Ω [at 25°C (77°F)]         3 and 1, 2       ∞ Ω         4 and 1, 2       (Continuity should not exist)         the inspection result normal?       (Continuity should not exist)         (FS)       >> INSPECTION END         NO       >> GO TO 2.         .REPLACE AIR FUEL RATIO (A/F) SENSOR 1         eplace malfunctioning air fuel ratio (A/F) sensor 1.         AUTION:         Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.         Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $  |
| 4 and 1, 2       (Continuity should not exist)         the inspection result normal?         YES       >> INSPECTION END         NO       >> GO TO 2.         .REPLACE AIR FUEL RATIO (A/F) SENSOR 1         eplace malfunctioning air fuel ratio (A/F) sensor 1.         AUTION:         Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.         Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor         Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).  |
| the inspection result normal?<br>(FES >> INSPECTION END<br>NO >> GO TO 2.<br>.REPLACE AIR FUEL RATIO (A/F) SENSOR 1<br>eplace malfunctioning air fuel ratio (A/F) sensor 1.<br>AUTION:<br>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a<br>hard surface such as a concrete floor; use a new one.<br>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor<br>Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubri-<br>cant (commercial service tool).  |
| <ul> <li>VES &gt;&gt; INSPECTION END</li> <li>VO &gt;&gt; GO TO 2.</li> <li>.REPLACE AIR FUEL RATIO (A/F) SENSOR 1</li> <li>eplace malfunctioning air fuel ratio (A/F) sensor 1.</li> <li>AUTION:</li> <li>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</li> <li>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).</li> </ul>   |
| <ul> <li>NO &gt;&gt; GO TO 2.</li> <li>REPLACE AIR FUEL RATIO (A/F) SENSOR 1</li> <li>eplace malfunctioning air fuel ratio (A/F) sensor 1.</li> <li>AUTION:</li> <li>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</li> <li>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).</li> </ul>   |
| REPLACE AIR FUEL RATIO (A/F) SENSOR 1<br>eplace malfunctioning air fuel ratio (A/F) sensor 1.<br>AUTION:<br>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a<br>hard surface such as a concrete floor; use a new one.<br>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor<br>Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubri-<br>cant (commercial service tool).  |
| eplace malfunctioning air fuel ratio (A/F) sensor 1.<br>AUTION:<br>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a<br>hard surface such as a concrete floor; use a new one.<br>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor<br>Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubri-<br>cant (commercial service tool).   |
| AUTION:<br>Discard any (A/F) sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a<br>hard surface such as a concrete floor; use a new one.<br>Before installing new (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor<br>Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubri-<br>cant (commercial service tool).   |
|   |
| >> INSPECTION END   |
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# P0037, P0038, P0057, P0058 HO2S2 HEATER

# Description

INFOID:000000003387946

### SYSTEM DESCRIPTION

| Sensor   | Input signal to ECM        | ECM function           | Actuator                      |  |
|--|----------------------------|------------------------|-------------------------------|--|
| Camshaft position sensor (PHASE)<br>Crankshaft position sensor (POS) | Engine speed               | Heated oxygen sensor 2 | Heated oxygen sensor 2 heater |  |
| Engine coolant temperature sensor                                    | Engine coolant temperature | heater control         |                               |  |
| Mass air flow sensor   | Amount of intake air       |                        |                               |  |

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

### OPERATION

| Engine speed  | Heated oxygen sensor 2 heater |
|---|-------------------------------|
| Above 3,600 rpm   | OFF                           |
| <ul> <li>Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul> | ON                            |

# **DTC Logic**

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name  | DTC detecting condition   | Possible cause   |
|---------|---|---|--|
| P0037   | Heated oxygen sensor 2<br>heater (bank 1) control<br>circuit low  | The current amperage in the heated oxygen sensor<br>2 heater circuit is out of the normal range.<br>(An excessively low voltage signal is sent to ECM<br>through the heated oxygen sensor 2 heater.)  | <ul> <li>Harness or connectors<br/>(The heated oxygen sensor 2 heater<br/>circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul> |
| P0038   | Heated oxygen sensor 2<br>heater (bank 1) control<br>circuit high | The current amperage in the heated oxygen sensor<br>2 heater circuit is out of the normal range.<br>(An excessively high voltage signal is sent to ECM<br>through the heated oxygen sensor 2 heater.) | <ul> <li>Harness or connectors<br/>(The heated oxygen sensor 2 heater<br/>circuit is shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>         |
| P0057   | Heated oxygen sensor 2<br>heater (bank 2) control<br>circuit low  | The current amperage in the heated oxygen sensor<br>2 heater circuit is out of the normal range.<br>(An excessively low voltage signal is sent to ECM<br>through the heated oxygen sensor 2 heater.)  | <ul> <li>Harness or connectors<br/>(The heated oxygen sensor 2 heater<br/>circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul> |
| P0058   | Heated oxygen sensor 2<br>heater (bank 2) control<br>circuit high | The current amperage in the heated oxygen sensor<br>2 heater circuit is out of the normal range.<br>(An excessively high voltage signal is sent to ECM<br>through the heated oxygen sensor 2 heater.) | <ul> <li>Harness or connectors<br/>(The heated oxygen sensor 2 heater<br/>circuit is shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>         |

# DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10.5 V and 16 V at idle.

>> GO TO 2.

INFOID:000000003387947

# P0037, P0038, P0057, P0058 HO2S2 HEATER

2.PERFORM DTC CONFIRMATION PROCEDURE Start engine and warm it up to the normal operating temperature. Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 4. Turn ignition switch OFF and wait at least 10 seconds. 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 6. Let engine idle for 1 minute. 7. Check 1st trip DTC. Is 1st tip DTC detected? YES >> Go to EC-149, "Diagnosis Procedure". >> INSPECTION END NO Diagnosis Procedure INFOID:000000003387948 1. CHECK GROUND CONNECTION Turn ignition switch OFF. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace ground connection. 2.CHECK HO2S2 POWER SUPPLY CIRCUIT Disconnect heated oxygen sensor 2 (HO2S2) harness connector. Turn ignition switch ON. Check the voltage between HO2S2 harness connector and ground. HO2S2 DTC Ground Voltage Bank Connector Terminal P0037, P0038 1 F70 2 Ground Battery voltage P0057, P0058 2 F71 2 Is the inspection result normal? YES >> GO TO 4. NO >> GO TO 3. 3.DETECT MALFUNCTIONING PART Check the following. IPDM E/R connector F8 15 A fuse (No. 46) Harness for open or short between heated oxygen sensor 2 and fuse >> Repair open circuit, short to ground or short to power in harness or connectors. 4.CHECK H02S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT Turn ignition switch OFF. Disconnect ECM harness connector. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC          | HO2S2 |           | E        | CM        | Continuity |            |
|--------------|-------|-----------|----------|-----------|------------|------------|
| DIC          | Bank  | Connector | Terminal | Connector | Terminal   | Continuity |
| P0037, P0038 | 1     | F70       | 3        | F7        | 13         | Existed    |
| P0057, P0058 | 2     | F71       | 3        |           | 17         | LVISIGO    |

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

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

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# P0037, P0038, P0057, P0058 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[VQ35DE]

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

**5.**CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-150, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

**6.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2.

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

**Component Inspection** 

**1.**CHECK HEATED OXYGEN SENSOR 2 HEATER

Check resistance between HO2S2 terminals as per the following.

| Terminal No.  | Resistance                    |
|---------------|-------------------------------|
| 2 and 3       | 3.4 - 4.4 Ω [at 25°C (77°F)]  |
| 1 and 2, 3, 4 | $\infty \Omega$               |
| 4 and 1, 2, 3 | (Continuity should not exist) |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

**2.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. **CAUTION:** 

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

Revision: 2008 October

INFOID:000000003387949

# P0075, P0081 IVT CONTROL SOLENOID VALVE

### < COMPONENT DIAGNOSIS >

# P0075, P0081 IVT CONTROL SOLENOID VALVE

# Description

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

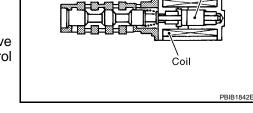
The longer pulse width advances valve timing.

Trouble diagnosis name

Intake valve timing control so-

The shorter pulse width retards valve timing.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



Possible cause

# DTC Logic

DTC No.

### DTC DETECTION LOGIC

INFOID:000000003387951

| P0075  | Intake valve timing control so-<br>lenoid valve (bank 1) circuit | An improper voltage is sent to the ECM through intake valve timing control solenoid | <ul> <li>Harness or connectors<br/>(Intake valve timing control solenoid valve)</li> </ul> |  |  |  |  |
|--|--|---|--|--|--|--|--|
| P0081         Intake valve timing control so-<br>lenoid valve (bank 2) circuit         unough make valve timing control solenoid         circuit is open or shorted.)           • Intake valve timing control solenoid         • Intake valve timing control solenoid         • Intake valve timing control solenoid |  |   |  |  |  |  |  |
|  | NFIRMATION PROCED  | URE   |  |  |  |  |  |
| ing the ne   |  |   | perform the following before conduct-  |  |  |  |  |

DTC detecting condition

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for 5 seconds. 1.
- Check 1st trip DTC. 2.

### Is 1st trip DTC detected?

YES >> Go to EC-151, "Diagnosis Procedure".

### >> INSPECTION END NO

### **Diagnosis** Procedure

# 1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

Disconnect intake valve timing (IVT) control solenoid valve harness connector. 2.

3. Turn ignition switch ON.

Check the voltage between intake valve timing control solenoid valve harness connector and ground with 4 Ρ CONSULT-III or tester.

| DTC   | IVT co | ontrol solenoi | d valve  | Ground | Voltage         |  |
|-------|--------|----------------|----------|--------|-----------------|--|
| DIC   | Bank   | Connector      | Terminal | Ground | voltage         |  |
| P0075 | 1      | F81            | 2        | Ground | Battery voltage |  |
| P0081 | 2      | F82            | 2        | Ground | ballery vollage |  |

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# P0075, P0081 IVT CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

| DTC   | IVT control solenoid valve |           |          | ECM       |          | Continuity |
|-------|----------------------------|-----------|----------|-----------|----------|------------|
|       | Bank                       | Connector | Terminal | Connector | Terminal | Continuity |
| P0075 | 1                          | F81       | 1        | F8        | 78       | Existed    |
| P0081 | 2                          | F82       | 1        | 10        | 75       | LAISteu    |

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-152, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace malfunctioning intake valve timing control solenoid valve.

**4.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

### >> INSPECTION END

### **Component Inspection**

INFOID:000000003591557

# 1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

- 1. Disconnect intake valve timing control solenoid valve harness connector.
- 2. Check resistance between intake valve timing control solenoid valve terminals as per the following.

| Terminals         | Resistance  |  |
|-------------------|---|--|
| 1 and 2           | 7.0 - 7.5 Ω [at 20°C (68°F)]                      |  |
| 1 or 2 and ground | ${}^{\infty\Omega}$ (Continuity should not exist) |  |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve.

# P0075, P0081 IVT CONTROL SOLENOID VALVE

### < COMPONENT DIAGNOSIS >

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 Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
 CAUTION:

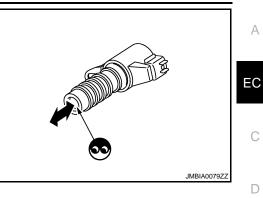
Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning intake valve timing control solenoid valve.



# P0101 MAF SENSOR

# Description

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The greater air flow, the greater the heat loss.

Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

# PBIA9559J

# DTC Logic

### DTC DETECTION LOGIC

DTC No. DTC detecting condition Possible cause Trouble diagnosis name · Harness or connectors (The sensor circuit is open or A high voltage from the sensor is sent to ECM shorted.) A) under light load driving condition. Mass air flow sensor • EVAP control system pressure sensor Mass air flow sensor cir-· Harness or connectors P0101 cuit range/performance (The sensor circuit is open or shorted.) A low voltage from the sensor is sent to ECM un-• Intake air leakage B) der heavy load driving condition. · Mass air flow sensor EVAP control system pressure sensor · Intake air temperature sensor

# DTC CONFIRMATION PROCEDURE

### NOTE:

Check vehicle specifications and VIN, then select the procedure to be performed. (Refer to the table below.)

| Vehicle specification | Vehicle serial number   | TYPE |
|-----------------------|-------------------------|------|
|                       | Up to JN8AZ18U*9W100000 | A    |
| 2WD                   | From JN8AZ18U*9W100001  | В    |
| 200                   | Up to JN8AZ18U*9W710000 | A    |
|                       | From JN8AZ18U*9W710001  | В    |
|                       | Up to JN8AZ18W*9W200000 | A    |
| 4WD                   | From JN8AZ18W*9W200001  | В    |
| 400                   | Up to JN8AZ18W*9W810000 | A    |
|                       | From JN8AZ18W*9W810001  | В    |

### TYPE A

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

# EC-154

### 2009 Murano

INFOID:000000003387954

INFOID:00000003387955

< COMPONENT DIAGNOSIS >

|   |  |   | _  |
|---|--|---|----|
| >> GO TO  |  |   | A  |
|   | CONFIRMATION PROCEDURE FOR MALFUNC   |   | _  |
|   | d warm it up to normal operating temperature.<br>at least 10 seconds at idle speed.<br>DTC.            |   | EC |
| Is 1st trip DTC dete                              | cted?  |   | C  |
| NO-1 >> With C                                    | <u>EC-157, "Diagnosis Procedure"</u> .<br>ONSULT-III: GO TO 3.<br>t CONSULT-III: GO TO 5.              |   | C  |
| -   | AIR FLOW SENSOR FUNCTION   |   | D  |
|   |  |   | _  |
| If engine cann                                    | d warm it up to normal operating temperature.<br>ot be started, go to <u>EC-157, "Diagnosis Procec</u> | <u>lure"</u> .                              | E  |
| 3. Select "MAS A<br>SULT-III.                     | /F SE-B1" in "DATA MONITOR" mode with CON-   |   |    |
|   | age of "MAS A/F SE-B1".  |   | F  |
|   | ne speed to about 4,000 rpm.   | ОК V<br>5.00 т                              |    |
| <ol><li>Monitor the lin<br/>increases.</li></ol>  | hear voltage rise in response to engine speed  | 2.50  | G  |
| Is the inspection real                            | sult normal?   | 2.30  | 0  |
| YES >> GO TO                                      |  | 1.25  |    |
| NO >> Go to                                       | <u> EC-157, "Diagnosis Procedure"</u> .  | - meret                                     | Н  |
|   |  | 0.00  |    |
|   |  |   |    |
|   |  | NG V  | I  |
|   |  | 5.00<br>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |    |
|   |  | 2.50 -                                      | J  |
|   |  |   |    |
|   |  | 1.25 -                                      |    |
|   |  |   | K  |
|   |  | 0.00  |    |
|   |  | DDDD4575                                    | L  |
|   | CONFIRMATION PROCEDURE FOR MALFUNC   |   | _] |
|   |  |   | _  |
| 1. Maintain the fol                               | llowing conditions for at least 5 consecutive secon  | us.   | M  |
| ENG SPEED   | More than 2,000 rpm  |   |    |
| TP SEN 1-B1                                       | More than 3 V  |   | Ν  |
| TP SEN 2-B1                                       | More than 3 V  |   |    |
| Selector lever                                    | Suitable position  |   |    |
|   | Driving vehicle uphill (Increased engine load) will help   |   | 0  |
| Driving location                                  | maintain the driving conditions required for this test.  |   |    |
| CAUTION:<br>Always drive v<br>2. Check 1st trip [ | vehicle at a safe speed.   |   | Ρ  |
| ls 1st trip DTC dete                              |  |   |    |
| YES >> Go to E                                    | <u>EC-157. "Diagnosis Procedure"</u> .<br>CTION END  |   |    |
| _   | PONENT FUNCTION CHECK FOR MALFUNCT   | ION B                                       |    |
|   |  |   | _  |

### < COMPONENT DIAGNOSIS >

Perform component function check. Refer to <u>EC-157, "Component Function Check"</u>. **NOTE:** 

Use component function check to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-157, "Diagnosis Procedure".

### TYPE B

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

- 1. Start engine and warm it up to normal operating temperature.
- 2. Run engine for at least 10 seconds at idle speed.
- 3. Check 1st trip DTC.

### Is 1st trip DTC detected?

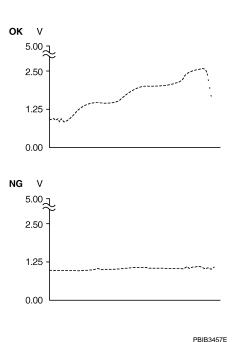
- YES >> Go to EC-157, "Diagnosis Procedure".
- NO-1 >> With CONSULT-III: GO TO 3.
- NO-2 >> Without CONSULT-III: GO TO 5.

# 3.CHECK MASS AIR FLOW SENSOR FUNCTION

- 1. Turn ignition switch ON.
- Start engine and warm it up to normal operating temperature. If engine cannot be started, go to <u>EC-157</u>, "Diagnosis Procedure".
- Select "MAS A/F SE-B1" in "DATA MONITOR" mode with CON-SULT-III.
- 4. Check the voltage of "MAS A/F SE-B1".
- 5. Increases engine speed to about 4,000 rpm.
- 6. Monitor the linear voltage rise in response to engine speed increases.

### Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Go to EC-157, "Diagnosis Procedure".



### **4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. Maintain the following conditions for at least 10 consecutive seconds.

### < COMPONENT DIAGNOSIS >

| ENG SPEED   | More than 2,000 rpm   | _  |
|---|---|--|
| TP SEN 1-B1   | More than 1.5 V   |  |
| TP SEN 2-B1   | More than 1.5 V   | _  |
| Selector lever  | Suitable position   |  |
| Driving location  | Driving vehicle uphill (Increased engine load) will help<br>maintain the driving conditions required for this test.                       |  |
| CAUTION:<br>Always drive<br>2. Check 1st trip   | <b>vehicle at a safe speed.</b><br>DTC.   |  |
| Is 1st trip DTC dete  |   |  |
| NO >> INSPE   | <u>EC-157, "Diagnosis Procedure"</u> .<br>CTION END   |  |
| <b>5.</b> PERFORM CON   | MPONENT FUNCTION CHECK FOR MALFUNG  | CTION B  |
| Perform componen  | t function check. Refer to <u>EC-157. "Component</u>  | Function Check".   |
| Use component fu  | nction check to check the overall function of th<br>C might not be confirmed.   | e mass air flow sensor circuit. During this  |
| Is the inspection re  | •   |  |
|   | CTION END   |  |
| NO >> Go to I   | EC-157, "Diagnosis Procedure".  |  |
| Component Fu  | nction Check  | INF0ID:000000003387956   |
| <b>1.</b> PERFORM CON   | MPONENT FUNCTION CHECK FOR MALFUNG  | CTION B  |
| <ol> <li>Select Service</li> <li>Check the mass</li> <li>Check for line<br/>response to incompose to</li></ol> | es air flow sensor signal with Service \$01.<br>Ear mass air flow sensor signal value rise<br>creases to about 4,000 rpm in engine speed. | in CALC LOAD 20%<br>COOLANT TEMP 95°C<br>SHORT FT #1 2%<br>LONG FT #1 0%<br>SHORT FT #2 4%<br>LONG FT #2 0%<br>ENGINE SPD 2637RPM<br>VEHICLE SPD 0MPH<br>IGN ADVANCE 41.0°<br>INTAKE AIR 41°C<br>MAF 14.1gm/sec<br>THROTTLE POS 3% |
| Diagnosis Proc  | cedure  | INFOID:00000003387957  |
| 1.INSPECTION S  | TART  |  |
| Confirm the detected  | ed malfunction (A or B). Refer to EC-154, "DTC  | Logic".  |
| Which malfunction   |   |  |
| A >> GO TC  |   |  |
| B >> GO TC  |   |  |
| 2.CHECK INTAKE  | SYSTEM  |  |
| Check the following   | g for connection.   |  |
| <ul> <li>Air duct</li> </ul>  |   |  |
| <ul> <li>Vacuum hoses</li> </ul>  |   |  |
| <ul><li>Vacuum hoses</li><li>Intake air passag</li></ul>  | e between air duct and intake manifold  |  |
|   | sult normal?  |  |

### < COMPONENT DIAGNOSIS >

NO >> Reconnect the parts.

# **3.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". 2.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace ground connection.

4.CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.

- 2. Turn ignition switch ON.
- Check the voltage between MAF sensor harness connector and ground. 3.

| MAF       | sensor   | Ground | Voltage         |  |
|-----------|----------|--------|-----------------|--|
| Connector | Terminal | Ground |                 |  |
| F4        | 5        | Ground | Battery voltage |  |

Is the inspection result normal?

YES >> GO TO 6. NO

>> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E7, F121

Harness for open or short between mass air flow sensor and ECM

Harness for open or short between mass air flow sensor and IPDM E/R

>> Repair open circuit, short to ground or short to power in harness or connectors.

### 6.CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| MAF       | sensor   | E                  | Continuity |            |
|-----------|----------|--------------------|------------|------------|
| Connector | Terminal | Connector Terminal |            | Continuity |
| F4        | F4 4     |                    | 56         | Existed    |

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

Is the inspection result normal?

YES >> GO TO 7.

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

**I**.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

| MAF       | sensor             | E  | Continuity |            |
|-----------|--------------------|----|------------|------------|
| Connector | Connector Terminal |    | Terminal   | Continuity |
| F4 3      |                    | F8 | 58         | Existed    |

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

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK INTAKE AIR TEMPERATURE SENSOR

| < COMPONENT                    | DIAGNOSIS >   | [VQ35DE]                  |    |  |  |
|--------------------------------|---|---------------------------|----|--|--|
| Refer to EC-168                | "Component Inspection".   |                           |    |  |  |
| Is the inspection              | result normal?  |                           | А  |  |  |
| YES >> GO                      |   |                           |    |  |  |
| · · ·                          | lace mass air flow sensor (with intake air temperature ser                              | nsor).                    |    |  |  |
| 9.CHECK EVAR                   | P CONTROL SYSTEM PRESSURE SENSOR  |                           | EC |  |  |
| Refer to EC-302                | "Component Inspection".   |                           |    |  |  |
| Is the inspection              | result normal?  |                           | С  |  |  |
| YES >> GO                      |   |                           |    |  |  |
| '                              | ace EVAP control system pressure sensor.  |                           |    |  |  |
| <b>10.</b> CHECK MA            | ASS AIR FLOW SENSOR   |                           | D  |  |  |
| Refer to EC-159                | "Component Inspection".   |                           |    |  |  |
| Is the inspection              | result normal?  |                           | Е  |  |  |
| YES >> GO                      |   |                           |    |  |  |
| •                              | lace mass air flow sensor.  |                           |    |  |  |
| 11.CHECK INTERMITTENT INCIDENT |   |                           |    |  |  |
| Refer to GI-40, "              | Intermittent Incident".   |                           |    |  |  |
|                                |   |                           |    |  |  |
| >> INSI                        | PECTION END   |                           | G  |  |  |
| Component I                    | nspection   | INFOID:00000003387958     |    |  |  |
|                                | S AIR FLOW SENSOR-I   |                           | Н  |  |  |
|                                |   |                           |    |  |  |
|                                |   |                           |    |  |  |
|                                | Ill harness connectors disconnected.<br>and warm it up to normal operating temperature. |                           |    |  |  |
|                                | NSULT-III and select "DATA MONITOR" mode.   |                           |    |  |  |
| 4. Select "MAS                 | A/F SE-B1" and check indication under the following cor                                 | nditions.                 | .1 |  |  |
|                                |   |                           | 0  |  |  |
| Monitor item                   | Condition   | MAS A/F SE-B1 (V)         |    |  |  |
|                                | Ignition switch ON (Engine stopped.)  | Approx. 0.4               | Κ  |  |  |
| MAS A/F SE-B1                  | Idle (Engine is warmed-up to normal operating temperature.)                             | 0.9 - 1.2                 |    |  |  |
|                                | 2,500 rpm (Engine is warmed-up to normal operating temperature.)                        | 1.6 - 1.9                 |    |  |  |
|                                | Idle to approximately 4,000 rpm   | 0.9 - 1.2 to Approx. 2.4* | L  |  |  |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Without CONSULT-III

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

N

Μ

|           | ECM                            |           |                                      |  | $\circ$   |  |
|-----------|--------------------------------|-----------|--------------------------------------|--|-----------|--|
| Connector | +                              | _         | Condition                            | Voltage (V)  | 0         |  |
|           | Terminal                       | Terminal  |                                      |  |           |  |
|           | 58<br>(MAF sen-<br>sor signal) |           | Ignition switch ON (Engine stopped.) | Approx. 0.4  | Ρ         |  |
| F8        |                                | (MAF sen- | 56<br>(Sensor                        | Idle (Engine is warmed-up to normal operating temperature.)      | 0.9 - 1.2 |  |
| ГО        |                                |           | ground)                              | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9 |  |
|           |                                | -         | Idle to approximately 4,000 rpm      | 0.9 - 1.2 to Approx. 2.4*  |           |  |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Is the inspection result normal?

YES >> INSPECTION END

### NO >> GO TO 2.

# 2. Check for the cause of uneven air flow through mass air flow sensor

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK MASS AIR FLOW SENSOR-II

### With CONSULT-III

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT-III and select "DATA MONITOR" mode.
- 4. Select "MAS A/F SE-B1" and check indication under the following conditions.

| Monitor item  | Condition  | MAS A/F SE-B1 (V)         |
|---------------|--|---------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.)                             | Approx. 0.4               |
|               | Idle (Engine is warmed-up to normal operating temperature.)      | 0.9 - 1.2                 |
|               | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9                 |
|               | Idle to approximately 4,000 rpm                                  | 0.9 - 1.2 to Approx. 2.4* |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Without CONSULT-III

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

| ECM       |                 |               |   | Voltage (V)               |  |           |
|-----------|-----------------|---------------|---|---------------------------|--|-----------|
| Connector | + –             |               | Condition   |                           |  |           |
|           | Terminal        | Terminal      |   |                           |  |           |
|           |                 |               | Ignition switch ON (Engine stopped.)                        | Approx. 0.4               |  |           |
| F8        | 58<br>(MAF sen- | 56<br>(Sensor | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.2                 |  |           |
| ГО        | sor signal)     | `             | `   | ground)                   | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9 |
|           |                 |               | Idle to approximately 4,000 rpm                             | 0.9 - 1.2 to Approx. 2.4* |  |           |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4.CHECK MASS AIR FLOW SENSOR-III

### With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT-III and select "DATA MONITOR" mode.
- 5. Select "MAS A/F SE-B1" and check indication under the following conditions.

### < COMPONENT DIAGNOSIS >

|  |                                       |  | Condition MAS A  | /F SE-B1 (V)              |
|--|---------------------------------------|--|--|---------------------------|
|  | Ignit                                 | tion switch O  | N (Engine stopped.) Ap   | prox. 0.4                 |
| /IAS A/F SE-B  | ldle                                  | (Engine is w   | armed-up to normal operating temperature.) 0   | 9 - 1.2                   |
|  | 2,50                                  |  |  | 6 - 1.9                   |
|  | ldle                                  | to approxima   | ately 4,000 rpm 0.9 - 1.2  | o Approx. 2.4*            |
| Without CC<br>Turn ignitio<br>Disconnec<br>Start engir | ONSUL<br>on swit<br>ct mass<br>ne and | <b>T-III</b><br>ich OFF.<br>s air flow s<br>warm it up | response to engine being increased to approximately 4,000 rpm.<br>ensor harness connector and reconnect it again.<br>to normal operating temperature.<br>ECM harness connector terminals under the following | conditions.               |
|  | ECM                                   |  |  |                           |
|  | +                                     | _  | Condition  | Voltage (V)               |
| onnector Te  | rminal                                | Terminal   |  |                           |
|  |                                       |  | Ignition switch ON (Engine stopped.)   | Approx. 0.4               |
|  | 58                                    | 56   | Idle (Engine is warmed-up to normal operating temperature.)  | 0.9 - 1.2                 |
|  | AF sen-<br>signal)                    | (Sensor<br>ground)                                     | 2,500 rpm (Engine is warmed-up to normal operating temperature   |                           |
| 301  | Jignal                                | ground   | Idle to approximately 4,000 rpm  | 0.9 - 1.2 to Approx. 2.4* |
| <u>he inspection</u><br>ES >> IN                       | on resu<br>ISPEC <sup>-</sup>         | <u>ilt normal?</u><br>TION END                         | -  |                           |
| <u>he inspectio</u><br>ES >> IN                        | on resu<br>ISPEC <sup>-</sup>         | <u>ilt normal?</u><br>TION END                         |  |                           |
| <u>he inspection</u><br>ES >> IN                       | on resu<br>ISPEC <sup>-</sup>         | <u>ilt normal?</u><br>TION END                         |  |                           |
| <u>he inspectio</u><br>ES >> IN                        | on resu<br>ISPEC <sup>-</sup>         | <u>ilt normal?</u><br>TION END                         |  |                           |
| <u>he inspection</u><br>ES >> IN                       | on resu<br>ISPEC <sup>-</sup>         | <u>ilt normal?</u><br>TION END                         |  |                           |

# P0102, P0103 MAF SENSOR

### Description

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The greater air flow, the greater the heat loss.

Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

# DEIA9559J

# DTC Logic

### DTC DETECTION LOGIC

INFOID:000000003387960

| DTC No. | Trouble diagnosis name                    | DTC detecting condition                                     | Possible cause   |
|---------|---|---|--|
| P0102   | Mass air flow sensor<br>circuit low input | An excessively low voltage from the sensor is sent to ECM.  | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li> <li>Intake air leakage</li> <li>Mass air flow sensor</li> </ul> |
| P0103   | Mass air flow sensor circuit high input   | An excessively high voltage from the sensor is sent to ECM. | <ul><li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li><li>Mass air flow sensor</li></ul>                                |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

- 1. Start engine and wait at least 5 seconds.
- 2. Check DTC.

### Is DTC detected?

YES >> Go to EC-163, "Diagnosis Procedure".

NO >> INSPECTION END

# **3.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Check DTC.

### Is DTC detected?

- YES >> Go to EC-163, "Diagnosis Procedure".
- NO >> GO TO 4.

### **4.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

- 1. Start engine and wait at least 5 seconds.
- 2. Check DTC.

# EC-162

INFOID:000000003591558

# P0102, P0103 MAF SENSOR

| < COMPONENT  | DIAGNOSIS                  | ;>                  |                     |   | [VQ35DE]               |
|--|----------------------------|---------------------|---------------------|---|------------------------|
| Is DTC detected?   | )<br>-                     |                     |                     |   |                        |
|  | EC-163, "Dia<br>ECTION END | agnosis Proced<br>) | lure".              |   |                        |
| Diagnosis Pro  | ocedure                    |                     |                     |   | INFOID:000000003387961 |
| 1.INSPECTION   | START                      |                     |                     |   |                        |
| Confirm the detect   |                            |                     |                     |   |                        |
| Which DTC is det<br>P0102 >> GO T                                  |                            |                     |                     |   |                        |
| P0102 >> GO T  |                            |                     |                     |   |                        |
| 2.CHECK INTAK  | KE SYSTEM                  |                     |                     |   |                        |
| Check the followin <ul> <li>Air duct</li> </ul>                    | ng for connec              | tion.               |                     |   |                        |
| <ul> <li>Vacuum hoses</li> </ul>                                   |                            |                     |                     |   |                        |
| Intake air passa   | -                          |                     | e manifold          |   |                        |
| Is the inspection I<br>YES >> GO T                                 |                            | <u>_</u>            |                     |   |                        |
| •  | onnect the par             |                     |                     |   |                        |
| 3.CHECK GROU   | JND CONNE                  | CTION               |                     |   |                        |
| 1. Turn ignition   |                            | F38 Refer to G      | Ground Inspection   | in <u>GI-43, "Circuit Inspection"</u> . |                        |
| Is the inspection i  |                            |                     |                     |   |                        |
| YES >> GO T  |                            |                     | ine                 |   |                        |
| NO >> Repa   |                            | ground connect      |                     |   |                        |
|  |                            |                     | arness connector.   |   | <u> </u>               |
| 2. Turn ignition   | switch ON.                 |                     |                     |   |                        |
| 3. Check the vo  | litage betweer             | NMAF Sensor r       | narness connector   | and ground.                             |                        |
| MAF ser  | nsor                       | Crownd              |                     | _                                       |                        |
| Connector  | Terminal                   | Ground              | Voltage             | _                                       |                        |
| F4   | 5                          | Ground              | Battery voltage     | _                                       |                        |
| Is the inspection I<br>YES >> GO T                                 |                            | <u>&gt;</u>         |                     |   |                        |
| NO >> GO T   |                            |                     |                     |   | I                      |
| 5.DETECT MAL   | FUNCTIONIN                 | IG PART             |                     |   |                        |
| Check the following  |                            | 4                   |                     |   |                        |
| <ul> <li>Harness connect</li> <li>Harness for operative</li> </ul> |                            |                     | flow sensor and E   | ECM                                     |                        |
|  |                            |                     | flow sensor and I   |   |                        |
| >> Rena  | ir open circuit            | short to arour      | nd or short to powe | er in harness or connectors.            | (                      |
| •  | -                          | -                   | T FOR OPEN ANI      |   |                        |
| 1. Turn ignition   |                            |                     |                     |   |                        |
|  | CM harness                 | connector.          |                     |   |                        |

3. Check the continuity between MAF sensor harness connector and ECM harness connector.

# P0102, P0103 MAF SENSOR

### < COMPONENT DIAGNOSIS >

| MAF       | MAF sensor |           | ECM      |            |
|-----------|------------|-----------|----------|------------|
| Connector | Terminal   | Connector | Terminal | Continuity |
| F4        | 4          | F8        | 56       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 7.

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

**I**.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

| MAF       | MAF sensor |                    | ECM |            |
|-----------|------------|--------------------|-----|------------|
| Connector | Terminal   | Connector Terminal |     | Continuity |
| F4        | 3          | F8                 | 58  | Existed    |

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

Is the inspection result normal?

YES >> GO TO 8.

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

**8.**CHECK MASS AIR FLOW SENSOR

Refer to EC-164, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace mass air flow sensor.

**9.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

### >> INSPECTION END

### Component Inspection

1.CHECK MASS AIR FLOW SENSOR-I

### With CONSULT-III

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT-III and select "DATA MONITOR" mode.
- 4. Select "MAS A/F SE-B1" and check indication under the following conditions.

| Monitor item  | Condition  | MAS A/F SE-B1 (V)         |
|---------------|--|---------------------------|
|               | Ignition switch ON (Engine stopped.)                             | Approx. 0.4               |
| MAS A/F SE-B1 | Idle (Engine is warmed-up to normal operating temperature.)      | 0.9 - 1.2                 |
| MAS AN SE-BI  | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9                 |
|               | Idle to approximately 4,000 rpm                                  | 0.9 - 1.2 to Approx. 2.4* |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### **Without CONSULT-III**

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

INFOID:000000003591559

# P0102, P0103 MAF SENSOR

### < COMPONENT DIAGNOSIS >

[VQ35DE]

|   | ECM   |   |  |  |  |
|---|---|---|--|--|--|
| Connector   | +   | -   | Condition  |  | Voltage (V)  |
|   | Terminal  | Terminal  | Institute and the AN (Francisco atoms ad )   |  | Anna   |
|   | 58  | 56  | Ignition switch ON (Engine stopped.)   |  | Approx. 0.4  |
| F8  | (MAF sen-   | (Sensor   | Idle (Engine is warmed-up to normal operating temp   |  | 0.9 - 1.2  |
|   | sor signal)   | ground)   | 2,500 rpm (Engine is warmed-up to normal operation   | g temperature.)  | 1.6 - 1.9  |
|   |   |   | Idle to approximately 4,000 rpm  |  | 0.9 - 1.2 to Approx. 2.4*  |
|   |   |   | response to engine being increased to approximately  | 4,000 rpm.   |  |
| YES ><br>NO >   | > INSPEC  |   | -  | SAIR FLOW S  | SENSOR   |
| Crushed<br>Malfunc<br>Uneven  | l air ducts<br>tioning sea<br>dirt of air o   | I of air clea   | air flow through mass air flow sensor. Refe<br>aner element<br>ment<br>ke air system parts   | r to the follow  | ing.   |
|   | •   | ult normal?   |  |  |  |
|   | > GO TO<br>> GO TO  |   |  |  |  |
| B.CHEC  | K MASS A<br>ONSULT-I  | IR FLOW S   | SENSOR-II<br>ioning part.<br>o to normal operating temperature.  |  |  |
| With C<br>With C<br>Repair<br>Start of<br>Conno.<br>Selec                                       | K MASS A<br>ONSULT-II<br>ir or replacengine and<br>ect CONSI<br>t "MAS A/F  | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and   | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con   |  |  |
| With C<br>With C<br>Repair<br>Start 6<br>Conn   | K MASS A<br>ONSULT-I<br>ir or replacengine and<br>ect CONSI<br>t "MAS A/F   | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>F SE-B1" a   | ioning part.<br>o to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition  | MAS A/F  | SE-B1 (V)  |
| With C<br>With C<br>Repair<br>Start of<br>Conno<br>Select                                       | K MASS A<br>ONSULT-II<br>ir or replacengine and<br>ect CONSI<br>t "MAS A/F<br>item  | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>SE-B1" a<br>ition switch O   | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition  | MAS A/F<br>Appro   | ox. 0.4  |
| With C<br>With C<br>Repair<br>Start of<br>Conno<br>Select                                       | K MASS A<br>ONSULT-II<br>ir or replace<br>ect CONSI<br>t "MAS A/F<br>item<br>Ign<br>Ign<br>Idle   | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>F SE-B1" a<br>ition switch O   | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)  | MAS A/F<br>Appro<br>0.9                                      | - 1.2  |
| With C<br>. Repair<br>. Start of<br>. Selec<br>Monitor  | K MASS A<br>ONSULT-II<br>ir or replace<br>ect CONSI<br>t "MAS A/F<br>item<br>Ign<br>Ign<br>Idle   | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>F SE-B1" a<br>ition switch O   | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition  | MAS A/F<br>Appro<br>0.9                                      | ox. 0.4  |
| With C<br>. Repair<br>2. Start of<br>3. Conn<br>4. Selec<br>Monitor                             | K MASS A<br>ONSULT-II<br>ir or replace<br>ect CONSI<br>t "MAS A/F<br>item<br>Ign<br>Idle<br>2,5<br>Idle   | IR FLOW S<br>I<br>e malfuncti<br>I warm it up<br>JLT-III and<br>SE-B1" a<br>ition switch O<br>e (Engine is w<br>00 rpm (Engine<br>to approximation  | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)<br>ne is warmed-up to normal operating temperature.)<br>ately 4,000 rpm  | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to               | - 1.2  |
| Monitor<br>*: Check<br>MAS A/F<br>*: Check<br>Withou<br>. Repai                                 | K MASS A         ONSULT-II         ir or replace         ect CONSI         t "MAS A/F         item         item         SE-B1         SE-B1         iter voltage         t CONSULT         item         Idle         2,5         Idle         SE-B1         item voltage  | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>5 SE-B1" a<br>ition switch O<br>e (Engine is w<br>00 rpm (Engine)<br>to approximation<br>to approximation<br>t | ioning part.<br>to to normal operating temperature.<br>select "DATA MONITOR" mode.<br>nd check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)<br>ne is warmed-up to normal operating temperature.)  | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to<br>4,000 rpm. | ox. 0.4<br>- 1.2<br>- 1.9<br>Approx. 2.4*                              |
| Monitor<br>*: Check<br>MAS A/F<br>*: Check<br>Withou<br>. Repai                                 | K MASS A<br>ONSULT-II<br>ir or replace<br>ect CONSI<br>t "MAS A/F<br>item<br>Item<br>SE-B1<br>Idle<br>2,5<br>Idle<br>ck for linear v<br>t CONSUL<br>r or replace<br>engine and<br>k the voltage<br>ECM  | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>5 SE-B1" a<br>ition switch O<br>e (Engine is w<br>00 rpm (Engine)<br>to approximation<br>to approximation<br>t | ioning part.<br>b to normal operating temperature.<br>select "DATA MONITOR" mode.<br>Ind check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)<br>Ine is warmed-up to normal operating temperature.)<br>ately 4,000 rpm<br>response to engine being increased to approximately<br>ioning part.<br>b to normal operating temperature.<br>D to normal operating temperature.<br>D to normal operating temperature.<br>D ECM harness connector terminals under t                | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to<br>4,000 rpm. | ox. 0.4<br>- 1.2<br>- 1.9<br>Approx. 2.4*                              |
| Monitor<br>*: Check<br>MAS A/F<br>*: Check<br>Withou<br>. Repai                                 | K MASS A         ONSULT-II         ir or replace         ect CONSI         t "MAS A/F         item         item         SE-B1         SE-B1         item         Idle         ck for linear v         t CONSUL         it or replace         engine and         ck for linear v         t CONSUL         ir or replace         engine and         k the voltage         ECM         + | IR FLOW S<br>II<br>e malfunct<br>I warm it up<br>JLT-III and<br>F SE-B1" and<br>E SE-B1" and<br>E Composition<br>(Engine is w<br>00 rpm (Engine)<br>to approximation<br>oltage rise in<br><b>T-III</b><br>e malfunct<br>I warm it up<br>ge betweer  | ioning part.<br>to normal operating temperature.<br>select "DATA MONITOR" mode.<br>Ind check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)<br>ne is warmed-up to normal operating temperature.)<br>ately 4,000 rpm<br>response to engine being increased to approximately<br>ioning part.<br>to to normal operating temperature.   | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to<br>4,000 rpm. | ox. 0.4<br>- 1.2<br>- 1.9<br>Approx. 2.4*                              |
| Mas A/F<br>*: Check<br>Withou<br>Mas A/F<br>*: Check<br>Withou<br>Start of<br>Start of<br>Check | K MASS A<br>ONSULT-II<br>ir or replace<br>ect CONSI<br>t "MAS A/F<br>item<br>Item<br>SE-B1<br>Idle<br>2,5<br>Idle<br>ck for linear v<br>t CONSUL<br>r or replace<br>engine and<br>k the voltage<br>ECM  | IR FLOW S<br>II<br>e malfuncti<br>I warm it up<br>JLT-III and<br>5 SE-B1" a<br>ition switch O<br>e (Engine is w<br>00 rpm (Engine)<br>to approximation<br>to approximation<br>t | ioning part.<br>b to normal operating temperature.<br>select "DATA MONITOR" mode.<br>Ind check indication under the following con<br>Condition<br>N (Engine stopped.)<br>arrmed-up to normal operating temperature.)<br>Ine is warmed-up to normal operating temperature.)<br>ately 4,000 rpm<br>response to engine being increased to approximately<br>ioning part.<br>b to normal operating temperature.<br>D to normal operating temperature.<br>D to normal operating temperature.<br>D ECM harness connector terminals under the<br>Condition | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to<br>4,000 rpm. | v. 0.4<br>- 1.2<br>- 1.9<br>Approx. 2.4*<br>conditions.<br>Voltage (V) |
| Mas A/F<br>*: Check<br>Withou<br>Mas A/F<br>*: Check<br>Withou<br>Start of<br>Start of<br>Check | K MASS A         ONSULT-II         ir or replace         ect CONSI         t "MAS A/F         item         item         SE-B1         SE-B1         item         Idle         ck for linear v         t CONSUL         it or replace         engine and         ck for linear v         t CONSUL         ir or replace         engine and         k the voltage         ECM         + | IR FLOW S<br>II<br>e malfunct<br>I warm it up<br>JLT-III and<br>F SE-B1" and<br>E SE-B1" and<br>E Composition<br>(Engine is w<br>00 rpm (Engine)<br>to approximation<br>oltage rise in<br><b>T-III</b><br>e malfunct<br>I warm it up<br>ge betweer  | ioning part.<br>b to normal operating temperature.<br>select "DATA MONITOR" mode.<br>Ind check indication under the following con<br>Condition<br>N (Engine stopped.)<br>rarmed-up to normal operating temperature.)<br>Ine is warmed-up to normal operating temperature.)<br>ately 4,000 rpm<br>response to engine being increased to approximately<br>ioning part.<br>b to normal operating temperature.<br>D to normal operating temperature.<br>D to normal operating temperature.<br>D ECM harness connector terminals under t                | MAS A/F<br>Appro<br>0.9<br>1.6<br>0.9 - 1.2 to<br>4,000 rpm. | ox. 0.4<br>- 1.2<br>- 1.9<br>Approx. 2.4*                              |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

Idle to approximately 4,000 rpm

Is the inspection result normal?

sor signal)

ground)

# EC-165

2,500 rpm (Engine is warmed-up to normal operating temperature.)

1.6 - 1.9

0.9 - 1.2 to Approx. 2.4\*

YES >> INSPECTION END NO >> GO TO 4.

4. CHECK MASS AIR FLOW SENSOR-III

### With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT-III and select "DATA MONITOR" mode.
- 5. Select "MAS A/F SE-B1" and check indication under the following conditions.

| Monitor item  | Condition  | MAS A/F SE-B1 (V)         |
|---------------|--|---------------------------|
|               | Ignition switch ON (Engine stopped.)                             | Approx. 0.4               |
| MAS A/F SE-B1 | Idle (Engine is warmed-up to normal operating temperature.)      | 0.9 - 1.2                 |
| MAS AF SE-BI  | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9                 |
|               | Idle to approximately 4,000 rpm                                  | 0.9 - 1.2 to Approx. 2.4* |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Without CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Check the voltage between ECM harness connector terminals under the following conditions.

|           | ECM             |               |  |                           |
|-----------|-----------------|---------------|--|---------------------------|
| Connector | +               | _             | Condition  | Voltage (V)               |
| Connector | Terminal        | Terminal      |  |                           |
|           |                 |               | Ignition switch ON (Engine stopped.)                             | Approx. 0.4               |
| F8        | 58<br>(MAF sen- | 56<br>(Sensor | Idle (Engine is warmed-up to normal operating temperature.)      | 0.9 - 1.2                 |
| FO        | sor signal)     | ground)       | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.6 - 1.9                 |
|           |                 |               | Idle to approximately 4,000 rpm                                  | 0.9 - 1.2 to Approx. 2.4* |

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Is the inspection result normal?

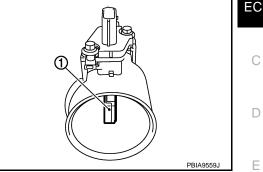
- YES >> INSPECTION END
- NO >> Clean or replace mass air flow sensor.

# P0112, P0113 IAT SENSOR

### Description

The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.

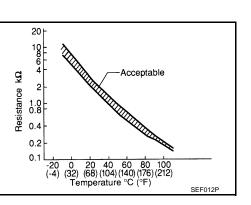
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



### <Reference data>

| Intake air temperature<br>[°C (°F)] | Voltage* (V) | Resistance (k $\Omega$ ) |
|-------------------------------------|--------------|--------------------------|
| 25 (77)                             | 3.3          | 1.800 - 2.200            |
| 80 (176)                            | 1.2          | 0.283 - 0.359            |

\*: These data are reference values and are measured between ECM terminals 50 (Intake air temperature sensor) and 56 (Sensor ground).



INFOID:000000003387964

# **DTC** Logic

DTC DETECTION LOGIC

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| DTC No. | Trouble diagnosis name                                   | DTC detecting condition                                     | Possible cause  |   |
|---------|--|---|---|---|
| P0112   | Intake air tempera-<br>ture sensor circuit<br>low input  | An excessively low voltage from the sensor is sent to ECM.  | <ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul> | K |
| P0113   | Intake air tempera-<br>ture sensor circuit<br>high input | An excessively high voltage from the sensor is sent to ECM. | Intake air temperature sensor   | L |

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-Ν ing the next test.

- Turn ignition switch OFF and wait at least 10 seconds. 1.
- Turn ignition switch ON. 2.
- Turn ignition switch OFF and wait at least 10 seconds. 3.

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 5 seconds.

### Check 1st trip DTC. 2.

Is 1st trip DTC detected?

YES >> Go to EC-168, "Diagnosis Procedure".

>> INSPECTION END NO

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INFOID:00000003387963

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# P0112, P0113 IAT SENSOR

### < COMPONENT DIAGNOSIS >

### Diagnosis Procedure

INFOID:000000003387965

### **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

# 2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.

2. Turn ignition switch ON.

3. Check the voltage between mass air flow sensor harness connector and ground.

| MAF       | sensor             | Ground | Voltage     |
|-----------|--------------------|--------|-------------|
| Connector | Connector Terminal |        | voltage     |
| F4        | 2                  | Ground | Approx. 5 V |

Is the inspection result normal?

YES >> GO TO 3.

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

 ${
m 3.}$  CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check harness continuity between mass air flow sensor harness connector and ECM harness connector.

| MAF       | MAF sensor |                    | ECM |            |
|-----------|------------|--------------------|-----|------------|
| Connector | Terminal   | Connector Terminal |     | Continuity |
| F4        | 1          | F8                 | 56  | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-168. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace mass air flow sensor (with intake air temperature sensor).

**5.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

### >> INSPECTION END

### **Component Inspection**

INFOID:000000003387966

# 1. CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.

3. Check resistance between mass air flow sensor terminals as per the following.

# P0112, P0113 IAT SENSOR

| COMPONEN   | IT DIAGNOSIS >                   | , -           | HIJIAT SENSOR                 | [VQ35DE] |
|------------|----------------------------------|---------------|-------------------------------|----------|
| Terminal   | Condition                        |               | Resistance (kΩ)               | ,        |
| 1 and 2    | Temperature [°C (°F)]            | 25 (77)       | 1.800 - 2.200                 |          |
| YES >> INS | n result normal?<br>SPECTION END |               |                               | E        |
| NO >> Re   | place mass air flow sei          | nsor (with in | take air temperature sensor). |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               | I        |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |
|            |                                  |               |                               |          |

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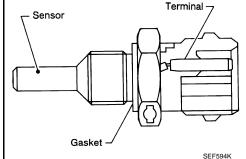
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# P0116 ECT SENSOR

# Description

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



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### <Reference data>

| Engine coolant temperature<br>[°C (°F)] | Voltage* (V) | Resistance ( $k\Omega$ ) |
|---|--------------|--------------------------|
| -10 (14)                                | 4.4          | 7.0 - 11.4               |
| 20 (68)                                 | 3.5          | 2.1 - 2.9                |
| 50 (122)                                | 2.2          | 0.68 - 1.00              |
| 90 (194)                                | 0.9          | 0.236 - 0.260            |

Cy 2 0.1 0.2 0.1 0.2 0.1 -20 0.2 0.1 -20 0.2 0.4 0.2 0.1 -20 0.20 40 60 80 100 -20 (-4) (32) (68) (104)(140)(176)(212) Temperature °C (°F) SEE012P

\*: These data are reference values and are measured between ECM terminals 46 (Engine coolant temperature sensor) and 52 (Sensor ground).

INFOID:000000003544736

# DTC Logic

### DTC DETECTION LOGIC

# NOTE:

If DTC P0116 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to <u>EC-172, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name  | DTC detecting condition   | Possible cause   |
|---------|---|---|--|
| P0116   | Engine coolant temper-<br>ature sensor circuit<br>range/performance | Engine coolant temperature signal from engine<br>coolant temperature sensor does not fluctuate,<br>even when some time has passed after starting<br>the engine with pre-warming up condition. | <ul> <li>Harness or connectors<br/>(High or low resistance in the circuit)</li> <li>Engine coolant temperature sensor</li> </ul> |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### **TEST CONDITION:**

### Before performing the following procedure, do not add fuel.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and warm it up to normal operating temperature.
- 2. Rev engine up to 2,000 rpm for more than 10 minutes.
- 3. Move the vehicle to a cool place, then stop engine and turn ignition switch OFF.

# EC-170

INFOID:000000003387967

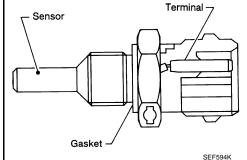
# P0116 ECT SENSOR

[VQ35DE1 < COMPONENT DIAGNOSIS > Check resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5. 4. Soak the vehicle until the resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5 5. А becomes 0.5 k $\Omega$  higher than the value measured before soaking. CAUTION: Never turn ignition switch ON during soaking. EC NOTE: Soak time changes depending on ambient air temperature. It may take several hours. 6. Start engine and let it idle for 5 minutes. 7. Check 1st trip DTC. Is 1st trip DTC detected? YES >> EC-171, "Diagnosis Procedure" >> INSPECTION END NO Diagnosis Procedure INFOID:000000003544737 Ε 1. CHECK GROUND CONNECTION Turn ignition switch OFF. 1. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". 2. Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace ground connection. 2.check engine coolant temperature sensor Refer to EC-171, "Component Inspection". Н Is the inspection result normal? YES >> GO TO 3. NO >> Replace engine coolant temperature sensor. **3.**CHECK INTERMITTENT INCIDENT Refer to GI-40, "Intermittent Incident". >> INSPECTION END Component Inspection INFOID:000000003387970 K 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR 1. Turn ignition switch OFF. 2. Disconnect engine coolant temperature sensor harness connector. Remove engine coolant temperature sensor. 3. Check resistance between engine coolant temperature sensor 4 M terminals as per the following. Resistance (kΩ) Terminals Condition Ν 20 (68) 2.1 - 2.91 and 2 Temperature [°C (°F)] 50 (122) 0.68 - 1.00 90 (194) 0.236 - 0.260 Is the inspection result normal? YES >> INSPECTION END JMBIA0080Z NO >> Replace engine coolant temperature sensor.

# P0117, P0118 ECT SENSOR

### Description

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



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### <Reference data>

| Engine coolant temperature<br>[°C (°F)] | Voltage* (V) | Resistance (kΩ) |
|---|--------------|-----------------|
| -10 (14)                                | 4.4          | 7.0 - 11.4      |
| 20 (68)                                 | 3.5          | 2.1 - 2.9       |
| 50 (122)                                | 2.2          | 0.68 - 1.00     |
| 90 (194)                                | 0.9          | 0.236 - 0.260   |

Cy 2 1.0 0.8 0.4 0.2 0.1 -20 0 20 40 60 80 100 (-4) (32) (68) (104) (140) (176) (212) Temperature °C (°F) SEE012P

\*: These data are reference values and are measured between ECM terminals 46 (Engine coolant temperature sensor) and 52 (Sensor ground).

# DTC Logic

INFOID:000000003387968

### DTC DETECTION LOGIC

| DTC No. | Trouble Diagnosis<br>Name                                      | DTC detecting condition                                     | Possible Cause   |
|---------|--|---|--|
| P0117   | Engine coolant tem-<br>perature sensor cir-<br>cuit low input  | An excessively low voltage from the sensor is sent to ECM.  | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li> </ul> |
| P0118   | Engine coolant tem-<br>perature sensor cir-<br>cuit high input | An excessively high voltage from the sensor is sent to ECM. | Engine coolant temperature sensor  |

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Check DTC.

### Is DTC detected?

- YES >> Go to EC-173, "Diagnosis Procedure".
- NO >> INSPECTION END

[VQ35DE]

# P0117, P0118 ECT SENSOR

|   |                                       | P0117, P01              | 18 ECT SEN         | SOR                             |                     |   |
|---|---------------------------------------|-------------------------|--------------------|---------------------------------|---------------------|---|
| < COMPONENT   | DIAGNOSIS >                           |                         |                    |                                 | [VQ35DE]            |   |
| Diagnosis Pro   | ocedure                               |                         |                    | INFO                            | DID:000000003387969 |   |
| 1.CHECK GRO   | UND CONNECT                           | ION                     |                    |                                 | A                   | Ł |
| 1. Turn ignition<br>2. Check arour                      |                                       | 8 Refer to Grour        | nd Inspection in ( | H-43, "Circuit Inspection".     | EC                  | C |
| Is the inspection                                       |                                       |                         |                    | <u>n-40, Oncon inspection</u> . |                     |   |
| YES >> GO   |                                       |                         |                    |                                 | С                   |   |
| · ·   | air or replace gro                    | und connection.         |                    |                                 | 0                   | , |
|   |                                       | mperature (ECT)         |                    | connector                       |                     |   |
| 2. Turn ignition  | switch ON.                            |                         |                    |                                 | D                   | , |
| 3. Check the vo   | oltage between E                      | CT sensor harne         | ess connector and  | d ground.                       | _                   | _ |
| ECT   | sensor                                |                         |                    |                                 | E                   | - |
| Connector   | Terminal                              | Ground                  | Voltage            |                                 |                     |   |
| F80   | 1                                     | Ground                  | Approx. 5 V        |                                 | F                   | 1 |
| Is the inspection<br>YES >> GO                          |                                       |                         |                    |                                 |                     |   |
|   |                                       | hort to ground or       | short to power ir  | harness or connectors.          | G                   | ì |
| 3. СНЕСК ЕСТ  | SENSOR GROL                           | IND CIRCUIT FO          | R OPEN AND S       | HORT                            |                     |   |
| 1. Turn ignition  |                                       |                         |                    |                                 | H                   |   |
|   | ECM harness con<br>continuity betweer |                         | ness connector a   | and ECM harness connector.      |                     |   |
|   | -                                     |                         |                    | _                               |                     |   |
| ECT sens  |                                       | ECM                     | Continuity         |                                 |                     |   |
| Connector<br>F80  |                                       | nector Termina<br>F8 52 | Existed            | -                               | J                   | J |
|   |                                       | to ground and sh        |                    | -                               |                     |   |
| Is the inspection                                       |                                       | 0                       | ·                  |                                 | K                   | ( |
| YES >> GO<br>NO >> Repa                                 |                                       | bort to around or       | short to power in  | harness or connectors.          | 1.                  | L |
| 4.CHECK ENG   | •                                     | •                       | •                  |                                 | 1                   |   |
| Refer to EC-173.  |                                       |                         |                    |                                 | L                   |   |
| Is the inspection                                       | result normal?                        |                         |                    |                                 | B. (                |   |
| YES >> GO<br>NO >> Repl                                 |                                       | ant temperature s       | ensor              |                                 | M                   | 1 |
| 5.CHECK INTE  |                                       |                         | Sensol.            |                                 |                     |   |
| Refer to <u>GI-40,</u> "                                |                                       |                         |                    |                                 | N                   |   |
|   |                                       |                         |                    |                                 |                     |   |
| _   | PECTION END                           |                         |                    |                                 | 0                   | ) |
| Component I   | nspection                             |                         |                    | INFO                            | DID:000000003625296 |   |
|   |                                       | EMPERATURE              | SENSOR             |                                 | P                   | ) |
| <ol> <li>Turn ignition</li> <li>Disconnect e</li> </ol> |                                       | mperature senso         | r harness conned   | ctor.                           |                     |   |

Disconnect engine coolant temperature sensor harness connector.
 Remove engine coolant temperature sensor.

# P0117, P0118 ECT SENSOR

### < COMPONENT DIAGNOSIS >

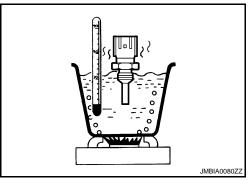
4. Check resistance between engine coolant temperature sensor terminals as per the following.

| Terminals | Condition             | Resistance (k $\Omega$ ) |               |
|-----------|-----------------------|--------------------------|---------------|
| 1 and 2   | Temperature [°C (°F)] | 20 (68)                  | 2.1 - 2.9     |
|           |                       | 50 (122)                 | 0.68 - 1.00   |
|           |                       | 90 (194)                 | 0.236 - 0.260 |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor.

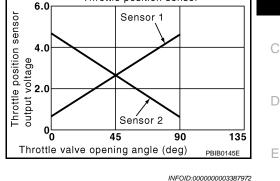


P0122, P0123 TP SENSOR

# Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has two sensors. These sensors are a kind of potentiometer which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.



Throttle position sensor

# DTC Logic

### DTC DETECTION LOGIC NOTE: If DTC P0122 or P0123 is displayed with DTC P0643 first perform

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                          | DTC detecting condition  | Possible cause   |
|---------|---|--|--|
| P0122   | Throttle position sensor<br>2 circuit low input | An excessively low voltage from the TP sensor 2 is sent to ECM.  | Harness or connectors     (TP sensor 2 circuit is open or shorted.)      |
| P0123   | Throttle position sensor 2 circuit high input   | An excessively high voltage from the TP sensor 2 is sent to ECM. | <ul> <li>Electric throttle control actuator<br/>(TP sensor 2)</li> </ul> |

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

### **TESTING CONDITION:**

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

| >> GO TO 2.   |                        | M |
|---|------------------------|---|
| 2. PERFORM DTC CONFIRMATION PROCEDURE   |                        |   |
| <ol> <li>Start engine and let it idle for 1 second.</li> <li>Check DTC.</li> </ol>  |                        | Ν |
| Is DTC detected?  |                        |   |
| YES >> Go to <u>EC-175, "Diagnosis Procedure"</u> .<br>NO >> INSPECTION END   |                        | 0 |
| Diagnosis Procedure   | INFOID:000000003387973 |   |
| 1. CHECK GROUND CONNECTION  |                        | Ρ |
| <ol> <li>Turn ignition switch OFF.</li> <li>Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.<br/><u>Is the inspection result normal?</u></li> </ol> |                        |   |

YES >> GO TO 2.

NO >> Repair or replace ground connection.

# EC-175

# [VQ35DE]

INFOID:00000000338797

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# P0122, P0123 TP SENSOR

### < COMPONENT DIAGNOSIS >

# **2.**CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

- 1. Disconnect electric throttle control actuator harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator |          | Ground | Voltage     |  |
|------------------------------------|----------|--------|-------------|--|
| Connector                          | Terminal | Ground | voltage     |  |
| F29                                | 1        | Ground | Approx. 5 V |  |

Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$  CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

| Electric throttle | control actuator | ECM                |    | Continuity |
|-------------------|------------------|--------------------|----|------------|
| Connector         | Terminal         | Connector Terminal |    | Continuity |
| F29               | 4                | F8                 | 36 | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

 ${f 4.}$  CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

 Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

| Electric throttle | control actuator | ECM       |          | Continuity |  |
|-------------------|------------------|-----------|----------|------------|--|
| Connector         | Terminal         | Connector | Terminal |            |  |
| F29               | 3                | F8        | 38       | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK THROTTLE POSITION SENSOR

Refer to EC-177, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.

2. Refer to EC-177, "Special Repair Requirement".

### >> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

|                        | NENT DIAGNOS                             | •                          | FUIZS IF SEI               | NOCK              |                  | [VQ35DE]               |
|------------------------|--|----------------------------|----------------------------|-------------------|------------------|------------------------|
| >>                     | INSPECTION E                             | ND                         |                            |                   |                  |                        |
| Compone                | ent Inspection                           |                            |                            |                   |                  | INFOID:000000003387974 |
|                        | THROTTLE POS                             | ITION SENSOR               |                            |                   |                  |                        |
|                        | nition switch OFF.                       |                            |                            |                   |                  |                        |
| 2. Reconr              | nect all harness co                      | onnectors disconr          | nected.<br>SED POSITION LE |                   | oial Danair Dag  | uiromont"              |
| I. Turn ig             | nition switch ON.                        |                            |                            | ARNING . Spe      | ciai Repair Req  | <u>uirement</u> .      |
| 5. Set sel<br>5. Check | ector lever to D po<br>the voltage betwe | osition.<br>en ECM harness | connector terminal         | s under the follo | owing condition  | S.                     |
|                        |  |                            |                            |                   | <u> </u>         | _                      |
|                        | ECM                                      |                            |                            |                   |                  |                        |
| Connector              | +<br>Torminal                            | -<br>To resided            | Condi                      | ion               | Voltage          |                        |
|                        | Terminal<br>37                           | Terminal                   |                            | Fully released    | More than 0.36 V | <del>,</del>           |
|                        | (TP sensor 1 sig-<br>nal)                | 22                         |                            | Fully depressed   |                  | _                      |
| F8                     | 38                                       | 36<br>(Sensor ground)      | Accelerator pedal          | Fully released    | Less than 4.75 V |                        |
|                        | (TP sensor 2 sig-<br>nal)                |                            |                            | Fully depressed   | More than 0.36 V | ,                      |
| s the inspe            | ection result norma                      | al?                        |                            |                   |                  | -                      |
| NO >>                  | INSPECTION EN<br>GO TO 2.                |                            |                            |                   |                  |                        |
|                        | CE ELECTRIC TH                           |                            | OL ACTUATOR                |                   |                  |                        |
|                        | e electric throttle<br>C-177, "Special F |                            | ent".                      |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |
| >>                     | INSPECTION E                             | ND                         |                            |                   |                  |                        |
| Special F              | Repair Require                           | ement                      |                            |                   |                  | INFOID:000000003387975 |
| .PERFO                 | RM THROTTLE V                            | ALVE CLOSED P              | OSITION LEARNI             | NG                |                  |                        |
| Refer to <u>EC</u>     | -17, "THROTTLE                           | VALVE CLOSED               | POSITION LEAR              | NING : Special    | Repair Requirer  | ment"                  |
|                        |  |                            |                            |                   |                  |                        |
| _                      | • GO TO 2.<br>RM IDLE AIR VOI            |                            | <b>、</b>                   |                   |                  |                        |
|                        |  |                            | NG : Special Repair        | Pequiromont"      |                  |                        |
|                        |  |                            |                            | Requirement       |                  |                        |
| >>                     | END                                      |                            |                            |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |
|                        |  |                            |                            |                   |                  |                        |

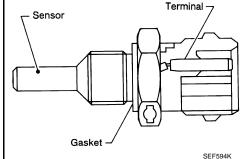
# P0122, P0123 TP SENSOR

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# P0125 ECT SENSOR

# Description

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



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### <Reference data>

| Engine coolant temperature<br>[°C (°F)] | Voltage* (V) | Resistance ( $k\Omega$ ) |
|---|--------------|--------------------------|
| -10 (14)                                | 4.4          | 7.0 - 11.4               |
| 20 (68)                                 | 3.5          | 2.1 - 2.9                |
| 50 (122)                                | 2.2          | 0.68 - 1.00              |
| 90 (194)                                | 0.9          | 0.236 - 0.260            |

Cy 2 1.0 1.0 0.4 0.2 0.1 -20 0 20 40 60 80 100 (-4) (32) (68) (104) (140) (176) (212) Temperature °C (°F) SEE012P

\*: These data are reference values and are measured between ECM terminals 46 (Engine coolant temperature sensor) and 52 (Sensor ground).

INFOID:000000003387977

# DTC Logic

# DTC DETECTION LOGIC **NOTE**:

- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to <u>EC-170, "DTC Logic"</u>.
- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to <u>EC-172, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause  |
|---------|--|---|---|
| P0125   | Insufficient engine cool-<br>ant temperature for<br>closed loop fuel control | <ul> <li>Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul> | <ul> <li>Harness or connectors<br/>(High resistance in the circuit)</li> <li>Engine coolant temperature sensor</li> <li>Thermostat</li> </ul> |

### DTC CONFIRMATION PROCEDURE

# **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

### With CONSULT-III

Turn ignition switch ON.

INFOID:000000003624712

# **P0125 ECT SENSOR**

| FUIZJ LOT SENSOR   |                        |
|--|------------------------|
| < COMPONENT DIAGNOSIS >  | [VQ35DE]               |
| <ol> <li>Select "DATA MONITOR" mode with CONSULT-III.</li> <li>Check that "COOLAN TEMP/S" is above 10°C (50°F).</li> </ol>   | A                      |
| With GST     Follow the procedure "With CONSULT-III" above.  |                        |
| Is the temperature above 10°C (50°F)?  | EQ                     |
| YES >> INSPECTION END  |                        |
| NO >> GO TO 3.   |                        |
| <b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE   | C                      |
| With CONSULT-III   |                        |
| <ol> <li>Start engine and run it for 65 minutes at idle speed.</li> <li>If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop end</li> </ol> | ngine because          |
| the test result will be OK.  | gine because           |
| CAUTION:<br>Never overheat engine.   | E                      |
| 2. Check 1st trip DTC.   | E                      |
| With GST   |                        |
| Follow the procedure "With CONSULT-III" above.<br>Is 1st trip DTC detected?  | F                      |
| YES >> EC-179, "Diagnosis Procedure"   |                        |
| NO >> INSPECTION END   | (                      |
| Diagnosis Procedure  | INFOID:000000003387978 |
| 1.CHECK GROUND CONNECTION  | ŀ                      |
| 1. Turn ignition switch OFF.   |                        |
| 2. Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u> .   | ſ                      |
| Is the inspection result normal?   | 1                      |
| YES >> GO TO 2.<br>NO >> Repair or replace ground connection.  |                        |
| 2. CHECK ENGINE COOLANT TEMPERATURE SENSOR   |                        |
| Refer to EC-179, "Component Inspection".   |                        |
| Is the inspection result normal?   | ŀ                      |
| YES >> GO TO 3.  |                        |
| NO >> Replace engine coolant temperature sensor.   | 1                      |
| 3.CHECK THERMOSTAT OPERATION   |                        |
| When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and c engine coolant does not flow.   |                        |
| Is the inspection result normal?   | N                      |
| YES >> GO TO 4.  |                        |
| NO >> Repair or replace thermostat. Refer to <u>CO-23, "Removal and Installation"</u> .  | Ν                      |
| 4.CHECK INTERMITTENT INCIDENT  |                        |
| Refer to <u>GI-40, "Intermittent Incident"</u> .   | C                      |
| >> INSPECTION END  |                        |
| Component Inspection   | INFOID:000000003591570 |
| 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR  |                        |
| 1. Turn ignition switch OFF.   |                        |

1. Turn ignition switch OFF.

Disconnect engine coolant temperature sensor harness connector.
 Remove engine coolant temperature sensor.

# **P0125 ECT SENSOR**

### < COMPONENT DIAGNOSIS >

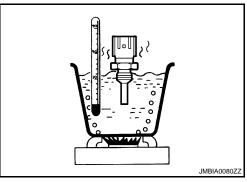
4. Check resistance between engine coolant temperature sensor terminals as per the following.

| Terminals | Condition             |          | Resistance (k $\Omega$ ) |
|-----------|-----------------------|----------|--------------------------|
| 1 and 2   | Temperature [°C (°F)] | 20 (68)  | 2.1 - 2.9                |
|           |                       | 50 (122) | 0.68 - 1.00              |
|           |                       | 90 (194) | 0.236 - 0.260            |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor.

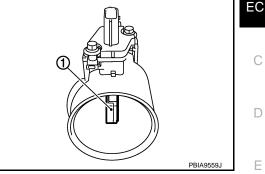


## P0127 IAT SENSOR

## Description

The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.

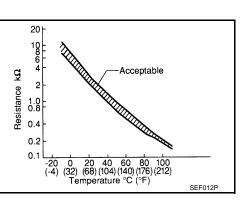
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



#### <Reference data>

| Intake air temperature<br>[°C (°F)] | Voltage* (V) | Resistance (k $\Omega$ ) |
|-------------------------------------|--------------|--------------------------|
| 25 (77)                             | 3.3          | 1.800 - 2.200            |
| 80 (176)                            | 1.2          | 0.283 - 0.359            |

\*: These data are reference values and are measured between ECM terminals 50 (Intake air temperature sensor) and 56 (Sensor ground).



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## DTC Logic

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name DTC detecting condition |   | Possible cause   |   |
|---------|--|---|--|---|
| P0127   | Intake air temperature<br>too high             | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Intake air temperature sensor</li> </ul> | K |

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

## With CONSULT-III

- 1. Wait until engine coolant temperature is less than 90°C (194°F)
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Check the engine coolant temperature.

# [VQ35DE]

INFOID:000000003591562

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## P0127 IAT SENSOR

#### < COMPONENT DIAGNOSIS >

 If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.

NOTE:

- Perform the following steps before engine coolant temperature is above 90°C (194°F).
- 2. Turn ignition switch ON.
- 3. Select "DATA MONITOR" mode with CONSULT-III.
- 4. Start engine.
- 5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds. CAUTION:

#### Always drive vehicle at a safe speed.

6. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to EC-182, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000003387982

[VQ35DE]

**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

## 2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-182, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace mass air flow sensor (with intake air temperature sensor).

**3.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

INFOID:000000003591563

## **1.**CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.

3. Check resistance between mass air flow sensor terminals as per the following.

| Terminal | Condition             | Resistance (k $\Omega$ ) |               |
|----------|-----------------------|--------------------------|---------------|
| 1 and 2  | Temperature [°C (°F)] | 25 (77)                  | 1.800 - 2.200 |

Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor).

## **P0128 THERMOSTAT FUNCTION**

< COMPONENT DIAGNOSIS >

## P0128 THERMOSTAT FUNCTION

## **DTC Logic**

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303, P0304, P0305 or P0306, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306. Refer to <u>EC-251,</u> <u>"DTC Logic"</u>.

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leakage in the seal or the thermostat being stuck open.

| DTC No. | Trouble diagnosis name | DTC detecting condition  | Possible cause  |   |
|---------|------------------------|--|---|---|
| P0128   | Thermostat function    | The engine coolant temperature does not reach<br>to specified temperature even though the en-<br>gine has run long enough. | <ul> <li>Thermostat</li> <li>Leakage from sealing portion of thermostat</li> <li>Engine coolant temperature sensor</li> </ul> | F |

# DTC CONFIRMATION PROCEDURE **NOTE**:

Check vehicle specifications and VIN, then select the procedure to be performed. (Refer to the table below.)

| Vehicle specification | Vehicle serial number   | TYPE |
|-----------------------|-------------------------|------|
|                       | Up to JN8AZ18U*9W100000 | A    |
| 2WD                   | From JN8AZ18U*9W100001  | В    |
| 2000                  | Up to JN8AZ18U*9W710000 | A    |
|                       | From JN8AZ18U*9W710001  | В    |
|                       | Up to JN8AZ18W*9W200000 | A    |
| 4WD                   | From JN8AZ18W*9W200001  | В    |
| 400                   | Up to JN8AZ18W*9W810000 | A    |
|                       | From JN8AZ18W*9W810001  | В    |

#### TYPE A

| 1.PRECONDITIONING |
|-------------------|
|-------------------|

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of −10°C (14°F) to 56°C (133°F).
- Before performing the following procedure, do not add fuel.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Turn A/C switch OFF.
- 2. Turn blower fan switch OFF.
- 3. Turn ignition switch ON.
- 4. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
- 5. Check the indication of "COOLAN TEMP/S" If it is below 56°C (133°F), go to next step.

## EC-183

#### 2009 Murano

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## **P0128 THERMOSTAT FUNCTION**

#### < COMPONENT DIAGNOSIS >

If it is above 56°C (133°F), cool down the engine to less than 56°C (133°F). Then go to next steps.

- 6. Start engine.
- Wait at idle for at least 30 minutes.
   If "COOLAN TEMP/S" increases to more than 75°C (167°F) within 30 minutes, turn ignition switch OFF because the test result will be OK.
- 8. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to EC-184, "Diagnosis Procedure".

NO >> INSPECTION END

TYPE B

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 56°C (133°F).
- Before performing the following procedure, do not add fuel.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Turn A/C switch OFF.
- 2. Turn blower fan switch OFF.
- 3. Turn ignition switch ON.
- 4. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
- Check the indication of "COOLAN TEMP/S" If it is below 56°C (133°F), go to next step. If it is above 56°C (133°F), cool down the engine to less than 56°C (133°F). Then go to next steps.
- 6. Start engine.
- 7. Drive vehicle for 10 consecutive minutes under the following conditions.

#### **CAUTION:**

## Always drive vehicle at a safe speed.

NOTÉ:

If "COOLAN TEMP/S" increases to more than 75°C (167°F) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT-III" above.

#### Is 1st trip DTC detected?

- YES >> Go to EC-184, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

## **1.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-185, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

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## **P0128 THERMOSTAT FUNCTION**

#### < COMPONENT DIAGNOSIS >

NO >> Replace engine coolant temperature sensor.

## 2. CHECK THERMOSTAT

#### Check thermostat. Refer to CO-23, "Removal and Installation".

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace thermostat.

#### Component Inspection

## $1. {\sf CHECK} \ {\sf ENGINE} \ {\sf COOLANT} \ {\sf TEMPERATURE} \ {\sf SENSOR}$

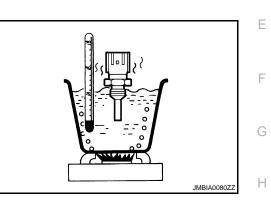
- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor.
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

| Terminals | Condition             | Resistance (k $\Omega$ ) |               |
|-----------|-----------------------|--------------------------|---------------|
| 1 and 2   | Temperature [°C (°F)] | 20 (68)                  | 2.1 - 2.9     |
|           |                       | 50 (122)                 | 0.68 - 1.00   |
|           |                       | 90 (194)                 | 0.236 - 0.260 |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor.



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## P0130, P0150 A/F SENSOR 1

## Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the

lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

## DTC Logic

#### DTC DETECTION LOGIC

To judge malfunctions, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal fluctuates according to fuel feedback control.

| DTC No.                         | Trouble diagnosis name              |    | DTC detecting condition  | Possible cause   |
|---------------------------------|-------------------------------------|----|--|--|
| P0130 Air fuel ra<br>(bank 1) d | Air fuel ratio (A/F) sensor 1       | A) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V. | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 circuit is open<br/>or shorted.)</li> </ul> |
|                                 |                                     | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.                       | A/F sensor 1   |
| P0150                           | P0150 Air fuel ratio (A/F) sensor 1 |    | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V. | <ul> <li>Harness or connectors<br/>(The A/F sensor 1 circuit is open<br/>or shorted.)</li> </ul> |
|                                 | (bank 2) circuit                    | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.                       | <ul> <li>A/F sensor 1</li> </ul>   |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

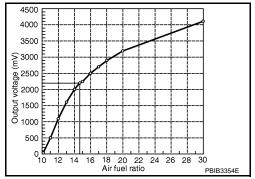
- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

# Protector Holder

Zirconia element



INFOID:00000003387988

## P0130, P0150 A/F SENSOR 1

|   | FUISU, FUISU AF SENSOR I  |    |
|---|---|----|
| < COMPONENT DIAGNO  | SIS > [VQ35D  | =] |
| 2.PERFORM DTC CONFI   | RMATION PROCEDURE FOR MALFUNCTION A   |    |
| <ol> <li>Start engine and warm</li> <li>Let engine idle for 2 mi</li> </ol> | it up to normal operating temperature.  |    |
| 3. Check 1st trip DTC.  |   |    |
| <u>Is 1st trip DTC detected?</u><br>YES >> Go to EC-188.                    | "Diagnosis Procedure".  |    |
| NO-1 >> With CONSUL   |   |    |
| NO-2 >> With GST: GO  | TO 7.   |    |
| 3.CHECK AIR FUEL RATI   | IO (A/F) SENSOR 1 FUNCTION  |    |
| <ol> <li>Select "Ă/F SEN1 (B1)"</li> </ol>                                  | it up to normal operating temperature.<br>" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-III.<br>" or "A/F SEN1 (B2)" indication. |    |
| Does the indication fluctuat  | e around 2.2 V?   |    |
| YES >> GO TO 4.   |   |    |
| 4   | "Diagnosis Procedure".  |    |
|   | RMATION PROCEDURE FOR MALFUNCTION B-I   |    |
|   | ) P1276" (for DTC P0130) or "A/F SEN1 (B2) P1286" (for DTC P0150) of "A   | /F |
| 2. Touch "START".   | SUPPORT" mode with CONSULT-III.   |    |
|   | nditions are met, "TESTING" will be displayed on the CONSULT-III screen.  |    |
| -   |   |    |
| ENG SPEED   | 1,000 - 3,200 rpm   |    |
| VHCL SPEED SE   | More than 64 km/h (40 mph)  |    |
| B/FUEL SCHDL  | 1.0 - 8.0 msec  |    |
| Selector lever  | D position  |    |
|   | isplayed after 20 seconds, retry from step 2.   |    |
| CAUTION:<br>Always drive vehicle  | at a safe sneed   |    |
| s "TESTING" displayed on  | •   |    |
| YES >> GO TO 5.   |   |    |
|   | sor 1 function again. GO TO 3.  |    |
| D.PERFORM DTC CONFI   | RMATION PROCEDURE FOR MALFUNCTION B-II  |    |
| Release accelerator pedal   | fully.  |    |
| NOTE:   |   |    |
|   | leasing the accelerator pedal.  |    |
| Which does "TESTING" ch   |   |    |
| COMPLETED>>GO TO 6<br>OUT OF CONDITION>>R                                   | etry DTC CONFIRMATION PROCEDURE. GO TO 4.   |    |
| •   | RMATION PROCEDURE FOR MALFUNCTION B-III   |    |
|   |   |    |
| Touch "SELF-DIAG RESUL<br>Which is displayed on CON                         |   |    |
| OK >> INSPECTION  |   |    |
|   | "Diagnosis Procedure".  |    |
|   | NT FUNCTION CHECK FOR MALFUNCTION B   |    |
|   | n check. Refer to EC-188, "Component Function Check".   |    |
| NOTE:   | Teneok. Refer to <u>EO-100, Component l'unction Officek</u> .   |    |
| Use component function cl   | neck to check the overall function of the A/F sensor 1 circuit. During this check   | а  |

Use component function check to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

## P0130, P0150 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

#### NO >> Go to <u>EC-188</u>, "Diagnosis Procedure".

## Component Function Check

## 1.PERFORM COMPONENT FUNCTION CHECK

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
- 3. Shift the selector lever to the D position, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

#### CAUTION:

# Always drive vehicle at a safe speed. NOTE:

Never apply brake when releasing the accelerator pedal.

- 4. Repeat steps 2 and 3 for 5 times.
- 5. Stop the vehicle and turn ignition switch OFF.
- 6. Wait at least 10 seconds and restart engine.
- 7. Repeat steps 2 and 3 for 5 times.
- 8. Stop the vehicle.
- 9. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-188, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

#### **1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

## 2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- 1. Disconnect A/F sensor 1 harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between A/F sensor 1 harness connector and ground.

| DTC   |      | A/F sensor 1 | Ground   | Voltage |                 |  |
|-------|------|--------------|----------|---------|-----------------|--|
| DIC   | Bank | Connector    | Terminal | Oround  | voltage         |  |
| P0130 | 1    | F27          | 4        | Ground  | Battery voltage |  |
| P0150 | 2    | F64          | 4        | Giodila |                 |  |

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

#### Check the following.

- IPDM E/R harness connector F12
- 15 A fuse (No. 46)

1.

Harness for open or short between A/F sensor 1 and IPDM E/R

>> Repair or replace harness or connectors.

## **4.**CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

2. Disconnect ECM harness connector.

Turn ignition switch OFF.

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## P0130, P0150 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

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3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC    | A/F sensor 1 |            |          | E         | Continuity |            |         |
|--------|--------------|------------|----------|-----------|------------|------------|---------|
| DIC    | Bank         |            | Terminal | Connector | Terminal   | Continuity |         |
| P0130  |              | 0130 1 F27 | E27      | 1         |            | 45         | Existed |
| F 0130 |              |            | 1 121    | 2         | F8         | 49         |         |
| P0150  |              | F64        | 1        | 10        | 53         | LAISIEU    |         |
| F0150  |              | F04        | 2        |           | 57         |            |         |

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

|   | DTC   |      | A/F sensor 1 | Ground | Continuity |             |
|---|-------|------|--------------|--------|------------|-------------|
|   | DIC   | Bank | Connector    |        |            |             |
| - | P0130 | 1    | F27          | 1      |            | Not existed |
|   | 10130 | I    | 121          | 2      | Ground     |             |
| - | P0150 | 2    | F64          | 1      | Giouna     |             |
|   | F0150 | 2    | F04          | 2      | •          |             |

| DTC   | ECM       |          | Ground Continuity |             |
|-------|-----------|----------|-------------------|-------------|
| DIC   | Connector | Terminal | Ground            | Continuity  |
| P0130 |           | 45       | 0                 | Not existed |
| P0130 | Го        | 49       |                   |             |
| D0150 | F8        | 53       | Ground            |             |
| P0150 |           | 57       |                   |             |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK INTERMITTENT INCIDENT

Perform GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

**O**.REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. CAUTION:

• Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

• Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

Ρ

## P0131, P0151 A/F SENSOR 1

## Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the

lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current

relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

## **DTC** Logic

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

| DTC No. | Trouble diagnosis name  | DTC detecting condition  | Possible cause   |
|---------|---|--|--|
| P0131   | Air fuel ratio (A/F) sensor 1<br>(bank 1) circuit low voltage | • The A/F signal computed by ECM from the A/<br>F sensor 1 signal is constantly approx. 0 V. | Harness or connectors     (The A/F sensor 1 circuit is open or |
| P0151   | Air fuel ratio (A/F) sensor 1<br>(bank 2) circuit low voltage |  | shorted.)<br>• A/F sensor 1                                    |

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

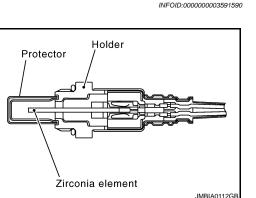
>> GO TO 2.

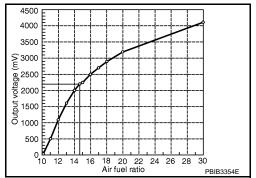
2.CHECK A/F SENSOR 1 FUNCTION

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

## EC-190





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[VQ35DE]

|                                  |                          |                            | P013           | 31, P015         | 51 A/F SENS       | OR 1                                      |    |
|----------------------------------|--------------------------|----------------------------|----------------|------------------|-------------------|---|----|
| < COMPC                          | NENT DI                  | AGNOSIS                    |                | ,                |                   | [VQ35DE]                                  |    |
| G     With G                     |                          |                            |                |                  |                   |   |    |
|                                  | •                        | e "With CO                 |                | " above.         |                   |   | А  |
|                                  |                          | stantly app<br>C-191, "Dia |                | ocedure"         |                   |   |    |
|                                  | > GO TO                  |                            |                | <u>ocedure</u> . |                   |   | EC |
| 3.PERFC                          | ORM DTC                  | CONFIRM                    | ATION PR       | OCEDUR           | E                 |   |    |
| With Co                          |                          |                            |                |                  |                   |   | С  |
|                                  | gnition sw<br>gnition sw | itch OFF, w                | ait at leas    | t 10 secon       | ids.              |   |    |
|                                  |                          |                            | ait at leas    | t 10 secon       | ids and then rest | art engine.                               | _  |
| 4. Drive                         |                          | erate vehic                | le to more     | than 40 k        | m/h (25 MPH) wi   | thin 20 seconds after restarting engine.  | D  |
|                                  | -                        | ehicle at a                | safe spe       | ed.              |                   |   |    |
| 5. Maint                         | ain the foll             | owing cond                 | ditions for    | approxima        | tely 20 consecut  | ive seconds.                              | Е  |
| ENG SPEE                         | -D                       | 1 (                        | )00 - 3,200 r  | nm               |                   | -   |    |
| VHCL SPE                         |                          |                            |                | m/h (25 mph      | )                 | _   | F  |
| B/FUEL SC                        |                          |                            | 5 - 9.0 msec   | anin (20 mph     | )                 | -   |    |
| Selector le                      |                          |                            | itable positic | on               |                   | _   |    |
| NOTE                             |                          |                            |                |                  |                   | -   | G  |
| • Kee                            | p the acc                |                            |                |                  | ossible during o  |   |    |
| • If th<br>1.                    | is proced                | lure is not                | complete       | d within 1       | minute after re   | starting engine at step 1, return to step | Н  |
| ••                               | < 1st trip D             | TC.                        |                |                  |                   |   |    |
| With G                           |                          | «M// 00                    |                |                  |                   |   |    |
| Follow the<br><u>Is 1st trip</u> | •                        | e "With CO                 | NSULI-III      | " above.         |                   |   | I  |
| •                                |                          | <u>C-191, "Dia</u>         | anosis Pr      | ocedure"         |                   |   |    |
|                                  |                          | CTION END                  |                |                  |                   |   | J  |
| Diagnos                          | sis Proce                | edure                      |                |                  |                   | INFOID:000000003387993                    |    |
| 4                                |                          |                            |                |                  |                   |   | Κ  |
|                                  |                          |                            | JION           |                  |                   |   |    |
|                                  | gnition sw<br>< around c |                            | E38. Refe      | r to Ground      | d Inspection in G | I-43, "Circuit Inspection".               | I  |
|                                  |                          | ult normal?                |                |                  |                   |   |    |
|                                  | > GO TO                  |                            |                |                  |                   |   |    |
| -                                | •                        | or replace g               |                |                  |                   |   | M  |
|                                  |                          |                            |                |                  | WER SUPPLY C      |   |    |
|                                  | nnect A/F<br>gnition sw  | sensor 1 h                 | arness co      | nnector.         |                   |   | Ν  |
|                                  |                          |                            | n A/F sens     | or 1 harne       | ess connector and | d ground.                                 |    |
|                                  | ·                        |                            |                |                  |                   |   | ~  |
| DTC                              |                          | A/F sensor 1               |                | Ground           | Voltage           |   | 0  |
|                                  | Bank                     | Connector                  | Terminal       | 5.00110          |                   |   |    |
| P0131                            | 1                        | F27                        | 4              | Ground           | Battery voltage   |   | Ρ  |
| P0151                            | 2                        | F64                        | 4              |                  |                   |   |    |

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

Check the following.

## P0131, P0151 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

• IPDM E/R harness connector F12

• 15 A fuse (No. 46)

• Harness for open or short between A/F sensor 1 and IPDM E/R

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC   | A/F sensor 1 |                    |          | EC        | Continuity |            |
|-------|--------------|--------------------|----------|-----------|------------|------------|
| DIC   | Bank         | Connector          | Terminal | Connector | Terminal   | Continuity |
| P0131 | 1            | 1 F27 -<br>2 F64 - | 1        | F8        | 45         | Existed    |
| FUISI | I            |                    | 2        |           | 49         |            |
| P0151 | C            |                    | 1        |           | 53         |            |
| FUIDI | Z            |                    | 2        |           | 57         |            |

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

| DTC   |       | A/F sensor 1 | Ground   | Continuity |             |
|-------|-------|--------------|----------|------------|-------------|
| DIC   | Bank  | Connector    | Terminal | Ground     | Continuity  |
| P0131 | 1     | F27          | 1        | - Ground   | Not existed |
| FUISI | 1     | Γ21          | 2        |            |             |
| P0151 | 2     | F0.4         | 1        |            |             |
| PUISI | 2 F64 |              | 2        |            |             |

| DTC   | EC                 | CM | Ground | Continuity  |  |
|-------|--------------------|----|--------|-------------|--|
| DIC   | Connector Terminal |    | Ground | Continuity  |  |
| P0131 |                    | 45 |        |             |  |
| FUISI | F8                 | 49 | Ground | Not existed |  |
| P0151 | 10                 | 53 | Gibunu |             |  |
| FUISI |                    | 57 |        |             |  |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK INTERMITTENT INCIDENT

Perform GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

 $\mathbf{6}.$ REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. **CAUTION:** 

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

| >> INSPECTION EI | ٧D |
|------------------|----|
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## P0132, P0152 A/F SENSOR 1

## Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the

lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

## **DTC Logic**

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

| DTC No. | Trouble diagnosis name   | DTC detecting condition                       | Possible cause   |
|---------|--|---|--|
| P0132   | Air fuel ratio (A/F) sensor 1<br>(bank 1) circuit high voltage | • The A/F signal computed by ECM from the A/F | Harness or connectors     (The A/F sensor 1 circuit is open or |
| P0152   | Air fuel ratio (A/F) sensor 1<br>(bank 2) circuit high voltage | sensor 1 signal is constantly approx. 5 V.    | shorted.)<br>• A/F sensor 1                                    |

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always preform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

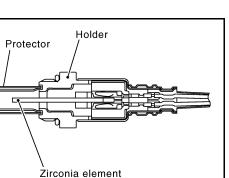
>> GO TO 2.

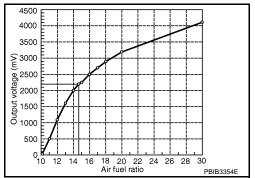
2.CHECK A/F SENSOR 1 FUNCTION

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

## EC-194





#### INFOID:000000003591591

JMBIA0112GE

INFOID:00000003387995

## P0132, P0152 A/F SENSOR 1

|   |   |                             | P013           | 32, P015          | 2 A/F SENS                          | OR 1   |       |  |
|---|---|-----------------------------|----------------|-------------------|-------------------------------------|--|-------|--|
| < COMPC   | NENT DI   | AGNOSIS                     | 5 >            |                   |                                     | [VQ35DE]   |       |  |
|   | ST  |                             |                |                   |                                     |  |       |  |
|   | •   | e "With CO                  |                | " above.          |                                     |  | А     |  |
| <u>Is the indication constantly approx. 5 V?</u><br>YES >> Go to <u>EC-195, "Diagnosis Procedure"</u> . |   |                             |                |                   |                                     |  |       |  |
|   |   |                             | agnosis Pr     | <u>ocedure"</u> . |                                     |  | EC    |  |
|   |   | confirm                     | ATION PR       |                   | F                                   |  |       |  |
| (P)With C   |   |                             |                | 0022011           | -                                   |  |       |  |
|   |   | itch OFF a                  | nd wait at     | least 10 se       | econds.                             |  | С     |  |
|   | gnition swi   |                             |                |                   |                                     |  |       |  |
|   |   |                             |                |                   | ds and then rest<br>m/h (25 MPH) wi | art engine.<br>ithin 20 seconds after restarting engine. | D     |  |
| CAUT  | ION:  |                             |                |                   |                                     |  |       |  |
|   |   | ehicle at a                 |                |                   | taly 20 appagat                     | ivo occordo  | _     |  |
| 5. Mainta   |   | owing cond                  |                | арргохітіа        | tely 20 consecut                    | ive seconds.   | E     |  |
| ENG SPEE  | D   | 1,0                         | 000 - 3,200 rj | om                |                                     | -  |       |  |
| VHCL SPE  | ED SE   |                             | -              | m/h (25 mph       | )                                   | _  | F     |  |
| B/FUEL SC   | CHDL  |                             | 5 - 9.0 msec   |                   | ,                                   | _  |       |  |
| Selector lev  | ver   | Su                          | itable positio | n                 |                                     | -  | 0     |  |
| NOTE  | :   |                             |                |                   |                                     | -  | G     |  |
|   |   |                             |                |                   | ossible during o                    |  |       |  |
| • If th<br>1.   | is proced   | ure is not                  | complete       | d within 1        | minute after re                     | starting engine at step 1, return to step                | Н     |  |
|   | < 1st trip D  | TC.                         |                |                   |                                     |  |       |  |
| With G  |   |                             |                |                   |                                     |  |       |  |
|   | •   | e "With CO                  | NSULI-III      | " above.          |                                     |  | I     |  |
| <u>ls 1st trip</u><br>YES >   |   | <u>ceu r</u><br>C-195, "Dia | annosis Pr     | ocedure"          |                                     |  |       |  |
|   |   | TION END                    |                | <u>ocedure</u> .  |                                     |  | J     |  |
| Diagnos   | is Proce  | edure                       |                |                   |                                     | INFOID:000000003387996                                   |       |  |
| 4   |   |                             |                |                   |                                     | IN 012.00000003.07350                                    | K     |  |
| 1.CHEC  | K GROUN   |                             | CTION          |                   |                                     |  | rx    |  |
|   | gnition swi   |                             |                | _                 | _                                   |  |       |  |
|   | •   |                             |                | r to Ground       | d Inspection in <u>G</u>            | I-43, "Circuit Inspection".                              | L     |  |
|   | SOCION SECTION SECT | ult normal?                 | 2              |                   |                                     |  |       |  |
|   |   | ∠.<br>or replace o          | around cor     | nection.          |                                     |  | M     |  |
| •   | •   |                             | -              |                   | NER SUPPLY C                        | IRCUIT   | 1 V I |  |
| -   |   | sensor 1 h                  |                |                   |                                     |  |       |  |
|   | gnition swi   |                             |                | meetor.           |                                     |  | Ν     |  |
| 3. Check  | the voltag  | ge betweer                  | n A/F sens     | or 1 harne        | ss connector an                     | d ground.  |       |  |
|   |   |                             |                |                   | 1                                   |  | 0     |  |
| DTC   |   | A/F sensor 1                |                | Ground            | Voltage                             |  | 0     |  |
|   | Bank  | Connector                   | Terminal       |                   |                                     |  |       |  |
| P0132   | 1   | F27                         | 4              | Ground            | Battery voltage                     |  | Ρ     |  |
| P0152   | 2   | F64                         | 4              |                   |                                     |  |       |  |

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

Check the following.

## P0132, P0152 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

• 15 A fuse (No. 46)

Harness for open or short between A/F sensor 1 and IPDM E/R

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC   |       | A/F sensor 1 |          | E               | Continuity |            |  |
|-------|-------|--------------|----------|-----------------|------------|------------|--|
| ыс    | Bank  | Connector    | Terminal | Connector Termi |            | Continuity |  |
| P0132 | 1     | F27          | 1        | F8              | 45         | Existed    |  |
| F0132 | I     |              | 2        |                 | 49         |            |  |
| P0152 | 2     | F64          | 1        |                 | 53         |            |  |
| F0152 | 2 F04 | 2            |          | 57              | 1          |            |  |

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

| DTC   |       | A/F sensor 1 | Ground   | Continuity |             |
|-------|-------|--------------|----------|------------|-------------|
| DIC   | Bank  | Connector    | Terminal | Ground     | Continuity  |
| P0132 | 1     | F27          | 1        | - Ground   | Not existed |
| F0132 | I     | Γ21          | 2        |            |             |
| P0152 | 2 F64 | 504          | 1        |            |             |
| FU152 |       | 2            |          |            |             |

| DTC   | EC              | CM | Ground | Continuity  |  |
|-------|-----------------|----|--------|-------------|--|
| DIC   | Connector Termi |    | Ground | Continuity  |  |
| P0132 |                 | 45 | Ground | Not existed |  |
| F0132 | F8              | 49 |        |             |  |
| P0152 | ГО              | 53 |        |             |  |
|       |                 | 57 |        |             |  |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK INTERMITTENT INCIDENT

Perform GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

 $\mathbf{6}.$ REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. **CAUTION:** 

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

| A | ł |  |
|---|---|--|
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|   |   |  |

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## P0133, P0153 A/F SENSOR 1

## Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the

lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

## **DTC Logic**

#### DTC DETECTION LOGIC

To judge the malfunction of A/F sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the A/F sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the A/F sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause  |
|---------|--|---|---|
| P0133   | Air fuel ratio (A/F) sensor 1<br>(bank 1) circuit slow re-<br>sponse |   | Harness or connectors<br>(The A/F sensor 1 circuit is open or<br>shorted.)  |
| P0153   | Air fuel ratio (A/F) sensor 1<br>(bank 2) circuit slow re-<br>sponse | <ul> <li>The response of the A/F signal computed by<br/>ECM from A/F sensor 1 signal takes more than<br/>the specified time.</li> </ul> | <ul> <li>A/F sensor 1</li> <li>A/F sensor 1 heater</li> <li>Fuel pressure</li> <li>Fuel injector</li> <li>Intake air leakage</li> <li>Exhaust gas leakage</li> <li>PCV</li> <li>Mass air flow sensor</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

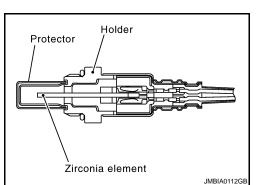
- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

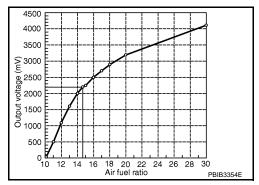
#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle. <u>Will CONSULT-III be used?</u>

## EC-198

#### 2009 Murano





INFOID:000000003387998

INFOID:000000003591592

| P0133, P0153 A/F SENSOR 1  |    |
|--|----|
| < COMPONENT DIAGNOSIS > [VQ35DE]<br>YES >> GO TO 2.  |    |
| NO >> GO TO 5.   | А  |
| 2.PERFORM DTC CONFIRMATION PROCEDURE-I   |    |
| <ul> <li>With CONSULT-III</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ul>   | EC |
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1minute under no load.</li> <li>Let engine idle for 1 minute.</li> </ol>  | С  |
| <ol> <li>Select "A/F SEN1(B1) P1278/P1279" (for DTC P0133) or "A/F SEN1(B2) P1288/P1289" (for DTC P0153) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.</li> <li>Touch "START".</li> </ol>   | D  |
| Is COMPLETED displayed?<br>YES >> GO TO 3.<br>NO >> GO TO 4.   | E  |
| 3.PERFORM DTC CONFIRMATION PROCEDURE-II  | F  |
| Check that "OK" is displayed after touching "SELF-DIAG RESULT".<br>Is OK displayed?  | I  |
| YES >> INSPECTION END<br>NO >> Go to <u>EC-200, "Diagnosis Procedure"</u> .  | G  |
| 4.PERFORM DTC CONFIRMATION PROCEDURE-III   | Н  |
| <ol> <li>After perform the following procedure, "TESTING" will be displayed on the CONSULT-III screen.</li> <li>Increase the engine speed up to between 4,000 and 5,000 rpm and maintain that speed for 10 seconds.</li> <li>Fully release accelerator pedal and then let engine idle for approximately 10 seconds.</li> <li>If "TESTING" is not displayed after 10 seconds, go to <u>EC-127</u>, "Component Function Check".</li> <li>Wait for approximately 20 seconds idle under the condition that "TESTING" is displayed on the CON-</li> </ol> |    |
| <ul> <li>SULT-III screen.</li> <li>Check that "TESTING" changes to "COMPLETED".</li> <li>If "TESTING" changed to "OUT OF CONDITION", go to <u>EC-127, "Component Function Check"</u>.</li> <li>Check that "OK" is displayed after touching "SELF-DIAG RESULT".</li> </ul>  | J  |
| Is OK displayed?   | K  |
| YES >> INSPECTION END<br>NO >> Go to <u>EC-200, "Diagnosis Procedure"</u> .  |    |
| 5. CHECK MIXTURE RATIO SELF-LEARNING VALUE   | L  |
| <ul> <li>With GST</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Select Service \$01 with GST.</li> </ul>  | M  |
| 3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.  |    |
| <u>Is the total percentage within ±15%?</u><br>YES >> GO TO 7.   | Ν  |
| NO >> GO TO 6.<br>6.DETECT MALFUNCTIONING PART   |    |
|  | 0  |
| Check the following.     Intake air leakage  |    |
| <ul> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> </ul>   | Ρ  |
| <ul> <li>Lack of fuel</li> <li>Fuel injector</li> </ul>  |    |
| Incorrect PCV hose connection  |    |

• Mass air flow sensor

## P0133, P0153 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

>> Repair or replace malfunctioning part.

**7.**PERFORM DTC CONFIRMATION PROCEDURE-IV

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Increase the engine speed up to between 4,000 and 5,000 rpm and maintain that speed for 10 seconds.
- 7. Fully release accelerator pedal and then let engine idle for approximately 1 minute.
- 8. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-200, "Diagnosis Procedure".
- NO >> INSPECTION END

**Diagnosis Procedure** 

INFOID:000000003387999

## **1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43. "Circuit Inspection".

Is the inspection result normal?

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

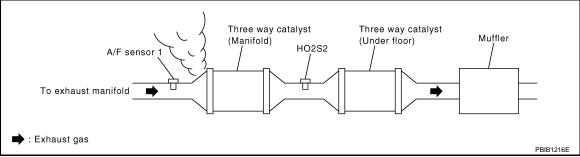
2.RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to EM-34, "Removal and Installation".

>> GO TO 3.

## 3.check exhaust gas leakage

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before three way catalyst (manifold).



#### Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 4.

#### **4.**CHECK FOR INTAKE AIR LEAKAGE

Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 5.

**5.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- Clear the mixture ratio self-learning value. Refer to <u>EC-19</u>, "MIXTURE RATIO SELF-LEARNING VALUE <u>CLEAR : Special Repair Requirement"</u>.
- 2. Run engine for at least 10 minutes at idle speed.
- 3. Check 1st trip DTC.
- Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

## EC-200

## P0133, P0153 A/F SENSOR 1

| < COMPO                                     |                              | AGNOSIS >                            |               | , P0153    | BA/FSENS            | OR 1<br>[VQ35I                             | DE]    |
|---|------------------------------|--------------------------------------|---------------|------------|---------------------|--|--------|
|   | > Perform                    | trouble diag                         | nosis for D   | TC P017    | 1, P0174 or P01     | 72, P0175. Refer to <u>EC-226, "DTC Lo</u> | gic"   |
| NO >:                                       | or <u>EC-23</u><br>> GO TO 6 | <u>31, "DTC Lo</u><br>3              | <u>gic"</u> . |            |                     |  | А      |
| ~   |                              |                                      | /F) SENSO     | R 1 POW    | ER SUPPLY CI        | IRCUIT                                     |        |
|   | nition swit                  |                                      | ,             |            |                     |  | EC     |
| 2. Discor                                   |                              | sensor 1 ha                          | rness conn    | ector.     |                     |  |        |
|   |                              |                                      | A/F sensor    | 1 harnes   | s connector and     | d ground.                                  | С      |
|   |                              | A / E                                |               |            |                     |  |        |
| DTC   | Bank                         | A/F sensor 1<br>Connector            | Terminal      | Ground     | Voltage             |  | D      |
| P0133                                       | 1                            | F27                                  | 4             |            |                     |  |        |
| P0153                                       | 2                            | F64                                  | 4             | Ground     | Battery voltage     |  | E      |
| Is the inspe                                | ection resu                  | ult normal?                          |               |            |                     |  |        |
| -   | > GO TO 8<br>> GO TO 7       |                                      |               |            |                     |  | _      |
| _   |                              |                                      |               |            |                     |  | F      |
| Check the                                   |                              |                                      |               |            |                     |  |        |
| <ul> <li>IPDM E/I</li> </ul>                | R harness                    | connector F                          | -12           |            |                     |  | G      |
| <ul><li>15 A fuse</li><li>Harness</li></ul> |                              | or short betw                        | veen A/F se   | ensor 1 ar | nd IPDM E/R         |  |        |
|   | ·                            |                                      |               |            |                     |  | Н      |
| ~   | -                            | r replace ha                         |               |            |                     |  |        |
|   |                              |                                      | JT SIGNAL     | . CIRCUIT  | FOR OPEN A          | ND SHORT                                   |        |
|   | nition swit                  | tch OFF.<br>I harness co             | onnector      |            |                     |  |        |
|   |                              |                                      |               | or 1 harn  | ess connector a     | and ECM harness connector.                 | J      |
|   |                              | ۸ / <b>۲</b>                         | 4             |            | 5014                |  |        |
| DTC   | Bank                         | A/F sensor <sup>2</sup><br>Connector |               | Connect    | ECM<br>tor Terminal | Continuity                                 | K      |
|   |                              |                                      | 1             | Connoon    | 45                  |  |        |
| P0133                                       | 1                            | F27                                  | 2             |            | 49                  | -<br>Futeto d                              |        |
| P0153                                       | 2                            | F64                                  | 1             | – F8       | 53                  | - Existed                                  | L      |
|   |                              |                                      | 2             |            | 57                  | -  |        |
| 4. Check ground                             |                              | nuity betwee                         | en A/F sen    | sor 1 har  | ness connector      | and ground, or ECM harness conne           | ctor M |
| ground                                      |                              |                                      |               |            |                     |  |        |
| DTC   |                              | A/F sensor ?                         | 1             | Ground     | d Continuity        |  | Ν      |
|   | Bank                         | Connector                            | Terminal      | Giound     | Continuity          |  |        |
| P0133                                       | 1                            | F27                                  | 1             | -          |                     |  | 0      |
|   |                              |                                      | 2             | Ground     | Not existed         |  | 0      |

P0153

2

F64

1

2

Ρ

## P0133, P0153 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

| DTC       | E         | CM       | Ground | Continuity  |  |
|-----------|-----------|----------|--------|-------------|--|
| DIC       | Connector | Terminal | Ground |             |  |
| P0133     |           | 45       |        |             |  |
| F 0 1 3 3 | F8        | 49       | Ground | Not existed |  |
| P0153     | 10        | 53       |        |             |  |
|           |           | 57       |        |             |  |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to EC-147, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

**10.**CHECK MASS AIR FLOW SENSOR

Refer to EC-159, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

**11.**CHECK PCV VALVE

Refer to EC-462, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve.

12. CHECK INTERMITTENT INCIDENT

Perform GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace malfunctioning part.

**13.**REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. CAUTION:

• Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

• Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

## P0137, P0157 HO2S2

## Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

## **DTC** Logic



The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

| DTC No. | Trouble diagnosis name                                      | DTC detecting condition | Possible cause  |   |
|---------|---|-------------------------|---|---|
| P0137   | Heated oxygen sensor 2<br>(bank 1) circuit low volt-<br>age |                         | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul> | K |
| P0157   | Heated oxygen sensor 2<br>(bank 2) circuit low volt-<br>age |                         | <ul><li>Fuel pressure</li><li>Fuel injector</li><li>Intake air leakage</li></ul>                                      | L |

#### DTC CONFIRMATION PROCEDURE

## **1.**INSPECTION START

Will CONSULT-III be used?

Will CONSULT-III be used?

2. PRECONDITIONING

If DTC confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

>> GO TO 3.

## EC-203

Holder

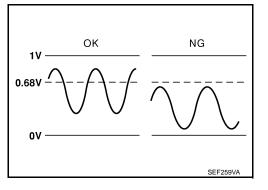
Zirconia tube

INFOID:000000003388001

SEF327R

D

F



Heater pad

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[VQ35DE]

## **3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F). 9. Open engine hood.
- 10. Select "HO2S2 (B1) P1147" (for DTC P0137) or "HO2S2 (B2) P1167" (for DTC P0157) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
- 11. Follow the instruction of CONSULT-III display.
  - **NOTE:** It will take at most 10 minutes until "COMPLETED" is displayed.
- 12. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to EC-205, "Diagnosis Procedure".

CAN NOT BE DIAGNOSED>>GO TO 4.

### **4.**PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- 1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
- 2. Perform DTC confirmation procedure again.

>> GO TO 3.

#### **5.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-204, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-205, "Diagnosis Procedure".

#### **Component Function Check**

INFOID:000000003388002

## **1.**PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT-III

- T. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|  |  | ECM   |  |   |   |
|--|--|---|--|---|---|
| DTC  | Connec-  | +   | -  | Condition   | Voltage   |
|  | tor  | Terminal  | Terminal   |   |   |
| P0137  | - F8   | 33<br>[HO2S2 (bank 1)<br>signal]  | 35<br>(Sensor  | Revving up to 4,000 rpm under no  | The voltage should be above 0.68 V  |
| P0157  |  | 34<br>[HO2S2 (bank 2)<br>signal]  | ground)  | load at least 10 times  | at least once during this procedure.  |
|  |  | ult normal?   |  |   |   |
|  |  |   |  |   |   |
| _  | > GO TO  |   |  |   |   |
| 2.PERFC  | ORM COM  | PONENT FUNC   | TION CH  | ECK-II  |   |
| Check the  | e voltage b  | etween ECM har  | ness coni  | nector terminals under the follow   | wing conditions.  |
|  |  | ECM   |  |   |   |
| DTC  | Connec-  | +   | -  | Condition   | Voltage   |
|  | tor  | Terminal  | Terminal   | -   |   |
| P0137  | - F8   | 33<br>[HO2S2 (bank 1)<br>signal]  | 35<br>(Sensor  | Keeping engine at idle for 10 min-  | The voltage should be above 0.68 V  |
| P0157  |  | 34<br>[HO2S2 (bank 2)   | ground)  | utes  | at least once during this procedure.  |
| <u>s the ins</u><br>YES ><br>NO >  | > INSPEC > GO TO   |   |  | ECK-III   |   |
| <u>s the insp</u><br>YES<br>NO<br>3.PERFC  | >> INSPEC<br>>> GO TO<br>ORM COM   | <u>ult normal?</u><br>CTION END<br>3.<br>PONENT FUNC  |  | ECK-III<br>nector terminals under the follow  | wing conditions.  |
| <u>s the insp</u><br>YES<br>NO<br>3.PERFC  | >> INSPEC<br>>> GO TO<br>ORM COM   | <u>ult normal?</u><br>CTION END<br>3.<br>PONENT FUNC  |  |   | wing conditions.  |
| <u>s the insp</u><br>YES<br>NO<br>3.PERFC  | >> INSPEC<br>>> GO TO<br>ORM COM   | <u>ult normal?</u><br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har  |  |   | wing conditions.<br>Voltage   |
| s the insp<br>YES ><br>NO ><br>3.PERF(<br>Check the  | >> INSPEC<br>>> GO TO<br>DRM COM<br>e voltage b  | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM  |  | nector terminals under the follow   |   |
| s the insr<br>YES ><br>NO ><br>PERF(<br>Check the<br>DTC<br>P0137  | >> INSPEC<br>>> GO TO<br>DRM COM<br>e voltage b<br>Connec-   | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34   | ness coni  | nector terminals under the follow   |   |
| s the insp<br>YES ><br>NO ><br>3.PERF(<br>Check the<br>DTC   | >> INSPEC<br>>> GO TO<br>DRM COM<br>2 voltage b<br>Connec-<br>tor  | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)  | ness coni<br>–<br>Terminal<br>35<br>(Sensor            | Condition<br>Condition  | Voltage<br>The voltage should be above 0.68 V   |
| s the insp<br>YES ><br>NO ><br>Check the<br>DTC<br>P0137<br>P0157  | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> </ul>  | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]   | ness coni<br>–<br>Terminal<br>35<br>(Sensor            | Condition<br>Condition  | Voltage<br>The voltage should be above 0.68 V   |
| s the insr<br>YES ><br>NO ><br>PERFO<br>Check the<br>DTC<br>P0137<br>P0157<br>s the insr<br>YES >  | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise residence</li> <li>&gt; INSPEC</li> </ul>   | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)  | ness coni<br>–<br>Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position | Voltage<br>The voltage should be above 0.68 V   |
| s the insp<br>YES ><br>NO ><br>Check the<br>DTC<br>P0137<br>P0157<br>s the insp<br>YES ><br>NO >   | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise residence</li> <li>&gt; INSPEC</li> </ul>   | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>4<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-205. "Diagnos   | ness coni<br>–<br>Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position | Voltage<br>The voltage should be above 0.68 V   |
| s the insr<br>YES ><br>NO ><br>PERFO<br>Check the<br>DTC<br>P0137<br>P0157<br>YES ><br>NO ><br>Diagnos   | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise F8</li> <li>&gt; Sis Procession</li> </ul>   | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-205, "Diagnos  | Terminal<br>35<br>(Sensor<br>ground)                   | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position | Voltage<br>The voltage should be above 0.68 V<br>at least once during this procedure. |
| s the insr<br>YES ><br>NO ><br>PERFO<br>Check the<br>DTC<br>P0137<br>P0157<br>S the insr<br>YES ><br>NO ><br>Diagnos                                       | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise F8</li> <li>&gt; Sis Procession</li> </ul>   | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-205, "Diagnos<br>edure<br>D CONNECTION   | Terminal<br>35<br>(Sensor<br>ground)                   | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position | Voltage<br>The voltage should be above 0.68 V<br>at least once during this procedure. |
| s the insp<br>YES =<br>NO =<br>Check the<br>DTC<br>P0137<br>P0157<br>S the insp<br>YES =<br>NO =<br>Diagnos<br>L.CHEC                                      | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; COM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise</li> <li>&gt; Sis Proce</li> <li>&gt; GROUN</li> <li>gnition swith ground c</li> </ul> | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-205, "Diagnos<br>edure<br>D CONNECTION<br>itch OFF.<br>onnection E38. F          | Terminal<br>35<br>(Sensor<br>ground)                   | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position | Voltage The voltage should be above 0.68 V at least once during this procedure.       |
| s the insp<br>YES ><br>NO ><br>Check the<br>DTC<br>P0137<br>P0157<br>S the insp<br>YES ><br>NO ><br>Diagnos<br>I.CHEC<br>. Turn i<br>2. Chec<br>s the insp | <ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; COM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise</li> <li>&gt; Sis Proce</li> <li>&gt; GROUN</li> <li>gnition swith ground c</li> </ul> | ult normal?<br>CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>(HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-205. "Diagnos<br>edure<br>D CONNECTION<br>itch OFF.<br>onnection E38. F<br>ult normal? | Terminal<br>35<br>(Sensor<br>ground)                   | Condition<br>Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position              | Voltage The voltage should be above 0.68 V at least once during this procedure.       |

## **2.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement"</u>.
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to <u>EC-226, "DTC Logic"</u>. NO >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

| DTC   |      | HO2S2     |          | E         | Continuity |            |
|-------|------|-----------|----------|-----------|------------|------------|
| DIC   | Bank | Connector | Terminal | Connector | Terminal   | Continuity |
| P0137 | 1    | F70       | 1        | F8        | 35         | Existed    |
| P0157 | 2    | F71       | 1        | ГО        |            | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC   |      | HO2S2     |          | E         | Continuity |            |
|-------|------|-----------|----------|-----------|------------|------------|
| DIC   | Bank | Connector | Terminal | Connector | Terminal   | Continuity |
| P0137 | 1    | F70       | 4        | F8        | 33         | Existed    |
| P0157 | 2    | F71       | 4        | 1.0       | 34         | LAISIEU    |

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

| DTC   |      | HO2S2 | Ground             | Continuity |              |  |
|-------|------|-------|--------------------|------------|--------------|--|
| DIC   | Bank |       | Connector Terminal |            | Continuity   |  |
| P0137 | 1    | F70   | 4                  | Ground     | Not existed  |  |
| P0157 | 2    | F71   | 4                  | Ground     | TNUL EXISIEU |  |

| DTC   | E         | СМ       | Ground | Continuity  |  |
|-------|-----------|----------|--------|-------------|--|
| DIC   | Connector | Terminal | Giouna |             |  |
| P0137 | F8        | 33       | Ground | Not existed |  |
| P0157 | 10        | 34       | Ground | NUL EXISIEU |  |

#### 3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK HEATED OXYGEN SENSOR 2

Refer to <u>EC-207</u>, "Component Inspection". Is the inspection result normal?

Revision: 2008 October

| F0137, F0137 110232  |   |
|--|---|
| COMPONENT DIAGNOSIS >  | [VQ35DE]  |
| YES >> GO TO 7.<br>NO >> GO TO 6.  |   |
| <b>6.</b> REPLACE HEATED OXYGEN SENSOR 2   |   |
| Replace malfunctioning heated oxygen sensor 2.   |   |
| <ul> <li>Discard any heated oxygen sensor which has been dropped from a</li> </ul>   | a height of more than 0.5 m (19.7   |
| <ul> <li>in) onto a hard surface such as a concrete floor; use a new one.</li> <li>Before installing new oxygen sensor, clean exhaust system thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and (commercial service tool).</li> </ul>   |   |
| >> INSPECTION END  |   |
| CHECK INTERMITTENT INCIDENT  |   |
| Refer to GI-40, "Intermittent Incident".   |   |
| >> INSPECTION END  |   |
| Component Inspection   | INFO ID-000000000000000000000000000000000000                                  |
|  | INFO/D:00000003388004   |
| 1.INSPECTION START   |   |
| Will CONSULT-III be used?  |   |
| <u>Will CONSULT-III be used?</u><br>YES >> GO TO 2.  |   |
| NO >> GO TO 3.   |   |
| <b>2.</b> CHECK HEATED OXYGEN SENSOR 2   |   |
| <ul> <li>With CONSULT-III</li> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CON</li> <li>Start engine and warm it up to the normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm</li> <li>Let engine idle for 1 minute.</li> <li>Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO with CONSULT-III.</li> <li>Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION"</li> </ul> | n for at least 1 minute under no load.<br>02S2 (B1)/(B2)" as the monitor item |
| V ~ (Reference data)   |   |
| 0.64 - The voltage should be above<br>0.64 - O.68V at least one time.  | The voltage should be below 0.18V at least one time.                          |
| "HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the  |   |
| "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the<br><u>Is the inspection result normal?</u>   | e "FUEL INJECTION" is – 25%.  |
| YES >> INSPECTION END  |   |
| NO >> GO TO 6.<br>3.CHECK HEATED OXYGEN SENSOR 2-I   |   |
|  |   |

- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

## EC-207

#### < COMPONENT DIAGNOSIS >

#### 4. Let engine idle for 1 minute.

5. Check the voltage between ECM harness connector terminals under the following conditions.

| ECM       |                                  |               |  |   |  |
|-----------|----------------------------------|---------------|--|---|--|
| Connector | + –                              |               | Condition                                | Voltage   |  |
| Connector | Terminal                         | Terminal      |  |   |  |
| F8        | 33<br>[HO2S2 (bank 1)<br>signal] | 35<br>(Sensor | Revving up to 4,000 rpm under no load at | The voltage should be above 0.68 V at least once during this procedure. |  |
| 10        | 34<br>[HO2S2 (bank 2)<br>signal] | ground)       | least 10 times                           | The voltage should be below 0.18 V at least once during this procedure. |  |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

| ECM       |  |                          |                                       |  |  |
|-----------|--|--------------------------|---------------------------------------|--|--|
| Connector | + –  |                          | Condition                             | Voltage  |  |
| Connector | Terminal   | Terminal                 |                                       |  |  |
| F8        | 33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal] | 35<br>(Sensor<br>ground) | Keeping engine at idle for 10 minutes | The voltage should be above 0.68 V at<br>least once during this procedure.<br>The voltage should be below 0.18 V at<br>least once during this procedure. |  |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

| ECM       |                                  |               |   |   |  |
|-----------|----------------------------------|---------------|---|---|--|
| Connector | + –                              |               | Condition   | Voltage   |  |
| Connector | Terminal                         | Terminal      |   |   |  |
| F8 -      | 33<br>[HO2S2 (bank 1)<br>signal] | 35<br>(Sensor | Coasting from 80 km/h (50 MPH) with se-<br>lector lever in the D position | The voltage should be above 0.68 V at least once during this procedure. |  |
|           | 34<br>[HO2S2 (bank 2)<br>signal] | ground)       |   | The voltage should be below 0.18 V at least once during this procedure. |  |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**6.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. **CAUTION:** 

• Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

#### < COMPONENT DIAGNOSIS >

#### [VQ35DE]

• Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

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EC

## P0138, P0158 HO2S2

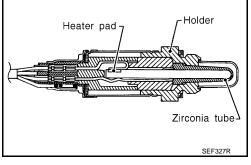
#### Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



## **DTC** Logic

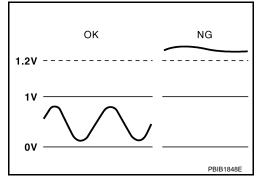
INFOID:000000003388006

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/ F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.

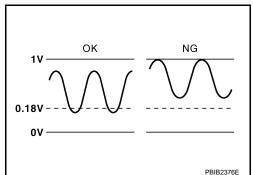
#### **MALFUNCTION A**

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during various driving conditions such as fuel cut.



#### MALFUNCTION B

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during various driving conditions such as fuel-cut.



| DTC No. | Trouble diagnosis name   |    | DTC detecting condition  | Possible cause  |
|---------|--|----|--|---|
|         | A) An excessively high voltage from the se sor is sent to ECM. |    | An excessively high voltage from the sen-<br>sor is sent to ECM.             | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>   |
| P0138   | (bank 1) circuit high volt-<br>age                             | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul> |

[VQ35DE]

INFOID:00000003591594

#### ADONENT DIA CNOSIS

|         | VENT DIAGNOSIS >                                   | •  |  | [180082]  |    |
|---------|--|----|--|---|----|
| DTC No. | Trouble diagnosis name                             |    | DTC detecting condition  | Possible cause  | 0  |
|         |  | A) | An excessively high voltage from the sen-<br>sor is sent to ECM.             | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul> | A  |
| P0158   | Heated oxygen sensor 2 (bank 2) circuit high volt- |    |  | Harness or connectors     (The sensor circuit is open or shorted)   | EC |
|         | age  | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul>                              | С  |

## DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds. 3.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 2 minutes.
- 7. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- >> Go to EC-213, "Diagnosis Procedure". YES
- NO-1 >> With CONSULT-III: GO TO 3.
- NO-2 >> Without CONSULT-III: GO TO 5.

## 3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

#### NOTE:

#### For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

- 1. Select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to the normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds. 3.
- Turn ignition switch ON. 4.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- Μ 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 7. Let engine idle for 1 minute.
- Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- Ν If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F). 9. Open engine hood.
- 10. Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
- 11. Follow the instruction of CONSULT-III display. NOTE:
- It will take at most 10 minutes until "COMPLETED" is displayed.
- 12. Touch "SELF-DIAG RESULTS".

## Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to EC-213, "Diagnosis Procedure".
- CON NOT BE DIAGNOSED>>GO TO 4.

## 4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B AGAIN

Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle). 1.

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#### < COMPONENT DIAGNOSIS >

2. Perform DTC confirmation procedure again.

#### >> GO TO 3.

**5.**PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to EC-212, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to <u>EC-213</u>, "Diagnosis Procedure".

## Component Function Check

INFOID:000000003388007

[VQ35DE]

#### **1.**PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT-III

- T. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

|            |     | ECM                              |                    |                                  |                                      |
|------------|-----|----------------------------------|--------------------|----------------------------------|--------------------------------------|
| DTC Connec |     | Connec- +                        |                    | Condition                        | Voltage                              |
|            | tor | Terminal                         | Terminal           |                                  |                                      |
| P0138      | F8  | 33<br>[HO2S2 (bank 1)<br>signal] |                    | Revving up to 4,000 rpm under no | The voltage should be below 0.18 V   |
| P0158      | 10  | 34<br>[HO2S2 (bank 2)<br>signal] | (Sensor<br>ground) | load at least 10 times           | at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

|             |            | ECM                              |                    |                                     |                                      |  |
|-------------|------------|----------------------------------|--------------------|-------------------------------------|--------------------------------------|--|
| DTC         | Connec-    | +                                | _                  | Condition                           | Voltage                              |  |
|             | tor        | Terminal                         | Terminal           |                                     |                                      |  |
| P0138       | Eo         | 33<br>[HO2S2 (bank 1)<br>signal] | 35<br>(Sansar      | Keeping engine speed at idle for 10 | The voltage should be below 0.18 V   |  |
| P0158       | — F8 —     | 34<br>[HO2S2 (bank 2)<br>signal] | (Sensor<br>ground) | minutes                             | at least once during this procedure. |  |
| Is the insp | ection res | ult normal?                      |                    |                                     |                                      |  |
| YES >       | > INSPEC   | TION END                         |                    |                                     |                                      |  |

NO >> GO TO 3.

**3.**PERFORM COMPONENT FUNCTION CHECK-III

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

#### Check the voltage between ECM harness connector terminals under the following conditions.

|               |                      | ECM                             |                   |                   |   |                       |                                      |
|---------------|----------------------|---------------------------------|-------------------|-------------------|---|-----------------------|--------------------------------------|
| DTC           | Connec-              | + –                             |                   |                   | Conditio  | n                     | Voltage                              |
|               | tor                  | Terminal                        | Termina           | al                |   |                       |                                      |
| P0138         | - F8                 | 33<br>[HO2S2 (bank<br>signal]   | 1) 35<br>(Senso   |                   | Coasting from 80 km/h (50 MPH)<br>with selector lever in the D position |                       | The voltage should be below 0.18 V   |
| P0158         |                      | 34<br>[HO2S2 (bank<br>signal]   | around            |                   | ector lever in t  | he D position         | at least once during this procedure. |
| s the insp    | pection res          | ult normal?                     |                   |                   |   |                       |                                      |
|               |                      | CTION END<br>C-213, "Diagn      | <u>osis Proce</u> | edure".           |   |                       |                                      |
| Jiagnos       | sis Proce            | edure                           |                   |                   |   |                       | INFOID:000000033880                  |
| .INSPE        | CTION ST             | ART                             |                   |                   |   |                       |                                      |
|               |                      | d malfunction                   | (A or B). R       | efer to <u>EC</u> | <u>C-210, "DT(</u>  | <u>C Logic"</u> .     |                                      |
|               |                      | s detected?                     |                   |                   |   |                       |                                      |
|               | >> GO TO<br>>> GO TO |                                 |                   |                   |   |                       |                                      |
| CHEC          | K GROUN              |                                 | ON                |                   |   |                       |                                      |
|               | ignition sw          |                                 |                   | •                 |   |                       |                                      |
|               | •                    | onnection E38<br>ult normal?    | 3. Refer to       | Ground Ir         | nspection ir  | n <u>GI-43, "Circ</u> | cuit Inspection".                    |
|               | >> GO TO             |                                 |                   |                   |   |                       |                                      |
|               |                      | or replace gro                  | und conne         | ction.            |   |                       |                                      |
| 3.CHEC        | K HO2S2 (            | CONNECTOR                       | FOR WAT           | ΓER               |   |                       |                                      |
|               |                      | ted oxygen se                   |                   |                   | nector.   |                       |                                      |
|               |                      | er is not inside<br>ult normal? | connector         | S.                |   |                       |                                      |
| •             | >> GO TO             |                                 |                   |                   |   |                       |                                      |
|               | •                    | or replace har                  |                   |                   |   |                       |                                      |
| CHEC          | K HO2S2 (            | GROUND CIR                      | CUIT FOF          | R OPEN A          | ND SHOR   | Г                     |                                      |
|               |                      | ted oxygen se                   |                   | ness conr         | nector.   |                       |                                      |
|               |                      | /I harness con                  |                   | xvaen se          | nsor 2 (HC  | )2S2) harned          | ss connector and ECM harnes          |
| conne         |                      | many botweel                    |                   | any goin ae       |   |                       |                                      |
|               | 1                    | 110000                          |                   |                   |   |                       |                                      |
| DTC           | Bank                 | HO2S2<br>Connector              | Terminal (        | EC<br>Connector   | CM<br>Terminal  | Continuity            |                                      |
| P0138         | Вапк<br>1            | F70                             | 1                 | Johnector         | Terrillia   |                       |                                      |
| P0158         | 2                    | F71                             | 1                 | F8                | 35  | Existed               |                                      |
|               |                      | less for short t                | -                 | and short         | to power  |                       |                                      |
|               |                      | ult normal?                     | S ground c        |                   | 5 pomol.  |                       |                                      |
|               | >> GO TO             |                                 |                   |                   |   |                       |                                      |
|               | 20010                |                                 |                   |                   |   |                       |                                      |
| YES ><br>NO > | >> Repair o          |                                 | -                 |                   | •   |                       | or connectors.                       |

#### < COMPONENT DIAGNOSIS >

| DTC   |      | HO2S2     |          | E         | Continuity |            |
|-------|------|-----------|----------|-----------|------------|------------|
| DIC   | Bank | Connector | Terminal | Connector | Terminal   | Continuity |
| P0138 | 1    | F70       | 4        | F8        | 33         | Existed    |
| P0158 | 2    | F71       | 4        | 10        | 34         | LAISIEU    |

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

| DTC   |      | HO2S2     | Ground   | Continuity |             |  |
|-------|------|-----------|----------|------------|-------------|--|
| DIC   | Bank | Connector | Terminal | Giouna     | Continuity  |  |
| P0138 | 1    | F70       | 4        | Ground     | Not existed |  |
| P0158 | 2    | F71       | 4        | Giouna     |             |  |

| DTC   | E         | CM       | Ground | Continuity  |  |
|-------|-----------|----------|--------|-------------|--|
| DIC   | Connector | Terminal | Ground |             |  |
| P0138 | F8        | 33       | Ground | Not existed |  |
| P0158 | 10        | 34       | Ground | NUL EXISIEU |  |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.

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

**6.**CHECK HEATED OXYGEN SENSOR 2

Refer to EC-216, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 7.

**7.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

9. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.
- Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace ground connection.

10. CLEAR MIXTURE RATIO SELF-LEARNING VALUE

|   |                                      |               | P            | 0138, PO    | 158 HO2            | S2         |                              |     |
|---|--------------------------------------|---------------|--------------|-------------|--------------------|------------|------------------------------|-----|
| < COMPC   |                                      | GNOSIS        | >            |             |                    |            | [VQ35DE]                     |     |
| 1. Clear  | the mixture                          | e ratio self- | learning va  | alue. Refer | to <u>EC-19,</u> " | MIXTURE    | RATIO SELF-LEARNING VALUE    |     |
| <u>CLEA</u>   | CLEAR : Special Repair Requirement". |               |              |             |                    |            |                              |     |
| 2. Run engine for at least 10 minutes at idle speed.  |                                      |               |              |             |                    |            |                              |     |
| Is the 1st trip DTC P0172 or P0175 detected? Is it difficult to start engine?                                   |                                      |               |              |             |                    |            |                              |     |
| YES >> Perform trouble diagnosis for DTC P0172, P0175. Refer to <u>EC-231, "DTC Logic"</u> .<br>NO >> GO TO 11. |                                      |               |              |             |                    |            |                              |     |
|   |                                      |               |              |             | AND SHO            | от         |                              |     |
|   |                                      |               | CIRCUIT      |             | AND SHU            | κι         |                              | С   |
|   | gnition swit                         |               | oonoor 9 h   | ornoon oon  | aatar              |            |                              | 0   |
|   | nnect ECM                            |               |              | arness coni |                    |            |                              |     |
|   |                                      |               |              | harness co  | nnector and        | ECM harn   | ess connector.               | D   |
|   |                                      |               |              |             |                    |            | _                            |     |
| DTC   |                                      | HO2S2         |              | EC          | CM                 | Continuity | _                            | _   |
|   | Bank                                 | Connector     | Terminal     | Connector   | Terminal           |            |                              | Е   |
| P0138   | 1                                    | F70           | 1            | F8          | 25                 | Existed    | -                            |     |
| P0158   | 2                                    | F71           | 1            | Fð          | 35                 |            |                              | F   |
| 5. Also c   | heck harne                           | ess for shou  | rt to ground | d and short | to power.          |            | -                            |     |
| Is the insp   | ection resu                          | It normal?    |              |             |                    |            |                              |     |
|   | > GO TO 1                            |               |              |             |                    |            |                              | G   |
|   |                                      |               | •            |             | •                  |            | or connectors.               |     |
| 12.CHE  | CK HO2S2                             | INPUT SIG     | GNAL CIR     | CUIT FOR    | OPEN AND           | SHORT      |                              |     |
| 1. Check  | the contin                           | uity betwee   | en HO2S2     | harness co  | nnector and        | ECM harn   | less connector.              | Н   |
|   |                                      | -             |              |             |                    |            |                              |     |
| DTC   | HO2S2                                |               |              | ECM         |                    | Continuity | -                            | 1   |
|   | Bank                                 | Connector     | Terminal     | Connector   | Terminal           | Continuity |                              |     |
| P0138   | 1                                    | F70           | 4            | F0          | 33                 | Existed    | -                            |     |
| P0158   | 2                                    | F71           | 4            | F8 –        | 34                 |            |                              | J   |
| 2. Check  | the contir                           | uity betwe    | en HO2S2     | 2 harness o | connector a        | nd ground, | or ECM harness connector and |     |
| groun   | d.                                   | -             |              |             |                    | -          |                              | K   |
|   |                                      |               |              |             |                    | _          |                              | r×. |
| DTC   |                                      | HO2S2         |              | Ground      | Continuity         |            |                              |     |
|   | Bank                                 | Connector     | Terminal     |             |                    |            |                              | L   |
| P0138   | 1                                    | F70           | 4            | Ground      | Not existed        |            |                              |     |
| P0158   | 2                                    | F71           | 4            | Orbana      | NOT EXISTED        |            |                              |     |
|   |                                      |               |              |             |                    | _          |                              | M   |
| DTO   | E                                    | ECM           |              |             |                    |            |                              |     |
| DTC   | Connector                            | Terminal      | Ground       | Continuity  |                    |            |                              | Ν   |
| P0138   | 50                                   | 33            |              |             |                    |            |                              | IN  |
| P0158   | F8                                   | 34            | Ground       | Not exist   | ed                 |            |                              |     |
| 3. Also c   | heck harne                           | ess for sho   | rt to power  | I           |                    |            |                              | 0   |
|   | ection resu                          |               | 1            |             |                    |            |                              |     |
|   | > GO TO 1                            |               |              |             |                    |            |                              |     |
|   |                                      |               | short to gr  | ound or sho | ort to power       | in harness | or connectors.               | Ρ   |
| 13.CHE  | CK HEATE                             | D OXYGEI      | N SENSOF     | R 2         |                    |            |                              |     |
|   |                                      |               | nspection".  |             |                    |            |                              |     |
| Refer to F  | C-216 °C.0                           | пропении      | ISDECHOL     |             |                    |            |                              |     |

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 14.

14.REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

15. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

Component Inspection

**1.**INSPECTION START

Will CONSULT-III be used?

Will CONSULT-III be used?

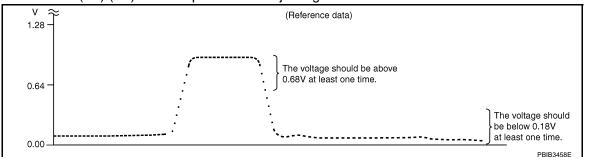
YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

#### With CONSULT-III

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-III.
- 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm$  25%.



"HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is – 25%.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**3.**CHECK HEATED OXYGEN SENSOR 2-I

#### **Without CONSULT-III**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

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### P0138, P0158 HO2S2

#### < COMPONENT DIAGNOSIS >

### [VQ35DE]

|   | ECM  |  |   |   |  |
|---|--|--|---|---|--|
| Connector +   |  | -                                      | Condition   | Voltage   |  |
| Connector   | Terminal   | Terminal                               |   |   |  |
| F8  | 33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)  | 35<br>(Sensor<br>ground)               | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68 V a<br>least once during this procedure.<br>The voltage should be below 0.18 V at<br>least once during this procedure. |  |
|   | signal]  | 10                                     |   |   |  |
| YES >><br>NO >>   | ection result norr<br>INSPECTION I<br>GO TO 4.<br>HEATED OXYG  | END                                    | SOR 2-II  |   |  |
|   |  |  | ness connector terminals under the                      | following conditions  |  |
|   | i enage serreen  | 2011114                                |   |   |  |
|   | ECM  |  |   |   |  |
| Connector   | +  | _                                      | Condition   | Voltage   |  |
| Connector   | Terminal   | Terminal                               |   |   |  |
| 33<br>[HO2S2 (bank<br>signal]                                       | [HO2S2 (bank 1)  | 35<br>(Sensor                          | Keeping engine at idle for 10 minutes                   | The voltage should be above 0.68 V at least once during this procedure.   |  |
|   |  | (00.000                                | ricophing engine at laid for the minator                | The voltage should be below 0.18 V at least once during this procedure.   |  |
| the inspe<br>YES >><br>NO >>  | 34<br>[HO2S2 (bank 2)<br>signal]<br>ection result norr<br>NSPECTION I<br>GO TO 5.  | END                                    |   |   |  |
| the inspe<br>YES >><br>NO >><br>O.CHECK                             | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION I<br>GO TO 5.<br>HEATED OXYO  | nal?<br>END<br>EEN SENS                | SOR 2-III<br>ness connector terminals under the t       | least once during this procedure.   |  |
| the inspe<br>YES >><br>NO >><br>O.CHECK                             | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION I<br>GO TO 5.<br>HEATED OXYO  | nal?<br>END<br>EEN SENS                |   | least once during this procedure.   |  |
| the inspense<br>YES >><br>NO >><br>CHECK                            | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION I<br>GO TO 5.<br>HEATED OXYC<br>voltage between   | nal?<br>END<br>EEN SENS                |   | least once during this procedure.   |  |
| the inspe<br>YES >><br>NO >><br>O.CHECK                             | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION I<br>GO TO 5.<br>HEATED OXYC<br>voltage between<br>ECM  | nal?<br>END<br>EEN SENS                | ness connector terminals under the t                    | least once during this procedure.   |  |
| the inspense<br>YES >><br>NO >><br>CHECK                            | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION F<br>GO TO 5.<br>HEATED OXYG<br>voltage between<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34 | nal?<br>END<br>EEN SENS<br>ECM har     | ness connector terminals under the t                    | following conditions.<br>Voltage<br>The voltage should be above 0.68 V at<br>least once during this procedure.<br>The voltage should be below 0.18 V at |  |
| S the inspe<br>YES >><br>NO >><br>O.CHECK<br>Check the<br>Connector | [HO2S2 (bank 2)<br>signal]<br>ection result norr<br>INSPECTION F<br>GO TO 5.<br>HEATED OXYG<br>voltage between<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]       | nal?<br>END<br>EEN SENS<br>ECM har<br> | Condition<br>Coasting from 80 km/h (50 MPH) with se-    | following conditions.<br>Voltage  |  |

(commercial service tool).

### P0138, P0158 HO2S2

< COMPONENT DIAGNOSIS >

>> INSPECTION END

### P0139, P0159 HO2S2

### Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

### **DTC** Logic

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

| DTC No. | Trouble diagnosis name  | DTC detecting condition                          | Possible cause  |  |
|---------|---|--|---|--|
| P0139   | Heated oxygen sensor 2<br>(bank 1) circuit slow re-<br>sponse | It takes more time for the sensor to respond be- | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul> |  |
| P0159   | Heated oxygen sensor 2<br>(bank 2) circuit slow re-<br>sponse | tween rich and lean than the specified time.     | <ul><li>Fuel pressure</li><li>Fuel injector</li><li>Intake air leakage</li></ul>                                      |  |

#### DTC CONFIRMATION PROCEDURE

### **1.**INSPECTION START

Will CONSULT-III be used?

Will CONSULT-III be used?

2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

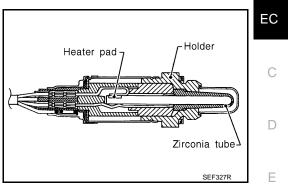
For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

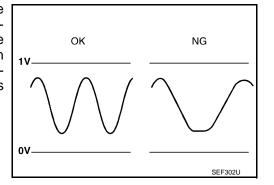
>> GO TO 3.

INFOID:000000003591596

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А







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## **3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Open engine hood.
- 9. Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
- 10. Follow the instruction of CONSULT-III display. **NOTE:** 
  - It will take at most 10 minutes until "COMPLETED" is displayed.
- 11. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to EC-221, "Diagnosis Procedure".

CAN NOT BE DIAGNOSED>>GO TO 4.

### **4.**PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- 1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
- 2. Perform DTC confirmation procedure again.

#### >> GO TO 3.

#### **5.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-220, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-221, "Diagnosis Procedure".

### Component Function Check

INFOID:000000003388012

**1.**PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT-III

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

### P0139, P0159 HO2S2

### < COMPONENT DIAGNOSIS >

[VQ35DE]

|  |   | ECM   |                                      |   |   |
|--|---|---|--------------------------------------|---|---|
| DTC  | Connec-   | +   | _                                    | Condition   | Voltage   |
|  | tor   | Terminal  | Terminal                             |   |   |
| P0139  | - F8  | 33<br>[HO2S2 (bank 1)<br>signal]  | 35<br>(Sensor                        | Revving up to 4,000 rpm under no load at least 10 times                   | A change of voltage should be more than 0.24 V for 1 second during this                             |
| P0159  |   | 34<br>[HO2S2 (bank 2)<br>signal]  | ground)                              |   | procedure.  |
| YES >  |   | <u>ult normal?</u><br>CTION END<br>2.   |                                      |   |   |
| -  |   | PONENT FUNC   | TION CH                              | ECK-II  |   |
|  |   |   |                                      | nector terminals under the follow   | wing conditions.  |
|  |   | ECM   |                                      |   |   |
| DTC  | Connec-   | +   | _                                    | Condition   | Voltage   |
|  | tor   | Terminal  | Terminal                             |   | č   |
| P0139  | - F8  | 33<br>[HO2S2 (bank 1)<br>signal]  | 35<br>(Sensor                        | Keeping engine at idle for 10 minutes                                     | A change of voltage should be more<br>than 0.24 V for 1 second during this                          |
| P0159  |   | 34<br>[HO2S2 (bank 2)<br>signal]  | ground)                              |   | procedure.  |
| YES >  | >> GO TO  | -   |                                      | ECK-III   |   |
| YES<br>NO<br>3.PERFO   | >> GO TO<br>ORM COM   | TION END<br>3.<br>PONENT FUNC   |                                      | ECK-III<br>nector terminals under the follow                              | wing conditions.  |
| YES<br>NO<br>3.PERFO   | >> GO TO<br>ORM COM   | TION END<br>3.<br>PONENT FUNC   |                                      |   | wing conditions.  |
| YES<br>NO<br>3.PERFO   | >> GO TO<br>ORM COM<br>e voltage b<br>Connec-   | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har  |                                      |   | wing conditions.<br>Voltage   |
| YES<br>NO<br>3.PERFO<br>Check the  | >> GO TO<br>ORM COM<br>e voltage b  | TION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM  |                                      | nector terminals under the follow   |   |
| YES<br>NO<br>3.PERFO<br>Check the  | >> GO TO<br>ORM COM<br>e voltage b<br>Connec-   | ETION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]  | ness con                             | Condition   | Voltage<br>A change of voltage should be more   |
| YES<br>NO<br>3.PERFO<br>Check the<br>DTC   | >> GO TO<br>ORM COM<br>e voltage b<br>Connec-<br>tor  | ETION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)   | rness con<br>–<br>Terminal<br>35     | Condition   | Voltage   |
| YES 2<br>NO 2<br>3.PERFO<br>Check the<br>DTC<br>P0139<br>P0159<br>Is the insp<br>YES 2   | <ul> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; ORM COM</li> <li>&gt;&gt; Connector</li> <li>F8</li> <li>&gt;&gt; INSPEC</li> </ul>   | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)   | Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH) in<br>D position | Voltage<br>A change of voltage should be more<br>than 0.24 V for 1 second during this               |
| YES 2<br>NO 2<br>3.PERFO<br>Check the<br>DTC<br>P0139<br>P0159<br>Is the insp<br>YES 2<br>NO 2   | <ul> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; ORM COM</li> <li>&gt;&gt; Connector</li> <li>F8</li> <li>&gt;&gt; Encion res</li> <li>&gt;&gt; So to E</li> </ul>   | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-221, "Diagnos   | Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH) in<br>D position | Voltage<br>A change of voltage should be more<br>than 0.24 V for 1 second during this               |
| YES<br>NO<br>3.PERFO<br>Check the<br>DTC<br>P0139<br>P0159<br>Is the insp<br>YES<br>NO<br>Diagnos  | <ul> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; ORM COM</li> <li>&gt;&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt;&gt; Encion res</li> <li>&gt;&gt; So to E</li> <li>&gt;&gt; Sis Proce</li> </ul>   | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal]<br>ult normal?<br>CTION END<br>C-221, "Diagnos   | Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH) in<br>D position | Voltage<br>A change of voltage should be more<br>than 0.24 V for 1 second during this<br>procedure. |
| YES<br>NO<br>3.PERFO<br>Check the<br>DTC<br>P0139<br>P0159<br>Is the insp<br>YES<br>NO<br>Diagnos<br>1.CHEC<br>1. Turn<br>2. Chec                | <ul> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; ORM COM</li> <li>&gt;&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt;&gt; Entropy</li> <li>&gt;&gt; Go to E</li> <li>&gt;&gt; Go to E</li> <li>Sis Proce</li> <li>K GROUN</li> <li>ignition sw</li> <li>k ground c</li> </ul> | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>4<br>[HO2S2 (bank 2)<br>signal]<br>Ult normal?<br>CTION END<br>C-221, "Diagnos<br>edure<br>D CONNECTION<br>itch OFF.<br>onnection E38. F                | Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH) in<br>D position | Voltage<br>A change of voltage should be more<br>than 0.24 V for 1 second during this<br>procedure. |
| YES<br>NO<br>3.PERFO<br>Check the<br>DTC<br>P0139<br>P0159<br>Is the insp<br>YES<br>NO<br>Diagnos<br>1.CHEC<br>1. Turn<br>2. Chec<br>Is the insp | <ul> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; GO TO</li> <li>&gt;&gt; ORM COM</li> <li>&gt;&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt;&gt; Entropy</li> <li>&gt;&gt; Go to E</li> <li>&gt;&gt; Go to E</li> <li>Sis Proce</li> <li>K GROUN</li> <li>ignition sw</li> <li>k ground c</li> </ul> | CTION END<br>3.<br>PONENT FUNC<br>etween ECM har<br>ECM<br>+<br>Terminal<br>33<br>[HO2S2 (bank 1)<br>signal]<br>4<br>[HO2S2 (bank 2)<br>signal]<br>Ult normal?<br>CTION END<br>C-221, "Diagnos<br>edure<br>D CONNECTION<br>itch OFF.<br>onnection E38. F<br>ult normal? | Terminal<br>35<br>(Sensor<br>ground) | Condition<br>Condition<br>Coasting from 80 km/h (50 MPH) in<br>D position | Voltage<br>A change of voltage should be more<br>than 0.24 V for 1 second during this<br>procedure. |

NO >> Repair or replace ground connection.

**2.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement"</u>.
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-226. "DTC Logic"</u> or <u>EC-231. "DTC Logic"</u>.

NO >> GO TO 3.

 $\mathbf{3}$ . CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

| DTC   |      | HO2S2     |          | E         | Continuity |            |
|-------|------|-----------|----------|-----------|------------|------------|
| DIC   | Bank | Connector | Terminal | Connector | Terminal   | Continuity |
| P0139 | 1    | F70       | 1        | F8        | 35         | Existed    |
| P0159 | 2    | F71       | 1        | 10        | 55         | LAISIEU    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK H02S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC   |      | HO2S2     |          | E         | Continuity |            |
|-------|------|-----------|----------|-----------|------------|------------|
| DIC   | Bank | Connector | Terminal | Connector | Terminal   | Continuity |
| P0139 | 1    | F70       | 4        | F8        | 33         | Existed    |
| P0159 | 2    | F71       | 4        | 10        | 34         | LXISIGU    |

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

| DTC   |      | HO2S2     | Ground   | Continuity |             |  |
|-------|------|-----------|----------|------------|-------------|--|
| DIC   | Bank | Connector | Terminal | Ciouna     | Continuity  |  |
| P0139 | 1    | F70       | 4        | Ground     | Not existed |  |
| P0159 | 2    | F71       | 4        | Gibunu     |             |  |

| DTC   | E         | CM       | Ground | Continuity  |  |
|-------|-----------|----------|--------|-------------|--|
| DIC   | Connector | Terminal | Ground |             |  |
| P0139 | F8        | 33       | Ground | Not existed |  |
| P0159 | ГО        | 34       | Ground | NUL EXISTED |  |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK HEATED OXYGEN SENSOR 2

### P0139, P0159 H02S2

| P0139, P0159 HO2S2   |  |
|--|--|
| < COMPONENT DIAGNOSIS >  | [VQ35DE]                                   |
| Refer to EC-223, "Component Inspection".   |  |
| Is the inspection result normal?   | A  |
| YES >> GO TO 7.  |  |
| NO >> GO TO 6.   | EC   |
| <b>6.</b> REPLACE HEATED OXYGEN SENSOR 2   | 20   |
| Replace malfunctioning heated oxygen sensor 2.   |  |
| <ul><li>CAUTION:</li><li>Discard any heated oxygen sensor which has been dropped from a height of more than</li></ul>  | 0.5 m (19.7 <sup>C</sup>                   |
| in) onto a hard surface such as a concrete floor; use a new one.   | ·  |
| • Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sen   |  |
| Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seiz (commercial service tool).   | ze lubricant                               |
|  |  |
| >> INSPECTION END  | E  |
| 7. CHECK INTERMITTENT INCIDENT   |  |
| Refer to GI-40, "Intermittent Incident".   |  |
|  | F  |
| >> INSPECTION END  |  |
| Component Inspection   | NFOID:000000003625196                      |
|  | VI 012.00000000000000000000000000000000000 |
| 1.INSPECTION START   | Н  |
| Will CONSULT-III be used?  |  |
| Will CONSULT-III be used?  |  |
| YES >> GO TO 2.<br>NO >> GO TO 3.  | I  |
| 2. CHECK HEATED OXYGEN SENSOR 2  |  |
|  |  |
| With CONSULT-III Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.  | 0  |
| 2. Start engine and warm it up to the normal operating temperature.  |  |
| 3. Turn ignition switch OFF and wait at least 10 seconds.  | K  |
| <ol> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute up</li> <li>Let engine idle for 1 minute.</li> </ol>               | nder no load.                              |
| 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the  | monitor item                               |
| with CONSULT-III.  | L  |
| 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm$ 25%.   |  |
|  | Μ  |
|  |  |
| The voltage should be above  | Ν  |
| 0.64 - 0.68V at least one time.  | IN   |
| The voltage sh   | nould                                      |
| be below 0.18<br>at least one tir  |  |
| 0.00 - L PBIE  | 33458E                                     |
| "HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION"<br>"HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" |  |
| Is the inspection result normal?   |  |
| YES >> INSPECTION END<br>NO >> GO TO 6.  |  |
| 3. CHECK HEATED OXYGEN SENSOR 2-1  |  |
|  | ·  |

Without CONSULT-III
Start engine and warm it up to the normal operating temperature.

### P0139, P0159 HO2S2

#### < COMPONENT DIAGNOSIS >

- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

|           | ECM                              |               |   |   |  |
|-----------|----------------------------------|---------------|---|---|--|
| Connector | + –                              |               | Condition   | Voltage   |  |
| Connector | Terminal                         | Terminal      |   |   |  |
| F8        | 33<br>[HO2S2 (bank 1)<br>signal] | 35<br>(Sensor | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68 V at least once during this procedure. |  |
| F8        | 34<br>[HO2S2 (bank 2)<br>signal] | ground)       |   | The voltage should be below 0.18 V at least once during this procedure. |  |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

### **4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

|           | ECM                              |                    |                                       |   |  |
|-----------|----------------------------------|--------------------|---------------------------------------|---|--|
| Connector | + –                              |                    | Condition                             | Voltage   |  |
| CONNECTOR | Terminal                         | Terminal           |                                       |   |  |
| F8        | 33<br>[HO2S2 (bank 1)<br>signal] | 35                 | Keeping engine at idle for 10 minutes | The voltage should be above 0.68 V at least once during this procedure. |  |
|           | 34<br>[HO2S2 (bank 2)<br>signal] | (Sensor<br>ground) |                                       | The voltage should be below 0.18 V at least once during this procedure. |  |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

#### **5.**CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

|           | ECM  |                          |   |  |
|-----------|--|--------------------------|---|--|
| Connector | + –  |                          | Condition   | Voltage  |
| Connector | Terminal   | Terminal                 |   |  |
| F8        | 33<br>[HO2S2 (bank 1)<br>signal]<br>34<br>[HO2S2 (bank 2)<br>signal] | 35<br>(Sensor<br>ground) | Coasting from 80 km/h (50 MPH) with se-<br>lector lever in the D position | The voltage should be above 0.68 V at<br>least once during this procedure.<br>The voltage should be below 0.18 V at<br>least once during this procedure. |

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**6.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. CAUTION:

• Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

### P0139, P0159 HO2S2

#### < COMPONENT DIAGNOSIS >

#### [VQ35DE]

• Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

Κ

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EC

#### < COMPONENT DIAGNOSIS >

### P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000003388015

[VQ35DE]

### DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (the actual mixture ratio is too lean), the ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

| Sensor       | Input signal to ECM   | ECM function           | Actuator      |
|--------------|---|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas<br>(Mixture ratio feedback signal) | Fuel injection control | Fuel injector |

| DTC No. | Trouble diagnosis name                     | DTC detecting condition   | Possible cause   |              |
|---------|--|---|--|--------------|
| P0171   | Fuel injection system too lean (bank 1)    |   | <ul> <li>Intake air leakage</li> <li>A/F sensor 1</li> </ul>   | A/F sensor 1 |
| P0174   | Fuel injection system too<br>lean (bank 2) | <ul> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul> | <ul> <li>Fuel injector</li> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul> |              |

# DTC CONFIRMATION PROCEDURE **NOTE**:

Check vehicle specifications and VIN, then select the procedure to be performed. (Refer to the table below.)

| Vehicle specification | Vehicle serial number   | TYPE |
|-----------------------|-------------------------|------|
|                       | Up to JN8AZ18U*9W100000 | A    |
| 2WD                   | From JN8AZ18U*9W100001  | В    |
| 200                   | Up to JN8AZ18U*9W710000 | A    |
|                       | From JN8AZ18U*9W710001  | В    |
|                       | Up to JN8AZ18W*9W200000 | A    |
| 4WD                   | From JN8AZ18W*9W200001  | В    |
| 400                   | Up to JN8AZ18W*9W810000 | А    |
|                       | From JN8AZ18W*9W810001  | В    |

TYPE A

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

## 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement"</u>.
- 2. Start engine.

Is it difficult to start engine?

| •  | JEL INJECTION SYSTEM FUNCTION   |  |  |  |  |  |
|--|---|--|--|--|--|--|
| < COMPONENT DIAGNOSIS ><br>YES >> GO TO 3.   | [VQ35DE]  |  |  |  |  |  |
| NO >> GO TO 4. A   |   |  |  |  |  |  |
| 3.RESTART ENGINE   |   |  |  |  |  |  |
| If it is difficult to start engine, the fuel injection system has a malfunction, too.<br>Crank engine while depressing accelerator pedal.  |   |  |  |  |  |  |
| NOTE:<br>• When depressing accelerator pedal to the second | three-fourths (3/4) or more, the control system does not start the  |  |  |  |  |  |
| engine. Do not depress accelerator   | bedal too much. C   |  |  |  |  |  |
| <u>Does engine start?</u><br>YES >> Go to <u>EC-228</u> , "Diagnosis Pr  | cooduro"  |  |  |  |  |  |
| NO >> Check exhaust and intake ai  |   |  |  |  |  |  |
| 4. PERFORM DTC CONFIRMATION PR   | ROCEDURE-II   |  |  |  |  |  |
| <ol> <li>Keep engine idle for at least 10 minu</li> <li>Check 1st trip DTC.</li> </ol>   | tes. E  |  |  |  |  |  |
| Is 1st trip DTC detected?  |   |  |  |  |  |  |
| YES >> Go to <u>EC-228, "Diagnosis Pr</u><br>NO >> GO TO 5.  | r <mark>ocedure".</mark> F  |  |  |  |  |  |
| 5.PERFORM DTC CONFIRMATION PF  |   |  |  |  |  |  |
|  |   |  |  |  |  |  |
|  | der similar conditions to (1st trip) Freeze Frame Data for 10 minutes.  |  |  |  |  |  |
| Hold the accelerator pedal as stea   |   |  |  |  |  |  |
| Similar conditions to (1st trip) Freeze the same time.   | Frame Data mean that the following conditions should be satisfied at  |  |  |  |  |  |
|  |   |  |  |  |  |  |
| Engine speed   | Engine speed in the freeze frame data $\pm$ 400 rpm   |  |  |  |  |  |
| Vehicle speed  | Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)  |  |  |  |  |  |
| Basic fuel schedule  | Basic fuel schedule in freeze frame data $\times$ (1 ± 0.1)When the freeze frame data shows lower than 70°C (158°F),        |  |  |  |  |  |
| Engine explant temperature (T) condition   | T should be lower than $70^{\circ}$ C (158°F).  |  |  |  |  |  |
| Engine coolant temperature (T) condition   | When the freeze frame data shows higher than or equal to 70°C (158°F),<br>T should be higher than or equal to 70°C (158°F). |  |  |  |  |  |
| 3. Check 1st trip DTC.   |   |  |  |  |  |  |
| Is 1st trip DTC detected?  | L   |  |  |  |  |  |
| YES >> Go to <u>EC-228</u> , " <u>Diagnosis Pr</u><br>NO >> INSPECTION END   | <u>'ocedure"</u> .  |  |  |  |  |  |
| ТҮРЕ В   | Μ   |  |  |  |  |  |
| 1.PRECONDITIONING  |   |  |  |  |  |  |
|  | previously conducted, always perform the following before conduct-  |  |  |  |  |  |
| ing the next test.   |   |  |  |  |  |  |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>   |   |  |  |  |  |  |
| 3. Turn ignition switch OFF and wait at least 10 seconds.  |   |  |  |  |  |  |
|  |   |  |  |  |  |  |
| >> GO TO 2.  |   |  |  |  |  |  |
| 2.PERFORM DTC CONFIRMATION PR  |   |  |  |  |  |  |
| 1. Clear the mixture ratio self-learning<br><u>CLEAR : Special Repair Requiremen</u>   | value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u><br>nt".  |  |  |  |  |  |
| 2. Start engine.   | —   |  |  |  |  |  |
| Is it difficult to start engine?   |   |  |  |  |  |  |
| YES >> GO TO 3.  |   |  |  |  |  |  |

< COMPONENT DIAGNOSIS >

[VQ35DE]

## NO >> GO TO 4. 2

**3.**RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too. Crank engine while depressing accelerator pedal.

#### NOTE:

 When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

#### Does engine start?

YES >> Go to EC-228, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

#### **4.**PERFORM DTC CONFIRMATION PROCEDURE-II

- 1. Keep engine idle for at least 5 minutes.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-228, "Diagnosis Procedure".
- NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE-III

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start engine.
- 3. Maintain the following conditions for at least 10 consecutive minutes. Hold the accelerator pedal as steady as possible.

| VHCL | SPEED SE |  |
|------|----------|--|

50 - 120 km/h (31 - 75 mph)

#### CAUTION:

#### Always drive vehicle at a safe speed.

4. Check 1st trip DTC.

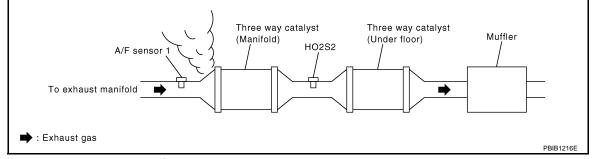
#### Is 1st trip DTC detected?

YES >> Go to <u>EC-228, "Diagnosis Procedure"</u>. NO >> INSPECTION END

### Diagnosis Procedure

### **1.**CHECK EXHAUST GAS LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before three way catalyst (manifold).



#### Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

**2.**CHECK FOR INTAKE AIR LEAKAGE

- 1. Listen for an intake air leakage after the mass air flow sensor.
- 2. Check PCV hose connection.

#### Is intake air leakage detected?

- YES >> Repair or replace malfunctioning part.
- NO >> GO TO 3.

### < COMPONENT DIAGNOSIS >

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## 3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect corresponding A/F sensor 1 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

|   | DTC   | A/F sensor 1 |           |          | ECM       |          | Continuity |
|---|-------|--------------|-----------|----------|-----------|----------|------------|
|   | ыс    | Bank         | Connector | Terminal | Connector | Terminal | Continuity |
|   | P0171 | 1            | F27       | 1        | F8        | 45       | Existed    |
|   |       |              |           | 2        |           | 49       |            |
| - | D0174 | 0 504        | F64       | 1        | ГО        | 53       | EXISIEU    |
|   | P0174 | 2            | F04       | 2        | †         | 57       |            |

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

| DTC   | A/F sensor 1 |           |          | Ground | Continuity  |
|-------|--------------|-----------|----------|--------|-------------|
| DIC   | Bank         | Connector | Terminal | Giouna | Continuity  |
| P0171 | 1            | F27       | 1        | Ground | Not existed |
| PUITI |              |           | 2        |        |             |
| D0174 | 2            | EC4       | 1        | Ground |             |
| P0174 | Z            | F64       | 2        | 1      |             |

| DTC   | ECM       |          | - Ground Continuity |             |
|-------|-----------|----------|---------------------|-------------|
| DIC   | Connector | Terminal | Giouna              | Continuity  |
| P0171 |           | 45       | Ground              | Not evicted |
| FUT   | Eo        | 49       |                     |             |
| P0174 | - F8      | 53       | Ground              | Not existed |
| P0174 |           | 57       |                     |             |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to <u>EC-545</u>, "Inspection".

2. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-545. "Inspection".

| At idling: Approximately 350 kPa (3.57 kg/cm <sup>2</sup> , 51 psi) | Ν |  |  |  |
|---|---|--|--|--|
| Is the inspection result normal?                                    |   |  |  |  |
| YES >> GO TO 6.   | 0 |  |  |  |
| NO >> GO TO 5.  |   |  |  |  |
| 5. DETECT MALFUNCTIONING PART                                       |   |  |  |  |
| Check fuel hoses and fuel tubes for clogging.                       |   |  |  |  |
| Is the inspection result normal?                                    |   |  |  |  |
| YES >> Replace "fuel filter and fuel pump assembly".                |   |  |  |  |
| NO >> Repair or replace malfunctioning part.                        |   |  |  |  |
|   |   |  |  |  |

**Ó.**CHECK MASS AIR FLOW SENSOR

#### With CONSULT-III

< COMPONENT DIAGNOSIS >

- 1. Install all removed parts.
- Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III. For specification, refer to <u>EC-551</u>, "Mass Air Flow Sensor".

### With GST

- 1. Install all removed parts.
- Check mass air flow sensor signal in Service \$01 with GST. For specification, refer to <u>EC-551, "Mass Air Flow Sensor"</u>.

Is the measurement value within the specification?

- YES >> GO TO 7.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-163. "Diagnosis Procedure"</u>.

**7.**CHECK FUNCTION OF FUEL INJECTOR

### With CONSULT-III

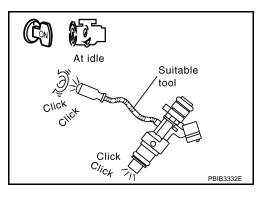
- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that each circuit produces a momentary engine speed drop.

### With GST

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-444</u>, "Diagnosis Procedure".



### 8.CHECK FUEL INJECTOR

- 1. Turn ignition switch OFF.
- 2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- 3. Disconnect all fuel injector harness connectors.
- 4. Remove fuel tube assembly. Refer to <u>EM-45</u>, "<u>Removal and Installation</u>". Keep fuel hose and all fuel injectors connected to fuel tube.
- For DTC P0171, reconnect fuel injector harness connectors on bank 1. For DTC P0174, reconnect fuel injector harness connectors on bank 2.
- 6. Disconnect all ignition coil harness connectors.
- 7. Prepare pans or saucers under each fuel injector.
- 8. Crank engine for about 3 seconds.

For DTC P0171, check that fuel sprays out from fuel injectors on bank 1. For DTC P0174, check that fuel sprays out from fuel injectors on bank 2.

### Fuel should be sprayed evenly for each fuel injector.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

### < COMPONENT DIAGNOSIS >

## P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

### **DTC** Logic

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[VQ35DE]

DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (the actual mixture ratio is too rich), the ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

| Sensor       | Input signal to ECM   | ECM function           | Actuator      | D |
|--------------|---|------------------------|---------------|---|
| A/F sensor 1 | Density of oxygen in exhaust gas<br>(Mixture ratio feedback signal) | Fuel injection control | Fuel injector | _ |

| DTC No. | Trouble diagnosis name                  | DTC detecting condition   | Possible cause   | - |
|---------|---|---|--|---|
| P0172   | Fuel injection system too rich (bank 1) | • Fuel injection system does not operate properly.                                      | <ul><li> A/F sensor 1</li><li> Fuel injector</li></ul>   | F |
| P0175   | Fuel injection system too rich (bank 2) | The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) | <ul><li>Exhaust gas leakage</li><li>Incorrect fuel pressure</li><li>Mass air flow sensor</li></ul> | G |

### DTC CONFIRMATION PROCEDURE

#### NOTE:

Check vehicle specifications and VIN, then select the procedure to be performed. (Refer to the table below.)

| Vehicle specification | Vehicle serial number   | TYPE |
|-----------------------|-------------------------|------|
|                       | Up to JN8AZ18U*9W100000 | А    |
| 2WD                   | From JN8AZ18U*9W100001  | В    |
| 2000                  | Up to JN8AZ18U*9W710000 | А    |
|                       | From JN8AZ18U*9W710001  | В    |
|                       | Up to JN8AZ18W*9W200000 | А    |
| 4WD                   | From JN8AZ18W*9W200001  | В    |
| 400                   | Up to JN8AZ18W*9W810000 | А    |
|                       | From JN8AZ18W*9W810001  | В    |

### TYPE A

#### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE-I

- Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> P <u>CLEAR : Special Repair Requirement"</u>.
- 2. Start engine.

Is it difficult to start engine?

| YES | >> GO TO 3. |
|-----|-------------|
| NO  | >> GO TO 4. |
| ~   |             |

**3.**RESTART ENGINE

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If it is difficult to start engine, the fuel injection system has a malfunction, too. Crank engine while depressing accelerator pedal.

NOTE:

• When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

#### Does engine start?

YES >> Go to EC-233, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

### **4.**PERFORM DTC CONFIRMATION PROCEDURE-II

1. Keep engine idle for at least 10 minutes.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-233, "Diagnosis Procedure".

NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-III

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start engine and drive the vehicle under similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.

#### Hold the accelerator pedal as steady as possible.

Similar conditions to (1st trip) Freeze Frame Data mean that the following conditions should be satisfied at the same time.

| Engine speed                             | Engine speed in the freeze frame data $\pm$ 400 rpm  |
|--|--|
| Vehicle speed                            | Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)   |
| Basic fuel schedule                      | Basic fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)  |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70°C (158°F),<br>T should be lower than 70°C (158°F).  |
|  | When the freeze frame data shows higher than or equal to $70^{\circ}C$ (158°F), T should be higher than or equal to $70^{\circ}C$ (158°F). |

#### 3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-233, "Diagnosis Procedure".

NO >> INSPECTION END

#### TYPE B

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement"</u>.
- 2. Start engine.

Is it difficult to start engine?

YES >> GO TO 3. NO >> GO TO 4.

**3.**RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.

### EC-232

[VQ35DE]

| Crank engine while depressing accelerator pedal.   |
|--|
| When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.    |
| boes engine start?   |
| YES >> Go to EC-233, "Diagnosis Procedure".  |
| NO >> Check exhaust and intake air leakage visually.   |
| PERFORM DTC CONFIRMATION PROCEDURE-II  |
| Keep engine idle for at least 5 minutes.<br>Check 1st trip DTC.  |
| <u>1st trip DTC detected?</u>  |
| (ES >> Go to <u>EC-233, "Diagnosis Procedure"</u> .  |
| NO >> GO TO 5.   |
| PERFORM DTC CONFIRMATION PROCEDURE-III   |
| <ul> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine.</li> </ul>  |
| Maintain the following conditions for at least 10 consecutive minutes.   |
| Hold the accelerator pedal as steady as possible.  |
| VHCL SPEED SE         50 - 120 km/h (31 - 75 mph)  |
| CAUTION:<br>Always drive vehicle at a safe speed.  |
| Check 1st trip DTC.  |
| 1st trip DTC detected?   |
| /ES >> Go to EC-233. "Diagnosis Procedure". NO >> INSPECTION END   |
|  |
|  |
| CHECK EXHAUST GAS LEAKAGE  |
| Start engine and run it at idle.<br>Listen for an exhaust gas leakage before three way catalyst (manifold).  |
| A/F sensor 1<br>To exhaust manifold  |
| ➡ : Exhaust gas  |
| exhaust gas leakage detected?  |
| YES >> Repair or replace malfunctioning part.  |
| CHECK FOR INTAKE AIR LEAKAGE   |
| sten for an intake air leakage after the mass air flow sensor.   |
| intake air leakage detected?   |
| YES >> Repair or replace malfunctioning part.  |
| CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT  |
| <ul> <li>Turn ignition switch OFF.</li> <li>Disconnect corresponding A/F sensor 1 harness connector.</li> <li>Disconnect ECM harness connector.</li> </ul> |
| FC-233   |

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### < COMPONENT DIAGNOSIS >

4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC   | A/F sensor |           |          | E         | CM       | Continuity |
|-------|------------|-----------|----------|-----------|----------|------------|
| DIC   | Bank       | Connector | Terminal | Connector | Terminal | Continuity |
| P0172 | 1          | F27       | 1        |           | 45       |            |
| FUITZ | I          | 121       | 2        | F8        | 49       | Existed    |
| P0175 | 2          | F64       | 1        | ГО        | 53       | EXISIED    |
| FU175 | 2          | F04       | 2        |           | 57       | 1          |

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

| DTC   |       | A/F sensor 1 |          | Ground | Continuity  |             |
|-------|-------|--------------|----------|--------|-------------|-------------|
| DIC   | Bank  | Connector    | Terminal | Ground | Continuity  |             |
| P0172 | 1     | F27          | 1        |        |             |             |
| FUITZ | 1 121 | 2            | F27      | 2      | Ground      | Not existed |
| D0475 | 0     | FC4          | 1        | Giouna | NUL EXISIEU |             |
| P0175 | 2     | F64          | 2        |        |             |             |

| DTC   | ECM       |          | Ground | Continuity  |  |
|-------|-----------|----------|--------|-------------|--|
| DIC   | Connector | Terminal | Ground | Continuity  |  |
| D0172 |           | 45       |        | Not existed |  |
| P0172 | F8        | 49       | Ground |             |  |
| D0175 | го        | 53       | Giouna | NOL EXISTED |  |
| P0175 |           | 57       |        |             |  |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-545, "Inspection".

2. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-545, "Inspection".

### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace "fuel filter and fuel pump assembly".

**5.**CHECK MASS AIR FLOW SENSOR

#### With CONSULT-III

- 1. Install all removed parts.
- 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III. For specification, refer to <u>EC-551, "Mass Air Flow Sensor"</u>.

#### With GST

- 1. Install all removed parts.
- Check mass air flow sensor signal in "Service \$01" with GST. For specification, refer to <u>EC-551, "Mass Air Flow Sensor"</u>.

Is the measurement value within the specification?

YES >> GO TO 6.

NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-163, "Diagnosis Procedure"</u>.

### EC-234

#### < COMPONENT DIAGNOSIS >

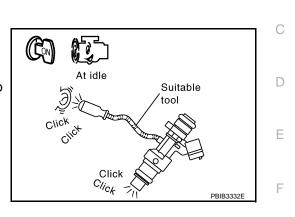
### 6. CHECK FUNCTION OF FUEL INJECTOR

#### (I) With CONSULT-III

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.
- Is the inspection result normal?
- YES >> GO TO 7.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to EC-444, "Diagnosis Procedure".



### 7. CHECK FUEL INJECTOR

| 1. Remove fuel injector assembly. Refer to EM-45, "Removal and Installation".   | _     |
|---|-------|
| <ol> <li>Remove fuel injector assembly. Refer to <u>EM-45, "Removal and Installation"</u>.<br/>Keep fuel hose and all fuel injectors connected to fuel tube.</li> </ol> | G     |
| <ol> <li>Confirm that the engine is cooled down and there are no fire hazards near the vehicle.</li> </ol>  |       |
| 3. Disconnect all fuel injector harness connectors.   |       |
| 4. Disconnect all ignition coil harness connectors.   | Н     |
| 5. Prepare pans or saucers under each fuel injectors.   |       |
| 6. Crank engine for about 3 seconds.  |       |
| Check fuel does not drip from fuel injector.  |       |
| Is the inspection result normal?  |       |
| YES >> GO TO 8.   |       |
| NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.   | J     |
| 8. CHECK INTERMITTENT INCIDENT  |       |
| Refer to GI-40, "Intermittent Incident".  | K     |
|   | N     |
| >> INSPECTION END   |       |
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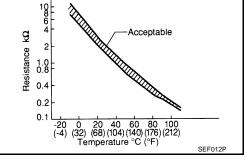
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### P0181 FTT SENSOR

### Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases. <**Reference data**>



201

|   | Fluid temperature<br>[°C (°F)] | Voltage*<br>(V) | Resistance<br>(kΩ) |  |
|---|--------------------------------|-----------------|--------------------|--|
| - | 20 (68)                        | 3.5             | 2.3 - 2.7          |  |
| - | 50 (122)                       | 2.2             | 0.79 - 0.90        |  |

\*: These data are reference values and are measured between ECM terminals 95 (Fuel tank temperature sensor) and ground.

### DTC Logic

### DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause  |
|---------|--|---|---|
| P0181   | Fuel tank temperature<br>sensor circuit range/per-<br>formance | Rationally incorrect voltage from the sensor is<br>sent to ECM, compared with the voltage signals<br>from engine coolant temperature sensor and in-<br>take air temperature sensor. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Fuel tank temperature sensor</li> </ul> |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

## 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-237, "Diagnosis Procedure".

NO >> GO TO 3.

3.CHECK ENGINE COOLANT TEMPERATURE

#### With CONSULT-III

- I. Select "COOLAN TEMP/S" in "DATA MONITOR" with CONSULT-III.
- 2. Check "COOLAN TEMP/S" value.

#### With GST

Follow the procedure "With CONSULT-III" above.

Is "COOLAN TEMP/S" less than 60°C (140°F)?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-II



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2009 Murano

### P0181 FTT SENSOR

| < COMPONENT DIAGNOS<br>With CONSULT-III<br>Cool engine down until "  | S >  |  |   | [VQ35DE]                                      |
|--|--|--|---|---|
| 1. Cool engine down until "  | <u> </u>   |  |   |   |
| <ol> <li>Wait at least 10 seconds.</li> <li>Check 1st trip DTC.</li> </ol>   |  | P/S" is less t                           | han 60°C (140                                 | )°F).   |
| With GST Follow the procedure "With C  | ONSULT-III" at   | ove.                                     |   |   |
| <u>Is 1st trip DTC detected?</u><br>YES >> Go to <u>EC-237, "E</u>   | iagnosis Proce   | edure".                                  |   |   |
| NO >> INSPECTION EN  |  |  |   |   |
| Diagnosis Procedure  |  |  |   | INFOID:000000003388021                        |
| 1.CHECK GROUND CONN  | ECTION   |  |   |   |
| <ol> <li>Turn ignition switch OFF.</li> <li>Check ground connection<br/><u>Is the inspection result norma</u><br/>YES &gt;&gt; GO TO 2.     </li> </ol>  |  | Ground Ins                               | pection in <u>GI-4</u>                        | 3. "Circuit Inspection".                      |
| NO >> Repair or replace  | •  |  |   |   |
| 2.CHECK FUEL TANK TEM<br>1. Turn ignition switch OFF.<br>2. Disconnect "fuel level ser<br>3. Turn ignition switch ON.  |  |  |   |   |
| 0  | n "fuel level se   | ensor unit ar                            | nd fuel pump"                                 | harness connector and ground.                 |
| Fuel level sensor unit and fuel pur  | np<br>Ground   | Vo                                       | oltage  |   |
| Connector Terminal   |  |  | <b>F</b> \/                                   |   |
| B40 4  | Ground   | Арр                                      | rox. 5 V                                      |   |
| a the increation regult norma  |  |  |   |   |
| <u>Is the inspection result norma</u><br>YES >> GO TO 4.<br>NO >> GO TO 3.   | <u>1:</u>  |  |   |   |
| YES >> GO TO 4.<br>NO >> GO TO 3.  |  |  |   |   |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br><b>3.</b> DETECT MALFUNCTION<br>Check the following.  | NG PART  |  |   |   |
| YES >> GO TO 4.  | NG PART  | nd "fuel leve                            | el sensor unit a                              | and fuel pump"                                |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br>3.DETECT MALFUNCTION<br>Check the following.<br>• Harness connectors E104,  | NG PART<br>34<br>etween ECM a  |  |   |   |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br>3.DETECT MALFUNCTION<br>Check the following.<br>• Harness connectors E104,<br>• Harness for open or short b   | NG PART<br>34<br>etween ECM a<br>iit, short to grou  | und or short                             | to power in ha                                | arness or connector.                          |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br>3.DETECT MALFUNCTION<br>Check the following.<br>• Harness connectors E104,<br>• Harness for open or short b<br>>> Repair open circu<br>4.CHECK FUEL TANK TEM<br>1. Turn ignition switch OFF.<br>2. Disconnect ECM harness   | NG PART<br>34<br>etween ECM a<br>nit, short to grou<br>PERATURE SE<br>s connector.                   | und or short<br>ENSOR GRO                | to power in ha<br>OUND CIRCU                  | arness or connector.                          |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br>3.DETECT MALFUNCTION<br>Check the following.<br>• Harness connectors E104,<br>• Harness for open or short b<br>>> Repair open circu<br>4.CHECK FUEL TANK TEM<br>1. Turn ignition switch OFF.<br>2. Disconnect ECM harness<br>3. Check the continuity betw               | NG PART<br>34<br>etween ECM a<br>nit, short to grou<br>PERATURE SE<br>connector.<br>veen "fuel level | und or short<br>ENSOR GRO<br>sensor unit | to power in ha<br>OUND CIRCU<br>and fuel pump | arness or connector.<br>IT FOR OPEN AND SHORT |
| YES >> GO TO 4.<br>NO >> GO TO 3.<br>3.DETECT MALFUNCTION<br>Check the following.<br>• Harness connectors E104,<br>• Harness for open or short b<br>>> Repair open circu<br>4.CHECK FUEL TANK TEM<br>1. Turn ignition switch OFF.<br>2. Disconnect ECM harness<br>3. Check the continuity betw<br>connector. | NG PART<br>34<br>etween ECM a<br>nit, short to grou<br>PERATURE SE<br>connector.<br>veen "fuel level | und or short<br>ENSOR GRO<br>sensor unit | to power in ha<br>OUND CIRCU                  | arness or connector.<br>IT FOR OPEN AND SHORT |

Revision: 2008 October

### P0181 FTT SENSOR

#### < COMPONENT DIAGNOSIS >

Harness connectors E105, M11

• Harness connectors M77, B11

• Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

>> Repair open circuit, short to ground or short to power in harness or connector.

### **6.**CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-238. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace "fuel level sensor unit and fuel pump".

7. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

### **Component Inspection**

## 1.CHECK FUEL TANK TEMPERATURE SENSOR

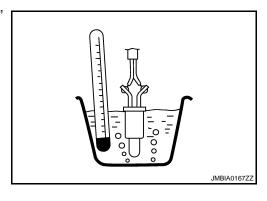
- 1. Turn ignition switch OFF.
- 2. Remove fuel level sensor unit.

 Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

| Terminals | Condition             |          | Resistance     |
|-----------|-----------------------|----------|----------------|
| 4 and 5   | Temperature [°C (°F)] | 20 (68)  | 2.3 - 2.7 kΩ   |
| 4 810 5   |                       | 50 (122) | 0.79 - 0.90 kΩ |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace "fuel level sensor unit and fuel pump".

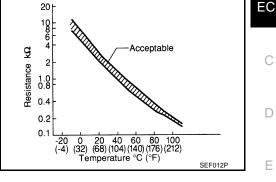


### P0182, P0183 FTT SENSOR

### Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases. <**Reference data>** 

| Fluid temperature<br>[°C (°F)] | Voltage*<br>(V) | Resistance<br>(kΩ) |
|--------------------------------|-----------------|--------------------|
| 20 (68)                        | 3.5             | 2.3 - 2.7          |
| 50 (122)                       | 2.2             | 0.79 - 0.90        |



\*: These data are reference values and are measured between ECM terminals 95 (Fuel tank temperature sensor) and ground.

### **DTC** Logic

### DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name                            | DTC detecting condition                                     | Possible cause   |
|---------|---|---|--|
| P0182   | Fuel tank temperature<br>sensor circuit low input | An excessively low voltage from the sensor is sent to ECM.  | Harness or connectors     (The sensor circuit is open or shorted.) |
| P0183   | Fuel tank temperature sensor circuit high input   | An excessively high voltage from the sensor is sent to ECM. | Fuel tank temperature sensor                                       |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

### 2.PERFORM DTC CONFIRMATION PROCEDURE 1. Turn ignition switch ON and wait at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-239, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

### 1.CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

2.CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

### EC-239

## [VQ35DE]

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### P0182, P0183 FTT SENSOR

#### < COMPONENT DIAGNOSIS >

- 2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between "fuel level sensor unit and fuel pump" harness connector and ground.

| Fuel level sensor unit and fuel pump |          | Ground | Voltage     |  |
|--------------------------------------|----------|--------|-------------|--|
| Connector                            | Terminal | Ground | voltage     |  |
| B40                                  | 4        | Ground | Approx. 5 V |  |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E104, B4

• Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

>> Repair open circuit, short to ground or short to power in harness or connector.

### ${f 4.}$ CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ECM harness connector.

| Fuel level sensor unit and fuel pump |          | ECM       |          | Continuity |
|--------------------------------------|----------|-----------|----------|------------|
| Connector                            | Terminal | Connector | Terminal | Continuity |
| B40                                  | 5        | E16       | 104      | Existed    |

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E105, M11

Harness connectors M77, B11

• Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

>> Repair open circuit, short to ground or short to power in harness or connector.

#### **6.**CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-240, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace "fuel level sensor unit and fuel pump".

7. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

### **Component Inspection**

**1.**CHECK FUEL TANK TEMPERATURE SENSOR

1. Turn ignition switch OFF.

### P0182, P0183 FTT SENSOR

#### < COMPONENT DIAGNOSIS >

### [VQ35DE]

2. Remove fuel level sensor unit.

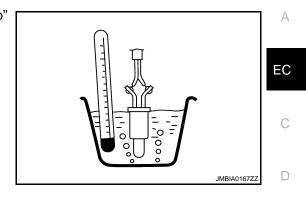
3. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

| Terminals | Condition             |          | Resistance     |
|-----------|-----------------------|----------|----------------|
| 4 and 5   | Temperature [°C (°F)] | 20 (68)  | 2.3 - 2.7 kΩ   |
| 4 414 5   |                       | 50 (122) | 0.79 - 0.90 kΩ |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump".



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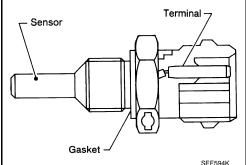
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### P0196 EOT SENSOR

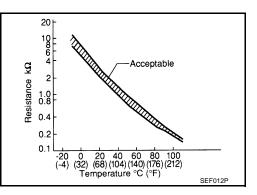
### Description

The engine oil temperature sensor is used to detect the engine oil temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine oil temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



#### <Reference data>

| Engine oil temperature<br>[°C (°F)] | Voltage* (V) | Resistance (k $\Omega$ ) |
|-------------------------------------|--------------|--------------------------|
| -10 (14)                            | 4.4          | 7.0 - 11.4               |
| 20 (68)                             | 3.5          | 2.1 - 2.9                |
| 50 (122)                            | 2.2          | 0.68 - 1.00              |
| 90 (194)                            | 0.9          | 0.236 - 0.260            |
| 110 (230)                           | 0.6          | 0.143 - 0.153            |



\*: These data are reference values and are measured between ECM terminals 54 (Engine oil temperature sensor) and 52 (Sensor ground).

### **DTC Logic**

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P0196 is displayed with P0197 or P0198, first perform the trouble diagnosis for DTC P0197, P0198. Refer to <u>EC-245, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                                  | DTC detecting condition   | Possible cause   |
|---------|---|---|--|
| P0196   | Engine oil temperature<br>sensor range/perfor-<br>mance | Rationally incorrect voltage from the sensor is<br>sent to ECM, compared with the voltage signals<br>from engine coolant temperature sensor and in-<br>take air temperature sensor. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Engine oil temperature sensor</li> </ul> |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

>> GO TO 2.

### 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.

### EC-242

2009 Murano

INFOID:00000003544688

### **P0196 EOT SENSOR**

| < COMPONENT DIAGNOSIS >  | [VQ35DE]   |   |
|--|--|---|
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine and let it idle for 5 minutes and 10 seconds.</li> <li>Check 1st trip DTC.</li> </ol>  |  |   |
| <u>s 1st trip DTC detected?</u><br>YES >> <u>EC-243, "Diagnosis Procedure"</u> .   |  | E |
| NO >> GO TO 3.   |  |   |
| <b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE-I   | 11   |   |
| <ul> <li>With CONSULT-III</li> <li>Select "DATA MONITOR" mode with CONSULT-II</li> <li>Check that "COOLAN TEMP/S" indicates above 8<br/>If it is above 80°C (176°F), go to the following step<br/>(6 it is a below 80°C (176°F).</li> </ul>  | 30°C (176°F).<br>ps.   |   |
| <ul> <li>Then perform the following steps.</li> <li>Turn ignition switch OFF and soak the vehicle in a</li> <li>Turn ignition switch ON.</li> <li>NOTE:</li> </ul>   | "COOLAN TEMP/S" indicates more than 80°C (176°F).<br>a cool place. |   |
| <b>Do not turn ignition switch OFF until step 8.</b><br>5. Select "DATA MONITOR" mode with CONSULT-II<br>6. Check the following.   | Ι.   |   |
| COOLAN TEMP/S  | Below 40°C (104°F)   |   |
| INT/A TEMP SE  | Below 40°C (104°F)   |   |
| Difference between "COOLAN TEMP/S" and "INT/A TEMP SE"   | Within 6°C (11°F)  |   |
| <ul> <li>If they are within the specified range, perform the If they are out of the specified range, soak the ver lowing steps.</li> <li>NOTE: <ul> <li>Do not turn ignition switch OFF.</li> <li>If it is supposed to need a long period of time</li> </ul> </li> <li>7. Start engine and let it idle for 5 minutes.</li> <li>3. Check 1st trip DTC.</li> </ul> | nicle to meet the above conditions. Then perform the fol-          |   |
| Solution DTC.     Solution DTC.     Solution DTC detected?     YES >> EC-243, "Diagnosis Procedure".   |  |   |
| NO >> INSPECTION END   |  |   |
| Diagnosis Procedure  | INFOID:00000003544690  |   |
| <ol> <li>CHECK GROUND CONNECTION</li> <li>Turn ignition switch OFF.</li> <li>Check ground connection E38. Refer to Ground In<br/>s the inspection result normal?</li> <li>YES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace ground connection.</li> <li>CHECK ENGINE OIL TEMPERATURE SENSOR</li> </ol>  | nspection in <u>GI-43, "Circuit Inspection"</u> .                  |   |
|  |  |   |
| Refer to EC-244, "Component Inspection".   |  |   |

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

### Component Inspection

## 1. CHECK ENGINE OIL TEMPERATURE SENSOR

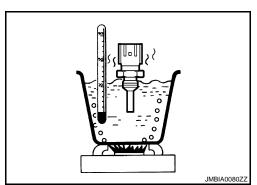
- 1. Turn ignition switch OFF.
- 2. Disconnect engine oil temperature sensor harness connector.
- 3. Remove engine oil temperature sensor.
- 4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition               |          | Resistance       |
|-----------|-------------------------|----------|------------------|
|           | 2 Temperature [°C (°F)] | 20 (68)  | 2.1 - 2.9 kΩ     |
| 1 and 2   |                         | 50 (122) | 0.68 - 1.00 kΩ   |
|           |                         | 90 (194) | 0.236 - 0.260 kΩ |

Is the inspection result normal?

YES >> INSPECTION END

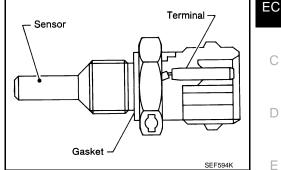
NO >> Replace engine oil temperature sensor.



### P0197, P0198 EOT SENSOR

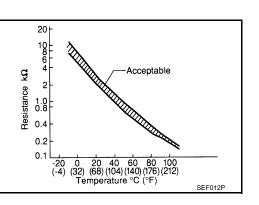
### Description

The engine oil temperature sensor is used to detect the engine oil temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine oil temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



#### <Reference data>

| Engine oil temperature<br>[°C (°F)] | Voltage* (V) | Resistance (k $\Omega$ ) |
|-------------------------------------|--------------|--------------------------|
| -10 (14)                            | 4.4          | 7.0 - 11.4               |
| 20 (68)                             | 3.5          | 2.1 - 2.9                |
| 50 (122)                            | 2.2          | 0.68 - 1.00              |
| 90 (194)                            | 0.9          | 0.236 - 0.260            |
| 110 (230)                           | 0.6          | 0.143 - 0.153            |



## \*: These data are reference values and are measured between ECM terminals 54 (Engine oil temperature sensor) and 52 (Sensor ground).

### **DTC** Logic

#### DTC DETECTION LOGIC

| DTC No. | Trouble Diagnosis<br>Name                                | DTC detecting condition                                     | Possible Cause  | K |
|---------|--|---|---|---|
| P0197   | Engine oil tempera-<br>ture sensor circuit low<br>input  | An excessively low voltage from the sensor is sent to ECM.  | <ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul> | L |
| P0198   | Engine oil tempera-<br>ture sensor circuit<br>high input | An excessively high voltage from the sensor is sent to ECM. | Engine oil temperature sensor   | M |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

INFOID:000000003668898

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### P0197, P0198 EOT SENSOR

< COMPONENT DIAGNOSIS >

#### YES >> Go to EC-246, "Diagnosis Procedure".

NO >> INSPECTION END

### **Diagnosis** Procedure

### **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

### 2. CHECK EOT SENSOR POWER SUPPLY CIRCUIT

- 1. Disconnect engine oil temperature (EOT) sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between EOT sensor harness connector and ground.

| EOT sensor |          | Ground | Voltage     |  |
|------------|----------|--------|-------------|--|
| Connector  | Terminal | Ground | voltage     |  |
| F66        | 1        | Ground | Approx. 5 V |  |

Is the inspection result normal?

YES >> GO TO 3.

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

## ${f 3.}$ CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| EOT sensor |          | ECM                |    | Continuity |
|------------|----------|--------------------|----|------------|
| Connector  | Terminal | Connector Terminal |    | Continuity |
| F66        | 2        | F8                 | 52 | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

#### **4.**CHECK ENGINE OIL TEMPERATURE SENSOR

#### Refer to EC-246, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine oil temperature sensor.

#### **5.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

### **Component Inspection**

### 1.CHECK ENGINE OIL TEMPERATURE SENSOR

1. Turn ignition switch OFF.

#### 2. Disconnect engine oil temperature sensor harness connector.

3. Remove engine oil temperature sensor.

### EC-246

2009 Murano

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[VQ35DE]

### P0197, P0198 EOT SENSOR

#### < COMPONENT DIAGNOSIS >

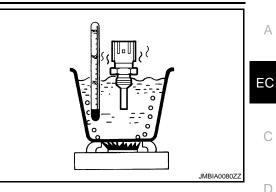
4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition             |          | Resistance       |
|-----------|-----------------------|----------|------------------|
|           |                       | 20 (68)  | 2.1 - 2.9 kΩ     |
| 1 and 2   | Temperature [°C (°F)] | 50 (122) | 0.68 - 1.00 kΩ   |
|           |                       | 90 (194) | 0.236 - 0.260 kΩ |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil temperature sensor.



## [VQ35DE]

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P0222, P0223 TP SENSOR

### Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

the throttle valve movement. The throttle position sensor has two sensors. These sensors are a kind of potentiometer which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.



PBIB0145E

135

90

### **DTC** Logic

#### DTC DETECTION LOGIC NOTE: If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-347, "DTC Logic".

| DTC No. | Trouble diagnosis name   | DTC detecting condition                        | Possible cause  |
|---------|--------------------------|--|---|
| P0222   | Throttle position sensor | An excessively low voltage from the TP sensor  | • Harness or connectors                               |
|         | 1 circuit low input      | 1 is sent to ECM.                              | (TP sensor 1 circuit is open or shorted.)             |
| P0223   | Throttle position sensor | An excessively high voltage from the TP sensor | <ul> <li>Electric throttle control actuator</li></ul> |
|         | 1 circuit high input     | 1 is sent to ECM.                              | (TP sensor 1)   |

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 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-248, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

### **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in <u>GI-43. "Circuit Inspection"</u>.

Is the inspection result normal?

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

INFOID:00000003388029

INFOID:000000003591571

Throttle position sensor

Sensor 1

Seńsor 2

45

Throttle valve opening angle (deg)

6.0

4.0

output voltage

## P0222, P0223 TP SENSOR

|  |  |   |  | ER SUPPLY CIRCUIT-I  |                |
|--|--|---|--|--|----------------|
|  | electric throttle  |   |  |  |                |
| . Turn ignitior  | n switch ON.   |   |  |  |                |
| . Check the v  | oltage betwee  | en electric the   | rottle contr   | ol actuator harness connecto   | r and ground.  |
| Electric throttle  | control actuator   |   |  |  |                |
| Connector  | Terminal   | - Ground  | Ve   | oltage   |                |
| F29  | 1  | Ground  | Арр  | rox. 5 V   |                |
| <u>the inspection</u><br>YES >> GO   |  | <u> ?</u>   |  |  |                |
|  |  | iit, short to gr  | ound or sh   | ort to power in harness or co  | nnectors.      |
| CHECK THR  | OTTLE POSI   | TION SENS   | OR 1 GRO   | UND CIRCUIT FOR OPEN A   | ND SHORT       |
|  | switch OFF.  |   |  |  |                |
|  | ECM harness<br>continuity betw   |   | throttle cor   | ntrol actuator and ECM harne   | ess connector. |
|  | ,  |   |  |  |                |
| Electric throttle c  |  | EC  |  | Continuity   |                |
| Connector  | Terminal   | Connector   | Terminal   |  |                |
| F29<br>Also check  | 4  | F8  | 36   | Existed  |                |
| YES >> GO<br>NO >> Rep   | <u>result normal</u><br>TO 4.<br>pair open circu   | l <u>?</u><br>it, short to gr   | round or sh  | to power.<br>Nort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI   |                |
| YES >> GO<br>NO >> Rep<br>•.CHECK THR  | <u>result normal</u><br>TO 4.<br>pair open circu<br>OTTLE POSI   | l <u>?</u><br>it, short to gr<br>TION SENS(   | round or sh<br>OR 1 INPU   | ort to power in harness or co  | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•.CHECK THR  | result normal<br>TO 4.<br>pair open circu<br>OTTLE POSI<br>continuity betw   | l <u>?</u><br>it, short to gr<br>TION SENS(   | round or sh<br>OR 1 INPU<br>throttle cor   | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne                                       | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>CHECK THR<br>Check the c   | result normal<br>TO 4.<br>pair open circu<br>OTTLE POSI<br>continuity betw   | I?<br>iit, short to gr<br>TION SENS(<br>reen electric   | round or sh<br>OR 1 INPU<br>throttle cor   | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI   | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>• CHECK THR<br>• Check the c<br>Electric throttle c<br>Connector<br>F29  | orresult normal<br>TO 4.<br>Dair open circu<br>OTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2  | I?<br>iit, short to gr<br>TION SENS(<br>veen electric<br>EC<br>Connector<br>F8  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37  | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed              | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check   | TO 4.<br>Dair open circu<br>OTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh   | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37  | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed              | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>.CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection   | orresult normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh   | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37  | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed              | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep   | on result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>Control scutt normal<br>TO 5.<br>Dair open circu  | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short   | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed              | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep   | on result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>Control scutt normal<br>TO 5.<br>Dair open circu  | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short   | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep   | TO 4.<br>Dair open circu<br>COTTLE POSI<br>CONTINUITY betwe<br>Continuity betwe<br>Control actuator<br>Terminal<br>2<br>harness for sharness for sharne | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR                    | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>CHECK THR<br>efer to <u>EC-250</u><br>the inspection  | on result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>Control scult normal<br>TO 5.<br>Dair open circu<br>COTTLE POSI<br>COTTLE POSI<br>Component<br>Component  | I?<br>iit, short to gr<br>TION SENS<br>reen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr<br>TION SENS<br>t Inspection".  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR                    | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>CHECK THR<br>efer to <u>EC-250</u><br>the inspection<br>YES >> GO   | n result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>Dair open circu<br>COTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.  | I?<br>iit, short to gr<br>TION SENS<br>reen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr<br>TION SENS<br>t Inspection".  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR                    | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>ntrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>•CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>•CHECK THR<br>efer to EC-250<br>the inspection<br>YES >> GO  | n result normal<br>TO 4.<br>Dair open circu<br>OTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>Dair open circu<br>OTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.<br>TO 6.   | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr<br>TION SENSO<br>t Inspection".  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR                    | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>atrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>.CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>.CHECK THR<br>efer to EC-250<br>the inspection<br>YES >> GO<br>NO >> GO<br>NO >> GO  | n result normal<br>TO 4.<br>Dair open circu<br>OTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>Dair open circu<br>OTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.<br>TO 6.   | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>EC<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr<br>TION SENSO<br>t Inspection".<br>I?<br>ROTTLE CO   | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR                    | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>atrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>.CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>.CHECK THR<br>efer to EC-250<br>the inspection<br>YES >> GO<br>NO >> GO<br>.REPLACE El<br>. Replace ele  | n result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>Dair open circu<br>COTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.<br>TO 6.<br>LECTRIC THE  | I?         iit, short to gr         TION SENSO         reen electric         EC         Connector         F8         nort to ground         I?         iit, short to gr         II?         iit, short to gr         II?         ROTTLE COI         ontrol actuat | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR<br>NTROL AC<br>or. | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>atrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| YES >> GO<br>NO >> Rep<br>CHECK THR<br>Check the c<br>Electric throttle c<br>Connector<br>F29<br>Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>CHECK THR<br>efer to EC-250<br>the inspection<br>YES >> GO<br>NO >> GO<br>REPLACE El<br>Replace ele<br>Refer to EC  | n result normal<br>TO 4.<br>Dair open circu<br>COTTLE POSI<br>Continuity betw<br>Control actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>Dair open circu<br>COTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.<br>TO 6.<br>LECTRIC THF<br>ectric throttle ci<br>-250, "Special  | I?<br>iit, short to gr<br>TION SENSO<br>veen electric<br>Connector<br>F8<br>nort to ground<br>I?<br>iit, short to gr<br>TION SENSO<br>t Inspection".<br>I?<br>ROTTLE COI<br>ontrol actuat<br>Repair Req   | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR<br>NTROL AC<br>or. | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>atrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |
| NO >> Rep<br>. CHECK THR<br>. Check the c<br>Electric throttle c<br>Connector<br>F29<br>. Also check<br>the inspection<br>YES >> GO<br>NO >> Rep<br>. CHECK THR<br>Refer to EC-250<br>s the inspection<br>YES >> GO<br>NO >> Rep<br>. CHECK THR<br>Refer to EC-250<br>s the inspection<br>YES >> GO<br>NO >> GO<br>. CHECK THR<br>Refer to EC-250<br>s the inspection<br>YES >> GO<br>NO >> GO<br>. REPLACE El<br>. Replace ele<br>. Refer to EC | n result normal<br>TO 4.<br>pair open circu<br>OTTLE POSI<br>continuity betw<br>ontrol actuator<br>Terminal<br>2<br>harness for sh<br>n result normal<br>TO 5.<br>pair open circu<br>OTTLE POSI<br>0. "Component<br>n result normal<br>TO 7.<br>TO 6.<br>LECTRIC THF<br>ectric throttle cr<br>-250, "Special<br>PECTION EN   | I?<br>iit, short to gr<br>TION SENSO<br>reen electric<br>Connector<br>F8<br>nort to ground<br>I?<br>it, short to gr<br>TION SENSO<br>t Inspection".<br>I?<br>ROTTLE COI<br>ontrol actuat<br>Repair Reg  | round or sh<br>DR 1 INPU<br>throttle cor<br>M<br>Terminal<br>37<br>d and short<br>round or sh<br>DR<br>NTROL AC<br>or. | ort to power in harness or co<br>T SIGNAL CIRCUIT FOR OI<br>atrol actuator and ECM harne<br>Continuity<br>Existed<br>to power. | PEN AND SHORT  |

Refer to GI-40, "Intermittent Incident".

### >> INSPECTION END

### P0222, P0223 TP SENSOR

### < COMPONENT DIAGNOSIS >

### Component Inspection

### 1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Set selector lever to D position.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

| ECM       |                                   |  |   |                 |                  |
|-----------|-----------------------------------|--|---|-----------------|------------------|
| Connector | +                                 | -  | Condition                               |                 | Voltage          |
| Connector | Terminal                          | Terminal                                       |   |                 |                  |
| F8        | 37<br>(TP sensor 1 sig-<br>nal) 3 |  | 36<br>(Sensor ground) Accelerator pedal | Fully released  | More than 0.36 V |
|           |                                   | 36   |   | Fully depressed | Less than 4.75 V |
|           | 38                                | 38 (Sensor ground)<br>TP sensor 2 sig-<br>nal) |   | Fully released  | Less than 4.75 V |
|           | , U                               |  |   | Fully depressed | More than 0.36 V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.

2. Go to EC-177, "Special Repair Requirement".

#### >> INSPECTION END

### Special Repair Requirement

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

### >> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

### < COMPONENT DIAGNOSIS >

### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

### **DTC** Logic

INFOID:000000003388032

[VQ35DE]

#### DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

| Sensor                           | Input signal to ECM | ECM function                  | 0 |
|----------------------------------|---------------------|-------------------------------|---|
| Crankshaft position sensor (POS) | Engine speed        | On board diagnosis of misfire |   |

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the 1st trip, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off. If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink. When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on. If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

 Two Trip Detection Logic (Exhaust quality deterioration) For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only illuminate when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected in any one cylinder or in multiple cylinders.

| DTC No. | Trouble diagnosis name              | DTC detecting condition     | Possible cause  |
|---------|-------------------------------------|-----------------------------|---|
| P0300   | Multiple cylinder misfires detected | Multiple cylinders misfire. | Improper spark plug   |
| P0301   | No. 1 cylinder misfire detected     | No. 1 cylinder misfires.    | Insufficient compression     Incorrect fuel pressure                    |
| P0302   | No. 2 cylinder misfire detected     | No. 2 cylinder misfires.    | The fuel injector circuit is open or shorted                            |
| P0303   | No. 3 cylinder misfire detected     | No. 3 cylinder misfires.    | <ul> <li>Fuel injector</li> <li>Intake air leakage</li> </ul>           |
| P0304   | No. 4 cylinder misfire detected     | No. 4 cylinder misfires.    | • The ignition signal circuit is open or shorted                        |
| P0305   | No. 5 cylinder misfire detected     | No. 5 cylinder misfires.    | Lack of fuel     Signal plate   |
| P0306   | No. 6 cylinder misfire detected     | No. 6 cylinder misfires.    | <ul> <li>A/F sensor 1</li> <li>Incorrect PCV hose connection</li> </ul> |

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and let it idle for approximately 15 minutes.
- 6. Check 1st trip DTC.

### Is 1st trip DTC detected?

А

EC

D

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F

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Μ

Ν

P

### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< COMPONENT DIAGNOSIS >

YES >> Go to EC-252, "Diagnosis Procedure".

NO >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE-II

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and drive the vehicle under similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.

#### Hold the accelerator pedal as steady as possible.

Similar conditions to (1st trip) Freeze Frame Data mean that the following conditions should be satisfied at the same time.

#### **CAUTION:**

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

| Engine speed                   | Engine speed in the freeze frame data $\pm400$ rpm   |  |
|--------------------------------|--|--|
| Vehicle speed                  | Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)   |  |
| Basic fuel schedule            | Basic fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)  |  |
| Engine coolant temperature (T) | When the freeze frame data shows lower than 70°C (158°F),<br>T should be lower than 70°C (158°F).                        |  |
| condition                      | When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F). |  |

Driving time varies according to the engine speed in the freeze frame data.

| Engine speed        | Time                      |
|---------------------|---------------------------|
| Around 1,000 rpm    | Approximately 10 minutes  |
| Around 2,000 rpm    | Approximately 5 minutes   |
| More than 3,000 rpm | Approximately 3.5 minutes |

5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-252, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

1. CHECK FOR INTAKE AIR LEAKAGE AND PCV HOSE

- 1. Start engine and run it at idle speed.
- 2. Listen for the sound of the intake air leakage.
- 3. Check PCV hose connection.

#### Is intake air leakage detected?

YES >> Discover air leakage location and repair.

NO >> GO TO 2.

### 2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

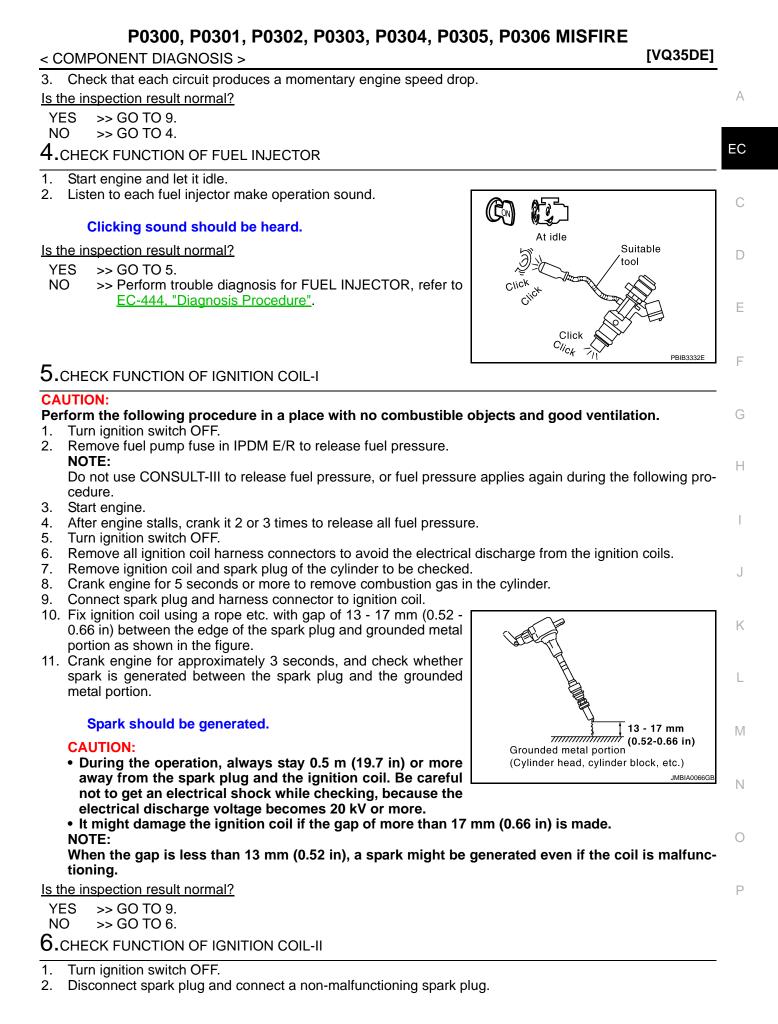
- YES-1 >> With CONSULT-III: GO TO 3.
- YES-2 >> Without CONSULT-III: GO TO 4.
- NO >> Repair or replace malfunctioning part.

**3.** PERFORM POWER BALANCE TEST

#### With CONSULT-III

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.

### EC-252



## EC-253

## P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

#### < COMPONENT DIAGNOSIS >

3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

Is the inspection result normal?

YES >> GO TO 7.

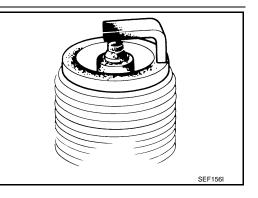
NO >> Check ignition coil, power transistor and their circuits. Refer to EC-451, "Diagnosis Procedure".

**7.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

#### Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-142, "Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 8.



[VQ35DE]

## 8.CHECK FUNCTION OF IGNITION COIL-III

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

#### Spark should be generated.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-142, "Spark</u> <u>Plug"</u>.

## 9.CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

**10.**CHECK FUEL PRESSURE

- 2. Release fuel pressure to zero. Refer to <u>EC-545</u>, "Inspection".
- 3. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-545, "Inspection".

#### At idle: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace "fuel filter and fuel pump assembly".

NO >> Repair or replace malfunctioning part.

12. CHECK IGNITION TIMING

Check idle speed and ignition timing. For procedure, refer to <u>EC-12, "BASIC INSPECTION : Special Repair Requirement"</u>.

<sup>1.</sup> Install all removed parts.

|  | P0300         | , <b>P0301</b>          | , P0302, F   | P0303, P0                    | 304, P0305, P0306 M                  | ISFIRE               |    |
|--|---------------|-------------------------|--------------|------------------------------|--------------------------------------|----------------------|----|
| < COMPO                                    | NENT DIA      | GNOSIS >                |              |                              |                                      | [VQ35DE]             |    |
| For specifi                                | cation, refer | to <u>EC-551</u>        | , "Idle Spee | d" and <u>EC-5</u>           | 51, "Ignition Timing".               |                      |    |
| Is the insp                                | ection result | t normal?               |              |                              |                                      |                      | А  |
| -  | > GO TO 13    |                         |              |                              |                                      |                      |    |
|  |               |                         |              |                              | ecial Repair Requirement".           |                      |    |
| <b>13.</b> CHEC                            | CK A/F SEN    | ISOR 1 IN               | PUT SIGNAI   |                              |                                      |                      | EC |
| <ol> <li>Discor</li> <li>Discor</li> </ol> | nect ECM I    | ponding A<br>harness co | nnector.     | harness con<br>r 1 harness c | nector.<br>connector and ECM harness | connector.           | С  |
|  | A/F sensor 1  |                         | E            | СМ                           |                                      |                      | D  |
| Bank                                       | Connector     | Terminal                | Connector    | Terminal                     | Continuity                           |                      |    |
|  | F07           | 1                       |              | 45                           |                                      |                      | Е  |
| 1  | F27           | 2                       | 50           | 49                           |                                      |                      |    |
|  | 504           | 1                       | F8           | 53                           | Existed                              |                      |    |
| 2  | F64           | 2                       |              | 57                           |                                      |                      | F  |
| 5. Check<br>and gr                         |               | uity betwee             | en A/F senso | or 1 harness                 | connector and ground, or E           | CM harness connector | G  |
|  | A/F sensor 1  |                         | Ground       | Continuity                   |                                      |                      |    |
| Bank                                       | Connector     | Terminal                | Giouna       | Continuity                   |                                      |                      | Н  |
| 4  | F07           | 1                       |              |                              |                                      |                      |    |
| 1  | F27           | 2                       | One and      | Net evieted                  |                                      |                      |    |
|  | 504           | 1                       | Ground       | Not existed                  |                                      |                      |    |
| 2  | F64           | 2                       |              |                              |                                      |                      |    |
|  | · ·           |                         |              |                              |                                      |                      | J  |

#### Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

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

14.CHECK A/F SENSOR 1 HEATER

Refer to EC-147, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace malfunctioning A/F sensor 1.

15. CHECK MASS AIR FLOW SENSOR

#### (P)With CONSULT-III

1. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

2. For specification, refer to EC-551, "Mass Air Flow Sensor".

#### With GST

1. Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to EC-551, "Mass Air Flow Sensor". 2.

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## P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< COMPONENT DIAGNOSIS >

[VQ35DE]

Is the measurement value within the specification?

YES >> GO TO 16.

NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-163. "Diagnosis Procedure"</u>.

**16.**CHECK SYMPTOM TABLE

Check items on the rough idle symptom in EC-533, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace malfunctioning part.

**17.**ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to <u>EC-102</u>, "<u>Diagnosis Descrip-</u><u>tion</u>".

>> GO TO 18.

**18.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

#### < COMPONENT DIAGNOSIS >

## P0327, P0328, P0332, P0333 KS

## Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

## DTC Logic

INFOID:000000003388035

[VQ35DE]

INFOID:00000003388034

## DTC DETECTION LOGIC

| DTC No.         | Trouble diagnosis name                      | DTC detected condition                                      | Possible cause   |
|-----------------|---|---|--|
| P0327           | Knock sensor (bank 1)<br>circuit low input  | An excessively low voltage from the sensor is sent to ECM.  |  |
| P0328           | Knock sensor (bank 1)<br>circuit high input | An excessively high voltage from the sensor is sent to ECM. | Harness or connectors  |
| P0332           | Knock sensor (bank 2)<br>circuit low input  | An excessively low voltage from the sensor is sent to ECM.  | <ul> <li>(The sensor circuit is open or shorted.)</li> <li>Knock sensor</li> </ul> |
| P0333           | Knock sensor (bank 2)<br>circuit high input | An excessively high voltage from the sensor is sent to ECM. | -  |
| DTC CON         | FIRMATION PRO                               | CEDURE  |  |
| <b>1.</b> PRECO | NDITIONING                                  |   |  |
| ing the nex     | t test.                                     | has been previously conducted, always                       | s perform the following before conduct-  |

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

Κ >> GO TO 2. 2. PERFORM DTC CONFIRMATION PROCEDURE 1. Start engine and run it for at least 5 seconds at idle speed. L Check 1st trip DTC. 2. Is 1st trip DTC detected? YES >> Go to EC-257, "Diagnosis Procedure". Μ >> INSPECTION END NO **Diagnosis** Procedure INFOID:000000003388036 Ν **1.**CHECK GROUND CONNECTION Turn ignition switch OFF. 1 Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". 2. Is the inspection result normal? >> GO TO 2. YES Ρ NO >> Repair or replace ground connection. 2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and ECM harness connector.

Check the continuity between knock sensor harness connector and ECM harness connector.

А

## P0327, P0328, P0332, P0333 KS

#### < COMPONENT DIAGNOSIS >

| DTC          |      | Knock senso | r        | EC        | CM       | Continuity |
|--------------|------|-------------|----------|-----------|----------|------------|
| DIC          | Bank | Connector   | Terminal | Connector | Terminal | Continuity |
| P0327, P0328 | 1    | F201        | 2        | F8        | 67       | Existed    |
| P0332, P0333 | 2    | F202        | 2        | 10        | 07       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F200, F78

Harness for open or short between knock sensor and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

## 4. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between knock sensor harness connector and ECM harness connector.

| DTC          |      | Knock senso | r        | EC        | CM       | Continuity |
|--------------|------|-------------|----------|-----------|----------|------------|
| DIC          | Bank | Connector   | Terminal | Connector | Terminal | Continuity |
| P0327, P0328 | 1    | F201        | 1        | F8        | 61       | Existed    |
| P0332, P0333 | 2    | F202        | 1        | ГО        | 62       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F200, F78

Harness for open or short between knock sensor and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### 6.CHECK KNOCK SENSOR

Refer to EC-258. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace malfunctioning knock sensor.

**1**.CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

#### Component Inspection

## **1.**CHECK KNOCK SENSOR

1. Turn ignition switch OFF.

- 2. Disconnect knock sensor harness connector.
- 3. Check resistance between knock sensor terminal as per the following. **NOTE:**

Revision: 2008 October

## EC-258

2009 Murano

INFOID:00000003388037

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

| lt is ne  | necessary to use an ohmmeter which can measure more than 10 M $\Omega$ .  | A |
|-----------|---|---|
| Terminals | Resistance  |   |
| 1 and 2   | Approx. 532 - 588 kΩ [at 20°C (68°F)]   |   |
|           | FION:<br>r use any knock sensors that have been dropped or physically damaged. Use or<br>pection result normal? |   |
| YES >>    | <ul> <li>&gt; INSPECTION END</li> <li>&gt; Replace malfunctioning knock sensor.</li> </ul>                      | ( |
|           |   | I |
|           |   |   |
|           |   |   |
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#### < COMPONENT DIAGNOSIS >

## P0335 CKP SENSOR (POS)

## Description

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

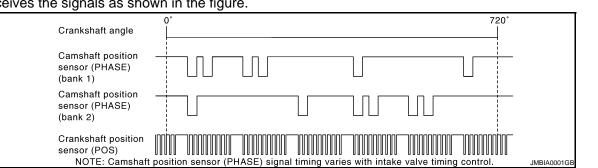
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



## DTC Logic

INFOID:000000003388039

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name                        | DTC detecting condition   | Possible cause  |
|---------|---|---|---|
| P0335   | Crankshaft position sen-<br>sor (POS) circuit | <ul> <li>The crankshaft position sensor (POS) signal<br/>is not detected by the ECM during the first<br/>few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft<br/>position sensor (POS) is not sent to ECM<br/>while the engine is running.</li> <li>The crankshaft position sensor (POS) signal<br/>is not in the normal pattern during engine run-<br/>ning.</li> </ul> | <ul> <li>Harness or connectors<br/>[CKP sensor (POS) circuit is open or<br/>shorted.]</li> <li>(APP sensor 2 circuit is shorted.)</li> <li>(EVAP control system pressure sensor<br/>circuit is shorted.)</li> <li>(Refrigerant pressure sensor circuit is<br/>shorted.)</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> <li>Signal plate</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

Turn ignition switch OFF and wait at least 10 seconds. 1.

- Turn ignition switch ON. 2.
- Turn ignition switch OFF and wait at least 10 seconds. 3.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

# [VQ35DE]

JMBIA0062Z

INFOID:00000003388038

## P0335 CKP SENSOR (POS)

| < COMPO          |                                   |                          |                                    | S CAP SEN                        |                       | 3)                     | [VQ35DE]               |
|------------------|-----------------------------------|--------------------------|------------------------------------|----------------------------------|-----------------------|------------------------|------------------------|
| _                |                                   |                          |                                    |                                  |                       |                        | [10002]                |
|                  |                                   |                          | MATION PRO                         |                                  |                       |                        |                        |
| lf engi          | ne does n<br>1st trip D           | ot start, o<br>TC.       | e for at least 5<br>crank engine f | or at least 2 se                 | econds.               |                        |                        |
| YES >:           |                                   | <u>C-261, "[</u>         | <u>Diagnosis Proc</u><br>ND        | <u>cedure"</u> .                 |                       |                        | •                      |
| Diagnosi         | is Proce                          | edure                    |                                    |                                  |                       |                        | INFOID:000000003388040 |
| <b>1.</b> снеск  | GROUN                             | D CONN                   | ECTION                             |                                  |                       |                        |                        |
|                  | gnition swi                       |                          |                                    |                                  |                       |                        |                        |
| Is the inspe     | -                                 | ult norma                |                                    | o Ground Insp                    | ection in <u>GI-4</u> | 3. "Circuit Inspection | <u>. "nc</u> ".        |
| NO >:<br>2.CHECK | > Repair o<br>CRANKS              | or replace<br>SHAFT P    |                                    | P) SENSOR (F                     |                       | R SUPPLY CIRCU         | T-I                    |
| 2. Turn ig       | gnition swi                       | tch ON.                  | . ,                                | sensor (POS) ł<br>or (POS) harne |                       |                        |                        |
| СКР              | sensor (PC                        | )S)                      |                                    |                                  |                       |                        |                        |
| Connecto         |                                   | erminal                  | Ground                             | Voltage (V)                      |                       |                        |                        |
| F20              |                                   | 1                        | Ground                             | Approx. 5                        |                       |                        |                        |
| ls the inspe     | ection res                        | ult norma                | al?                                |                                  |                       |                        |                        |
| NO >:            | > GO TO<br>> GO TO 3              | 3.                       |                                    |                                  |                       |                        |                        |
| <b>3.</b> CHECK  | CRANKS                            | SHAFT P                  | OSITION (CK                        | P) SENSOR (F                     | POS) POWEI            | R SUPPLY CIRCUI        | T-II                   |
| 2. Discor        |                                   | 1 harnes                 | s connector.<br>ween CKP ser       | nsor (POS) har                   | ness connec           | tor and ECM harne      | ss connector.          |
| CKP :            | sensor (POS                       | 6)                       | ECM                                |                                  | 0 11 11               | -                      |                        |
| Connecto         | r Terr                            | ninal                    | Connector                          | Terminal                         | Continuity            |                        |                        |
| F20              |                                   | 1                        | F8                                 | 76                               | Existed               | -                      |                        |
| NO >:<br>4.CHECK | > GO TO<br>> Repair c<br>( SENSOF | 4.<br>pen circ<br>R POWE | uit.<br>R SUPPLY CI                |                                  | tween the fol         | lowing terminals.      |                        |
|                  |                                   |                          |                                    |                                  |                       |                        |                        |
| EC               |                                   |                          | N I                                | Sensor                           | Oceanoli              | Tormir -               |                        |
| Connector        | Terminal                          | Pofrigora                | Name                               | or                               | Connector             |                        |                        |
| F8               | 72<br>76                          | -                        | ant pressure sens                  | UI                               | E300<br>F20           | 1                      |                        |
|                  | 70                                |                          | . ,                                |                                  | F20                   |                        |                        |

91 EVAP control

87

APP sensor

EVAP control system pressure sensor

YES >> GO TO 5.

E16

E110

B17

5

3

## P0335 CKP SENSOR (POS)

< COMPONENT DIAGNOSIS >

[VQ35DE]

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

5. CHECK COMPONENTS

Check the following.

• EVAP control system pressure sensor (Refer to EC-302. "Component Inspection".)

• Refrigerant pressure sensor (Refer to EC-463, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

**6.**CHECK APP SENSOR

Refer to EC-415, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.

2. Refer to EC-415, "Special Repair Requirement".

#### >> INSPECTION END

#### $\mathbf{8}$ .CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sen   | sor (POS) | E         | CM       | Continuity |
|-----------|-----------|-----------|----------|------------|
| Connector | Terminal  | Connector | Terminal | Continuity |
| F20       | 2         | F8        | 60       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 9.

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

 ${f 9.}$ CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sen   | sor (POS) | E         | CM       | Continuity |
|-----------|-----------|-----------|----------|------------|
| Connector | Terminal  | Connector | Terminal | Continuity |
| F20       | 3         | F8        | 65       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 10.

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

**10.**CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-263. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace crankshaft position sensor (POS).

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth. Is the inspection result normal?

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# 

|  | P0335 CKP SENSOR                                       | (POS)                    |   |
|--|--|--------------------------|---|
| < COMPONENT DIAGNOS  | IS >   | [VQ35DE]                 |   |
| YES >> GO TO 12.<br>NO >> Replace the sign<br>12.CHECK INTERMITTEN   | •  | A                        | Å |
| Refer to GI-40, "Intermittent I  | ncident".  | EC                       | C |
| >> INSPECTION EN   | ID   |                          |   |
| Component Inspection   |  | INFOID:000000003388041 C | ) |
| 1.CHECK CRANKSHAFT P   |  |                          | ) |
| <ol> <li>Remove the sensor.</li> <li>Visually check the sensor</li> <li>Is the inspection result normal</li> </ol> | osition sensor (POS) harness conner<br>r for chipping. | ctor.                    | - |
| YES >> GO TO 2.<br>NO >> Replace cranksh   | aft position sensor (POS)                              | F                        | - |
|  |  | G                        | 3 |
| 0  |  | JMBIA0063ZZ H            | - |
| 2.CHECK CRANKSHAFT P   | OSITION SENSOR (POS)-II                                |                          |   |
| Check resistance crankshaft  | position sensor (POS) terminals as p                   | per the following.       |   |
| Terminal No. (Polarity)  | Resistance   |                          |   |
| 1 (+) - 2 (-)  |  | J                        | J |

|           | 1 (+) - 2 (-)         |   |
|-----------|-----------------------|---|
|           | 1 (+) - 3 (-)         | Except 0 or $\propto \Omega$ [at 25°C (77°F)] |
|           | 2 (+) - 3 (-)         |   |
| Is the in | spection result norma | al?   |
| YES       | >> INSPECTION EN      | 1D  |
| NO        | >> Replace cranksh    | aft position sensor (POS)                     |

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#### < COMPONENT DIAGNOSIS >

## P0340, P0345 CMP SENSOR (PHASE)

## Description

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

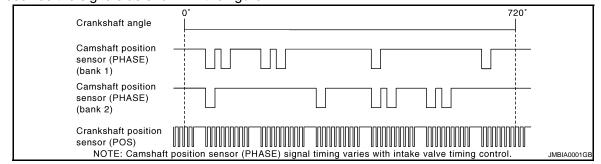
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes. ECM receives the signals as shown in the figure.



## DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P0340 or P0345 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                                    | DTC detecting condition  | Possible cause  |
|---------|---|--|---|
| P0340   | Camshaft position sen-<br>sor (PHASE) (bank 1)<br>circuit | <ul> <li>The cylinder No. signal is not sent to ECM for<br/>the first few seconds during engine cranking.</li> <li>The cylinder No. signal is not sent to ECM</li> </ul> | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> </ul>   |
| P0345   | Camshaft position sen-<br>sor (PHASE) (bank 2)<br>circuit | <ul><li>during engine running.</li><li>The cylinder No. signal is not in the normal pattern during engine running.</li></ul>   | <ul> <li>Camshaft (INT)</li> <li>Starter motor (Refer to <u>STR-5.</u>)</li> <li>Starting system circuit (Refer to <u>STR-5.</u>)</li> <li>Dead (Weak) battery</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

#### >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

INFOID:000000003388042

JMBIA0064ZZ

INFOID:00000003388043

## P0340, P0345 CMP SENSOR (PHASE)

| < COMPO              |                                |                   | •                 | 343 CN           | IF JENJ            | JK (FRASE)                 | )<br>[VQ35DE]            |     |
|----------------------|--------------------------------|-------------------|-------------------|------------------|--------------------|----------------------------|--------------------------|-----|
|                      |                                | let it idle fo    |                   |                  | s.<br>st 2 seconds |                            |                          | Λ   |
|                      | 1st trip D                     |                   |                   |                  | 51 2 3600103       |                            |                          | A   |
| <u>Is 1st trip [</u> |                                |                   |                   |                  |                    |                            |                          |     |
|                      | > Go to <u>EC</u><br>> GO TO 3 | <u>265, "Dia</u>  | <u>gnosis Pro</u> | <u>cedure"</u> . |                    |                            |                          | EC  |
| 3.PERFO              |                                |                   |                   |                  | =_1                |                            |                          |     |
| -                    |                                |                   |                   |                  | n for at least     | 5 soconds                  |                          | С   |
|                      | 1st trip D                     |                   |                   | 11 000 1011      |                    | 5 Seconds.                 |                          |     |
| <u>Is 1st trip E</u> | DTC detect                     | ted?              |                   |                  |                    |                            |                          | D   |
|                      | > Go to <u>EC</u><br>> INSPEC  | <u>-265, "Dia</u> | <u>gnosis Pro</u> | <u>cedure"</u> . |                    |                            |                          | D   |
| -                    |                                | -                 |                   |                  |                    |                            |                          |     |
| Diagnos              | is Proce                       | aure              |                   |                  |                    |                            | INFOID:00000003388044    | Ε   |
| <b>1.</b> CHECK      | STARTIN                        | G SYSTEN          | Л                 |                  |                    |                            |                          |     |
| Turn ignitic         | on switch to                   | START p           | osition.          |                  |                    |                            |                          | F   |
|                      |                                | over? Doe         | s the start       | er motor o       | operate?           |                            |                          |     |
| -                    | > GO TO 2                      |                   | om (Refer         | to STR-2         | . "Work Flow       | /" )                       |                          | G   |
|                      |                                |                   | •                 | 10 <u>011(-2</u> |                    | <u>(</u> .)                |                          | 0   |
|                      | qnition swit                   |                   |                   |                  |                    |                            |                          |     |
|                      |                                |                   | 38. Refer         | to Ground        | Inspection         | in <u>GI-43, "Circui</u> t | t Inspection".           | Н   |
| Is the insp          |                                |                   |                   |                  |                    |                            |                          |     |
|                      | > GO TO 3                      |                   | round conr        | oction           |                    |                            |                          |     |
| •                    |                                | r replace gi      |                   |                  |                    |                            |                          |     |
|                      |                                |                   |                   |                  |                    | ess connector.             |                          | J   |
| 2. Turn ig           | gnition swit                   | ch ON.            | · · ·             | ,                | ,                  |                            |                          |     |
| 3. Check             | the voltag                     | e between         | CMP sens          | sor (PHAS        | SE) harness        | connector and g            | round.                   | LZ. |
|                      | CM                             | P sensor (PH      | ASE)              |                  |                    | _                          |                          | K   |
| DTC                  | Bank                           | Connector         | Terminal          | Ground           | Voltage (V)        |                            |                          |     |
| P0340                | 1                              | F26               | 1                 |                  |                    |                            |                          | L   |
| P0345                | 2                              | F69               | 1                 | Ground           | Approx. 5          |                            |                          |     |
| Is the insp          | ection resu                    | It normal?        |                   | 11               |                    | —                          |                          | M   |
|                      | > GO TO 4                      |                   |                   |                  | 1                  |                            |                          |     |
|                      |                                |                   | •                 |                  |                    | er in harness or           |                          | Ν   |
|                      |                                | •                 | ASE) GRU          |                  |                    | OPEN AND SHO               |                          | IN  |
|                      | gnition swit                   | harness c         | onnector.         |                  |                    |                            |                          |     |
| 3. Check             | the contin                     | uity betwee       | en CMP se         | ensor (PH        | ASE) harnes        | s connector and            | d ECM harness connector. | 0   |
|                      |                                |                   |                   |                  | 5014               |                            |                          |     |
| DTC                  |                                | P sensor (PH      | ,                 |                  | ECM                | Continuity                 |                          | Ρ   |
| P0340                | Bank<br>1                      | Connector<br>F26  | Terminal<br>2     | Connecto         | or Terminal<br>64  |                            |                          |     |
| P0340                | 2                              | F20               | 2                 | F8               | 68                 | Existed                    |                          |     |
| 1 0040               |                                | 103               | -                 |                  |                    |                            |                          |     |

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

#### Is the inspection result normal?

YES >> GO TO 5.

## P0340, P0345 CMP SENSOR (PHASE)

#### < COMPONENT DIAGNOSIS >

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

 $\mathbf{5.}$  CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

| DTC   | CM   | P sensor (PH | ASE)     | E         | CM       | Continuity |
|-------|------|--------------|----------|-----------|----------|------------|
| DIC   | Bank | Connector    | Terminal | Connector | Terminal | Continuity |
| P0340 | 1    | F26          | 3        | F8        | 70       | Existed    |
| P0345 | 2    | F69          | 3        | ГО        | 69       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 6.

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

#### 6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-266, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace malfunctioning camshaft position sensor (PHASE).

**7.**CHECK CAMSHAFT (INT)

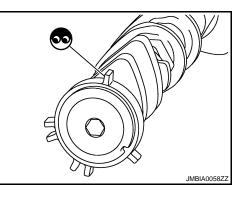
#### Check the following.

- · Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



## 8. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

## **Component Inspection**

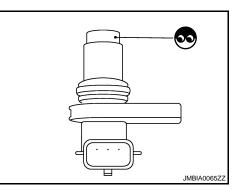
# 1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor.
- 5. Visually check the sensor for chipping.

#### Is the inspection result normal?

#### YES >> GO TO 2.

NO >> Replace malfunctioning camshaft position sensor (PHASE).



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[VQ35DE]

## P0340, P0345 CMP SENSOR (PHASE)

## < COMPONENT DIAGNOSIS >

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# 2. CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as per the following.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning camshaft position sensor (PHASE).

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#### < COMPONENT DIAGNOSIS >

## P0420, P0430 THREE WAY CATALYST FUNCTION

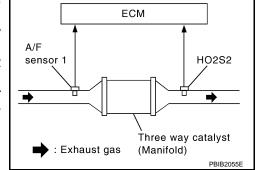
## DTC Logic

#### DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of A/F sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



| DTC No. | Trouble diagnosis name                                      | DTC detecting condition  | Possible cause   |
|---------|---|--|--|
| P0420   | Catalyst system efficien-<br>cy below threshold<br>(bank 1) | <ul> <li>Three way catalyst (manifold) does not oper-<br/>ate properly.</li> </ul> | <ul> <li>Intake air leakage</li> </ul>   |
| P0430   | Catalyst system efficien-<br>cy below threshold<br>(bank 2) | Three way catalyst (manifold) does not have  | <ul> <li>Fuel injector</li> <li>Fuel injector leakage</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul> |

## DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

#### Will CONSULT-III be used?

Will CONSULT-III be used?

YES >> GO TO 2. NO >> GO TO 7.

## 2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

## **TESTING CONDITION:**

Do not maintain engine speed for more than the specified minutes below.

#### >> GO TO 3.

# 3. PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT-III

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 9. Open engine hood.
- 10. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.

#### **EC-268**

2009 Murano

[VQ35DE]

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| PU420, PU430 INREE WAT CATALIST FUNCTION   |
|--|
| < COMPONENT DIAGNOSIS > [VQ35DE]   |
| 11. Rev engine between 2,000 and 3,000 rpm and hold it for 3 consecutive minutes then release the acceler-   |
| ator pedal completely.<br>12. Check the indication of "CATALYST".  |
| Which is displayed on CONSULT-III screen?  |
| CMPLT>> GO TO 6.   |
| INCMP >> GO TO 4.  |
| 4.PERFORM DTC CONFIRMATION PROCEDURE-II  |
| <ol> <li>Wait 5 seconds at idle.</li> <li>Rev engine between 2,000 and 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to<br/>"CMPLT" (It will take approximately 5 minutes).</li> </ol> |
| Does the indication change to "CMPLT"?   |
| YES >> GO TO 6.<br>NO >> GO TO 5.  |
| 5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN  |
| 1. Stop engine and cool it down to less than 70°C (158°F).   |
| <ol> <li>Perform DTC CONFIRMATION PROCEDURE again.</li> </ol>  |
|  |
| >> GO TO 3.  |
| <b>6.</b> PERFORM DTC CONFIRMATION PROCEDURE-III   |
| Check 1st trip DTC.  |
| Is 1st trip DTC detected?  |
| YES >> Go to <u>EC-270, "Diagnosis Procedure"</u> .<br>NO >> INSPECTION END  |
| 7.PERFORM COMPONENT FUNCTION CHECK   |
| Perform component function check. Refer to <u>EC-269, "Component Function Check"</u> .   |
| NOTE:  |
| Use component function check to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.   |
| Is the inspection result normal?   |
| YES >> INSPECTION END<br>NO >> Go to <u>EC-270, "Diagnosis Procedure"</u> .  |
| Component Function Check   |
|  |
| 1.PERFORM COMPONENT FUNCTION CHECK   |
| Without CONSULT-III  |
| <ol> <li>Start engine and warm it up to the normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>   |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>   |
| 4. Turn ignition switch OFF and wait at least 10 seconds.  |
| <ol> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.</li> <li>Let engine idle for 1 minute.</li> </ol>                                     |
| 7. Open engine hood.   |
| 8. Check the voltage between ECM harness connector terminals under the following conditions.   |
|  |
|  |

#### < COMPONENT DIAGNOSIS >

|       | ECM     |                                  |               |                                   |  |
|-------|---------|----------------------------------|---------------|-----------------------------------|--|
| DTC   | Connec- | +                                | -             | Condition                         | Voltage (V)  |
|       | tor     | Terminal                         | Terminal      | *                                 |  |
| P0420 | F8      | 33<br>[HO2S2 (bank 1)<br>signal] | 35<br>(Sensor | Keeping engine speed at 2,500 rpm | The voltage fluctuation cycle takes more than 5 seconds.         |
| P0430 | F8      | 34<br>[HO2S2 (bank 2)<br>signal] | ground)       | constant under no load            | <ul> <li>1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 -<br/>1.0</li> </ul> |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-270, "Diagnosis Procedure".

Diagnosis Procedure

## **1.**CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dents.

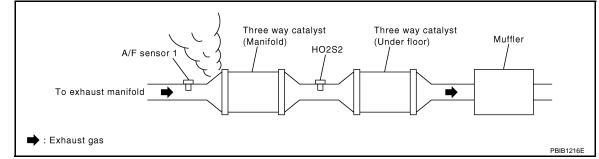
Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2.CHECK EXHAUST GAS LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before the three way catalyst (manifold).



Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

**3.**CHECK INTAKE AIR LEAKAGE

Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 4.

**4.**CHECK IGNITION TIMING

Check idle speed and ignition timing.

For procedure, refer to EC-12, "BASIC INSPECTION : Special Repair Requirement".

For specification, refer to EC-551, "Idle Speed" and EC-551, "Ignition Timing".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Follow the EC-12, "BASIC INSPECTION : Special Repair Requirement".

**5.**CHECK FUEL INJECTORS

1. Stop engine and then turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals.

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## < COMPONENT DIAGNOSIS >

[VQ35DE]

|   | E  | CM  |  |   |  |
|---|--|---|--|---|--|
|   | +  | -   |  | Voltage   |  |
| Connector   | Terminal   | Connector   | Terminal   | _   |  |
|   | 1  |   |  |   |  |
|   | 3  |   |  |   |  |
| F7  | 29   | E16   | 112  | Battery voltage   |  |
| 17  | 30   | LIU   | 112  | Dattery voltage   |  |
|   | 31   |   |  |   |  |
|   | 32   |   |  |   |  |
| s the inspec  | tion result norm   | <u>nal?</u>   |  |   |  |
|   | GO TO 6.   | 4 "Dia  |  |   |  |
| ~   | Perform <u>EC-44</u>   |   |  |   |  |
| CAUTION:  | FUNCTION OF  | IGNITION COI  | L-I  |   |  |
| <ol> <li>Turn ign</li> <li>Remove</li> <li>NOTE:</li> <li>Do not u<br/>cedure.</li> <li>Start eng</li> <li>After eng</li> <li>Turn ign</li> <li>Remove</li> <li>Remove</li> <li>Crank eng</li> <li>Connect</li> </ol> | ition switch OFI<br>fuel pump fuse<br>use CONSULT-I<br>gine stalls, cran<br>ition switch OFI<br>all ignition coil an | F.<br>in IPDM E/R t<br>Il to release fu<br>k it 2 or 3 times<br>F.<br>harness conne<br>d spark plug of<br>onds or more to<br>harness conn | o release fue<br>el pressure,<br>s to release a<br>ectors to avo<br>the cylinder<br>o remove cor<br>ector to ignit | el pressure.<br>or fuel pressure a<br>all fuel pressure.<br>id the electrical di<br>to be checked.<br>mbustion gas in th<br>ion coil. | pplies again during the following pro-<br>scharge from the ignition coils.<br>e cylinder.        |
| portion a<br>1. Crank e   | between the ed<br>as shown in the<br>ngine for appro<br>generated bet<br>ortion.                                     | figure.<br>ximately 3 sec   | conds, and c   | heck whether  |  |
| Spar  | k should be ge   | enerated.   |  |   | 13 - 17 mm   |
| CAUTIC<br>• During<br>away  | -  | n, always stay<br>c plug and the  | ignition co  | il. Be careful  | (0.52-0.66 in)<br>Grounded metal portion<br>(Cylinder head, cylinder block, etc.)<br>JMBIA0066GB |
| electri<br>• It migl<br>NOTE:<br>When th  | ical discharge<br>ht cause to dan<br>he gap is less  | voltage becor<br>mage the ignit   | nes 20 kV o<br>tion coil if th   | r more.<br>ne gap of more th  | nan 17 mm (0.66 in) is taken.<br>e generated even if the coil is mal-                            |
| function  | •  | al2   |  |   |  |
| •   | <u>xtion result norm</u><br>GO TO 10.  | <u>ial (</u>  |  |   |  |
|   | GO TO 7.   |   |  |   |  |
|   | FUNCTION OF  | IGNITION COI  | L-II   |   |  |
|   |  |   | - "  |   |  |
| 2. Disconn<br>3. Crank e  | ition switch OFI<br>ect spark plug a<br>ngine for appro<br>t the grounded  | and connect a l<br>ximately 3 sec   |  |   | park is generated between the spark  |

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

#### Spark should be generated.

Is the inspection result normal?

YES >> GO TO 8.

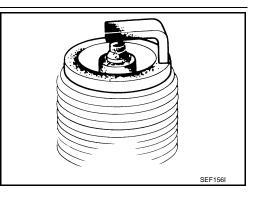
NO >> Check ignition coil, power transistor and their circuit. Refer to EC-451, "Diagnosis Procedure".

#### **8.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-142, "Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 9.



## 9. CHECK FUNCTION OF IGNITION COIL-III

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

#### Spark should be generated.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>EM-142, "Spark Plug"</u>.
- 10. CHECK FUEL INJECTOR
- 1. Turn ignition switch OFF.
- Remove fuel injector assembly. Refer to <u>EM-45</u>, "<u>Removal and Installation</u>". Keep fuel hose and all fuel injectors connected to fuel tube.
- Disconnect all ignition coil harness connectors.
- 4. Reconnect all fuel injector harness connectors disconnected.
- 5. Turn ignition switch ON.
- 6. Check that the fuel does not drip from fuel injector.

#### Does fuel drip from fuel injector?

- YES >> Replace the fuel injector(s) from which fuel is dripping.
- NO >> GO TO 11.
- 11.CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace three way catalyst assembly.
- NO >> Repair or replace harness or connector.

< COMPONENT DIAGNOSIS >

## P0441 EVAP CONTROL SYSTEM

## **DTC Logic**

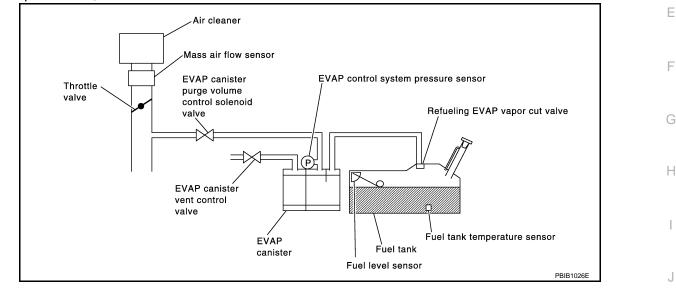
#### DTC DETECTION LOGIC

#### NOTE:

# If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.



| DTC No. | Trouble diagnosis name                        | DTC detecting condition  | Possible cause   |
|---------|---|--|--|
| P0441   | EVAP control system in-<br>correct purge flow | EVAP control system does not operate proper-<br>ly, EVAP control system has a leakage between<br>intake manifold and EVAP control system pres-<br>sure sensor. | <ul> <li>EVAP canister purge volume control solenoid valve stuck closed</li> <li>EVAP control system pressure sensor and the circuit</li> <li>Loose, disconnected or improper connection of rubber tube</li> <li>Blocked rubber tube</li> <li>Cracked EVAP canister</li> <li>EVAP canister purge volume control solenoid valve circuit</li> <li>Accelerator pedal position sensor</li> <li>Blocked purge port</li> <li>EVAP canister vent control valve</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

## **1.**INSPECTION START

Will CONSULT-III be used? Will CONSULT-III be used?

YES >> GO TO 2.

NO >> GO TO 6.

## 2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

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< COMPONENT DIAGNOSIS >

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and let it idle for at least 70 seconds.
- Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CON-SULT-III.
- 7. Touch "START".

Is "COMPLETED" displayed on CONSULT-III screen?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-II

When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

| Selector lever | Suitable position           |
|----------------|-----------------------------|
| VHCL SPEED SE  | 32 - 120 km/h (20 - 75 mph) |
| ENG SPEED      | 500 - 3,000 rpm             |
| B/FUEL SCHDL   | 1.3 - 9.0 msec              |
| COOLAN TEMP/S  | More than 0°C (32°F)        |

#### CAUTION:

Always drive vehicle at a safe speed.

#### If "TESTING" does not change for a long time, retry from step 2.

Is "COMPLETED" displayed on CONSULT-III screen?

YES >> GO TO 5.

NO >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 3.

**5.**PERFORM DTC CONFIRMATION PROCEDURE-III

Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to EC-275, "Diagnosis Procedure".

**6.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-274, "Component Function Check".

#### NOTE:

Use component function check to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-275, "Diagnosis Procedure".

**Component Function Check** 

**1.**PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

[VQ35DE]

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- 1. Lift up drive wheels. Start engine (VDC switch OFF) and warm it up to normal operating temperature. 2. А Turn ignition switch OFF, wait at least 10 seconds. 3. Turn ignition switch ON. 4. Turn ignition switch OFF, wait at least 10 seconds. 5. EC Start engine and wait at least 70 seconds. 6. 7. Set voltmeter probes to ECM harness connector terminals under the following conditions. ECM + \_ Connector Terminal Terminal D 86 96 E16 (EVAP control system pressure sensor signal) (Sensor ground) Check EVAP control system pressure sensor value at idle speed and note it. Е 8. 9. Establish and maintain the following conditions for at least 1 minute. Air conditioner switch ON ON Head lamp switch ON Rear window defogger switch Engine speed Approx. 3,000 rpm Gear position Any position other than P, N or R 10. Verify that EVAP control system pressure sensor value stays 0.1 V less than the value at idle speed (mea-Н sured at step 6) for at least 1 second. Is the inspection result normal? YES >> INSPECTION END NO >> Go to EC-275, "Diagnosis Procedure". Diagnosis Procedure INFOID:000000003388051 1.CHECK EVAP CANISTER 1. Turn ignition switch OFF. Κ Check EVAP canister for cracks. 2. Is the inspection result normal? YES-1 >> With CONSULT-III: GO TO 2. YES-2 >> Without CONSULT-III: GO TO 3. NO >> Replace EVAP canister. 2.CHECK PURGE FLOW M With CONSULT-III 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to EC-77, "System Dia-Ν gram".
- Start engine and let it idle.
- 3. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III.
- 4. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL C/V" opening and check vacuum existence.

| PURG VOL C/V | Vacuum      |
|--------------|-------------|
| 100%         | Existed     |
| 0%           | Not existed |

Is the inspection result normal?

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

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#### < COMPONENT DIAGNOSIS >

[VQ35DE]

# 3. CHECK PURGE FLOW

#### **Without CONSULT-III**

- 1. Start engine and warm it up to normal operating temperature.
- 2. Stop engine.
- Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to <u>EC-77</u>, "System Diagram".
- 4. Start engine and let it idle.
  - Do not depress accelerator pedal even slightly.
- 5. Check vacuum gauge indication before 60 seconds pass after starting engine.

#### Vacuum should not exist.

6. Rev engine up to 2,000 rpm after 100 seconds pass after starting engine.

#### Vacuum should exist.

Is the inspection result normal?

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

**4.**CHECK EVAP PURGE LINE

1. Turn ignition switch OFF.

 Check EVAP purge line for improper connection or disconnection. Refer to <u>EC-77, "System Diagram"</u>.

Is the inspection result normal?

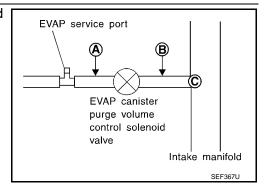
YES >> GO TO 5.

NO >> Repair EVAP purge line.

5.CHECK EVAP PURGE HOSE AND PURGE PORT

 Disconnect purge hoses connected to EVAP service port A and EVAP canister purge volume control solenoid valve B.

2. Blow air into each hose and EVAP purge port **C**.



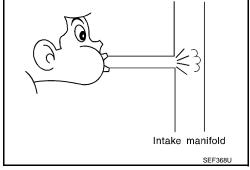
3. Check that air flows freely.

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 6.

YES-2 >> Without CONSULT-III: GO TO 7.

NO >> Repair or clean hoses and/or purge port.



#### 6.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT-III

- 1. Start engine.
- 2. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

| < COMPONENT DIAGNOSIS >  | [VQ35DE] |
|--|----------|
| Does engine speed vary according to the valve opening?   |          |
| YES >> GO TO 8.  | A        |
| NO $\rightarrow$ GO TO 7.<br>7.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE   |          |
| Refer to EC-287, "Component Inspection".   | EC       |
| Is the inspection result normal?   |          |
| YES >> GO TO 8.  | С        |
| NO >> Replace EVAP canister purge volume control solenoid valve.   | 0        |
| ${f 8}.$ CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR   |          |
| <ol> <li>Disconnect EVAP control system pressure sensor harness connector.</li> <li>Check that water is not inside connector.</li> </ol> | D        |
| <ol> <li>Check that water is not inside connectors.</li> <li><u>Is the inspection result normal?</u></li> </ol>                          |          |
| YES >> GO TO 9.  | E        |
| NO >> Replace EVAP control system pressure sensor.   |          |
| 9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION   | г        |
| Refer to EC-303, "DTC Logic" for DTC P0452, EC-308, "DTC Logic" for DTC P0453.   | F        |
| Is the inspection result normal?   |          |
| YES >> GO TO 10.   | G        |
| NO >> Replace EVAP control system pressure sensor.   |          |
| 10.CHECK RUBBER TUBE FOR CLOGGING  | —— Н     |
| <ol> <li>Disconnect rubber tube connected to EVAP canister vent control valve.</li> <li>Check the rubber tube for clogging.</li> </ol>   |          |
| Is the inspection result normal?   |          |
| YES >> GO TO 11.   | I        |
| NO >> Clean the rubber tube using an air blower.   |          |
| 11.CHECK EVAP CANISTER VENT CONTROL VALVE  | J        |
| Refer to EC-294, "Component Inspection".   |          |
| Is the inspection result normal?   | V        |
| YES >> GO TO 12.<br>NO >> Replace EVAP canister vent control valve.  | K        |
| 12. CHECK EVAP PURGE LINE  |          |
| Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leakage.   | L        |
| Refer to <u>EC-77, "System Diagram"</u> .  |          |
| Is the inspection result normal?   | Μ        |
| YES >> GO TO 13.   |          |
| NO >> Repair EVAP purge line.  |          |
| 13.CLEAN EVAP PURGE LINE   | N        |
| Clean EVAP purge line (pipe and rubber tube) using air blower.   |          |
| >> GO TO 14.   | 0        |
| 14. CHECK INTERMITTENT INCIDENT  |          |
| Refer to <u>GI-40, "Intermittent Incident"</u> .   |          |
|  | P        |
|  |          |

>> INSPECTION END

#### < COMPONENT DIAGNOSIS >

## P0442 EVAP CONTROL SYSTEM

## **DTC Logic**

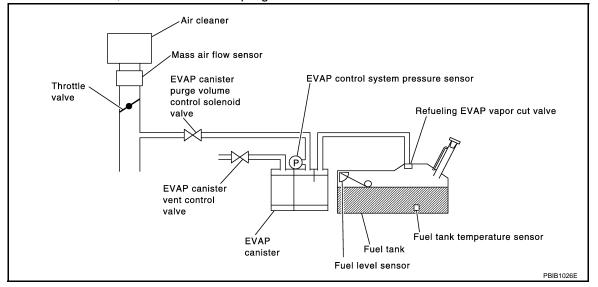
[VQ35DE]

#### DTC DETECTION LOGIC

This diagnosis detects leakage in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leakage in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P0442   | EVAP control system<br>small leakage detected<br>(negative pressure) | EVAP control system has a leakage,<br>EVAP control system does not operate<br>properly. | <ul> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Fuel filler cap remains open or does not close.</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leakage is in line between intake manifold and<br/>EVAP canister purge volume control solenoid<br/>valve.</li> <li>Foreign matter caught in EVAP canister vent con-<br/>trol valve.</li> <li>EVAP canister or fuel tank leakage</li> <li>EVAP purge line (pipe and rubber tube) leakage</li> <li>EVAP purge line rubber tube bent</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister purge volume control solenoid<br/>valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister is saturated with water</li> <li>EVAP control system pressure sensor</li> <li>Fuel level sensor and the circuit</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leakage</li> </ul> |

#### **CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.
- If the fuel filler cap is not tightened properly, the MIL may illuminate.
- Use only a genuine NISSAN rubber tube as a replacement.

#### DTC CONFIRMATION PROCEDURE

< COMPONENT DIAGNOSIS >

# 1.PRECONDITIONING

|  | А  |
|--|----|
| If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-<br>ing the next test.                              |    |
| 1. Turn ignition switch OFF and wait at least 10 seconds.  | EC |
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>   |    |
| TESTING CONDITION:<br>• Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed<br>on flat level surface.          | С  |
| on flat level surface.<br>• Always perform test at a temperature of 0 to 30°C (32 to 86°F).  |    |
| NOTE:<br>Check that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.  | D  |
| Will CONSULT-III be used?  |    |
| YES >> GO TO 2.  | Е  |
| NO >> GO TO 3.<br>2. PERFORM DTC CONFIRMATION PROCEDURE  |    |
|  | F  |
| With CONSULT-III Turn ignition switch ON.  | 1  |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.</li> </ol> | 0  |
| <ol><li>Check that the following conditions are met.</li></ol>   | G  |
| COOLAN TEMP/S: 0 - 70°C (32 - 158°F)<br>INT/A TEMP SE: 0 - 30°C (32 - 86°F)  |    |
| <ol> <li>Select "EVP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode<br/>with CONSULT-III.</li> </ol>                               | Н  |
| Follow the instructions displayed.   |    |
| <b>NOTE:</b><br>If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to   |    |
| EC-12, "BASIC INSPECTION : Special Repair Requirement".  |    |
| Which is displayed on CONSULT-III screen?<br>OK >> INSPECTION END  | J  |
| NG >> Go to <u>EC-279, "Diagnosis Procedure"</u> .   |    |
| 3. PERFORM COMPONENT FUNCTION CHECK  | Κ  |
| With GST   |    |
| <b>NOTE:</b><br>Be sure to read the explanation of DRIVING PATTERN in <u>EC-524, "How to Set SRT Code"</u> before driving                                    | L  |
| vehicle.<br>1. Start engine.   |    |
| <ol><li>Drive vehicle according to DRIVING PATTERN.</li></ol>  | M  |
| <ol> <li>Stop vehicle.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>  |    |
| 5. Turn ignition switch ON.  | Ν  |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>   |    |
| 8. Check 1st trip DTC.   | 0  |
| <u>Is 1st trip DTC displayed?</u><br>YES-1 >> P0441: Go to <u>EC-275, "Diagnosis Procedure"</u> .  | 0  |
| YES-2 >> P0442: Go to EC-279, "Diagnosis Procedure".   | _  |
| NO >> INSPECTION END   | Ρ  |
| Diagnosis Procedure  |    |
| 1.CHECK FUEL FILLER CAP DESIGN   |    |

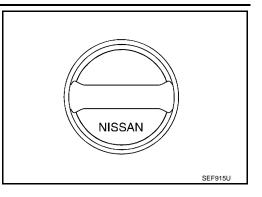
1. Turn ignition switch OFF.

#### < COMPONENT DIAGNOSIS >

#### 2. Check for genuine NISSAN fuel filler cap design.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace with genuine NISSAN fuel filler cap.



[VQ35DE]

## 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Retighten until ratcheting sound is heard.

3.CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 4.

**4.**CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-283, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace fuel filler cap with a genuine one.

**5.**CHECK FOR EVAP LEAKAGE

Refer to EC-547, "Inspection".

Is there any leakage in EVAP line?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 6.

**6.**CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to <u>EC-549, "Removal and Installation"</u>.
- EVAP canister vent control valve. Refer to <u>EC-294, "Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace EVAP canister vent control valve and O-ring.

7.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

#### < COMPONENT DIAGNOSIS >

>> GO TO 8.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.

YES

NO

#### Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Does water drain from the EVAP canister?

|   | Water                                    |
|---|--|
|   | EVAP canister vent                       |
| 8.CHECK EVAP CANISTER   | control valve JMBIA1134GB                |
|   |  |
| Weigh the EVAP canister with the EVAP canister vent control valve ar attached.  | id EVAP control system pressure sensor   |
| The weight should be less than 2.1 kg (4.6 lb).<br>Is the inspection result normal?   |  |
| YES-1 >> With CONSULT-III: GO TO 10.<br>YES-2 >> Without CONSULT-III: GO TO 11.<br>NO >> GO TO 9.   |  |
| 9. DETECT MALFUNCTIONING PART   |  |
| <ul><li>Check the following.</li><li>EVAP canister for damage</li><li>EVAP hose between EVAP canister and vehicle frame for clogging of</li></ul>   | or poor connection                       |
| >> Repair hose or replace EVAP canister.  |  |
| 10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLE   | NOID VALVE OPERATION                     |
| <ul> <li>With CONSULT-III</li> <li>Disconnect vacuum hose from EVAP canister purge volume cont</li> <li>Start engine.</li> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode.</li> <li>Touch "Qu" on CONSULT-III screen to increase "PURG VOL C/V"</li> <li>Check vacuum hose for vacuum.</li> </ul>   |  |
| Vacuum should exist.  |  |
| Is the inspection result normal?  |  |
| YES >> GO TO 13.<br>NO >> GO TO 12.   |  |
| 11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLE   | NOID VALVE OPERATION                     |
| <ul> <li>Without CONSULT-III</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Stop engine.</li> <li>Disconnect vacuum hose from EVAP canister purge volume cont</li> <li>Start engine and let it idle for at least 80 seconds.</li> <li>Check vacuum hose for vacuum when revving engine up to 2,000</li> </ul> | rol solenoid valve at EVAP service port. |
| Vacuum should exist.  |  |
| Is the inspection result normal?  |  |
| YES >> GO TO 13.  |  |

Check vacuum hoses for clogging or disconnection. Refer to EC-77, "System Diagram". Is the inspection result normal?

>> GO TO 12. 12.CHECK VACUUM HOSE

## EC-281

[VQ35DE]

EVAP canister

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< COMPONENT DIAGNOSIS >

YES >> GO TO 13.

NO >> Repair or reconnect the hose.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-287, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace EVAP canister purge volume control solenoid valve.

14.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-238, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace fuel level sensor unit and fuel pump.

**15.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-302, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace EVAP control system pressure sensor.

**16.**CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to <u>EC-77, "System Diagram"</u>.

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or reconnect the hose.

**17.**CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 18.

**18.**CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and improper connection. For location, refer to <u>EC-457, "Description"</u>.

Is the inspection result normal?

YES >> GO TO 19.

NO >> Repair or replace hoses and tubes.

**19.**CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 20.

NO >> Repair or replace hose, tube or filler neck tube.

20. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-460, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 21.

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

21. CHECK FUEL LEVEL SENSOR

Refer to MWI-47, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 22.

>> Replace fuel level sensor unit and fuel pump.

>> INSPECTION END

## **Component Inspection**

< COMPONENT DIAGNOSIS >

NO

## **1.**CHECK FUEL FILLER CAP

- Turn ignition switch OFF. 1.
- 2. Remove fuel filler cap.
- 3. Wipe clean valve housing.

Install fuel filler cap adapter (commercial service tool) to fuel filler cap. Check valve opening pressure and vacuum. 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 -Fuel filler cap

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

2.90 psi)

Pressure:

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

2.REPLACE FUEL FILLER CAP

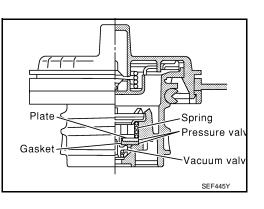
## Replace fuel filler cap.

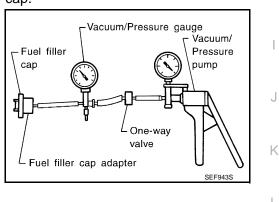
**CAUTION:** 

4.

5.

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.





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## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE < COMPONENT DIAGNOSIS > [VQ35DE]

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

## Description

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

# PBE2439E

## DTC Logic

## DTC DETECTION LOGIC

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| DTC No. | Trouble diagnosis name                                  | DTC detecting condition  | Possible cause  |
|---------|---|--|---|
| P0443   | EVAP canister purge<br>volume control solenoid<br>valve | The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed. | <ul> <li>EVAP control system pressure sensor</li> <li>EVAP canister purge volume control solenoid valve<br/>(The valve is stuck open.)</li> <li>EVAP canister vent control valve</li> <li>EVAP canister</li> <li>Hoses<br/>(Hoses are connected incorrectly or clogged.)</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

#### Always perform test at a temperature of 5°C (41°F) or more.

Will CONSULT-III be used?

YES >> GO TO 2.

NO >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "PURG VOL C/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
- 7. Touch "START".
- 8. Start engine and let it idle until "TESTING" on CONSULT-III changes to "COMPLETED". (It will take approximately 10 seconds.)

## If "TESTING" is not displayed after 5 minutes, retry from step 2.

9. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

## EC-284

| [V  |  |   | T DIAGNOSIS >   | COMPONENT  |
|---|--|---|---|--|
|   |  | asis Procedure  | PECTION END<br>to <u>EC-285, "Diaq</u>  |  |
|   | -  |   | TC CONFIRMAT  |  |
|   |  |   |   | With GST   |
| ire.  |  |   | and warm it up t  | Start engine   |
|   | seconds.   | wait at least 10  | n switch OFF and<br>n switch ON.  | <ul> <li>Turn ignition</li> <li>Turn ignition</li> </ul>   |
|   |  |   | n switch OFF and  | Turn ignition  |
|   | nds.   | at least 20 seco  | and let it idle for   | Start engine<br>Check 1st tr   |
|   |  |   |   | <u>1st trip DTC d</u>  |
|   |  | nosis Procedure   | to <u>EC-285, "Diag</u>   |  |
|   |  |   | PECTION END   |  |
| INFOID:0  |  |   | ocedure   | iagnosis Pr  |
| OLENOID VALVE POWER SUPPLY C  | CONTROL SC   | RGE VOLUME  | P CANISTER PU   | .CHECK EVA   |
|   |  |   | n switch OFF.   | Turn ignition  |
| valve harness connector.  | rol solenoid v   | irge volume con   |   | <ul> <li>Disconnect I</li> <li>Turn ignition</li> </ul>  |
| control solenoid valve harness conne  | urge volume  | EVAP canister p   |   | 0  |
|   | 0  | ·   | U   | ground.  |
|   |  |   |   |  |
|   |  |   |   |  |
|   | Voltage  | Ground  | irge volume control<br>id valve   |  |
|   | Voltage  | Ground  |   |  |
|   | Voltage<br>Battery voltag  | Ground  | vid valve   | soleno   |
|   | _  |   | id valve<br>Terminal<br>1<br>result normal?   | soleno<br>Connector<br>F30<br>s the inspection   |
|   | _  |   | id valve<br>Terminal<br>1<br>result normal?<br>TO 3.  | soleno<br>Connector<br>F30<br>the inspection<br>YES >> GO  |
|   | _  | Ground  | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.   | soleno<br>Connector<br>F30<br>the inspection<br>YES >> GO<br>NO >> GO  |
|   | _  | Ground  | id valve<br>Terminal<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING  | soleno<br>Connector<br>F30<br>the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI  |
| ge  | Battery voltag   | Ground  | id valve<br>Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7   | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness conne   |
| ge<br>ume control solenoid valve and IPDM E   | Battery voltag   | Ground<br>PART<br>een EVAP canist   | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7<br>pen or short betw  | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness conne<br>Harness for op   |
| ge  | Battery voltag   | Ground<br>PART<br>een EVAP canist   | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7<br>pen or short betw  | Soleno<br>Connector<br>F30<br>Sole the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>heck the follow<br>Harness conne<br>Harness for op   |
| ge<br>ume control solenoid valve and IPDM E   | Battery voltag<br>er purge volu<br>er purge volu                                   | Ground<br>PART<br>een EVAP canist<br>een EVAP canist  | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7<br>ben or short betw<br>ben or short betw   | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness conne<br>Harness for op<br>Harness for op   |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM   | Battery voltag<br>er purge volu<br>er purge volu<br>r short to pow                 | Ground<br>PART<br>een EVAP canist<br>een EVAP canist  | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7<br>ben or short betw<br>ben or short betw   | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness for op<br>Harness for op<br>Harness for op  |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.  | Battery voltag<br>er purge volu<br>er purge volu<br>r short to pow                 | Ground<br>PART<br>een EVAP canist<br>een EVAP canist  | Terminal<br>1<br>result normal?<br>TO 3.<br>TO 2.<br>LFUNCTIONING<br>ving.<br>ectors F121, E7<br>ben or short betw<br>ben or short betw<br>ben or short betw  | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness for op<br>Harness for op<br>S-Rep<br>CHECK EVAN   |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.  | Battery voltag<br>er purge volu<br>er purge volu<br>r short to pow                 | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME                                | Terminal Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ving. ectors F121, E7 ben or short betw ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF.  | soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAI<br>OR OPEN AND<br>Turn ignition                                      |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.<br>SOLENOID VALVE OUTPUT SIGNAL (  | Battery voltag<br>er purge volui<br>er purge volui<br>r short to pow<br>CONTROL SC | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME                                | Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ing. ectors F121, E7 ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF. ECM harness co   | soleno<br>Connector<br>F30<br>the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>heck the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAI<br>OR OPEN AND<br>Turn ignition<br>Disconnect                           |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.  | Battery voltag<br>er purge volui<br>er purge volui<br>r short to pow<br>CONTROL SC | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME                                | Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ing. ectors F121, E7 ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF. ECM harness co   | soleno<br>Connector<br>F30<br>the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>heck the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAI<br>OR OPEN AND<br>Turn ignition<br>Disconnect I<br>Check the c          |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.<br>SOLENOID VALVE OUTPUT SIGNAL (  | Battery voltag<br>er purge volui<br>er purge volui<br>r short to pow<br>CONTROL SC | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME                                | Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ving. ectors F121, E7 ben or short betw ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF. ECM harness co continuity betweel ss connector. | Soleno<br>Connector<br>F30<br>Sthe inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>heck the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAI<br>OR OPEN AND<br>Disconnect I<br>Check the co<br>ECM harnes           |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.<br>SOLENOID VALVE OUTPUT SIGNAL of<br>e control solenoid valve harness conne | Battery voltag<br>er purge volui<br>er purge volui<br>r short to pow<br>CONTROL SC | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME                                | Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ving. ectors F121, E7 ben or short betw ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF. ECM harness co continuity betweel ss connector. | Soleno<br>Connector<br>F30<br>Sthe inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAN<br>OR OPEN AND<br>. Turn ignition<br>. Disconnect I<br>. Check the co |
| ge<br>ume control solenoid valve and IPDM E<br>ume control solenoid valve and ECM<br>ver in harness or connectors.<br>SOLENOID VALVE OUTPUT SIGNAL (  | Battery voltag<br>er purge volu<br>er purge volu<br>r short to pow<br>CONTROL SC   | Ground<br>PART<br>een EVAP canist<br>een EVAP canist<br>short to ground o<br>IRGE VOLUME<br>nnector.<br>n EVAP canister | Terminal 1 result normal? TO 3. TO 2. LFUNCTIONING ving. ectors F121, E7 ben or short betw ben or short betw bair open circuit, s P CANISTER PL D SHORT n switch OFF. ECM harness co continuity betweel ss connector. | Soleno<br>Connector<br>F30<br>S the inspection<br>YES >> GO<br>NO >> GO<br>DETECT MAI<br>Check the follow<br>Harness for op<br>Harness for op<br>Harness for op<br>CHECK EVAI<br>OR OPEN AND<br>COR OPEN AND<br>Check the ci<br>EVAP canister pur  |

Is the inspection result normal?

YES >> GO TO 4.

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

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

## **4.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

- 1. Disconnect EVAP control system pressure sensor harness connector.
- Check that water is not inside connectors.

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace EVAP control system pressure sensor.

5.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-302, "Component Inspection".

#### Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 6.

YES-2 >> Without CONSULT-III: GO TO 7.

NO >> Replace EVAP control system pressure sensor.

**6.**CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Reconnect harness connectors disconnected.
- 3. Start engine.
- 4. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-287, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace EVAP canister purge volume control solenoid valve.

## **8.**CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Clean the rubber tube using an air blower.

**9.**CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-294, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP canister vent control valve.

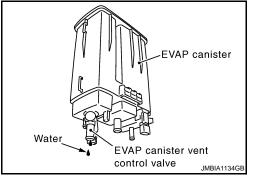
**10.**CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

Does water drain from the EVAP canister?

YES >> GO TO 11.

NO >> GO TO 13.



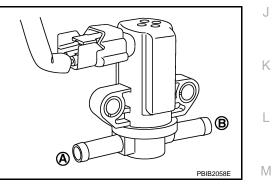
## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

| 11.CHECK EVAP CANISTER  |                        |
|---|------------------------|
| Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control attached.          | system pressure sensor |
| The weight should be less than 2.1 kg (4.6 lb).   |                        |
| Is the inspection result normal?  |                        |
| YES >> GO TO 13.<br>NO >> GO TO 12.   |                        |
| 12. DETECT MALFUNCTIONING PART  |                        |
| Check the following.<br>• EVAP canister for damage  |                        |
| <ul> <li>EVAP hose between EVAP canister and vehicle frame for clogging or poor connect</li> </ul>    | ion                    |
| >> Repair hose or replace EVAP canister.  |                        |
| 13. CHECK INTERMITTENT INCIDENT   |                        |
| Refer to GI-40, "Intermittent Incident".  |                        |
| >> INSPECTION END   |                        |
| Component Inspection  | INFOID:000000003388058 |
| 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE  |                        |
| With CONSULT-III  |                        |
| <ol> <li>Turn ignition switch OFF.</li> <li>Reconnect all harness connectors disconnected.</li> </ol> |                        |
| 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume contro                         | l solenoid valve.      |

- Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve. Turn ignition switch ON.
- 4.
- Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. 5.
- Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG 6. VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition<br>(PURG VOL C/V value) | Air passage continuity between (A) and (B) |
|-----------------------------------|--|
| 100%                              | Existed                                    |
| 0%                                | Not existed                                |



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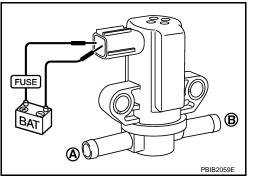
[VQ35DE]

#### Without CONSULT-III

- Turn ignition switch OFF. 1.
- Disconnect EVAP canister purge volume control solenoid valve harness connector. 2.
- Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve. 3.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition  | Air passage continuity between (A) and (B) |
|--|--|
| 12 V direct current supply between terminals 1 and 2 | Existed                                    |
| No supply  | Not existed                                |
| Is the inspection result normal?                     |  |

YES >> INSPECTION END



#### < COMPONENT DIAGNOSIS >

>> Replace EVAP canister purge volume control solenoid valve NO

#### P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

## [VQ35DE]

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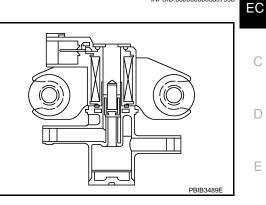
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# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

## Description

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



INFOID:000000003388060

## DTC Logic

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name  | DTC detecting condition   | Possible cause  | G |
|---------|---|---|---|---|
| P0444   | EVAP canister purge volume<br>control solenoid valve circuit<br>open    | An excessively low voltage signal is sent<br>to ECM through the valve | <ul> <li>Harness or connectors<br/>(The solenoid valve circuit is open or<br/>shorted.)</li> <li>EVAP canister purge volume control so-<br/>lenoid valve</li> </ul> | Η |
| P0445   | EVAP canister purge volume<br>control solenoid valve circuit<br>shorted | An excessively high voltage signal is sent to ECM through the valve   | <ul> <li>Harness or connectors<br/>(The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control so-<br/>lenoid valve</li> </ul>             |   |

## DTC CONFIRMATION PROCEDURE

## 1.CONDITIONING

|   | 12 |
|---|----|
| If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct- | N  |
| ing the next test.  |    |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>                                |    |
| 2. Turn ignition switch ON.   | L  |
| 3. Turn ignition switch OFF and wait at least 10 seconds.   |    |
| TESTING CONDITION:  |    |
| Before performing the following procedure, confirm battery voltage is more than 11 V at idle.             | M  |
|   |    |
| >> GO TO 2.   |    |
| 2. PERFORM DTC CONFIRMATION PROCEDURE   | Ν  |
| 1. Start engine and let it idle for at least 13 seconds.  |    |
| 2. Check 1st trip DTC.  | 0  |
| Is 1st trip DTC detected?   | 0  |
| YES >> Go to EC-289, "Diagnosis Procedure".   |    |
| NO >> INSPECTION END  |    |
|   | Ρ  |
| Diagnosis Procedure   |    |
| <b>1.</b> CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT                    |    |

1. Turn ignition switch OFF.

2. Disconnect EVAP canister purge volume control solenoid valve harness connector.

3. Turn ignition switch ON.

## EC-289

## P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### < COMPONENT DIAGNOSIS >

4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

|                                  | rge volume control<br>id valve | Ground | Voltage         |  |  |
|----------------------------------|--------------------------------|--------|-----------------|--|--|
| Connector                        | Terminal                       |        |                 |  |  |
| F30                              | 1                              | Ground | Battery voltage |  |  |
| le the increation result normal? |                                |        |                 |  |  |

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 2.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F121, E7

- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

 $\mathbf{3.}$  CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

| EVAP canister purge volume con-<br>trol solenoid valve |          | E         | Continuity |         |
|--|----------|-----------|------------|---------|
| Connector  | Terminal | Connector | Terminal   |         |
| F30  | 2        | F7        | 25         | Existed |

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

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 4.

YES-2 >> Without CONSULT-III: GO TO 5.

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

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### With CONSULT-III

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine.
- 3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

YES >> GO TO 6. NO >> GO TO 5.

5.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-291, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EVAP canister purge volume control solenoid valve.

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

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#### P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

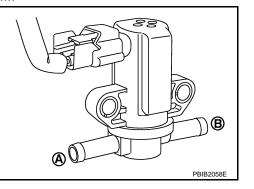
>> INSPECTION END Component Inspection

## 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### (P)With CONSULT-III

- Turn ignition switch OFF. 1.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Turn ignition switch ON.
- Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. 5.
- Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG 6. VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition<br>(PURG VOL C/V value) | Air passage continuity between (A) and (B) |
|-----------------------------------|--|
| 100%                              | Existed                                    |
| 0%                                | Not existed                                |



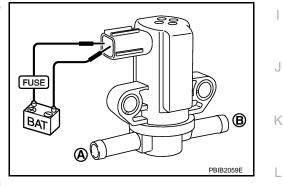
#### Without CONSULT-III

- Turn ignition switch OFF. 1.
- Disconnect EVAP canister purge volume control solenoid valve harness connector.
- Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve. 3.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition  | Air passage continuity between (A) and (B) |
|--|--|
| 12 V direct current supply between terminals 1 and 2 | Existed                                    |
| No supply  | Not existed                                |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP canister purge volume control solenoid valve



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#### < COMPONENT DIAGNOSIS >

## P0447 EVAP CANISTER VENT CONTROL VALVE

## Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

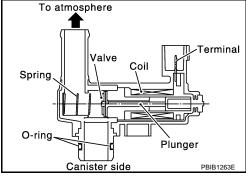
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.

## DTC Logic

#### DTC DETECTION LOGIC



INFOID:00000003388064

| DTC No. | Trouble diagnosis name                             | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P0447   | EVAP canister vent con-<br>trol valve circuit open | An improper voltage signal is sent to ECM through EVAP canister vent control valve. | <ul> <li>Harness or connectors<br/>(The valve circuit is open or shorted.)</li> <li>EVAP canister vent control valve</li> <li>Hoses<br/>(Hoses are connected incorrectly or<br/>clogged.)</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- Turn ignition switch OFF and wait at least 10 seconds. 1.
- Turn ignition switch ON. 2.
- Turn ignition switch OFF and wait at least 10 seconds. 3

#### **TESTING CONDITION:**

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

Start engine and wait at least 8 seconds. 1.

Check 1st trip DTC. 2.

#### Is 1st trip DTC detected?

YES >> Go to EC-292, "Diagnosis Procedure". NO

>> INSPECTION END

## **Diagnosis** Procedure

**1.**INSPECTION START

Will CONSULT-III be used?

Will CONSULT-III be used?

YES >> GO TO 2. NO >> GO TO 3.

 ${
m 2.}$ CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

(P)With CONSULT-III

INFOID-00000003388065

[VQ35DE]

|   | -  | -                              | ANISTER            | VENT C          |  |  |
|---|--|--------------------------------|--------------------|-----------------|--|--|
| < COMPONE   |  |                                |                    |                 | [VQ35DE]                                     |  |
| <ol> <li>Select "VE</li> <li>Touch "ON</li> </ol>   | on switch OFF<br>NT CONTROL<br>I/OFF" on CON<br>operating soun | /V" in "ACTI<br>ISULT-III scre | VE TEST" n<br>een. | node with C     | ONSULT-III.                                  |  |
| Clickin   | g sound shou   | Id be heard                    |                    |                 | EC   |  |
| Is the inspection   | on result norma  | <u>  ?</u>                     |                    |                 |  |  |
|   | D TO 7.  |                                |                    |                 | C  |  |
| •   | D TO 3.  |                                |                    |                 |  |  |
|   |  |                                | TRUL VALV          | E POWER         |  |  |
|   | on switch OFF.<br>t EVAP caniste                               | er vent contro                 | l valve harn       | iess connec     | tor.   |  |
| 0   | on switch ON.  |                                | inter vont e       | - start such se | however every star and every d               |  |
| 4. Check the  | voltage betwe  | en EVAP car                    | lister vent c      | ontrol valve    | harness connector and ground.                |  |
| EVAP canister v   | vent control valve   |                                |                    |                 |  |  |
| Connector   | Terminal   | - Ground                       | Volta              | age             | F  |  |
| B65   | 1  | Ground                         | Battery            | voltage         |  |  |
| Is the inspection   | on result norma  | ?                              |                    |                 | G  |  |
|   | D TO 5.  |                                |                    |                 |  |  |
| <b>4.</b> DETECT M  | D TO 4.  |                                |                    |                 |  |  |
|   |  | ING PART                       |                    |                 | F  |  |
| <ul><li>Check the follo</li><li>Harness cont</li></ul>  |  | E7                             |                    |                 |  |  |
| <ul> <li>Harness con</li> </ul>   | nectors E104,  | B4                             | _                  |                 |  |  |
| <ul> <li>Harness for c</li> </ul>   | open or short b  | etween EVA                     | P canister v       | ent control v   | alve and IPDM E/R                            |  |
| >> Re   | pair open circu  | uit short to a                 | round or she       | ort to power    | in harness or connectors.                    |  |
| _   | · ·  | •                              |                    | •               | SIGNAL CIRCUIT FOR OPEN AND SHORT            |  |
|   | on switch OFF.   |                                |                    |                 |  |  |
| 2. Disconnec  | t ECM harness  |                                |                    |                 | к  |  |
| <ol> <li>Check the<br/>nector.</li> </ol>   | continuity betw  | veen ECM ha                    | arness conn        | ector and E     | /AP canister vent control valve harness con- |  |
|   | /iring Diagram.  |                                |                    |                 | L  |  |
|   |  |                                |                    |                 | _  |  |
|   | ent control valve  | EC                             | -                  | Continuity      | N  |  |
| Connector   | Terminal   | Connector                      | Terminal           |                 | -  |  |
|   | B65 2 E16 109 Existed  |                                |                    |                 |  |  |
|   | charness for sl  | -                              | d and short        | to power.       | Ν  |  |
| Is the inspection<br>YES >> GO  | D TO 7.  | <u>u :</u>                     |                    |                 |  |  |
|   | D TO 6.  |                                |                    |                 | C  |  |
| 6.DETECT M  | ALFUNCTION   | ING PART                       |                    |                 |  |  |
| Check the follo   | wing.  |                                |                    |                 |  |  |
| <ul> <li>Harness connectors E104, B4</li> <li>Harness for open or short between EVAP canister vent control valve and ECM</li> </ul> |  |                                |                    |                 |  |  |
| <ul> <li>Harness for of</li> </ul>  | open or short b  | etween EVA                     | r canister v       | ent control v   |  |  |
| >> Re   | epair open circu   | uit, short to a                | round or she       | ort to power    | in harness or connectors.                    |  |
| 7.CHECK RU  |  | -                              |                    |                 |  |  |
|   | t rubber tube c  |                                |                    | ter vent con    | trol valve                                   |  |
|   |  |                                |                    |                 |  |  |

< COMPONENT DIAGNOSIS >

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean the rubber tube using an air blower.

**8.**CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-294, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP canister vent control valve.

9.CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

Component Inspection

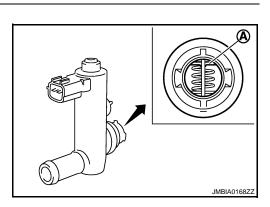
## 1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.

2. Check portion (A) of EVAP canister vent control valve for rust.

#### Is it rusted?

- YES >> Replace EVAP canister vent control valve.
- NO >> GO TO 2.



## 2. CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### With CONSULT-III

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

| Condition VENT CONTROL/V | Air passage continuity between (A) and (B) |
|--------------------------|--|
| ON                       | Not existed                                |
| OFF                      | Existed                                    |

#### Operation takes less than 1 second.

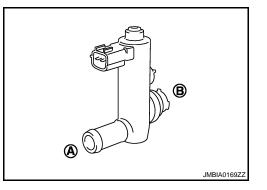
#### Without CONSULT-III

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Check air passage continuity and operation delay time under the
- following conditions.

#### Check that new O-ring is installed properly.

| Condition  | Air passage continuity between (A) and (B) |
|--|--|
| 12 V direct current supply between terminals 1 and 2 | Not existed                                |
| OFF  | Existed                                    |

Operation takes less than 1 second.



[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal? YES >> INSPECTION END

NO >> GO TO 3.

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

#### (P)With CONSULT-III

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

| Condition VENT CONTROL/V | Air passage continuity between (A) and (B) |
|--------------------------|--|
| ON                       | No   |
| OFF                      | Yes  |

Operation takes less than 1 second.

#### Without CONSULT-III

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.

| Condition  | Air passage continuity between (A) and (B) |
|--|--|
| 12 V direct current supply between terminals (1) and (2) | No   |
| OFF  | Yes  |

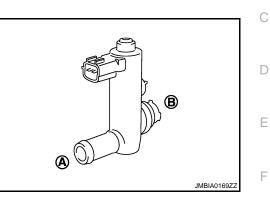
#### Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve

EC-295



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#### < COMPONENT DIAGNOSIS >

## P0448 EVAP CANISTER VENT CONTROL VALVE

## Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

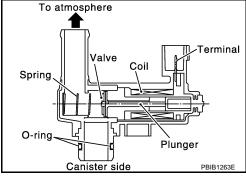
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid value is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.

## DTC Logic

#### DTC DETECTION LOGIC



INFOID:000000003388068

| DTC No. | Trouble diagnosis name                      | DTC detecting condition  | Possible cause  |
|---------|---|--|---|
| P0448   | EVAP canister vent con-<br>trol valve close | EVAP canister vent control valve remains<br>closed under specified driving conditions. | <ul> <li>EVAP canister vent control valve</li> <li>EVAP control system pressure sensor<br/>and the circuit</li> <li>Blocked rubber tube to EVAP canister<br/>vent control valve</li> <li>EVAP canister is saturated with water</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
- 4. Start engine and let it idle for at least 1 minute.
- 5. Repeat next procedures 3 times.
- Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.

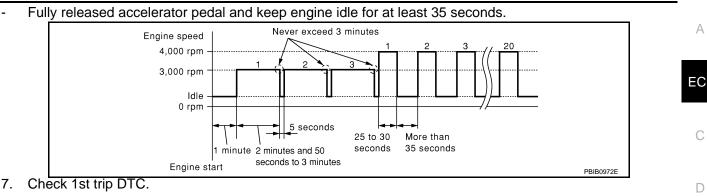
#### Never exceed 3 minutes.

- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
- Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

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[VQ35DE]

#### < COMPONENT DIAGNOSIS >



Is 1st trip DTC detected?

YES >> Go to EC-297, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

| Diagnosis Flocedule   | INFOID:000000003388069 |   |
|---|------------------------|---|
| 1.CHECK RUBBER TUBE   |                        | F |
| <ol> <li>Turn ignition switch OFF.</li> <li>Disconnect rubber tube connected to EVAP canister vent control valve.</li> <li>Check the rubber tube for clogging.</li> </ol> |                        | G |
| Is the inspection result normal?  |                        |   |
| YES >> GO TO 2.<br>NO >> Clean rubber tube using an air blower.   |                        | Н |

## 2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-298, "Component Inspection".

Is he inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve.

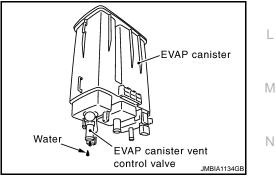
3.CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

2. Check if water will drain from the EVAP canister.

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



## 4.CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the following.EVAP canister for damage

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#### < COMPONENT DIAGNOSIS >

• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.

Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace EVAP control system pressure sensor.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-302, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace EVAP control system pressure sensor.

**8.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

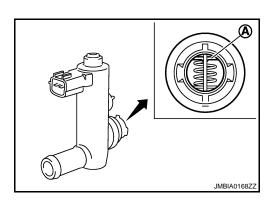
## 1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.

2. Check portion (A) of EVAP canister vent control valve for rust.

Is it rusted?

- YES >> Replace EVAP canister vent control valve.
- NO >> GO TO 2.



## 2. CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### With CONSULT-III

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.

4. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

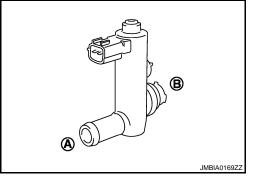
| Condition VENT CONTROL/V | Air passage continuity between (A) and (B) |
|--------------------------|--|
| ON                       | Not existed                                |
| OFF                      | Existed                                    |

Operation takes less than 1 second.

#### Without CONSULT-III

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Check air passage continuity and operation delay time under the
- following conditions.

#### Check that new O-ring is installed properly.



Air passage continuity between (A) and (B)

Not existed

Existed

#### < COMPONENT DIAGNOSIS >

Condition 12 V direct current supply between

Operation takes less than 1 second. Is the inspection result normal?

>> GO TO 3.

>> INSPECTION END

terminals 1 and 2

OFF

YES

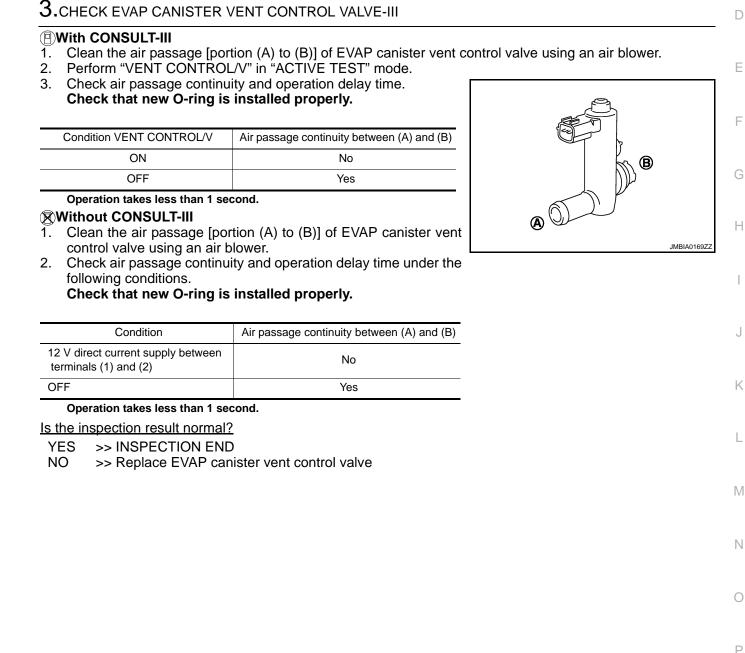
NO

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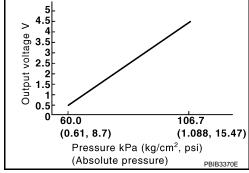


#### < COMPONENT DIAGNOSIS >

## P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## DTC Logic

### DTC DETECTION LOGIC

INFOID:000000003388072

| DTC No. | Trouble diagnosis name                                  | DTC detecting condition  | Possible cause   |
|---------|---|--|--|
| P0451   | EVAP control system<br>pressure sensor perfor-<br>mance | ECM detects a sloshing signal from the EVAP control system pressure sensor | <ul> <li>Harness or connectors<br/>(EVAP control system pressure sensor<br/>circuit is shorted.)<br/>[CKP sensor (POS) circuit is shorted.]<br/>(APP sensor 2 circuit is shorted.)<br/>(Refrigerant pressure sensor circuit is<br/>shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> </ul> |

## DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and wait at least 40 seconds. **NOTE:** 
  - Do not depress accelerator pedal even slightly.
- Check 1st trip DTC.
- Is 1st trip DTC detected?
- YES >> Go to EC-300, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

## 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

## EC-300

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#### P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR [VQ35DE] < COMPONENT DIAGNOSIS > YES >> GO TO 2. NO >> Repair or replace ground connection. 2.check evap control system pressure sensor connector for water Disconnect EVAP control system pressure sensor harness connector.

1. Check that water is not inside connectors. 2.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness connector.

 ${f 3.}$  CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.

Check the voltage between EVAP control system pressure sensor harness connector and ground. 2.

| EVAP control syste | em pressure sensor | Ground | Voltage (V) |  |
|--------------------|--------------------|--------|-------------|--|
| Connector Terminal |                    | Ground | voltage (v) |  |
| B17                | 3                  | Ground | Approx. 5   |  |

Is the inspection result normal?

>> GO TO 8. YES

NO >> GO TO 4.

### 4.CHECK SENSOR POWER SUPPLY CIRCUIT

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

| EC  | CM   | Sensor   |              |          |
|---|--|--|--------------|----------|
| Connector   | Terminal   | Name   | Connector    | Terminal |
| F8  | 72   | Refrigerant pressure sensor                            | E300         | 1        |
| Fδ  | 76   | CKP sensor (POS)                                       | F20          | 1        |
| E16   | 87   | APP sensor   | E110         | 5        |
| EIO   | 91   | EVAP control system pressure sensor                    | B17          | 3        |
| NO >><br>5.CHECK (                                      |  | t to ground or short to power in har<br>NTS            | ness or conn | ectors.  |
| • Refrigeran<br><u>Is the inspec</u><br>YES >><br>NO >> | t position se<br>t pressure s<br><u>ction result r</u><br>GO TO 6.<br>Replace ma | Ifunctioning components.                               |              |          |
| 6.CHECK A   | APP SENSC  | DR   |              |          |
| Is the inspect<br>YES >><br>NO >>                       | <u>ction result r</u><br>GO TO 9.<br>GO TO 7.                                    | oonent Inspection".<br>oormal?<br>RATOR PEDAL ASSEMBLY |              |          |
| 2. Go to <u>E</u>                                       | <u>C-415, "Spe</u>   | r pedal assembly.<br>cial Repair Requirement".         |              |          |
| >>  | INSPECTIC  | IN END   |              |          |

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

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< COMPONENT DIAGNOSIS >

Refer to EC-302, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP control system pressure sensor.

## 9. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Remove EVAP control system pressure sensor with its harness connector.
- Always replace O-ring with a new one.
- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

|           | ECM   | Applied veguum kDe |  |                                     |
|-----------|---|--------------------|--|-------------------------------------|
| Connector | +   | _                  | Applied vacuum kPa<br>(kg/cm <sup>2</sup> , psi) | Voltage                             |
|           | Terminal  | Terminal           | (  |                                     |
|           | 86  | 96                 | Not applied                                      | 1.8 - 4.8 V                         |
| E16       | (EVAP control system<br>pressure sensor signal) | (Sensor ground)    | -26.7 (-0.272, -3.87)                            | 2.1 to 2.5 V lower than above value |

#### **CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

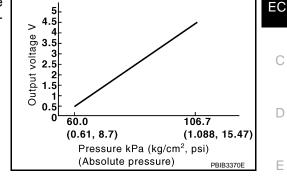
- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor

#### < COMPONENT DIAGNOSIS >

## P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

#### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## **DTC Logic**

#### DTC DETECTION LOGIC

DTC No. Possible cause Trouble diagnosis name DTC detecting condition Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) EVAP control system (Refrigerant pressure sensor circuit is An excessively low voltage from the sensor is P0452 pressure sensor low insent to ECM. shorted.) put EVAP control system pressure sensor Crankshaft position sensor (POS) Accelerator pedal position sensor · Refrigerant pressure sensor

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT-III.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Set voltmeter probes to ECM harness connector terminals under the following conditions.

## EC-303

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#### < COMPONENT DIAGNOSIS >

| ECM       |   |                        |  |  |  |  |
|-----------|---|------------------------|--|--|--|--|
| Connector | +   | _                      |  |  |  |  |
|           | Terminal                                    | Terminal               |  |  |  |  |
| E16       | 95<br>(Fuel tank temperature sensor signal) | 104<br>(Sensor ground) |  |  |  |  |

- 3. Check that the voltage is less than 4.2 V.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Turn ignition switch OFF and wait at least 10 seconds.
- 7. Start engine and wait at least 20 seconds.
- 8. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-304, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

**1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43. "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

## 2. CHECK CONNECTOR

- 1. Disconnect EVAP control system pressure sensor harness connector.
- 2. Check that water is not inside connector.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness connector.

## ${\it 3.}$ CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch ON.
- 2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control syste | em pressure sensor | Ground | Voltage (V) |  |
|--------------------|--------------------|--------|-------------|--|
| Connector Terminal |                    | Ground | Voltage (V) |  |
| B17                | 3                  | Ground | Approx. 5   |  |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 4.

#### **4.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

| EVAP control syste | em pressure sensor | E         | Continuity |            |
|--------------------|--------------------|-----------|------------|------------|
| Connector Terminal |                    | Connector | Terminal   | Continuity |
| B17                | 3                  | E16       | 91         | Existed    |

Is the inspection result normal?

YES >> GO TO 6.

| < COMPON   |                         | 2 EVAP CONTROL SYSTE<br>NOSIS >                     |                      | SURE SEN       | [VQ35DE]              |
|--|-------------------------|---|----------------------|----------------|-----------------------|
|  | GO TO 5.                |   |                      |                |                       |
| 5.DETECT   | MALFUNC                 | TIONING PART  |                      |                |                       |
| Check the fo   |                         |   |                      |                |                       |
| <ul> <li>Harness co</li> <li>Harness for</li> </ul>    |                         | 4, E104<br>nort between EVAP control system         | pressure ser         | sor and ECM    | E                     |
|  |                         |   |                      |                |                       |
| ~  | Repair oper             |   |                      |                | (                     |
| <b>6.</b> CHECK S                                      | SENSOR PO               | OWER SUPPLY CIRCUIT                                 |                      |                |                       |
| Check harne  | ess for short           | to power and short to ground, betw                  | veen the follo       | wing terminals | S.                    |
| EC   | CM                      | Sensor  |                      |                |                       |
| Connector  | Terminal                | Name  | Connector            | Terminal       |                       |
|  | 72                      | Refrigerant pressure sensor                         | E300                 | 1              |                       |
| F8   | 76                      | CKP sensor (POS)                                    | F20                  | 1              |                       |
| E16  | 87                      | APP sensor  | E110                 | 5              |                       |
|  | 91                      | EVAP control system pressure sensor                 | B17                  | 3              |                       |
| Is the inspec  |                         | ormal?  |                      |                | (                     |
|  | GO TO 7.<br>Repair shor | t to ground or short to power in har                | ness or conn         | ectors         |                       |
| 7.снеск с  | •                       | •   |                      |                |                       |
| Check the fo   |                         | -   |                      |                |                       |
| <ul> <li>Crankshaft</li> </ul>                         | t position se           | nsor (POS) (Refer to <u>EC-263, "Cor</u>            |                      |                |                       |
| <ul> <li>Refrigeran</li> <li>Is the inspect</li> </ul> | -                       | ensor (Refer to <u>EC-463, "Diagnosis</u><br>ormal2 | <u>s Procedure</u> " | .)             |                       |
| •  | GO TO 8.                | ionnar:   |                      |                |                       |
|  |                         | Ifunctioning components.                            |                      |                |                       |
| 8.CHECK A  | APP SENSC               | DR  |                      |                |                       |
|  |                         | onent Inspection".                                  |                      |                |                       |
| Is the inspec  |                         | ormal?  |                      |                | l                     |
|  | GO TO 15.<br>GO TO 9.   |   |                      |                |                       |
| •  |                         | RATOR PEDAL ASSEMBLY                                |                      |                |                       |
|  |                         | r pedal assembly.                                   |                      |                |                       |
|  |                         | pecial Repair Requirement".                         |                      |                | ſ                     |
|  |                         |   |                      |                |                       |
|  |                         |   |                      |                |                       |
| SHORT  | CEVAP CC                | ONTROL SYSTEM PRESSURE S                            | SENSOR G             | KOUND CIRC     | JUIT FOR OPEN AND     |
|  | ition switch            | OFF.  |                      |                |                       |
| 2. Disconn   | ect ECM ha              | rness connector.                                    |                      |                | (                     |
| <ol> <li>Check t<br/>ness col</li> </ol>               |                         | y between EVAP control system p                     | pressure sens        | sor harness co | onnector and ECM har- |
| 1000 001   |                         |   |                      |                | l                     |
| EVAP control   | system pressu           | re sensor ECM                                       |                      |                |                       |

| EVAP control syste | em pressure sensor | ECM       |          | Continuity |  |  |
|--------------------|--------------------|-----------|----------|------------|--|--|
| Connector          | Terminal           | Connector | Terminal | Continuity |  |  |
| B17                | 1                  | E16       | 96       | Existed    |  |  |
|                    |                    |           |          |            |  |  |

4. Also check harness for short to ground and short to power. <u>Is the inspection result normal?</u>

< COMPONENT DIAGNOSIS >

YES >> GO TO 12. NO >> GO TO 11. **11.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors B4, E104

• Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

12.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

| EVAP control system pressure sensor |          | ECM       |          | Continuity |
|-------------------------------------|----------|-----------|----------|------------|
| Connector                           | Terminal | Connector | Terminal | Continuity |
| B17                                 | 2        | E16       | 86       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 14. NO >> GO TO 13.

NO >> GO 10 13.

13. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors B4, E104

• Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

14.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-306. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace EVAP control system pressure sensor.

15. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000003625710

## 1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.

- 2. Remove EVAP control system pressure sensor with its harness connector.
- Always replace O-ring with a new one.
- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

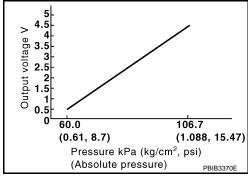
| Connector       +       -       Operating layout       Voltage         1       Terminal       Terminal       Not applied       1.8 - 4.8 V         16       (EVAP control system)       96       Not applied       1.8 - 4.8 V         2       (EVAP control system)       96            4       (EVAP control system)       (Sensor ground)       -26.7 (0.272, -3.87)       2.110 -25 V lower than above value         3       Mays calibrate the vacuum pump gauge when using it.                                   |                                     | ECM   |                 | Applied vacuum kPa    |         |                                   |   |
|--|-------------------------------------|---|-----------------|-----------------------|---------|-----------------------------------|---|
| Terminal       Terminal         86       96         (EVAP control system pressure sensor signal)       96         (Sensor ground)       -26.7 (-0.272, -3.87)         2.1 to 2.5 V lower than above value         CAUTION:         • Always calibrate the vacuum pump gauge when using it.         • Never apply below -93.3 kPa (-0.952 kg/cm <sup>2</sup> , -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm <sup>2</sup> 14.69 psi).         s the inspection result normal?         YES       >> INSPECTION END | Connector                           |   |                 |                       | Voltage |                                   | F |
| E16       (EVAP control system pressure sensor signal)       96<br>(Sensor ground)       -26.7 (-0.272, -3.87)       2.1 to 2.5 V lower than above value         CAUTION:       - Always calibrate the vacuum pump gauge when using it.       • Always calibrate the vacuum pump gauge when using it.         • Never apply below -93.3 kPa (-0.952 kg/cm <sup>2</sup> , -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm <sup>2</sup> the inspection result normal?         YES       >> INSPECTION END            |                                     | Terminal                                      | Terminal        |                       |         |                                   |   |
| caution       (Sensor ground)       -26.7 (-0.272, -3.87)       Entropy for the instant above value         caution:       • Always calibrate the vacuum pump gauge when using it.         • Never apply below -93.3 kPa (-0.952 kg/cm <sup>2</sup> , -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm <sup>2</sup> 14.69 psi).         the inspection result normal?         YES       >> INSPECTION END   | E16                                 |   |                 |                       |         |                                   |   |
| <ul> <li>Always calibrate the vacuum pump gauge when using it.</li> <li>Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup> 14.69 psi).</li> <li>the inspection result normal?</li> <li>&gt;&gt; INSPECTION END</li> </ul>  | 210                                 | pressure sensor signal)                       | (Sensor ground) | -26.7 (-0.272, -3.87) |         |                                   |   |
| the inspection result normal?<br>(ES >> INSPECTION END   | <ul><li>Alwa</li><li>Neve</li></ul> | eys calibrate the vac<br>er apply below -93.3 |                 |                       |         | 3 kPa (1.033 kg/cm <sup>2</sup> , |   |
|  | <u>the inspe</u><br>′ES >>          | <ul> <li>INSPECTION END</li> </ul>            | rol system pres | sure sensor           |         |                                   |   |
|  |                                     |   | or system pres  |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |
|  |                                     |   |                 |                       |         |                                   |   |

#### < COMPONENT DIAGNOSIS >

## P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## DTC Logic

### DTC DETECTION LOGIC

INFOID:000000003388080

| DTC No. | Trouble diagnosis name                                 | DTC detecting condition                                     | Possible cause   |
|---------|--|---|--|
| P0453   | EVAP control system<br>pressure sensor high in-<br>put | An excessively high voltage from the sensor is sent to ECM. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted.)<br/>[CKP sensor (POS) circuit is shorted.]<br/>(APP sensor 2 circuit is shorted.)<br/>(Refrigerant pressure sensor circuit is<br/>shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> <li>EVAP canister vent control valve</li> <li>EVAP canister</li> <li>Rubber hose from EVAP canister vent<br/>control valve to vehicle frame</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT-III.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

## EC-308

[VQ35DE]

< COMPONENT DIAGNOSIS >

[VQ35DE]

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- With GST
  Start engine and warm it up to normal operating temperature.
  Set voltmeter probes to ECM harness connector terminals.

|  | E  | CM              |   | -                                     | EC           |
|--|--|-----------------|---|---------------------------------------|--------------|
|  | +  |                 | _                                       | -                                     |              |
| Connector                                      | Terminal   |                 | Terminal                                | _                                     | 0            |
| E16  | 95<br>(Fuel tank temperature   | sensor signal)  | 104<br>(Sensor ground)                  | _                                     | C            |
| <ol> <li>Turn ign</li> <li>Turn ign</li> </ol> | nat the voltage is less<br>ition switch OFF and<br>ition switch ON.                  | wait at least 1 |   | _                                     | D            |
| <ol> <li>Start eng</li> <li>Check 1</li> </ol> | ition switch OFF and<br>gine and wait at least<br>st trip DTC.<br><u>C detected?</u> |                 | 0 seconds.                              |                                       | Е            |
| YES >>   | Go to <u>EC-309, "Diagr</u><br>INSPECTION END  | nosis Procedur  | r <u>e"</u> .                           |                                       | F            |
|  | Procedure  |                 |   | INFOID:00000003388081                 | G            |
| 1.СНЕСК С                                      | GROUND CONNECT   | ION             |   |                                       |              |
| 2. Check g                                     |  | 8. Refer to Gro | ound Inspection in <u>G</u>             | I-43, "Circuit Inspection".           | Н            |
|  | tion result normal?  |                 |   |                                       |              |
|  | GO TO 2.<br>Repair or replace gro  | und connectio   | n.                                      |                                       |              |
| -  | CONNECTOR  |                 |   |                                       |              |
|  | ect EVAP control sys   | tem pressure :  | sensor harness coni                     | nector.                               | J            |
|  | nat water is not inside  | connectors.     |   |                                       |              |
|  | tion result normal?  |                 |   |                                       | K            |
|  | GO TO 3.<br>Repair or replace har  | ness connecto   | or.                                     |                                       |              |
| -  |  |                 |   | VER SUPPLY CIRCUIT                    |              |
| 1. Turn ign                                    | ition switch ON.   |                 |   | sor harness connector and ground.     | L            |
|  |  |                 |   |                                       | $\mathbb{M}$ |
| EVAP control<br>Connector                      | system pressure sensor<br>Terminal   | Ground          | Voltage (V)                             |                                       |              |
| B17  | 3  | Ground          | Approx. 5                               |                                       | Ν            |
|  | tion result normal?  | Cround          | , |                                       |              |
| YES >>   | GO TO 10.<br>GO TO 4.  |                 |   |                                       | 0            |
| 4.CHECK E                                      | EVAP CONTROL SYS   | STEM PRESS      | URE SENSOR POV                          | VER SUPPLY CIRCUIT-II                 |              |
| 1. Turn ign                                    | ition switch OFF.<br>ect ECM harness cor   |                 |   |                                       | Ρ            |
|  | he continuity betwee   |                 | ol system pressure                      | sensor harness connector and ECM har- |              |

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

| EVAP control system pressure sensor |          | E         | Continuity |            |
|-------------------------------------|----------|-----------|------------|------------|
| Connector                           | Terminal | Connector | Terminal   | Continuity |
| B17                                 | 3        | E16       | 91         | Existed    |

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

### **5.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors B4, E104

• Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit.

#### **6.**CHECK SENSOR POWER SUPPLY CIRCUIT

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

| EC        | CM       | Sensor                              |           |          |  |
|-----------|----------|-------------------------------------|-----------|----------|--|
| Connector | Terminal | Name                                | Connector | Terminal |  |
| F8        | 72       | Refrigerant pressure sensor         | E300      | 1        |  |
| FO        | 76       | CKP sensor (POS)                    | F20       | 1        |  |
| E16       | 87       | APP sensor                          | E110      | 5        |  |
| EIO       | 91       | EVAP control system pressure sensor | B17       | 3        |  |

Is the inspection result normal?

YES >> GO TO 7.

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

**/**.CHECK COMPONENTS

#### Check the following.

• Crankshaft position sensor (POS) (Refer to EC-263, "Component Inspection".)

• Refrigerant pressure sensor (Refer to EC-463, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning components.

8. CHECK APP SENSOR

Refer to EC-415. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 9.

9.replace accelerator pedal assembly

1. Replace accelerator pedal assembly.

2. Refer to EC-415, "Special Repair Requirement".

#### >> INSPECTION END

10.check evap control system pressure sensor ground circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

| EVAP control system                          | m pressure sensor | EC                          | M                | Continuity      |                              |
|--|-------------------|-----------------------------|------------------|-----------------|------------------------------|
| Connector                                    | Terminal          | Connector                   | Terminal         | Continuity      |                              |
| B17  | 1                 | E16                         | 96               | Existed         |                              |
| 4. Also check h                              | arness for short  | to ground and s             | short to power.  |                 |                              |
| Is the inspection                            |                   |                             |                  |                 |                              |
| YES >> GO T<br>NO >> GO T                    |                   |                             |                  |                 |                              |
|  | ALFUNCTIONIN      |                             |                  |                 |                              |
| Check the followi                            |                   |                             |                  |                 |                              |
| <ul> <li>Harness conne</li> </ul>            |                   |                             |                  |                 |                              |
| <ul> <li>Harness for operative</li> </ul>    | en or short betw  | een EVAP contr              | ol system pres   | sure sensor ar  | Id ECM                       |
| 5  | ,                 |                             |                  |                 |                              |
|  |                   | short to ground a           |                  |                 |                              |
| TZ.CHECK EV/<br>SHORT                        | AP CONTROL :      | SYSTEM PRES                 | SURE SENSO       | R INPUT SIGI    | AL CIRCUIT FOR OPEN AND      |
|  | ontinuity betwee  | n EVAP control              | system press     | ure sensor ha   | rness connector and ECM har- |
| ness connec                                  |                   |                             | system press     |                 |                              |
|  |                   |                             |                  |                 |                              |
| EVAP control syster                          | m pressure sensor | EC                          |                  | Continuity      |                              |
| Connector                                    | Terminal          | Connector                   | Terminal         |                 |                              |
| B17  | 2                 | E16                         | 86               | Existed         |                              |
| 2. Also check h                              |                   | to ground and s             | short to power.  |                 |                              |
| Is the inspection                            |                   |                             |                  |                 |                              |
| YES >> GO T<br>NO >> GO T                    |                   |                             |                  |                 |                              |
| <b>13.</b> DETECT M                          |                   |                             |                  |                 |                              |
| Check the followi                            |                   |                             |                  |                 |                              |
| <ul> <li>Harness conne</li> </ul>            | ctors B4, E104    |                             |                  |                 |                              |
| <ul> <li>Harness for operative</li> </ul>    | en or short betw  | een EVAP contr              | ol system pres   | sure sensor ar  | Id ECM                       |
|  | air an an aircuit | abort to ground a           | ar abort to pow  | ar in harnood a | raconactora                  |
| >> кера<br>14.снеск RU                       | •                 | short to ground o           | or short to powe | er in namess c  | r connectors.                |
|  |                   |                             |                  |                 |                              |
|  | ubber tube conr   | nected to EVAP (<br>paging. | canister vent co | ontrol valve.   |                              |
| Is the inspection                            |                   | - 3 3 3 .                   |                  |                 |                              |
| YES >> GO T                                  |                   |                             |                  |                 |                              |
|  |                   | e using an air bl           | •                | replace rubbe   | r tube.                      |
| <b>15.</b> CHECK EV                          | AP CANISTER '     | VENT CONTRO                 | L VALVE          |                 |                              |
| Refer to <u>EC-294,</u>                      | "Component In     | spection".                  |                  |                 |                              |
| Is the inspection                            |                   |                             |                  |                 |                              |
| YES >> GO T<br>NO >> Repl                    |                   | ster vent control           | valve            |                 |                              |
| 16.CHECK EV                                  |                   |                             |                  | 2               |                              |
|  |                   |                             |                  | `               |                              |
| Refer to <u>EC-312,</u><br>Is the inspection |                   | spection.                   |                  |                 |                              |
| VES >> GO ]                                  |                   |                             |                  |                 |                              |

YES >> GO TO 17.

NO >> Replace EVAP control system pressure sensor.

#### < COMPONENT DIAGNOSIS >

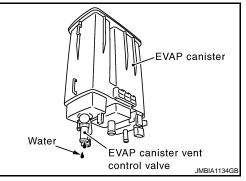
[VQ35DE]

17. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
- 2. Check if water will drain from the EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 18.
- NO >> GO TO 20.



## **18.**CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> GO TO 20. NO >> GO TO 19.

19. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 20. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

#### **Component Inspection**

1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.

- 2. Remove EVAP control system pressure sensor with its harness connector. Always replace O-ring with a new one.
- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

|               | ECM   | Applied veguum kDo |  |                                     |  |
|---------------|---|--------------------|--|-------------------------------------|--|
| Connector + - |   | _                  | Applied vacuum kPa<br>(kg/cm <sup>2</sup> , psi) | Voltage                             |  |
| Connector     | Terminal  | Terminal           |  |                                     |  |
|               | 86  | 96                 | Not applied                                      | 1.8 - 4.8 V                         |  |
| E16           | (EVAP control system<br>pressure sensor signal) | (Sensor ground)    | -26.7 (-0.272, -3.87)                            | 2.1 to 2.5 V lower than above value |  |

#### **CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor

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#### < COMPONENT DIAGNOSIS >

## P0455 EVAP CONTROL SYSTEM

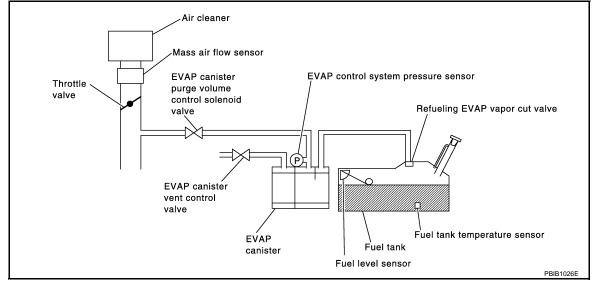
## DTC Logic

INFOID:000000003388083

[VQ35DE]

#### DTC DETECTION LOGIC

This diagnosis detects a very large leakage (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



| DTC No. | Trouble diagnosis name                        | DTC detecting condition   | Possible cause  |
|---------|---|---|---|
| P0455   | EVAP control system<br>gross leakage detected | EVAP control system has a very large leakage<br>such as fuel filler cap fell off, EVAP control sys-<br>tem does not operate properly. | <ul> <li>Fuel filler cap remains open or does not close.</li> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leakage is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent control valve.</li> <li>EVAP canister or fuel tank leakage</li> <li>EVAP purge line (pipe and rubber tube) leakage</li> <li>EVAP purge line rubber tube bent.</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister vent control valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>EVAP control system pressure sensor</li> <li>QRVR system leakage</li> </ul> |

#### **CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.
- If the fuel filler cap is not tightened properly, the MIL may illuminate.
- Use only a genuine NISSAN rubber tube as a replacement.

### DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

#### CAUTION:

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

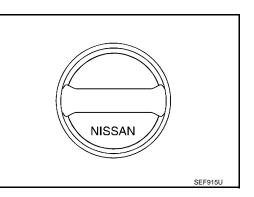
| <b>Never remove fuel filler cap during the DTC Confirmation Procedure.</b><br>If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-                            | А      |
|--|--------|
| ing the next test.<br>1. Turn ignition switch OFF and wait at least 10 seconds.  | 1      |
| 2. Turn ignition switch ON.  | EC     |
| <ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Check that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.</li> <li>TESTING CONDITION:</li> </ol> |        |
| <ul> <li>Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed<br/>on flat level surface.</li> </ul>   | С      |
| <ul> <li>Open engine hood before conducting the following procedures.</li> </ul>   |        |
| Will CONSULT-III be used?  | D      |
| YES >> GO TO 2.<br>NO >> GO TO 4.  |        |
| 2.PERFORM DTC CONFIRMATION PROCEDURE   | Е      |
| With CONSULT-III   |        |
| <ol> <li>Tighten fuel filler cap securely until ratcheting sound is heard.</li> <li>Turn ignition switch ON.</li> </ol>  | F      |
| 3. Turn ignition switch OFF and wait at least 10 seconds.  |        |
| <ol> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.</li> <li>Check that the following conditions are met.</li> </ol>   | $\sim$ |
| COOLAN TEMP/S: 0 - 70°C (32 - 158°F)   | G      |
| <ul> <li>INT/A TEMP SE: 0 - 60°C (32 - 140°F)</li> <li>6. Select "EVP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode</li> </ul>  |        |
| with CONSULT-III.  | Н      |
| Follow the instructions displayed. NOTE:   |        |
| If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to <u>EC-12, "BASIC INSPECTION : Special Repair Requirement"</u> .   |        |
| Which is displayed on CONSULT-III screen?  |        |
| OK >> INSPECTION END<br>NG >> GO TO 3.   | J      |
| 3. CHECK DTC   |        |
| Check DTC.   | Κ      |
| Which DTC is detected?   |        |
| P0455 >> Go to <u>EC-316. "Diagnosis Procedure"</u> .<br>P0442 >> Go to <u>EC-279. "Diagnosis Procedure"</u> .   | L      |
| 442 >> G0 to <u>EC-279. Diagnosis Procedure</u> .<br>4.PERFORM DTC CONFIRMATION PROCEDURE  |        |
|  | Μ      |
| ŇOTE:  |        |
| Be sure to read the explanation of DRIVING PATTERN in <u>EC-524. "How to Set SRT Code"</u> before driving vehicle.   | N      |
| 1. Start engine.   | Ν      |
| <ol> <li>Drive vehicle according to DRIVING PATTERN.</li> <li>Stop vehicle.</li> </ol>   |        |
| 4. Turn ignition switch OFF and wait at least 10 seconds.  | 0      |
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>   |        |
| 7. Turn ignition switch ON.  | Ρ      |
| <ol> <li>Check 1st trip DTC.</li> <li><u>Is 1st trip DTC detected?</u></li> </ol>  |        |
| YES-1 >> P0455: Go to <u>EC-316. "Diagnosis Procedure"</u> .   |        |
| YES-2 >> P0442: Go to <u>EC-279, "Diagnosis Procedure"</u> .<br>YES-3 >> P0441: Go to <u>EC-275, "Diagnosis Procedure"</u> .   |        |
| NO $>>$ INSPECTION END   |        |
|  |        |

#### < COMPONENT DIAGNOSIS >

### Diagnosis Procedure

### **1.**CHECK FUEL FILLER CAP DESIGN

- 1. Turn ignition switch OFF.
- 2. Check for genuine NISSAN fuel filler cap design.
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Replace with genuine NISSAN fuel filler cap.



## 2.CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Retighten until ratcheting sound is heard.

## **3.**CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-318, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

**5.**CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to EC-77, "System Diagram".

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or reconnect the hose.

**6.**CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

#### >> GO TO 7.

## 7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to <u>EC-549. "Removal and Installation"</u>.
- EVAP canister vent control valve. Refer to <u>EC-294, "Component Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair or replace EVAP canister vent control valve and O-ring.

## EC-316

< COMPONENT DIAGNOSIS >

| 8. CHECK FOR EVAP LEAKAGE  |
|--|
| Refer to EC-547, "Inspection".   |
| Is there any leakage in EVAP line?   |
| YES >> Repair or replace.<br>NO-1 >> With CONSULT-III: GO TO 9.<br>NO-2 >> Without CONSULT-III: GO TO 10.  |
| 9. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION   |
| <ul> <li>With CONSULT-III</li> <li>Disconnect vacuum hose from EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>Start engine.</li> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode.</li> <li>Touch "Qu" on CONSULT-III screen to increase "PURG VOL C/V" opening to 100%.</li> <li>Check vacuum hose for vacuum.</li> </ul> |
| Vacuum should exist.   |
| Is the inspection result normal?   |
| YES >> GO TO 12.   |
| NO >> GO TO 11.  |
| 10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION $G$  |
| Without CONSULT-III  Start engine and warm it up to normal operating temperature.  Stop engine.  |
| <ol> <li>Disconnect vacuum hose from EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>Start engine and let it idle for at least 80 seconds.</li> <li>Check vacuum hose for vacuum when revving engine up to 2,000 rpm.</li> </ol>  |
| Vacuum should exist.   |
| Is the inspection result normal?   |
| YES >> GO TO 13.   |
| NO >> GO TO 11.<br>11.CHECK VACUUM HOSE  |
|  |
| Check vacuum hoses for clogging or disconnection. Refer to <u>EC-77, "System Diagram"</u> .<br>Is the inspection result normal?  |
| YES-1 >> With CONSULT-III: GO TO 12.   |
| YES-2 >> Without CONSULT-III: GO TO 13.  |
| NO >> Repair or reconnect the hose.  |
| 12.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE   |
| With CONSULT-III Start engine. N   |
| <ol> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.</li> </ol>  |
| Does engine speed vary according to the valve opening?   |
| YES >> GO TO 14.<br>NO >> GO TO 13.  |
| 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE  |
| Checkeval canistent onde voedme control solehold valve   |
| Refer to EC-287, "Component Inspection".   |
| Refer to EC-287, "Component Inspection".<br>Is the inspection result normal?   |
| Refer to <u>EC-287, "Component Inspection"</u> .<br><u>Is the inspection result normal?</u><br>YES >> GO TO 14.  |
| Refer to EC-287, "Component Inspection".<br>Is the inspection result normal?   |

< COMPONENT DIAGNOSIS >

Refer to EC-238, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace fuel level sensor unit.

**15.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-302, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace EVAP control system pressure sensor.

**16.**CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and improper connection. For location, refer to <u>EC-457, "Description"</u>.

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace hoses and tubes.

**17.**CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace hose, tube or filler neck tube.

**18.**CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-460, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

**19.**CHECK INTERMITTENT INCIDENT

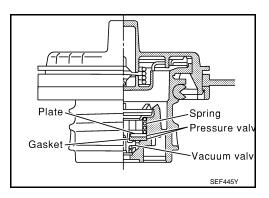
Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

#### Component Inspection

**1.**CHECK FUEL FILLER CAP

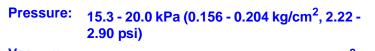
- 1. Turn ignition switch OFF.
- 2. Remove fuel filler cap.
- 3. Wipe clean valve housing.



4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.

#### < COMPONENT DIAGNOSIS >

#### 5. Check valve opening pressure and vacuum.



Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

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

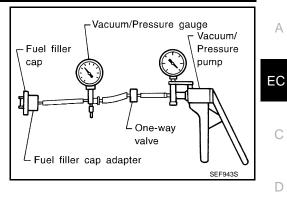
**2.**REPLACE FUEL FILLER CAP

#### Replace fuel filler cap.

#### CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END



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## P0456 EVAP CONTROL SYSTEM

DTC Logic

#### DTC DETECTION LOGIC

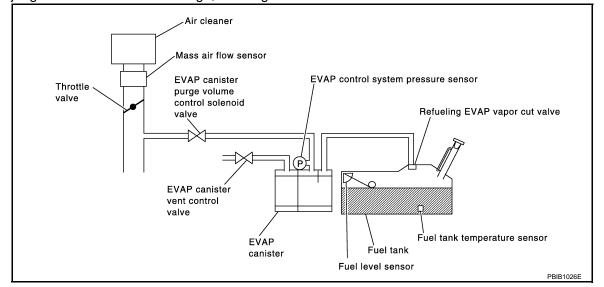
#### NOTE:

#### If DTC P0456 is displayed with DTC P0442, first perform the trouble diagnosis for DTC P0456.

This diagnosis detects very small leakage in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the negative pressure.

If ECM judges a leakage which corresponds to a very small leakage, the very small leakage P0456 will be detected.

If ECM judges a leakage equivalent to a small leakage, EVAP small leakage P0442 will be detected. If ECM judges that there are no leakage, the diagnosis will be OK.



| DTC No. | Trouble diagnosis name  | DTC detecting condition   | Possible cause  |
|---------|---|---|---|
| P0456   | Evaporative emission<br>control system very<br>small leakage (negative<br>pressure check) | <ul> <li>EVAP system has a very small leak-<br/>age.</li> <li>EVAP system does not operate prop-<br/>erly.</li> </ul> | <ul> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Fuel filler cap remains open or does not close.</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leakage is in line between intake manifold and<br/>EVAP canister purge volume control solenoid<br/>valve.</li> <li>Foreign matter caught in EVAP canister vent con-<br/>trol valve.</li> <li>EVAP canister or fuel tank leakage</li> <li>EVAP purge line (pipe and rubber tube) leakage</li> <li>EVAP purge line rubber tube bent</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister purge volume control solenoid<br/>valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister vent control valve is miss-<br/>ing or damaged</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leakage</li> <li>Fuel level sensor and the circuit</li> <li>Foreign matter caught in EVAP canister purge vol-<br/>ume control solenoid valve</li> </ul> |

#### CAUTION:

| < COMPONENT DIAGNOSIS > [VQ35DE   | :]               |
|---|------------------|
| <ul> <li>Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, th MIL may illuminate.</li> <li>If the fuel filler cap is not tightened properly, the MIL may illuminate.</li> <li>Use only a genuine NISSAN rubber tube as a replacement.</li> </ul>                       | ne<br>A          |
| DTC CONFIRMATION PROCEDURE  | EC               |
| 1.PRECONDITIONING   |                  |
| <ul> <li>If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.</li> <li>1. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>2. Turn ignition switch ON.</li> <li>3. Turn ignition switch OFF and wait at least 10 seconds.</li> </ul> | <del>xt-</del> C |
| Will CONSULT-III be used?   |                  |
| YES >> GO TO 2.<br>NO >> GO TO 4.<br><b>2.</b> PRECONDITIONING  | E                |
| If DTC CONFIRMATION PROCEDURE has been previously conducted, always turn ignition switch OFF ar wait at least 10 seconds before conducting the next test. <b>NOTE:</b>  | nd F             |
| <ul> <li>After repair, make sure that the hoses and clips are installed properly.</li> <li>Check that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.</li> <li>TESTING CONDITION:</li> </ul>  | p- G             |
| <ul> <li>Open engine hood before conducting the following procedure.</li> <li>If any of following conditions are met just before the DTC CONFIRMATION PROCEDURE, leave the vehicle for more than 1 hour.</li> </ul>   | H                |
| <ul> <li>Fuel filler cap is removed.</li> <li>Fuel is refilled or drained.</li> <li>EVAP component part/parts is/are removed.</li> </ul>  | I                |
| • Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.  | J                |
| <b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE  | K                |
| <ul> <li>With CONSULT-III</li> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.</li> <li>Check that the following conditions are met.<br/>FUEL LEVEL SE: 0.25 - 1.4 V</li> </ul>  | _ K              |
| COOLAN TEMP/S: 0 - 32°C (32 - 90°F)<br>FUEL T/TMP SE: 0 - 35°C (32 - 95°F)<br>INT A/TEMP SE: More than 0°C (32°F)<br>If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle), or refill/drain fu   |                  |
| <ul> <li>until the output voltage of the "FUEL LEVEL SE" meets within the range above and leave the vehicle from ore than 1 hour. Then start from step 1.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ul>  | or<br>N          |
| <ol> <li>Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mod<br/>with CONSULT-III.<br/>Follow the instructions displayed.<br/>NOTE:</li> </ol>  | le o             |
| If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go t<br>EC-12, "BASIC INSPECTION : Special Repair Requirement".  | to P             |
| Which is displayed on CONSULT-III?<br>OK >> INSPECTION END  |                  |
| NG >> Go to <u>EC-322. "Diagnosis Procedure"</u> .  |                  |
| 4.PERFORM COMPONENT FUNCTION CHECK  |                  |

Perform Component Function Check. Refer to EC-322, "Component Function Check".

< COMPONENT DIAGNOSIS >

#### NOTE:

Use Component Function Check to check the overall function of the EVAP very small leakage function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END NO >> Go to EC-322, "Diagnosis Procedure".

**Component Function Check** 

**1.**PERFORM COMPONENT FUNCTION CHECK

## With GST

#### CAUTION:

- Never use compressed air, doing so may damage the EVAP system.
- Never start engine.

#### • Never exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi).

- 1. Attach the EVAP service port adapter (commercial service tool) securely to the EVAP service port.
- 2. Set the pressure pump and a hose.
- 3. Also set a vacuum gauge via 3-way connector and a hose.
- 4. Turn ignition switch ON.
- 5. Connect GST and select Service \$08.
- 6. Using Service \$08 control the EVAP canister vent control valve (close).
- 7. Apply pressure and make sure the following conditions are satisfied.

Pressure to be applied: 2.7 kPa ( $0.028 \text{ kg/cm}^2$ , 0.39 psi) Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa ( $0.004 \text{ kg/cm}^2$ , 0.06 psi).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to EC-322, "Diagnosis Procedure".

#### 2.release pressure

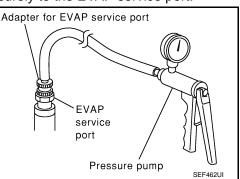
- 1. Disconnect GST.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Restart engine and let it idle for 90 seconds.
- 5. Keep engine speed at 2,000 rpm for 30 seconds.
- 6. Turn ignition switch OFF. NOTE: For more information, refer to GST Instruction Manual.

>> INSPECTION END

#### Diagnosis Procedure

#### **1.**CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.



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#### < COMPONENT DIAGNOSIS >

2.

YES

YES

YES

NO

NO

NO

Check for genuine NISSAN fuel filler cap design. Is the inspection result normal? >> GO TO 2. >> Replace with genuine NISSAN fuel filler cap. 2.CHECK FUEL FILLER CAP INSTALLATION Check that the cap is tightened properly by rotating the cap clockwise. Is the inspection result normal? >> GO TO 3. >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Retighten until ratcheting sound is heard. 3.CHECK FUEL FILLER CAP FUNCTION Check for air releasing sound while opening the fuel filler cap. Is the inspection result normal? >> GO TO 5. >> GO TO 4.

**4.**CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-326, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

**5.**CHECK FOR EVAP LEAKAGE

| Refe                                      | r to <u>EC-547, "Inspection"</u> .   |  |
|---|--|--|
| Is there any leakage in EVAP line?        |  |  |
|   | <ul> <li>S &gt;&gt; Repair or replace malfunctioning part.</li> <li>&gt;&gt; GO TO 6.</li> </ul> |  |
| 6. CHECK EVAP CANISTER VENT CONTROL VALVE |  |  |
| Check the following                       |  |  |

nowing. EVAP canister vent control valve is installed properly.

Refer to EC-549, "Removal and Installation".

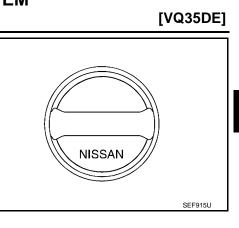
 EVAP canister vent control valve. Refer to EC-294, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace EVAP canister vent control valve and O-ring.

7.CHECK IF EVAP CANISTER IS SATURATED WITH WATER



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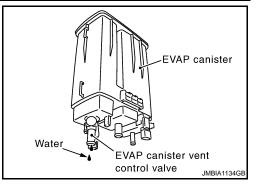
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#### < COMPONENT DIAGNOSIS >

Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

Does water drain from the EVAP canister?

- YES >> GO TO 8.
- NO-1 >> With CONSULT-III: GO TO 10.
- NO-2 >> Without CONSULT-III: GO TO 11.



[VQ35DE]

## 8. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 10. YES-2 >> Without CONSULT-III: GO TO 11. NO >> GO TO 9.

#### **9.**DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### With CONSULT-III

- 1. Disconnect vacuum hose connected to EVAP service port and EVAP canister purge volume control solenoid valve from EVAP service port.
- 2. Start engine.
- 3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode.
- 4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL C/V" opening to 100%.
- 5. Check vacuum hose for vacuum.

#### Vacuum should exist.

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> GO TO 12.

11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### Without CONSULT-III

- T. Start engine and warm it up to normal operating temperature.
- 2. Stop engine.
- 3. Disconnect vacuum hose connected to EVAP service port and EVAP canister purge volume control solenoid valve from EVAP service port.
- 4. Start engine and let it idle for at least 80 seconds.
- 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

#### Vacuum should exist.

Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-77, "System Diagram".

## EC-324

# **P0456 EVAP CONTROL SYSTEM**

| P0456 EVAP CONTROL SYSTEM  |              |
|--|--------------|
| < COMPONENT DIAGNOSIS > [V   | /Q35DE]      |
| Is the inspection result normal?   |              |
| YES >> GO TO 13.<br>NO >> Repair or reconnect the hose.  | A            |
| 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE  | 50           |
| Refer to EC-287, "Component Inspection".   | EC           |
| Is the inspection result normal?   |              |
| YES >> GO TO 14.<br>NO >> Replace EVAP canister purge volume control solenoid valve.   | С            |
| 14. CHECK FUEL TANK TEMPERATURE SENSOR   |              |
| Refer to <u>EC-238, "Component Inspection"</u> .   | D            |
| Is the inspection result normal?   |              |
| YES >> GO TO 15.   | E            |
| NO >> Replace fuel level sensor unit.  | E            |
| 15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR  |              |
| Refer to <u>EC-302</u> , "Component Inspection".   | F            |
| <u>Is the inspection result normal?</u><br>YES >> GO TO 16.  |              |
| NO >> Replace EVAP control system pressure sensor.   | G            |
| 16.CHECK EVAP PURGE LINE   |              |
| Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper conr<br>Refer to <u>EC-77, "System Diagram"</u> .                        | nection. $H$ |
| Is the inspection result normal?   |              |
| YES >> GO TO 17.   | I            |
| NO >> Repair or reconnect the hose.<br>17.CLEAN EVAP PURGE LINE  |              |
|  |              |
| Clean EVAP purge line (pipe and rubber tube) using air blower.   | J            |
| >> GO TO 18.   | V            |
| 18. CHECK EVAP/ORVR LINE   | K            |
| Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and connection. For location, refer to <u>EC-457</u> , " <u>Description</u> ". | improper     |
| Is the inspection result normal?   |              |
| YES >> GO TO 19.   |              |
| NO >> Repair or replace hoses and tubes.   | M            |
| 19.CHECK RECIRCULATION LINE<br>Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, loose                                      | ness and     |
| improper connection.   | N            |
| Is the inspection result normal?   |              |
| YES >> GO TO 20.<br>NO >> Repair or replace hose, tube or filler neck tube.  | 0            |
| 20. CHECK REFUELING EVAP VAPOR CUT VALVE   |              |
| Refer to <u>EC-460, "Component Inspection"</u> .   | P            |
| Is the inspection result normal?   | I            |
| YES >> GO TO 21.   |              |
| NO >> Replace refueling EVAP vapor cut valve with fuel tank.   |              |
| 21.CHECK FUEL LEVEL SENSOR   |              |
| Refer to <u>MWI-47, "Component Inspection"</u> .   |              |

Revision: 2008 October

Is the inspection result normal?

# P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

YES >> GO TO 22. NO >> Replace fuel level senso

NO >> Replace fuel level sensor unit.

22. CHECK INTERMITTENT INCIDENT

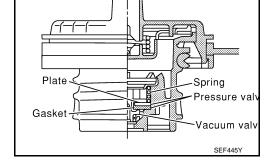
Refer to GI-40, "Intermittent Incident".

>> INSPECTION END

Component Inspection

**1.**CHECK FUEL FILLER CAP

- 1. Turn ignition switch OFF.
- 2. Remove fuel filler cap.
- 3. Wipe clean valve housing.

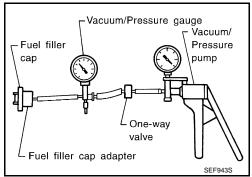


- 4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
- 5. Check valve opening pressure and vacuum.

 Pressure:
 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

 Vacuum:
 -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

 Is the inspection result normal?
 YES >> INSPECTION END



**2.**REPLACE FUEL FILLER CAP

>> GO TO 2.

Replace fuel filler cap.

CAUTION:

NO

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END

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[VQ35DE]

# **P0460 FUEL LEVEL SENSOR**

< COMPONENT DIAGNOSIS >

# P0460 FUEL LEVEL SENSOR

# Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

## DTC Logic

INFOID:000000003388091

DTC DETECTION LOGIC

NOTE:

- If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-346, "DTC Logic"</u>.

When the vehicle is parked, the fuel level in the fuel tank is naturally stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

| DTC No. | Trouble diagnosis name          | DTC detecting condition   | Possible cause   | G |
|---------|---------------------------------|---|--|---|
| P0460   | Fuel level sensor circuit noise | Even though the vehicle is parked, a signal be-<br>ing varied is sent from the fuel level sensor to<br>ECM. | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or<br/>shorted)</li> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul> | Н |

## DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2. 2. PERFORM DTC CONFIRMATION PROCEDURE M Start engine and wait maximum of 2 consecutive minutes. 1. 2. Check 1st trip DTC. Is 1st trip DTC detected? Ν >> Go to EC-327, "Diagnosis Procedure". YES NO >> INSPECTION END Diagnosis Procedure INFOID:000000003388092 1. CHECK COMBINATION METER FUNCTION Refer to MWI-34, "CONSULT-III Function (METER/M&A)". P Is the inspection result normal? YES >> GO TO 2. NO >> Go to MWI-46, "Diagnosis Procedure". 2.CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

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# P0461 FUEL LEVEL SENSOR

#### < COMPONENT DIAGNOSIS >

# P0461 FUEL LEVEL SENSOR

# Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

#### DTC Logic

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DTC DETECTION LOGIC

NOTE:

- If DTC P0461 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- Ε If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-346, "DTC Logic".

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has F been driven.

| DTC No. | Trouble diagnosis name                      | DTC detecting condition   | Possible cause   | G |
|---------|---|---|--|---|
| P0461   | Fuel level sensor circuit range/performance | The output signal of the fuel level sensor does<br>not change within the specified range even<br>though the vehicle has been driven a long dis-<br>tance. | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or<br/>shorted)</li> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul> | Η |

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-329, "Component Function Check". Use component function check to check the overall function of the fuel level sensor. During this check, a 1st Κ trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-330, "Diagnosis Procedure".

## Component Function Check

1.PRECONDITIONING

#### WARNING:

Ν When performing the following procedure, always observe the handling of the fuel. Refer to FL-12, "Removal and Installation".

#### **TESTING CONDITION:**

Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT-III be used?

YES >> GO TO 2. NO >> GO TO 3.

2.PERFORM COMPONENT FUNCTION CHECK

# With CONSULT-III

NOTE:

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30  $\ell$  (7-7/8 US gal, 6-5/ 8 Imp gal) in advance.

Prepare a fuel container and a spare hose.

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# P0461 FUEL LEVEL SENSOR

#### < COMPONENT DIAGNOSIS >

- 2. Release fuel pressure from fuel line, refer to <u>EC-547, "Inspection"</u>.
- 3. Remove the fuel feed hose on the fuel level sensor unit.
- 4. Connect a spare fuel hose where the fuel feed hose was removed.
- 5. Turn ignition switch OFF and wait at least 10 seconds then turn ON.
- 6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-III.
- 7. Check "FUEL LEVEL SE" output voltage and note it.
- 8. Select "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
- 9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
- 10. Check "FUEL LEVEL SE" output voltage and note it.
- 11. Fill fuel into the fuel tank for 30  $\ell$  (7-7/8 US gal, 6-5/8 Imp gal).
- 12. Check "FUEL LEVEL SE" output voltage and note it.

13. Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

#### YES >> INSPECTION END

NO >> Go to EC-330, "Diagnosis Procedure".

**3.**PERFORM COMPONENT FUNCTION CHECK

# Without CONSULT-III

# Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 $\ell$ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1. Prepare a fuel container and a spare hose.
- 2. Release fuel pressure from fuel line. Refer to EC-547, "Inspection".
- 3. Remove the fuel feed hose on the fuel level sensor unit.
- 4. Connect a spare fuel hose where the fuel feed hose was removed.
- 5. Turn ignition switch ON.
- 6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
- 7. Confirm that the fuel gauge indication varies.
- 8. Fill fuel into the fuel tank for 30  $\ell$  (7-7/8 US gal, 6-5/8 Imp gal).
- 9. Confirm that the fuel gauge indication varies.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-330, "Diagnosis Procedure".

#### **Diagnosis** Procedure

INFOID:000000003591660

[VQ35DE]

#### **1.**CHECK COMBINATION METER FUNCTION

Refer to MWI-34, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to <u>MWI-46, "Diagnosis Procedure"</u>.

2. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

# P0462, P0463 FUEL LEVEL SENSOR

#### Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output volt-

age changes depending on the movement of the fuel mechanical float.

#### DTC Logic

INFOID-000000003388098

#### DTC DETECTION LOGIC

NOTE:

- If DTC P0462 or P0463 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607.Refer to EC-346, "DTC Logic".

| DTC No. | Trouble diagnosis name                  | DTC detecting condition                                     | Possible cause  |
|---------|---|---|---|
| P0462   | Fuel level sensor circuit<br>low input  | An excessively low voltage from the sensor is sent to ECM.  | Harness or connectors     (The CAN communication line is open or  |
| P0463   | Fuel level sensor circuit<br>high input | An excessively high voltage from the sensor is sent to ECM. | <ul> <li>shorted)</li> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

Turn ignition switch OFF and wait at least 10 seconds. 3.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at ignition switch ON.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE M Turn ignition switch ON and wait at least 5 seconds. 1. Check 1st trip DTC. 2. Ν Is 1st trip DTC detected? YES >> Go to EC-331, "Diagnosis Procedure". NO >> INSPECTION END C Diagnosis Procedure INFOID:000000003591662 1. CHECK COMBINATION METER FUNCTION P Refer to MWI-34, "CONSULT-III Function (METER/M&A)". Is the inspection result normal? YES >> GO TO 2. NO >> Go to MWI-46, "Diagnosis Procedure". 2.CHECK INTERMITTENT INCIDENT Refer to GI-40, "Intermittent Incident".

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# P0500 VSS

## Description

The vehicle speed signal is sent to the combination meter from the "ABS actuator and electric unit (control unit)" via the CAN communication line. The combination meter then sends a signal to the ECM via the CAN communication line.

# DTC Logic

DTC DETECTION LOGIC NOTE:

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-346, "DTC Logic".

| DTC No. | Trouble diagnosis name | DTC detecting condition   | Possible cause  |  |
|---------|------------------------|---|---|--|
| P0500   | Vehicle speed sensor   | The vehicle speed signal sent to ECM is almost 0 km/h (0 MPH) even when vehicle | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or short-<br/>ed)</li> <li>Harness or connectors<br/>(The vehicle speed signal circuit is open or</li> </ul>   |  |
| 10300   | Venicie speed sensor   | is being driven.  | <ul> <li>(The vehicle speed signal circuit is open of<br/>shorted)</li> <li>Wheel sensor</li> <li>Combination meter</li> <li>ABS actuator and electric unit (control unit)</li> </ul> |  |

# DTC CONFIRMATION PROCEDURE

#### **1.INSPECTION START**

Will CONSULT-III be used? Will CONSULT-III be used? YES >> GO TO 2. >> GO TO 5. NO 2.PRECONDITIONING Κ If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test. Turn ignition switch OFF and wait at least 10 seconds. 1. L Turn ignition switch ON. 2. 3. Turn ignition switch OFF and wait at least 10 seconds. Μ >> GO TO 3. 3.CHECK VEHICLE SPEED SIGNAL Ν NOTE: This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle. (P)With CONSULT-III

- 1. Start engine (VDC switch OFF).
- Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-III. The vehicle speed on CON-SULT-III should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to <u>EC-334</u>, "Diagnosis Procedure".

**4.**PERFORM DTC CONFIRMATION PROCEDURE

1. Select "DATA MONITOR" mode with CONSULT-III.

2. Warm engine up to normal operating temperature.

[VQ35DE]

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#### 3. Maintain the following conditions for at least 50 consecutive seconds. CAUTION:

Always drive vehicle at a safe speed.

| ENG SPEED      | 1,400 - 6,000 rpm      |
|----------------|------------------------|
| COOLAN TEMP/S  | More than 70°C (158°F) |
| B/FUEL SCHDL   | 5.5 - 31.8 msec        |
| Selector lever | Except P or N position |
| PW/ST SIGNAL   | OFF                    |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-334, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM COMPONENT FUNCTION CHECK

Perform Component Function Check. Refer to <u>EC-334</u>, "<u>Component Function Check</u>". Use Component Function Check to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-334, "Diagnosis Procedure".

## **Component Function Check**

**1.**PERFORM COMPONENT FUNCTION CHECK

#### With GST

- 1. Lift up drive wheels.
- 2. Start engine.
- Read vehicle speed signal in Service \$01 with GST. The vehicle speed signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-334, "Diagnosis Procedure".

## **Diagnosis Procedure**

INFOID:000000003388103

INFOID:000000003388102

# 1. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to BRC-29, "CONSULT-III Function".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2. CHECK COMBINATION METER FUNCTION

Refer to MWI-34, "CONSULT-III Function (METER/M&A)".

# **P0506 ISC SYSTEM**

#### < COMPONENT DIAGNOSIS >

# P0506 ISC SYSTEM

# Description

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# DTC Logic

INFOID:000000003388105

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

| DTC No.   | Trouble diagnosis name  | DTC detecting condition   | Possible cause  |
|---|---|---|---|
| P0506   | Idle speed control sys-<br>tem RPM lower than ex-<br>pected   | The idle speed is less than the target idle speed by 100 rpm or more.   | <ul><li>Electric throttle control actuator</li><li>Intake air leakage</li></ul> |
| DTC CON   | FIRMATION PROC  | EDURE   |   |
| •   | NDITIONING  |   |   |
|   |   | nas been previously conducted, always   | perform the following before conduct-   |
| ing the nex   | t test.   |   |   |
|   | nition switch OFF and<br>nition switch ON.  | d wait at least 10 seconds.   |   |
| 3. Turn ig  | nition switch OFF and   | d wait at least 10 seconds.   |   |
|   |   | of the specified value, perform <u>EC-17</u><br>before conducting DTC CONFIRMATION  |   |
| TESTING (   | CONDITION:  | -   |   |
|   |   | ing procedure confirm that battany y  | oltago is more than 11 V at idle  |
|   |   | ring procedure, confirm that battery vertex above 10°C(14°E)  | ollage is more than it v at lule.   |
|   |   | temperature above –10°C(14°F).  | oltage is more than it v at lule.   |
| • Always p  |   |   | oltage is more than it v at lule.   |
| • Always r  | perform the test at a   | temperature above –10°C(14°F).  | oltage is more than it v at lule.   |
| • Always p<br>>><br>2.PERFO<br>1. Start e   | GO TO 2.<br>MDTC CONFIRMA   | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.  |   |
| • Always p<br>>><br>2.PERFO<br>1. Start et<br>2. Turn ig  | GO TO 2.<br>M DTC CONFIRMA<br>ngine and warm it up t<br>nition switch OFF and   | temperature above –10°C(14°F).  |   |
| • Always p<br>>><br>2.PERFO<br>1. Start ei<br>2. Turn ig<br>3. Turn ig  | GO TO 2.<br>M DTC CONFIRMA<br>ngine and warm it up t<br>nition switch OFF and<br>nition switch ON.  | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.  |   |
| Always p<br>2.PERFO<br>1. Start en<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar   | GO TO 2.<br>RM DTC CONFIRMA<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for  | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.   |   |
| Always p<br>Always p<br>2.PERFO<br>1. Start el<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar<br>6. Check   | GO TO 2.<br>M DTC CONFIRMA<br>ngine and warm it up t<br>nition switch OFF and<br>nition switch OFF and<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.   | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.   |   |
| Always p<br>Always p<br>2.PERFO<br>1. Start el<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar<br>6. Check<br>ls 1st trip D                                | GO TO 2.<br>RM DTC CONFIRMA<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.<br><u>DTC detected?</u>                            | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.<br>d wait at least 10 seconds.<br>at least 1 minute at idle speed.                      |   |
| Always p<br>Always p<br>2.PERFO<br>1. Start el<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar<br>6. Check<br>is 1st trip D<br>YES >>                      | GO TO 2.<br>M DTC CONFIRMA<br>ngine and warm it up t<br>nition switch OFF and<br>nition switch OFF and<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.   | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.<br>d wait at least 10 seconds.<br>at least 1 minute at idle speed.                      |   |
| Always p<br>Always p<br>2.PERFO<br>1. Start el<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar<br>6. Check<br>1s 1st trip D<br>YES >><br>NO >>             | GO TO 2.<br>RM DTC CONFIRMAT<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.<br><u>DTC detected?</u><br>Go to <u>EC-335, "Diag</u>                  | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.<br>d wait at least 10 seconds.<br>at least 1 minute at idle speed.                      |   |
| Always p<br>Always p<br>2.PERFO<br>1. Start en<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restar<br>6. Check<br>1s 1st trip D<br>YES >><br>NO >><br>Diagnosi | GO TO 2.<br>RM DTC CONFIRMAT<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.<br><u>DTC detected?</u><br>Go to <u>EC-335, "Diag</u><br>NSPECTION END | temperature above –10°C(14°F).<br>TION PROCEDURE<br>to normal operating temperature.<br>d wait at least 10 seconds.<br>d wait at least 10 seconds.<br>at least 1 minute at idle speed.<br>mosis Procedure". |   |

2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

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#### YES >> Discover air leakage location and repair.

# $\begin{array}{ll} \text{NO} & >> \text{GO TO 2.} \\ \textbf{2.} \text{REPLACE ECM} \end{array}$

- 1. Stop engine.
- 2. Replace ECM.
- 3. Go to EC-15, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

# **P0507 ISC SYSTEM**

#### < COMPONENT DIAGNOSIS >

# P0507 ISC SYSTEM

# Description

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The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# DTC Logic

INFOID:000000003388108

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

| DTC No.   | Trouble diagnosis name   | DTC detecting condition   | Possible cause   |
|---|--|---|--|
| P0507   | Idle speed control sys-<br>tem RPM higher than<br>expected   | The idle speed is more than the target idle speed by 200 rpm or more.   | <ul><li>Electric throttle control actuator</li><li>Intake air leakage</li><li>PCV system</li></ul> |
| DTC CON   | FIRMATION PROCI  | EDURE   |  |
|   | NDITIONING   |   |  |
| f DTC Con<br>ng the nex<br>1. Turn ig<br>2. Turn ig<br>3. Turn ig<br>f the targe<br>Special Re  | firmation Procedure h<br>t test.<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t idle speed is out o<br>pair Requirement", I<br>CONDITION:   | has been previously conducted, always<br>I wait at least 10 seconds.<br>I wait at least 10 seconds.<br>I <b>the specified value, perform <u>EC-1</u><br/>Defore conducting DTC Confirmation</b><br><b>ing procedure, confirm that battery</b> | 7, "IDLE AIR VOLUME LEARNING :<br>Procedure.   |
|   |  | temperature above –10°C(14°F).  |  |
| Always p<br>>><br>2.PERFOI<br>1. Start er<br>2. Turn ig   | GO TO 2.<br>M DTC CONFIRMAT<br>ngine and warm it up t<br>nition switch OFF and   |   |  |
| Always p<br>>><br>2.PERFOI<br>1. Start er<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restard   | GO TO 2.<br>M DTC CONFIRMAT<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and  | TION PROCEDURE<br>to normal operating temperature.  |  |
| Always p<br>Always p<br>2.PERFOI<br>1. Start er<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restart<br>5. Restart<br>6. Check<br><u>s 1st trip D</u><br>YES >>                          | GO TO 2.<br>M DTC CONFIRMAT<br>ngine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for   | TION PROCEDURE<br>to normal operating temperature.<br>I wait at least 10 seconds.<br>I wait at least 10 seconds.<br>at least 1 minute at idle speed.  |  |
| Always p<br>Always p<br>2.PERFOI<br>1. Start er<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restart<br>5. Restart<br>5. Restart<br>6. Check<br><u>s 1st trip D</u><br>YES >><br>NO >>   | GO TO 2.<br>RM DTC CONFIRMAT<br>regine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.<br><u>TC detected?</u><br>Go to <u>EC-337. "Diag</u>   | TION PROCEDURE<br>to normal operating temperature.<br>I wait at least 10 seconds.<br>I wait at least 10 seconds.<br>at least 1 minute at idle speed.  | INF0ID:000000003388109   |
| Always p<br>Always p<br>2.PERFOI<br>1. Start er<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restard<br>5. Restard<br>6. Check<br><u>s 1st trip D</u><br>YES >><br>NO >><br>Diagnosi     | GO TO 2.<br>RM DTC CONFIRMAT<br>regine and warm it up to<br>nition switch OFF and<br>nition switch ON.<br>nition switch OFF and<br>t engine and run it for<br>1st trip DTC.<br><u>TC detected?</u><br>Go to <u>EC-337, "Diag</u><br>INSPECTION END                             | TION PROCEDURE<br>to normal operating temperature.<br>I wait at least 10 seconds.<br>I wait at least 10 seconds.<br>at least 1 minute at idle speed.  | INFOID:00000003388109  |
| Always p<br>Always p<br>2.PERFOI<br>1. Start er<br>2. Turn ig<br>3. Turn ig<br>4. Turn ig<br>5. Restard<br>5. Restard<br>5. Check<br>s 1st trip D<br>YES >><br>NO >><br>Diagnosi<br>1.CHECK | GO TO 2.<br>RM DTC CONFIRMAT<br>regine and warm it up to<br>nition switch OFF and<br>nition switch OFF and<br>nition switch OFF and<br>the engine and run it for<br>1st trip DTC.<br><u>TC detected?</u><br>Go to <u>EC-337. "Diag</u><br>INSPECTION END<br><b>S Procedure</b> | TION PROCEDURE<br>to normal operating temperature.<br>I wait at least 10 seconds.<br>I wait at least 10 seconds.<br>at least 1 minute at idle speed.<br>nosis Procedure".   | INFOID:000000003388109   |

YES >> GO TO 2.

# P0507 ISC SYSTEM

< COMPONENT DIAGNOSIS >

NO >> Repair or replace malfunctioning part.

# 2.CHECK INTAKE AIR LEAKAGE

1. Start engine and let it idle.

2. Listen for an intake air leakage after the mass air flow sensor.

#### Is intake air leakage detected?

YES >> Discover air leakage location and repair.

NO >> GO TO 3.

# 3.REPLACE ECM

- 1. Stop engine.
- 2. Replace ECM.
- 3. Go to EC-15. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

# P0550 PSP SENSOR

#### < COMPONENT DIAGNOSIS >

# P0550 PSP SENSOR

# Description

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load.

This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

#### DTC Logic

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## DTC DETECTION LOGIC

#### NOTE: If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                 | DTC detecting condition  | Possible cause  | F |
|---------|--|--|---|---|
| P0550   | Power steering pressure sensor circuit | An excessively low or high voltage from the sensor is sent to ECM. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted)</li> <li>Power steering pressure sensor</li> </ul> |   |
| DTC CON | FIRMATION PROC                         | EDURE  |   | G |

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

| <ol> <li>Start engine and let it idle for at least 5 seconds.</li> <li>Check 1st trip DTC.</li> </ol>   | K                 |
|---|-------------------|
| Is 1st trip DTC detected?   |                   |
| YES >> Go to <u>EC-339, "Diagnosis Procedure"</u> .<br>NO >> INSPECTION END   | L                 |
| Diagnosis Procedure   | D:000000003388112 |
| 1. CHECK GROUND CONNECTION  | 111               |
| <ol> <li>Turn ignition switch OFF.</li> <li>Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.</li> </ol> | N                 |
| Is the inspection result normal?  |                   |
| YES >> GO TO 2.<br>NO >> Repair or replace ground connection.   | 0                 |
| 2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT  |                   |

1. Disconnect power steering pressure (PSP) sensor harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between PSP sensor harness connector and ground.

| PSP sensor |          | Ground | Voltage     |
|------------|----------|--------|-------------|
| Connector  | Terminal | Ground | voltage     |
| F62        | 3        | Ground | Approx. 5 V |

Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$  CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

Disconnect ECM harness connector. 2.

Check the continuity between PSP sensor harness connector and ECM harness connector. 3.

| PSP       | sensor   | EC        | CM       | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| F62       | 1        | F8        | 48       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between PSP sensor harness connector and ECM harness connector.

| PSP       | PSP sensor |           | ECM      |            |  |
|-----------|------------|-----------|----------|------------|--|
| Connector | Terminal   | Connector | Terminal | Continuity |  |
| F62       | 2          | F8        | 41       | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 5.

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

#### 5.CHECK PSP SENSOR

Refer to EC-340, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace PSP sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

1. CHECK POWER STEERING PRESSURE SENSOR

- Reconnect all harness connectors disconnected. 1.
- 2. Start engine and let it idle.
- 3. Check the voltage between ECM terminals under the following conditions.

|             | ECM  |          |                                   |             |  |
|-------------|--|----------|-----------------------------------|-------------|--|
| Connector   | +  | _        | Condition                         | Voltage     |  |
| Connector   | Terminal                                   | Terminal |                                   |             |  |
|             | 41   | 48       | Steering wheel: Being turned.     | 0.5 - 4.5 V |  |
| F8          | F8 (Power steering pressure sensor signal) |          | Steering wheel: Not being turned. | 0.4 - 0.8 V |  |
| la tha inan | action regult normal?                      |          |                                   |             |  |

Is the inspection result normal?

# **P0550 PSP SENSOR**

#### < COMPONENT DIAGNOSIS >

- YES >> INSPECTION END
- NO >> Replace power steering pressure sensor.

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## P0603 ECM POWER SUPPLY

#### Description

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

# DTC Logic

#### DTC DETECTION LOGIC

DTC No.Trouble diagnosis nameDTC detecting conditionPossible causeP0603ECM power supply circuitECM back up RAM system does not function<br/>properly.• Harness or connectors<br/>[ECM power supply (back up) circuit is<br/>open or shorted.]<br/>• ECM

#### DTC CONFIRMATION PROCEDURE

## **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Start engine and let it idle for 1 second.
- 3. Turn ignition switch OFF, wait at least 10 seconds, and then turn it ON.
- 4. Repeat steps 2 and 3 for 4 times.
- 5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-342, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

# 1.CHECK ECM POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the voltage between ECM harness connector terminals.

INFOID:000000003388116

PBIA9222J





# P0603 ECM POWER SUPPLY

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|                                 | EC                            | Μ             |               |                 |                                   | A  |
|---------------------------------|-------------------------------|---------------|---------------|-----------------|-----------------------------------|----|
|                                 | +                             |               | _             | Voltage         |                                   |    |
| Connector                       | Terminal                      | Connector     | Terminal      |                 | _                                 | EC |
| F8                              | 77                            | E16           | 112           | Battery voltage | _                                 |    |
| Is the inspect                  |                               | mal?          |               |                 |                                   |    |
|                                 | GO TO 3.<br>GO TO 2.          |               |               |                 |                                   | С  |
| 2.DETECT                        |                               |               | -             |                 |                                   |    |
| -                               |                               |               |               |                 |                                   | D  |
| Check the fol<br>• 15 A fuse (I |                               |               |               |                 |                                   |    |
| • IPDM E/R h                    | narness conne                 |               | _             |                 |                                   | _  |
| <ul> <li>Harness for</li> </ul> | open or shor                  | t between E   | CM and batte  | ery             |                                   | E  |
|                                 | ) on oir or ronk              | aa harnaaa    | or connector  |                 |                                   |    |
| 3.CHECK IN                      | Repair or repla               |               |               | 5.              |                                   | F  |
|                                 |                               |               |               |                 |                                   |    |
| Refer to <u>GI-4</u>            |                               |               |               |                 |                                   | G  |
| -                               | GO TO 4.                      |               |               |                 |                                   | G  |
|                                 | Repair or repla               | ace harness   | or connectors | S.              |                                   |    |
| 4.PERFORM                       | I DTC CONF                    | IRMATION F    | ROCEDUR       | Ē               |                                   | Н  |
|                                 | tion switch ON                | ۷.            |               |                 |                                   |    |
| 2. Erase DT<br>3. Perform I     | <sup>-</sup> C.<br>DTC CONFIR |               |               |                 |                                   |    |
|                                 | 342, "DTC Lo                  |               | OCEDURE.      |                 |                                   |    |
| Is the 1st trip                 | DTC P0603 c                   | displayed aga | ain?          |                 |                                   |    |
|                                 | SO TO 5.                      |               |               |                 |                                   | J  |
|                                 | NSPECTION                     | END           |               |                 |                                   |    |
| 5.REPLACE                       |                               |               |               |                 |                                   | K  |
| 1. Replace<br>2. Go to EC       |                               | ONAL SERV     | /ICE WHEN     | REPLACING CONTR | OL UNIT : Special Repair Require- |    |
| <u>ment"</u> .                  |                               |               |               |                 |                                   | 1  |
|                                 |                               |               |               |                 |                                   |    |
| >>                              | NSPECTION                     | END           |               |                 |                                   |    |
|                                 |                               |               |               |                 |                                   | M  |
|                                 |                               |               |               |                 |                                   |    |
|                                 |                               |               |               |                 |                                   | Ν  |
|                                 |                               |               |               |                 |                                   |    |
|                                 |                               |               |               |                 |                                   |    |
|                                 |                               |               |               |                 |                                   | 0  |
|                                 |                               |               |               |                 |                                   |    |
|                                 |                               |               |               |                 |                                   | Р  |

# P0605 ECM

# Description

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.

# DTC Logic

DTON

## DTC DETECTION LOGIC

**T** ... 1.1

| DIC NO. | I rouble diagnosis name | DIC detecting condition |   | Possible cause |
|---------|-------------------------|-------------------------|---|----------------|
|         |                         | A)                      | ECM calculation function is malfunctioning.   |                |
| P0605   | Engine control module   | B)                      | ECM EEP-ROM system is malfunctioning.         | • ECM          |
|         |                         | C)                      | ECM self shut-off function is malfunctioning. |                |
|         |                         |                         |   |                |

## DTC CONFIRMATION PROCEDURE

## **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

- 1. Turn ignition switch ON.
- 2. Check 1st trip DTC.
- Is 1st trip DTC detected?
- YES >> Go to EC-345, "Diagnosis Procedure".
- NO >> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Turn ignition switch OFF, wait at least 10 seconds, and then turn it ON.
- 3. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-345. "Diagnosis Procedure".

NO >> GO TO 4.

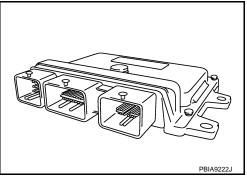
#### 4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Turn ignition switch OFF, wait at least 10 seconds, and then turn it ON.
- 3. Repeat step 2 for 32 times.
- 4. Check 1st trip DTC.

Is 1st trip DTC detected?

#### EC-344

INFOID:000000003388117



| < COMPONENT DIAGNOSIS > [VQ35DE]  |    |
|---|----|
| YES >> Go to <u>EC-345, "Diagnosis Procedure"</u> .<br>NO >> INSPECTION END   | А  |
| Diagnosis Procedure   |    |
| 1.INSPECTION START  | EC |
| <ol> <li>Turn ignition switch ON.</li> <li>Erase DTC.</li> <li>Perform DTC CONFIRMATION PROCEDURE.<br/>See <u>EC-344, "DTC Logic"</u>.</li> </ol> | С  |
| Is the 1st trip DTC P0605 displayed again?  | _  |
| YES >> GO TO 2.<br>NO >> INSPECTION END<br>2.REPLACE ECM  | D  |
| 1. Replace ECM.   | Е  |
| <ol> <li>Go to <u>EC-15. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"</u>.</li> </ol>                            | F  |
| >> INSPECTION END   | G  |
|   | Н  |
|   | I  |
|   | J  |
|   | K  |
|   | L  |
|   | M  |
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# P0607 ECM

## Description

INFOID:000000003388120

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

# DTC Logic

INFOID:000000003388121

INFOID:00000003388122

#### DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition  | Possible cause |
|---------|------------------------|--|----------------|
| P0607   | CAN communication bus  | When detecting error during the initial diagno-<br>sis of CAN controller of ECM. | • ECM          |

## DTC CONFIRMATION PROCEDURE

**1.**PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.

2. Check DTC.

#### Is DTC detected?

YES >> Go to <u>EC-346, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

- **1.**INSPECTION START
- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-346, "DTC Logic"</u>.
- 4. Check DTC.

Is the DTC P0607 displayed again?

Yes >> GO TO 2.

No >> INSPECTION END

## 2.REPLACE ECM

- 1. Replace ECM.
- 2. Go to EC-15. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

Revision: 2008 October

## P0643 SENSOR POWER SUPPLY

#### < COMPONENT DIAGNOSIS >

# P0643 SENSOR POWER SUPPLY

# DTC Logic

A

EC

INFOID:000000003388123

[VQ35DE]

## DTC DETECTION LOGIC

|  | Trouble diagnosis<br>name   | DTC detecting condition  | Possible cause   |
|--|---|--|--|
| P0643  | Sensor power supply circuit short   | ECM detects that the voltage of power source for sensor is excessively low or high.          | <ul> <li>Harness or connectors<br/>(APP sensor 1 circuit is shorted.)<br/>(TP sensor circuit is shorted.)<br/>[CMP sensor (PHASE) circuit is shorted.)<br/>(PSP sensor circuit is shorted.)<br/>(Battery current sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor</li> <li>Throttle position sensor</li> <li>Camshaft position sensor (PHASE)</li> <li>Power steering pressure sensor</li> <li>Battery current sensor</li> </ul> |
| DTC CON  | FIRMATION PRO   | CEDURE   |  |
| 1.PRECO  | NDITIONING  |  |  |
| 3. Turn ig   | CONDITION:  | nd wait at least 10 seconds.<br>ing procedure, confirm that battery                          | voltage is more than 10 V at idle  |
| •  | > GO TO 2.  |  |  |
| 2.perfo  | RM DTC CONFIRM  | ATION PROCEDURE  |  |
| 2.perfo  | RM DTC CONFIRM  |  |  |
| 2.PERFO<br>1. Start e<br>2. Check<br>Is DTC det  | RM DTC CONFIRM,<br>ngine and let it idle fo<br>DTC<br>ected?  | or 1 second.   |  |
| 2.PERFO<br>1. Start e<br>2. Check<br><u>Is DTC det</u><br>YES >>   | RM DTC CONFIRM,<br>ngine and let it idle fo<br>DTC  | or 1 second.<br>Ignosis Procedure".  |  |
| 2.PERFO<br>1. Start e<br>2. Check<br><u>Is DTC det</u><br>YES >><br>NO >>  | RM DTC CONFIRM,<br>ngine and let it idle fo<br>DTC<br>ected?<br>> Go to <u>EC-347, "Dia</u>   | or 1 second.<br>Ignosis Procedure".  | INFOID:000000003388124   |
| 2.PERFO<br>1. Start e<br>2. Check<br>Is DTC det<br>YES >:<br>NO >:<br>Diagnosi   | RM DTC CONFIRM,<br>ngine and let it idle for<br>DTC<br>ected?<br>> Go to <u>EC-347, "Dia</u><br>> INSPECTION END  | or 1 second.<br>Ignosis Procedure".  |  |
| 2.PERFO<br>1. Start e<br>2. Check<br>Is DTC det<br>YES >><br>Diagnosi<br>1.CHECK<br>1. Turn ig<br>2. Check<br>Is the inspective<br>YES >>          | RM DTC CONFIRM,<br>ngine and let it idle for<br>DTC<br>ected?<br>> Go to <u>EC-347. "Dia</u><br>> INSPECTION END<br>s <b>Procedure</b><br>GROUND CONNEC<br>gnound connection E<br>ection result normal?<br>> GO TO 2.   | or 1 second.<br>Ignosis Procedure".<br>CTION<br>E38. Refer to Ground Inspection in <u>GI</u> | INFOID:000000003388124   |
| 2.PERFO<br>1. Start e<br>2. Check<br>Is DTC det<br>YES >><br>Diagnosi<br>1.CHECK<br>1. Turn ig<br>2. Check<br>Is the inspective<br>YES >><br>NO >> | RM DTC CONFIRM,<br>ngine and let it idle for<br>DTC<br>ected?<br>> Go to <u>EC-347, "Dia</u><br>> INSPECTION END<br>S <b>Procedure</b><br>GROUND CONNEC<br>Inition switch OFF.<br>ground connection E<br>ection result normal?<br>> GO TO 2.<br>> Repair or replace g | or 1 second.<br>Ignosis Procedure".<br>CTION<br>E38. Refer to Ground Inspection in <u>GI</u> | -43, "Circuit Inspection".   |

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.

| <br>APP s     | sensor   | Ground | Voltage (V) |  |
|---------------|----------|--------|-------------|--|
| <br>Connector | Terminal | Ground |             |  |
| <br>E110      | 4        | Ground | Approx. 5   |  |

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# P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

3. 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 |
|           | 47       | TP sensor                   | F29       | 1        |
|           | 51       | Battery current sensor      | F76       | 1        |
| F8        | 55       | PSP sensor                  | F62       | 3        |
|           | 59       | CMP sensor (PHASE) (bank 1) | F26       | 1        |
|           | 63       | CMP sensor (PHASE) (bank 2) | F69       | 1        |
| E16       | 83       | APP sensor                  | E110      | 4        |

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK COMPONENTS

Check the following.

- Camshaft position sensor (PHASE) (Refer to <u>EC-266, "Component Inspection"</u>.)
- Battery current sensor (Refer to <u>EC-366, "Component Inspection"</u>.)
- Power steering pressure sensor (Refer to <u>EC-340, "Component Inspection"</u>.) Is the inspection result normal?
- YES >> GO TO 5.
- NO >> Replace malfunctioning component.

**5.**CHECK TP SENSOR

Refer to EC-177, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9. NO >> GO TO 6.

 $\sim$ 

**6.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.

2. Go to EC-177, "Special Repair Requirement".

>> INSPECTION END

**7.**CHECK APP SENSOR

Refer to EC-415, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8.Replace accelerator pedal assembly

1. Replace accelerator pedal assembly.

2. Go to EC-415, "Special Repair Requirement".

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

# P0643 SENSOR POWER SUPPLY

#### < COMPONENT DIAGNOSIS >

>> INSPECTION END

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# P0850 PNP SWITCH

# Description

INFOID:000000003388125

[VQ35DE]

#### When the selector lever position is P or N, park/neutral position (PNP) signal from the TCM is sent to ECM.

#### DTC Logic

INFOID:000000003388126

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name       | DTC detecting condition  | Possible cause  |
|---------|------------------------------|--|---|
| P0850   | Park/neutral position switch | The signal of the park/neutral position (PNP) signal does not change during driving after the engine is started. | <ul> <li>Harness or connectors<br/>[The park/neutral position (PNP) signal<br/>circuit is open or shorted.]</li> <li>TCM</li> </ul> |

## DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

Will CONSULT-III be used?

Will CONSULT-III be used?

YES >> GO TO 2. NO >> GO TO 5.

# 2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 3.

3.CHECK PNP SIGNAL

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-III. Then check the "P/N POSI SW" signal under the following conditions.

| Position (Selector lever) | Known-good signal |
|---------------------------|-------------------|
| N or P position           | ON                |
| Except above position     | OFF               |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to EC-351, "Diagnosis Procedure".

#### **4.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Select "DATA MONITOR" mode with CONSULT-III.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Maintain the following conditions for at least 50 consecutive seconds.
  - CAUTION:

Always drive vehicle at a safe speed.

| ENG SPEED     | 1,100 - 6,375 rpm      |
|---------------|------------------------|
| COOLAN TEMP/S | More than 70°C (158°F) |
| B/FUEL SCHDL  | 4.0 - 31.8 msec        |

# P0850 PNP SWITCH

| < COMPO             | NENT D                  | IAGNOS                       | IS >                         | 00501141                       | omion           | [VQ35DE]                                   |
|---------------------|-------------------------|------------------------------|------------------------------|--------------------------------|-----------------|--|
| VHCL SPE            | ED SE                   | 1                            | More than 64 km              | /h (40 mph)                    |                 |  |
| Selector lev        | ver                     | 5                            | Suitable position            |                                |                 |  |
| . Check             | 1st trip D              | DTC.                         |                              |                                |                 |  |
| <u>s 1st trip [</u> |                         |                              |                              |                                |                 |  |
|                     |                         | <u>C-351, "E</u><br>CTION EN | <u>)iagnosis Pro</u><br>ID   | <u>cedure"</u> .               |                 |  |
| -                   |                         |                              | FUNCTION                     | CHECK                          |                 |  |
|                     |                         |                              |                              |                                | omponent Fu     | action Check"                              |
| NOTE:               | •                       |                              |                              |                                |                 |  |
|                     |                         |                              |                              | he overall fun<br>be confirmed |                 | ark/neutral position (PNP) signal circuit. |
| s the insp          |                         |                              | -                            |                                |                 |  |
|                     |                         |                              |                              |                                |                 |  |
|                     |                         |                              | <u>Diagnosis Pro</u>         | <u>cedure"</u> .               |                 |  |
| Compon              | ent Fur                 | nction C                     | check                        |                                |                 | INF0/D:00000003388127                      |
| .PERFO              | RM CON                  | IPONENT                      | FUNCTION                     | CHECK                          |                 |  |
| . Turn io           | nition sw               | vitch ON.                    |                              |                                |                 |  |
|                     | ,                       |                              | en ECM harn                  | ess connecto                   | r terminals.    |  |
|                     |                         |                              |                              |                                |                 |  |
| ECM                 |                         |                              | Condition                    |                                | Voltage         |  |
| Connector           | +<br>Terminal           | –<br>Terminal                | Condition                    |                                | · Snugo         |  |
|                     |                         |                              | Selector lever               | P or N                         | Battery voltage | -  |
| E16                 | 102                     | 112                          | position                     | Except above                   | Approx. 0 V     |  |
| the insp            | ection res              | sult norma                   | 12                           |                                |                 |  |
|                     |                         |                              |                              | I V                            |                 |  |
|                     |                         |                              | <u>Diagnosis Pro</u>         | <u>cedure"</u> .               |                 |  |
| lagnos              | is Proce                | edure                        |                              |                                |                 | INFOID:00000003388128                      |
| .CHECK              |                         | ТН ТСМ                       |                              |                                |                 |  |
| efer to E           | C-521, "D               | TC Index                     | <u>&lt;"</u> .               |                                |                 |  |
|                     |                         | ult norma                    |                              |                                |                 |  |
|                     | > GO TO                 |                              |                              |                                |                 |  |
|                     |                         | or replace<br>NG SYST        | e malfunctioni               | ng part.                       |                 |  |
|                     |                         |                              |                              | • <b>DT</b>                    |                 |  |
|                     | on switch<br>er motor d |                              | n turn it to ST              | ART.                           |                 |  |
|                     | > GO TO                 |                              |                              |                                |                 |  |
|                     |                         |                              | "COMMON                      | TEM : CONS                     | ULT-III Functio | on (BCM - COMMON ITEM)".                   |
| 3.CHECK             | PNP SW                  | /ITCH INI                    | PUT SIGNAL                   | CIRCUIT FO                     | R OPEN AND      | SHORT-I                                    |
| . Turn iç           | gnition sw              | itch OFF.                    |                              |                                |                 |  |
|                     |                         |                              | s connector.<br>rness connec | tor                            |                 |  |
|                     |                         |                              |                              |                                | tor and IPDM    | E/R harness connector.                     |

4. Check the continuity between TCM harness connector and IPDM E/R harness connector.

# P0850 PNP SWITCH

#### < COMPONENT DIAGNOSIS >

| Т         | СМ       | IPDN      | Continuity |            |
|-----------|----------|-----------|------------|------------|
| Connector | Terminal | Connector | Terminal   | Continuity |
| F23       | 20       | F12       | 72         | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK PNP SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect IPDM E/R harness connectors.

2. Disconnect ECM harness connector.

3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM                |     | IPDN      | Continuity |            |
|--------------------|-----|-----------|------------|------------|
| Connector Terminal |     | Connector | Terminal   | Continuity |
| E16                | 102 | E10       | 30         | Existed    |

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

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

>> Repair or replace malfunctioning part.

## P1148, P1168 CLOSED LOOP CONTROL

DTC detecting condition

The closed loop control function for bank 1 does

not operate even when vehicle is being driven

The closed loop control function for bank 2 does

not operate even when vehicle is being driven

in the specified condition.

in the specified condition.

#### < COMPONENT DIAGNOSIS >

# P1148, P1168 CLOSED LOOP CONTROL

# **DTC** Logic

DTC No.

P1148

P1168

DTC DETECTION LOGIC NOTE: DTC P1148 or P1168 is displayed with another DTC for A/F sensor 1.

Trouble diagnosis name

Closed loop control

Closed loop control

function (bank 2)

function (bank 1)

Perform the trouble diagnosis for the corresponding DTC.

[VQ35DE]

INFOID:000000003388129

Possible cause

· Harness or connectors

• A/F sensor 1 heater

ed.)

A/F sensor 1

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# P1212 TCS COMMUNICATION LINE

## Description

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)".

# Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

#### DTC Logic

INFOID:000000003388131

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1212 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-346, "DTC Logic"</u>.

#### Freeze frame data is not stored in the ECM for this self-diagnosis.

| DTC No. | Trouble diagnosis name | DTC detecting condition   | Possible cause   |
|---------|------------------------|---|--|
| P1212   | TCS communication line | ECM cannot receive the information from<br>"ABS actuator and electric unit (control<br>unit)" continuously. | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or short-<br/>ed.)</li> <li>ABS actuator and electric unit (control unit)</li> <li>Dead (Weak) battery</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

#### Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 2.

# **2.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 10 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-354, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

Go to BRC-5, "Work Flow".

INFOID:000000003388132

[VQ35DE]

## P1217 ENGINE OVER TEMPERATURE

#### < COMPONENT DIAGNOSIS >

# P1217 ENGINE OVER TEMPERATURE

#### DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-346, "DTC Logic".

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

D When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

| DTC No. | Trouble diagnosis name                  | DTC detecting condition   | Possible cause   | E |
|---------|---|---|--|---|
| P1217   | Engine over tempera-<br>ture (Overheat) | <ul> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> <li>Engine coolant is not within the specified range.</li> </ul> | <ul> <li>Harness or connectors<br/>(The cooling fan circuit is open or short-<br/>ed.)</li> <li>IPDM E/R (Cooling fan relays)</li> <li>Cooling fan motor</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul> | F |

#### **CAUTION:**

When a malfunction is indicated, always replace the coolant. Refer to <u>CO-8, "Draining"</u>. Also, replace the engine oil. Refer to LU-8, "Draining".

- 1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Always use coolant with the proper mixture ratio. Refer to MA-16, "FOR NORTH AMERICA : Anti-Freeze Coolant Mixture Ratio".
- 2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

#### DTC CONFIRMATION PROCEDURE

#### **1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-355, "Component Function Check". NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-356, "Diagnosis Procedure".

#### Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK-I

#### WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

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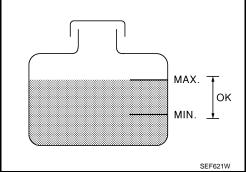
# P1217 ENGINE OVER TEMPERATURE

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

Check the coolant level in the reservoir tank and radiator. Allow engine to cool before checking coolant level. Is the coolant level in the reservoir tank and/or radiator below the proper range?

YES >> Go to <u>EC-356, "Diagnosis Procedure"</u>. NO >> GO TO 2.



# 2. PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-356, "Diagnosis Procedure".

NO >> GO TO 3.

**3.**PERFORM COMPONENT FUNCTION CHECK-III

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that cooling fan motors-1 and -2 operate at each speed (LOW/MID/HI).

#### **Without CONSULT-III**

Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-10, "Diagnosis</u> <u>Description"</u>.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-356, "Diagnosis Procedure".

## **Diagnosis Procedure**

1. CHECK COOLING FAN OPERATION

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that cooling fans-1 and -2 operate at each speed (LOW/MID/HI).

#### **Without CONSULT-III**

- Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-10</u>, "<u>Diagnosis</u> <u>Description</u>".
- 2. Check that cooling fans-1 and -2 operate at each speed (Low/Middle/High).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to EC-434, "Diagnosis Procedure".

2.CHECK COOLING SYSTEM FOR LEAKAGE-I

Check cooling system for leakage. Refer to CO-8. "Inspection".

Is leakage detected?

YES >> GO TO 3.

NO >> GO TO 4.

 ${\it 3.}$ CHECK COOLING SYSTEM FOR LEAKAGE-II

Check the following for leakage.

- Hose
- Radiator
- Water pump

# **P1217 ENGINE OVER TEMPERATURE**

| < COMPONENT DIAGNOSIS >  | [VQ35DE] |    |
|--|----------|----|
| >> Repair or replace malfunctioning part.                        |          |    |
| 4.CHECK RADIATOR CAP   |          | А  |
| Check radiator cap. Refer to CO-12, "RADIATOR CAP : Inspection". |          |    |
| Is the inspection result normal?                                 |          | EC |
| YES >> GO TO 5.<br>NO >> Replace radiator cap.                   |          |    |
| 5. CHECK THERMOSTAT  |          | С  |
| Check thermostat. Refer to CO-24, "Inspection".                  |          |    |
| Is the inspection result normal?                                 |          | D  |
| YES >> GO TO 6.  |          | D  |
| NO >> Replace thermostat   |          |    |
| 6. CHECK ENGINE COOLANT TEMPERATURE SENSOR                       |          | Е  |
| Refer to EC-171, "Component Inspection".                         |          |    |
| Is the inspection result normal?                                 |          |    |
| YES >> GO TO 7.  |          | F  |
| NO >> Replace engine coolant temperature sensor.                 |          |    |
| 7.CHECK MAIN 12 CAUSES   |          |    |
|  |          | G  |

If the cause cannot be isolated, check the following.

| Engine            | Step | Inspection item  | Equipment                                    | Standard   | Reference page                        |
|-------------------|------|--|--|--|---------------------------------------|
| OFF               | 1    | <ul> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul> | • Visual                                     | No blocking  | _                                     |
| -                 | 2    | Coolant mixture  | Coolant tester                               | MA-15, "FOR NORTH AMI<br>mendation"                                | ERICA : Engine Oil Recom-             |
| -                 | 3    | Coolant level  | Visual                                       | Coolant up to MAX level in reservoir tank and radiator filler neck | CO-8, "Inspection"                    |
| -                 | 4    | Radiator cap   | Pressure tester                              | CO-12, "RADIATOR CAP :   | Inspection"                           |
| ON* <sup>2</sup>  | 5    | Coolant leakage  | Visual                                       | No leakage   | CO-8, "Inspection"                    |
| ON* <sup>2</sup>  | 6    | Thermostat   | Touch the upper and<br>lower radiator hoses  | Both hoses should be hot   | CO-24, "Inspection"                   |
| ON* <sup>1</sup>  | 7    | Cooling fan  | CONSULT-III                                  | Operating  | EC-434, "Component<br>Function Check" |
| OFF               | 8    | Combustion gas leak-<br>age  | Color checker chemical tester 4 Gas analyzer | Negative   | _                                     |
| ON* <sup>3</sup>  | 9    | Coolant temperature     gauge  | Visual                                       | Gauge less than 3/4 when driving                                   | _                                     |
|                   |      | Coolant overflow to res-<br>ervoir tank  | • Visual                                     | No overflow during driving and idling                              | CO-8, "Inspection"                    |
| OFF* <sup>4</sup> | 10   | Coolant return from res-<br>ervoir tank to radiator  | • Visual                                     | Should be initial level in reservoir tank                          | CO-8, "Inspection"                    |
| OFF               | 11   | Cylinder head  | Straight gauge feeler gauge                  | 0.1 mm (0.004 in) Maxi-<br>mum distortion (warping)                | EM-114, "Inspection"                  |
| -                 | 12   | Cylinder block and pis-<br>tons  | Visual                                       | No scuffing on cylinder walls or piston                            | EM-126, "Inspection"                  |

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

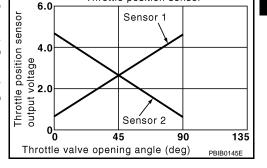
For more information, refer to CO-3, "Troubleshooting Chart".

# P1225 TP SENSOR

## Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has two sensors. These sensors are a kind of potentiometer which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.



Possible cause

Throttle position sensor

# DTC Logic

DTC No.

#### DTC DETECTION LOGIC

Trouble diagnosis name

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| P1225                        | Closed throttle position learning performance | Closed throttle position learning value is excessively low.            | Electric throttle control actuator<br>(TP sensor 1 and 2) | 0 |
|------------------------------|---|--|---|---|
| DTC CON                      | FIRMATION PROC                                | EDURE  |   | Н |
| 1.PRECC                      | NDITIONING                                    |  |   |   |
| ing the nex<br>1. Turn ig    | t test.<br>gnition switch OFF and             | has been previously conducted, always p<br>d wait at least 10 seconds. | perform the following before conduct-                     | I |
| 3. Turn iç<br><b>TESTING</b> | CONDITION:                                    | d wait at least 10 seconds.  |   | J |
| Before pe                    | rforming the followir                         | ng procedure, confirm that battery vol                                 | tage is more than 10 V at idle.                           | K |
| >:                           | > GO TO 2.                                    |  |   | N |

DTC detecting condition

# 2 DEDECODM DTC CONFIRMATION PROCEDURE

| Z.PERFORM DTC CONFIRMATION PROCEDURE  | 1 |
|---|---|
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Check 1st trip DTC.</li> </ol> | M |
| Is 1st trip DTC detected?<br>YES >> Go to EC-359, "Diagnosis Procedure".<br>NO >> INSPECTION END  | Ν |
| Diagnosis Procedure   |   |
| 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY  | 0 |
| <ol> <li>Turn ignition switch OFF.</li> <li>Remove the intake air duct.</li> </ol>  | Ρ |

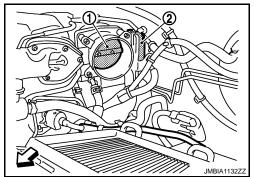
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# P1225 TP SENSOR

#### < COMPONENT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



 $2. {\tt Replace electric throttle control actuator}$ 

- 1. Replace electric throttle control actuator.
- 2. Go to EC-360. "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000003591588

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

# P1226 TP SENSOR

# Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has two sensors. These sensors are a kind of potentiometer which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.

# Throttle position sensor output voltage 0.7 0.9 0 Sensor 2 0<sup>L</sup> 45 90 135 Throttle valve opening angle (deg) PBIB0145E

6.0

Throttle position sensor

Sensor 1

Possible cause

#### INFOID:00000003388141

# DTC Logic

DTC No.

# DTC DETECTION LOGIC

Trouble diagnosis name

|                          | e e   | 0   |   |
|--------------------------|---|---|---|
| P1226                    | Closed throttle position learning performance         | Closed throttle position learning is not per-<br>formed successfully, repeatedly. | Electric throttle control actuator<br>(TP sensor 1 and 2) |
| TC CON                   | FIRMATION PROC  | EDURE   |   |
| .PRECO                   | NDITIONING  |   |   |
|                          |   | as been previously conducted, always p  | perform the following before conduct-                     |
| ng the nex<br>1. Turn ia |   | l wait at least 10 seconds.   |   |
| 2. Turn ig               | nition switch ON.                                     |   |   |
|                          | nition switch OFF and<br>CONDITION:                   | l wait at least 10 seconds.   |   |
|                          |   | g procedure, confirm that battery vol   | tage is more than 10 V at idle.                           |
|                          |   |   |   |
| -                        | • GO TO 2.  |   |   |
| 2.PERFO                  | RM DTC CONFIRMA                                       | TION PROCEDURE  |   |
|                          | nition switch ON.                                     |   |   |
|                          | nition switch OFF and<br>inition switch ON.           | l wait at least 10 seconds.   |   |
| 4. Repeat                | t steps 2 and 3 for 32                                | times.  |   |
|                          | 1st trip DTC.   |   |   |
|                          | ) <u>TC detected?</u><br>→ Go to <u>EC-361, "Diag</u> | nosis Procedure"  |   |
|                          | INSPECTION END  | <u>110313 1 10000010</u> .  |   |
| Diagnosi                 | s Procedure   |   | INFOID:00000003598158                                     |
| 1.снеск                  | ELECTRIC THROTT                                       | LE CONTROL ACTUATOR VISUALLY  |   |
| 1. Turn ig               | nition switch OFF.                                    |   |   |
|                          | a the strated as a local state.                       |   |   |

DTC detecting condition

2. Remove the intake air duct. INFOID:000000003591573

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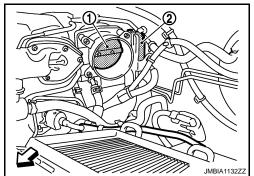
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# P1226 TP SENSOR

#### < COMPONENT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



 $2. {\tt Replace electric throttle control actuator}$ 

- 1. Replace electric throttle control actuator.
- 2. Go to EC-360. "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000003591589

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

**2.** PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

# P1421 COLD START CONTROL

#### < COMPONENT DIAGNOSIS >

# P1421 COLD START CONTROL

# Description

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

# DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

#### • If DTC P1421 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

| DTC No.   | Trouble diagnosis name  | DTC detecting condition   | Possible cause  |
|---|---|---|---|
| P1421   | Cold start emission reduction strategy monitoring   | ECM does not control ignition timing and engine<br>idle speed properly when engine is started with<br>pre-warming up condition. | <ul><li>Lack of intake air volume</li><li>Fuel injection system</li><li>ECM</li></ul> |
|   | FIRMATION PROCEDUR  | E   |   |
| 1.PRECO   | NDITIONING  |   |   |
| ing the nex<br>1. Turn ig<br>2. Turn ig<br>3. Turn ig<br><b>TESTING</b> | t test.<br>Inition switch OFF and wait a<br>Inition switch ON.<br>Inition switch OFF and wait a<br>CONDITION: |   | -   |
| •   | > GO TO 2.<br>RM DTC CONFIRMATION F   | PROCEDURE   |   |
| <ol> <li>Select</li> <li>Check</li> <li>If "COO</li> </ol>              | nition switch ON.<br>"DATA MONITOR" mode wit<br>that the "COOLAN TEMP/S'<br>DLAN TEMP/S" indication is        | ' indication is between 4°C (39°F) and 36° within the specified value, go to the follow   | ing steps.  |
| to step<br>4. Start e<br>5. Check<br>With GS                            | 1.<br>ngine and let it idle for 5 min<br>1st trip DTC.<br>ST  |   | n or warm engine up and go  |
| <u>Is 1st trip D</u><br>YES >>  | procedure "With CONSULT-I<br><u>)TC detected?</u><br>> Go to <u>EC-363, "Diagnosis F</u><br>> INSPECTION END  |   |   |
| Diagnosi  | s Procedure   |   | INFOID:000000003388144  |
| 1 PERFO   | RM IDLE AIR VOLUME LEA  | RNING   |   |
|   |   |   |   |
| _   | C-17, "IDLE AIR VOLUME LE   | EARNING : Special Repair Requirement".  |   |
| Perform <u>E(</u><br>Is Idle Air \                                      | /olume Learning carried out   |   |   |
| Perform <u>EC</u><br>Is Idle Air \<br>YES >>                            |   | successfully?   |   |

Check for the cause of intake air volume lacking. Refer to the following.

# EC-363

INFOID:000000003388144

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# P1421 COLD START CONTROL

< COMPONENT DIAGNOSIS >

Crushed intake air passage

Intake air passage clogging

Is the inspection result normal?

YES >> GO TO 3. NO >> Repair or replace malfunctioning part

**3.**CHECK FUEL INJECTION SYSTEM FUNCTION

Perform EC-226, "DTC Logic" for DTC P0171, P0174.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to <u>EC-228. "Diagnosis Procedure"</u> for DTC P0171, P0174.

**4.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-363, "DTC Logic"</u>.

Is the 1st trip DTC P1421 displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

**5.**REPLACE ECM

1. Replace ECM.

2. Go to EC-15. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

# P1550 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

# P1550 BATTERY CURRENT SENSOR

# Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-7</u>, <u>"System Description"</u>.

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

**DTC Logic** 

INFOID:000000003388148

# DTC DETECTION LOGIC

#### NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                              | DTC detecting condition  | Possible cause   | Ц |
|---------|---|--|--|---|
| P1550   | Battery current sensor circuit<br>range/performance | The output voltage of the battery current sensor remains within the specified range while engine is running. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul> | П |

# DTC CONFIRMATION PROCEDURE

# **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### 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 M Start engine and wait at least 10 seconds. 1. Check 1st trip DTC. 2. Ν Is 1st trip DTC detected? YES >> Go to EC-365, "Diagnosis Procedure". NO >> INSPECTION END C Diagnosis Procedure INFOID:00000003388149 1. CHECK GROUND CONNECTION P 1. Turn ignition switch OFF. Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>. Is the inspection result normal? YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

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# P1550 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

| Battery cur | rrent sensor | Ground | Voltage (V) |  |
|-------------|--------------|--------|-------------|--|
| Connector   | Terminal     | Ground | voliage (v) |  |
| F76         | 1            | Ground | Approx. 5   |  |

Is the inspection result normal?

YES >> GO TO 3.

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

# ${f 3.}$ CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| Battery cur | Battery current sensor |           | ECM      |            |
|-------------|------------------------|-----------|----------|------------|
| Connector   | Terminal               | Connector | Terminal | Continuity |
| F76         | 2                      | F8        | 44       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

| Battery cur | rrent sensor | ECM       |          | ECM Continuity |  |
|-------------|--------------|-----------|----------|----------------|--|
| Connector   | Terminal     | Connector | Terminal | Continuity     |  |
| F76         | 3            | F8        | 42       | Existed        |  |

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

#### Is the inspection result normal?

YES >> GO TO 5.

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

## **5.**CHECK BATTERY CURRENT SENSOR

#### Refer to EC-366, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

Component Inspection

#### **1.**CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

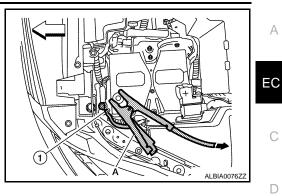
2. Reconnect harness connectors disconnected.

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# P1550 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- < : Vehicle front
- - To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.



[VQ35DE]

|           | ECM                                      |                       |             |
|-----------|--|-----------------------|-------------|
| Connector | +  | _                     | Voltage (V) |
| Connector | Terminal Terminal                        |                       |             |
| F8        | 42<br>(Battery current<br>sensor signal) | 44<br>(Sensor ground) | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

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# P1551, P1552 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

# P1551, P1552 BATTERY CURRENT SENSOR

# Description

INFOID:000000003664590

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-7</u>. "System Description".

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000003388152

# DTC DETECTION LOGIC

#### NOTE:

If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                       | DTC detecting condition                                     | Possible cause   |
|---------|--|---|--|
| P1551   | Battery current sensor circuit<br>low input  | An excessively low voltage from the sensor is sent to ECM.  | Harness or connectors     (The sensor circuit is open or shorted.) |
| P1552   | Battery current sensor circuit<br>high input | An excessively high voltage from the sensor is sent to ECM. |  |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-368, "Diagnosis Procedure".
- NO >> INSPECTION END

# Diagnosis Procedure

# **1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

INFOID:000000003664591

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| < COMPONEN   |   | -                | BATTERY C       | CURRENT SE       | NSOR<br>[VQ35DE]           |
|--|---|------------------|-----------------|------------------|----------------------------|
|  |   | ground connec    | tion            |                  |                            |
| 2.CHECK BAT  |   | •                |                 | YLY CIRCUIT      |                            |
|  |   | t sensor harne   |                 |                  |                            |
| 2. Turn ignitior   | n switch ON.                                    |                  |                 |                  | ad avance of               |
| 3. Check the v   | oltage betwee                                   | en battery curre | nt sensor harn  | ess connector ar | nd ground.                 |
| Battery curr   | ent sensor                                      |                  |                 | -                |                            |
| Connector  | Terminal  | Ground           | Voltage (V)     |                  |                            |
| F76  | 1   | Ground           | Approx. 5       | _                |                            |
| Is the inspection  | n result norma                                  | ?                |                 | -                |                            |
| YES >> GO  |   |                  |                 |                  |                            |
|  | •   | •                |                 | power in harness |                            |
| <b>3.</b> CHECK BAT  | TERY CURRE                                      | ENT SENSOR       | GROUND CIR      | CUIT FOR OPEN    | I AND SHORT                |
| 2. Disconnect  | n switch OFF.<br>ECM harness<br>continuity betw |                  | rrent sensor ha | arness connector | and ECM harness connector. |
| Battery curre  | ent sensor                                      | EC               |                 | Continuity       |                            |
| Connector  | Terminal  | Connector        | Terminal        |                  |                            |
| F76  | 2   | F8               | 44              | Existed          |                            |
| 1. Check the c   |   | -                | rrent sensor ha | arness connector | and ECM harness connector. |
| Connector  | Terminal  | Connector        | Terminal        | Continuity       |                            |
| F76  | 3   | F8               | 42              | Existed          |                            |
| 2. Also check  |   | nort to ground a | nd short to po  | wer.             |                            |
| s the inspection   |   | •                |                 |                  |                            |
| YES >> GO<br>NO >> Rep<br>O.CHECK BAT                            | pair open circu                                 | •                | ind or short to | power in harness | or connectors.             |
| Refer to EC-366  | 6, "Componen                                    | t Inspection".   |                 |                  |                            |
| s the inspection   |   | <u> ?</u>        |                 |                  |                            |
| YES >> GO<br>NO >> Rep   |   | negative cable a | seembly         |                  |                            |
| <b>`</b>   | •   | -                | soonibiy.       |                  |                            |
|  |   |                  |                 |                  |                            |
|  | ERMITTENT I                                     |                  |                 |                  |                            |
|  |   |                  |                 |                  |                            |
| Refer to <u>GI-40, '</u>   |   | ncident".        |                 |                  |                            |
| Refer to <u>GI-40, '</u><br>>> INS                               | "Intermittent Ir                                | ncident".        |                 |                  | INFOID:00000003635142      |
| Refer to <u>GI-40, '</u>   | "Intermittent Ir<br>PECTION EN                  | ncident".<br>ID  |                 |                  | INFOID:00000003635142      |
| Refer to <u>GI-40, '</u><br>>> INS<br>Component I<br>1.CHECK BAT | "Intermittent Ir<br>PECTION EN                  | ncident".<br>ID  |                 |                  | INFOID:00000003635142      |

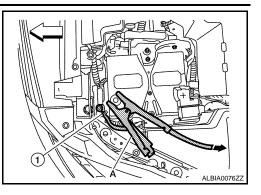
# P1551, P1552 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

3. Disconnect battery negative cable (1).

⟨⊐ : Vehicle front

- : To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.



|           | ECM                                      |                       |             |
|-----------|--|-----------------------|-------------|
| Connector | +  | _                     | Voltage (V) |
| Connector | Terminal                                 | Terminal              |             |
| F8        | 42<br>(Battery current<br>sensor signal) | 44<br>(Sensor ground) | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3. "How to Handle Battery".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly. [VQ35DE]

# P1553 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

# P1553 BATTERY CURRENT SENSOR

# Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-7</u>, <u>"System Description"</u>.

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

**DTC Logic** 



# DTC DETECTION LOGIC

#### NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                  | DTC detecting condition  | Possible cause   |  |
|---------|---|--|--|--|
| P1553   | Battery current sensor perfor-<br>mance | The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation. | <ul> <li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul> |  |

# DTC CONFIRMATION PROCEDURE

# **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### 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 wait at least 10 seconds. 2. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Go to EC-371. "Diagnosis Procedure". NO >> INSPECTION END Diagnosis Procedure INFOID:0000003664593 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43. "Circuit Inspection".

- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

 $\mathbf{2}$ .CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

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# P1553 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

|   | Battery cur | rrent sensor | Ground | Voltage (V) |  |
|---|-------------|--------------|--------|-------------|--|
| _ | Connector   | Terminal     | Ground | voltage (v) |  |
|   | F76         | 1            | Ground | Approx. 5   |  |

Is the inspection result normal?

YES >> GO TO 3.

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

# ${f 3.}$ CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| Battery cur | Battery current sensor |           | ECM      |            |
|-------------|------------------------|-----------|----------|------------|
| Connector   | Terminal               | Connector | Terminal | Continuity |
| F76         | 2                      | F8        | 44       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

| Battery cur | Battery current sensor |           | ECM      |            |
|-------------|------------------------|-----------|----------|------------|
| Connector   | Terminal               | Connector | Terminal | Continuity |
| F76         | 3                      | F8        | 42       | Existed    |

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

#### Is the inspection result normal?

YES >> GO TO 5.

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

## **5.**CHECK BATTERY CURRENT SENSOR

#### Refer to EC-366, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

Component Inspection

#### **1.**CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

2. Reconnect harness connectors disconnected.

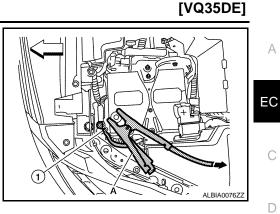
INFOID:000000003635141

# P1553 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

#### 3. Disconnect battery negative cable (1).

- + : To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.



|           | ECM                                      |                       |             |  |  |
|-----------|--|-----------------------|-------------|--|--|
| Connector | +  | -                     | Voltage (V) |  |  |
| Connector | Terminal                                 | Terminal              |             |  |  |
| F8        | 42<br>(Battery current<br>sensor signal) | 44<br>(Sensor ground) | Approx. 2.5 |  |  |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3. "How to Handle Battery".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.



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# P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

# P1554 BATTERY CURRENT SENSOR

# Description

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[VQ35DE]

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-7</u>, <u>"System Description"</u>.

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000003388160

# DTC DETECTION LOGIC

#### NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                  | DTC detecting condition  | Possible cause  |
|---------|---|--|---|
| P1554   | Battery current sensor perfor-<br>mance | The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough. | <ul><li>Harness or connectors<br/>(The sensor circuit is open or shorted.)</li><li>Battery current sensor</li></ul> |

# DTC CONFIRMATION PROCEDURE

**1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-374. "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the battery current sensor circuit. During this check, a 1st trip DTC might not be confirmed.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to <u>EC-375</u>, "Diagnosis Procedure".

# Component Function Check

INFOID:000000003388161

# 1.PRECONDITIONING

#### **TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK

#### (B) With CONSULT-III

- 1. Start engine and let it idle.
- 2. Select "BAT CUR SEN" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check "BAT CUR SEN" indication for 10 seconds.

#### "BAT CUR SEN" should be above 2,300mV at least once.

#### **Without CONSULT-III**

- 1. Start engine and let it idle.
- 2. Check voltage between ECM harness connector terminals under the following conditions.

# P1554 BATTERY CURRENT SENSOR

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|   | ECM   |   |                    |  |
|---|---|---|--------------------|--|
| Connector   | +   | -   | Voltage (V)        |  |
| Connector   | Terminal  | Terminal                                      |                    |  |
| 50  | 42<br>(Detterment   | 44<br>(Damaan                                 |                    |  |
| F8  | (Battery current<br>sensor signal)  | (Sensor<br>ground)                            | Above 2.3 at least | once   |
| the inspect   | ion result norma  | al?   |                    |  |
|   | NSPECTION EN  |   |                    |  |
| VO >> G   | Go to <u>EC-375, "E</u>   | <u>Diagnosis Pro</u>                          | <u>cedure"</u>     |  |
| iagnosis  | Procedure   |   |                    | INFOID:000000003591747                       |
| -CHECK G  | ROUND CONN  | ECTION  |                    |  |
|   | tion switch OFF.  |   |                    |  |
|   |   | n E38. Refer                                  | to Ground Inspec   | tion in <u>GI-43, "Circuit Inspection"</u> . |
| the inspect   | ion result norma  | <u>al?</u>                                    |                    |  |
|   | GO TO 2.  |   | a ation            |  |
|   | Repair or replace   | •   |                    |  |
|   |   |   | R POWER SUPP       |  |
|   | ect battery current<br>tion switch ON.  | nt sensor har                                 | ness connector.    |  |
|   |   | en battery cu                                 | rrent sensor harn  | ess connector and ground.                    |
|   | 5   | ,   |                    | J  |
| Battery of  | current sensor  | Ground  | Voltage (V)        | •  |
| Connector   | Terminal  | Giouna  | voltage (v)        |  |
| F76   | 1   | Ground  | Approx. 5          | -  |
| the inspect   | ion result norma  | <u>al?</u>                                    |                    |  |
|   | SO TO 3.  |   |                    |  |
|   | · ·   |   |                    | oower in harness or connectors.              |
|   |   | ENT SENSO                                     | R GROUND CIRC      | CUIT FOR OPEN AND SHORT                      |
|   | tion switch OFF.<br>ect ECM harness   | s connector                                   |                    |  |
|   |   |   | current sensor ha  | rness connector and ECM harness connector.   |
|   |   |   |                    |  |
| Battery c   | urrent sensor   |   | ECM                | Continuity                                   |
| Connector   | Terminal  | Connector                                     | Terminal           |  |
| F76   | 2   | F8  | 44                 | Existed                                      |
|   | ck harness for s  | -   | d and short to pov | /er.   |
|   |   | 10  |                    |  |
| the inspect   | ion result norma  | <u>al?</u>                                    |                    |  |
| the inspect   | GO TO 4.  |   | round or short to  | nower in harness or connectors               |
| the inspect<br>YES >> 0<br>NO >> F                                      | GO TO 4.<br>Repair open circi   | uit, short to gi                              | -                  | ower in harness or connectors.               |
| <u>the inspect</u><br>/ES >> 0<br>NO >> F<br>.CHECK B                   | GO TO 4.<br>Repair open circu<br>ATTERY CURR  | uit, short to gi<br>ENT SENSO                 | R INPUT SIGNAL     | CIRCUIT FOR OPEN AND SHORT                   |
| <u>the inspect</u><br>/ES >> 0<br>NO >> F<br>.CHECK B                   | GO TO 4.<br>Repair open circu<br>ATTERY CURR  | uit, short to gi<br>ENT SENSO                 | R INPUT SIGNAL     |  |
| the inspect<br>YES >> 0<br>NO >> F<br>CHECK B<br>Check th               | GO TO 4.<br>Repair open circo<br>ATTERY CURR<br>e continuity betw                   | uit, short to gi<br>ENT SENSO                 | R INPUT SIGNAL     | CIRCUIT FOR OPEN AND SHORT                   |
| the inspect<br>YES >> 0<br>NO >> F<br>CHECK B.<br>Check th<br>Battery c | GO TO 4.<br>Repair open circu<br>ATTERY CURR<br>e continuity betw<br>current sensor | uit, short to gr<br>ENT SENSO<br>veen battery | R INPUT SIGNAL     | CIRCUIT FOR OPEN AND SHORT                   |
| the inspect<br>YES >> 0<br>NO >> F<br>CHECK B                           | GO TO 4.<br>Repair open circo<br>ATTERY CURR<br>e continuity betw                   | uit, short to gi<br>ENT SENSO                 | R INPUT SIGNAL     | CIRCUIT FOR OPEN AND SHORT                   |

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

Is the inspection result normal?

# P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

INFOID:000000003664589

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

**5.**CHECK BATTERY CURRENT SENSOR

Refer to EC-376, "Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

## >> INSPECTION END

# Component Inspection

1.CHECK BATTERY CURRENT SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect harness connectors disconnected.

ECM

- 3. Disconnect battery negative cable (1).
- <a>: Vehicle front</a>
- 🖛: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

|--|

| Connector | +  | _                     | Voltage (V) |
|-----------|--|-----------------------|-------------|
| Connector | Terminal                                 | Terminal              |             |
| F8        | 42<br>(Battery current<br>sensor signal) | 44<br>(Sensor ground) | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

# Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

# P1564 ASCD STEERING SWITCH

# Description

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated. Refer to <u>EC-51, "System Diagram"</u> for the ASCD function.

# DTC Logic

# DTC DETECTION LOGIC **NOTE:**

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-344, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis<br>name | DTC detecting condition  | Possible cause   |   |
|---------|---------------------------|--|--|---|
| P1564   | ASCD steering switch      | 0  | <ul> <li>Harness or connectors<br/>(The switch circuit is open or shorted.)</li> <li>ASCD steering switch</li> </ul> | F |
|         |                           | <ul> <li>ECM detects that the ASCD steering switch is stuck ON.</li> </ul> | • ECM  | G |
| DTC CON | VFIRMATION PRO            | DCEDURE  |  | н |
| 1.PRECO | ONDITIONING               |  |  |   |

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

# >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 5. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 6. Check DTC.
- Is DTC detected?
- YES >> Go to EC-377, "Diagnosis Procedure".
- NO >> INSPECTION END

# Diagnosis Procedure

- **1.**CHECK GROUND CONNECTION
- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43. "Circuit Inspection".

# Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace ground connection.
- 2. CHECK ASCD STEERING SWITCH CIRCUIT

# With CONSULT-III

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#### 1. Turn ignition switch ON.

- 2. Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check each item indication under the following conditions.

| Monitor item  | Condition                     |          | Indication |
|---------------|-------------------------------|----------|------------|
| MAIN SW       | MAIN switch                   | Pressed  | ON         |
| MAIN SVV      | MAIN SWICH                    | Released | OFF        |
| CANCEL SW     | CANCEL switch                 | Pressed  | ON         |
|               | CANCEL SWICH                  | Released | OFF        |
| RESUME/ACC SW | RESUME/ACCEL-<br>ERATE switch | Pressed  | ON         |
|               |                               | Released | OFF        |
| SET SW        | SET/COAST switch              | Pressed  | ON         |
|               |                               | Released | OFF        |

#### **Without CONSULT-III**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals under the following conditions.

|                 | ECM |                               |                                      |             |
|-----------------|-----|-------------------------------|--------------------------------------|-------------|
| Con-            | +   | _                             | Condition                            | Voltage (V) |
| nector Terminal |     | Terminal                      |                                      |             |
|                 |     |                               | MAIN switch: Pressed                 | Approx. 0   |
| 85              | 92  | CANCEL switch: Pressed        | Approx. 1                            |             |
| E16             |     | (ASCD steering switch ground) | SET/COAST switch: Pressed            | Approx. 2   |
|                 |     |                               | RESUME/ACCELERATE switch: Pressed    | Approx. 3   |
| _               |     |                               | All ASCD steering switches: Released | Approx. 4   |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

# ${f 3.}$ CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect combination switch harness connector.

4. Check the continuity between combination switch and ECM harness connector.

| Combination switch | ECM       |          | Continuity |  |
|--------------------|-----------|----------|------------|--|
| Terminal           | Connector | Terminal | Continuity |  |
| 16                 | E16       | 92       | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M77, E105

• Combination switch (spiral cable)

• Harness for open and short between ECM and combination switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

# P1564 ASCD STEERING SWITCH

#### < COMPONENT DIAGNOSIS >

# 5.check ascd steering switch input signal circuit for open and short

#### 1. Check the continuity between combination switch and ECM harness connector.

| Combination switch | E         | Continuity |            |  |
|--------------------|-----------|------------|------------|--|
| Terminal           | Connector | Terminal   | Continuity |  |
| 13                 | E16       | 85         | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

#### 6.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M77, E105

• Combination switch (spiral cable)

· Harness for open and short between ECM and combination switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

## **7.**CHECK ASCD STEERING SWITCH

| Refer to EC-379, "Component Inspection". | -  |  |  |  |
|--|----|--|--|--|
| Is the inspection result normal?         | Н  |  |  |  |
| YES >> GO TO 8.                          |    |  |  |  |
| NO >> Replace ASCD steering switch.      |    |  |  |  |
| 8. CHECK INTERMITTENT INCIDENT           |    |  |  |  |
| Refer to GI-40, "Intermittent Incident". | _  |  |  |  |
|  | J  |  |  |  |
| >> INSPECTION END                        | -  |  |  |  |
| Component Inspection                     | 67 |  |  |  |

# 1.CHECK ASCD STEERING SWITCH

1. Turn ignition switch OFF.

2. Disconnect combination switch (spiral cable) harness connector.

3. Check resistance between combination switch harness connector terminals as per the following.

| Combination switch |           | Condition                            | Resistance ( $\Omega$ ) |
|--------------------|-----------|--------------------------------------|-------------------------|
| Connector          | Terminals |                                      |                         |
|                    |           | MAIN switch: Pressed                 | Approx. 0               |
|                    |           | CANCEL switch: Pressed               | Approx. 250             |
| M33                | 13 and 16 | SET/COAST switch: Pressed            | Approx. 660             |
|                    |           | RESUME/ACCELERATE switch: Pressed    | Approx. 1,480           |
|                    |           | All ASCD steering switches: Released | Approx. 4,000           |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch

[VQ35DE]

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# P1572 ASCD BRAKE SWITCH

# Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by those two types of input (ON/OFF signal). Refer to <u>EC-51, "System Diagram"</u> for the ASCD function.

# DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-344, "DTC Logic"</u>.
- This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch is turned OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

| DTC No. | Trouble diagnosis<br>name |    | DTC detecting condition  | Possible cause  |
|---------|---------------------------|----|--|---|
|         |                           | A) | When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time. | <ul> <li>Harness or connectors<br/>(The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors<br/>(The ASCD brake switch circuit is shorted.)</li> </ul>         |
| P1572   | ASCD brake switch         | B) | ASCD brake switch signal is not sent to<br>ECM for extremely long time while the ve-<br>hicle is being driven.   | <ul> <li>Stop lamp switch</li> <li>ASCD brake switch</li> <li>Incorrect stop lamp switch installation</li> <li>Incorrect ASCD brake switch installation</li> <li>ECM</li> </ul> |

# DTC CONFIRMATION PROCEDURE

# **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### NOTE:

The procedure for malfunction B is not described. It takes extremely long time to complete the procedure for malfunction B. By performing the procedure for malfunction A, the condition that causes malfunction B can be detected.

# >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT-III

- 1. Start engine (VDC switch OFF).
- 2. Select "DATA MONITOR" mode with CONSULT-III.
- 3. Press MAIN switch and check that CRUISE illuminates.
- 4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

#### **CAUTION:**

#### Always drive vehicle at a safe speed. NOTE:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

| VHCL SPEED SE  | More than 30 km/h (19 mph) |
|----------------|----------------------------|
| Selector lever | Suitable position          |

EC-380

INFOID-000000003388169

[VQ35DE]

# P1572 ASCD BRAKE SWITCH

|   |   |                       | P1572 AS                        |  | SWITCH                         |                                    |  |
|---|---|-----------------------|---------------------------------|--|--------------------------------|------------------------------------|--|
| < COMPO   | NENT DIAG                                     | NOSIS >               | 1                               |  |                                | [VQ35DE]                           |  |
| _   | 1st trip DTC.                                 |                       |                                 |  |                                |                                    |  |
| With GST     Follow the procedure "With CONSULT-III" above. |   |                       |                                 |  |                                |                                    |  |
|   | TC detected                                   |                       |                                 |  |                                |                                    |  |
|   |   | 31, "Diag             | nosis Procedu                   | <u>ıre"</u> .  |                                | E                                  |  |
|   | GO TO 3.                                      |                       |                                 |  |                                | _                                  |  |
|   |   | NFIRMAI               | ION PROCE                       | DURE   |                                |                                    |  |
| With CO I. Drive t  |   | at least              | 5 consecutive                   | seconds under th   | ne followina condi             | itions.                            |  |
| CAUTI   | ON:   |                       |                                 |  | 5                              |                                    |  |
| NOTE:   | s drive vehic                                 | cie at a s            | ate speed.                      |  |                                |                                    |  |
|   |   |                       |                                 | the drive wheels<br>is unnecessary                                       |                                | p or by driving the vehicle.<br>e. |  |
| VHCL SPEE   | ED SE   |                       | More than 30                    | km/h (19 mph)  |                                |                                    |  |
| Selector leve   | er  |                       | Suitable posit                  | ion  |                                |                                    |  |
| Driving locat   | tion  |                       | five seconds                    | orake pedal for more t<br>so as not to come off<br>ntioned vehicle speed | irom                           | (                                  |  |
| With GS     Follow the     Is 1st trip D                    | procedure "V<br><u>)TC detected</u>           | /ith CON:<br><u>?</u> | SULT-III" abov<br>nosis Procedu |  |                                | I                                  |  |
|   | NSPECTIC                                      |                       |                                 | <u></u> .  |                                |                                    |  |
| Diagnosi  | s Procedu                                     | re                    |                                 |  |                                | INFOID:000000003388170             |  |
| 1.снеск   | OVERALL F                                     | UNCTIO                | N-I                             |  |                                |                                    |  |
| <ol> <li>Turn ig</li> <li>Select</li> </ol>                 |   | 1" in "DA             |                                 | " mode with CON following conditic                                       |                                |                                    |  |
| Monitor ite   | em  | Condit                | tion                            | Indication   |                                |                                    |  |
|   |   | S                     | lightly depressed               | I OFF  |                                |                                    |  |
| BRAKE SW  | 1 Brake pe                                    | dal F                 | ully released                   | ON   |                                | ſ                                  |  |
| 1. Turn ig  | t CONSULT-<br>Inition switch<br>the voltage b | ON.                   | ECM harness                     | connector termina  | als.                           | I                                  |  |
|   | ECM   |                       |                                 |  |                                | (                                  |  |
| Connector   | +   | _                     | c                               | ondition   | Voltage                        |                                    |  |
|   | Terminal                                      | Terminal              | Г<br>Г                          |  |                                | -                                  |  |
| E16   | 110<br>(ASCD brake<br>switch signal)          | 112                   | Brake pedal                     | Slightly depressed<br>Fully released                                     | Approx. 0 V<br>Battery voltage |                                    |  |
|   | Switch Signal)                                |                       |                                 | -  |                                |                                    |  |

Is the inspection result normal?

YES >> GO TO 2. NO >> GO TO 3.

# 2. CHECK OVERALL FUNCTION-II

#### (I) With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

| Monitor item | Cor         | Indication         |     |
|--------------|-------------|--------------------|-----|
| BRAKE SW2    | Brake pedal | Slightly depressed | ON  |
|              | Diake peual | Fully released     | OFF |

#### **Without CONSULT-III**

Check the voltage between ECM harness connector terminals.

| ECM         |                              |          |                    |                |                 |  |
|-------------|------------------------------|----------|--------------------|----------------|-----------------|--|
| Connector   | +                            | _        | Condition          |                | ndition Voltage |  |
| Connector   | Terminal                     | Terminal |                    |                |                 |  |
| <b>-</b> 10 | 106                          |          | Slightly depressed |                | Battery voltage |  |
| E16         | (Stop lamp<br>switch signal) | 112      | Brake pedal        | Fully released | Approx. 0 V     |  |

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 7.

# **3.**CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ASCD brake switch harness connector.

3. Turn ignition switch ON.

4. Check the voltage between ASCD brake switch harness connector and ground.

| ASCD bra  | ake switch        | Ground | Voltage         |
|-----------|-------------------|--------|-----------------|
| Connector | onnector Terminal |        | voltage         |
| E49       | 1                 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

#### Check the following.

- Fuse block (J/B) connector E103
- 10 A fuse (No. 3)

• Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit, short to ground or short to power in harness or connectors.

# 5. Check ascd brake switch input signal circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.

3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

| ASCD bra  | ake switch | E                  | CM  | Continuity |
|-----------|------------|--------------------|-----|------------|
| Connector | Terminal   | Connector Terminal |     | Continuity |
| E49       | 2          | E16                | 110 | Existed    |

4. Also check harness for short to ground and short to power. Is the inspection result normal?

#### **ANA**/1**T** ...

|   | P1:               | 572 ASC   | D BRA     | <b>KE SWIT</b>     | СН                                 |    |  |
|---|-------------------|-----------|-----------|--------------------|------------------------------------|----|--|
| < COMPONENT DIAGNO  | OSIS >            |           |           |                    | [VQ35DE]                           | _  |  |
| YES >> GO TO 6.<br>NO >> Repair open circuit, short to ground or short to power in harness or connectors. |                   |           |           |                    |                                    |    |  |
| 6.CHECK ASCD BRAKE  | SWITCH            |           |           |                    |                                    |    |  |
| Refer to EC-384, "Compor  | nent Inspect      | ion (ASCD | Brake Sw  | <u>/itch)"</u>     |                                    | EC |  |
| Is the inspection result nor  | mal?              |           |           |                    |                                    |    |  |
| YES >> GO TO 12.<br>NO >> Replace ASCI  | ) hrake swit      | ch        |           |                    |                                    |    |  |
| 7.CHECK STOP LAMP S   |                   |           |           | чит                |                                    | С  |  |
| <ol> <li>Turn ignition switch OI</li> <li>Disconnect stop lamp</li> <li>Check the voltage betw</li> </ol> | F.<br>switch harn | ess conne | ctor.     |                    | d ground.                          | D  |  |
| Vahiele eeriel number   | Stop larr         | p switch  | Cround    | Valtaga            |                                    | E  |  |
| Vehicle serial number   | Connector         | Terminal  | Ground    | Voltage            |                                    |    |  |
| Up to JN8AZ18U*9W100000   |                   |           |           |                    |                                    | F  |  |
| Up to JN8AZ18U*9W710000   | E115              | 3         |           |                    |                                    | 1  |  |
| Up to JN8AZ18W*9W200000   | 2110              | LIIU      | 0         |                    |                                    |    |  |
| Up to JN8AZ18W*9W810000   |                   |           | Ground    | und Battery voltag | qe                                 | G  |  |
| From JN8AZ18U*9W100001  | -                 |           | 0.00.00   |                    | <u> </u>                           |    |  |
| From JN8AZ18U*9W710001  | E116              | E116 1    |           |                    |                                    | Н  |  |
| From JN8AZ18W*9W200001  |                   |           |           |                    |                                    |    |  |
| From JN8AZ18W*9W810001  |                   |           |           |                    |                                    |    |  |
| Is the inspection result nor  | mal?              |           |           |                    |                                    |    |  |
| YES >> GO TO 9.<br>NO >> GO TO 8.   |                   |           |           |                    |                                    |    |  |
| 8.DETECT MALFUNCTION  |                   | т         |           |                    |                                    | J  |  |
| Check the following.<br>• Fuse block (J/B) connect<br>• 10 A fuse (No. 7)<br>• Harness for open or show   | tor E103          |           | witch and | battery            |                                    | K  |  |
| >> Repair open c<br>9.CHECK STOP LAMP S   |                   | -         |           | •                  | ness or connectors.<br>N AND SHORT | L  |  |
| <ol> <li>Disconnect ECM harn</li> <li>Check the continuity b</li> </ol>                                   |                   |           | ch harnes | s connector a      | and ECM harness connector.         | M  |  |
| Vehicle serial number   | Stop lan          | np switch |           | ECM                | Continuity                         | Ν  |  |
|   | Connector         | Terminal  | Connecto  | or Terminal        | Continuity                         |    |  |
| Up to JN8AZ18U*9W100000   |                   |           |           |                    |                                    | ~  |  |
| Up to JN8AZ18U*9W710000   | E115              | 4         |           |                    |                                    | 0  |  |
| Up to JN8AZ18W*9W200000   |                   |           |           |                    |                                    |    |  |
| Lin to INIO A 71 0\A/*0\A/01.000  | 1                 | 1         | 1         | 1                  |                                    |    |  |

Revision: 2008 October

Is the inspection result normal?

Up to JN8AZ18W\*9W810000

From JN8AZ18U\*9W100001 From JN8AZ18U\*9W710001

From JN8AZ18W\*9W200001 From JN8AZ18W\*9W810001 E16

2

E116

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

106

Existed

Ρ

YES >> GO TO 11. NO >> GO TO 10.

**10.** DETECT MALFUNCTIONING PART

Check the following.

Fuse block (J/B) connector E103

Harness for open or short between stop lamp switch and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

**11.**CHECK STOP LAMP SWITCH

Refer to EC-384, "Component Inspection (Stop Lamp Switch)"

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace stop lamp switch.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

# Component Inspection (ASCD Brake Switch)

1.CHECK ASCD BRAKE SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Check the continuity between ASCD brake switch terminals under the following conditions.

| Terminals |             | Continuity         |             |
|-----------|-------------|--------------------|-------------|
| 1 and 2   | Brako podal | Fully released     | Existed     |
|           | Brake pedal | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to <u>BR-9</u>, "Inspection and Adjustment".

2. Check the continuity between ASCD brake switch terminals under the following conditions.

| Terminals |             | Condition          | Continuity  |
|-----------|-------------|--------------------|-------------|
| 1 and 2   | Brake pedal | Fully released     | Existed     |
| T anu z   |             | Slightly depressed | Not existed |

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch.

# Component Inspection (Stop Lamp Switch)

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.

2. Disconnect stop lamp switch harness connector.

3. Check harness continuity between stop lamp switch terminals under the following conditions.

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INFOID:000000003388171

# P1572 ASCD BRAKE SWITCH

## < COMPONENT DIAGNOSIS >

[VQ35DE]

|   | Terminals  | C              | Condition           | Continuity     |                    |
|---|------------|----------------|---------------------|----------------|--------------------|
| Jp to JN8AZ18U*9W100000                       |            |                | Evilly released     | Net evieted    |                    |
| Jp to JN8AZ18U*9W710000                       | 0 and 4    |                | Fully released      | Not existed    |                    |
| Jp to JN8AZ18W*9W200000                       | 3 and 4    |                | Oliophthy despected | Existed        |                    |
| Jp to JN8AZ18W*9W810000                       |            | Draka nadal    | Slightly depressed  | Existed        |                    |
| rom JN8AZ18U*9W100001                         |            | Brake pedal    | Fully released      | Not existed    |                    |
| rom JN8AZ18U*9W710001                         | 1 and 2    |                | Fully released      | NOT EXISTED    |                    |
| rom JN8AZ18W*9W200001                         | T and Z    |                |                     | Eviated        |                    |
| rom JN8AZ18W*9W810001                         |            |                | Slightly depressed  | Existed        |                    |
| the inspection result no                      | rmal?      |                |                     |                |                    |
| ES >> INSPECTION                              | IEND       |                |                     |                |                    |
| NO >> GO TO 2.                                |            |                |                     |                |                    |
| CHECK STOP LAMP S                             | SWITCH-II  |                |                     |                |                    |
| Adjust stop lamp swite                        |            |                |                     |                |                    |
| Check harness contin                          | uity betwe | en stop lam    | p switch terminals  | s under the fo | lowing conditions. |
|   | - · ·      |                |                     | <u> </u>       |                    |
| Vehicle serial number                         | Terminals  |                | Condition           | Continuity     |                    |
| Jp to JN8AZ18U*9W100000                       |            | Fully released | Not existed         |                |                    |
| Ip to JN8AZ18U*9W710000                       | 3 and 4    |                |                     |                |                    |
| Jp to JN8AZ18W*9W200000                       |            |                | Slightly depressed  | Existed        |                    |
| Jp to JN8AZ18W*9W810000                       |            | Brake pedal    |                     |                |                    |
| rom JN8AZ18U*9W100001                         |            | •              | Fully released      | Not existed    |                    |
| rom JN8AZ18U*9W710001                         | 1 and 2    |                |                     |                |                    |
| rom JN8AZ18W*9W200001                         |            |                | Slightly depressed  | Existed        |                    |
| rom JN8AZ18W*9W810001                         |            |                | 0,1                 |                |                    |
|   |            |                |                     |                |                    |
| the inspection result no                      |            |                |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | •h             |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            | 11                  |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            | 1 1                 |                |                    |
| the inspection result no<br>/ES >> INSPECTION | IEND       | ch.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | ch.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | :h.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>/ES >> INSPECTION | IEND       | :h.            |                     |                |                    |
| the inspection result no<br>/ES >> INSPECTION | IEND       | sh.            |                     |                |                    |
| the inspection result no<br>/ES >> INSPECTION | IEND       | :h.            |                     |                |                    |
| the inspection result no<br>'ES >> INSPECTION | IEND       | ch.            |                     |                |                    |

# P1574 ASCD VEHICLE SPEED SENSOR

# Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to <u>EC-51, "System Diagram"</u> for ASCD functions.

# DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P1574 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to <u>EC-333, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-344, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-346, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name    | DTC detecting condition   | Possible cause   |
|---------|---------------------------|---|--|
| P1574   | ASCD vehicle speed sensor | The difference the between two vehicle speed signals is out of the specified range. | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or<br/>shorted.)</li> <li>Combination meter</li> <li>ABS actuator and electric unit (control unit)</li> <li>Wheel sensor</li> <li>TCM</li> <li>ECM</li> </ul> |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine (VDC switch OFF).
- 2. Drive the vehicle at more than 40 km/h (25 MPH).

#### CAUTION: Always drive vehicle at a safe speed.

NOTE:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

3. Check DTC.

#### Is DTC detected?

YES >> Go to <u>EC-386, "Diagnosis Procedure"</u>. NO >> INSPECTION END

# **Diagnosis** Procedure

**1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-32, "Diagnosis Description".

Is the inspection result normal?

INFOID:00000003388174

INFOID:00000003388175

INFOID:000000003388176

# P1574 ASCD VEHICLE SPEED SENSOR

| F 1374 ASCD VEHICLE SPEED SENSOR                                 |          |    |
|--|----------|----|
| < COMPONENT DIAGNOSIS >  | [VQ35DE] |    |
| YES >> GO TO 2.  |          |    |
| NO >> Perform trouble shooting relevant to DTC indicated.        |          | А  |
| 2.check dtc with "abs actuator and electric unit (control unit)" | _        |    |
| Refer to BRC-29, "CONSULT-III Function".                         |          | EC |
| Is the inspection result normal?                                 |          | _0 |
| YES >> GO TO 3.  |          |    |
| NO >> Repair or replace malfunctioning part.                     |          | С  |
| 3. CHECK COMBINATION METER FUNCTION                              |          |    |
| Refer to MWI-34, "CONSULT-III Function (METER/M&A)".             |          |    |
|  |          | D  |
| >> INSPECTION END  |          |    |
|  |          | Ε  |
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# P1700 CVT CONTROL SYSTEM

# Description

INFOID:000000003388177

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for corresponding DTC. Refer to <u>EC-521</u>, "<u>DTC Index</u>". When this DTC is detected, the ASCD control is canceled.

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

#### < COMPONENT DIAGNOSIS >

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

# Description

ECM receives primary speed sensor signal from TCM via the CAN communication line. ECM uses this signal for engine control.

# **DTC Logic**

DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC UXXXX first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to <u>EC-260, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0340, P0345, first perform the trouble diagnosis for DTC P0340, P0345. Refer to <u>EC-264, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-344, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer F to <u>EC-346, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                                       | DTC detecting condition  | Possible cause  | G |
|---------|--|--|---|---|
| P1715   | Input speed sensor<br>(Primary speed sensor)<br>(TCM output) | Primary speed sensor signal is different<br>from the theoretical value calculated by<br>ECM from secondary sensor signal and<br>engine rpm signal. | <ul> <li>Harness or connectors<br/>(The CAN communication line is open or short-<br/>ed)</li> <li>Harness or connectors<br/>(Primary speed sensor circuit is open or short-<br/>ed)</li> <li>TCM</li> </ul> | Н |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

|  | J |
|--|---|
| If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-<br>ing the next test.                        |   |
| 1. Turn ignition switch OFF and wait at least 10 seconds.  | Κ |
| <ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>   |   |
| 3. Turnightion switch Of F and wait at least to seconds.   |   |
| >> GO TO 2.  | L |
| 2. PERFORM DTC CONFIRMATION PROCEDURE  |   |
| <ol> <li>Start engine.</li> <li>Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.</li> <li>Check 1st trip DTC.</li> </ol> | Μ |
| Is 1st trip DTC detected?  | Ν |
| YES >> Go to <u>EC-389, "Diagnosis Procedure"</u> .<br>NO >> INSPECTION END  |   |
| Diagnosis Procedure  | 0 |
| 1.снеск отс with тсм   | Р |
| Check DTC with TCM. Refer to TM-129, "DTC Index".  |   |
| Is the inspection result normal?   |   |
| YES >> GO TO 2.  |   |
| NO >> Perform trouble shooting relevant to DTC indicated.  |   |
| 2.REPLACE TCM  |   |

Replace TCM. Refer to TM-163, "Removal and Installation".

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>> INSPECTION END

# P1720 VSS

# Description

ECM receives two vehicle speed signals via the CAN communication line. One is sent from "ABS actuator and EC electric unit (control unit)" via combination meter, and the other is from TCM (Transmission control module). ECM uses these signals for engine control.

# DTC Logic

DTC DETECTION LOGIC NOTE:

- If DTC P1720 is displayed with DTC UXXXX first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1720 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-346, "DTC Logic".

| DTC No. | Trouble diagnosis name               | DTC detecting condition   | Possible cause  | -      |
|---------|--------------------------------------|---|---|--------|
| P1720   | Vehicle speed sensor<br>(TCM output) | The difference between two vehicle speed signals is out of the specified range. | <ul> <li>Harness or connectors<br/>(Secondary speed sensor circuit is open or<br/>shorted.)</li> <li>Harness or connectors<br/>(Wheel sensor circuit is open or shorted.)</li> <li>TCM</li> <li>Secondary speed sensor</li> <li>ABS actuator and electric unit (control unit)</li> <li>Wheel sensor</li> <li>Combination meter</li> </ul> | F<br>G |

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON. 2.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- Drive vehicle at a speed of 20 km/h (12 MPH) or more for at least 5 seconds without depressing the brake 2. pedal depressing.
- Check 1st trip DTC.
- Is 1st trip DTC detected?
- >> Go to EC-391, "Diagnosis Procedure". YES

NO >> INSPECTION END

# Diagnosis Procedure

# CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-129, "DTC Index".

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Perform trouble shooting relevant to DTC indicated.

2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to BRC-102, "DTC No. Index".

Is the inspection result normal?

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YES >> GO TO 3. NO >> perform trouble shooting relevant to DTC indicated.

3. CHECK COMBINATION METER FUNCTION

Refer to <u>MWI-75, "DTC Index"</u>.

>> INSPECTION END

# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < COMPONENT DIAGNOSIS >

# P1800 VIAS CONTROL SOLENOID VALVE 1

# Description

The VIAS control solenoid valve 1 cuts the intake manifold vacuum signal for power valve 1 control. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and sends the vacuum signal to the power valve actuator 1.

# DTC Logic

INFOID:000000003388185

# DTC DETECTION LOGIC

| DTC No.   | Trouble diagnosis name  | DTC detecting condition   | Possible cause  |
|---|---|---|---|
| P1800   | VIAS control solenoid valve 1<br>circuit  | An excessively low or high voltage signal<br>is sent to ECM through the VIAS control<br>solenoid valve 1. | <ul> <li>Harness or connectors<br/>(The solenoid valve 1 circuit is open or<br/>shorted.)</li> <li>VIAS control solenoid valve 1</li> </ul> |
| DTC CON   | FIRMATION PROCEDU   | RE  |   |
| 1.condi   | TIONING   |   |   |
| ing the nex<br>1. Turn ig<br>2. Turn ig<br>3. Turn ig<br><b>TESTING</b> | kt test.<br>gnition switch OFF and wait<br>gnition switch ON.<br>gnition switch OFF and wait<br><b>CONDITION:</b> | at least 10 seconds.  | erform the following before conduct-<br>s more than 11 V at idle.   |
| >   | > GO TO 2.  |   |   |
| 2.perfc   | ORM DTC CONFIRMATION  | PROCEDURE   |   |
|   | engine and let it idle for at le  | ast 5 seconds.  |   |
|   | DTC detected?   |   |   |
| YES >   | > Go to <u>EC-393, "Diagnosis</u>   | <u>Procedure"</u> .   |   |
|   | > INSPECTION END  |   |   |
| Jiagnos   | is Procedure  |   | INFOID:000000003388186  |
| <b>1.</b> CHECK   | VIAS CONTROL SOLEN  | DID VALVE 1 POWER SUPPLY CIR  | CUIT  |
|   | gnition switch OFF.   |   |   |
|   |   | valve 1 harness connector.  |   |
|   |   |   |   |
| 3. Turn ig  | gnition switch ON.<br>the voltage between VIAS  | control solenoid valve 1 harness co   | nnector and ground.   |
| 3. Turn ig<br>4. Check  | the voltage between VIAS  | control solenoid valve 1 harness co   | nnector and ground.   |
| <ol> <li>Turn ig</li> <li>Check</li> <li>VIAS c</li> </ol>              | the voltage between VIAS  |   | nnector and ground.   |
| <ol> <li>Turn ig</li> <li>Check</li> </ol>                              | the voltage between VIAS  |   | nnector and ground.   |

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

# 2.CHECK VIAS CONTROL SOLENOID VALVE 1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < COMPONENT DIAGNOSIS >

3. Check the continuity between VIAS control solenoid valve 1 harness connector and ECM harness connector.

| VIAS control s | olenoid valve 1 | ECM       |          | Continuity |
|----------------|-----------------|-----------|----------|------------|
| Connector      | Terminal        | Connector | Terminal | Continuity |
| F74            | 2               | F7        | 27       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 3.

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

# **3.**CHECK VIAS CONTROL SOLENOID VALVE 1

Refer to EC-394, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace VIAS control solenoid valve 1.

**4.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

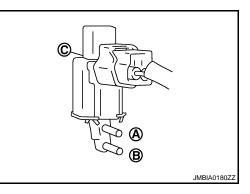
#### **Component Inspection**

# 1.CHECK VIAS CONTROL SOLENOID VALVE 1

#### With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect vacuum hoses connected to VIAS control solenoid valve 1.
- 4. Turn ignition switch ON.
- 5. Select "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT-III.
- 6. Check air passage continuity and operation delay time under the following conditions.

| Condition<br>(VIAS S/V-1) | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|---------------------------|--|--|
| ON                        | Existed                                    | Not existed                                |
| OFF                       | Not existed                                | Existed                                    |



#### Without CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 1.

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# **P1800 VIAS CONTROL SOLENOID VALVE 1**

# < COMPONENT DIAGNOSIS >

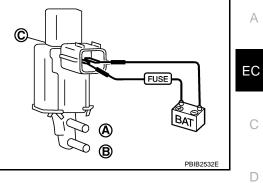
Check air passage continuity and operation delay time under the 4. following conditions.

| Condition   | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|---|--|--|
| 12 V direct current supply be-<br>tween terminals 1 and 2 | Existed                                    | Not existed                                |
| No supply   | Not existed                                | Existed                                    |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 1



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# P1801 VIAS CONTROL SOLENOID VALVE 2

#### < COMPONENT DIAGNOSIS >

# P1801 VIAS CONTROL SOLENOID VALVE 2

# Description

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The VIAS control solenoid valve 2 cuts the intake manifold vacuum signal for power valve 2 control. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and sends the vacuum signal to the power valve actuator 2.

# DTC Logic

INFOID:000000003388189

# DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name                   | DTC detecting condition   | Possible cause  |
|---------|--|---|---|
| P1801   | VIAS control solenoid valve 2<br>circuit | An excessively low or high voltage signal<br>is sent to ECM through the VIAS control<br>solenoid valve 2. | <ul> <li>Harness or connectors<br/>(The solenoid valve 2 circuit is open or<br/>shorted.)</li> <li>VIAS control solenoid valve 2</li> </ul> |

# DTC CONFIRMATION PROCEDURE

# 1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-396, "Diagnosis Procedure".

NO >> INSPECTION END

# **Diagnosis Procedure**

INFOID:00000003388190

# 1. CHECK VIAS CONTROL SOLENOID VALVE 2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect VIAS control solenoid valve 2 harness connector.

3. Turn ignition switch ON.

4. Check the voltage between VIAS control solenoid valve 2 harness connector and ground.

| VIAS control s | olenoid valve 2 | Ground | Voltage         |  |
|----------------|-----------------|--------|-----------------|--|
| Connector      | Terminal        | Ground |                 |  |
| F75            | 1               | Ground | Battery voltage |  |

Is the inspection result normal?

YES >> GO TO 2.

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

# 2.CHECK VIAS CONTROL SOLENOID VALVE 2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

# P1801 VIAS CONTROL SOLENOID VALVE 2

#### < COMPONENT DIAGNOSIS >

 Check the continuity between VIAS control solenoid valve 2 harness connector and ECM harness connector.

| nector.  |                 |                   |                 |                 |                       | А  |
|--|-----------------|-------------------|-----------------|-----------------|-----------------------|----|
| VIAS control so                                  | olenoid valve 2 | EC                | M               | Oraștinuițu     |                       |    |
| Connector  | Terminal        | Connector         | Terminal        | Continuity      |                       | EC |
| F75  | 2               | F7                | 26              | Existed         |                       |    |
| 4. Also check                                    | harness for sh  | ort to ground an  | d short to powe | er.             |                       | С  |
| Is the inspection                                |                 | <u>?</u>          |                 |                 |                       |    |
| YES >> GO<br>NO >> Rer                           |                 | t short to group  | d or chort to p | wor in hornooc  | or connectore         |    |
| 3.CHECK VIAS                                     |                 | •                 | •               | ower in harness | or connectors.        | D  |
|  |                 |                   | /E 2            |                 |                       |    |
| Refer to EC-397                                  |                 |                   |                 |                 |                       | Е  |
| Is the inspection<br>YES >> GO                   |                 | <u> </u>          |                 |                 |                       |    |
|  | -               | trol solenoid va  | ve 2.           |                 |                       |    |
| 4.CHECK INTE                                     |                 |                   |                 |                 |                       | F  |
| Refer to <u>GI-40</u> ,                          |                 |                   |                 |                 |                       |    |
|  |                 |                   |                 |                 |                       | G  |
| >> INS   | PECTION ENI     | )                 |                 |                 |                       |    |
| Component  | Inspection      |                   |                 |                 | INFOID:00000003388191 | Н  |
| <b>1.</b> CHECK VIAS                             | S CONTROL S     |                   | /E 2            |                 |                       |    |
|  | ILT-III         |                   |                 |                 |                       | I  |
| 1. Turn ignitio                                  | n switch OFF.   |                   |                 |                 |                       |    |
|  |                 | nectors disconr   |                 | enoid valve 2   |                       |    |
| 4. Turn ignition                                 | n switch ON.    |                   |                 |                 |                       | J  |
|  |                 | TIVE TEST" mo     |                 |                 |                       | 1  |
| <ol> <li>Check air p<br/>following cc</li> </ol> |                 | ity and operatio  | n delay time ur | ider the        |                       | К  |
| iono inng oo                                     |                 |                   |                 |                 | C C                   |    |
| Condition  | a Air pa        | assage continuity | Air passage co  | ntinuity        |                       | 1  |
| (VIAS S/V-                                       | 2) betw         | veen (A) and (B)  | between (A) a   |                 |                       | L  |
| ON   |                 | Existed           | Not existe      | d               |                       | I  |
| OFF  |                 | Not existed       | Existed         |                 |                       | M  |
|  |                 |                   |                 |                 | Teto 🗿                |    |
|  |                 |                   |                 |                 | ~                     |    |

#### Without CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 2.

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# P1801 VIAS CONTROL SOLENOID VALVE 2

#### < COMPONENT DIAGNOSIS >

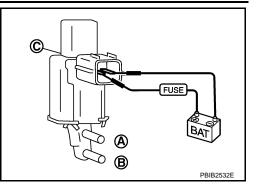
4. Check air passage continuity and operation delay time under the following conditions.

| Condition   | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|---|--|--|
| 12 V direct current supply be-<br>tween terminals 1 and 2 | Existed                                    | Not existed                                |
| No supply   | Not existed                                | Existed                                    |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 2



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# P1805 BRAKE SWITCH

# Description

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is being driven.

# DTC Logic

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## DTC DETECTION LOGIC

| DTC No.  | Trouble diagnosis name  | DTC detecting condition   | Possible cause   |
|--|---|---|--|
| P1805  | Brake switch  | A brake switch signal is not sent to ECM for ex-<br>tremely long time while the vehicle is being driv-<br>en. | <ul> <li>Harness or connectors<br/>(Stop lamp switch circuit is open or short-<br/>ed.)</li> <li>Stop lamp switch</li> </ul> |
| DTC CON  | FIRMATION PROC  | EDURE   |  |
| 1.PERFO  | RM DTC CONFIRMA   | TION PROCEDURE  |  |
| 2. Fully d<br>3. Erase f<br>4. Check<br><u>Is 1st trip D</u><br>YES >> | nition switch ON.<br>epress the brake peda<br>the DTC.<br>1st trip DTC.<br><u>)TC detected?</u><br>> Go to <u>EC-399, "Diag</u><br>> INSPECTION END | al for at least 5 seconds.<br>nosis Procedure".   |  |
| -  | s Procedure   |   | INFOID:000000003388194   |
|  |   |   | INF-012:00000003388194   |
| 1.CHECK  | STOP LAMP SWITCH  | H CIRCUIT   |  |
|  | nition switch OFF.<br>the stop lamp when d  | epressing and releasing the brake peda  | I.   |
| Brake  | e pedal Sto   | p lamp  |  |
|  | •   | luminated   |  |
|  |   | ninated   |  |
|  | ection result normal?   |   |  |
| NO >>  | > GO TO 4.<br>> GO TO 2.  |   |  |
|  |   | H POWER SUPPLY CIRCUIT  |  |
|  | nect stop lamp switch   | harness connector.<br>stop lamp switch harness connector and  | around   |
| 2. Oncok   | the voltage between a   |   | ground.  |
|  |   |   |  |
|  |   |   |  |

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# P1805 BRAKE SWITCH

#### < COMPONENT DIAGNOSIS >

| Vehicle serial number   | Stop lamp switch |          | Ground | Voltage         |
|-------------------------|------------------|----------|--------|-----------------|
| venicle senai number    | Connector        | Terminal | Giouna | vollage         |
| Up to JN8AZ18U*9W100000 |                  |          |        |                 |
| Up to JN8AZ18U*9W710000 | F115             | 3        |        |                 |
| Up to JN8AZ18W*9W200000 | LIIJ             | 5        |        |                 |
| Up to JN8AZ18W*9W810000 |                  |          | Ground | Battory voltago |
| From JN8AZ18U*9W100001  |                  |          | Giouna | Battery voltage |
| From JN8AZ18U*9W710001  | E116             | 1        |        |                 |
| From JN8AZ18W*9W200001  | E110             | I        |        |                 |
| From JN8AZ18W*9W810001  |                  |          |        |                 |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

• Fuse block (J/B) connector E103

10 A fuse (No. 7)

• Harness for open or short between battery and stop lamp switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

# 4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.

2. Disconnect ECM harness connector.

3. Check the continuity between stop lamp switch harness connector and ECM harness connector.

| Vehicle serial number   | Stop larr | np switch | EC        | CM       | Continuity |
|-------------------------|-----------|-----------|-----------|----------|------------|
| Venicle Senai number    | Connector | Terminal  | Connector | Terminal | Continuity |
| Up to JN8AZ18U*9W100000 |           |           |           |          |            |
| Up to JN8AZ18U*9W710000 | E115      | 4         |           |          |            |
| Up to JN8AZ18W*9W200000 | EIIS      | 4         |           | 106      | Existed    |
| Up to JN8AZ18W*9W810000 |           |           | E16       |          |            |
| From JN8AZ18U*9W100001  |           |           | E 10      | 100      | Existed    |
| From JN8AZ18U*9W710001  | E116      | 2         |           |          |            |
| From JN8AZ18W*9W200001  |           | Z         |           |          |            |
| From JN8AZ18W*9W810001  |           |           |           |          |            |

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the following.

• Fuse block (J/B) connector E103

• Harness for open or short between ECM and stop lamp switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

**6.**CHECK STOP LAMP SWITCH

Refer to EC-401. "Component Inspection (Stop Lamp Switch)".

# **P1805 BRAKE SWITCH**

|  |             | P1805       | BRAKE SWI          | ICH                |                       |    |
|--|-------------|-------------|--------------------|--------------------|-----------------------|----|
| < COMPONENT DIAGN  | SIS >       |             |                    |                    | [VQ35DE]              |    |
| Is the inspection result no  | rmal?       |             |                    |                    |                       |    |
| YES >> GO TO 7.  |             |             |                    |                    |                       | А  |
| NO >> Replace stop   | -           |             |                    |                    |                       |    |
| <b>1.</b> CHECK INTERMITTEN  | NT INCIDE   | NT          |                    |                    |                       | EC |
| Refer to GI-40, "Intermitte  | nt Incident | "           |                    |                    |                       | EC |
| >> INSPECTION  | END         |             |                    |                    |                       | С  |
| Component Inspection   | on (Stop    | Lamp Sv     | vitch)             |                    | INFOID:00000003591766 |    |
| 1.CHECK STOP LAMP S  | · ·         |             | ·····,             |                    |                       | D  |
|  |             |             |                    |                    |                       | D  |
| <ol> <li>Turn ignition switch O</li> <li>Disconnect stop lamp</li> </ol> |             | rness conne | ctor               |                    |                       |    |
| <ol> <li>Check harness contin</li> </ol>                                 |             |             |                    | s under the follow | ring conditions.      | Е  |
|  | •           |             |                    |                    |                       |    |
| Vehicle serial number  | Terminals   | C           | Condition          | Continuity         |                       | F  |
| Up to JN8AZ18U*9W100000  |             |             | Fully released     | Not existed        |                       | Г  |
| Up to JN8AZ18U*9W710000  | 3 and 4     |             | Fully released     | NOT EXISTED        |                       |    |
| Up to JN8AZ18W*9W200000  | 5 anu 4     |             | Slightly depressed | Existed            |                       | G  |
| Up to JN8AZ18W*9W810000  |             | Brake pedal | Signity depressed  | Existed            |                       |    |
| From JN8AZ18U*9W100001   |             | Diake peual | Fully released     | Not existed        |                       |    |
| From JN8AZ18U*9W710001   | 1 and 2     |             | Fully released     | NOT EXISTED        |                       | Н  |
| From JN8AZ18W*9W200001   | 1 and 2     |             | Clightly depressed | Existed            |                       |    |
| From JN8AZ18W*9W810001   |             |             | Slightly depressed | Existed            |                       |    |
| Is the inspection result no  | rmal?       |             |                    |                    |                       |    |
| YES >> INSPECTION  | END         |             |                    |                    |                       |    |
| NO >> GO TO 2.   |             |             |                    |                    |                       | J  |
| 2.CHECK STOP LAMP S  | SWITCH-II   |             |                    |                    |                       |    |
| 1. Adjust stop lamp swite  |             |             |                    |                    |                       | К  |
| 2. Check harness contin  | uity betwe  | en stop lam | p switch terminals | s under the follow | ing conditions.       |    |
| Vehicle serial number  | Terminals   | 0           | Condition          | Continuity         |                       |    |
| Up to JN8AZ18U*9W100000  | Terrinidis  |             |                    | Continuity         |                       | L  |
| Up to JN8AZ18U*9W710000  |             |             | Fully released     | Not existed        |                       |    |
| Up to JN8AZ18W*9W200000  | 3 and 4     |             |                    |                    |                       | Μ  |
| Up to JN8AZ18W*9W810000  |             |             | Slightly depressed | Existed            |                       |    |
| From JN8AZ18U*9W100001   |             | Brake pedal |                    |                    |                       |    |
| From JN8AZ18U*9W710001   |             |             | Fully released     | Not existed        |                       | Ν  |
| From JN8AZ18W*9W200001   | 1 and 2     |             |                    |                    |                       |    |
| From JN8AZ18W*9W810001   |             |             | Slightly depressed | Existed            |                       | 0  |
| Is the inspection result not   | rmal?       |             |                    |                    |                       | 0  |
| YES >> INSPECTION  |             |             |                    |                    |                       |    |
| NO >> Replace stop   |             | ch.         |                    |                    |                       | Ρ  |

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

#### < COMPONENT DIAGNOSIS >

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

## Description

INFOID:000000003388196

[VQ35DE]

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is controlled ON/OFF by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

## DTC Logic

INFOID:000000003388197

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name                     | DTC detecting condition   | Possible cause  |
|---------|--|---|---|
| P2100   | Throttle control motor relay circuit open  | ECM detects that the voltage of power source for throttle control motor is excessively low. | <ul> <li>Harness or connectors<br/>(Throttle control motor relay circuit is<br/>open)</li> <li>Throttle control motor relay</li> </ul>    |
| P2103   | Throttle control motor relay circuit short | ECM detects that the throttle control motor relay is stuck ON.                              | <ul> <li>Harness or connectors<br/>(Throttle control motor relay circuit is<br/>shorted)</li> <li>Throttle control motor relay</li> </ul> |

## DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

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

Witch DTC is detected?

P2100 >> GO TO 2. P2103 >> GO TO 3.

P2103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P2100

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

- YES >> Go to EC-402, "Diagnosis Procedure".
- NO >> INSPECTION END

## **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P2103

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Check DTC.

#### Is DTC detected?

- YES >> Go to EC-402, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

## **1.**CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

## EC-402

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

#### < COMPONENT DIAGNOSIS >

#### 3. Disconnect IPDM E/R harness connector.

4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDN      | IPDM E/R |           | ECM      |            |  |
|-----------|----------|-----------|----------|------------|--|
| Connector | Terminal | Connector | Terminal | Continuity |  |
| F12       | 70       | F7        | 15       | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 2.

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

## 2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDI      | IPDM E/R |           | ECM      |            |  |
|-----------|----------|-----------|----------|------------|--|
| Connector | Terminal | Connector | Terminal | Continuity |  |
| F12       | 54       | F7        | 2        | Existed    |  |

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

Is the inspection result normal?

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

1. Disconnect 15 A fuse (No. 51) from IPDM E/R.

2. Check if 15 A fuse is blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15 A fuse.

**4.**CHECK INTERMITTENT INCIDENT

#### Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

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#### < COMPONENT DIAGNOSIS >

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

## Description

INFOID:000000003388199

[VQ35DE]

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor. The throttle position sensor provides feedback to the ECM, when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

#### DTC Logic

INFOID:000000003388200

## DTC DETECTION LOGIC

NOTE:

If DTC P2101 is displayed with DTC P2100, first perform the trouble diagnosis for DTC P2100. Refer to <u>EC-402, "DTC Logic"</u>.

If DTC P2101 is displayed with DTC 2119, first perform the trouble diagnosis for DTC P2119. Refer to <u>EC-411, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name                | DTC detecting condition  | Possible cause  |
|---------|---------------------------------------|--|---|
| P2101   | Electric throttle control performance | Electric throttle control function does not oper-<br>ate properly. | <ul> <li>Harness or connectors<br/>(Throttle control motor circuit is open or<br/>shorted)</li> <li>Electric throttle control actuator</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

YES >> Go to <u>EC-404, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## **Diagnosis Procedure**

INFOID:000000003388201

#### **1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.

#### Is the inspection result normal?

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

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector terminals.

# EC-404

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|  | EC  | М   |  |                                |                        | A            |
|--|---|---|--|--------------------------------|------------------------|--------------|
|  | +   |   | _  | Condition                      | Voltage                |              |
| Connector  | Terminal  | Condition   | Terminal                                   | -                              |                        |              |
|  | -   | <b>5</b> 40   | 440  | Ignition switch OFF            | Approx. 0 V            | EC           |
| F7   | 2   | E16   | 112  | Ignition switch ON             | Battery voltage        |              |
| Is the insp  | ection resu   | It normal?  |  | l                              |                        | C            |
| -  | > GO TO 7   |   |  |                                |                        |              |
| •  | > GO TO 3   |   |  | _                              |                        | Γ            |
| <b>3.</b> CHECK  | ( THROTT  | LE CONT   | ROL MOT                                    | OR RELAY POW                   | ER SUPPLY CIRCUIT-I    | L            |
|  | gnition swit  |   | oonnootor                                  |                                |                        |              |
|  | nnect IPDN  |   |  |                                |                        | E            |
| 4. Check   | the contin  | uity betwe  | en IPDM                                    | E/R harness conr               | nector and ECM harness | s connector. |
|  |   |   |  | 1                              |                        | F            |
|  | PDM E/R   |   | EC   | (                              | Continuity             |              |
| Connecto   |   |   | onnector                                   | Terminal                       |                        |              |
| F12  | 70  |   | F7   | 15                             | Existed                | C            |
|  |   |   | 0  | nd and short to po             | ower.                  |              |
| •  | ection resu   |   | <u>,</u>                                   |                                |                        | ŀ            |
|  | > GO TO 4<br>> Repair o   |   | . short to                                 | around or short to             | power in harness or co |              |
|  | •   |   |  | -                              | T SIGNAL CIRCUIT-II    |              |
|  |   |   |  |                                | ector and ECM harness  |              |
| I. CHECK   |   |   |  | L/R namess com                 |                        |              |
| I  | PDM E/R   |   | EC   |                                |                        |              |
| Connecto   | or Term   | inal C  | onnector                                   | Terminal (                     | Continuity             |              |
| F12  | 54  | ļ   | F7   | 2                              | Existed                |              |
| 2. Also c  | heck harne  | ess for sho   | ort to grou                                | nd and short to po             | ower.                  | ŀ            |
| s the insp   | ection resu   | lt normal?  | )  |                                |                        |              |
|  |   | in norman.  | -  |                                |                        |              |
| YES >  |   | 5.  | -  |                                |                        |              |
| NO >   | > Repair o  | 5.  | -  | ground or short to             | power in harness or co | nnectors.    |
| NO >   | > Repair o  | 5.  | -  | ground or short to             | power in harness or co | nnectors.    |
| NO ><br>D.CHECK  | > Repair o<br>K FUSE<br>nnect 15 A  | i.<br>pen circuit<br>fuse (No.  | , short to<br>51) from                     |                                | power in harness or co |              |
| NO ><br>D.CHECk<br>1. Discor<br>2. Check   | > Repair o<br>K FUSE<br>nnect 15 A<br>k if 15 A fus   | i.<br>pen circuit<br>fuse (No.<br>se is blowr   | 51) from                                   |                                | power in harness or co |              |
| NO ><br>D.CHECk<br>1. Discor<br>2. Check<br>s the insp   | > Repair o<br>K FUSE<br>nnect 15 A<br>k if 15 A fus<br>ection resu  | i.<br>pen circuit<br>fuse (No.<br>se is blowr<br>ilt normal?  | 51) from                                   |                                | power in harness or co | P            |
| NO ><br>D.CHECk<br>1. Discor<br>2. Check<br>s the insp<br>YES >  | > Repair o<br>K FUSE<br>nnect 15 A<br>k if 15 A fus   | fuse (No.<br>fuse (No.<br>se is blowr<br>ilt normal?  | 51) from                                   |                                | power in harness or co | P            |
| NO ><br>5.CHECk<br>1. Discor<br>2. Check<br>s the insp<br>YES ><br>NO >  | > Repair o<br>K FUSE<br>nnect 15 A<br>k if 15 A fus<br>ection resu<br>> GO TO 6   | 5.<br>pen circuit<br>fuse (No.<br>se is blowr<br>ilt normal?<br>5.<br>15 A fuse   | 51) from                                   |                                | power in harness or co | P            |
| NO ><br>D.CHECK<br>1. Discor<br>2. Check<br>s the insp<br>YES ><br>NO ><br>D.CHECK   | > Repair of<br>(FUSE<br>nnect 15 A<br>(if 15 A fus<br>ection results)<br>> GO TO 6<br>> Replace<br>(INTERMI)  | 5.<br>pen circuit<br>fuse (No.<br>se is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN   | 51) from                                   |                                | power in harness or co | P            |
| NO ><br>D.CHECk<br>1. Discor<br>2. Check<br>s the insp<br>YES ><br>NO ><br>D.CHECk<br>Refer to G   | > Repair of<br>K FUSE<br>nnect 15 A<br>k if 15 A fus<br>ection resu<br>> GO TO 6<br>> Replace<br>K INTERMI<br>1-40, "Inter  | fuse (No.<br>se is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Inc   | 51) from<br>CIDENT                         |                                | power in harness or co | P            |
| NO ><br>D.CHECK<br>1. Discor<br>2. Check<br>s the insp<br>YES ><br>NO ><br>D.CHECK<br>Refer to G<br>s the insp   | > Repair of<br>(FUSE<br>nnect 15 A<br>(if 15 A fus<br>ection results)<br>> GO TO 6<br>> Replace<br>(INTERMI)  | fuse (No.<br>fuse (No.<br>se is blowr<br><u>alt normal?</u><br>5.<br>15 A fuse<br>TTENT IN<br><u>mittent Inc</u><br>alt normal?   | 51) from<br>51) from<br>CIDENT             |                                | power in harness or co | Γ            |
| NO ><br>5.CHECk<br>1. Discou<br>2. Check<br>s the insp<br>YES ><br>6.CHECk<br>Refer to G<br>s the insp<br>YES ><br>NO >  | > Repair of<br>K FUSE<br>nnect 15 A<br>if 15 A fus<br>ection resu<br>> GO TO 6<br>> Replace<br>( INTERMI<br>I-40, "Inter<br>ection resu<br>> Replace<br>> Replace   | fuse (No.<br>fuse (No.<br>e is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Inc<br>ilt normal?<br>IPDM E/R<br>r replace h   | 51) from<br>51) from<br>CIDENT             | IPDM E/R.                      | ·                      |              |
| NO ><br>5.CHECk<br>1. Discou<br>2. Check<br>Is the insp<br>YES ><br>6.CHECk<br>Refer to G<br>Is the insp<br>YES ><br>NO >  | > Repair of<br>K FUSE<br>nnect 15 A<br>if 15 A fus<br>ection resu<br>> GO TO 6<br>> Replace<br>( INTERMI<br>I-40, "Inter<br>ection resu<br>> Replace<br>> Replace   | fuse (No.<br>fuse (No.<br>e is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Inc<br>ilt normal?<br>IPDM E/R<br>r replace h   | 51) from<br>51) from<br>CIDENT             | IPDM E/R.                      | Dower in harness or co |              |
| NO ><br>5.CHECk<br>1. Discor<br>2. Check<br>Is the insp<br>YES ><br>6.CHECk<br>Refer to G<br>Is the insp<br>YES ><br>7.CHECk<br>1. Turn ig   | > Repair of   | fuse (No.<br>fuse (No.<br>e is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Inc<br>ilt normal?<br>IPDM E/R<br>r replace h<br>LE CONT<br>cch OFF.                  | 51) from<br>51) from<br>CIDENT<br>CIDENT   | r connectors.                  | SNAL CIRCUIT FOR OP    |              |
| NO ><br>5.CHECK<br>1. Discor<br>2. Check<br>1. Discor<br>2. Check<br>1. Turn ig<br>2. CHECK<br>1. Turn ig<br>2. Discor   | > Repair of<br>K FUSE<br>nnect 15 A<br>G f 15 A fus<br>ection resu<br>> GO TO 6<br>> Replace<br>( INTERMI<br>I-40, "Inter<br>ection resu<br>> Replace<br>> Replace | fuse (No.<br>se is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Inc<br>ilt normal?<br>IPDM E/R<br>r replace f<br>LE CONT<br>ch OFF.<br>ric throttle               | 51) from<br>51) from<br>CIDENT<br>cident". | r connectors.<br>OR OUTPUT SIG | SNAL CIRCUIT FOR OP    |              |
| NO ><br>D.CHECK<br>I. Discor<br>2. Check<br>s the insp<br>YES ><br>D.CHECK<br>Refer to G<br>s the insp<br>YES ><br>NO ><br>D.CHECK<br>Refer to G<br>s the insp<br>YES ><br>NO ><br>D.CHECK<br>I. Turn ig<br>2. Discor<br>3. Discor | > Repair of   | fuse (No.<br>se is blowr<br>ilt normal?<br>5.<br>15 A fuse<br>TTENT IN<br>mittent Ind<br>ilt normal?<br>IPDM E/R<br>r replace f<br>LE CONT<br>ch OFF.<br>ric throttle<br>harness of | 51) from<br>51) from<br>CIDENT<br>CIDENT   | r connectors.<br>OR OUTPUT SIG | NAL CIRCUIT FOR OP     |              |

# EC-405

#### < COMPONENT DIAGNOSIS >

| Electric throttle control actuator |          | ECM                |   | Continuity  |
|------------------------------------|----------|--------------------|---|-------------|
| Connector                          | Terminal | Connector Terminal |   | Continuity  |
|                                    | F29 6    | F7                 | 5 | Not existed |
| F20                                |          |                    | 6 | Existed     |
| 123                                |          |                    | 5 | Existed     |
|                                    |          |                    | 6 | Not existed |

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

Is the inspection result normal?

YES >> GO TO 8.

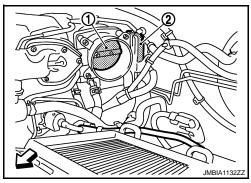
NO >> Repair or replace malfunctioning part.

## 8.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Remove the intake air duct.
- 2. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <a>: Vehicle front</a>

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



# 9. Check throttle control motor

Refer to EC-406, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace harness or connectors.

**11.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator.
- Refer to <u>EC-407</u>, "Special Repair Requirement".

#### >> INSPECTION END

## Component Inspection

1. CHECK THROTTLE CONTROL MOTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- 3. Check resistance between electric throttle control actuator terminals as per the following.

| Terminals | Resistance                        |
|-----------|-----------------------------------|
| 5 and 6   | Approx. 1 - 15 Ω [at 25°C (77°F)] |

Is the inspection result normal?

# EC-406

| < COMPONENT DIAGNOSIS > [VQ35D]   | E]   |
|---|------|
| YES >> INSPECTION END<br>NO >> GO TO 2.   | A    |
| 2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR  |      |
| <ol> <li>Replace electric throttle control actuator.</li> <li>Go to <u>EC-407, "Special Repair Requirement"</u>.</li> </ol>                 | EC   |
| >> INSPECTION END   | С    |
| Special Repair Requirement  | 8203 |
| 1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING<br>Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement" | D    |
| Relefito EC-17, THROTTLE VALVE CLOSED FOSTTON LEARNING . Special Repair Requirement   |      |
| >> GO TO 2.<br>2.PERFORM IDLE AIR VOLUME LEARNING   | E    |
| Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"   | F    |
| Relefito <u>LO-17, IDLE AIR VOLOME LEARNING : Special Repair Requirement</u>  | I    |
| >> END  | G    |
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# P2118 THROTTLE CONTROL MOTOR

## Description

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor. The throttle position sensor provides feedback to the ECM, when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

# DTC Logic

INFOID:000000003388205

## DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name                  | DTC detecting condition  | Possible cause  |
|---------|---|--|---|
| P2118   | Throttle control motor<br>circuit short | ECM detects short in both circuits between ECM and throttle control motor. | <ul> <li>Harness or connectors<br/>(Throttle control motor circuit is shorted.)</li> <li>Electric throttle control actuator<br/>(Throttle control motor)</li> </ul> |

## DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

- YES >> Go to EC-408. "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

## **1.**CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connections.

## 2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect electric throttle control actuator harness connector.
- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

INFOID-00000003388206

# P2118 THROTTLE CONTROL MOTOR

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|  | ontrol actuator  | EC  | N  | Continuity   |                         |
|--|--|---|--|--|-------------------------|
| Connector  | Terminal   | Connector   | Terminal   | Continuity   | _                       |
|  | <i>r</i>   |   | 5  | Not existed  |                         |
| 500  | 5  |   | 6  | Existed  |                         |
| F29  |  | F7  | 5  | Existed  | -                       |
|  | 6  |   | 6  | Not existed  |                         |
| 4. Also check  | harness for  | short to ground   | and short to p   | oower.   |                         |
| s the inspectio  |  | -   |  |  |                         |
| •  | ) TO 3.  |   |  |  |                         |
| NO >> Re   | pair or repla  | ce malfunctioni   | ng part.   |  |                         |
| <b>3.</b> снеск тн   | ROTTLE CO  | NTROL MOTO  | R  |  |                         |
| Refer to <u>EC-40</u>  | 9. "Compone  | ent Inspection".  |  |  |                         |
| Is the inspectio   |  |   |  |  |                         |
|  | ) TO 4.  |   |  |  |                         |
|  | D TO 5.  |   |  |  |                         |
| 4.CHECK INT  | ERMITTENT  | INCIDENT  |  |  |                         |
| Refer to <u>GI-40,</u>   | "Intermittent  | Incident".  |  |  |                         |
| Is the inspectio   |  |   |  |  |                         |
| •  | ) TO 5.  |   |  |  |                         |
| NO >> Re   | pair or repla  | ce harness or c   | onnectors.   |  |                         |
| <b>5.</b> replace e  | ELECTRIC T   | HROTTLE COI   | NTROL ACTU/  | ATOR   |                         |
| 1. Replace el  | ectric throttle  | e control actuate   | or.  |  |                         |
|  |  | Repair Require  |  |  |                         |
|  |  |   |  |  |                         |
|  |  |   |  |  |                         |
| >> INS   | SPECTION E   | END   |  |  |                         |
|  |  |   |  |  | INFOID:000000003591712  |
| Component  | Inspectio  | n   |  |  | INFOID:000000003591712  |
| Component  | Inspectio  | n   | R  |  | INFOID:000000003591712  |
| Component<br>1.CHECK THI   | Inspection<br>ROTTLE CO  | n<br>NTROL MOTO<br>F.   |  |  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro   | n<br>NTROL MOTO<br>F.<br>ttle control actu  | uator harness o  |  | INFOID:0000000003591712 |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro   | n<br>NTROL MOTO<br>F.<br>ttle control actu  | uator harness o  | connector.<br>cuator terminals as per the following. | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resi  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betwe   | n<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro  | uator harness o<br>ottle control act   |  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resist  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betwe   | NTROL MOTO<br>F.<br>een electric thro<br>R  | uator harness o<br>ottle control act<br>esistance  | tuator terminals as per the following.               | INFOID:000000003591712  |
| Component<br>1.CHECK THE<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betweens  | n<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1  | uator harness o<br>ottle control act   | tuator terminals as per the following.               | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspectio  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betwee<br>s<br>n result norm  | NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1   | uator harness o<br>ottle control act<br>esistance  | tuator terminals as per the following.               | INFOID:000000003591712  |
| Component<br>1.CHECK THF<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspectio<br>YES >> INS  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E   | NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1   | uator harness o<br>ottle control act<br>esistance  | tuator terminals as per the following.               | INFOID:000000003591712  |
| Component<br>1.CHECK THF<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resis<br>Terminals<br>5 and 6<br>Is the inspectio<br>YES >> INS<br>NO >> GC   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.  | n<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1<br>nal?<br>END   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)                                  | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THF<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspection<br>YES >> INS<br>NO >> GC<br>2.REPLACE E  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T  | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br><u>R</u><br>Approx. 1 - 1<br><u>nal?</u><br>END<br>HROTTLE COI  | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/                   | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resis<br>Terminals<br>5 and 6<br>s the inspectio<br>YES >> INS<br>NO >> GC<br>2.REPLACE E<br>1. Replace el  | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betwee<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle  | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br><u>R</u><br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.            | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitic<br>2. Disconnect<br>3. Check resis<br>Terminals<br>5 and 6<br>Is the inspectio<br>YES >> INS<br>NO >> GC<br>2.REPLACE E<br>1. Replace el   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance betwee<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle  | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br><u>R</u><br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.            | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspection<br>YES $>>$ INS<br>NO $>>$ GC<br>2.REPLACE E<br>1. Replace el-<br>2. Go to EC-4                                   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle<br>107, "Special  | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI<br>e control actuate<br>Repair Require   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.            | F)]  | INFOID:000000003591712  |
| Component<br>1. CHECK THI<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspectio<br>YES $>>$ INS<br>NO $>>$ GC<br>2. REPLACE E<br>1. Replace ell<br>2. Go to EC-4<br>>> INS                        | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle<br>107, "Special<br>SPECTION E                            | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI<br>e control actuate<br>Repair Require   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.            | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspection<br>YES $>>$ INS<br>NO $>>$ GC<br>2.REPLACE E<br>1. Replace el-<br>2. Go to EC-4                                   | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle<br>107, "Special<br>SPECTION E                            | N<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br>R<br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI<br>e control actuate<br>Repair Require   | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.            | F)]  | INFOID:000000003591712  |
| Component<br>1.CHECK THI<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspection<br>YES $>>$ INS<br>NO $>>$ GC<br>2.REPLACE E<br>1. Replace eli-<br>2. Go to EC-4<br>>> INS<br>Special Rep         | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle<br>107, "Special<br>SPECTION E<br>pair Requir             | n<br>NTROL MOTO<br>F.<br>ottle control actu<br>een electric thro<br><u>R</u><br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI<br>e control actuate<br>Repair Require<br>END<br>rement                 | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.<br>ement". | Truator terminals as per the following.              |                         |
| Component<br>1.CHECK THF<br>1. Turn ignitio<br>2. Disconnect<br>3. Check resist<br>Terminals<br>5 and 6<br>Is the inspection<br>YES >> INS<br>NO >> GC<br>2.REPLACE E<br>1. Replace el-<br>2. Go to EC-4<br>>> INS<br>Special Rep<br>1.PERFORM | Inspection<br>ROTTLE CO<br>on switch OF<br>t electric thro<br>stance between<br>s<br>n result norm<br>SPECTION E<br>D TO 2.<br>ELECTRIC T<br>ectric throttle<br>407, "Special<br>SPECTION E<br>bair Requir<br>THROTTLE | n<br>NTROL MOTO<br>F.<br>ottle control actu-<br>cen electric thro<br><u>R</u><br>Approx. 1 - 1<br>nal?<br>END<br>HROTTLE COI<br>e control actuato<br>Repair Require<br>END<br>Cement<br>VALVE CLOSE | uator harness o<br>ottle control act<br>esistance<br>5 Ω [at 25°C (77°)<br>NTROL ACTU/<br>or.<br>ement". | Truator terminals as per the following.              | INFOID:000000003388208  |

< COMPONENT DIAGNOSIS >

>> GO TO 2.

 $2. {\tt perform idle air volume learning}$ 

Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

#### < COMPONENT DIAGNOSIS >

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

## Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and sends the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and opens/closes the throttle valve in response to driving conditions via the throttle control motor.

## DTC Logic

## DTC DETECTION LOGIC

| DTC No.  | Trouble diagnosis name  |                    | DTC detecting condition   | Possible cause                     |
|--|---|--------------------|---|------------------------------------|
|  |   | A)                 | Electric throttle control actuator does not func-<br>tion properly due to the return spring malfunc-<br>tion. |                                    |
| P2119  | Electric throttle control actuator  |                    | Throttle valve opening angle in fail-safe mode is not in specified range.                                     | Electric throttle control actuator |
|  |   | C)                 | ECM detects that the throttle valve is stuck open.  |                                    |
| DTC CON  | FIRMATION PROC  | EDU                | RE  |                                    |
| 1.PRECC  | NDITIONING  |                    |   |                                    |
| ing the nex<br>1. Turn ig<br>2. Turn ig                                    |   | d wait             |   | In the following before conduct-   |
| ~  | > GO TO 2.<br>RM DTC CONFIRMA   | ΓΙΟΝ               | PROCEDURE FOR MALFUNCTION A   | AND B                              |
| 2. Shift s<br>3. Shift s   | nition switch ON and<br>elector lever to the D p<br>elector lever to the P p<br>nition switch OFF and | oositio<br>oositio | on and wait at least 3 seconds.<br>on.  |                                    |
| <ol> <li>6. Shift set</li> <li>7. Shift set</li> <li>8. Turn ig</li> </ol> | elector lever to the P p<br>pnition switch OFF, wa  | oositio<br>oositio | on and wait at least 3 seconds.   |                                    |
| 9. Check<br>Is DTC det   | -   |                    |   |                                    |
| YES >:   | > Go to <u>EC-412, "Diag</u> > GO TO 3.   | nosis              | Procedure".   |                                    |
| 3.PERFO  | RM DTC CONFIRMA   | TION               | PROCEDURE FOR MALFUNCTION C   |                                    |
| <ol> <li>Shift so</li> <li>Shift so</li> </ol>                             | elector lever to the N o  | oositio<br>or P p  | on and wait at least 3 seconds.<br>osition.   |                                    |
| Is DTC det   | ected?  |                    |   |                                    |

- YES >> Go to EC-412, "Diagnosis Procedure".
- NO >> INSPECTION END

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# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

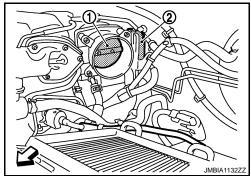
## < COMPONENT DIAGNOSIS >

## Diagnosis Procedure

INFOID:000000003630929

# 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct.
- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <a>: Vehicle front</a>
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



# **2.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator.
- 2. Go to EC-360, "Special Repair Requirement".

#### >> INSPECTION END

#### Special Repair Requirement

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

#### < COMPONENT DIAGNOSIS >

P2122, P2123 APP SENSOR

## Description

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 signals 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 engine operations such as fuel cut.

## DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-347, "DTC Logic"</u>.

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause   | ŀ |
|---------|--|---|--|---|
| P2122   | Accelerator pedal posi-<br>tion sensor 1 circuit low<br>input  | An excessively low voltage from the APP sensor 1 is sent to ECM.  | <ul> <li>Harness or connectors<br/>(APP sensor 1 circuit is open or shorted.)</li> </ul> |   |
| P2123   | Accelerator pedal posi-<br>tion sensor 1 circuit high<br>input | An excessively high voltage from the APP sensor 1 is sent to ECM. | <ul> <li>Accelerator pedal position sensor<br/>(APP sensor 1)</li> </ul>                 | 1 |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 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 <u>EC-413. "Diagnosis Procedure"</u>.

NO >> INSPECTION END

## Diagnosis Procedure

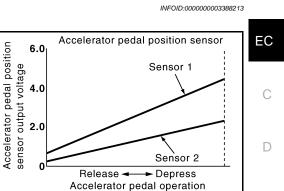
**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in <u>GI-43, "Circuit Inspection"</u>.

Is the inspection result normal?

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# P2122, P2123 APP SENSOR

< 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 s     | sensor             | Ground | Voltage (V) |
|-----------|--------------------|--------|-------------|
| Connector | Connector Terminal |        | voltage (v) |
| E110      | 4                  | Ground | Approx. 5   |

Is the inspection result normal?

YES >> GO TO 3.

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

## ${f 3.}$ CHECK APP SENSOR 1 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.

| APP       | sensor   | E         | СМ       | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| E110      | 2        | E16       | 84       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

| APP       | sensor   | E         | СМ       | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| E110      | 3        | E16       | 81       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK APP SENSOR

Refer to EC-415, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.

2. Refer to EC-415, "Special Repair Requirement".

#### >> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

# P2122, P2123 APP SENSOR

#### < COMPONENT DIAGNOSIS >

#### >> INSPECTION END

## **Component Inspection**

# $1. CHECK \ ACCELERATOR \ PEDAL \ POSITION \ SENSOR$

#### 1. Reconnect all harness connectors disconnected.

- 2. Turn ignition switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

|  | EC  |  |  |                   |                               |                 |                |                |           |
|--|---|--|--|-------------------|-------------------------------|-----------------|----------------|----------------|-----------|
|  | +   |  | _  | Condition Vo      |                               | Voltage (V)     |                |                |           |
| Connector  | Terminal  | Connector  | Terminal                                     |                   |                               |                 |                |                |           |
|  | 81<br>(APP consor 1 cig   |  |  |                   | 84                            |                 | Fully released | Fully released | 0.5 - 1.0 |
| _  | (APP sensor 1 sig-<br>nal)  | _  | (Sensor ground)                              |                   | Fully depressed               | 4.2 - 4.8       |                |                |           |
| E16  | 82  | E16  | 100  | Accelerator pedal | elerator pedal Fully released | 0.25 - 0.50     |                |                |           |
|  | (APP sensor 2 sig-<br>nal)  |  | (Sensor ground)                              |                   | Fully depressed               | 2.0 - 2.5       |                |                |           |
| Is the inspe   | ction result norma  | <u>al?</u>   |  |                   |                               |                 |                |                |           |
| -  | INSPECTION EN   | ND   |  |                   |                               |                 |                |                |           |
| <b>-</b>   | GO TO 2.  |  |  |                   |                               |                 |                |                |           |
|  | E ACCELERATC  |  |  |                   |                               |                 |                |                |           |
|  | e accelerator ped<br>C-415, "Special F  |  |  |                   |                               |                 |                |                |           |
|  |   |  |  |                   |                               |                 |                |                |           |
|  |   |  |  |                   |                               |                 |                |                |           |
| >>   | INSPECTION EN   |  |  |                   |                               |                 |                |                |           |
|  |   | ND   |  |                   |                               | INF01D:00000000 |                |                |           |
| Special R  | epair Require   | ND<br>ement  |  |                   |                               | INF01D:00000000 |                |                |           |
| Special R  |   | ND<br>ement  |  | SITION LEARNI     | NG                            | INF01D:00000000 |                |                |           |
| Special R<br>1.perfor  | epair Require   | ND<br>ement<br>DR PEDAL                                      | RELEASED PC                                  |                   |                               |                 |                |                |           |
| Special R<br>1.PERFOF<br>Refer to <u>EC</u>  | Repair Require  | ND<br>ement<br>DR PEDAL                                      | RELEASED PC                                  |                   |                               |                 |                |                |           |
| Special R<br>1.PERFOF<br>Refer to <u>EC</u><br>>>  | Repair Require<br>RM ACCELERATO<br>-17. "ACCELERA<br>GO TO 2.   | ND<br>ement<br>DR PEDAL<br>TOR PEDA                          | RELEASED PC                                  | POSITION LEAR     |                               |                 |                |                |           |
| Special R<br>1.PERFOF<br>Refer to <u>EC</u><br>>><br>2.PERFOF  | Cepair Require<br>RM ACCELERATO<br>-17. "ACCELERA<br>GO TO 2.<br>RM THROTTLE V  | ND<br>ement<br>DR PEDAL<br><u>TOR PEDA</u><br>ALVE CLOS      | RELEASED PC<br>AL RELEASED F<br>SED POSITION | POSITION LEAR     | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to <u>EC</u><br>>><br>2.PERFOF  | Repair Require<br>RM ACCELERATO<br>-17. "ACCELERA<br>GO TO 2.   | ND<br>ement<br>DR PEDAL<br><u>TOR PEDA</u><br>ALVE CLOS      | RELEASED PC<br>AL RELEASED F<br>SED POSITION | POSITION LEAR     | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to EC<br>>><br>2.PERFOF<br>Refer to EC                                  | Cepair Require<br>RM ACCELERATO<br>-17, "ACCELERA<br>GO TO 2.<br>RM THROTTLE V<br>-17, "THROTTLE                                  | ND<br>ement<br>DR PEDAL<br><u>TOR PEDA</u><br>ALVE CLOS      | RELEASED PC<br>AL RELEASED F<br>SED POSITION | POSITION LEAR     | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to EC<br>>><br>2.PERFOF<br>Refer to EC<br>>>                            | Cepair Require<br>RM ACCELERATO<br>-17. "ACCELERATO<br>GO TO 2.<br>RM THROTTLE V<br>-17. "THROTTLE<br>GO TO 3.                    | ND<br>Ement<br>DR PEDAL<br>TOR PEDA<br>ALVE CLO              | RELEASED PC                                  | POSITION LEAR     | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to EC<br>>><br>2.PERFOF<br>Refer to EC<br>>><br>3.PERFOF                | Cepair Require<br>RM ACCELERATO<br>-17, "ACCELERATO<br>GO TO 2.<br>RM THROTTLE V<br>-17, "THROTTLE<br>GO TO 3.<br>RM IDLE AIR VOL | ND<br>Ement<br>DR PEDAL<br>TOR PEDA<br>ALVE CLOS<br>VALVE CL | RELEASED PC                                  | POSITION LEARN    | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to EC<br>>><br>2.PERFOF<br>Refer to EC<br>>><br>3.PERFOF                | Cepair Require<br>RM ACCELERATO<br>-17. "ACCELERATO<br>GO TO 2.<br>RM THROTTLE V<br>-17. "THROTTLE<br>GO TO 3.                    | ND<br>Ement<br>DR PEDAL<br>TOR PEDA<br>ALVE CLOS<br>VALVE CL | RELEASED PC                                  | POSITION LEARN    | NING : Special R              | epair Requireme |                |                |           |
| Special R<br>1.PERFOF<br>Refer to EC<br>>><br>2.PERFOF<br>Refer to EC<br>>><br>3.PERFOF<br>Refer to EC | Cepair Require<br>RM ACCELERATO<br>-17, "ACCELERATO<br>GO TO 2.<br>RM THROTTLE V<br>-17, "THROTTLE<br>GO TO 3.<br>RM IDLE AIR VOL | ND<br>Ement<br>DR PEDAL<br>TOR PEDA<br>ALVE CLOS<br>VALVE CL | RELEASED PC                                  | POSITION LEARN    | NING : Special R              | epair Requireme |                |                |           |

Ρ

EC

С

#### < COMPONENT DIAGNOSIS >

## P2127, P2128 APP SENSOR

## Description

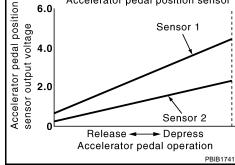
The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

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 signals 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 engine operations such as fuel cut.

## DTC Logic

#### DTC DETECTION LOGIC



6.0

Accelerator pedal position sensor

Sensor 1

INFOID:00000003388219

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P2127   | Accelerator pedal posi-<br>tion sensor 2 circuit low<br>input  | An excessively low voltage from the APP sen-<br>sor 2 is sent to ECM. | Harness or connectors     (APP sensor 2 circuit is open or shorted.)     [CKP sensor (POS) circuit is shorted.]  |
| P2128   | Accelerator pedal posi-<br>tion sensor 2 circuit high<br>input | An excessively high voltage from the APP sensor 2 is sent to ECM.     | <ul> <li>(Refrigerant pressure sensor circuit is shorted.)</li> <li>(EVAP control system pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

Turn ignition switch OFF and wait at least 10 seconds. 3.

## **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

- Start engine and let it idle for 1 second. 1.
- 2. Check DTC.
- Is DTC detected?
- YES >> Go to EC-416, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

#### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". 2.

#### EC-416

2009 Murano

INFOID:000000003388220

# P2127, P2128 APP SENSOR

|                                |               | P2                | 127, P212           | O APP SENS                                  | UR                  |          |
|--------------------------------|---------------|-------------------|---------------------|---|---------------------|----------|
| < COMPON                       | NENT DIAG     | SNOSIS >          |                     |   |                     | [VQ35DE] |
| Is the inspe                   | ction result  | normal?           |                     |   |                     |          |
|                                | GO TO 2.      |                   |                     |   |                     | A        |
| •                              |               | eplace ground o   |                     |   |                     |          |
| 2.CHECK                        | APP SENS      | OR 2 POWER S      | SUPPLY CIRC         | CUIT-I                                      |                     |          |
| 1. Disconr                     | nect accelei  | ator pedal posit  | ion (APP) ser       | sor harness conr                            | ector.              | EC       |
|                                | nition switch |                   |                     |   |                     |          |
| 3. Check t                     | the voltage   | between APP s     | ensor narness       | s connector and g                           | rouna.              | С        |
|                                | APP sensor    |                   |                     |   |                     |          |
| Connecto                       |               | G                 | round V             | /oltage (V)                                 |                     |          |
| E110                           |               |                   | round               |   |                     | D        |
| -                              | ation requilt |                   | lound               | Approx. 5                                   |                     |          |
| <u>Is the inspe</u><br>YES >>  | GO TO 6.      | <u>normar :</u>   |                     |   |                     | Е        |
| -                              | GO TO 3.      |                   |                     |   |                     |          |
| 3.снеск                        | APP SENS      | OR 2 POWER S      | SUPPLY CIRC         | CUIT-II                                     |                     |          |
|                                | nition switch |                   |                     |   |                     | F        |
|                                |               | arness connect    | or.                 |   |                     |          |
| 3. Check t                     | the continui  | ty between APF    | sensor harne        | ess connector and                           | ECM harness connect | ctor.    |
|                                |               |                   |                     |   |                     | G        |
| APF                            | o sensor      | E                 | СМ                  | Continuity                                  |                     |          |
| Connector                      | Termina       | Connector         | Terminal            |   |                     | Н        |
| E110                           | 5             | E16               | 87                  | Existed                                     |                     |          |
| Is the inspe                   |               | normal?           |                     |   |                     |          |
|                                | GO TO 4.      |                   |                     |   |                     |          |
| 4                              | Repair ope    |                   |                     |   |                     |          |
|                                |               | OWER SUPPL        |                     |   |                     | J        |
| Check harn                     | ess for sho   | t to power and    | short to groun      | d, between the fo                           | llowing terminals.  |          |
|                                | ~ ~ ~         |                   |                     |   | <u> </u>            |          |
|                                | CM            |                   |                     | ensor                                       |                     | K        |
| Connector                      | Terminal      |                   | ame                 | Connector                                   | Terminal            |          |
| F8                             | 72            | Refrigerant press |                     | E300  | 1                   |          |
|                                | 76            | CKP sensor (POS   | 5)                  | F20   | 1                   | L        |
| E16                            | 87            | APP sensor        |                     | E110  | 5                   |          |
|                                | 91            | EVAP control sys  | em pressure sen     | isor B17                                    | 3                   | M        |
| Is the inspe                   |               | normal?           |                     |   |                     |          |
|                                | GO TO 5.      | rt to ground or a | bort to power       | in harness or cor                           | nactore             | N        |
| <b>5.</b> CHECK                | -             | -                 | sion to power       |   | mectors.            | Ν        |
|                                |               | 1115              |                     |   |                     |          |
| Check the f                    |               | onsor (POS) (P    | ofor to EC 26       | 3, "Component In                            | epoction")          | 0        |
| EVAP con                       | ntrol system  | pressure senso    | or (Refer to EC     | <u>S. Component in</u><br>C-302, "Component | nt Inspection".)    |          |
| <ul> <li>Refrigerar</li> </ul> | nt pressure   | sensor (Refer to  | <u>ÈC-463, "Dia</u> | agnosis Procedur                            | <u>e"</u> .)        |          |
| Is the inspe                   | ction result  | normal?           |                     |   |                     | Р        |
|                                | GO TO 10      |                   |                     |   |                     |          |
| ~                              | •             | alfunctioning co  | •                   |   |                     |          |
|                                |               |                   | CIRCUIT FO          | R OPEN AND SH                               | IORT                |          |
| 1 <b>Turn</b> in               | nition owitak |                   |                     |   |                     |          |

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between APP sensor harness connector and ECM harness connector.

# EC-417

# P2127, P2128 APP SENSOR

#### < COMPONENT DIAGNOSIS >

| APP                | sensor | E         | Continuity |            |
|--------------------|--------|-----------|------------|------------|
| Connector Terminal |        | Connector | Terminal   | Continuity |
| E110               | 1      | E16       | 100        | Existed    |

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

Is the inspection result normal?

YES >> GO TO 7.

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

CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| APP       | sensor             | E   | Continuity         |         |
|-----------|--------------------|-----|--------------------|---------|
| Connector | Connector Terminal |     | Connector Terminal |         |
| E110      | 6                  | E16 | 82                 | Existed |

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

Is the inspection result normal?

YES >> GO TO 8.

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

**8.**CHECK APP SENSOR

Refer to EC-418, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

**9.**REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.

2. Refer to EC-419, "Special Repair Requirement"

#### >> INSPECTION END

## 10. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

## **Component Inspection**

INFOID:000000003591812

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 terminals under the following conditions.

|           | ECM                        |           |                 |                   |                 |           |
|-----------|----------------------------|-----------|-----------------|-------------------|-----------------|-----------|
| + –       |                            |           | Condition       |                   | Voltage (V)     |           |
| Connector | Terminal                   | Connector | Terminal        |                   |                 |           |
|           | 81                         |           | 84              |                   | Fully released  | 0.5 - 1.0 |
| E16       | (APP sensor 1 sig-<br>nal) | E16 —     | (Sensor ground) | Accelerator pedal | Fully depressed | 4.2 - 4.8 |
| 82        | E10 100                    |           |                 | Fully released    | 0.25 - 0.50     |           |
|           | (APP sensor 2 sig-<br>nal) |           | (Sensor ground) |                   | Fully depressed | 2.0 - 2.5 |

## P2127, P2128 APP SENSOR

| < COMPONENT DIAGNOSIS >   | [VQ35DE]                   |
|---|----------------------------|
| Is the inspection result normal?  |                            |
| YES >> INSPECTION END<br>NO >> GO TO 2.   | A                          |
| 2.REPLACE ACCELERATOR PEDAL ASSEMBLY  |                            |
| <ol> <li>Replace accelerator pedal assembly.</li> <li>Go to <u>EC-419, "Special Repair Requirement"</u>.</li> </ol> | EC                         |
| $2.0000 \underline{10-413}, opecial Repair Requirement.$  | C                          |
| >> INSPECTION END   |                            |
| Special Repair Requirement  | INFOID:000000003591813     |
| <b>1.</b> PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING  |                            |
| Refer to EC-17. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repa  | <u>ir Requirement"</u> . ⊨ |
| >> GO TO 2.   | L                          |
| 2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING  | F                          |
| Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requi                                     |                            |
| >> GO TO 3.   | G                          |
| 3. PERFORM IDLE AIR VOLUME LEARNING   |                            |
| Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".  | ———                        |
|   |                            |
| >> END  | I                          |
|   |                            |
|   | J                          |
|   |                            |
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#### < COMPONENT DIAGNOSIS >

# P2135 TP SENSOR

# Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

#### Throttle position sensor 6.0 Throttle position sensor output voltage 0 0 0 0 0 Sensor 1 Seńsor 2 45 90 135 Throttle valve opening angle (deg) PBIB0145E

DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-347, "DTC Logic".

| DTC No. | Trouble diagnosis name                                     | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P2135   | Throttle position sensor<br>circuit range/perfor-<br>mance | Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2. | <ul> <li>Harness or connector<br/>(TP sensor 1 or 2 circuit is open or short-<br/>ed.)</li> <li>Electric throttle control actuator<br/>(TP sensor 1 or 2)</li> </ul> |

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds. 3

#### **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

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

#### Is DTC detected?

- >> Go to EC-420, "Diagnosis Procedure". YES
- NO >> INSPECTION END

## Diagnosis Procedure

# 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection". 2.

- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

## EC-420

2009 Murano

INFOID:00000003388223

[VQ35DE]



INFOID:00000003388224

# P2135 TP SENSOR

## < COMPONENT DIAGNOSIS >

| COMPONEI  | IT DIAGNOS   |  |  |  |  |
|---|--|--|--|--|--|
| <ol> <li>СНЕСК ТН</li> </ol>  | ROTTLE POS   | ITION SENSO  | R POWER SU   | JPPLY CIRCL  | JIT-I                                      |
|   | t electric thrott<br>on switch ON.   | le control actua   | ator harness o   | connector.   |  |
|   |  | en electric thro   | ottle control ac   | tuator harnes  | s connector and ground.                    |
| Electric throt  | le control actuato   | r Grour  | od Volt  | age (V)  |  |
| Connector   | Terminal   |  |  |  |  |
| F29   |  | Grour  | nd App   | prox. 5  |  |
| YES >> G0   | o <u>n result norma</u><br>D TO 3.<br>epair open circ  |  | ound or short t  | o power in ha  | rness or connectors.                       |
| 3.снеск тн  | ROTTLE POS   | ITION SENSO  | R GROUND (   | CIRCUIT FOR  | OPEN AND SHORT                             |
| 2. Disconnec  | on switch OFF.<br>t ECM harnes<br>continuity bet   | s connector.   | hrottle control  | actuator harr  | ness connector and ECM harness con-        |
| Electric throttle   | control actuator   | EC   | CM   | - Continuity   | _  |
| Connector   | Terminal   | Connector  | Terminal   | -  | _  |
| F29   | 4  | F8   | 36   | Existed  | _  |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH   | ROTTLE POS   | uit, short to gro  | R INPUT SIG  | NAL CIRCUIT  | rness or connectors.<br>FOR OPEN AND SHORT |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>. Check the<br>nector.   | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet  | uit, short to gro<br>ITION SENSO<br>ween electric t  | R INPUT SIG  | NAL CIRCUIT  |  |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.  | D TO 4.<br>epair open circ<br>ROTTLE POS   | uit, short to gro<br>ITION SENSO<br>ween electric t  | R INPUT SIG  | NAL CIRCUIT  | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector  | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet   | uit, short to gro<br>ITION SENSO<br>ween electric t<br>E0<br>Connector   | R INPUT SIG  | AL CIRCUIT<br>actuator harr                          | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.  | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal   | uit, short to gro<br>ITION SENSO<br>ween electric t  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal   | AL CIRCUIT<br>actuator harr                          | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br>4.CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check  | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s  | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground   | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38   | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection  | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result normal  | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground   | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38   | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES >> GO   | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.  | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p                         | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES >> GO<br>NO >> Re   | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>pair open circ   | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p                         | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES >> GO<br>NO >> Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES >> GO<br>NO >> Re<br><b>5.</b> CHECK TH   | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>pair open circ<br>ROTTLE POS   | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro   | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p                         | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>D.</b> CHECK TH<br>Refer to <u>EC-42</u><br>s the inspection  | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>epair open circ<br>ROTTLE POS<br>22. "Componer<br>on result norma   | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p                         | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br>D.CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO  | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>charness for s<br>on result norma<br>D TO 5.<br>epair open circ<br>ROTTLE POS<br>22. "Componer<br>on result norma<br>D TO 7.  | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p                         | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>D.CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ GO  | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>pair open circ<br>ROTTLE POS<br>2. "Componer<br>on result norma<br>D TO 7.<br>D TO 6.  | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO<br>nt Inspection".<br>al?  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p<br>ound or short t      | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br>1. CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>D.CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>D.CHECK TH<br>Refer to EC-42<br>S the inspection<br>YES $>>$ GO<br>NO $>>$ GO<br>D.REPLACE I<br>1. Replace e   | D TO 4.<br>pair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>pair open circ<br>ROTTLE POS<br>2. "Componer<br>on result norma<br>D TO 7.<br>D TO 6.<br>ELECTRIC TH<br>lectric throttle of                                      | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO  | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p<br>ound or short t<br>R | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ GO<br><b>6.</b> REPLACE I<br>1. Replace e<br>2. Refer to E<br>2. Refer to E | O TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>O TO 5.<br>epair open circ<br>ROTTLE POS<br>22. "Componer<br>on result norma<br>O TO 7.<br>O TO 6.<br>ELECTRIC TH<br>lectric throttle of<br>C-422. "Special<br>SPECTION EN | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO<br>nt Inspection".<br>al?<br>ROTTLE CON<br>control actuato<br>al Repair Requ | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p<br>ound or short t<br>R | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |
| YES $>>$ GO<br>NO $>>$ Re<br><b>1.</b> CHECK TH<br>1. Check the<br>nector.<br>Electric throttle<br>Connector<br>F29<br>2. Also check<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ Re<br><b>5.</b> CHECK TH<br>Refer to EC-42<br>s the inspection<br>YES $>>$ GO<br>NO $>>$ GO<br><b>6.</b> REPLACE I<br>1. Replace e<br>2. Refer to E<br>2. Refer to E | D TO 4.<br>epair open circ<br>ROTTLE POS<br>continuity bet<br>control actuator<br>Terminal<br>2<br>3<br>c harness for s<br>on result norma<br>D TO 5.<br>epair open circ<br>ROTTLE POS<br>2. "Componer<br>on result norma<br>D TO 7.<br>D TO 6.<br>ELECTRIC TH<br>lectric throttle of<br>C-422. "Special                 | uit, short to gro<br>ITION SENSO<br>ween electric t<br>Connector<br>F8<br>hort to ground<br>al?<br>uit, short to gro<br>ITION SENSO<br>nt Inspection".<br>al?<br>ROTTLE CON<br>control actuato<br>al Repair Requ | R INPUT SIG<br>hrottle control<br>CM<br>Terminal<br>37<br>38<br>and short to p<br>ound or short t<br>R | AL CIRCUIT<br>actuator harr<br>Continuity<br>Existed | FOR OPEN AND SHORT                         |

>> INSPECTION END

Component Inspection

# 1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-422, "Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Shift selector lever position to D.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

|                               | EC                   |           |                       |                   |                 |                  |
|-------------------------------|----------------------|-----------|-----------------------|-------------------|-----------------|------------------|
| + –                           |                      |           | Condition             |                   | Voltage         |                  |
| Connector                     | Terminal             | Connector | Terminal              |                   |                 |                  |
|                               | 37                   |           |                       |                   | Fully released  | More than 0.36 V |
| F8 (TP sensor 1 signal)<br>38 |                      | )<br>— F8 | 36<br>(Sensor ground) | Accelerator pedal | Fully depressed | Less than 4.75 V |
|                               |                      | ГО        |                       | Accelerator pedal | Fully released  | Less than 4.75 V |
|                               | (TP sensor 2 signal) |           |                       |                   | Fully depressed | More than 0.36 V |

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

# **2.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.

2. Go to EC-422, "Special Repair Requirement".

#### >> INSPECTION END

## Special Repair Requirement

INFOID:000000003388227

# **1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

#### >> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

# P2138 APP SENSOR

## Description

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 signals 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 engine operations such as fuel cut.

## DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-347, "DTC Logic".

| DTC No. | Trouble diagnosis name   | DTC detecting condition   | Possible cause   |
|---------|--|---|--|
| P2138   | Accelerator pedal posi-<br>tion sensor circuit range/<br>performance | Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2. | <ul> <li>Harness or connector<br/>(APP sensor 1 or 2 circuit is open or<br/>shorted.)<br/>[CKP sensor (POS) circuit is shorted.]<br/>(Refrigerant pressure sensor circuit is<br/>shorted.)<br/>(EVAP control system pressure sensor<br/>circuit is shorted.)</li> <li>Accelerator pedal position sensor<br/>(APP sensor 1 or 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul> |

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

- Turn ignition switch ON. 2.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

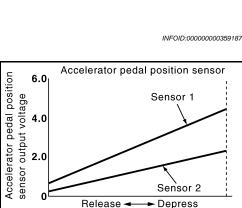
Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 2. 2. PERFORM DTC CONFIRMATION PROCEDURE P 1. Start engine and let it idle for 1 second. Check DTC. 2.

Is DTC detected?

YES >> Go to EC-424, "Diagnosis Procedure".

NO >> INSPECTION END



Release -

Accelerator pedal operation

А

EC

С

D

E

F

M

Ν

INFOID:000000003591874

Sensor 2

PRIB1741E

INFOID:000000003388229

Depress

# P2138 APP SENSOR

#### < COMPONENT DIAGNOSIS >

# Diagnosis Procedure

#### **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

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 (V) |  |
|--------------------|--------|--------|-------------|--|
| Connector Terminal |        | Ground | voltage (v) |  |
| E110               | 4      | Ground | Approx. 5   |  |

Is the inspection result normal?

YES >> GO TO 3.

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

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

- 1. Turn ignition switch ON.
- 2. Check the voltage between APP sensor harness connector and ground.

| APP :     | sensor             | Ground | Voltage (V) |
|-----------|--------------------|--------|-------------|
| Connector | Connector Terminal |        | voltage (v) |
| E110      | 5                  | Ground | Approx. 5   |

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

#### 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   | E                  | Continuity |            |
|-----------|----------|--------------------|------------|------------|
| Connector | Terminal | Connector Terminal |            | Continuity |
| E110      | 5        | E16                | 87         | Existed    |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit.

5. CHECK SENSOR POWER SUPPLY CIRCUIT

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

| EC        | CM       | Senso                       | or        |          |
|-----------|----------|-----------------------------|-----------|----------|
| Connector | Terminal | Name                        | Connector | Terminal |
| F8        | 72       | Refrigerant pressure sensor | E300      | 1        |
| 10        | 76       | CKP sensor (POS)            | F20       | 1        |

# P2138 APP SENSOR

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

|   | M   |  | Sens  | or  |                          |            |
|---|---|--|---|---|--------------------------|------------|
| Connector   | Terminal  | N  | ame   | Connector   | Terminal                 |            |
| <b>F</b> 40   | 87  | APP sensor   |   | E110  | 5                        |            |
| E16   | 91  | EVAP control syst  | em pressure sensor  | B17   | 3                        |            |
| Is the inspec   | ction result n  | ormal?   |   |   |                          |            |
|   | GO TO 6.  | to ground or o   | hort to now or in   |   |                          |            |
| ~   | •   | •  | short to power in   | namess or cor   | nectors.                 |            |
| <b>6.</b> CHECK (   |   | 115  |   |   |                          |            |
| Check the fo  |   | nsor (POS) (P  | efer to <u>EC-263, "</u>  |   | epoction")               |            |
| • EVAP con  | trol system p   | pressure senso   | r (Refer to <u>EC-30</u>  | 02, "Componei   | nt Inspection".)         |            |
| <ul> <li>Refrigeran</li> </ul>  | t pressure s  | ensor (Refer to  | ) <u>ÈC-463, "Diagn</u>   | osis Procedure  | <u>e"</u> .)             |            |
| Is the inspec   |   | ormal?   |   |   |                          |            |
| -   | GO TO 11.   | Ifunctioning co  | magazta   |   |                          |            |
| -   | •   | -  | •   |   | DT                       |            |
|   |   |  | IRCUIT FOR OF   | EN AND SHC  | I                        |            |
|   | ition switch  | OFF.<br>rness connecto   | or  |   |                          |            |
|   |   |  | sensor harness  | connector and   | ECM harness              | connector. |
|   | ,   |  |   |   |                          |            |
| APP   | sensor  | E  | CM  | Continuity  |                          |            |
| Connector   | Terminal  | Connector  | Terminal  | Continuity  |                          |            |
| <b>E</b> 440  | 2   | 540  | 84  | <b></b>   |                          |            |
| E110  | 1   | E16  |   | Existed   |                          |            |
|   | 1   |  | 100   |   |                          |            |
| 4. Also che   | •   | for short to gro   | 100<br>ound and short to  |   |                          |            |
| 4. Also che<br>Is the inspec  | eck harness   | -  |   |   |                          |            |
| <u>Is the inspec</u><br>YES >>  | eck harness<br><u>ction result n</u><br>GO TO 8.  | ormal?   | ound and short to   | power.  |                          |            |
| Is the inspec<br>YES >><br>NO >>  | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open   | ormal?   | ound and short to   | power.<br>t to power in h   |                          | ectors.    |
| ls the inspec<br>YES >><br>NO >>  | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open   | ormal?   | ound and short to   | power.<br>t to power in h   |                          | ectors.    |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK  | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC  | ormal?<br>circuit, short to<br>R INPUT SIGN  | ound and short to   | power.<br>t to power in h<br>DR OPEN AND  | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the  | Eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP   | ound and short to<br>o ground or shor<br>NAL CIRCUIT FC<br>sensor harness   | power.<br>t to power in h<br>DR OPEN AND  | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the  | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC  | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness  | power.<br>t to power in ha<br>DR OPEN ANE<br>connector and                          | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the  | Eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness  | power.<br>t to power in h<br>DR OPEN AND  | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK A<br>1. Check the<br>APP<br>Connector  | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>EC<br>Connector  | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness  | power.<br>t to power in ha<br>DR OPEN ANE<br>connector and<br>Continuity            | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP   | CK harness<br>Ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness  | power.<br>t to power in ha<br>DR OPEN ANE<br>connector and                          | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK A<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che   | eck harness<br><u>ction result n</u><br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>eck harness  | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81  | power.<br>t to power in ha<br>DR OPEN ANE<br>connector and<br>Continuity<br>Existed | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK A<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect   | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>eck harness<br>ction result n  | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82  | power.<br>t to power in ha<br>DR OPEN ANE<br>connector and<br>Continuity<br>Existed | SHORT                    |            |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK A<br>1. Check the<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >>  | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>pund and short to                     | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >>  | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.<br>Repair open  | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?   | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82  | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >><br>9.CHECK /  | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.<br>Repair open<br>APP SENSC   | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?<br>circuit, short to<br>PR                              | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>ound and short to<br>o ground or shor | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >><br>9.CHECK /<br>Refer to EC-                             | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>eck harness<br>ction result n<br>GO TO 9.<br>Repair open<br>APP SENSC<br>426, "Comp  | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?<br>circuit, short to<br>R<br>onent Inspectio            | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>ound and short to<br>o ground or shor | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >><br>9.CHECK /<br>Refer to EC-<br>Is the inspect           | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.<br>Repair open<br>APP SENSC<br>-426, "Comp<br>ction result n                          | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?<br>circuit, short to<br>R<br>onent Inspectio            | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>ound and short to<br>o ground or shor | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >><br>9.CHECK /<br>Refer to EC-<br>Is the inspect<br>YES >> | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.<br>Repair open<br>APP SENSC<br>-426, "Comp<br>ction result n<br>GO TO 11.             | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?<br>circuit, short to<br>R<br>onent Inspectio            | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>ound and short to<br>o ground or shor | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |
| Is the inspect<br>YES >><br>NO >><br>8.CHECK /<br>1. Check the<br>APP<br>Connector<br>E110<br>2. Also che<br>Is the inspect<br>YES >><br>NO >><br>9.CHECK /<br>Refer to EC-<br>Is the inspect<br>YES >> | ck harness<br>ction result n<br>GO TO 8.<br>Repair open<br>APP SENSC<br>he continuity<br>sensor<br>Terminal<br>3<br>6<br>ck harness<br>ction result n<br>GO TO 9.<br>Repair open<br>APP SENSC<br>426, "Comp<br>ction result n<br>GO TO 11.<br>GO TO 10. | ormal?<br>circuit, short to<br>R INPUT SIGN<br>between APP<br>Connector<br>E16<br>for short to gro<br>ormal?<br>circuit, short to<br>R<br>onent Inspection<br>ormal? | o ground or shor<br>NAL CIRCUIT FC<br>sensor harness<br>CM<br>Terminal<br>81<br>82<br>ound and short to<br>o ground or shor | power.<br>t to power in ha<br>DR OPEN AND<br>connector and<br>Continuity<br>Existed | 9 SHORT<br>I ECM harness | connector. |

2. Refer to EC-426, "Special Repair Requirement".

#### < COMPONENT DIAGNOSIS >

#### >> INSPECTION END

## **11.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000003591875

[VQ35DE]

# 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 terminals under the following conditions.

|           | ECM                        |                    |                 |                   |                 |             |
|-----------|----------------------------|--------------------|-----------------|-------------------|-----------------|-------------|
|           | + –                        |                    |                 | Condition         |                 | Voltage (V) |
| Connector | Terminal                   | Connector Terminal |                 |                   |                 |             |
|           | 81                         |                    | 84              |                   | Fully released  | 0.5 - 1.0   |
| E16       | (APP sensor 1 sig-<br>nal) | E16                | (Sensor ground) | Accelerator podel | Fully depressed | 4.2 - 4.8   |
| EIO       | 82                         | E 10               | 100             | Accelerator pedal | Fully released  | 0.25 - 0.50 |
|           | (APP sensor 2 sig-<br>nal) |                    | (Sensor ground) |                   | Fully depressed | 2.0 - 2.5   |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.

2. Go to EC-426, "Special Repair Requirement".

#### >> INSPECTION END

Special Repair Requirement

INFOID:000000003591879

# **1.**PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-17, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

#### >> GO TO 2.

**2.** PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-17, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

# **3.**PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-17, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

#### < COMPONENT DIAGNOSIS >

P2A00, P2A03 A/F SENSOR 1

# Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor

outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

## DTC Logic

#### DTC DETECTION LOGIC

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored so it will not shift to LEAN side or RICH side.

| DTC No. | Trouble diagnosis name   | DTC detecting condition  | Possible Cause   | Κ |
|---------|--|--|--|---|
| P2A00   | Air fuel ratio (A/F) sensor 1<br>(bank 1) circuit range/per-<br>formance | • The output voltage computed by ECM from the<br>A/F sensor 1 signal shifts to the lean side for a<br>specified period.                    | <ul> <li>A/F sensor 1</li> <li>A/F sensor 1 heater</li> <li>Fuel pressure</li> </ul> | L |
| P2A03   | Air fuel ratio (A/F) sensor 1<br>(bank 2) circuit range/per-<br>formance | <ul> <li>The A/F signal computed by ECM from the A/F<br/>sensor 1 signal is shifts to the rich side for a<br/>specified period.</li> </ul> | <ul><li>Fuel injector</li><li>Intake air leakage</li></ul>                           | M |

#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

>> GO TO 2.

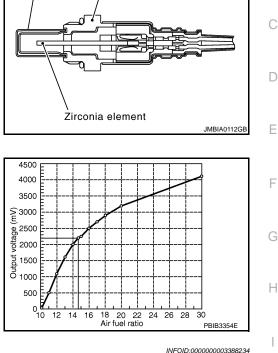
## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-19</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".
- 2. Turn ignition switch OFF and wait at least 10 seconds.

# EC-427

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Protector

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# P2A00, P2A03 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
- 8. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-428, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-43, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to EM-34, "Removal and Installation".

>> GO TO 3.

**3.**CHECK FOR INTAKE AIR LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

- YES >> GO TO 4.
- NO >> Repair or replace malfunctioning part.

**4.**CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

- Clear the mixture ratio self-learning value. Refer to <u>EC-19, "MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement"</u>.
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-226, "DTC Logic"</u> or <u>EC-231, "DTC Logic"</u>.

NO >> GO TO 5.

**5.**CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.

- 2. Disconnect A/F sensor 1 harness connector.
- 3. Check harness connector for water.

#### Water should not exit.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness connector.

**Ó.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between A/F sensor 1 harness connector and ground.

# P2A00, P2A03 A/F SENSOR 1

#### < COMPONENT DIAGNOSIS >

[VQ35DE]

| DTC  |  | A/F sense  |  | Ground                         | Voltage (V)  |                               |
|--|--|--|--|--------------------------------|--|-------------------------------|
|  | Bank   | Connecto   | or Terminal  |                                | ·····g· (·)  |                               |
| P2A00  |  | F27  | 4  | Ground                         | Battery voltage  | e                             |
| P2A03  |  | F64  | 4  |                                |  | _                             |
|  | •  | esult norma  | <u> ?</u>  |                                |  |                               |
| ′ES<br>IO  | >> GO T<br>>> GO T   |  |  |                                |  |                               |
|  |  | FUNCTION   | NG PART  |                                |  |                               |
|  | he followi   |  |  |                                |  |                               |
|  |  | ess connect  | or F12   |                                |  |                               |
|  | use (No. 4   |  | otwoon A/E   |                                |  |                               |
| Harne  | ess for ope  | en or snort d  | etween A/F   | sensoria                       | and IPDM E/R   |                               |
|  | >> Rena  | ir or replace  | harness or   | connector                      | .e   |                               |
| CHE  |  |  |  |                                |  | I AND SHORT                   |
|  |  |  |  |                                |  |                               |
|  |  | switch OFF.<br>CM harness  | connector.   |                                |  |                               |
|  |  |  |  | nsor 1 har                     | ness connecto  | or and ECM harness connector. |
|  | 1  |  |  |                                |  |                               |
| DTC  |  | A/F sensor   | 1  |                                | ECM  | Continuity                    |
|  | Bank   | Connector  | Terminal   | Connecto                       | r Terminal   |                               |
|  |  |  |  |                                |  |                               |
| P2A00  | 1  | F27  | 1  |                                | 45   |                               |
| P2A00  | 1  | F27  | 1  | - F8                           | 45<br>49   | Existed                       |
|  |  |  |  | - F8                           | _  | Existed                       |
| P2A03  | 2  | F64  | 2<br>1<br>2  | -                              | 49<br>53<br>57   |                               |
| P2A03  | 2<br>eck the co  | F64  | 2<br>1<br>2  | -                              | 49<br>53<br>57   | Existed                       |
| P2A03  | 2  | F64  | 2<br>1<br>2  | -                              | 49<br>53<br>57   |                               |
| . Che  | 2<br>eck the co  | F64  | 2<br>1<br>2  | -                              | 49<br>53<br>57   |                               |
| P2A03  | 2<br>eck the co  | F64<br>Intinuity bet   | 2<br>1<br>2<br>ween A/F so   | -                              | 49<br>53<br>57   |                               |
| P2A03<br>. Che<br>and<br>DTC   | 2<br>eck the co<br>I ground.<br>Bank                           | F64<br>Intinuity bet<br>A/F sensor 1<br>Connector                                      | 2<br>1<br>2  | ensor 1 ha                     | 49<br>53<br>57<br>arness connec                              |                               |
| P2A03<br>. Che<br>and  | 2<br>eck the co<br>I ground.                                   | F64<br>Intinuity bet   | 2<br>1<br>2<br>ween A/F so   | ensor 1 ha<br>Ground           | 49<br>53<br>57<br>arness connec<br>Continuity                |                               |
| P2A03<br>Che<br>and<br>DTC<br>P2A00  | 2<br>eck the co<br>I ground.<br>Bank<br>1                      | F64<br>Intinuity beta<br>A/F sensor 1<br>Connector<br>F27                              | 2<br>1<br>2<br>ween A/F so<br>Terminal                               | ensor 1 ha                     | 49<br>53<br>57<br>arness connec                              |                               |
| P2A03<br>Che<br>and<br>DTC<br>P2A00  | 2<br>eck the co<br>I ground.<br>Bank                           | F64<br>Intinuity bet<br>A/F sensor 1<br>Connector                                      | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2                     | ensor 1 ha<br>Ground           | 49<br>53<br>57<br>arness connec<br>Continuity                |                               |
| P2A03<br>. Che<br>and<br>DTC   | 2<br>eck the co<br>I ground.<br>Bank<br>1                      | F64<br>Intinuity beta<br>A/F sensor 1<br>Connector<br>F27                              | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1                | ensor 1 ha<br>Ground           | 49<br>53<br>57<br>arness connec<br>Continuity                |                               |
| P2A03<br>. Che<br>and<br>DTC -<br>P2A00<br>P2A03   | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2                   | F64<br>Intinuity beta<br>A/F sensor 1<br>Connector<br>F27                              | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1<br>2           | ensor 1 ha<br>Ground<br>Ground | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |
| P2A03<br>. Che<br>and<br>DTC -<br>P2A00  | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2                   | F64<br>Protinuity betwork<br>A/F sensor 1<br>Connector<br>F27<br>F64                   | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1                | ensor 1 ha<br>Ground           | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |
| P2A03 . Che<br>and . DTC - P2A00 P2A03 DTC -   | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2<br>E              | F64<br>Intinuity betwork<br>A/F sensor 1<br>Connector<br>F27<br>F64<br>CCM             | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1<br>2           | ensor 1 ha<br>Ground<br>Ground | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |
| P2A03<br>. Che<br>and<br>DTC -<br>P2A00<br>P2A03   | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2<br>E<br>Connector | F64<br>Protinuity betwork<br>A/F sensor 1<br>Connector<br>F27<br>F64<br>CM<br>Terminal | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1<br>2<br>Ground | ensor 1 ha<br>Ground<br>Ground | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |
| P2A03 . Che<br>and . Che<br>2000 . Che | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2<br>E              | F64<br>The sensor 1<br>Connector<br>F27<br>F64<br>CM<br>Terminal<br>45                 | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1<br>2           | ensor 1 ha<br>Ground<br>Ground | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |
| P2A03 . Che<br>and . DTC - P2A00 P2A03 DTC -   | 2<br>eck the co<br>ground.<br>Bank<br>1<br>2<br>E<br>Connector | F64<br>Terminal<br>49  | 2<br>1<br>2<br>ween A/F so<br>Terminal<br>1<br>2<br>1<br>2<br>Ground | ensor 1 ha<br>Ground<br>Ground | 49<br>53<br>57<br>arness connec<br>Continuity<br>Not existed |                               |

9. CHECK INTERMITTENT INCIDENT

< COMPONENT DIAGNOSIS >

Perform GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace malfunctioning part.

**10.**REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1.

CAUTION:

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

# **ASCD BRAKE SWITCH**

Revision: 2008 October

## < COMPONENT DIAGNOSIS > ASCD BRAKE SWITCH

# Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by those two types of input (ON/OFF signal). Refer to <u>EC-51</u>, "System Diagram" for the ASCD function.

## **Component Function Check**

## **1.**CHECK ASCD BRAKE SWITCH FUNCTION

#### With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
- 3. Check "BRAKE SW1" indication under the following conditions.

| Monitor item | Co          | ondition           | Indication |
|--------------|-------------|--------------------|------------|
| BRAKE SW1    | Brake pedal | Slightly depressed | OFF        |
| DIVARE SWI   | Diake pedai | Fully released     | ON         |

#### **Without CONSULT-III**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals.

|              | ECM                           |          |                            |                    |                 |
|--------------|-------------------------------|----------|----------------------------|--------------------|-----------------|
| Connector    | +                             | -        | Condition                  |                    | Voltage         |
| Connector    | Terminal                      | Terminal |                            |                    |                 |
| = + =        | 110                           |          |                            | Slightly depressed |                 |
| E16          | (ASCD brake<br>switch signal) | 112      | Brake pedal Fully released |                    | Battery voltage |
| Is the inspe | the inspection result normal? |          |                            |                    |                 |

#### YES >> INSPECTION END

NO >> Go to EC-431, "Diagnosis Procedure".

#### Diagnosis Procedure

# 1.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

|        |                                  |          | l.             |                 |  |
|--------|----------------------------------|----------|----------------|-----------------|--|
| A      | ASCD brake switch                |          | Ground Voltage | Voltage         |  |
| Con    | nector                           | Terminal | Giouna         | voltage         |  |
| E      | E49                              | 1        | Ground         | Battery voltage |  |
| Is the | Is the inspection result normal? |          |                |                 |  |
|        | ~                                |          |                |                 |  |

YES >> GO TO 3.

NO >> GO TO 2.

# 2. DETECT MALFUNCTIONING PART

#### Check the following.

Fuse block (J/B) connector E103

Harness for open or short between ASCD brake switch and fuse

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# **ASCD BRAKE SWITCH**

#### < COMPONENT DIAGNOSIS >

>> Repair open circuit, short to ground or short to power in harness or connectors.

# **3.**CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

| ASCD bra  | ake switch | E                  | CM  | Continuity |  |
|-----------|------------|--------------------|-----|------------|--|
| Connector | Terminal   | Connector Terminal |     | Continuity |  |
| E49       | 2          | E16                | 110 | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK ASCD BRAKE SWITCH

Refer to EC-432, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace ASCD brake switch.

**5.**CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

## Component Inspection (ASCD Brake Switch)

INFOID:000000003591752

1.CHECK ASCD BRAKE SWITCH-I

#### 1. Turn ignition switch OFF.

- 2. Disconnect ASCD brake switch harness connector.
- 3. Check the continuity between ASCD brake switch terminals under the following conditions.

| Terminals |             | Condition          | Continuity  |
|-----------|-------------|--------------------|-------------|
| 1 and 2   | Brake pedal | Fully released     | Existed     |
| T and Z   | Brake pedal | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

- 1. Adjust ASCD brake switch installation. Refer to <u>BR-9, "Inspection and Adjustment"</u>.
- 2. Check the continuity between ASCD brake switch terminals under the following conditions.

| Terminals |             | Condition          | Continuity  |
|-----------|-------------|--------------------|-------------|
| 1 and 2   | Brake pedal | Fully released     | Existed     |
| T and Z   | Brake pedal | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch.

### **ASCD INDICATOR**

### < COMPONENT DIAGNOSIS >

## ASCD INDICATOR

### Description

ASCD indicator lamp illuminates to indicate ASCD operation status. CRUISE is integrated in combination meter.

CRUISE illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

Refer to <u>EC-51, "System Diagram"</u> for the ASCD function.

### **Component Function Check**

### **1.**CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

| ASCD INDICATOR              |  | CONDITION SPECIFICA                                      |                       |
|-----------------------------|--|--|-----------------------|
| CRUISE                      | Ignition switch: ON                        | MAIN switch: Pressed at the<br>1st time →at the 2nd time | $ON\toOFF$            |
| Is the inspection result no | rmal?                                      |  |                       |
| YES >> INSPECTION           |  |  |                       |
| NO >> Go to <u>EC-433</u>   | <ol> <li>"Diagnosis Procedure".</li> </ol> |  |                       |
| <b>Diagnosis</b> Procedure  | e  |  | INFOID:00000003388243 |
| 1.снеск отс                 |  |  |                       |
| Check that DTC UXXXX i      | s not displayed.                           |  |                       |
| Is the inspection result no | rmal?                                      |  |                       |
| YES >> GO TO 2.             |  |  |                       |
| •                           | ble diagnosis for DTC UX                   | XXX.   |                       |
| 2. CHECK COMBINATIO         | N METER FUNCTION                           |  |                       |
| Refer to MWI-34, "CONSI     | JLT-III Function (METER                    | / <u>M&amp;A)"</u> .                                     |                       |
| Is the inspection result no | <u>rmal?</u>                               |  |                       |
| YES >> GO TO 3.             |  |  |                       |
| • · ·                       | lace malfunctioning part.                  |  |                       |
| 3.CHECK INTERMITTER         |  |  |                       |
| Refer to GI-40, "Intermitte |  |  |                       |
| Is the inspection result no |  |  |                       |
| YES >> Replace com          |  |  |                       |
| NO >> Repair or repl        | lace malfunctioning part.                  |  |                       |
|                             |  |  |                       |
|                             |  |  |                       |
|                             |  |  |                       |
|                             |  |  |                       |

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#### < COMPONENT DIAGNOSIS >

## COOLING FAN

### Description

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[VQ35DE]

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

#### COOLING FAN MOTOR

The cooling fan operates at each speed when the current flows in the cooling fan motor as per the following.

| Cooling fan speed  | Cooling fan motor terminals |         |  |
|--------------------|-----------------------------|---------|--|
| Cooling fair speed | (+)                         | ()      |  |
|                    | 1                           | 3 and 4 |  |
| Middle (MID)       | 2                           | 3 and 4 |  |
|                    | 1 and 2                     | 3       |  |
|                    | 1 and 2                     | 4       |  |
| High (HI)          | 1 and 2                     | 3 and 4 |  |

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under the middle speed condition.

Refer to EC-60, "System Diagram".

#### **Component Function Check**

**1.**CHECK COOLING FAN FUNCTION

#### (I) With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that cooling fan operates at each speed.

#### **Without CONSULT-III**

- 1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-10</u>, "<u>Diagnosis</u> <u>Description</u>".
- 2. Check that cooling fan operates at each speed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-434, "Diagnosis Procedure".

#### **Diagnosis** Procedure

INFOID:000000003388246

INFOID:00000003388245

### 1. CHECK COOLING FAN RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect cooling fan relays-2, -3.
- 3. Turn ignition switch ON.
- 4. Check the voltage between cooling fan relays-2, -3 harness connectors and ground.

| Cooling fan re        | lay      | Ground  | Voltage         |
|-----------------------|----------|---------|-----------------|
| Connector             | Terminal | Giouna  | vollage         |
| E57                   | 2        |         |                 |
| (cooling fan relay-2) | 5        | Ground  | Battery voltage |
| E59                   | 2        | Giodina | Dattery voltage |
| (cooling fan relay-3) | 5        |         |                 |

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 2.

# < COMPONENT DIAGNOSIS >

| 2.DETECT MALFUNG   | CTIONING PA                 | RT                               |                                  |                    |                          | Δ  |
|--|-----------------------------|----------------------------------|----------------------------------|--------------------|--------------------------|----|
| Check the following.<br>• 40 A fusible link (lette<br>• 10 A fuse (No. 42)   | ,                           |                                  |                                  |                    |                          | EC |
| <ul> <li>IPDM E/R harness c</li> <li>Harness for open or</li> </ul>  |                             | cooling fan re                   | lav-2 and batt                   | erv                |                          |    |
| <ul> <li>Harness for open or</li> <li>Harness for open or</li> <li>Harness for open or</li> </ul>                                    | short between short between | cooling fan re<br>cooling fan re | lay-3 and batte<br>lay-2 and IPD | ery<br>M E/R       |                          | С  |
| >> Renair on   | en circuit shor             | t to around or                   | short to nowe                    | r in harness or co | onnectors                | D  |
| 3.CHECK COOLING  |                             | •                                | •                                |                    |                          |    |
| <ol> <li>Turn ignition switc</li> <li>Disconnect IPDM</li> </ol>   | h OFF.<br>E/R harness c     | onnectors.                       |                                  | s connectors and   | IPDM E/R harness connec- | E  |
| Cooling fan r  | elav                        | IPDI                             | M E/R                            |                    |                          |    |
| Connector  | Terminal                    | Connector                        | Terminal                         | Continuity         |                          | 0  |
| E57<br>(cooling fan relay-2)   | 1                           | E11                              | 42                               | Existed            |                          | G  |
| E59<br>(cooling fan relay-3)   | 1                           | E10                              | 34                               | Existed            |                          | Н  |
| 4. Also check harnes   | -                           | round and sh                     | ort to power.                    |                    |                          |    |
| <u>Is the inspection result</u><br>YES >> GO TO 4.   | normal?                     |                                  |                                  |                    |                          |    |
|  | en circuit, shor            | t to ground or                   | short to power                   | r in harness or co | onnectors.               |    |
| 4.CHECK COOLING  | FAN MOTOR                   | POWER SUP                        | PLY CIRCUIT                      |                    |                          | J  |
| <ol> <li>Disconnect cooling</li> <li>Check the voltage</li> </ol>  |                             |                                  |                                  | nector and grour   | nd.                      | K  |
| Cooling fan mot  | or-1                        |                                  |                                  |                    |                          |    |
| Connector  | Terminal                    | Ground                           | Voltage                          |                    |                          | I  |
| E301   | 1 2                         | Ground                           | Battery voltage                  | e                  |                          |    |
| Is the inspection result   | normal?                     |                                  |                                  |                    |                          | M  |
| YES >> GO TO 6.<br>NO >> GO TO 5.  |                             |                                  |                                  |                    |                          | Ν  |
| 5.DETECT MALFUNG   | CTIONING PA                 | RT                               |                                  |                    |                          | IN |
| <ul> <li>Check the following.</li> <li>Harness connector E</li> <li>40 A fusible link (lette</li> <li>Harness for open or</li> </ul> | er M)                       | cooling fan m                    | otor-1 and bat                   | terv               |                          | 0  |
| , -  |                             | 5                                |                                  | ,                  |                          | Ρ  |
| >> Repair ope  |                             | •                                | short to power                   | r in harness or co | onnectors.               | ۲  |
| 1. Disconnect cooling  |                             |                                  | ector.                           |                    |                          |    |

1. Disconnect cooling fan motor-2 harness connector.

2. Check the continuity between cooling fan relay-2, -3 harness connectors and cooling fan motor-1, -2 harness connectors.

#### < COMPONENT DIAGNOSIS >

| Cooling fan relay     |          | Cooling fan motor             |          | Continuity |
|-----------------------|----------|-------------------------------|----------|------------|
| Connector             | Terminal | Connector                     | Terminal | Continuity |
| E57                   | 3        | E302<br>(Cooling fan motor-2) | 2        |            |
| (cooling fan relay-2) | 7        | E301<br>(Cooling fan motor-1) | 3        | Existed    |
| E59                   | 3        | E302<br>(Cooling fan motor-2) | 1        | Existed    |
| (cooling fan relay-3) | 7        | E301<br>(Cooling fan motor-1) | 4        |            |

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

Is the inspection result normal?

YES >> GO TO 8.

<u>NO</u> >> GO TO 7.

7. DETECT MALFUNCTIONING PART

#### Check the following.

Harness connector E70, E305

• Harness for open or short between cooling fan motor-1 and cooling fan relay-2

- Harness for open or short between cooling fan motor-1 and cooling fan relay-3
- Harness for open or short between cooling fan motor-2 and cooling fan relay-2

Harness for open or short between cooling fan motor-2 and cooling fan relay-3

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### 8. CHECK COOLING FAN MOTOR CIRCUIT-II

1. Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

| IPDN      | /I E/R   | Cooling fan motor             |          | Continuity |
|-----------|----------|-------------------------------|----------|------------|
| Connector | Terminal | Connector                     | Terminal | Continuity |
| E10       | 35       | E301<br>(Cooling fan motor-1) | 4        | Existed    |
| ETO       | 38       | E302<br>(Cooling fan motor-2) | 1        | Existed    |

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

**9.** DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connector E70, E305
- Harness for open or short between cooling fan motor-1 and IPDM E/R
- Harness for open or short between cooling fan motor-2 and IPDM E/R

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### **10.**CHECK COOLING FAN MOTOR CIRCUIT-III

1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground.

#### < COMPONENT DIAGNOSIS >

| Cooling far                          | n motor                               |                     |                              |                        |
|--------------------------------------|---------------------------------------|---------------------|------------------------------|------------------------|
| Connector                            | Terminal                              | - Ground            | Continuity                   |                        |
| E57<br>(cooling fan relay-2)         | 6                                     | Ground              | Existed                      |                        |
| E59<br>(cooling fan relay-3)         | 6                                     |                     |                              |                        |
| . Also check harnes                  | s for short to grou                   | and and short to p  | ower.                        |                        |
| s the inspection result              |                                       |                     |                              |                        |
|                                      | en circuit, short to                  | •                   | power in harness or connec   | ctors.                 |
| 11.CHECK COOLIN                      | G FAN MOTOR C                         | IRCUIT-IV           |                              |                        |
| . Check the continu                  | ity between coolir                    | ng fan motor-2 har  | ness connector and ground.   |                        |
|                                      | Т                                     |                     |                              |                        |
| Cooling fan r                        |                                       | Ground              | Continuity                   |                        |
| Connector                            | Terminal                              |                     |                              |                        |
| E302                                 | 3                                     | Ground              | Existed                      |                        |
|                                      | 4                                     |                     |                              |                        |
| . Also check harnes                  |                                       | ind and short to p  | ower.                        |                        |
| the inspection result                |                                       |                     |                              |                        |
| YES >> GO TO 12                      |                                       |                     |                              |                        |
|                                      |                                       | •                   | o power in harness or connec | ctors.                 |
| 12.CHECK COOLIN                      | G FAN RELAYS-2                        | 2 AND -3            |                              |                        |
| Refer to EC-438, "Con                |                                       |                     | elav)".                      |                        |
| s the inspection result              |                                       |                     | <u></u>                      |                        |
| YES >> GO TO 13                      |                                       |                     |                              |                        |
|                                      | nalfunctioning coo                    | ling fan relav.     |                              |                        |
| <b>3.</b> CHECK COOLIN               | •                                     | • •                 |                              |                        |
|                                      |                                       |                     | 2to r) "                     |                        |
| Refer to <u>EC-437, "Con</u>         | · · · · · · · · · · · · · · · · · · · | n (Cooling Fan Mo   | <u> ())</u> .                |                        |
| s the inspection result              |                                       |                     |                              |                        |
| YES >> GO TO 14<br>NO >> Replace m   | nalfunctioning coo                    | ling fan motor      |                              |                        |
| 4.CHECK INTERM                       | •                                     | •                   |                              |                        |
|                                      |                                       | 11                  |                              |                        |
| Perform <u>GI-40, "Interm</u>        |                                       |                     |                              |                        |
| s the inspection result              |                                       |                     |                              |                        |
| YES >> Replace If                    |                                       |                     |                              |                        |
| NO >> Repair or                      | replace harness c                     | onnectors.          |                              |                        |
| Component Inspe                      | ction (Cooling                        | g Fan Motor)        |                              | INFOID:000000003388247 |
| 1.CHECK COOLING                      | FAN MOTOR                             |                     |                              |                        |
| 1. Turn ignition switc               | h OFF.                                |                     |                              |                        |
| 2. Disconnect cooling                | g fan motor harne                     |                     |                              |                        |
| <ol><li>Supply cooling far</li></ol> | motor terminals                       | with battery voltag | e and check operation.       |                        |

#### < COMPONENT DIAGNOSIS >

|                   | Condition | Term    | ninals  |
|-------------------|-----------|---------|---------|
|                   | Condition | (+)     | (-)     |
|                   |           | 1       | 3 and 4 |
| Cooling fan motor | A         | 2       | 3 and 4 |
|                   |           | 1 and 2 | 3       |
|                   |           | 1 and 2 | 4       |
|                   | В         | 1, 2    | 3, 4    |

Check that cooling fan speed of condition B is higher than that of A. <u>Is the inspection result normal?</u>

YES >> INSPECTION END

NO >> Replace cooling fan motor.

### Component Inspection (Cooling Fan Relay)

# 1. CHECK COOLING FAN RELAY

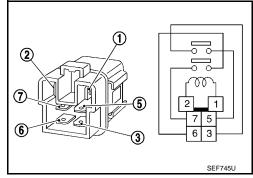
- 1. Disconnect cooling fan relays -2, -3 harness connectors.
- 2. Check continuity between cooling fan relay -2, -3 terminals under the following conditions.

| Terminals | Conditions   | Continuity  |
|-----------|--|-------------|
| 3 and 5   | 12 V direct current supply between terminals 1 and 2 | Existed     |
| 6 and 7   | No current supply                                    | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.



INFOID:000000003388248

### **ELECTRICAL LOAD SIGNAL**

# < COMPONENT DIAGNOSIS >

### ELECTRICAL LOAD SIGNAL

### Description

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication.

#### Component Function Check

# 1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

- 1. Turn ignition switch ON.
- 2. Connect CONSULT-III and select "DATA MONITOR" mode.
- 3. Select "LOAD SIGNAL" and check indication under the following conditions.

| Monitor item          | Condition   |         | Indication    | -        |
|-----------------------|---|---------|---------------|----------|
| LOAD SIGNAL           | Rear window defogger switch   | ON      | ON            | _        |
| LOAD SIGNAL           | Real window delogger switch   | OFF     | OFF           | _        |
| YES >> GC<br>NO >> GC | n result normal?<br>O TO 2.<br>o to <u>EC-439, "Diagnosis Pro</u><br>HTING SWITCH FUNCTIO |         | · <u>e"</u> . |          |
| Check "LOAD           | SIGNAL" indication under t  | he foll | owing con     | ditions. |
| Monitor item          | Condition   |         | Indication    |          |

| Monitor item | Co              | ondition           | Indication |
|--------------|-----------------|--------------------|------------|
| LOAD SIGNAL  | Lighting switch | ON at 2nd position | ON         |
| LOAD SIGNAL  | Lighting Switch | OFF                | OFF        |

Is the inspection result normal?

| O TO 3. |
|---------|
|---------|

NO >> Go to <u>EC-439, "Diagnosis Procedure"</u>.

### ${ m 3.check}$ heater fan control switch function

#### Select "HEATER FAN SW" and check indication under the following conditions.

| Monitor item  | Condition                 | Indication |     |
|---------------|---------------------------|------------|-----|
| HEATER FAN SW | Heater fan control switch | ON         | ON  |
|               |                           | OFF        | OFF |

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-439, "Diagnosis Procedure".

### Diagnosis Procedure

### **1.**INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to <u>EC-439, "Compo-nent Function Check"</u>.

Which circuit is related to the incident?

Rear window defogger>>GO TO 2.

Headlamp>>GO TO 3.

Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-3, "Work Flow".



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### ELECTRICAL LOAD SIGNAL

< COMPONENT DIAGNOSIS >

**3.**CHECK HEADLAMP SYSTEM

Refer to EXL-6, "Work Flow" (XENON TYPE) or EXL-189, "Work Flow" (HALOGEN TYPE).

>> INSPECTION END

>> INSPECTION END

**4.**CHECK HEATER FAN CONTROL SYSTEM

Refer to VTL-5, "System Description".

>> INSPECTION END

### ELECTRONIC CONTROLLED ENGINE MOUNT

#### < COMPONENT DIAGNOSIS >

### ELECTRONIC CONTROLLED ENGINE MOUNT

### Description

The electronic controlled engine mount control solenoid valve controls the intake manifold vacuum signal for electronic controlled engine mount. The electronic controlled engine mount control solenoid valve is moved by ON/OFF signal from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the solenoid is ON, the intake manifold vacuum signal is sent to the electronic controlled engine mount.

#### Component Function Check

#### **1.**CHECK OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature. Shift selector position is D while depressing the brake pedal and parking brake pedal. 2. Disconnect electronic controlled engine mount control solenoid valve harness connector. 3. Check that body vibration increases compared to the condition of step 2 above (with vehicle stopped). 4. Is the inspection result normal? YES >> INSPECTION END NO >> EC-441, "Diagnosis Procedure". Diagnosis Procedure 1. CHECK VACUUM SOURCE 1. Turn ignition switch OFF. Reconnect electronic controlled engine mount control solenoid valve harness connector. 2. Disconnect vacuum hose connected to electronic controlled engine mount. Start engine and let it idle. 4. 5. Check vacuum hose for vacuum existence.

#### Vacuum should exist.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 2.
- 2.CHECK VACUUM HOSES AND VACUUM GALLERY
- 1. Turn ignition switch OFF.
- 2. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-68. "System Diagram".

#### Is the inspection result normal?

- YES >> GO TO 3.
- >> Repair or replace vacuum hoses and vacuum gallery. NO

| 3. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE POWER SUPPLY |   |
|---|---|
| CIRCUIT   | N |

- 1. Disconnect electronic controlled engine mount control solenoid valve harness connector.
- Turn ignition switch ON. 2.
- Check the voltage between front electronic controlled engine mount harness connector and ground. 3.

| Electronic controlled engine mount<br>control solenoid valve |          | Ground | Voltage         |  |
|--|----------|--------|-----------------|--|
| Connector  | Terminal |        |                 |  |
| F11  | 1        | Ground | Battery voltage |  |

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

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### ELECTRONIC CONTROLLED ENGINE MOUNT

< COMPONENT DIAGNOSIS >

Check the following.

- Harness connectors E6, F123
- 10 A fuse (No. 3)
- Fuse block (J/B) connector E103
- Harness for open or short between electronic controlled engine mount control solenoid valve and fuse

>> Repair open circuit, short to ground or short to power in harness or connectors.

**5.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and electronic controlled engine mount control solenoid valve harness connector.

| ECM       |          | Electronic controlled engine mount control solenoid valve |          | Continuity |
|-----------|----------|---|----------|------------|
| Connector | Terminal | Connector   | Terminal |            |
| F7        | 28       | F11   | 2        | Existed    |

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

Is the inspection result normal?

YES >> GO TO 6.

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

**6.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Refer to EC-442, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

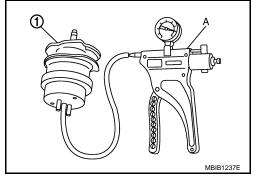
NO >> Replace electronic controlled engine mount control solenoid valve.

#### 7. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

- 1. Turn ignition switch OFF.
- Install vacuum pump (A) to electronic controlled engine mount (1).
- Check that a vacuum is maintained when applying the vacuum of -40 kPa (-0.41 kg/cm<sup>2</sup>, -5.8 psi) to electronic controlled engine mount.
- 4. Also visually check electronic controlled engine mount.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace electronic controlled engine mount.



### 8. CHECK INTERMITTENT INCIDENT

#### Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace intake manifold collector.
- NO >> Repair or replace malfunctioning part.

### **Component Inspection**

INFOID:000000003388255

# $1. {\sf check\ electronic\ controlled\ engine\ mount\ control\ solenoid\ valve}$

#### (I) With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Turn ignition switch ON.



### ELECTRONIC CONTROLLED ENGINE MOUNT

#### < COMPONENT DIAGNOSIS >

- 5. Select "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT-III.
- Check air passage continuity and operation delay time under the following conditions.

| Condition<br>(ENGINE MOUNTING) | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|--------------------------------|--|--|
| TRVL                           | Existed                                    | Not existed                                |
| IDLE                           | Not existed                                | Existed                                    |

#### **Without CONSULT-III**

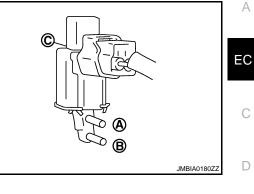
- 1. Turn ignition switch OFF.
- Disconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- Check air passage continuity and operation delay time under the following conditions.

| Condition   | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|---|--|--|
| 12 V direct current supply be-<br>tween terminals 1 and 2 | Existed                                    | Not existed                                |
| No supply   | Not existed                                | Existed                                    |

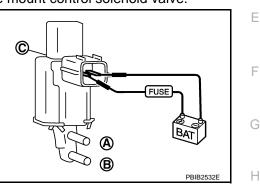
Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electronic controlled engine mount control solenoid valve.



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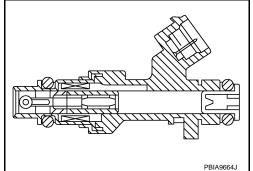
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#### < COMPONENT DIAGNOSIS >

## FUEL INJECTOR

### Description

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



### **Component Function Check**

INFOID:000000003388257

### **1.**INSPECTION START

Turn ignition switch to START.

Are any cylinders ignited?

YES >> GO TO 2.

NO >> Go to EC-444, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

#### With CONSULT-III

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Check that each circuit produces a momentary engine speed drop.

#### Without CONSULT-III

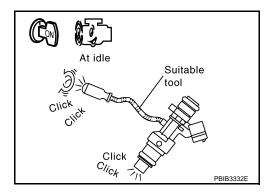
- 1. Start engine.
- 2. Listen to each fuel injector operating sound.

#### Clicking sound should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-444, "Diagnosis Procedure".



INFOID:000000003388258

### 1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

**Diagnosis** Procedure

- 2. Disconnect fuel injector harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between fuel injector harness connector and ground.

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[VQ35DE]

### **FUEL INJECTOR**

#### < COMPONENT DIAGNOSIS >

|   | Fuel injector          |   |                 |                  | _                            |  |
|---|------------------------|---|-----------------|------------------|------------------------------|--|
| Cylinder  | Connector              | Terminal                                      | Ground          | Voltage          |                              |  |
| 1   | F37                    | 1   |                 |                  | _                            |  |
| 2   | F38                    | 1   | -               |                  |                              |  |
| 3   | F39                    | 1   |                 |                  |                              |  |
| 4   | F40                    | 1   | Ground          | Battery voltage  |                              |  |
| 5   | F41                    | 1   | _               |                  |                              |  |
| 6   | F42                    | 1   | _               |                  |                              |  |
| -   | ction result no        | ormal?  |                 |                  | —                            |  |
| YES >>  | GO TO 3.               | <u>, , , , , , , , , , , , , , , , , , , </u> |                 |                  |                              |  |
| •   | GO TO 2.               |   |                 |                  |                              |  |
| <b>Z</b> .DETECT                                | MALFUNCT               | IONING PAF                                    | RT              |                  |                              |  |
| Check the fo                                    |                        |   |                 |                  |                              |  |
| <ul> <li>10 A fuse</li> <li>IPDM E/R</li> </ul> | (No.44)<br>harness con | nector F12                                    |                 |                  |                              |  |
|   |                        |   | fuel injector a | and IPDM E/R     |                              |  |
|   |                        |   |                 |                  |                              |  |
| >>  | Repair open            | circuit, short                                | to ground or    | r short to power | in harness or connectors.    |  |
| <b>3.</b> CHECK I                               |                        | FOR OUTPL                                     | JT SIGNAL C     |                  | OPEN AND SHORT               |  |
| 1. Turn igr                                     | nition switch (        | )FF   |                 |                  |                              |  |
|   | nect ECM har           |   | ctor.           |                  |                              |  |
| 3. Check t                                      | he continuity          | between fue                                   | el injector har | ness connector   | r and ECM harness connector. |  |
|   | <b>-</b>               |   | -               |                  |                              |  |
|   | Fuel injector          | <b>T</b> i i                                  |                 | CM               | Continuity                   |  |
| Cylinder  | Connector              | Terminal                                      | Connector       | Terminal         |                              |  |
| 1   | F37                    | 2   | _               | 32               |                              |  |
| 2   | F38                    | 2   | -               | 31               |                              |  |
| 3   | F39                    | 2   | - F7            | 30               | Existed                      |  |
| 4   | F40                    | 2   | -               | 29               |                              |  |
| 5   | F41                    | 2   | _               | 3                |                              |  |
| 6   | F42                    | 2   |                 | 1                |                              |  |
| 4. Also che                                     | eck harness f          | or short to g                                 | round and sh    | nort to power.   |                              |  |
|   | ction result no        | ormal?  |                 |                  |                              |  |
|   | GO TO 4.               |   |                 | 1 77             |                              |  |
|   | • •                    |   | to ground or    | r short to power | in harness or connectors.    |  |
| 4.CHECK   | FUEL INJEC             | FOR   |                 |                  |                              |  |
| Refer to EC.                                    | -446, "Compo           | onent Inspec                                  | tion".          |                  |                              |  |
| Is the inspec                                   | ction result no        | ormal?  |                 |                  |                              |  |
|   |                        |   |                 |                  |                              |  |
|   | GO TO 5.               | _   |                 |                  |                              |  |
| _NO >>  | Replace mal            | -   | -               |                  |                              |  |
| _NO >>  |                        | -   | -               |                  |                              |  |
| NO >><br>5.CHECK I                              | Replace mal            | NT INCIDE                                     | NT              |                  |                              |  |
| NO >><br>5.CHECK I<br>Refer to <u>GI-</u>       | Replace mai            | NT INCIDEN                                    | NT              |                  |                              |  |

YES >> Replace IPDM E/R. NO >> INSPECTION END

### **FUEL INJECTOR**

### < COMPONENT DIAGNOSIS >

### Component Inspection

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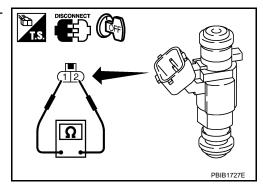
# 1.CHECK FUEL INJECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector harness connector.
- 3. Check resistance between fuel injector terminals as per the following.

| Terminals | Resistance                                |  |
|-----------|---|--|
| 1 and 2   | 11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)] |  |

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning fuel injector.



### **FUEL PUMP**

### < COMPONENT DIAGNOSIS > FUEL PUMP

# Description

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INFOID:000000003388260

[VQ35DE]

|  |                     |                   |                      | EC |
|--|---------------------|-------------------|----------------------|----|
| Sensor   | Input signal to ECM | ECM Function      | Actuator             |    |
| Crankshaft position sensor (POS)<br>Camshaft position sensor (PHASE) | Engine speed*       | Fuel pump control | Fuel pump relay<br>↓ | С  |
| Battery  | Battery voltage*    |                   | Fuel pump            |    |

\*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

| Condition                        | Fuel pump operation    | F |
|----------------------------------|------------------------|---|
| Ignition switch is turned to ON. | Operates for 1 second. |   |
| Engine running and cranking      | Operates.              |   |
| When engine is stopped           | Stops in 1.5 seconds.  | G |
| Except as shown above            | Stops.                 |   |

### **Component Function Check**

### 1. CHECK FUEL PUMP FUNCTION

- 1. Turn ignition switch ON.
- 2. Pinch fuel feed hose with two fingers.
- <>: Vehicle front (Illustration shows the view with intake air duct removed)

# Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> EC-447, "Diagnosis Procedure".

### Diagnosis Procedure

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connector terminals.

|           | +        |           | _        | Voltage         |
|-----------|----------|-----------|----------|-----------------|
| Connector | Terminal | Connector | Terminal |                 |
| F7        | 14       | E16       | 112      | Battery voltage |

#### Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 2. INFOID:000000003388262

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< COMPONENT DIAGNOSIS >

# 2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

#### Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R  |          | Ground | Voltage         |  |
|-----------|----------|--------|-----------------|--|
| Connector | Terminal | Ground | voltage         |  |
| F12       | 77       | Ground | Battery voltage |  |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 16.

**3.**DETECT MALFUNCTIONING PART

#### Check the following.

• IPDM E/R harness connector F12

• Harness for open or short between IPDM E/R and ECM

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### **4.**CHECK CONDENSER POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.

2. Reconnect all harness connectors disconnected.

3. Disconnect condenser harness connector.

4. Turn ignition switch ON.

5. Check the voltage between condenser harness connector and ground.

| Condenser |          | Ground | Voltage   |  |
|-----------|----------|--------|---|--|
| Connector | Terminal | Ground | voltage   |  |
| B81       | 1        | Ground | Battery voltage should exist for 1 second after ignition switch is turned ON. |  |

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 5.

**5.**CHECK 15 A FUSE

1. Turn ignition switch OFF.

2. Disconnect 15 A fuse (No. 41).

3. Check 15 A fuse.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuse.

6.CHECK CONDENSER POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector.

2. Check the continuity between IPDM E/R harness connector and condenser harness connector.

| IPDN      | IPDM E/R |                    | Condenser |            |  |
|-----------|----------|--------------------|-----------|------------|--|
| Connector | Terminal | Connector Terminal |           | Continuity |  |
| E10       | 13       | B81                | 1         | Existed    |  |

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

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 7.

**7.**DETECT MALFUNCTIONING PART

### **FUEL PUMP**

| 2.       Condenser       Ground       Continuity         B81       2       Ground       Existed         3.       Also check harness for short to power.       State         3.       Also check harness for short to power.       State         3.       Also check harness for short to power.       State         3.       Also check harness for short to power.       State         3.       DETECT MALFUNCTIONING PART       Deck the following.         1.       Harness connectors B4. E104 (with rear view monitor)       Harness connectors B4. E104 (with rear view monitor)         Harness for open or short between condenser and ground       >> Repair open circuit or short to power in harness or connectors.         0.       CHECK CONDENSER       Refer to EC-450. "Component Inspection (Condenser)".         8 the inspection result normal?       YES       >> GO TO 11.         NO       >> Replace condenser.       I.         1.       CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III       Disconnector.         .       Check harness connector.       Continuity         connector       Terminal       Connector         .       Dheck harness connector.       Continuity         .       Check harness connector.       Continuity         .       Check harness connec  | Check the folic<br>• Harness con<br>• IPDM E/R co<br>• Harness for<br>>> Re<br>8.CHECK CC<br>1. Turn ignition                                   | owing.<br>nectors E104<br>onnector E10 | 1, B4             |                |                        | [VQ35DE]                         |
|--|---|--|-------------------|----------------|------------------------|----------------------------------|
| Harness connectors E104, B4         IPDM E/R connector E10         Harness for open or short between IPDM E/R and condenser         >> Repair open circuit or short to power in harness or connectors.         CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground. <ul> <li>Condenser</li> <li>Connector Terminal</li> <li>Ground</li> <li>Existed</li> </ul> A. Also check harness for short to power.         athe inspection result normal?         YES       > GO T0 10.         NO       >> GO TO 10.         NO       >> Repair open circuit or short to power in harness or connectors.         O.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".         athe inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1. CHECK FUEL PUMP POWER S  | <ul> <li>Harness con</li> <li>IPDM E/R co</li> <li>Harness for on</li> <li>&gt;&gt; Re</li> <li>8.CHECK CC</li> <li>1. Turn ignition</li> </ul> | nectors E104<br>Innector E10           | -                 |                |                        |                                  |
| >> Repair open circuit or short to power in harness or connectors.         2. CHECK CONDENSER GROUND CIRCUIT         1. Turn ignition switch OFF.         2. Check the continuity between condenser harness connector and ground.         2. Condenser         Solo To 10.         NO         NO         Solo To 90.         DETECT MALFUNCTIONING PART         There is precision result normal?         YES         YES         Solo To 11.         NO         Solo To 11.         NO         Solo To 12.  | >> Re<br><b>8.</b> CHECK CC<br>1. Turn ignitio  | Spen of shor                           | thatwaan IDD      | ME/P and as    | ndancar                |                                  |
| >> Repair open circuit or short to power in harness or connectors.         3.CHECK CONDENSER GROUND CIRCUIT         . Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Image: Connector Terminal Ground Continuity         B81       2         Ground Existed         4. Also check harness for short to power.         is the inspection result normal?         YES       > GO TO 10.         NO       >> GO TO 11.         Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, Condenser)*.         It he inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconneet "fuel level sensor unit and fuel pump" harness connector. <td>8.CHECK CC</td> <td></td> <td>t between IPD</td> <td>M E/R and co</td> <td>ndenser</td> <td></td>  | 8.CHECK CC  |  | t between IPD     | M E/R and co   | ndenser                |                                  |
| CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Condenser       Ground         Connector       Terminal         Bit       2       Ground         Existed       Also check harness for short to power.         Is the inspection result normal?       YES         YES       >> GO TO 10.         NO       >> GO TO 9.         DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>O.</b> CHECK CONDENSER         Refer to EC-450, "Component Inspection (Condenser)".         is the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>11</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         E10       13       B40         13       B40       1         EXETECT MALFUNCT   | 8.CHECK CC  | epair open ci                          | rcuit or short to | o power in har | ness or connectors.    |                                  |
| 2. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         3. Also check harness for short to power.       Statistical Contenses       Statistical Contenses         3. Also check harness for short to power.       Statistical Contenses       Statistical Contenses         2. DETECT MALFUNCTIONING PART       Check the following.         Harness connectors B4, E104 (with rear view monitor)       Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.       O.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".       Sthe inspection result normal?         YES       >> GO T0 11.         NO       >> Replace condenser.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnector       Terminal         connector       Terminal         0       >> Replace condenser.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnectors       Continuity         Connector       Termina  |   |  |                   | •              |                        |                                  |
| 2. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         3. Also check harness for short to power.       Statistical Contenses       Statistical Contenses         3. Also check harness for short to power.       Statistical Contenses       Statistical Contenses         2. DETECT MALFUNCTIONING PART       Check the following.         Harness connectors B4, E104 (with rear view monitor)       Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.       O.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".       Sthe inspection result normal?         YES       >> GO T0 11.         NO       >> Replace condenser.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnector       Terminal         connector       Terminal         0       >> Replace condenser.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnectors       Continuity         Connector       Termina  |   | on switch OF                           | F.                |                |                        |                                  |
| Condenser         Ground         Continuity           Connector         Terminal         Ground         Existed           B81         2         Ground         Existed           Also check harness for short to power.         Sthe inspection result normal?           YES         >> GO TO 10.           NO         >> GO TO 9.           DETECT MALFUNCTIONING PART           Check the following.           Harness connectors B4, E104 (with rear view monitor)           Harness for open or short between condenser and ground           >> Repair open circuit or short to power in harness or connectors. <b>O.</b> CHECK CONDENSER           Refer to EC-450. "Component Inspection (Condenser)".           sthe inspection result normal?           YES         > GO TO 11.           NO         >> Replace condenser. <b>1</b> . CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III           Disconnect "fuel level sensor unit and fuel pump" harness connector.           Connector         Fuel level sensor unit and fuel pump" continuity           pump         Continuity           Connector         Terminal           E10         13           B40         1           E2.         Contor 12.           YES         > GO TO 12. <td></td> <td>continuity be</td> <td>etween conder</td> <td>nser harness (</td> <td>connector and ground.</td> <td></td>   |   | continuity be                          | etween conder     | nser harness ( | connector and ground.  |                                  |
| Connector         Terminal         Ground         Continuity           B81         2         Ground         Existed           Also check harness for short to power.         Statisted           Also check harness for short to power.         Statisted           Sthe inspection result normal?         YES           YES         >> GO TO 10.           NO         >> GO TO 9.           DETECT MALFUNCTIONING PART         Statisted           Check the following.         Harness connectors B4, E104 (with rear view monitor)           Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>O.CHECK CONDENSER</b> Stefer to EC-450. "Component Inspection (Condenser)".           Stefer to EC-450. "Component Inspection (Condenser)".         Ste inspection result normal?           YES         >> GO TO 11.           NO         >> Replace condenser. <b>1.</b> CHECK Fuele PUMP POWER SUPPLY CIRCUIT-IIII           Disconnect "fuel level sensor unit and fuel pump" harness connector. <b>1.</b> Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector. <b>i</b> DDM E/R         Fuel level sensor unit and fuel pump" continuity <b>e</b> To 13         B40         1         Existed  | Conde   | nser                                   |                   |                | _                      |                                  |
| B81       2       Ground       Existed         3. Also check harness for short to power.       athe inspection result normal?         YES       >> GO T0 10.       NO         NO       >> GO T0 9.         J.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO T0 11.         NO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness connector. <b>1.</b> Disconnector         Terminal       Connector         ownector       Terminal         connector       Terminal         pump       Continuity         connector       Terminal         pump       Continuity         Connector       Terminal         E10       13       B40         S the inspection result normal?         <  |   |  | Ground            | Continuity     |                        |                                  |
| Also check harness for short to power.         sthe inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         J.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         IO.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         Connector       Terminal         E10       13       B40         s the inspection result normal?       YES         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connecto   |   | 2                                      | Ground            | Existed        | _                      |                                  |
| YES       >> GO TO 10.         NO       >> GO TO 9.         DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.CHECK CONDENSER</b> Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>11.</b> -CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check namess continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check namess continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13       B40         s the inspection result normal?       YES         YES       > GO TO 13.         NO       >> GO TO 12.         2. DETECT MALFUNCTIONING PART <td>3. Also check</td> <td>k harness for</td> <td>short to powe</td> <td>er.</td> <td>_</td> <td></td> | 3. Also check   | k harness for                          | short to powe     | er.            | _                      |                                  |
| NO       >> GO TO 9.         DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         IO.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         II.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         . Check harness connector.         . Check harness connector.         . Continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         . Continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         . Check harness connector.         . Continuity <u>Connector Terminal Connector Terminal Pump Continuity</u> <u>Connector Terminal Connector Terminal Sector Terminal Connector Terminal Sector 13.         NO       &gt;&gt; GO TO 13.         NO       &gt;&gt; GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104    </u>   | s the inspection  | on result norr                         | <u>mal?</u>       |                |                        |                                  |
| P.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.CHECK CONDENSER</b> Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III</b> .       Disconnect "fuel level sensor unit and fuel pump" harness connector.         2.       Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         1.       IPDM E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal       Continuity         Connector       Terminal       Continuity         Connector       Terminal       Existed         s.the inspection result normal?       YES       >> GO TO 13.         NO       >> GO TO 13.       NO       >> GO TO 12.         2.       DETECT MALFUNCTIONING PART       Check the following.         Harness connectors B4, E104       Harness connectors B4, E104       Harness connectors B4, E104  |   |  |                   |                |                        |                                  |
| Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>IO.CHECK CONDENSER</b> Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>II.</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnect "fuel level sensor unit and fuel pump" harness connector.         2.       Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         connector       Terminal         Connector       Terminal         E10       13       B40         S the inspection result normal?       YES         YES       >> GO TO 13.         NO       >> GO TO 13.         NO       >> GO TO 12. <b>2</b> .DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104  | <b>^</b>  |  |                   |                |                        |                                  |
| Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >>> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         1. PDM E/R       Fuel level sensor unit and fuel pump         continuity       Continuity         Connector       Terminal         E10       13       B40         1       Existed         S the inspection result normal?       YES         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104   |   |  |                   |                |                        |                                  |
| >> Repair open circuit or short to power in harness or connectors. <b>10.CHECK CONDENSER</b> Refer to EC-450, "Component Inspection (Condenser)".         is the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III</b> . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         Connector       Terminal         E10       13         B40       1         Existed         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12. <b>2.DETECT MALFUNCTIONING PART</b> Check the following.         Harness connectors B4, E104  |   | •                                      | E104 (with rea    | r view monito  | r)                     |                                  |
| <b>0.</b> CHECK CONDENSER         Refer to EC-450, "Component Inspection (Condenser)". <b>s</b> the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed       S         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104   | <ul> <li>Harness for a</li> </ul>   | open or shor                           | t between con     | denser and gr  | ound                   |                                  |
| <b>0.</b> CHECK CONDENSER         Refer to EC-450. "Component Inspection (Condenser)". <b>s</b> the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed       St the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104  | 55 D/   | nair anan ai                           | rouit or chort t  | o power in her | noss or connectors     |                                  |
| Refer to EC-450, "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         connector       Terminal         E10       13         B40       1         Existed         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104   | 4.0   |  |                   |                |                        |                                  |
| st the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         st the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104   |   |  |                   | (Condonsor)    | 1                      |                                  |
| YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         Sthe inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104  |   |  |                   | (Condenser)    |                        |                                  |
| 1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         S the inspection result normal?         YES       > GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104  | YES >> G  |  |                   |                |                        |                                  |
| . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         S the inspection result normal?         YES       > GO TO 13.         NO       >> GO TO 12.         DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104   |   |  |                   |                |                        |                                  |
| IPDM E/R       Fuel level sensor unit and fuel pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?       YES       >> GO TO 13.       NO       >> GO TO 12.         DETECT MALFUNCTIONING PART       Check the following.       Harness connectors B4, E104       E104       E104   |   |  |                   |                |                        |                                  |
| pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?       YES       > GO TO 13.       NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART       Check the following.       Harness connectors B4, E104       E104  |   |  |                   |                |                        | "fuel level sensor unit and fuel |
| IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       s the inspection result normal?     YES     >> GO TO 13.       YES     >> GO TO 12.     Image: Continuity of the following.       2.DETECT MALFUNCTIONING PART     Enderstand  |   |  |                   |                |                        |                                  |
| IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       s the inspection result normal?     YES     >> GO TO 13.       YES     >> GO TO 12.     Image: Continuity of the following.       2.DETECT MALFUNCTIONING PART     Enderstand  |   |  | 1                 |                |                        |                                  |
| Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       s the inspection result normal?       YES     >> GO TO 13.       NO     >> GO TO 12.       I2.DETECT MALFUNCTIONING PART       Check the following.       Harness connectors B4, E104   | IPDM  | E/R                                    |                   |                | Continuity             |                                  |
| s the inspection result normal?<br>YES >> GO TO 13.<br>NO >> GO TO 12.<br>2.DETECT MALFUNCTIONING PART<br>Check the following.<br>Harness connectors B4, E104  | Connector   | Terminal                               |                   | •              | Continuity             |                                  |
| YES >> GO TO 13.<br>NO >> GO TO 12.<br>2.DETECT MALFUNCTIONING PART<br>Check the following.<br>Harness connectors B4, E104   | E10   | 13                                     | B40               | 1              | Existed                |                                  |
| NO >> GO TO 12.<br>2.DETECT MALFUNCTIONING PART<br>Check the following.<br>Harness connectors B4, E104   | s the inspection  | on result norr                         | nal?              |                |                        |                                  |
| 2.DETECT MALFUNCTIONING PART<br>Check the following.<br>Harness connectors B4, E104  |   |  |                   |                |                        |                                  |
| Check the following.<br>Harness connectors B4, E104  |   |  |                   | F              |                        |                                  |
| Harness connectors B4, E104  |   |  | IONING PARI       |                |                        |                                  |
|  |   |  | E104              |                |                        |                                  |
| Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R  |   |  |                   | l level sensor | unit and fuel pump" an | nd IPDM E/R                      |
|  |   |  |                   |                |                        |                                  |
| >> Repair open circuit or short to power in harness or connectors.   |   |  |                   | •              | ness or connectors.    |                                  |
| 3.CHECK FUEL PUMP GROUND CIRCUIT   |   |  |                   |                |                        |                                  |
|  |   | t "fuel level s                        | sensor unit and   | d fuel pump" h | arness connector.      |                                  |

### **FUEL PUMP**

#### < COMPONENT DIAGNOSIS >

|           | sor unit and fuel | Ground | Continuity |
|-----------|-------------------|--------|------------|
| Connector | Terminal          | *      |            |
| B40       | 3                 | Ground | Existed    |

Is the inspection result normal?

YES >> GO TO 15. NO >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors B4, E104 (with rear view monitor)

• Harness for open or short between "fuel level sensor unit and fuel pump" and ground

>> Repair open circuit or short to power in harness or connectors.

### 15.CHECK FUEL PUMP

Refer to EC-450, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace fuel pump.

16. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

### Component Inspection (Fuel Pump)

### 1.CHECK FUEL PUMP

- 1. Turn ignition switch OFF.
- 2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 3. Check resistance between "fuel level sensor unit and fuel pump" terminals as per the following.

| Terminals | Resistance                   |
|-----------|------------------------------|
| 1 and 3   | 0.2 - 5.0 Ω [at 25°C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump"

### **Component Inspection (Condenser)**

### **1.**CHECK CONDENSER

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser harness connector.
- 3. Check resistance between condenser terminals as per the following.

| Terminals | Resistance                          |
|-----------|-------------------------------------|
| 1 and 2   | Above 1 M $\Omega$ [at 25°C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser.

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#### < COMPONENT DIAGNOSIS >

### **IGNITION SIGNAL**

#### Description

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

| Component Function Check   | INFOID:000000003388266 | С |
|--|------------------------|---|
| 1.INSPECTION START   |                        |   |
| Turn ignition switch OFF, and restart engine.  |                        | D |
| Does the engine start?   |                        |   |
| YES-1 >> With CONSULT-III: GO TO 2.<br>YES-2 >> Without CONSULT-III: GO TO 3.  |                        | Е |
| NO $>>$ Go to <u>EC-451, "Diagnosis Procedure"</u> .   |                        |   |
| 2. CHECK IGNITION SIGNAL FUNCTION  |                        |   |
| With CONSULT-III   |                        | I |
| <ol> <li>Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.</li> <li>Check that each circuit produces a momentary engine speed drop.</li> </ol> |                        |   |
| Is the inspection result normal?   |                        | G |
| YES >> INSPECTION END  |                        |   |
| NO >> Go to <u>EC-451, "Diagnosis Procedure"</u> .   |                        | Н |
| 3. CHECK IGNITION SIGNAL FUNCTION  |                        |   |

#### Without CONSULT-III

- Let engine idle. 1.
- 2. Read the voltage signal between ECM harness connector terminals with an oscilloscope.

|               | E                              | СМ                    |              |                        | J  |
|---------------|--------------------------------|-----------------------|--------------|------------------------|----|
| 4             | + –                            |                       | -            | Voltage signal         |    |
| Connector     | Terminal                       | Connector             | Terminal     |                        | K  |
|               | 9                              |                       |              |                        |    |
| -             | 10                             |                       |              | 50mSec/div             |    |
|               | 11                             | <b></b>               | 440          |                        | L  |
| F7            | 18                             | E16                   | 112          |                        |    |
|               | 19                             |                       |              |                        | ъл |
|               | 21                             |                       |              | 2V/div JMBIA0035GB     | M  |
| NOTE:         |                                | ·                     |              |                        |    |
| The pulse     | cycle changes                  | s depending on        | rpm at idle. |                        | Ν  |
| Is the inspec | tion result r                  | ormal?                |              |                        |    |
|               | INSPECTIC<br>Go to <u>EC-4</u> | N END<br>51, "Diagnos | is Procedure | <u>e"</u> .            | 0  |
| Diagnosis     | Procedu                        | ire                   |              | INF01D:000000003388267 |    |

### 1. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

Turn ignition switch OFF, wait at least 10 seconds and then turn it ON. 1.

2. Check the voltage between ECM harness connector terminals.

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#### < COMPONENT DIAGNOSIS >

| Connector | +        | _        | Voltage         |
|-----------|----------|----------|-----------------|
| Connector | Terminal | Terminal |                 |
| E16       | 105      | 112      | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to <u>EC-135</u>, "Diagnosis Procedure".

2. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between condenser harness connector and ground.

| Conc      | lenser             | Ground | Voltage         |
|-----------|--------------------|--------|-----------------|
| Connector | Connector Terminal |        | voltage         |
| F13       | 1                  | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

**3.**CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

| IPDN      | IPDM E/R |           | Condenser |            |  |
|-----------|----------|-----------|-----------|------------|--|
| Connector | Terminal | Connector | Terminal  | Continuity |  |
| F12       | 49       | F13       | 1         | Existed    |  |

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

Is the inspection result normal?

YES >> Refer to EC-135, "Diagnosis Procedure".

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

**4.**CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between condenser harness connector and ground.

| Conc      | lenser             | Ground | Continuity |
|-----------|--------------------|--------|------------|
| Connector | Connector Terminal |        | Continuity |
| F13       | 2                  | Ground | Existed    |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK CONDENSER

Refer to EC-455, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace condenser.

#### < COMPONENT DIAGNOSIS >

# 6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

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

| Ignition coil |           |          | Ground | Voltago         |
|---------------|-----------|----------|--------|-----------------|
| Cylinder      | Connector | Terminal | Giouna | Voltage         |
| 1             | F31       | 3        | Ground | Pottonuvoltago  |
| 2             | F32       | 3        |        |                 |
| 3             | F33       | 3        |        |                 |
| 4             | F34       | 3        |        | Battery voltage |
| 5             | F35       | 3        |        |                 |
| 6             | F36       | 3        |        |                 |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness or connectors.

### 7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between ignition coil harness connector and ground.

| Ignition coil |           |          | Ground  | Continuity |
|---------------|-----------|----------|---------|------------|
| Cylinder      | Connector | Terminal | Giodina | Continuity |
| 1             | F31       | 2        | Ground  | Existed    |
| 2             | F32       | 2        |         |            |
| 3             | F33       | 2        |         |            |
| 4             | F34       | 2        |         | Existed    |
| 5             | F35       | 2        |         |            |
| 6             | F36       | 2        |         |            |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ignition coil harness connector and ECM harness connector.

| _ |               |           |          |            |          |            |
|---|---------------|-----------|----------|------------|----------|------------|
|   | Ignition coil |           | E        | Continuity |          |            |
| _ | Cylinder      | Connector | Terminal | Connector  | Terminal | Continuity |
| _ | 1             | F31       | 1        | F7 -       | 11       |            |
|   | 2             | F32       | 1        |            | 10       | *          |
|   | 3             | F33       | 1        |            | 9        | Existed    |
|   | 4             | F34       | 1        |            | 21       | LAISted    |
|   | 5             | F35       | 1        |            | 19       | -          |
|   | 6             | F36       | 1        |            | 18       |            |

3. Also check harness for short to ground and short to power. Is the inspection result normal? A

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< COMPONENT DIAGNOSIS >

YES >> GO TO 9.

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

**9.**CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-454. "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning ignition coil with power transistor.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

#### >> INSPECTION END

### Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000003388268

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.

2. Disconnect ignition coil harness connector.

3. Check resistance between ignition coil terminals as per the following.

| Terminal No. (Polarity) | Resistance Ω [at 25°C (77°F)] |
|-------------------------|-------------------------------|
| 1 and 2                 | Except 0 or ∞                 |
| 1 and 3                 | Except 0                      |
| 2 and 3                 | Except 0                      |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning ignition coil with power transistor.

2.CHECK IGNITION COIL WITH POWER TRANSISTOR-II

#### CAUTION:

#### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
- NOTE:

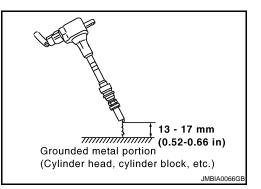
Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- 4. Start engine.
- 5. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 6. Turn ignition switch OFF.
- 7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 8. Remove ignition coil and spark plug of the cylinder to be checked.
- 9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 10. Connect spark plug and harness connector to ignition coil.
- 11. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 12. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### **CAUTION:**

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful



| < COMPONENT DIAGNOSIS > [VQ35DE  | :]      |
|--|---------|
| not to get an electrical shock while checking, because the electrical discharge voltage become 20 kV or more.  | es<br>A |
| <ul> <li>It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.</li> </ul>   |         |
| NOTE:<br>When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is ma<br>functioning.  | EC      |
| Is the inspection result normal?   |         |
| YES >> INSPECTION END<br>NO >> Replace malfunctioning ignition coil with power transistor.   | С       |
| Component Inspection (Condenser)   | 269     |
| 1. CHECK CONDENSER   | D       |
| <ol> <li>Turn ignition switch OFF.</li> <li>Disconnect condenser harness connector.</li> <li>Check resistance between condenser terminals as per the following.</li> </ol> | E       |
| Terminals Resistance   | F       |
| 1 and 2 Above 1 MΩ [at 25C° (77C°)]  |         |
| <u>Is the inspection result normal?</u><br>YES >> INSPECTION END   | G       |
| NO >> Replace condenser.   | Н       |
|  | 11      |
|  | I       |
|  |         |
|  | J       |
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#### < COMPONENT DIAGNOSIS >

### MALFUNCTION INDICATOR LAMP

### Description

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will illuminate when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should turn off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to EC-102, "Diagnosis Description".

# SERVICE ENG SOON SEF217U

### **Component Function Check**

**1.**CHECK MIL FUNCTION

Turn ignition switch ON. 1.

Check that MIL illuminates. 2.

Is the inspection result normal?

YES >> INSPECTION END

>> Go to EC-456, "Diagnosis Procedure". NO

### **Diagnosis** Procedure

1.CHECK DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC UXXXX.

2. CHECK COMBINATION METER FUNCTION

Refer to MWI-34, "CONSULT-III Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

 ${
m 3.}$ CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair or replace. INFOID:000000003388272

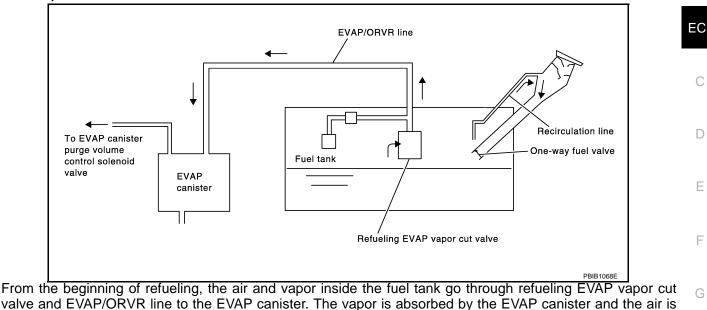
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[VQ35DE]

#### < COMPONENT DIAGNOSIS >

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### Description



#### released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and Н refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

#### WARNING:

| <ul> <li>When conducting inspections below, be sure to observe the following:</li> <li>Put a "CAUTION: FLAMMABLE" sign in workshop.</li> </ul>   |                        |   |
|--|------------------------|---|
| <ul> <li>Never smoke while servicing fuel system. Keep open flames and sparks away from work</li> </ul>  | rk area.               |   |
| <ul> <li>Always to furnish the workshop with a CO<sub>2</sub> fire extinguisher.</li> </ul>  |                        | J |
| CAUTION:   |                        |   |
| Before removing fuel line parts, carry out the following procedures:   |                        |   |
| <ul> <li>Put drained fuel in an explosion-proof container and put lid on securely.</li> <li>Release fuel pressure from fuel line. Refer to <u>EC-545</u>, "Inspection".</li> </ul>               |                        | K |
| - Disconnect battery ground cable.   |                        |   |
| • Always replace O-ring when the fuel gauge retainer is removed.   |                        |   |
| <ul> <li>Never kink or twist hose and tube when they are installed.</li> </ul>   |                        | L |
| Never tighten hose and clamps excessively to avoid damaging hoses.   |                        |   |
| <ul> <li>After installation, run engine and check for fuel leakage at connections.</li> <li>Never attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically</li> </ul> | ,                      |   |
| Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire   |                        | M |
| Component Function Check   | INFOID:000000003388274 |   |
| 1. CHECK ORVR FUNCTION   | I                      | Ν |
|  |                        |   |
| Check whether the following symptoms are present.  |                        |   |
| <ul> <li>Fuel odor from EVAP canister is strong.</li> <li>Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.</li> </ul>   | (                      | 0 |
| Are any symptoms present?  |                        |   |
| YES >> Go to <u>EC-457</u> , "Diagnosis Procedure".  |                        |   |
| NO $>>$ INSPECTION END   | l                      | Ρ |
|  |                        |   |
| Diagnosis Procedure  | INFOID:000000003388275 |   |
| 1.INSPECTION START   |                        |   |
| Check whether the following symptoms are present.  |                        |   |

A: Fuel odor from EVAP canister is strong.

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[VQ35DE]

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

<u>A or B</u> A >> GO TO 2.

B >> GO TO 7.

2. CHECK EVAP CANISTER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
- 2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

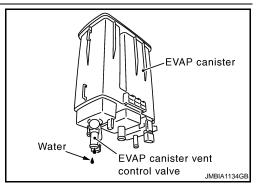
YES >> GO TO 3. NO >> GO TO 4.

3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



### **4.**REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

**6.**CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-460, "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

**7.**CHECK EVAP CANISTER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
- Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

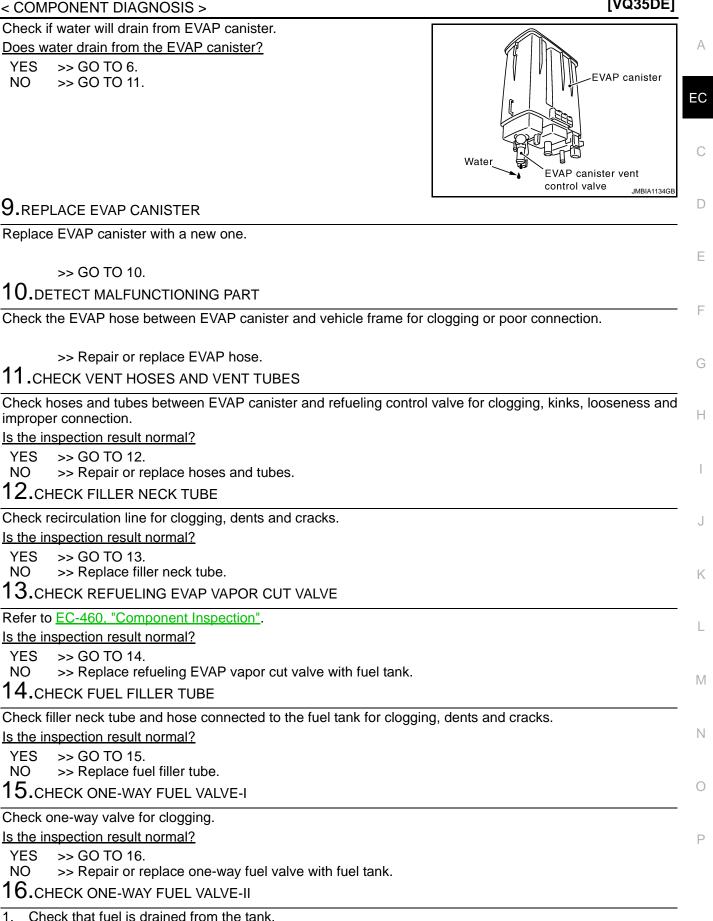
Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 9.

 $\mathbf{8}$ .CHECK IF EVAP CANISTER IS SATURATED WITH WATER

[VQ35DE]



1

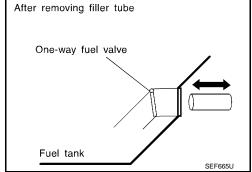
2. Remove fuel filler tube and hose.

#### < COMPONENT DIAGNOSIS >

 Check one-way fuel valve for operation as per the following. When a stick is inserted, the valve should open, when removing stick it should close.
 Do not drop any material into the tank.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



Component Inspection

INFOID:000000003388276

[VQ35DE]

#### **1.**INSPECTION START

Will CONSULT-III be used?

#### Will CONSULT-III be used?

YES >> GO TO 2.

NO >> GO TO 3.

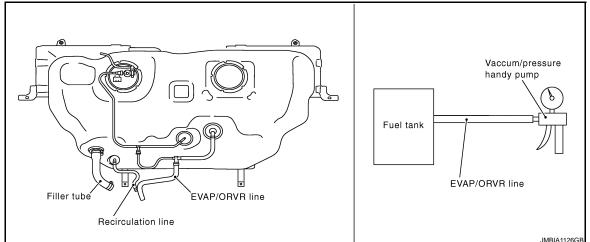
**2.**CHECK REFUELING EVAP VAPOR CUT VALVE

#### With CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Remove fuel tank. Refer to FL-12, "Removal and Installation".
- 3. Drain fuel from the tank as per the following:
- Remove fuel feed hose located on the fuel gauge retainer.
- Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
- Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
- Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
- 5. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
- Connect vacuum pump to hose end.
- Remove fuel gauge retainer with fuel gauge unit.

#### Always replace O-ring with new one.

- Turn fuel tank upside down.
- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



#### Is the inspection result normal?

YES >> INSPECTION END

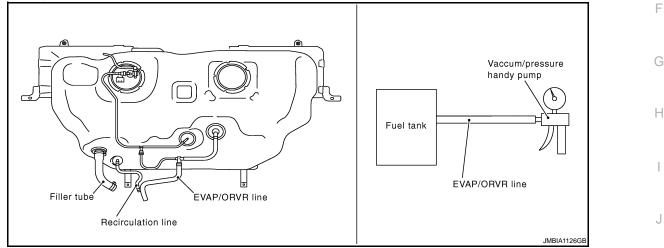
NO >> Replace refueling EVAP vapor cut valve with fuel tank.

< COMPONENT DIAGNOSIS >

**3.**CHECK REFUELING EVAP VAPOR CUT VALVE

#### Without CONSULT-III

- 1. Turn ignition switch OFF.
- 2. Remove fuel tank. Refer to FL-12, "Removal and Installation".
- 3. Drain fuel from the tank as per the following:
- Remove fuel gauge retainer.
- Drain fuel from the tank using a handy pump into a fuel container.
- 4. Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
- 5. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
- Connect vacuum pump to hose end.
- Remove fuel gauge retainer with fuel gauge unit.
- Always replace O-ring with new one.
- Turn fuel tank upside down.
- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace refueling EVAP vapor cut valve with fuel tank.

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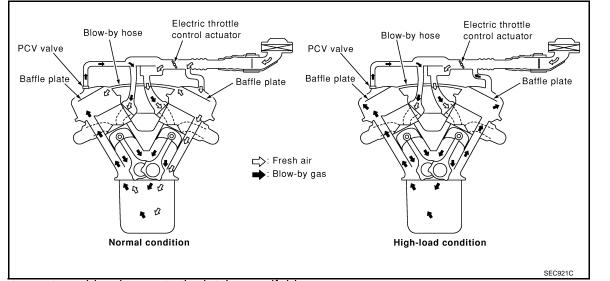
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#### < COMPONENT DIAGNOSIS >

### POSITIVE CRANKCASE VENTILATION

#### Description



This system returns blow-by gas to the intake manifold.

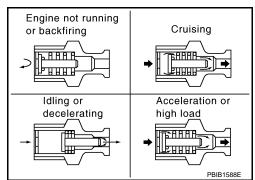
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is drawn from the air inlet tubes into the crankcase. In this process the air passes through

the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



INFOID:000000003388278

### **Component Inspection**

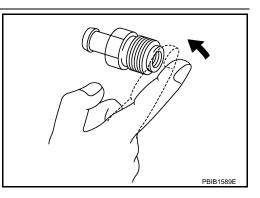
### **1.**CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace PCV valve.



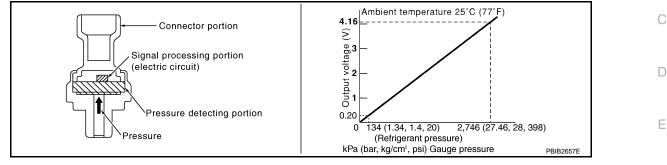
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#### < COMPONENT DIAGNOSIS >

# REFRIGERANT PRESSURE SENSOR

### Description

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



### **Component Function Check**

### 1.CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn A/C switch and blower fan switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

|                      | ECM   |                       |                        | -                      |   |
|----------------------|---|-----------------------|------------------------|------------------------|---|
| Connector            | +   | _                     | Voltage (V)            |                        | 1 |
| Connector            | Terminal  | Terminal              |                        |                        |   |
| F8                   | 39<br>(Refrigerant pressure sensor signal)  | 40<br>(Sensor ground) | 1.0 - 4.0              | -                      | J |
| YES >> IN<br>NO >> G | ion result normal?<br>NSPECTION END<br>to to <u>EC-463. "Diagnosis Procedu</u><br>Dressedures | <u>'e"</u> .          |                        | -                      | K |
| Diagnosis            | Procedure   |                       |                        | INFOID:000000003388281 |   |
| 1.снеск с            | ROUND CONNECTION  |                       |                        |                        | L |
| 2. Turn ignit        | switch and blower fan switch OFF<br>ion switch OFF.<br>ound connection E38. Refer to Gro      |                       | n <u>GI-43, "Circu</u> | it Inspection".        | Μ |
| YES >> G             | ion result normal?<br>iO TO 2.<br>epair or replace ground connectio                           | n.                    |                        |                        | Ν |
| 2.CHECK RI           | EFRIGERANT PRESSURE SENS  | OR POWER SU           | PPLY CIRCUI            | г                      |   |
| 2. Turn ignit        | ct refrigerant pressure sensor har<br>ion switch ON.  |                       |                        |                        | 0 |
| 3. Check the         | e voltage between refrigerant pres  | sure sensor harn      | ess connector          | and ground.            | Ρ |
| Refrigeran           | t pressure sensor Ground  | Voltage (V)           | -                      |                        |   |

| Refrigerant pr | essure sensor | Ground | Voltage (V) |  |
|----------------|---------------|--------|-------------|--|
| Connector      | Terminal      | Ground |             |  |
| E300           | 1             | Ground | Approx. 5   |  |

Is the inspection result normal?

YES >> GO TO 4.

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### **REFRIGERANT PRESSURE SENSOR**

< COMPONENT DIAGNOSIS >

# 3. DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connectors F123, E6
- IPDM E/R harness connectors E10, E346
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit, short to ground or short to power in harness or connectors.

### 4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor |          | ECM       |          | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector                   | Terminal | Connector | Terminal | Continuity |
| E300                        | 3        | F8        | 40       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F123, E6

• IPDM E/R harness connectors E10, E346

• Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### 6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor |          | ECM       |          | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector                   | Terminal | Connector | Terminal | Continuity |
| E300                        | 2        | F8        | 39       | Existed    |

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

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 7.

#### 7.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F123, E6
- IPDM E/R harness connectors E10, E346
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit, short to ground or short to power in harness or connectors.

#### 8. CHECK INTERMITTENT INCIDENT

Refer to GI-40, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor.

# **REFRIGERANT PRESSURE SENSOR**

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#### < COMPONENT DIAGNOSIS >

### VARIABLE INDUCTION AIR SYSTEM

### Description

Power Valves 1 and 2

The power valves 1 and 2 are installed in intake manifold collector and used to control the suction passage of the variable induction air control system. They are set in the fully closed or fully opened position by the power valve actuators 1 and 2 operated by the vacuum stored in the vacuum tank. The vacuum to power valve actuators is controlled by the VIAS control solenoid valves 1 and 2.

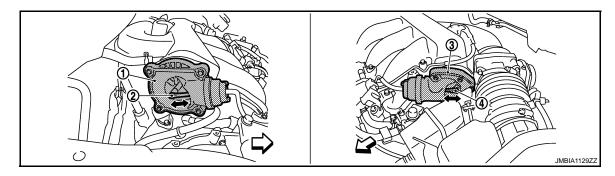
### Component Function Check

INFOID:000000003388283

### **1.**CHECK OVERALL FUNCTION-I

#### With CONSULT-III

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT-III.
- 3. Turn VIAS control solenoid valve 1 "ON" and "OFF", and check that power valve actuator 1 rod moves.



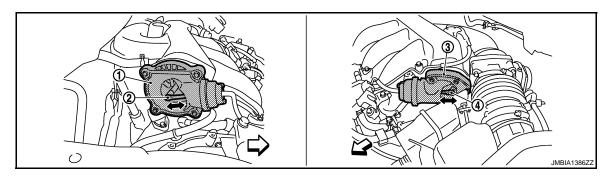
- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- Power valve actuator 2

3.

- 4. Power valve actuator 2 rod
- : Vehicle front

#### **Without CONSULT-III**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Rev engine quickly up to approximately 5,000 rpm.
- 3. Check that power valve actuator 1 rod moves.



- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- 3. Power valve actuator 2

. . . . .

Power valve actuator 2 rod

- Is the inspection result normal?
- YES >> GO TO 2.

: Vehicle front

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- NO >> <u>EC-467, "Diagnosis Procedure"</u>.
- 2. CHECK OVERALL FUNCTION-II

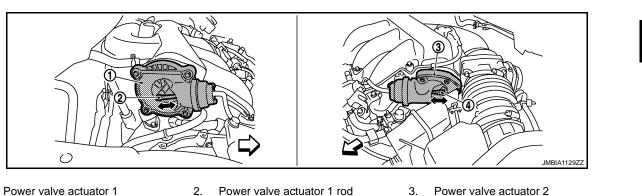
#### With CONSULT-III

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### VARIABLE INDUCTION AIR SYSTEM

#### < COMPONENT DIAGNOSIS >

- Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT-III. 1.
- 2. Turn VIAS control solenoid valve 2 "ON" and "OFF", and check that power valve actuator 2 rod moves.



3.

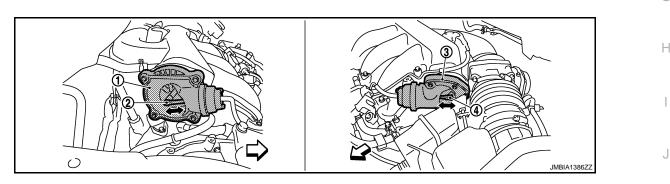
3.

Power valve actuator 2

- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- Power valve actuator 2 rod 4.
- : Vehicle front

#### **Without CONSULT-III**

- When revving engine up to 5,000 rpm quickly. 1
- Rev engine quickly up to approximately 5,000 rpm. 2.
- Check that power valve actuator 2 rod moves. 3.



- Power valve actuator 1 1.
- Power valve actuator 2 rod
- : Vehicle front  $\triangleleft$

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> EC-467, "Diagnosis Procedure".

### **Diagnosis Procedure**

#### **1.**INSPECTION START

Confirm the malfunctioning system (power valve 1 or power valve 2). Refer to EC-466, "Component Function Check".

Power valve actuator 1 rod

Which system is related to the incident?

Power valve 1>>GO TO 2. Power valve 2>>GO TO 6.

**2.**CHECK VACUUM EXISTENCE-I

#### (P) With CONSULT-III

1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.

2.

- 2. Start engine and let it idle.
- Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT-III. 3.
- 4. Turn VIAS control solenoid valve 1 ON and OFF, and check vacuum existence under the following conditions.

### EC-467

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### VARIABLE INDUCTION AIR SYSTEM

#### < COMPONENT DIAGNOSIS >

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| VIAS S/V-1 | Vacuum      |
|------------|-------------|
| ON         | Existed     |
| OFF        | Not existed |

#### **Without CONSULT-III**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

| Condition  | Vacuum      |
|--|-------------|
| Idle   | Existed     |
| Rev engine quickly up to approximately 5,000 rpm | Not existed |

Is the inspection result normal?

YES >> Repair or replace power valve actuator 1.

NO >> GO TO 3.

### 3. CHECK VACUUM TANK

- 1. Stop engine and disconnect vacuum hose connected to intake manifold collector.
- 2. Start engine and let it idle.
- 3. Check vacuum existence from intake manifold collector.

Does vacuum existence from the intake manifold collector?

YES >> GO TO 4.

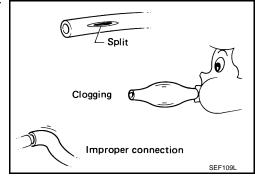
NO >> Replace intake manifold collector.

#### **4.**CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-94, "System Diagram"</u>.

#### Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair hoses or tubes.



### 5. CHECK VIAS CONTROL SOLENOID VALVE 1

Refer to EC-394, "Component Inspection".

#### Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace VIAS control solenoid valve 1.

#### 6.CHECK VACUUM EXISTENCE-II

#### With CONSULT-III

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Start engine and let it idle.
- 3. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT-III.
- Turn VIAS control solenoid valve 2 ON and OFF, and check vacuum existence under the following conditions.

## VARIABLE INDUCTION AIR SYSTEM

< COMPONENT DIAGNOSIS >

| VIAS S/V 2 | Vacuum      |
|------------|-------------|
| ON         | Existed     |
| OFF        | Not existed |

#### **Without CONSULT-III**

- Stop engine and disconnect vacuum hose connected to power valve actuator 2. 1.
- Disconnect VIAS control solenoid valve 1 harness connector. 2.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

| Condition  | Operation   |
|--|-------------|
| Idle   | Existed     |
| Rev engine quickly up to approximately 5,000 rpm | Not existed |

#### Is the inspection result normal?

YES >> Repair or replace power valve actuator 2.

NO >> GO TO 7.

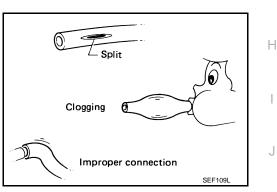
#### 7. CHECK VACUUM HOSE

- 1. Stop engine.
- 2. Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to EC-94, "System Diagram".

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair hoses or tubes.



| 8. CHECK VIAS CONTROL SOLENOID VALVE 2       | K |
|--|---|
| Refer to EC-397, "Component Inspection".     |   |
| Is the inspection result normal?             |   |
| YES >> GO TO 9.                              | L |
| NO >> Replace VIAS control solenoid valve 2. |   |
| 9. CHECK INTERMITTENT INCIDENT               |   |
| Pofer to CL 40. "Intermittent Incident"      | M |

Refer to <u>GI-40, "Intermittent Incident"</u>.

>> INSPECTION END

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# ECU DIAGNOSIS ECM

## **Reference Value**

VALUES ON THE DIAGNOSIS TOOL

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector. \* Specification data may not be directly related to their components signals/values/operations.
- I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIM-ING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

| Monitor Item              | 0   | Condition  | Values/Status           |  |  |
|---------------------------|---|--|-------------------------|--|--|
| ENG SPEED                 | Run engine and compare CONSUL   | Almost the same speed as the tachometer indication.  |                         |  |  |
| MAS A/F SE-B1             | See EC-127, "Description".  |  |                         |  |  |
| B/FUEL SCHDL              | See EC-127, "Description".  |  |                         |  |  |
| A/F ALPHA-B1              | See EC-127, "Description".  |  |                         |  |  |
| A/F ALPHA-B2              | See EC-127, "Description".  |  |                         |  |  |
| COOLAN TEMP/S             | Engine: After warming up  |  | More than 70°C (158°F)  |  |  |
| A/F SEN1 (B1)             | Engine: After warming up  | Maintaining engine speed at 2,000 rpm  | Fluctuates around 2.2 V |  |  |
| A/F SEN1 (B2)             | Engine: After warming up  | Maintaining engine speed at 2,000 rpm  | Fluctuates around 2.2 V |  |  |
| HO2S2 (B1)                | are met.<br>- Engine: After warming up  | <ul> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at</li> </ul> |                         |  |  |
| HO2S2 (B2)                | <ul> <li>Revving engine from idle to 3,000 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwee idle for 1 minute under no load</li> </ul> | 0 - 0.3 V ←→ Approx. 0.6 -<br>1.0 V  |                         |  |  |
| HO2S2 MNTR (B1)           | <ul> <li>Revving engine from idle to 3,000 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwee idle for 1 minute under no load</li> </ul> | $LEAN \leftarrow \rightarrow RICH$   |                         |  |  |
| HO2S2 MNTR (B2)           | <ul> <li>Revving engine from idle to 3,000 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betwee idle for 1 minute under no load</li> </ul> | $LEAN \leftarrow \rightarrow RICH$   |                         |  |  |
| VHCL SPEED SE             | Turn drive wheels and compare C dication.   | <ul> <li>Turn drive wheels and compare CONSULT-III value with the speedometer in-<br/>dication.</li> </ul>                       |                         |  |  |
| BATTERY VOLT              | Ignition switch: ON (Engine stopp   | ed)  | 11 - 14 V               |  |  |
|                           | Ignition switch: ON   | Accelerator pedal: Fully released  | 0.5 - 1.0 V             |  |  |
| ACCEL SEN 1               | (Engine stopped)  | Accelerator pedal: Fully depressed   | 4.2 - 4.8 V             |  |  |
|                           | Ignition switch: ON   | Accelerator pedal: Fully released  | 0.5 - 1.0 V             |  |  |
| ACCEL SEN 2* <sup>1</sup> | (Engine stopped)  | Accelerator pedal: Fully depressed   | 4.2 - 4.8 V             |  |  |

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#### < ECU DIAGNOSIS >

| Monitor Item              | Condition   |  | Values/Status                           |     |
|---------------------------|---|--|---|-----|
|                           | Ignition switch: ON   | Accelerator pedal: Fully released  | More than 0.36 V                        | A   |
| TP SEN 1-B1               | <ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>                                     | Accelerator pedal: Fully depressed   | Less than 4.75 V                        |     |
|                           | Ignition switch: ON   | Accelerator pedal: Fully released  | More than 0.36 V                        | EC  |
| TP SEN 2-B1* <sup>1</sup> | <ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>                                     | Accelerator pedal: Fully depressed   | Less than 4.75 V                        | -   |
| FUEL T/TMP SE             | Ignition switch: ON   |  | Indicates fuel tank tempera-<br>ture    | С   |
| INT/A TEMP SE             | Ignition switch: ON   |  | Indicates intake air tempera-<br>ture   | D   |
| EVAP SYS PRES             | Ignition switch: ON   |  | Approx. 1.8 - 4.8 V                     | -   |
| FUEL LEVEL SE             | Ignition switch: ON   |  | Depending on fuel level of<br>fuel tank | E   |
| START SIGNAL              | • Ignition switch: $ON \rightarrow START \rightarrow O$   | N  | $OFF\toON\toOFF$                        | -   |
| CLSD THL POS              | Ignition switch: ON   | Accelerator pedal: Fully released  | ON                                      | -   |
| CESD THE FOS              | (Engine stopped)  | Accelerator pedal: Slightly depressed  | OFF                                     | F   |
|                           | • Engine: After warming up, idle the  | Air conditioner switch: OFF  | OFF                                     | -   |
| AIR COND SIG              | engine  | Air conditioner switch: ON<br>(Compressor operates.)                                     | ON                                      | G   |
| P/N POSI SW               | Ignition switch: ON   | Selector lever: P or N position  | ON                                      | -   |
| P/IN POSI 5W              | • Ignition switch. ON   | Selector lever: Except above position  | OFF                                     | Н   |
| PW/ST SIGNAL              | • Engine: After warming up, idle the  | Steering wheel: Not being turned   | OFF                                     | -   |
| FW/ST SIGNAL              | engine  | Steering wheel: Being turned   | ON                                      | -   |
|                           | Ignition switch: ON   | Rear window defogger switch: ON<br>and/or  | ON                                      |     |
| LOAD SIGNAL               |   | Lighting switch: 2nd position<br>Rear window defogger switch and lighting<br>switch: OFF | OFF                                     | J   |
| IGNITION SW               | • Ignition switch: $ON \rightarrow OFF \rightarrow ON$  |  | $ON \rightarrow OFF \rightarrow ON$     | -   |
|                           | Engine: After warming up, idle the  | Heater fan switch: ON  | ON                                      | K   |
| HEATER FAN SW             | engine  | Heater fan switch: OFF   | OFF                                     | -   |
|                           |   | Brake pedal: Fully released  | OFF                                     | -   |
| BRAKE SW                  | Ignition switch: ON   | Brake pedal: Slightly depressed  | ON                                      | L   |
|                           | Engine: After warming up  | Idle   | 2.0 - 3.0 msec                          | -   |
| INJ PULSE-B1              | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | 2,000 rpm  | 1.9 - 2.9 msec                          | M   |
|                           | Engine: After warming up  | Idle   | 2.0 - 3.0 msec                          | -   |
| INJ PULSE-B2              | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | 2,000 rpm  | 1.9 - 2.9 msec                          | - N |
|                           | Engine: After warming up  | Idle   | 7 - 17°BTDC                             | 0   |
| IGN TIMING                | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | 2,000 rpm  | 25 - 45°BTDC                            | -   |
|                           | Engine: After warming up  | Idle   | 5 - 35%                                 | P   |
| CAL/LD VALUE              | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | 2,500 rpm  | 5 - 35%                                 | -   |
|                           | Engine: After warming up  | Idle   | 2.0 - 6.0 g⋅m/s                         | -   |
| MASS AIRFLOW              | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | 2,500 rpm  | 7.0 - 20.0 g⋅m/s                        | -   |

| Monitor Item   | C  | ondition   | Values/Status                        |
|----------------|--|--|--------------------------------------|
| PURG VOL C/V   | <ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>                        | Idle<br>(Accelerator pedal: Not depressed even<br>slightly, after engine starting.)<br>2,000 rpm | 0%<br>—                              |
|                | Engine: After warming up   |  | –5 - 5°CA                            |
| INT/V TIM (B1) | <ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>  | 2,000 rpm  | Approx. 0 - 30°CA                    |
|                | Engine: After warming up   | Idle   | –5 - 5°CA                            |
| INT/V TIM (B2) | <ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>  | 2,000 rpm  | Approx. 0 - 30°CA                    |
|                | Engine: After warming up   | Idle   | 0 - 2%                               |
| INT/V SOL (B1) | <ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>  | 2,000 rpm  | Approx. 0 - 50%                      |
|                | Engine: After warming up   | Idle   | 0 - 2%                               |
| INT/V SOL (B2) | <ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>  | 2,000 rpm  | Approx. 0 - 50%                      |
| VIAS S/V-1     | <ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>                        | When revving engine up to 5,000 rpm quickly  | $OFF \rightarrow ON \rightarrow OFF$ |
| VIAS S/V-2     | <ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>                        | When revving engine up to 5,000 rpm quickly  | $OFF \rightarrow ON \rightarrow OFF$ |
|                |  | Air conditioner switch: OFF  | OFF                                  |
| AIR COND RLY   | Engine: After warming up, idle the engine  | Air conditioner switch: ON<br>(Compressor operates)  | ON                                   |
|                |  | Below 950 rpm  | IDLE                                 |
| ENGINE MOUNT   | Engine: After warming up   | Above 950 rpm  | TRVL                                 |
| FUEL PUMP RLY  | <ul><li>For 1 second after turning ignition</li><li>Engine running or cranking</li></ul>   | switch: ON   | ON                                   |
|                | Except above   |  | OFF                                  |
| VENT CONT/V    | Ignition switch: ON  |  | OFF                                  |
| THRTL RELAY    | Ignition switch: ON  |  | ON                                   |
|                |  | Engine coolant temperature: 97°C<br>(206°F) or less  | OFF                                  |
| COOLING FAN    | Engine: After warming up, idle the engine  | Engine coolant temperature: Between<br>98°C (208°F) and 99°C (210°F)                             | LOW                                  |
| COOLING FAN    | Air conditioner switch: OFF  | Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)                              | MID                                  |
|                |  | Engine coolant temperature: 105°C<br>(221°F) or more   | н                                    |
| HO2S2 HTR (B1) | <ul> <li>Engine speed: Below 3,600 rpm a</li> <li>Engine: After warming up</li> <li>Keeping the engine speed betwee<br/>idle for 1 minute under no load</li> </ul> | fter the following conditions are met.<br>n 3,500 and 4,000 rpm for 1 minute and at              | ON                                   |
|                | Engine speed: Above 3,600 rpm  | OFF  |                                      |

#### < ECU DIAGNOSIS >

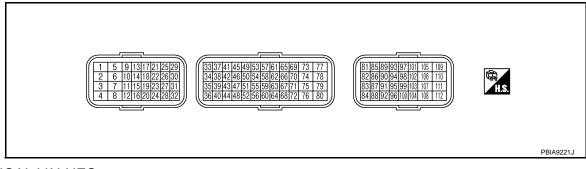
| Monitor Item        | C  | Condition  | Values/Status                                       |
|---------------------|--|--|---|
| HO2S2 HTR (B2)      | <ul> <li>Engine speed: Below 3,600 rpm a</li> <li>Engine: After warming up</li> <li>Keeping the engine speed betwee<br/>idle for 1 minute under no load</li> </ul> | fter the following conditions are met.<br>en 3,500 and 4,000 rpm for 1 minute and at | ON  |
|                     | Engine speed: Above 3,600 rpm  |  | OFF   |
| I/P PULLY SPD       | Vehicle speed: More than 20 km/h   | n (12 MPH)   | Almost the same speed as the tachometer indication  |
| VEHICLE SPEED       | • Turn drive wheels and compare C dication.  | ONSULT-III value with the speedometer in-  | Almost the same speed as the speedometer indication |
| IDL A/V LEARN       | Engine: Running  | Idle air volume learning has not been per-<br>formed yet.                            | YET   |
|                     |  | Idle air volume learning has already been performed successfully.                    | CMPLT   |
| ENG OIL TEMP        | Engine: After warming up   |  | More than 70°C (158°F)                              |
| TRVL AFTER MIL      | Ignition switch: ON  | Vehicle has traveled after MIL has illumi-<br>nated.                                 | 0 - 65,535 km<br>(0 - 40,723 miles)                 |
| A/F S1 HTR (B1)     | Engine: After warming up, idle the<br>(More than 140 seconds after star  |  | 4 - 100%  |
| A/F S1 HTR (B2)     | Engine: After warming up, idle the<br>(More than 140 seconds after star  |  | 4 - 100%  |
| AC PRESS SEN        | <ul><li>Engine: Idle</li><li>Both A/C switch and blower fan sw</li></ul>   | witch: ON (Compressor operates)  | 1.0 - 4.0 V   |
| VHCL SPEED SE       | • Turn drive wheels and compare C dication.  | ONSULT-III value with the speedometer in-  | Almost the same speed as the speedometer indication |
| SET VHCL SPD        | Engine: Running  | Engine: Running ASCD: Operating  |   |
| MAIN SW             | Ignition switch: ON  | MAIN switch: Pressed   | ON  |
|                     | ignition switch. Or  | MAIN switch: Released  | OFF   |
| CANCEL SW           | <ul> <li>Ignition switch: ON</li> </ul>  | CANCEL switch: Pressed   | ON  |
| O, ITOLL OW         |  | CANCEL switch: Released  | OFF   |
| RESUME/ACC SW       | Ignition switch: ON  | RESUME/ACCELERATE switch:<br>Pressed   | ON  |
| RESOME/ACC SW       |  | RESUME/ACCELERATE switch: Re-<br>leased  | OFF   |
| SET SW              | Ignition switch: ON  | SET/COAST switch: Pressed  | ON  |
| SET SW              |  | SET/COAST switch: Released   | OFF   |
| BRAKE SW1           | <ul> <li>Ignition switch: ON</li> </ul>  | Brake pedal: Fully released  | ON  |
| (ASCD brake switch) | ignition switch. Or  | Brake pedal: Slightly depressed  | OFF   |
| BRAKE SW2           | Ignition switch: ON  | Brake pedal: Fully released  | OFF   |
| (Stop lamp switch)  | · Ignition switch. ON  | Brake pedal: Slightly depressed  | ON  |
| VHCL SPD CUT        | Ignition switch: ON  |  | NON   |
| LO SPEED CUT        | Ignition switch: ON  |  | NON   |
| AT OD MONITOR       | Ignition switch: ON  |  | OFF   |
| AT OD CANCEL        | Ignition switch: ON  |  | OFF   |
| CRUISE LAMP         | Ignition switch: ON  | MAIN switch: Pressed at the 1st time $\rightarrow$ at the 2nd time                   | $ON \rightarrow OFF$                                |
|                     | MAIN switch: ON  | ASCD: Operating  | ON  |
| SET LAMP            | <ul> <li>When vehicle speed is between<br/>40 km/h (25 MPH) and 144 km/h<br/>(89 MPH)</li> </ul>   | ASCD: Not operating  | OFF   |

| Monitor Item | Condition  | Values/Status            |
|--------------|--|--------------------------|
| ALT DUTY     | Engine: Idle   | 0 - 80%                  |
| A/F ADJ-B1   | Engine: Running  | -0.330 - 0.330           |
| A/F ADJ-B2   | Engine: Running  | -0.330 - 0.330           |
| BAT CUR SEN  | <ul> <li>Engine speed: Idle</li> <li>Battery: Fully charged*<sup>2</sup></li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul> | Approx. 2,600 - 3,500 mV |
| ALT DUTY SIG | Power generation voltage variable control: Operating   | ON                       |
| ALI DOTT SIG | Power generation voltage variable control: Not operating   | OFF                      |

\*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

#### TERMINAL LAYOUT



## PHYSICAL VALUES

#### NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values.
- Pulse signal is measured by CONSULT-III.

| Termin       | al No.     | Description                         |                  |  | Value  |             |
|--------------|------------|-------------------------------------|------------------|--|--|-------------|
| +            |            | Signal name                         | Input/<br>Output | Condition  | (Approx.)  |             |
| 1<br>(P/B)   |            | Fuel injector No. 6                 |                  |  | BATTERY VOLTAGE<br>(11 - 14 V)★                                |             |
| 3<br>(L/W)   |            | Fuel injector No. 5                 |                  | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul> | 50mSec/div   |             |
| 29<br>(LG/R) | 112        | Fuel injector No. 4                 |                  |  | NOTE:<br>The pulse cycle changes de-<br>pending on rpm at idle | 10V/div     |
| 30<br>(R/Y)  | (B)        | Fuel injector No. 3                 | Output           |  | BATTERY VOLTAGE<br>(11 - 14 V)★                                |             |
| 31<br>(R/W)  |            | Fuel injector No. 2                 |                  | [Engine is running]<br>• Warm-up condition   | 50mSec/div   |             |
| 32<br>(R/B)  |            | Fuel injector No. 1                 |                  | Engine speed: 2,000 rpm  | ÷<br>10V/div   | JMBIA0048GB |
| 2<br>(G/W)   | 112<br>(B) | Throttle control motor power supply | Input            | [Ignition switch: ON]  | BATTERY VOLTAGE<br>(11 - 14 V)                                 |             |

#### [VQ35DE]

| Termin      | al No.     | Description                     |                  |   | Value  | ٥       |
|-------------|------------|---------------------------------|------------------|---|--|---------|
| +           |            | Signal name                     | Input/<br>Output | Condition   | Value<br>(Approx.)   | A       |
| 4<br>(BR/Y) | 112<br>(B) | A/F sensor 1 heater<br>(bank 1) | Output           | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed<br/>(More than 140 seconds after<br/>starting engine)</li> </ul>      | 2.9 - 8.8 V★<br>50mSec/div<br>50mSec/div<br>50mSec/div<br>50mSec/div<br>50mSec/div<br>50mSec/div | EC<br>C |
| 5           | 112        | Throttle control motor (Open)   | Output           | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul> | 0 - 14 V★<br>500µSec/div<br>   | E       |
| (L)         | (B)        | Throttle control motor (Open)   | Uutput           | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>  | 0 - 14 V★<br>500µSec/div<br>   | G       |
| 6<br>(P)    | 112<br>(B) | Throttle control motor (Close)  | Output           | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>  | 0 - 14 V★<br>500µSec/div<br>↓<br>↓<br>5V/div JMBIA1125GB   | J       |
| 8<br>(SB)   | 112<br>(B) | A/F sensor 1 heater (bank 2)    | Output           | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed<br/>(More than 140 seconds after<br/>starting engine)</li> </ul>      | 2.9 - 8.8 V★<br>50mSec/div<br>50mSec/div<br>50mSec/div<br>50mSec/div<br>JMBIA0030GB              | M       |

0

Ρ

| Terminal No.              |            | Description                                    |                  |   | Value  |
|---------------------------|------------|--|------------------|---|--|
| +                         |            | Signal name                                    | Input/<br>Output | Condition   | (Approx.)  |
| 9<br>(L/B)<br>10<br>(G/R) |            | Ignition signal No. 3<br>Ignition signal No. 2 |                  | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> </ul>   | 0 - 0.2 V★<br>50mSec/div   |
| 11<br>(Y/R)               | 112        | Ignition signal No. 1                          |                  | The pulse cycle changes de-<br>pending on rpm at idle   | 2V/div JMBIA0035GB   |
| 18<br>(GR/R)              | (B)        | Ignition signal No. 6                          | Output           |   | 0.1 - 0.4 V★<br>50mSec/div   |
| 19<br>(P)                 |            | Ignition signal No. 5                          |                  | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm   |  |
| 21<br>(W)                 |            | Ignition signal No. 4                          |                  |   | 2V/div JMBIA0036GB   |
| 12<br>(B)                 |            | ECM ground                                     |                  | _   | _  |
| 13<br>(P/B)               | 112<br>(B) | Heated oxygen sensor 2 heat-<br>er (bank 1)    | Output           | <ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul> | 10 V★<br>50mSec/div<br>50mSec/div<br>5V/div<br>JMBIA0902GB               |
|                           |            |  |                  | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>   | BATTERY VOLTAGE<br>(11 - 14 V)   |
| 14<br>(GR)                | 112<br>(B) | Fuel pump relay                                | Output           | <ul> <li>[Ignition switch: ON]</li> <li>For 1 second after turning ignition switch ON</li> <li>[Engine is running]</li> </ul>   | 0 - 1.5 V  |
|                           | (8)        |  |                  | <ul><li>[Ignition switch: ON]</li><li>More than 1 second after turning ignition switch ON</li></ul>   | BATTERY VOLTAGE<br>(11 - 14 V)   |
| 15<br>(O)                 | 112<br>(B) | Throttle control motor relay                   | Output           | [Ignition switch: $ON \rightarrow OFF$ ]  | 0 - 1.0 V $\rightarrow$ BATTERY VOLTAGE<br>(11 - 14 V) $\rightarrow$ 0 V |
| 16                        | (2)        |  |                  | [Ignition switch: ON]   | 0 - 1.0 V  |
| (B/Y)                     | —          | ECM ground                                     | —                |   |  |

#### < ECU DIAGNOSIS >

| Termina  | al No.     | Description                                 |                  |   | Value   |              |
|--|------------|---|------------------|---|---|--------------|
| +  |            | Signal name                                 | Input/<br>Output | Condition   | Value<br>(Approx.)  | A            |
| 17<br>(R)  | 112<br>(B) | Heated oxygen sensor 2 heat-<br>er (bank 2) | Output           | <ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600<br/>rpm after the following condi-<br/>tions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed be-<br/>tween 3,500 and 4,000 rpm<br/>for 1 minute and at idle for 1<br/>minute under no load</li> </ul> | 10 V★<br>50mSec/div<br>€<br>5V/div<br>JMBIA0902GB   | EC<br>C<br>D |
|  |            |   |                  | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>   | BATTERY VOLTAGE<br>(11 - 14 V)  | E            |
| 24<br>(W/B)  | 112<br>(P) | ECM relay                                   | Output           | <ul><li>[Engine is running]</li><li>[Ignition switch: OFF]</li><li>A few seconds after turning ignition switch OFF</li></ul>  | 0 - 1.5 V   | F            |
| (VV/B)   | (B)        | (Self shut-off)                             |                  | <ul><li>[Ignition switch: OFF]</li><li>More than a few seconds after<br/>turning ignition switch OFF</li></ul>  | BATTERY VOLTAGE<br>(11 - 14 V)  | G            |
| 25   | 112        | EVAP canister purge volume                  |                  | <ul> <li>[Engine is running]</li> <li>Idle speed</li> <li>Accelerator pedal: Not depressed even slightly, after engine starting</li> </ul>  | BATTERY VOLTAGE<br>(11 - 14 V)★<br>50mSec/div<br>⊊<br>10V/div JMBIA0039GB   | H<br>I<br>J  |
| (P/L)  | (B)        | control solenoid valve                      | Output           | <ul> <li>[Engine is running]</li> <li>Engine speed: approximately 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>  | BATTERY VOLTAGE<br>(11 - 14 V)★<br>50mSec/div<br>10V/div JMBIA0040GB  | K<br>L       |
| 26<br>(GR/R)* <sup>3</sup><br>(GR/B)* <sup>4</sup> | 112<br>(B) | VIAS control solenoid valve 2               | Output           | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>When revving engine up to 5,000 rpm quickly</li> </ul>   | BATTERY VOLTAGE<br>(11 - 14 V)<br>BATTERY VOLTAGE (11 - 14 V)<br>↓<br>0 - 1.0 V<br>↓<br>BATTERY VOLTAGE (11 - 14 V) | N            |
| 27   | 110        |   |                  | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>  | BATTERY VOLTAGE<br>(11 - 14 V)  | Ρ            |
| 27<br>(V)  | 112<br>(B) | VIAS control solenoid valve 1               | Output           | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 5,000 rpm quickly</li></ul>   | BATTERY VOLTAGE (11 - 14 V)<br>↓<br>0 - 1.0 V<br>↓<br>BATTERY VOLTAGE (11 - 14 V)                                   |              |

#### < ECU DIAGNOSIS >

| Terminal No. |            | Description                                    |                  |   | )/- h                          |
|--------------|------------|--|------------------|---|--------------------------------|
| +            |            | Signal name                                    | Input/<br>Output | Condition   | Value<br>(Approx.)             |
| 28           | 112        | Electronic controlled engine                   |                  | [Engine is running]<br>• Idle speed 0 - 1.0 V   |                                |
| (BR/W)       | (B)        | mount control solenoid valve                   | Output           | <ul><li>[Engine is running]</li><li>Engine speed: More than 950 rpm</li></ul>   | BATTERY VOLTAGE<br>(11 - 14 V) |
| 33<br>(W)    | 112<br>(B) | Heated oxygen sensor 2<br>(bank 1)             | Input            | <ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul> | 0 - 1.0 V                      |
| 34<br>(W/L)  | 112<br>(B) | Heated oxygen sensor 2<br>(bank 2)             | Input            | <ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul> | 0 - 1.0 V                      |
| 35<br>(B)    | —          | Sensor ground<br>(Heated oxygen sensor 2)      | —                | _   | _                              |
| 36<br>(B)    |            | Sensor ground<br>(Throttle position sensor)    | —                | _   | -                              |
| 37           | 112        | Throttle position sensor 1                     | Input            | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>  | More than 0.36 V               |
| (W)          | (B)        |  | mput             | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>   | Less than 4.75 V               |
| 38           | 112        |  | logut            | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>  | Less than 4.75 V               |
| (R)          | (B)        | Throttle position sensor 2                     | Input            | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>   | More than 0.36 V               |
| 39<br>(R)    | 40<br>(G)  | Refrigerant pressure sensor                    | Input            | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Both A/C switch and blower<br/>fan motor switch: ON (Com-<br/>pressor operates)</li> </ul>   | 1.0 - 4.0 V                    |
| 40<br>(G)    | _          | Sensor ground<br>(Refrigerant pressure sensor) | _                | _   |                                |

| Terminal No. |             | Description  |                  |  | Volue  |
|--------------|-------------|--|------------------|--|--|
| +            |             | Signal name  | Input/<br>Output | Condition  | Value<br>(Approx.)   |
| 41           | 48          | Power steering pressure sen-   | 0.1.1            | [Engine is running]<br>• Steering wheel: Being turned  | 0.5 - 4.5 V  |
| (O/B)        | (B/P)       | sor  | Output           | <ul><li>[Engine is running]</li><li>Steering wheel: Not being turned</li></ul>                           | 0.4 - 0.8 V  |
| 42<br>(BR)   | 44<br>(G/B) | Battery current sensor   | Input            | <ul> <li>[Engine is running]</li> <li>Battery: Fully charged*<sup>2</sup></li> <li>Idle speed</li> </ul> | 2.6 - 3.5 V  |
| 44<br>(G/B)  | _           | Sensor ground<br>(Battery current sensor)  | _                | _  | _  |
| 45<br>(P)    | 49<br>(L)   | A/F sensor 1 (bank 1)  | Input            | [Ignition switch: ON]  | 2.2 ∨  |
| 46<br>(Y)    | 52<br>(B/R) | Engine coolant temperature sensor  | Input            | [Engine is running]  | 0 - 4.8 V<br>Output voltage varies with engine<br>coolant temperature. |
| 47<br>(G)    | 36<br>(B)   | Sensor power supply<br>(Throttle position sensor)  | _                | [Ignition switch: ON]  | 5 V  |
| 48<br>(B/P)  | _           | Sensor ground<br>(Power steering pressure<br>sensor)                                       | _                | _  | _  |
| 49<br>(L)    | 112<br>(B)  | A/F sensor 1 (bank 1)  | Input            | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>          | 1.8 V<br>Output voltage varies with air fuel<br>ratio.                 |
| 50<br>(L/Y)  | 56<br>(G/B) | Intake air temperature sensor  | Input            | [Engine is running]  | 0 - 4.8 V<br>Output voltage varies with intake<br>air temperature.     |
| 51<br>(R/Y)  | 44<br>(G/B) | Sensor power supply<br>(Battery current sensor)  | _                | [Ignition switch: ON]  | 5 V  |
| 52<br>(B/R)  |             | Sensor ground<br>(Engine coolant temperature<br>sensor/Engine oil tempera-<br>ture sensor) | _                | _  | _  |
| 53<br>(V)    | 57<br>(LG)  | A/F sensor 1 (bank 2)  | Input            | [Ignition switch: ON]  | 2.2 V  |
| 54<br>(G)    | 52<br>(B/R) | Engine oil temperature sensor  | Input            | [Engine is running]  | 0 - 4.8 V<br>Output voltage varies with engine<br>oil temperature.     |
| 55<br>(SB)   | 48<br>(Y)   | Sensor power supply<br>(Power steering pressure<br>sensor)                                 | _                | [Ignition switch: ON]  | 5 V  |
| 56<br>(G/B)  | _           | Sensor ground<br>(Mass air flow sensor/Intake<br>air temperature sensor)                   | _                | _  | _  |
| 57<br>(LG)   | 112<br>(B)  | A/F sensor 1 (bank 2)  | Input            | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>          | 1.8 V<br>Output voltage varies with air fuel<br>ratio.                 |
| 58           | 56          | Mass air flow sensor   | Input            | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>                       | 0.9 - 1.2 V  |
| (O)          | (G/B)       |  |                  | <ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,500 rpm</li></ul>          | 1.6 - 1.9 V  |

| Terminal No. |             | Description   |                  |   | Value  |  |
|--------------|-------------|---|------------------|---|--|--|
| +            |             | Signal name   | Input/<br>Output | Condition   | (Approx.)  |  |
| 59<br>(G/W)  | 64<br>(B/R) | Sensor power supply<br>[Camshaft position sensor<br>(PHASE) (bank 1)] | _                | [Ignition switch: ON]   | 5 V  |  |
| 60<br>(Y/B)  | _           | Sensor ground<br>[Crankshaft position sensor<br>(POS)]                | _                | _   | _  |  |
| 61<br>(B)    | 67<br>(—)   | Knock sensor (bank 1)   | Input            | [Engine is running]<br>• Idle speed   | 2.5 V* <sup>1</sup>  |  |
| 62<br>(W)    | 67<br>(—)   | Knock sensor (bank 2)   | Input            | [Engine is running]<br>• Idle speed   | 2.5 V* <sup>1</sup>  |  |
| 63<br>(R/W)  | 68<br>(Y/G) | Sensor power supply<br>[Camshaft position sensor<br>(PHASE) (bank 2)] | _                | [Ignition switch: ON]   | 5 V  |  |
| 64<br>(B/R)  |             | Sensor ground<br>[Camshaft position sensor<br>(PHASE) (bank 1)]       | _                | _   | _  |  |
| 65           | 60          | 60 Crankshaft position sensor<br>Y/B) (POS) Input [Engine is running] |                  | 4.0 - 5.0 V★<br>1mSec/div<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓  |  |  |
| (W/B)        | (Y/B)       |   |                  | [Engine is running]<br>• Engine speed: 2,000 rpm  | 4.0 - 5.0 V★<br>1mSec/div<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓ |  |
| 67<br>(—)    | _           | Sensor ground<br>(Knock sensor)                                       | —                | _   | _  |  |
| 68<br>(Y/G)  | _           | Sensor ground<br>[Camshaft position sensor<br>(PHASE) (bank 2)]       | _                | _   | _  |  |
| 69<br>(BR/W) | 68<br>(Y/G) | Camshaft position sensor<br>(PHASE) (bank 2)                          | Input            | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed<br/>NOTE:<br/>The pulse cycle changes depending on rpm at idle</li> </ul> | 3.0 - 5.0 V★<br>20mSec/div<br>2V/div JMBIA0045GB                                 |  |
|              | (1/3)       |   |                  | [Engine is running]<br>• Engine speed is 2,000 rpm  | 3.0 - 5.0 V★<br>20mSec/div<br>2V/div JMBIA0046GB                                 |  |

## < ECU DIAGNOSIS >

| Termin       | al No.      | Description  |                  |   | Velue  |   |
|--------------|-------------|--|------------------|---|--|---|
| +            |             | Signal name  | Input/<br>Output | Condition   | Value<br>(Approx.)   | A |
| 70           | 64          | Camshaft position sensor                                     |                  | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>   | 3.0 - 5.0 V★<br>20mSec/div<br>€<br>2V/div JMBIA0045GB                | C |
| (W/R)        | (B/R)       | (PHASE) (bank 1)   | Input            | [Engine is running]<br>• Engine speed is 2,000 rpm  | 3.0 - 5.0 V★<br>20mSec/div<br>=<br>=<br>=<br>=<br>2V/div JMBIA0046GB | F |
| 72<br>(BR/W) | 40<br>(G)   | Sensor power supply<br>(Refrigerant pressure sensor)         |                  | [Ignition switch: ON]   | 5 V  | G |
|              | (-)         |  |                  | [Engine is running]<br>• Warm-up condition<br>• Idle speed  | BATTERY VOLTAGE<br>(11 - 14 V)                                       | F |
| 75<br>(Y)    | 112<br>(B)  | Intake valve timing control so-<br>lenoid valve (bank 2)     | Output           | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm   | 7 - 12 V★  | J |
| 76<br>(R/G)  | 60<br>(Y/B) | Sensor power supply<br>[Crankshaft position sensor<br>(POS)] |                  | [Ignition switch: ON]   | 5 V  | k |
| 77<br>(W/L)  | 112<br>(B)  | Power supply for ECM (Back-<br>up)                           | Input            | [Ignition switch: OFF]  | BATTERY VOLTAGE<br>(11 - 14 V)                                       | L |
|              |             |  |                  | [Engine is running]<br>• Warm-up condition<br>• Idle speed  | BATTERY VOLTAGE<br>(11 - 14 V)                                       | N |
| 78<br>(R/L)  | 112<br>(B)  | Intake valve timing control so-<br>lenoid valve (bank 1)     | Output           | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm   | 7 - 12 V★  | N |
| 81<br>(W)    | 84<br>(B)   | Accelerator pedal position sensor 1                          | Input            | <ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Accelerator pedal: Fully released</li> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Accelerator pedal: Fully depressed</li> </ul> | 0.5 - 1.0 V<br>4.2 - 4.8 V   | Ρ |

## < ECU DIAGNOSIS >

| Termin     | al No.     | Description   |                  |   | Value                          |
|------------|------------|---|------------------|---|--------------------------------|
| +          |            | Signal name   | Input/<br>Output | Condition   | (Approx.)                      |
| 82         | 100        | Accelerator pedal position  |                  | <ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully released</li></ul>  | 0.25 - 0.50 V                  |
| (O)        | (G)        | sensor 2  | Input            | <ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul> | 2.0 - 2.5 V                    |
| 83<br>(BR) | 84<br>(B)  | Sensor power supply<br>(Accelerator pedal position<br>sensor 1)   | _                | [Ignition switch: ON]   | 5 V                            |
| 84<br>(B)  | _          | Sensor ground<br>(Accelerator pedal position<br>sensor 1)         | _                | _   | _                              |
|            |            |   |                  | [Ignition switch: ON]<br>• ASCD steering switch: OFF  | 4 V                            |
|            |            |   |                  | [Ignition switch: ON]<br>• MAIN switch: Pressed 0 V   | 0 V                            |
| 85<br>(Y)  | 92<br>(BR) | ASCD steering switch  | Input            | [Ignition switch: ON]<br>• CANCEL switch: Pressed   | 1 V                            |
| (1)        |            |   |                  | [Ignition switch: ON]<br>• RESUME/ACCELERATE<br>switch: Pressed   | 3 V                            |
|            |            |   |                  | [Ignition switch: ON]<br>• SET/COAST switch: Pressed  | 2 V                            |
| 86<br>(SB) | 96<br>(GR) | EVAP control system pres-<br>sure sensor                          | Input            | [Ignition switch: ON]   | 1.8 - 4.8 V                    |
| 87<br>(GR) | 100<br>(G) | Sensor power supply<br>(Accelerator pedal position<br>sensor 2)   | _                | [Ignition switch: ON]   | 5 V                            |
| 88<br>(O)  | _          | Data link connector   | Input/<br>Output | _   | _                              |
| 91<br>(L)  | 96<br>(GR) | Sensor power supply<br>(EVAP control system pres-<br>sure sensor) | _                | [Ignition switch: ON]   | 5 V                            |
| 92<br>(BR) | _          | Sensor ground<br>(ASCD steering switch)                           | _                | _   | _                              |
| 02         | 112        |   |                  | [Ignition switch: OFF]  | 0 V                            |
| 93<br>(BR) | (B)        | Ignition switch   | Input            | [Ignition switch: ON]   | BATTERY VOLTAGE<br>(11 - 14 V) |

## < ECU DIAGNOSIS >

| Terminal No.             |             | Description   |                  |  | Value   |  |
|--------------------------|-------------|---|------------------|--|---|--|
| +                        |             | Signal name Input/<br>Output                                |                  | Condition  | (Approx.)   |  |
| 94                       | 112         |   |                  | <ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed<br/>NOTE:<br/>The pulse cycle changes depending on rpm at idle</li> </ul>            | 1 V★<br>10mSec/div<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓<br>↓ |  |
| (GR)                     | (B)         | Engine speed output signal                                  | Output           | [Engine is running]<br>• Engine speed: 2,000 rpm   | 1 V★<br>10mSec/div<br>F<br>2V/div JMBIA0077GB   |  |
| 95<br>(Y)                | 104<br>(SB) | Fuel tank temperature sensor                                | Input            | [Engine is running]  | 0 - 4.8 V<br>Output voltage varies with fuel tank<br>temperature.                                       |  |
| 96<br>(GR)               | _           | Sensor ground<br>(EVAP control system pres-<br>sure sensor) | _                | _  | _   |  |
| 97<br>(P)                | _           | CAN communication line                                      | Input/<br>Output | _  | _   |  |
| 98<br>(L)                | _           | CAN communication line                                      | Input/<br>Output | _  | _   |  |
| 100<br>(G)               | _           | Sensor ground<br>(Accelerator pedal position<br>sensor 2)   | _                | _  | _   |  |
| 102<br>(R)               | 112<br>(B)  | PNP signal  | Input            | <ul> <li>[Ignition switch: ON]</li> <li>Selector lever: P or N position</li> <li>[Ignition switch: ON]</li> <li>Selector lever: Except above position</li> </ul> | BATTERY VOLTAGE<br>(11 - 14 V)<br>0 V   |  |
| 104<br>(SB)              | _           | Sensor ground<br>(Fuel tank temperature sen-<br>sor)        | _                | _  | _   |  |
| 105<br>(V)               | 112<br>(B)  | Power supply for ECM  | Input            | [Ignition switch: ON]  | BATTERY VOLTAGE<br>(11 - 14 V)  |  |
| 106<br>(SB)              | 112<br>(B)  | Stop lamp switch  | Input            | <ul> <li>[Ignition switch: OFF]</li> <li>Brake pedal: Fully released</li> <li>[Ignition switch: OFF]</li> <li>Brake pedal: Slightly depressed</li> </ul>         | 0 V<br>BATTERY VOLTAGE<br>(11 - 14 V)   |  |
| 107<br>(B)<br>108<br>(B) | _           | ECM ground  | _                |  | _   |  |
| 109<br>(W)               | 112<br>(B)  | EVAP canister vent control valve                            | Output           | [Ignition switch: ON]  | BATTERY VOLTAGE<br>(11 - 14 V)  |  |

| ٢V | Q3  | 5 | D | E1       |
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| LV | QU, |   |   | <u> </u> |

| Termin                   | al No.     | Description       |                  |   | Value<br>(Approx.)             |  |
|--------------------------|------------|-------------------|------------------|---|--------------------------------|--|
| +                        |            | Signal name       | Input/<br>Output | Condition   |                                |  |
| 110                      | 112<br>(B) | ASCD brake switch | Input            | <ul><li>[Ignition switch: ON]</li><li>Brake pedal: Slightly depressed</li></ul> | 0 V                            |  |
| (G)                      |            |                   |                  | [Ignition switch: ON]<br>• Brake pedal: Fully released                          | BATTERY VOLTAGE<br>(11 - 14 V) |  |
| 111<br>(B)<br>112<br>(B) |            | ECM ground        |                  | _   | _                              |  |

 $\star$ : Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

\*1: This may vary depending on internal resistance of the tester.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-3, "How to Handle Battery"</u>.

\*3: Up to VIN JN8AZ18U\*9W100000, JN8AZ18W\*9W200000, JN8AZ18U\*9W710000, JN8AZ18W\*9W810000.

\*4: From VIN JN8AZ18U\*9W100001, JN8AZ18W\*9W200001, JN8AZ18U\*9W710001, JN8AZ18W\*9W810001.

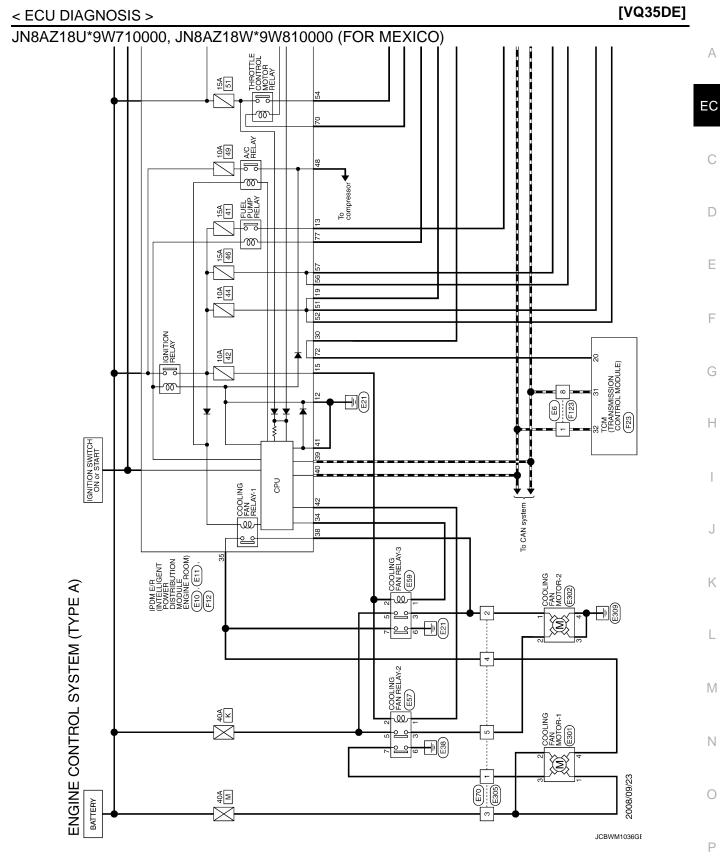
## Wiring Diagram—ENGINE CONTROL SYSTEM—

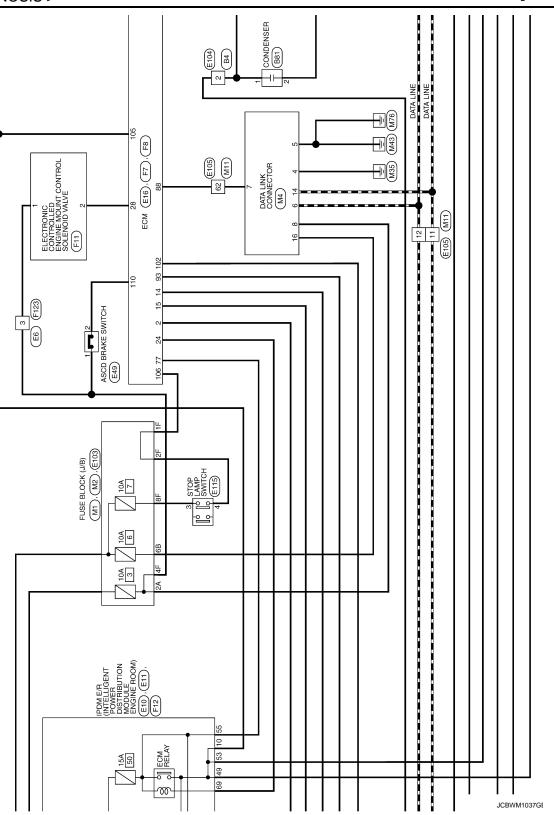
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#### NOTE:

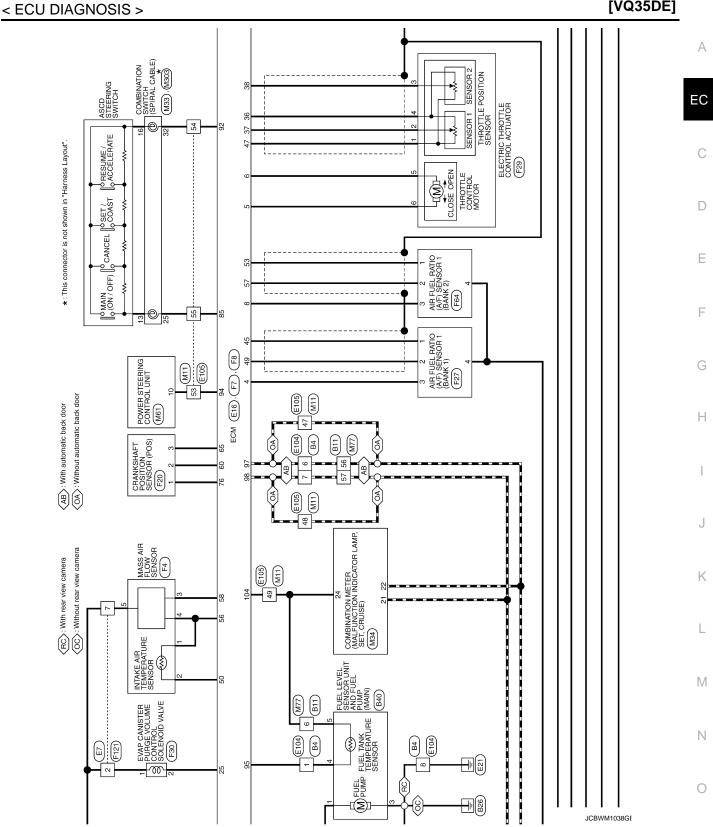
- Type A Up to VIN: JN8AZ18U\*9W100000, JN8AZ18W\*9W200000 (EXCEPT FOR MEXICO), JN8AZ18U\*9W710000, JN8AZ18W\*9W810000 (FOR MEXICO)
- Type B From VIN: JN8AZ18U\*9W100001, JN8AZ18W\*9W200001 (EXCEPT FOR MEXICO), JN8AZ18U\*9W710001, JN8AZ18W\*9W810001 (FOR MEXICO)

Up to VIN: JN8AZ18U\*9W100000, JN8AZ18W\*9W200000 (EXCEPT FOR MEXICO),



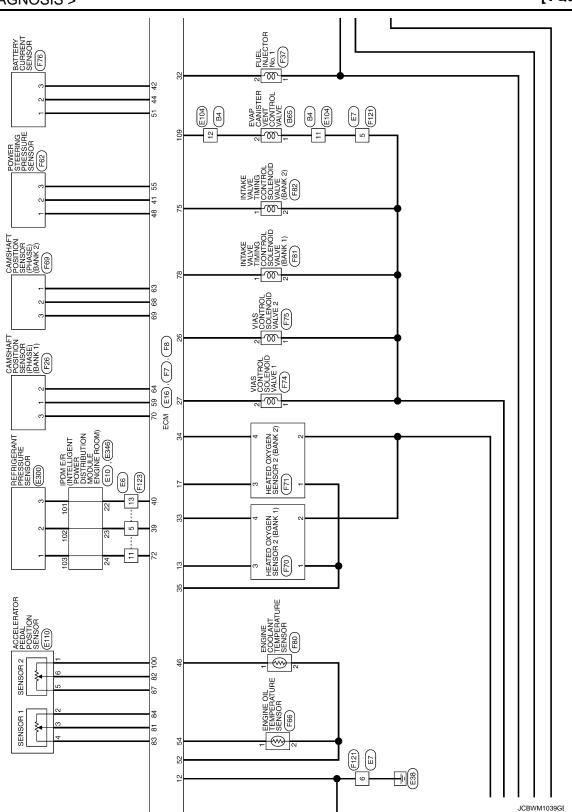


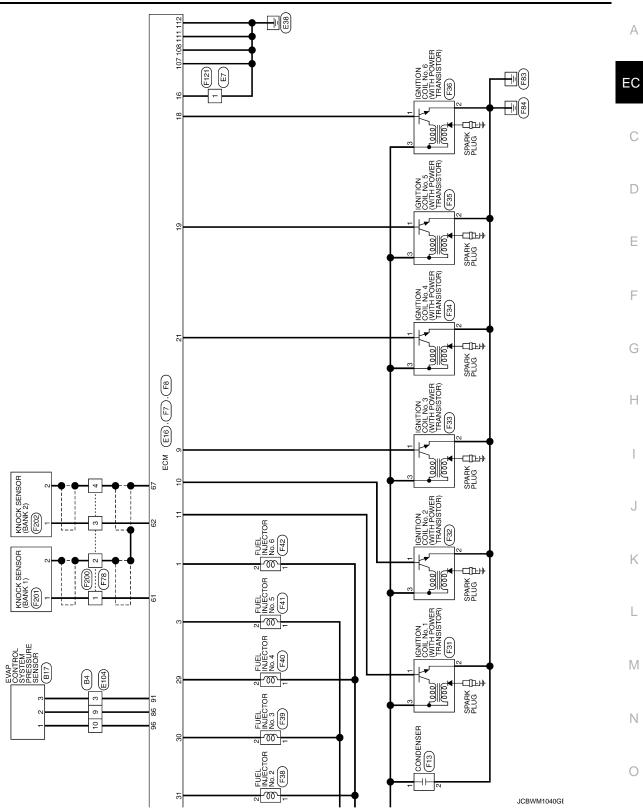
[VQ35DE]



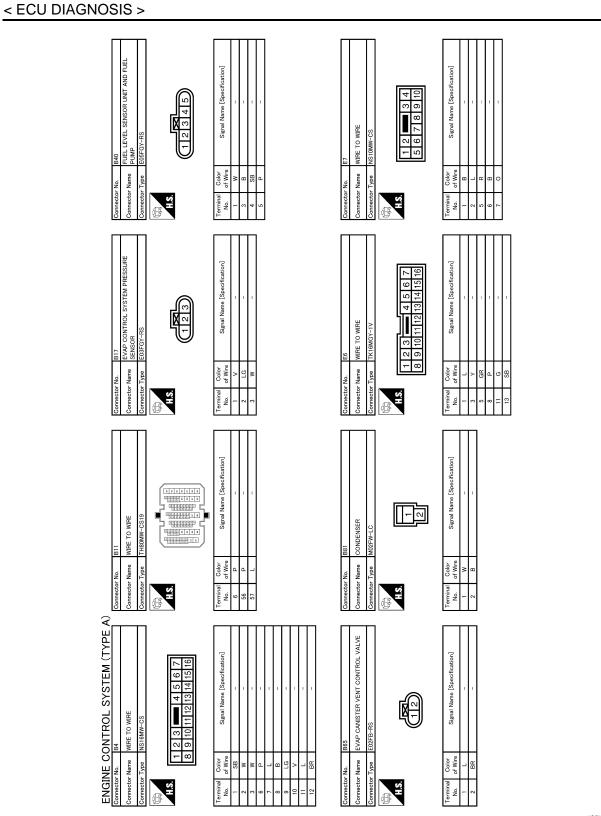
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**ECM** 

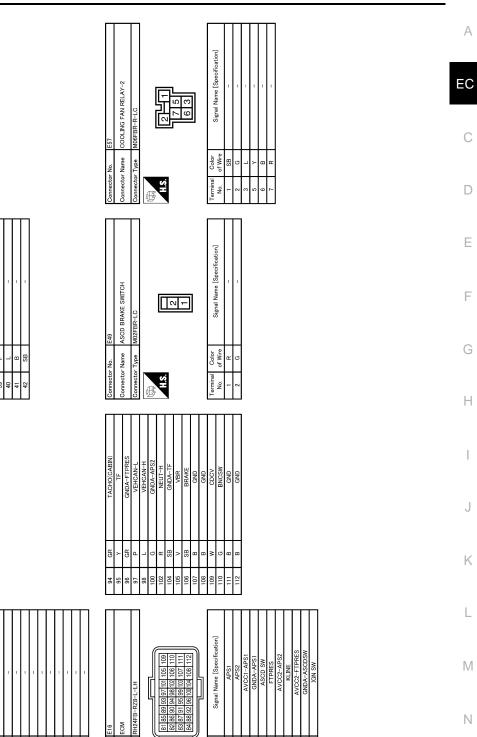




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JCBWM1041GE



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E11 IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

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ENGINE CONTROL SYSTEM (TYPE A)

DISTRIBUTION MODULE ENGINE ROOM) TH20FW-CS12-M4-1V

inector Name

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Signal Name [Specification]

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Signal Name [Specification]

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Terminal No.

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Revision: 2008 October

ECM

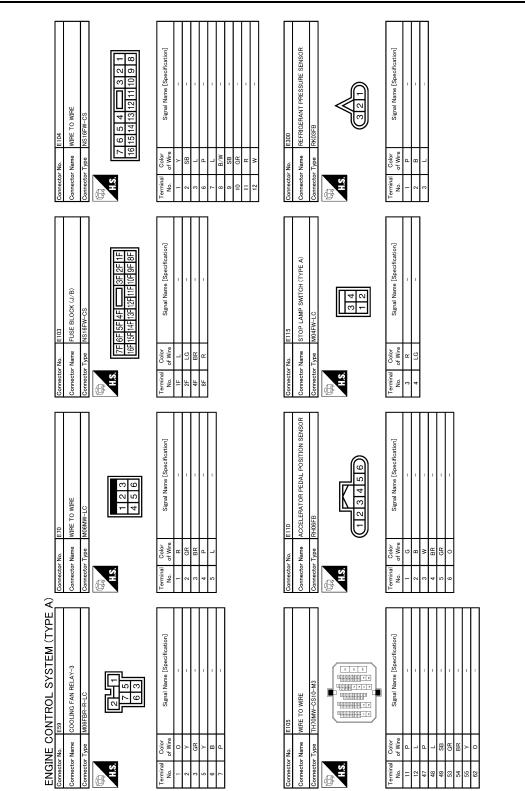
2009 Murano

JCBWM1042GE

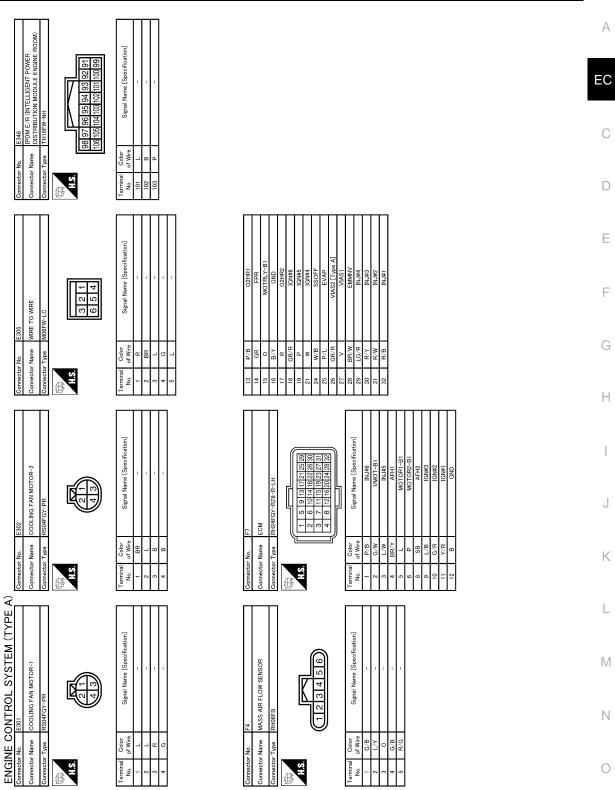
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JCBWM1043GE



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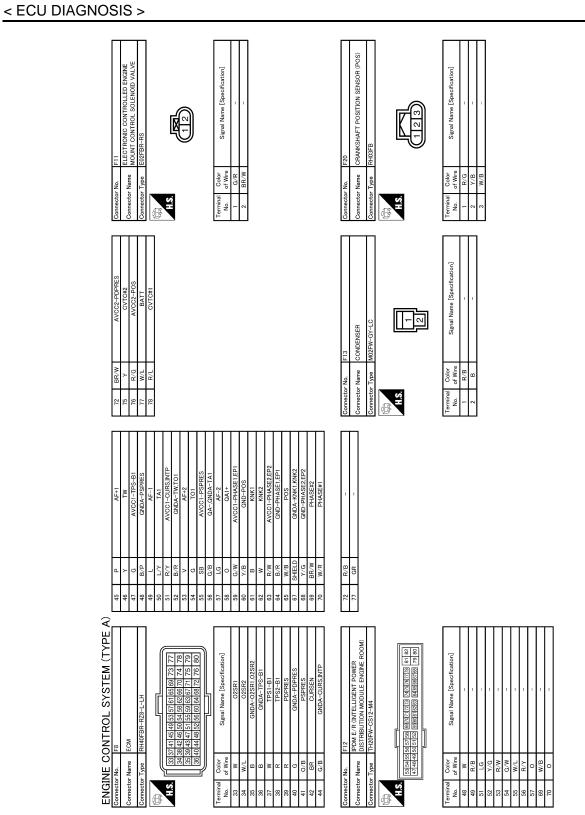
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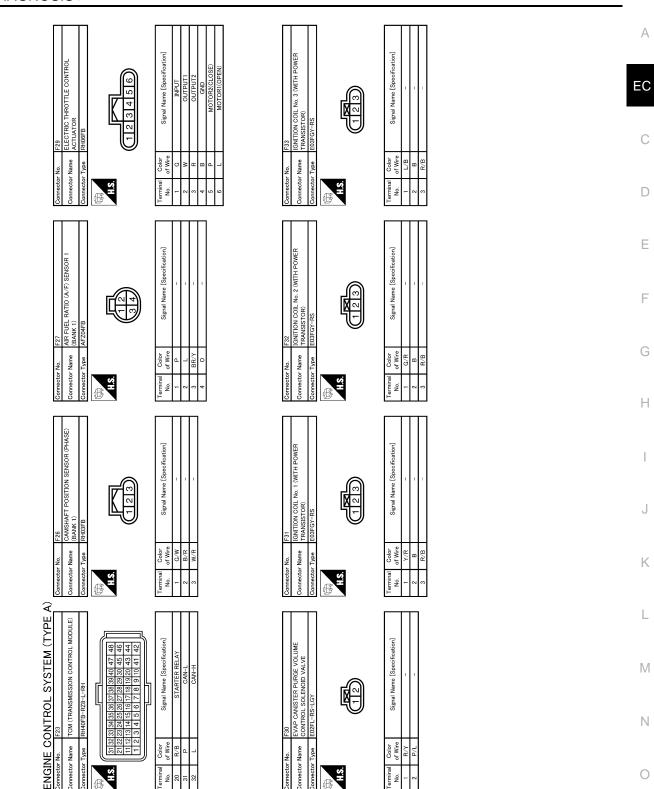
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JCBWM1044GE

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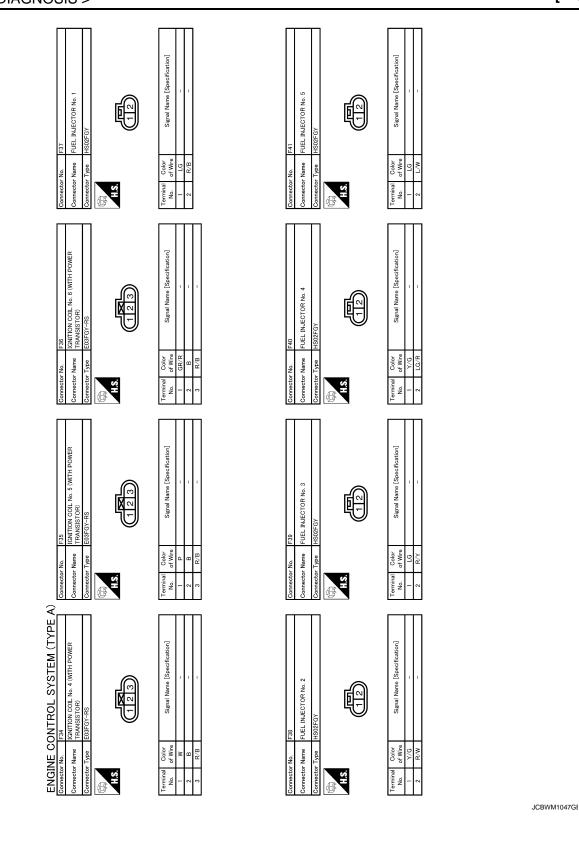
JCBWM1045GE



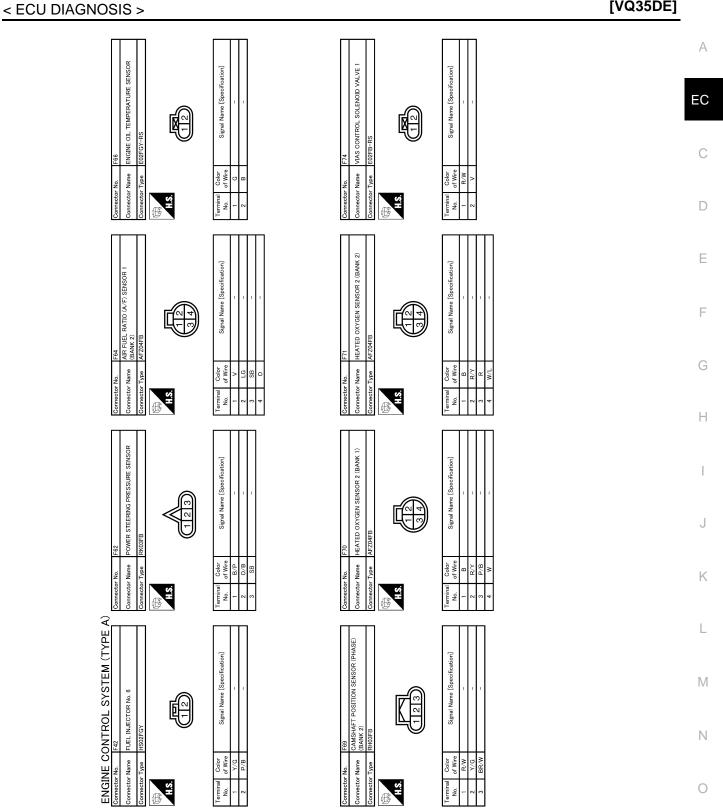
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JCBWM1046GE

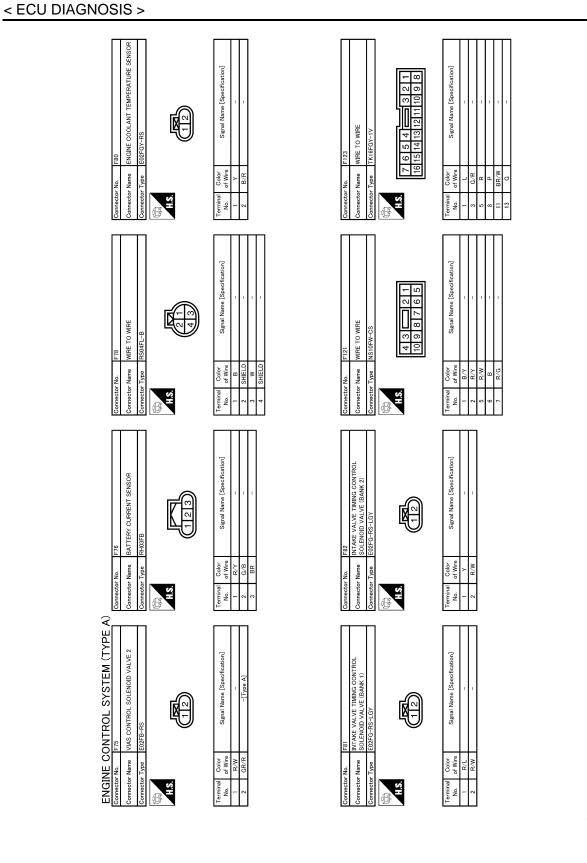


Revision: 2008 October

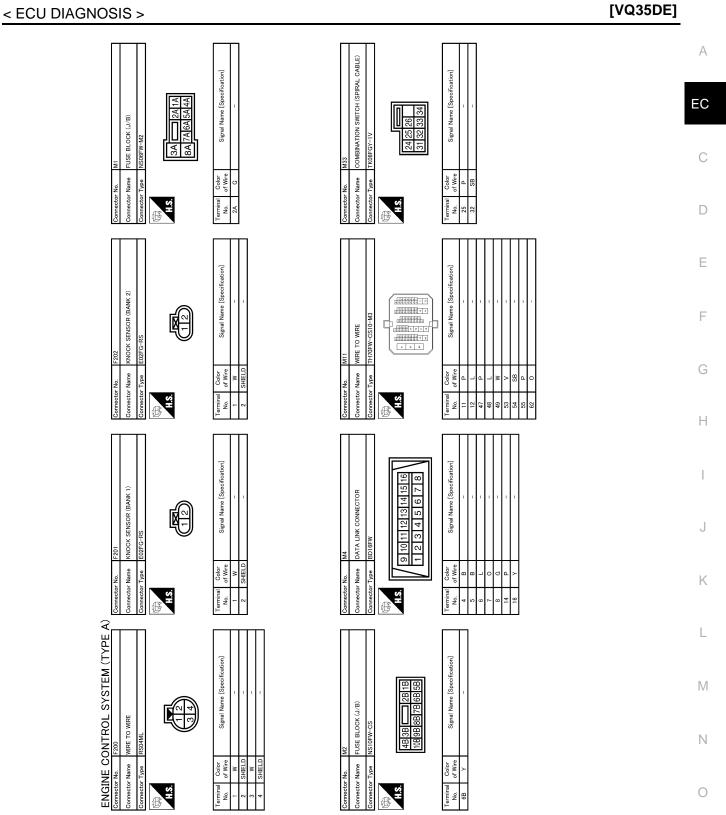


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JCBWM1048GE



JCBWM1049GE



JCBWM1050GE

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VIN:

From



JN8AZ18W\*9W200001

MEXICO),

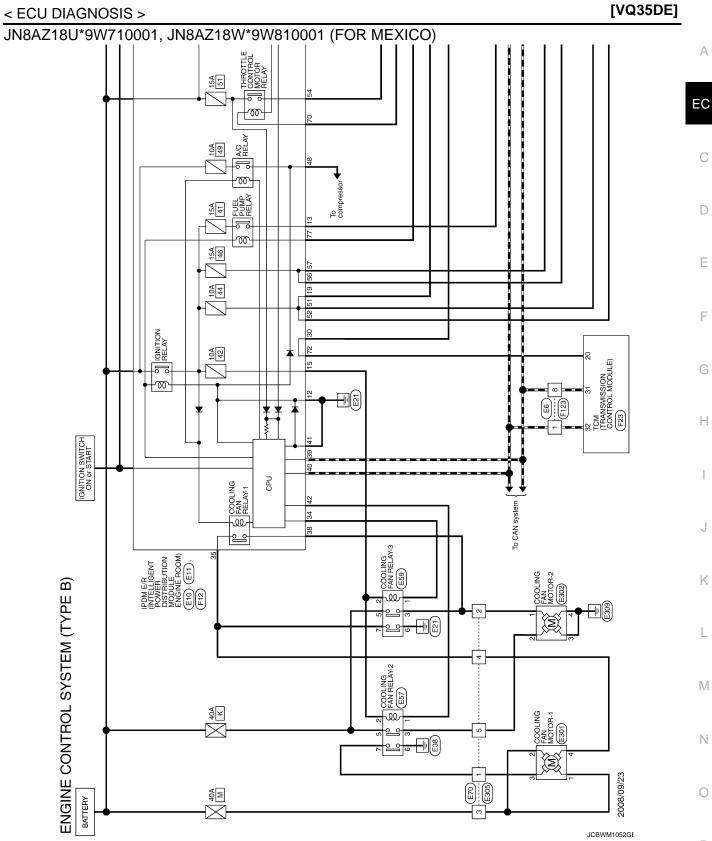
JCBWM1051GE

FOR

(EXCEPT

COMBINATION SWITCH (SPIRAL CABLE) Signal Name [Specification] Color of Wire ctor Name H.S. erminal No. Signal Name [Specification] WIRE TO WIRE Name H.S. POWER STEERING CONTROL UNIT Signal Name [Specification] ENG TACHO Name actor H.S. ermina No. ENGINE CONTROL SYSTEM (TYPE A) Signal Name [Specification] COMBINATION METER ctor Name 5

JN8AZ18U\*9W100001,



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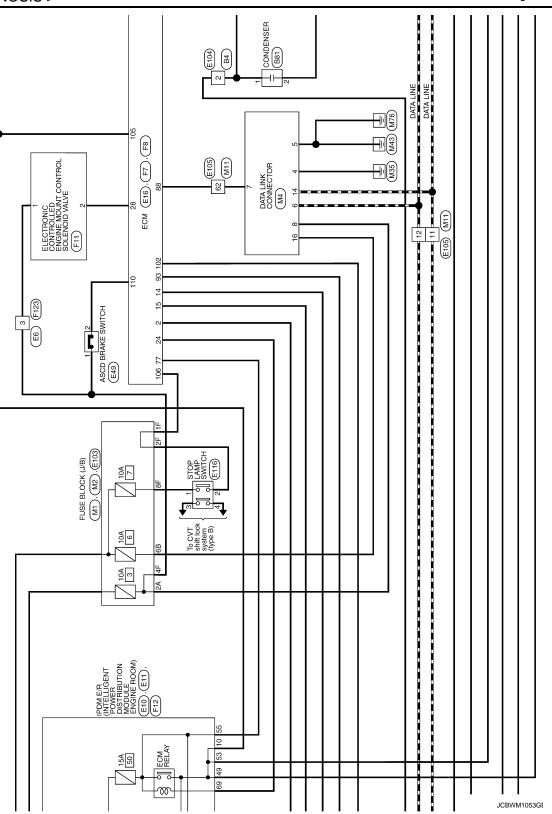
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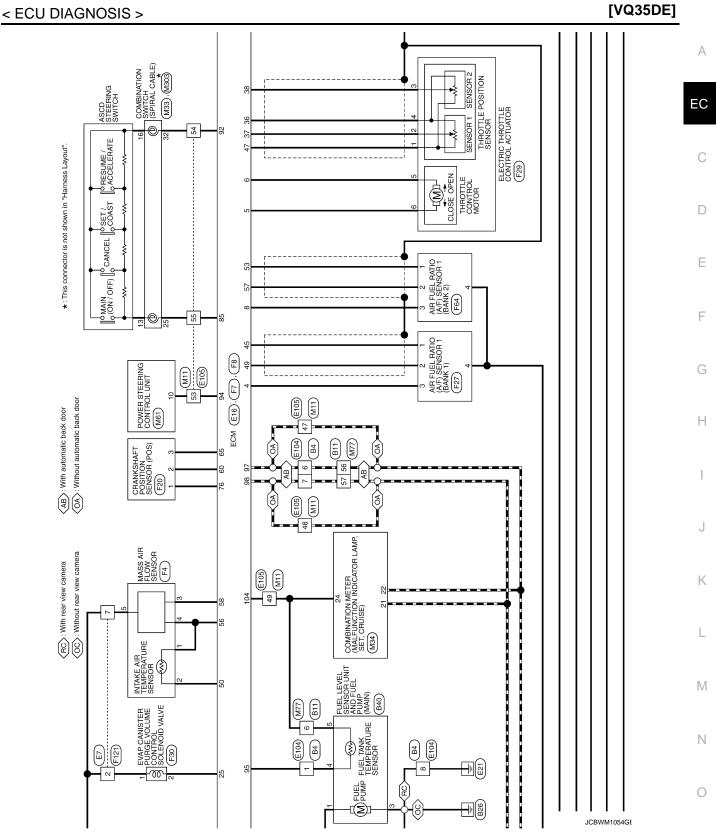
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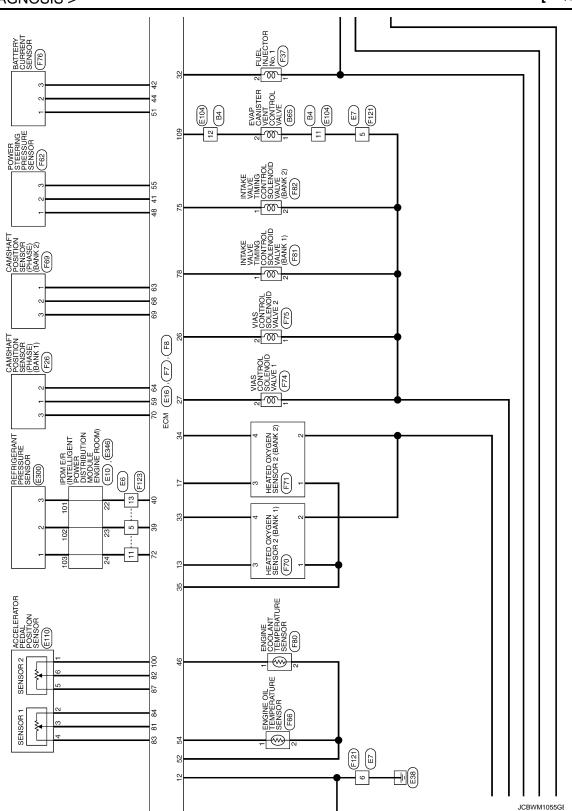
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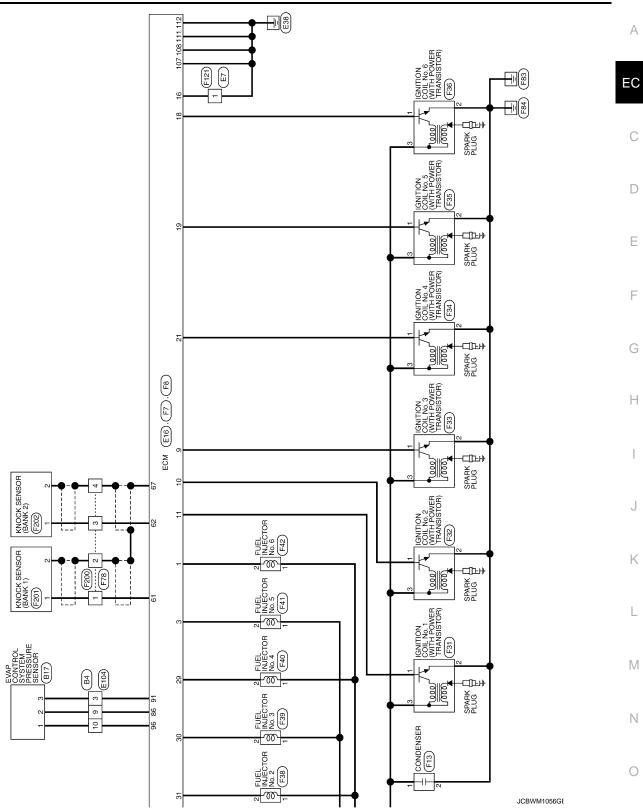
2009 Murano





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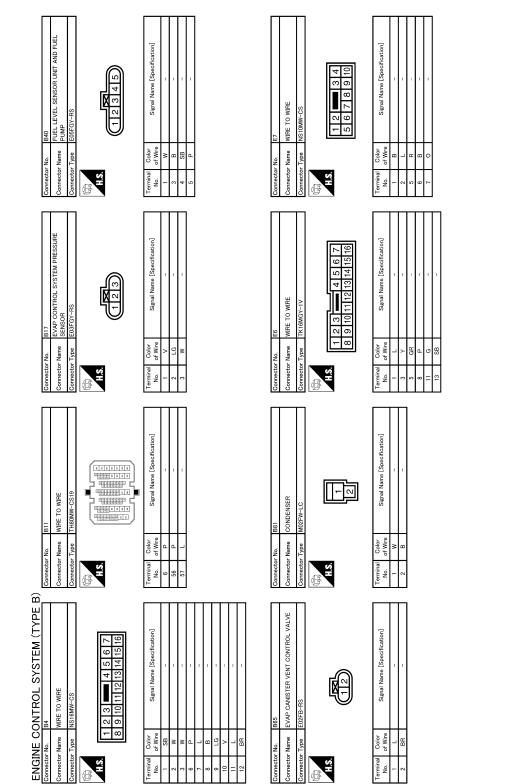


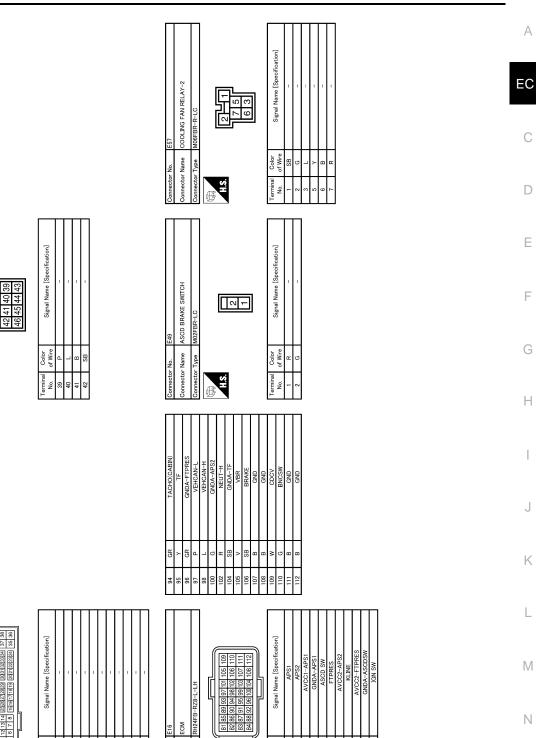


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E11 IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

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ENGINE CONTROL SYSTEM (TYPE B)

DISTRIBUTION MODULE ENGINE ROOM) TH20FW-CS12-M4-1V

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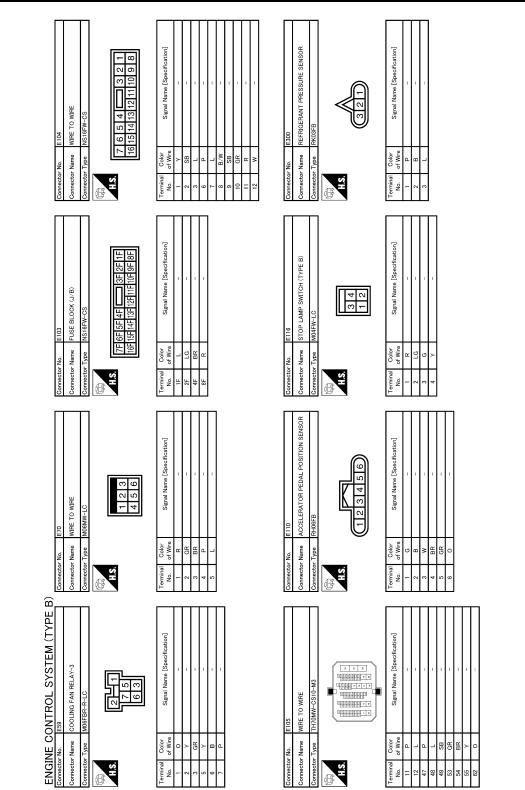
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JCBWM1058GE

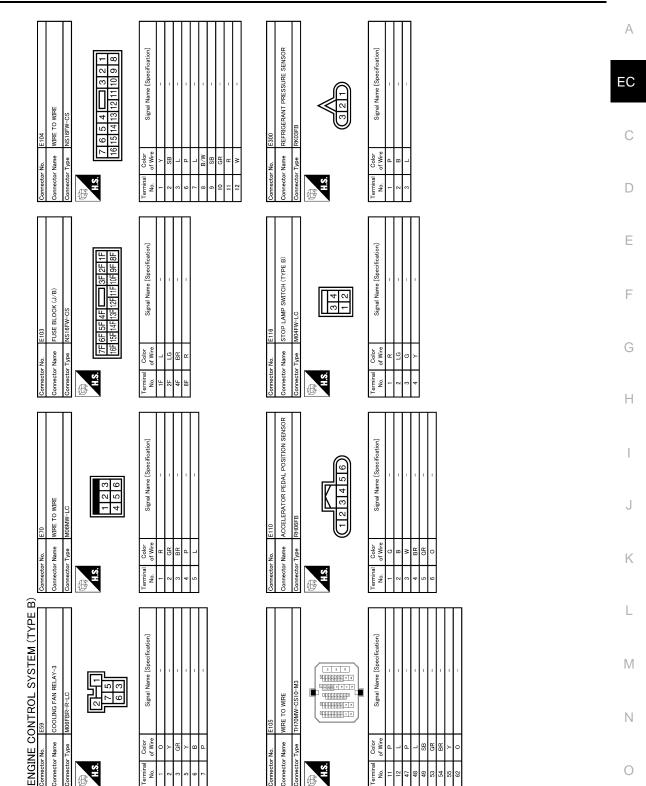
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JCBWM1059GE



JCBWM1059GE

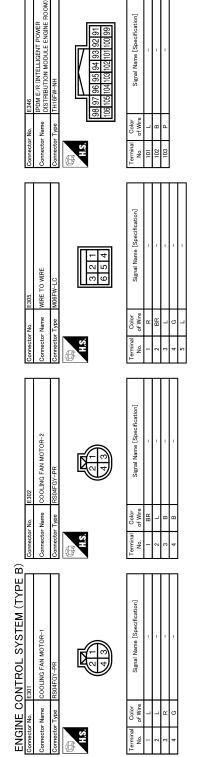
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Revision: 2008 October



JCBWM1060GE



| 13 P/B 02HR1 | 14 GR FPR | 15 0 MOTRLY-B1 | 16 B/Y GND       | 17 R 02HR2 | 18 GR/R IGN#6 | 19 P IGN#5             | 21 W IGN#4 | 24 W/B SSOFF | 25 P/L EVAP | 26 GR/B VIAS2 [Type B] | ^ | 28 BR/W EMMNV | 29 LG/R INJ#4               | 30 R/Y INJ#3 | 31 R/W INJ#2 | 32 R/B INJ#1 |      |           |           |      |       |       |  |
|--------------|-----------|----------------|------------------|------------|---------------|------------------------|------------|--------------|-------------|------------------------|---|---------------|-----------------------------|--------------|--------------|--------------|------|-----------|-----------|------|-------|-------|--|
| F7           | ECM       | CM             | RH24FGY-RZ8-R-LH |            |               | 1 5 0 13 17 21 25 20 1 | 500        |              | 8 12        |                        |   |               | Signal Name [Specification] | 9#0NI        | VMOT-B1      | INU#5        | AFH1 | MOTOR1-B1 | MOTOR2-B1 | AFH2 | IGN#3 | IGN#2 |  |

Color of Wire

irmina No.

Signal Name [Specification]

Color of Wire G/B

rminal No.

C/W Р/В

BR

P SB L/B G/R Y/R

Name

ctor

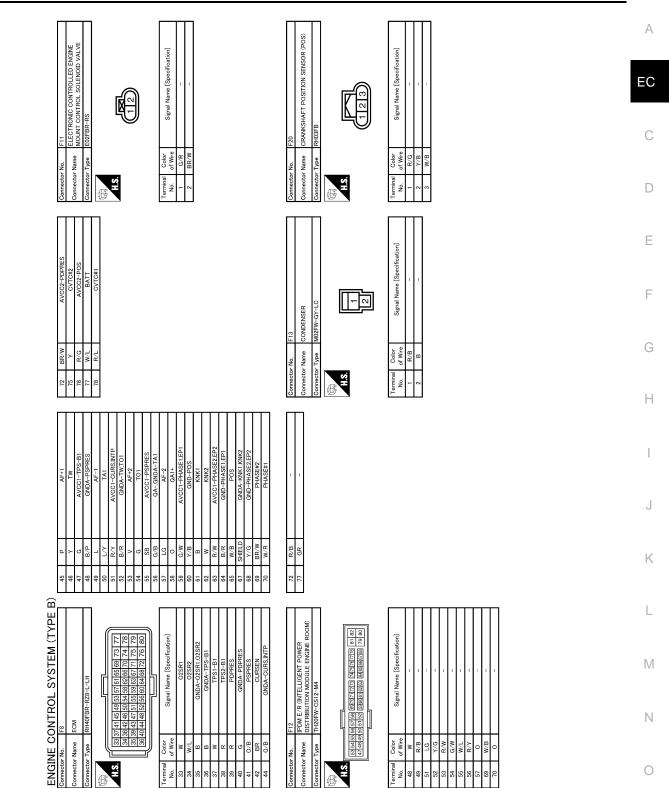
MASS AIR FLOW SENSOR

ector Name

H.S.

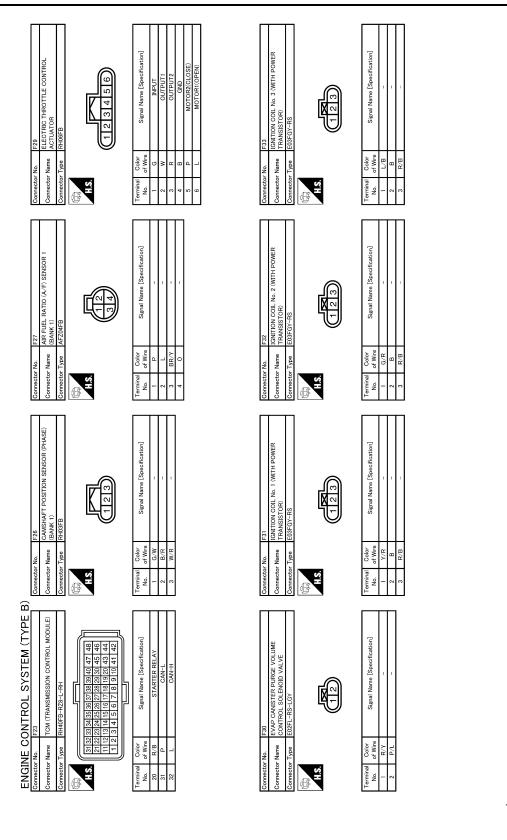
H.S.

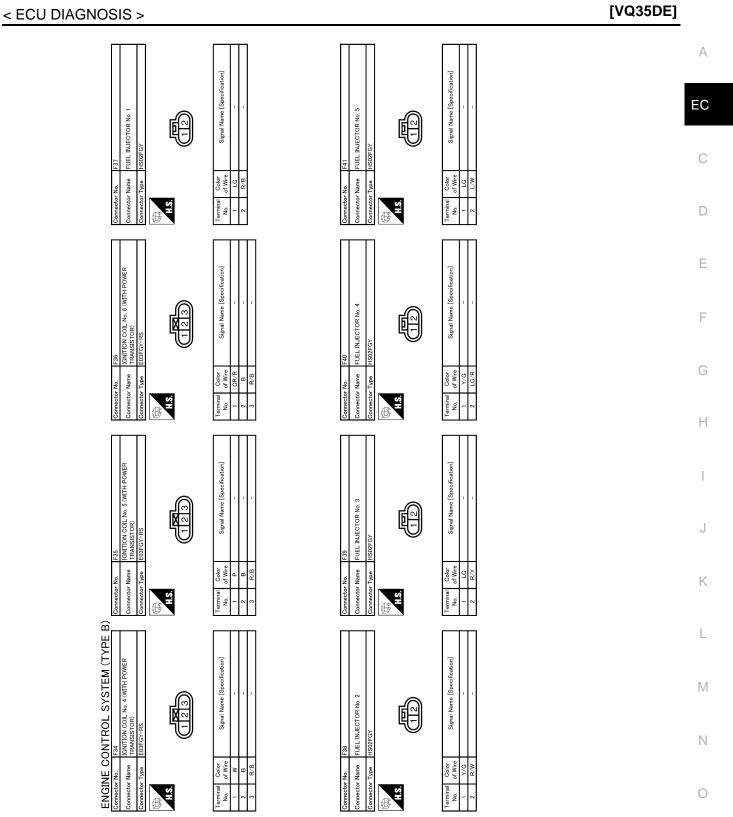
actor No.

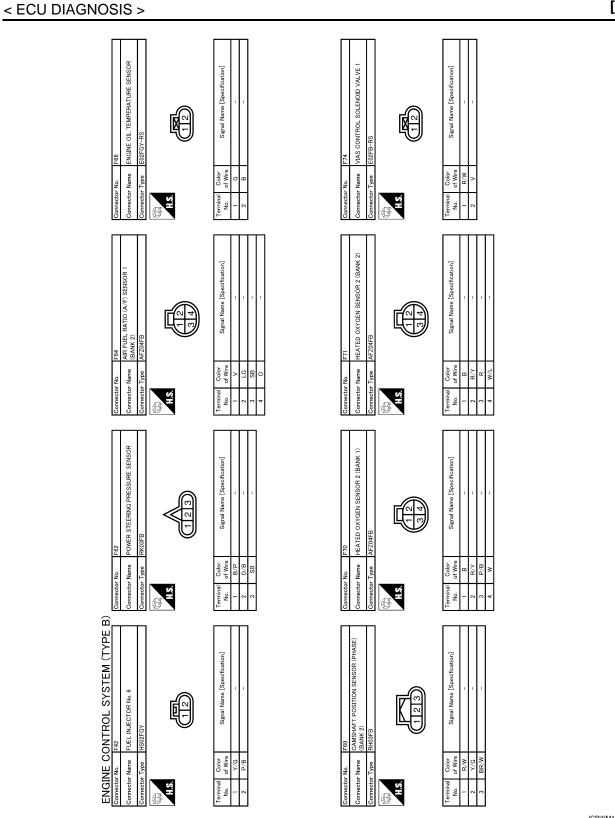


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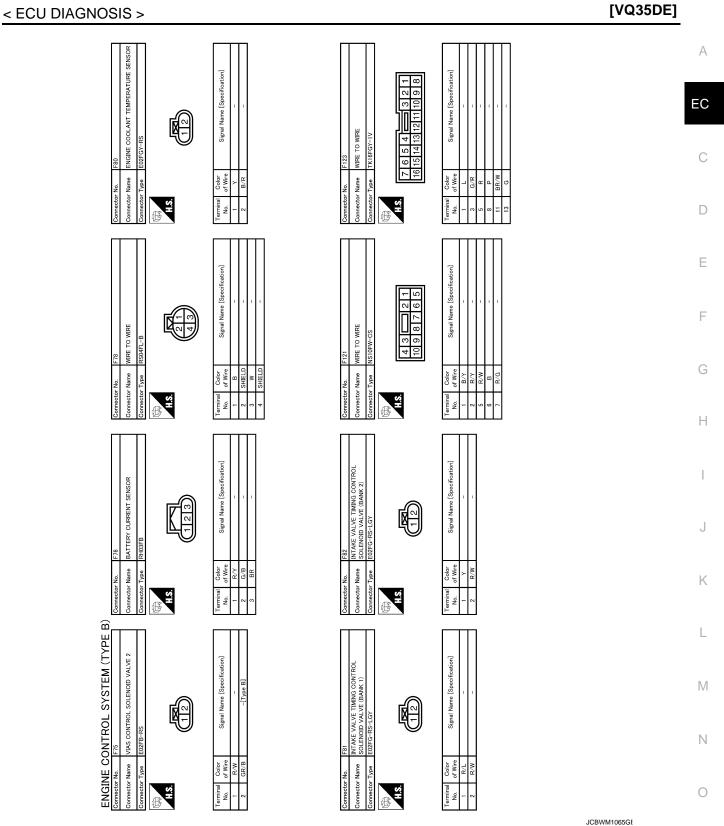
Ρ



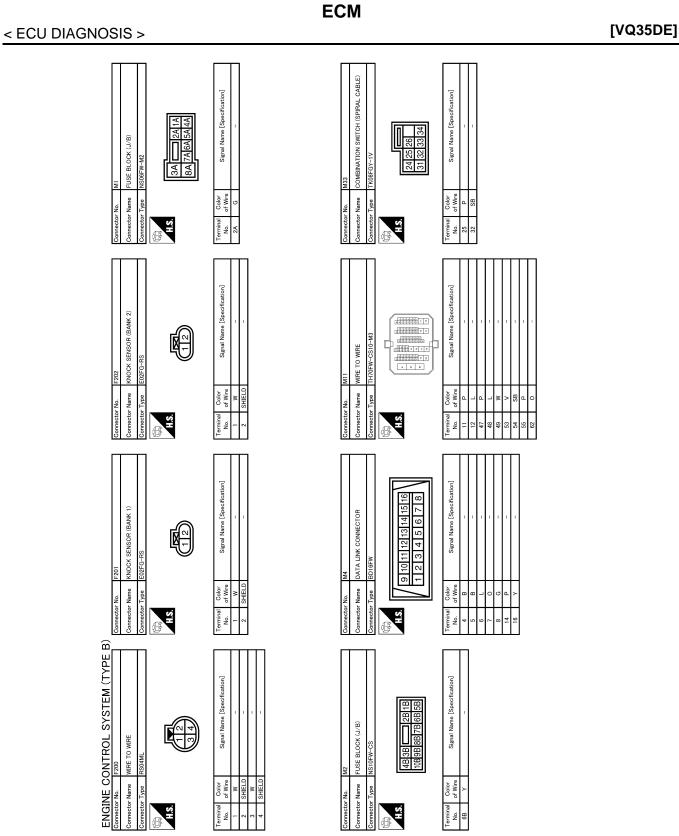




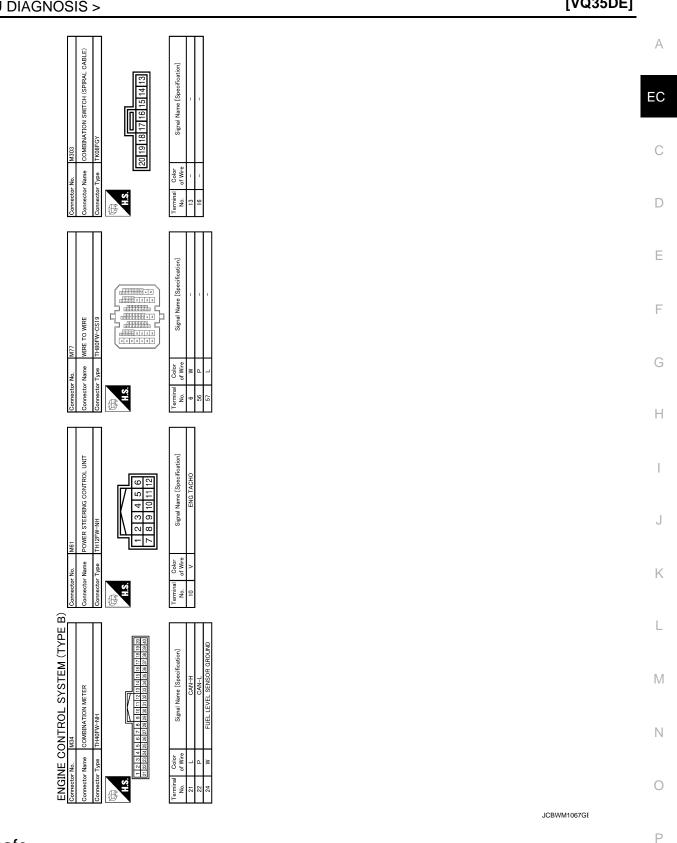
JCBWM1064GE



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JCBWM1066GE



Fail-safe

NON DTC RELATED ITEM

INFOID:000000003388287

| Engine operating condi-<br>tion in fail-safe mode                        | Detected items                        | Remarks   | Reference<br>page |
|--|---------------------------------------|---|-------------------|
| Engine speed will not<br>rise more than 2,500 rpm<br>due to the fuel cut | Malfunction indicator<br>lamp circuit | When there is an open circuit on MIL circuit, the ECM cannot warn the driver by illuminating MIL when there is malfunction on engine control system.<br>Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating the fail-safe function.<br>The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction. | <u>EC-456</u>     |

# DTC RELATED ITEM

| DTC No.                                   | Detected items                                 | Engine opera  | ating condition in fail-safe mode   |
|---|--|---|---|
| P0011<br>P0021                            | Intake valve timing control                    | The signal is not energized to the in control does not function.  | take valve timing control solenoid valve and the valve                                |
| P0102<br>P0103                            | Mass air flow sensor circuit                   | Engine speed will not rise more that  | n 2,400 rpm due to the fuel cut.  |
| P0117<br>P0118                            | Engine coolant tempera-<br>ture sensor circuit |   | determined by ECM based on the following condition oolant temperature decided by ECM. |
|   |  | Condition   | Engine coolant temperature decided<br>(CONSULT-III display)                           |
|   |  | Just as ignition switch is turned ON or START   | 40°C (104°F)  |
|   |  | Approx 4 minutes or more after en-<br>gine starting   | 80°C (176°F)  |
|   |  | Except as shown above   | 40 - 80°C (104 - 176°F)<br>(Depends on the time)                                      |
|   |  | When the fail-safe system for engin fan operates while engine is runnin   | e coolant temperature sensor is activated, the cooling g.                             |
| P0122<br>P0123<br>P0222<br>P0223<br>P2135 | Throttle position sensor                       | order for the idle position to be with  | eed of the throttle valve to be slower than the normal                                |
| P0196<br>P0197<br>P0198                   | Engine oil temperature<br>sensor               | Intake valve timing control does no   | t function.   |
| P0500                                     | Vehicle speed sensor                           | The cooling fan operates (Highest)  | while engine is running.  |
| P0605                                     | ECM  | (When ECM calculation function is<br>ECM stops the electric throttle cont<br>fixed opening (approx. 5 degrees) b<br>ECM deactivates ASCD operation. | rol actuator control, throttle valve is maintained at a                               |
| P0643                                     | Sensor power supply                            | ECM stops the electric throttle cont<br>fixed opening (approx. 5 degrees) I   | trol actuator control, throttle valve is maintained at a by the return spring.        |
| P1805                                     | Brake switch                                   | ECM controls the electric throttle co<br>small range.<br>Therefore, acceleration will be poor   | ontrol actuator by regulating the throttle opening to a r.                            |
|   |  | Vehicle condition   | Driving condition   |
|   |  | When engine is idling   | Normal  |
|   |  | When accelerating   | Poor acceleration   |
| P2100<br>P2103                            | Throttle control motor relay                   | ECM stops the electric throttle cont<br>fixed opening (approx. 5 degrees) b   | rrol actuator control, throttle valve is maintained at a by the return spring.        |
| P2101                                     | Electric throttle control function             | ECM stops the electric throttle cont<br>fixed opening (approx. 5 degrees) I   | rol actuator control, throttle valve is maintained at a by the return spring.         |

| DTC No.                                   | Detected items                          | Engine operating condition in fail-safe mode  | 0  |
|---|---|---|----|
| P2118                                     | Throttle control motor                  | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.   | A  |
| P2119                                     | Electric throttle control ac-<br>tuator | (When electric throttle control actuator does not function properly due to the return spring malfunction:)<br>ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.                            | EC |
|   |   | (When throttle valve opening angle in fail-safe mode is not in specified range:)<br>ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.   | С  |
|   |   | (When ECM detects the throttle valve is stuck open:)<br>While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls.   | D  |
|   |   | The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.  | E  |
| P2122<br>P2123<br>P2127<br>P2128<br>P2138 | Accelerator pedal position sensor       | The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.<br>The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.<br>Therefore, the acceleration will be poor. | F  |

# DTC Inspection Priority Chart

INFOID:000000003388288 G

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

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| Priority | Detected items (DTC)  |
|----------|---|
| 1        | <ul> <li>U0101 U0164 U1000 U1001 CAN communication line</li> <li>P0101 P0102 P0103 Mass air flow sensor</li> <li>P0112 P0113 P0127 Intake air temperature sensor</li> <li>P0116 P0117 P0118 P0125 Engine coolant temperature sensor</li> <li>P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor</li> <li>P0128 Thermostat function</li> <li>P0181 P0182 P0183 Fuel tank temperature sensor</li> <li>P0196 P0197 P0198 Engine oil temperature sensor</li> <li>P0327 P0328 P0332 P0333 Knock sensor</li> <li>P0335 Crankshaft position sensor (POS)</li> <li>P0340 P0345 Camshaft position sensor (PHASE)</li> <li>P0460 P0461 P0462 P0463 Fuel level sensor</li> <li>P0500 Vehicle speed sensor</li> <li>P0643 Sensor power supply</li> <li>P0705 P0850 Park/Neutral position (PNP) switch</li> <li>P1550 P1552 P1552 P1554 Battery current sensor</li> <li>P1610 - P1615 NATS</li> <li>P1700 CVT control system</li> <li>P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> </ul>   |
| 2        | <ul> <li>P1212 P212 P212 P212 P212 P212 P2130 Accelerator pectar position sensor</li> <li>P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater</li> <li>P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater</li> <li>P0130 P0131 P0132 P0133 P0150 P0151 P0152 P0153 P2A00 P2A03 Air fuel ratio (A/F) sensor 1</li> <li>P0137 P0138 P0139 P0157 P0158 P0159 Heated oxygen sensor 2</li> <li>P0441 EVAP control system purge flow monitoring</li> <li>P0443 P0444 P0445 EVAP canister purge volume control solenoid valve</li> <li>P0447 P0448 EVAP canister vent control valve</li> <li>P0445 P0452 P0453 EVAP control system pressure sensor</li> <li>P0550 Power steering pressure sensor</li> <li>P0603 ECM power supply</li> <li>P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 CVT related sensors, solenoid valves and switches</li> <li>P1217 Engine over temperature (OVERHEAT)</li> <li>P1720 Vehicle speed sensor</li> <li>P1800 P1801 VIAS control solenoid valve</li> <li>P1805 Brake switch</li> <li>P2100 P2103 Throttle control motor relay</li> <li>P2118 Throttle control motor</li> </ul> |
| 3        | <ul> <li>P0011 P0021 Intake valve timing control</li> <li>P0171 P0172 P0174 P0175 Fuel injection system function</li> <li>P0300 - P0306 Misfire</li> <li>P0420 P0430 Three way catalyst function</li> <li>P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> <li>P0455 EVAP control system (GROSS LEAK)</li> <li>P0506 P0507 Idle speed control system</li> <li>P1148 P1168 Closed loop control</li> <li>P1212 TCS communication line</li> <li>P1421 Cold start control</li> <li>P1564 ASCD steering switch</li> <li>P1572 ASCD brake switch</li> <li>P1574 ASCD vehicle speed sensor</li> <li>P1715 Primary speed sensor</li> <li>P2119 Electric throttle control actuator</li> </ul>  |

# < ECU DIAGNOSIS >

# DTC Index

[VQ35DE]

INFOID:000000003388289

|                                  |                    |  |          | 1    | ×:Applicable –         | -: Not applicable | e        |
|----------------------------------|--------------------|--|----------|------|------------------------|-------------------|----------|
| DTC                              | *1                 | Items  |          |      |                        | Reference         |          |
| CONSULT-III<br>GST* <sup>2</sup> | ECM* <sup>3</sup>  | (CONSULT-III screen terms)                                 | SRT code | Trip | MIL                    | page              | EC       |
| U0101                            | 0101* <sup>4</sup> | LOST COMM (ECM)  | _        | 1    | ×                      | <u>EC-138</u>     | C        |
| U0164                            | 0164* <sup>4</sup> | LOST COMM (HVAC)   | _        | 1    | ×                      | <u>EC-139</u>     |          |
| U1000                            | 1000* <sup>4</sup> | CAN COMM CIRCUIT   | _        | 1    | ×                      | <u>EC-140</u>     |          |
| U1001                            | 1001* <sup>4</sup> | CAN COMM CIRCUIT   |          | 2    |                        | <u>EC-140</u>     | D        |
| P0000                            | 0000               | NO DTC IS DETECTED.<br>FURTHER TESTING<br>MAY BE REQUIRED. | _        | _    | Blinking* <sup>7</sup> | _                 | E        |
| P0011                            | 0011               | INT/V TIM CONT-B1  | _        | 2    | ×                      | <u>EC-141</u>     | -        |
| P0021                            | 0021               | INT/V TIM CONT-B2  | _        | 2    | ×                      | <u>EC-141</u>     | F        |
| P0031                            | 0031               | A/F SEN1 HTR (B1)  | _        | 2    | ×                      | <u>EC-145</u>     | <u>.</u> |
| P0032                            | 0032               | A/F SEN1 HTR (B1)  | _        | 2    | ×                      | <u>EC-145</u>     | -        |
| P0037                            | 0037               | HO2S2 HTR (B1)   |          | 2    | ×                      | <u>EC-148</u>     | G        |
| P0038                            | 0038               | HO2S2 HTR (B1)   | _        | 2    | ×                      | <u>EC-148</u>     | -        |
| P0051                            | 0051               | A/F SEN1 HTR (B2)  | _        | 2    | ×                      | <u>EC-145</u>     | Н        |
| P0052                            | 0052               | A/F SEN1 HTR (B2)  |          | 2    | ×                      | <u>EC-145</u>     |          |
| P0057                            | 0057               | HO2S2 HTR (B2)   | _        | 2    | ×                      | <u>EC-148</u>     | -        |
| P0058                            | 0058               | HO2S2 HTR (B2)   |          | 2    | ×                      | <u>EC-148</u>     |          |
| P0075                            | 0075               | INT/V TIM V/CIR-B1   |          | 2    | ×                      | <u>EC-151</u>     | -        |
| P0081                            | 0081               | INT/V TIM V/CIR-B2   | _        | 2    | ×                      | <u>EC-151</u>     |          |
| P0101                            | 0101               | MAF SEN/CIRCUIT-B1   |          | 2    | ×                      | <u>EC-154</u>     | J        |
| P0102                            | 0102               | MAF SEN/CIRCUIT-B1   |          | 1    | ×                      | <u>EC-162</u>     | -        |
| P0103                            | 0103               | MAF SEN/CIRCUIT-B1   |          | 1    | ×                      | <u>EC-162</u>     | K        |
| P0112                            | 0112               | IAT SEN/CIRCUIT-B1   | _        | 2    | ×                      | <u>EC-167</u>     | -        |
| P0113                            | 0113               | IAT SEN/CIRCUIT-B1   |          | 2    | ×                      | <u>EC-167</u>     |          |
| P0116                            | 0116               | ECT SEN/CIRC   |          | 2    | ×                      | <u>EC-170</u>     | L        |
| P0117                            | 0117               | ECT SEN/CIRC   | _        | 1    | ×                      | <u>EC-172</u>     | -        |
| P0118                            | 0118               | ECT SEN/CIRC   | _        | 1    | ×                      | <u>EC-172</u>     | M        |
| P0122                            | 0122               | TP SEN 2/CIRC-B1   | _        | 1    | ×                      | <u>EC-175</u>     | -        |
| P0123                            | 0123               | TP SEN 2/CIRC-B1   | _        | 1    | ×                      | <u>EC-175</u>     | -        |
| P0125                            | 0125               | ECT SENSOR   | _        | 2    | ×                      | <u>EC-178</u>     | N        |
| P0127                            | 0127               | IAT SENSOR-B1  | _        | 2    | ×                      | <u>EC-181</u>     | -        |
| P0128                            | 0128               | THERMSTAT FNCTN  | _        | 2    | ×                      | <u>EC-183</u>     | 0        |
| P0130                            | 0130               | A/F SENSOR1 (B1)   | _        | 2    | ×                      | <u>EC-186</u>     | 0        |
| P0131                            | 0131               | A/F SENSOR1 (B1)   |          | 2    | ×                      | <u>EC-190</u>     | -        |
| P0132                            | 0132               | A/F SENSOR1 (B1)   | _        | 2    | ×                      | <u>EC-194</u>     | Р        |
| P0133                            | 0133               | A/F SENSOR1 (B1)   | ×        | 2    | ×                      | EC-198            | -        |
| P0137                            | 0137               | HO2S2 (B1)   | ×        | 2    | ×                      | EC-203            | -        |
| P0138                            | 0138               | HO2S2 (B1)   | ×        | 2    | ×                      | EC-210            | -        |
| P0139                            | 0139               | HO2S2 (B1)   | ×        | 2    | ×                      | EC-219            | -        |
| P0150                            | 0150               | A/F SENSOR1 (B2)   |          | 2    | ×                      | EC-186            | -        |

| DTC                              | C* <sup>1</sup>   | Items                      |          |        |     | Deference         |
|----------------------------------|-------------------|----------------------------|----------|--------|-----|-------------------|
| CONSULT-III<br>GST* <sup>2</sup> | ECM* <sup>3</sup> | (CONSULT-III screen terms) | SRT code | Trip   | MIL | Reference<br>page |
| P0151                            | 0151              | A/F SENSOR1 (B2)           |          | 2      | ×   | <u>EC-190</u>     |
| P0152                            | 0152              | A/F SENSOR1 (B2)           |          | 2      | ×   | <u>EC-194</u>     |
| P0153                            | 0153              | A/F SENSOR1 (B2)           | ×        | 2      | ×   | <u>EC-198</u>     |
| P0157                            | 0157              | HO2S2 (B2)                 | ×        | 2      | ×   | <u>EC-203</u>     |
| P0158                            | 0158              | HO2S2 (B2)                 | ×        | 2      | ×   | EC-210            |
| P0159                            | 0159              | HO2S2 (B2)                 | ×        | 2      | ×   | EC-219            |
| P0171                            | 0171              | FUEL SYS-LEAN-B1           |          | 2      | ×   | <u>EC-226</u>     |
| P0172                            | 0172              | FUEL SYS-RICH-B1           | _        | 2      | ×   | <u>EC-231</u>     |
| P0174                            | 0174              | FUEL SYS-LEAN-B2           | _        | 2      | ×   | <u>EC-226</u>     |
| P0175                            | 0175              | FUEL SYS-RICH-B2           |          | 2      | ×   | EC-231            |
| P0181                            | 0181              | FTT SENSOR                 |          | 2      | ×   | <u>EC-236</u>     |
| P0182                            | 0182              | FTT SEN/CIRCUIT            |          | 2      | ×   | EC-239            |
| P0183                            | 0183              | FTT SEN/CIRCUIT            |          | 2      | ×   | <u>EC-239</u>     |
| P0196                            | 0196              | EOT SEN/CIRC               |          | 2      | ×   | <u>EC-242</u>     |
| P0197                            | 0197              | EOT SEN/CIRC               |          | 2      | ×   | <u>EC-245</u>     |
| P0198                            | 0198              | EOT SEN/CIRC               |          | 2      | ×   | <u>EC-245</u>     |
| P0222                            | 0222              | TP SEN 1/CIRC-B1           | _        | 1      | ×   | <u>EC-248</u>     |
| P0223                            | 0223              | TP SEN 1/CIRC-B1           | _        | 1      | ×   | EC-248            |
| P0300                            | 0300              | MULTI CYL MISFIRE          | _        | 1 or 2 | ×   | EC-251            |
| P0301                            | 0301              | CYL 1 MISFIRE              |          | 1 or 2 | ×   | <u>EC-251</u>     |
| P0302                            | 0302              | CYL 2 MISFIRE              |          | 1 or 2 | ×   | EC-251            |
| P0303                            | 0303              | CYL 3 MISFIRE              |          | 1 or 2 | ×   | EC-251            |
| P0304                            | 0304              | CYL 4 MISFIRE              |          | 1 or 2 | ×   | EC-251            |
| P0305                            | 0305              | CYL 5 MISFIRE              |          | 1 or 2 | ×   | EC-251            |
| P0306                            | 0306              | CYL 6 MISFIRE              |          | 1 or 2 | ×   | EC-251            |
| P0327                            | 0327              | KNOCK SEN/CIRC-B1          |          | 2      |     | <u>EC-257</u>     |
| P0328                            | 0328              | KNOCK SEN/CIRC-B1          |          | 2      |     | EC-257            |
| P0332                            | 0332              | KNOCK SEN/CIRC-B2          |          | 2      |     | EC-257            |
| P0333                            | 0333              | KNOCK SEN/CIRC-B2          |          | 2      |     | <u>EC-257</u>     |
| P0335                            | 0335              | CKP SEN/CIRCUIT            |          | 2      | ×   | <u>EC-260</u>     |
| P0340                            | 0340              | CMP SEN/CIRC-B1            |          | 2      | ×   | EC-264            |
| P0345                            | 0345              | CMP SEN/CIRC-B2            |          | 2      | ×   | <u>EC-264</u>     |
| P0420                            | 0420              | TW CATALYST SYS-B1         | ×        | 2      | ×   | EC-268            |
| P0430                            | 0430              | TW CATALYST SYS-B2         | ×        | 2      | ×   | EC-268            |
| P0441                            | 0441              | EVAP PURG FLOW/MON         | ×        | 2      | ×   | EC-273            |
| P0442                            | 0442              | EVAP SMALL LEAK            | ×        | 2      | ×   | EC-278            |
| P0443                            | 0443              | PURG VOLUME CONT/V         |          | 2      | ×   | EC-284            |
| P0444                            | 0444              | PURG VOLUME CONT/V         |          | 2      | ×   | EC-289            |
| P0445                            | 0445              | PURG VOLUME CONT/V         | _        | 2      | ×   | EC-289            |
| P0447                            | 0447              | VENT CONTROL VALVE         |          | 2      | ×   | EC-292            |
| P0448                            | 0448              | VENT CONTROL VALVE         |          | 2      | ×   | <u>EC-296</u>     |
| P0451                            | 0451              | EVAP SYS PRES SEN          | _        | 2      | ×   | EC-300            |

### < ECU DIAGNOSIS >

# [VQ35DE]

| DTC                              | ×1                | Items                      |                 |        |        | Reference     | А  |
|----------------------------------|-------------------|----------------------------|-----------------|--------|--------|---------------|----|
| CONSULT-III<br>GST* <sup>2</sup> | ECM* <sup>3</sup> | (CONSULT-III screen terms) | SRT code        | Trip   | MIL    | page          | ~  |
| P0452                            | 0452              | EVAP SYS PRES SEN          | _               | 2      | ×      | EC-303        | EC |
| P0453                            | 0453              | EVAP SYS PRES SEN          | -               | 2      | ×      | EC-308        |    |
| P0455                            | 0455              | EVAP GROSS LEAK            | _               | 2      | ×      | <u>EC-314</u> |    |
| P0456                            | 0456              | EVAP VERY SML LEAK         | ×* <sup>6</sup> | 2      | ×      | EC-320        | С  |
| P0460                            | 0460              | FUEL LEV SEN SLOSH         | _               | 2      | ×      | <u>EC-327</u> |    |
| P0461                            | 0461              | FUEL LEVEL SENSOR          | _               | 2      | ×      | EC-329        | D  |
| P0462                            | 0462              | FUEL LEVL SEN/CIRC         | _               | 2      | ×      | EC-331        |    |
| P0463                            | 0463              | FUEL LEVL SEN/CIRC         | _               | 2      | ×      | EC-331        |    |
| P0500                            | 0500              | VEH SPEED SEN/CIRC*5       | _               | 2      | ×      | EC-333        | E  |
| P0506                            | 0506              | ISC SYSTEM                 | _               | 2      | ×      | EC-335        |    |
| P0507                            | 0507              | ISC SYSTEM                 |                 | 2      | ×      | <u>EC-337</u> | F  |
| P0550                            | 0550              | PW ST P SEN/CIRC           | -               | 2      |        | EC-339        |    |
| P0603                            | 0603              | ECM BACK UP/CIRCUIT        | _               | 2      | ×      | EC-342        |    |
| P0605                            | 0605              | ECM                        | -               | 1 or 2 | × or — | <u>EC-344</u> | G  |
| P0607                            | 0607              | ECM                        | -               | 1      | ×      | <u>EC-346</u> |    |
| P0643                            | 0643              | SENSOR POWER/CIRC          | _               | 1      | ×      | <u>EC-347</u> | Н  |
| P0705                            | 0705              | PNP SW/CIRC                | -               | 2      | ×      | <u>TM-44</u>  |    |
| P0710                            | 0710              | ATF TEMP SEN/CIRC*8        | —               | 1      | ×      | <u>TM-47</u>  |    |
| P0715                            | 0715              | INPUT SPD SEN/CIRC         | _               | 2      | ×      | <u>TM-50</u>  |    |
| P0720                            | 0720              | VEH SPD SEN/CIR AT*5       | _               | 2      | ×      | <u>TM-53</u>  |    |
| P0740                            | 0740              | TCC SOLENOID/CIRC          | _               | 2      | ×      | TM-60         | J  |
| P0744                            | 0744              | A/T TCC S/V FNCTN          | _               | 2      | ×      | <u>TM-62</u>  |    |
| P0745                            | 0745              | L/PRESS SOL/CIRC           | _               | 2      | ×      | <u>TM-64</u>  |    |
| P0746                            | 0746              | PRS CNT SOL/A FCTN         | _               | 1      | ×      | <u>TM-66</u>  | K  |
| P0776                            | 0776              | PRS CNT SOL/B FCTN         | _               | 2      | ×      | <u>TM-68</u>  |    |
| P0778                            | 0778              | PRS CNT SOL/B CIRC         | _               | 2      | ×      | <u>TM-70</u>  |    |
| P0840                            | 0840              | TR PRS SENS/A CIRC         | _               | 2      | ×      | <u>TM-72</u>  |    |
| P0845                            | 0845              | TR PRS SENS/B CIRC         | -               | 2      | ×      | <u>TM-78</u>  |    |
| P0850                            | 0850              | P-N POS SW/CIRCUIT         | _               | 2      | ×      | <u>EC-350</u> | M  |
| P1148                            | 1148              | CLOSED LOOP-B1             |                 | 1      | ×      | <u>EC-353</u> |    |
| P1168                            | 1168              | CLOSED LOOP-B2             | —               | 1      | ×      | <u>EC-353</u> | Ν  |
| P1212                            | 1212              | TCS/CIRC                   | _               | 2      | —      | <u>EC-354</u> |    |
| P1217                            | 1217              | ENG OVER TEMP              | —               | 1      | ×      | <u>EC-355</u> |    |
| P1225                            | 1225              | CTP LEARNING-B1            | _               | 2      |        | <u>EC-359</u> | 0  |
| P1226                            | 1226              | CTP LEARNING-B1            | _               | 2      |        | <u>EC-361</u> |    |
| P1421                            | 1421              | COLD START CONTROL         | _               | 2      | ×      | <u>EC-363</u> | P  |
| P1550                            | 1550              | BAT CURRENT SENSOR         | _               | 2      |        | <u>EC-365</u> | I  |
| P1551                            | 1551              | BAT CURRENT SENSOR         | _               | 2      | _      | <u>EC-368</u> |    |
| P1552                            | 1552              | BAT CURRENT SENSOR         | —               | 2      |        | <u>EC-368</u> |    |
| P1553                            | 1553              | BAT CURRENT SENSOR         | _               | 2      |        | <u>EC-371</u> |    |
| P1554                            | 1554              | BAT CURRENT SENSOR         | —               | 2      |        | <u>EC-374</u> |    |
| P1564                            | 1564              | ASCD SW                    | —               | 1      | —      | <u>EC-377</u> |    |

EC-523

#### < ECU DIAGNOSIS >

| DTO                              | C*1               |                                      |          |      |     |                                    |
|----------------------------------|-------------------|--------------------------------------|----------|------|-----|------------------------------------|
| CONSULT-III<br>GST* <sup>2</sup> | ECM* <sup>3</sup> | Items     (CONSULT-III screen terms) | SRT code | Trip | MIL | Reference<br>page                  |
| P1572                            | 1572              | ASCD BRAKE SW                        | _        | 1    | _   | <u>EC-380</u>                      |
| P1574                            | 1574              | ASCD VHL SPD SEN                     | _        | 1    | —   | <u>EC-386</u>                      |
| P1610                            | 1610              | LOCK MODE                            | _        | 2    | _   | <u>SEC-39</u> or<br><u>SEC-269</u> |
| P1611                            | 1611              | ID DISCORD, IMM-ECM                  | _        | 2    | _   | <u>SEC-40</u> or<br><u>SEC-270</u> |
| P1612                            | 1612              | CHAIN OF ECM-IMMU                    | _        | 2    | _   | <u>SEC-42</u> or<br><u>SEC-272</u> |
| P1614                            | 1614              | CHAIN OF IMMU-KEY                    | _        | 2    | _   | <u>SEC-43</u> or<br><u>SEC-273</u> |
| P1615                            | 1615              | DIFFERENCE OF KEY                    | _        | 2    | _   | <u>SEC-46</u> or<br><u>SEC-276</u> |
| P1700                            | 1700              | CVT C/U FUNCT                        | _        | 1    | _   | <u>EC-388</u>                      |
| P1715                            | 1715              | IN PULY SPEED                        |          | 2    | _   | <u>EC-389</u>                      |
| P1720                            | 1720              | V/SP SEN(A/T OUT)                    | _        | 2    | —   | EC-391                             |
| P1740                            | 1740              | LU-SLCT SOL/CIRC                     | _        | 2    | ×   | <u>TM-92</u>                       |
| P1777                            | 1777              | STEP MOTR CIRC                       | _        | 1    | ×   | <u>TM-95</u>                       |
| P1778                            | 1778              | STEP MOTR FNC                        |          | 2    | ×   | <u>TM-98</u>                       |
| P1800                            | 1800              | VIAS S/V-1                           | _        | 2    | —   | EC-393                             |
| P1801                            | 1801              | VIAS S/V-2                           | _        | 2    | —   | <u>EC-396</u>                      |
| P1805                            | 1805              | BRAKE SW/CIRCUIT                     | _        | 2    | —   | <u>EC-399</u>                      |
| P2100                            | 2100              | ETC MOT PWR-B1                       | _        | 1    | ×   | EC-402                             |
| P2101                            | 2101              | ETC FNCTN/CIRC-B1                    |          | 1    | Х   | <u>EC-404</u>                      |
| P2103                            | 2103              | ETC MOT PWR                          | —        | 1    | ×   | <u>EC-402</u>                      |
| P2118                            | 2118              | ETC MOT-B1                           | _        | 1    | ×   | <u>EC-408</u>                      |
| P2119                            | 2119              | ETC ACTR-B1                          |          | 1    | Х   | <u>EC-411</u>                      |
| P2122                            | 2122              | APP SEN 1/CIRC                       |          | 1    | Х   | EC-413                             |
| P2123                            | 2123              | APP SEN 1/CIRC                       |          | 1    | Х   | <u>EC-413</u>                      |
| P2127                            | 2127              | APP SEN 2/CIRC                       | _        | 1    | ×   | <u>EC-416</u>                      |
| P2128                            | 2128              | APP SEN 2/CIRC                       | _        | 1    | ×   | EC-416                             |
| P2135                            | 2135              | TP SENSOR-B1                         | _        | 1    | ×   | <u>EC-420</u>                      |
| P2138                            | 2138              | APP SENSOR                           | _        | 1    | ×   | <u>EC-423</u>                      |
| P2A00                            | 2A00              | A/F SENSOR1 (B1)                     |          | 2    | ×   | <u>EC-427</u>                      |
| P2A03                            | 2A03              | A/F SENSOR1 (B2)                     |          | 2    | ×   | <u>EC-427</u>                      |

\*1: 1st trip DTC No. is the same as DTC No.

\*2: This number is prescribed by SAE J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*4: The troubleshooting for this DTC needs CONSULT-III.

\*5: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

\*6: SRT code will not be set if the self-diagnostic result is NG.

\*7: When the ECM is in the mode displays SRT status, MIL may blink. For the details, refer to "How to Display SRT Status".

\*8: When erasing this DTC, always use CONSULT-III or GST.

# How to Set SRT Code

To set all SRT codes, self-diagnoses for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

# EC-524

2009 Murano

INFOID:000000003388290

### (P)WITH CONSULT-III

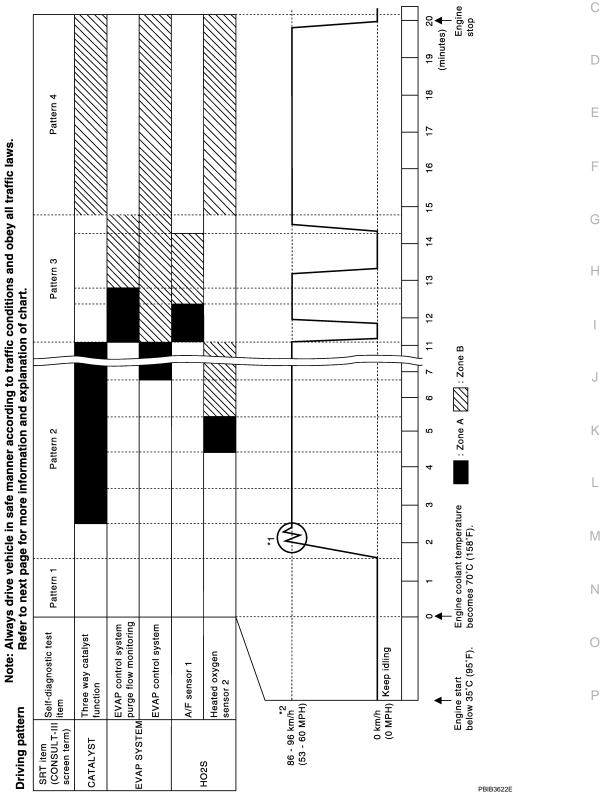
Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table А on "SRT Item".

**ECM** 

#### WITHOUT CONSULT-III

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

#### DRIVING PATTERN



# [VQ35DE]

 The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.

Zone A refers to the range where the time, required for the diagnosis under normal conditions\*, is the shortest.

Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

- \*: Normal conditions refer to the following:
- Sea level
- Flat road
- Ambient air temperature: 20 30°C (68 86°F)

• Diagnosis is performed as quickly as possible under normal conditions. Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- The engine is started at the engine coolant temperature of -10 to  $35^{\circ}C$  (14 to  $95^{\circ}F$ ) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3 V).
- The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 46 and ground is lower than 1.4 V).
- The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 95 and ground is less than 4.1 V).

Pattern 2:

 When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during deceleration of vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).

Pattern 4:

- The accelerator pedal must be held very steady during steadystate driving.
- If the accelerator pedal is moved, the test must be conducted adain.

\*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

\*2: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for CVT Models Set the selector lever in the D position.

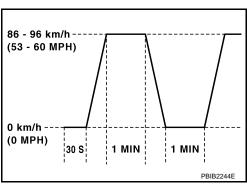
# Test Value and Test Limit

The following is the information specified in Service \$06 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

These data (test value and test limit) are specified by On Board Monitor ID(OBDMID), Test ID (TID), Unit and Scaling ID and can be displayed on the GST screen.

The items of the test value and test limit will be displayed with GST screen which items are provided by the ECM. (eg., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)



INFOID:000000004747837

# **ECM**

# < ECU DIAGNOSIS >

# [VQ35DE]

| lte m | OBD- |                                    | DTO   | li   | mit                      | Description                                  | A  |   |
|-------|------|------------------------------------|-------|--|--------------------------|--|----|---|
| Item  | MID  | Self-diagnostic test item          | DTC   | TID  | Unitand<br>Scaling<br>ID | Description                                  | EC |   |
|       |      |                                    | P0131 | 83H  | 0BH                      | Minimum sensor output voltage for test cycle | С  |   |
|       |      |                                    | P0131 | 84H  | 0BH                      | Maximum sensor output voltage for test cycle | 0  |   |
|       |      |                                    | P0130 | (GST display)DescriptionTIDUnit and<br>ScalingDescription83H0BHMinimum sensor output voltage for test<br>cycle84H0BHMaximum sensor output voltage for test<br>cycle85H0BHMinimum sensor output voltage for test<br>cycle86H0BHMinimum sensor output voltage for test<br>cycle87H04HResponse rate: Response ratio (Lean to<br>Rich)88H04HResponse rate: Response ratio (Rich to<br> | D                        |  |    |   |
|       |      | Air fuel ratio (A/F) sensor 1      | P0130 | 86H  | 0BH                      |  | Е  |   |
|       | 01H  | (Bank 1)                           | P0133 | 87H  | 04H                      |  |    |   |
|       |      |                                    | P0133 | 88H  | 04H                      |  | F  |   |
|       |      |                                    | P2A00 | 89H  | 84H                      | The amount of shift in air fuel ratio        |    |   |
|       |      |                                    | P2A00 | 8AH  | 84H                      | The amount of shift in air fuel ratio        | G  |   |
| HO2S  |      |                                    | P0130 | 8BH  | 0BH                      | Difference in sensor output voltage          |    |   |
|       |      |                                    | P0133 | 8CH  | 83H                      | Response gain at the limited frequency       |    |   |
|       |      |                                    | P0138 | 07H  | 0CH                      |  | Н  |   |
|       | 02H  | Heated oxygen sensor 2<br>(Bank 1) | P0137 | 08H  | 0CH                      |  |    |   |
|       |      |                                    | P0138 | 80H  | 0CH                      | Sensor output voltage                        |    |   |
|       |      |                                    | P0139 | 81H  | 0CH                      | Difference in sensor output voltage          | 1  |   |
|       |      |                                    |       | P0143  | 07H                      | 0CH  |    | J |
|       | 03H  | Heated oxygen sensor 3<br>(Bank 1) | P0144 | 08H  | 0CH                      |  | K  |   |
|       |      |                                    | P0146 | 80H  | 0CH                      | Sensor output voltage                        |    |   |
|       |      |                                    | P0145 | 81H  | 0CH                      | Difference in sensor output voltage          | I  |   |

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# < ECU DIAGNOSIS >

[VQ35DE]

|       |      |                                    |       |     | e and Test<br>mit        |   |
|-------|------|------------------------------------|-------|-----|--------------------------|---|
| 14    | OBD- |                                    | DTO   |     | display)                 |   |
| Item  | MID  | Self-diagnostic test item          | DTC   | TID | Unitand<br>Scaling<br>ID | Description                                     |
|       |      |                                    | P0151 | 83H | 0BH                      | Minimum sensor output voltage for test cycle    |
|       |      |                                    | P0151 | 84H | 0BH                      | Maximum sensor output voltage for test cycle    |
|       |      |                                    | P0150 | 85H | 0BH                      | Minimum sensor output voltage for test cycle    |
|       |      | Air fuel ratio (A/F) sensor 1      | P0150 | 86H | 0BH                      | Maximum sensor output voltage for test cycle    |
|       | 05H  | (Bank 2)                           | P0153 | 87H | 04H                      | Response rate: Response ratio (Lean to Rich)    |
|       |      |                                    | P0153 | 88H | 04H                      | Response rate: Response ratio (Rich to Lean)    |
|       |      |                                    | P2A03 | 89H | 84H                      | The amount of shift in air fuel ratio           |
|       |      |                                    | P2A03 | 8AH | 84H                      | The amount of shift in air fuel ratio           |
| HO2S  |      |                                    | P0150 | 8BH | 0BH                      | Difference in sensor output voltage             |
|       |      |                                    | P0153 | 8CH | 83H                      | Response gain at the limited frequency          |
|       |      |                                    | P0158 | 07H | 0CH                      | Minimum sensor output voltage for test cycle    |
|       | 06H  | Heated oxygen sensor 2<br>(Bank 2) | P0157 | 08H | 0CH                      | Maximum sensor output voltage for test cycle    |
|       |      |                                    | P0158 | 80H | 0CH                      | Sensor output voltage                           |
|       |      |                                    | P0159 | 81H | 0CH                      | Difference in sensor output voltage             |
|       |      |                                    | P0163 | 07H | 0CH                      | Minimum sensor output voltage for test cycle    |
|       | 07H  | Heated oxygen sensor 3<br>(Bank2)  | P0164 | 08H | 0CH                      | Maximum sensor output voltage for test cycle    |
|       |      |                                    | P0166 | 80H | 0CH                      | Sensor output voltage                           |
|       |      |                                    | P0165 | 81H | 0CH                      | Difference in sensor output voltage             |
|       |      |                                    | P0420 | 80H | 01H                      | O2 storage index                                |
|       | 0411 | Three way catalyst function        | P0420 | 82H | 01H                      | Switching time lag engine exhaust index value   |
|       | 21H  | (Bank1)                            | P2423 | 83H | 0CH                      | Difference in 3rd O2 sensor output voltage      |
| CATA- |      |                                    | P2423 | 84H | 84H                      | O2 storage index in HC trap catalyst            |
| LYST  |      |                                    | P0430 | 80H | 01H                      | O2 storage index                                |
|       | 0011 | Three way catalyst function        | P0430 | 82H | 01H                      | Switching time lag engine exhaust index value   |
|       | 22H  | (Bank2)                            | P2424 | 83H | 0CH                      | Difference in 3rd O2 sensor output volt-<br>age |
|       |      |                                    | P2424 | 84H | 84H                      | O2 storage index in HC trap catalyst            |

# < ECU DIAGNOSIS >

# [VQ35DE]

|                | OBD- |   | DTO                                 | li  | e and Test<br>mit<br>display) | Destrution   | A        |
|----------------|------|---|-------------------------------------|-----|-------------------------------|--|----------|
| ltem           | MID  | Self-diagnostic test item                   | DTC                                 | TID | Unitand<br>Scaling<br>ID      | Description  | EC       |
|                |      |   | P0400                               | 80H | 96H                           | Low Flow Faults: EGR temp change rate (short term)   | С        |
|                |      |   | P0400                               | 81H | 96H                           | Low Flow Faults: EGR temp change rate (long term)  | . 0      |
| EGR<br>SYSTEM  | 31H  | EGR function                                | P0400                               | 82H | 96H                           | Low Flow Faults: Difference between<br>max EGR temp and EGR temp under<br>idling condition   | D        |
|                |      |   | P0400                               | 83H | 96H                           | Low Flow Faults: Max EGR temp  | -<br>- E |
|                |      |   | P1402                               | 84H | 96H                           | High Flow Faults: EGR temp increase rate   |          |
|                |      |   | P0011                               | 80H | 9DH                           | VTC intake function diagnosis (VTC alignment check diagnosis)                                | F        |
|                | 35H  | VVT Monitor (Bank1)                         | P0014                               | 81H | 9DH                           | VTC exhaust function diagnosis (VTC alignment check diagnosis)                               | 0        |
|                | 301  | VVI Monitor (Banki)                         | P0011                               | 82H | 9DH                           | VTC intake function diagnosis (VTC drive failure diagnosis)                                  | G        |
| VVT            |      |   | P0014                               | 83H | 9DH                           | VTC exhaust function diagnosis (VTC drive failure diagnosis)                                 | Н        |
| SYSTEM         |      |   | P0021                               | 80H | 9DH                           | VTC intake function diagnosis (VTC alignment check diagnosis)                                |          |
|                | 2011 | V//T Manitar (Danka)                        | P0024                               | 81H | 9DH                           | VTC exhaust function diagnosis (VTC alignment check diagnosis)                               | •        |
|                | 36H  | VVT Monitor (Bank2)                         | P0021                               | 82H | 9DH                           | VTC intake function diagnosis (VTC drive failure diagnosis)                                  | J        |
|                |      |   | P0024                               | 83H | 9DH                           | VTC exhaust function diagnosis (VTC drive failure diagnosis)                                 |          |
|                | 39H  | EVAP control system leak<br>(Cap Off)       | P0455                               | 80H | 0CH                           | Difference in pressure sensor output voltage before and after pull down                      | K        |
|                | 3BH  | EVAP control system leak<br>(Small leak)    | P0442                               | 80H | 05H                           | Leak area index (for more than 0.04 inch)  | L        |
| EVAP<br>SYSTEM | зсн  | EVAP control system leak                    | P0456                               | 80H | 05H                           | Leak area index (for more than 0.02 inch)  |          |
| 01012m         | зсп  | (Very small leak)                           | P0456                               | 81H | FDH                           | Maximum internal pressure of EVAP system during monitoring                                   | M        |
|                | 3DH  | Purge flow system                           | P0441                               | 83H | 0CH                           | Difference in pressure sensor output<br>voltage before and after vent control<br>valve close | N        |
|                | 41H  | A/F sensor 1 heater<br>(Bank 1)             | Low Input:P0031<br>High Input:P0032 | 81H | 0BH                           | Converted value of Heater electric cur-<br>rent to voltage                                   | 0        |
|                | 42H  | Heated oxygen sensor 2 heat-<br>er (Bank 1) | Low Input:P0037<br>High Input:P0038 | 80H | 0CH                           | Converted value of Heater electric cur-<br>rent to voltage                                   |          |
| O2 SEN-        | 43H  | Heated oxygen sensor 3 heat-<br>er (Bank 1) | P0043                               | 80H | 0CH                           | Converted value of Heater electric cur-<br>rent to voltage                                   | Ρ        |
| SOR<br>HEATER  | 45H  | A/F sensor 1 heater<br>(Bank 2)             | Low Input:P0051<br>High Input:P0052 | 81H | 0BH                           | Converted value of Heater electric cur-<br>rent to voltage                                   |          |
|                | 46H  | Heated oxygen sensor 2 heat-<br>er (Bank 2) | Low Input:P0057<br>High Input:P0058 | 80H | 0CH                           | Converted value of Heater electric cur-<br>rent to voltage                                   |          |
|                | 47H  | Heated oxygen sensor 3 heat-<br>er (Bank 2) | P0063                               | 80H | 0CH                           | Converted value of Heater electric cur-<br>rent to voltage                                   |          |

| ltem                    | OBD- | Self-diagnostic test item      | DTC                          | li  | e and Test<br>mit<br>display) | Description  |
|-------------------------|------|--------------------------------|------------------------------|-----|-------------------------------|--|
| item                    | MID  | Sen-ulagnostic test item       | DIC                          | TID | Unitand<br>Scaling<br>ID      | Description  |
|                         |      |                                | P0411                        | 80H | 01H                           | Secondary Air Injection System Incor-<br>rect Flow Detected    |
|                         |      |                                | Bank1: P0491<br>Bank2: P0492 | 81H | 01H                           | Secondary Air Injection System Insufficient Flow               |
|                         |      |                                | P2445                        | 82H | 01H                           | Secondary Air Injection System Pump<br>Stuck Off               |
| SEC-<br>OND-<br>ARY AIR | 71H  | Secondary Air system           | P2448                        | 83H | 01H                           | Secondary Air Injection System High<br>Airflow                 |
|                         |      |                                | Bank1: P2440<br>Bank2: P2442 | 84H | 01H                           | Secondary Air Injection System Switch-<br>ing Valve Stuck Open |
|                         |      |                                | P2440                        | 85H | 01H                           | Secondary Air Injection System Switch-<br>ing Valve Stuck Open |
|                         |      |                                | P2444                        | 86H | 01H                           | Secondary Air Injection System Pump<br>Stuck On                |
|                         | 81H  | Fuel injection system function | P0171 or P0172               | 80H | 2FH                           | Long term fuel trim  |
| FUEL                    | 0111 | (Bank 1)                       | P0171 or P0172               | 81H | 24H                           | The number of lambda control clamped                           |
| SYSTEM                  | 82H  | Fuel injection system function | P0174 or P0175               | 80H | 2FH                           | Long term fuel trim  |
|                         | 0211 | (Bank 2)                       | P0174 or P0175               | 81H | 24H                           | The number of lambda control clamped                           |

# < ECU DIAGNOSIS >

# [VQ35DE]

|         |             |                            |       |      | e and Test<br>mit        |  | А  |
|---------|-------------|----------------------------|-------|------|--------------------------|--|----|
| Item    | OBD-<br>MID | Self-diagnostic test item  | DTC   | (GST | display)                 | Description  |    |
|         | NILD        |                            |       | TID  | Unitand<br>Scaling<br>ID |  | EC |
|         |             |                            | P0301 | 80H  | 24H                      | Misfiring counter at 1000 revolution of the first cylinder     | С  |
|         |             |                            | P0302 | 81H  | 24H                      | Misfiring counter at 1000 revolution of the second cylinder    |    |
|         |             |                            | P0303 | 82H  | 24H                      | Misfiring counter at 1000 revolution of the third cylinder     | D  |
|         |             |                            | P0304 | 83H  | 24H                      | Misfiring counter at 1000 revolution of the fourth cylinder    | Е  |
|         |             |                            | P0305 | 84H  | 24H                      | Misfiring counter at 1000 revolution of the fifth cylinder     |    |
|         |             |                            | P0306 | 85H  | 24H                      | Misfiring counter at 1000 revolution of the sixth cylinder     | F  |
|         |             |                            | P0307 | 86H  | 24H                      | Misfiring counter at 1000 revolution of the seventh cylinder   | 0  |
|         |             |                            | P0308 | 87H  | 24H                      | Misfiring counter at 1000 revolution of the eighth cylinder    | G  |
|         |             |                            | P0300 | 88H  | 24H                      | Misfiring counter at 1000 revolution of the multiple cylinders | Н  |
| MISFIRE | A1H         | Multiple Oulinder Miefiree | P0301 | 89H  | 24H                      | Misfiring counter at 200 revolution of the first cylinder      |    |
| MISTIRE | АП          | Multiple Cylinder Misfires | P0302 | 8AH  | 24H                      | Misfiring counter at 200 revolution of the second cylinder     | I  |
|         |             |                            | P0303 | 8BH  | 24H                      | Misfiring counter at 200 revolution of the third cylinder      | J  |
|         |             |                            | P0304 | 8CH  | 24H                      | Misfiring counter at 200 revolution of the fourth cylinder     |    |
|         |             |                            | P0305 | 8DH  | 24H                      | Misfiring counter at 200 revolution of the fifth cylinder      | K  |
|         |             |                            | P0306 | 8EH  | 24H                      | Misfiring counter at 200 revolution of the sixth cylinder      | L  |
|         |             |                            | P0307 | 8FH  | 24H                      | Misfiring counter at 200 revolution of the seventh cylinder    |    |
|         |             |                            | P0308 | 90H  | 24H                      | Misfiring counter at 200 revolution of the eighth cylinder     | Μ  |
|         |             |                            | P0300 | 91H  | 24H                      | Misfiring counter at 1000 revolution of the single cylinder    | N  |
|         |             |                            | P0300 | 92H  | 24H                      | Misfiring counter at 200 revolution of the single cylinder     |    |
|         |             |                            | P0300 | 93H  | 24H                      | Misfiring counter at 200 revolution of the multiple cylinders  | 0  |

Ρ

# < ECU DIAGNOSIS >

[VQ35DE]

|         |      |                           |       |     | e and Test<br>mit        |  |
|---------|------|---------------------------|-------|-----|--------------------------|--|
| Item    | OBD- | Self-diagnostic test item | DTC   |     | display)                 | Description  |
| nem     | MID  | Sell-diagnostic test item | DIC   | TID | Unitand<br>Scaling<br>ID | Description  |
|         | A2H  | No. 1 Cylinder Misfire    | P0301 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0301 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | АЗН  | No. 2 Cylinder Misfire    | P0302 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0302 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | A4H  | No. 3 Cylinder Misfire    | P0303 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0303 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | A5H  | No. 4 Cylinder Misfire    | P0304 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
| MISFIRE |      |                           | P0304 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
| MISFIRE | A6H  | No. 5 Cylinder Misfire    | P0305 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0305 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | A7H  | No. 6 Cylinder Misfire    | P0306 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0306 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | A8H  | No. 7 Cylinder Misfire    | P0307 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0307 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |
|         | A9H  | No. 8 Cylinder Misfire    | P0308 | 0BH | 24H                      | EWMA (Exponential Weighted Moving<br>Average) misfire counts for last 10 driv-<br>ing cycles |
|         |      |                           | P0308 | 0CH | 24H                      | Misfire counts for last/current driving cy-<br>cles  |

#### < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

# Symptom Table

## SYSTEM — BASIC ENGINE CONTROL SYSTEM

|          |  |                      |              |                         |                        |              | S`                 | (MPT)              | OM               |                        |                             |                            |                           |                             |  | С |
|----------|--|----------------------|--------------|-------------------------|------------------------|--------------|--------------------|--------------------|------------------|------------------------|-----------------------------|----------------------------|---------------------------|-----------------------------|--|---|
|          |  |                      |              |                         |                        | 7            |                    |                    |                  |                        | НS                          |                            |                           |                             | -  |   |
|          |  | т (ехср. на)         |              | AT SPOT                 | NO                     | ACCELERATION |                    |                    |                  | щ                      | PERATURE HIGH               | MPTION                     | NOIL                      | CHARGE)                     |  | D |
|          |  | START/RESTART (EXCP. |              | URGING/FL               | (/DETONATI             | POWER/POOR A | N IDLE             | HUNTING            | lion             | 'URN TO IDI            | VATER TEM                   | JEL CONSU                  | IL CONSUM                 | D (UNDER (                  | Reference<br>page                                  | F |
|          |  | HARD/NO STA          | ENGINE STALL | HESITATION/SURGING/FLAT | SPARK KNOCK/DETONATION | LACK OF POW  | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) |  | G |
| Warrant  | y symptom code                             | AA                   | AB           | AC                      | AD                     | AE           | AF                 | AG                 | AH               | AJ                     | AK                          | AL                         | AM                        | HA                          |  | Н |
| Fuel     | Fuel pump circuit                          | 1                    | 1            | 2                       | 3                      | 2            |                    | 2                  | 2                |                        |                             | 3                          |                           | 2                           | <u>EC-447</u>                                      |   |
|          | Fuel pressure regulator system             | 3                    | 3            | 4                       | 4                      | 4            | 4                  | 4                  | 4                | 4                      |                             | 4                          |                           |                             | <u>EC-545</u>                                      |   |
|          | Fuel injector circuit                      | 1                    | 1            | 2                       | 3                      | 2            |                    | 2                  | 2                |                        |                             | 2                          |                           |                             | <u>EC-444</u>                                      |   |
|          | Evaporative emission system                | 3                    | 3            | 4                       | 4                      | 4            | 4                  | 4                  | 4                | 4                      |                             | 4                          |                           |                             | <u>EC-77</u>                                       |   |
| Air      | Positive crankcase ventilation sys-<br>tem | 3                    | 3            | 4                       | 4                      | 4            | 4                  | 4                  | 4                | 4                      |                             | 4                          | 1                         |                             | <u>EC-462</u>                                      | J |
|          | Incorrect idle speed adjustment            |                      |              |                         |                        |              | 1                  | 1                  | 1                | 1                      |                             | 1                          |                           |                             | EC-12  | K |
|          | Electric throttle control actuator         | 1                    | 1            | 2                       | 3                      | 3            | 2                  | 2                  | 2                | 2                      |                             | 2                          |                           | 2                           | <u>EC-404,</u><br><u>EC-411</u>                    |   |
| Ignition | Incorrect ignition timing adjustment       | 3                    | 3            | 1                       | 1                      | 1            |                    | 1                  | 1                |                        |                             | 1                          |                           |                             | <u>EC-12</u>                                       | L |
|          | Ignition circuit                           | 1                    | 1            | 2                       | 2                      | 2            |                    | 2                  | 2                |                        |                             | 2                          |                           |                             | <u>EC-451</u>                                      |   |
| Power s  | supply and ground circuit                  | 2                    | 2            | 3                       | 3                      | 3            |                    | 3                  | 3                |                        | 2                           | 3                          |                           |                             | <u>EC-135</u>                                      |   |
| Mass ai  | r flow sensor circuit                      | 1                    |              |                         | 2                      |              |                    |                    |                  |                        |                             |                            |                           |                             | <u>EC-154,</u><br><u>EC-162</u>                    | Μ |
| Engine   | coolant temperature sensor circuit         |                      |              |                         |                        |              | 3                  |                    |                  | 3                      |                             |                            |                           |                             | <u>EC-172,</u><br><u>EC-178</u>                    | Ν |
| Air fuel | ratio (A/F) sensor 1 circuit               |                      | 1            | 2                       | 3                      | 2            |                    | 2                  | 2                |                        |                             | 2                          |                           |                             | EC-186,<br>EC-190,<br>EC-194,<br>EC-198,<br>EC-427 | 0 |
| Throttle | position sensor circuit                    |                      |              |                         |                        |              | 2                  | 1                  |                  | 2                      |                             |                            |                           |                             | EC-175,<br>EC-248,<br>EC-359,<br>EC-361,<br>EC-420 | Ρ |
| Accelera | ator pedal position sensor circuit         |                      |              | 3                       | 2                      | 1            |                    |                    |                  |                        |                             |                            |                           |                             | EC-347,<br>EC-413,<br>EC-416,<br>EC-423            |   |

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#### < SYMPTOM DIAGNOSIS >

#### [VQ35DE]

|   |                                  |              |                              |                        |                                 | S١                 | (MPT)              | ОМ               |                        |                                  |                            |                           |                             |                                 |
|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|---------------------------------|
|   | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDRE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) | Reference<br>page               |
| Warranty symptom code                                   | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                               | AL                         | AM                        | HA                          |                                 |
| Knock sensor circuit                                    |                                  |              | 2                            |                        |                                 |                    |                    |                  |                        |                                  | 3                          |                           |                             | <u>EC-257</u>                   |
| Engine oil temperature sensor                           |                                  |              | 4                            |                        | 2                               |                    |                    |                  |                        |                                  | 3                          |                           |                             | <u>EC-242,</u><br><u>EC-219</u> |
| Crankshaft position sensor (POS) circuit                | 2                                | 2            |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | EC-260                          |
| Camshaft position sensor (PHASE) circuit                | 3                                | 2            |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | EC-264                          |
| Vehicle speed signal circuit                            |                                  | 2            | 3                            |                        | 3                               |                    |                    |                  |                        |                                  | 3                          |                           |                             | EC-333                          |
| Power steering pressure sensor circuit                  |                                  | 2            |                              |                        |                                 |                    | 3                  | 3                |                        |                                  |                            |                           |                             | EC-339                          |
| ECM   | 2                                | 2            | 3                            | 3                      | 3                               | 3                  | 3                  | 3                | 3                      | 3                                | 3                          |                           |                             | <u>EC-342,</u><br>EC-344        |
| Intake valve timing control solenoid valve cir-<br>cuit |                                  | 3            | 2                            |                        | 1                               | 3                  | 2                  | 2                | 3                      |                                  | 3                          |                           |                             | <u>EC-151</u>                   |
| PNP signal circuit                                      |                                  |              | 3                            |                        | 3                               |                    | 3                  | 3                |                        |                                  | 3                          |                           |                             | EC-350                          |
| VIAS control solenoid valve 1 circuit                   |                                  |              |                              |                        | 1                               |                    |                    |                  |                        |                                  |                            |                           |                             | EC-393                          |
| VIAS control solenoid valve 2 circuit                   |                                  |              |                              |                        | 1                               |                    |                    |                  |                        |                                  |                            |                           |                             | EC-396                          |
| Refrigerant pressure sensor circuit                     |                                  | 2            |                              |                        |                                 | 3                  |                    |                  | 3                      |                                  | 4                          |                           |                             | EC-463                          |
| Electrical load signal circuit                          |                                  |              |                              |                        |                                 |                    | 3                  |                  |                        |                                  |                            |                           |                             | EC-439                          |
| Air conditioner circuit                                 | 2                                | 2            | 3                            | 3                      | 3                               | 3                  | 3                  | 3                | 3                      |                                  | 3                          |                           | 2                           | <u>HAC-38,</u><br>HAC-157       |
| ABS actuator and electric unit (control unit)           |                                  |              | 4                            |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | BRC-29                          |

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

# SYSTEM — ENGINE MECHANICAL & OTHER

#### < SYMPTOM DIAGNOSIS >

# [VQ35DE]

|                 |   |                              |              |                              |                        |                                 | S                  | YMPT               | ОМ               |                        |                             |                            |             |                     |                               | А  |
|-----------------|---|------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|-----------------------------|----------------------------|-------------|---------------------|-------------------------------|----|
|                 |   | (EXCP. HA)                   |              | T SPOT                       | Z                      | LACK OF POWER/POOR ACCELERATION |                    |                    |                  |                        | ERATURE HIGH                | <b>IPTION</b>              | TION        | CHARGE)             |                               | EC |
|                 |   | RESTART                      |              | BING/FLA                     | TONATIC                | POOR AC                         | Ш                  | TING               | _                | N TO IDLE              | ER TEMP                     | CONSUM                     | CONSUMPTION | INDER CI            | Reference<br>page             | С  |
|                 |   | HARD/NO START/RESTART (EXCP. | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | F POWER/                        | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE | EXCESSIVE FUEL CONSUMPTION | OIL         | BATTERY DEAD (UNDER |                               | D  |
|                 |   | HARD/N                       | ENGINE       | HESITA                       | SPARK                  | LACK O                          | HIGH ID            | ROUGH              | IDLING           | SLOW/N                 | OVERH                       | EXCES                      | EXCESSIVE   | BATTEF              |                               | E  |
| Warranty s      | symptom code  | AA                           | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                          | AL                         | AM          | HA                  |                               | F  |
| Fuel            | Fuel tank   | 5                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>FL-12</u>                  |    |
|                 | Fuel piping   | J                            |              | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                             | 5                          |             |                     | <u>FL-4</u>                   |    |
|                 | Vapor lock  |                              | 5            |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | —                             | G  |
|                 | Valve deposit   |                              |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | —                             |    |
|                 | Poor fuel (Heavy weight gasoline, Low octane)   | 5                            |              | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                             | 5                          |             |                     | _                             | Η  |
| Air             | Air duct  |                              |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>EM-27</u>                  |    |
|                 | Air cleaner   |                              |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>EM-27</u>                  |    |
|                 | Air leakage from air duct<br>(Mass air flow sensor — electric<br>throttle control actuator) |                              | 5            | 5                            |                        | 5                               |                    | 5                  | 5                |                        |                             | 5                          |             |                     | <u>EM-27</u>                  | I  |
|                 | Electric throttle control actuator  | 5                            |              |                              | 5                      |                                 | 5                  |                    |                  | 5                      |                             |                            |             |                     | <u>EM-29</u>                  | J  |
|                 | Air leakage from intake manifold/<br>Collector/Gasket                                       | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>EM-29,</u><br><u>EM-32</u> | K  |
| Cranking        | Battery   | 1                            | 1            | 1                            |                        | 1                               |                    | 1                  | 1                |                        |                             |                            |             | 1                   | <u>PG-106</u>                 |    |
|                 | Generator circuit   | •                            |              |                              |                        | •                               |                    |                    |                  |                        |                             |                            |             | •                   | <u>CHG-21</u>                 |    |
|                 | Starter circuit   | 3                            |              |                              |                        |                                 |                    |                    |                  |                        |                             | 1                          |             |                     | STR-5                         | L  |
|                 | Signal plate  | 6                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>EM-114</u>                 |    |
|                 | PNP signal  | 4                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>TM-45</u>                  | Μ  |
| Engine          | Cylinder head   | 5                            | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                             | 5                          |             |                     | <u>EM-107</u>                 |    |
|                 | Cylinder head gasket  |                              |              |                              |                        |                                 | -                  |                    | -                |                        | 4                           |                            | 3           |                     |                               |    |
|                 | Cylinder block  | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     |                               | Ν  |
|                 | Piston  | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            | 4           |                     |                               |    |
|                 | Piston ring   | 6                            | 6            | 6                            | 6                      | 6                               |                    | 6                  | 6                |                        |                             | 6                          |             |                     | <u>EM-118</u>                 | 0  |
|                 | Connecting rod  | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     |                               |    |
|                 | Bearing   | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     |                               |    |
|                 | Crankshaft  |                              |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     |                               | Ρ  |
| Valve<br>mecha- | Timing chain  | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     | <u>EM-66</u>                  |    |
| nism            | Camshaft  | _                            | _            | _                            | _                      | _                               |                    | _                  | _                |                        |                             | _                          |             |                     | <u>EM-94</u>                  |    |
|                 | Intake valve timing control   | 5                            | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                             | 5                          |             |                     | <u>EM-66</u>                  |    |
|                 | Intake valve  | -                            |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            | 3           |                     | <u>EM-107</u>                 |    |
|                 | Exhaust valve   |                              |              |                              |                        |                                 |                    |                    |                  |                        |                             |                            |             |                     |                               |    |

#### < SYMPTOM DIAGNOSIS >

|                    |   |                                  |              |                              |                        |                                 | S١                 | (MPT)              | ОМ               |                        |                                  |                            |                           |                             |   |
|--------------------|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|---|
|                    |   | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) | Reference<br>page                               |
| Warranty s         | symptom code  | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                               | AL                         | AM                        | HA                          |   |
| Exhaust            | Exhaust manifold/Tube/Muffler/<br>Gasket                        | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                  | 5                          |                           |                             | <u>EM-34</u> , <u>EX-</u><br><u>4</u>           |
|                    | Three way catalyst  |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | Ξ.  |
| Lubrica-<br>tion   | Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                  | 5                          |                           |                             | <u>LU-7, LU-</u><br><u>10, LU-11,<br/>LU-13</u> |
|                    | Oil level (Low)/Filthy oil                                      |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | <u>LU-7</u>                                     |
| Cooling            | Radiator/Hose/Radiator filler cap                               |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | <u>CO-12,</u><br><u>CO-12</u>                   |
|                    | Thermostat  |                                  |              |                              |                        |                                 |                    |                    |                  | 5                      |                                  |                            |                           |                             | <u>CO-23</u>                                    |
|                    | Water pump  | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        | 4                                | 5                          |                           |                             | <u>CO-18</u>                                    |
|                    | Water gallery   | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        | 4                                | 5                          |                           |                             | <u>CO-2</u>                                     |
|                    | Cooling fan   |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | <u>CO-16</u>                                    |
|                    | Coolant level (Low)/Contaminat-<br>ed coolant                   |                                  |              |                              |                        |                                 |                    |                    |                  | 5                      |                                  |                            |                           |                             | <u>CO-8</u>                                     |
| NVIS (NIS<br>NATS) | SAN Vehicle Immobilizer System —                                | 1                                | 1            |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | <u>SEC-18</u> ,<br><u>SEC-244</u>               |

1 - 6: The numbers refer to the order of inspection.

# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

# Description

| Description   | 0:000000003388293 |    |
|---|-------------------|----|
| FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)<br>If the engine speed is above 1,400 rpm under no load (for example, the selector lever position is P<br>engine speed is over 1,400 rpm) fuel will be cut off after some time. The exact time when the fuel is o |                   | EC |
| ies based on engine speed.<br>Fuel cut will be operated until the engine speed reaches 1,000 rpm, then fuel cut will be cancelled.<br><b>NOTE:</b>  |                   | С  |
| This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System<br><u>"System Description"</u> .  | n, <u>EC-28.</u>  | D  |
|   |                   | Ε  |
|   |                   | F  |
|   |                   | G  |
|   |                   | Η  |
|   |                   | I  |
|   |                   | J  |

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# < PRECAUTION > PRECAUTION PRECAUTIONS

# Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

#### WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

# Precautions For Xenon Headlamp Service

WARNING:

Comply with the following warnings to prevent any serious accident.

- Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)
- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

#### CAUTION:

Comply with the following cautions to prevent any error and malfunction.

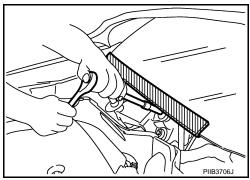
- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

#### Precaution for Procedure without Cowl Top Cover

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When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



#### < PRECAUTION >

# On Board Diagnostic (OBD) System of Engine and CVT

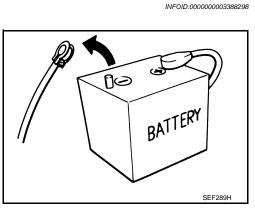
The ECM has an on board diagnostic system. It will illuminate the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

#### CAUTION:

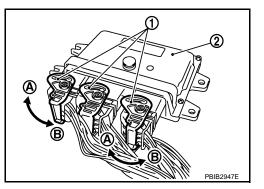
- Always to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to illuminate.
- Always to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to illuminate due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- · Certain systems and components, especially those related to OBD, may use a new style slide-lock-D ing type harness connector. For description and how to disconnect, refer to PG-96, "Description".
- Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.
- Always to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.
- Always to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

#### General Precautions

- Always use a 12 volt battery as power source.
- Never attempt to disconnect battery cables while engine is runnina.
- · Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- · Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.



- Never disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value. The ECM will now start to self-control at its initial value. Thus, engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Never replace parts because of a slight variation.
- If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.
- ECM (2)
- Loosen (A)



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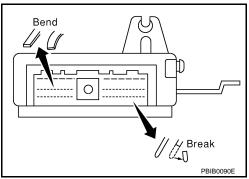
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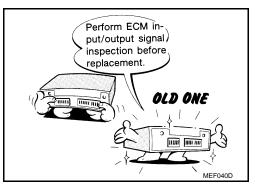
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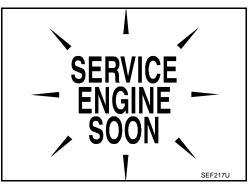
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#### < PRECAUTION >

- When connecting or disconnecting pin connectors into or from ECM, never damage pin terminals (bends or break). Check that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors.
   A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and check ECM functions properly. Refer to <u>EC-470, "Reference Value"</u>.
- Handle mass air flow sensor carefully to avoid damage.
- Never clean mass air flow sensor with any type of detergent.
- Never disassemble electric throttle control actuator.
- Even a slight leakage in the air intake system can cause serious incidents.
- Never shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Component Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



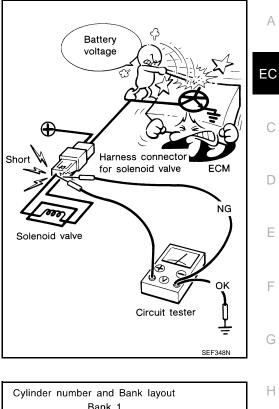




# [VQ35DE]

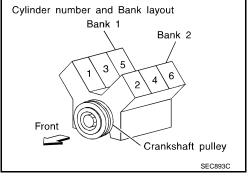
#### < PRECAUTION >

• When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.

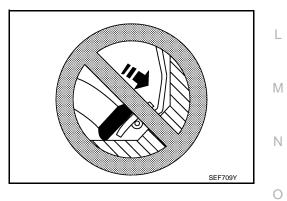


[VQ35DE]

- B1 indicates bank 1, B2 indicates bank 2 as shown in the figure.
- Never operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



- Never depress accelerator pedal when starting.
- Immediately after starting, never rev up engine unnecessarily.
- Never rev up engine just prior to shutdown.



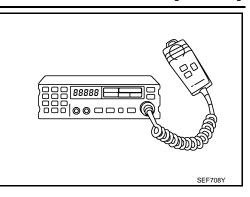
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#### < PRECAUTION >

# • When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.

- Keep the antenna as far as possible from the electronic control units.
- Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.
- Never let them run parallel for a long distance.
- Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



#### [VQ35DE]

# PREPARATION

# < PREPARATION > PREPARATION

# PREPARATION

# Special Service Tools

| Γool number<br>Kent-Moore No.)  | e tools may differ from those of special service to | Description  |
|---|---|--|
| ōol name<br>J-44321)  |   | Checks fuel pressure   |
| Fuel pressure gauge<br>tit  |   |  |
|   | LEC642  |  |
| (J-44321-6)<br>Fuel pressure adapter  |   | Connects fuel pressure gauge to quick connector type fuel lines  |
|   |   |  |
|   | LBIA0376E   |  |
| ommercial Service   | e Tools   | INFOID:00000003388   |
|   |   |  |
|   |   | Description  |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-  |   | Description<br>Removes fuel tube quick connectors in engine<br>room  |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-  |   | Removes fuel tube quick connectors in engine   |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-  | PBIC0198E   | Removes fuel tube quick connectors in engine   |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-<br>lease<br>Leak detector  | PBIC0198E   | Removes fuel tube quick connectors in engine   |
| Tool name<br>(Kent-Moore No.)<br>(J-45488)<br>Quick connector re-<br>lease<br>Leak detector<br>i.e.: (J-41416)                    | PBIC0198E   | Removes fuel tube quick connectors in engine<br>room   |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-<br>lease<br>Leak detector  |   | Removes fuel tube quick connectors in engine room  |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-<br>lease<br>Leak detector<br>i.e.: (J-41416)<br>EVAP service port<br>adapter |   | Removes fuel tube quick connectors in engine<br>room   |
| (Kent-Moore No.)<br>(J-45488)<br>Quick connector re-<br>lease<br>Leak detector  |   | Removes fuel tube quick connectors in engine room         Locates the EVAP leakage         Applys positive pressure through EVAP service |

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# PREPARATION

#### < PREPARATION >

| Tool name<br>(Kent-Moore No.)   |   | Description  |
|---|---|--|
| Fuel filler cap adapter<br>i.e.: (MLR-8382)   |   | Checks fuel tank vacuum relief valve opening pressure  |
|   |   |  |
| Socket wrench   | S-NT815<br>19 mm<br>(0.75 in)<br>10 mm<br>10 m | Removes and installs engine coolant temperature sensor   |
| Oxygen sensor thread<br>cleaner<br>i.e.: (J-43897-18)<br>(J-43897-12)   | AEM488  | Reconditions the exhaust system threads before<br>installing a new oxygen sensor. Use with anti-<br>seize lubricant shown below.<br>a: 18 mm diameter with pitch 1.5 mm for Zirco-<br>nia Oxygen Sensor<br>b: 12 mm diameter with pitch 1.25 mm for Tita-<br>nia Oxygen Sensor |
| Anti-seize lubricant<br>i.e.: (Permatex <sup>TM</sup><br>133AR or equivalent<br>meeting MIL specifica-<br>tion MIL-A-907) | S-NT779   | Lubricates oxygen sensor thread cleaning tool<br>when reconditioning exhaust system threads.   |

At idling

# <u>< ON-VEHICLE MAINTENANCE ></u> ON-VEHICLE MAINTENANCE > FUEL PRESSURE

# Inspection

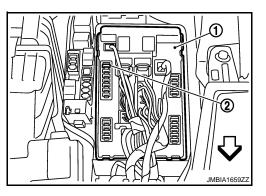
# FUEL PRESSURE RELEASE

(P) With CONSULT-III

- 1. Turn ignition switch ON.
- 2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-III.
- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 5. Turn ignition switch OFF.

**Without CONSULT-III** 

- 1. Remove fuel pump fuse (2) located in IPDM E/R (1).
- 2. Start engine.
- 3. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 4. Turn ignition switch OFF.
- 5. Reinstall fuel pump fuse after servicing fuel system.



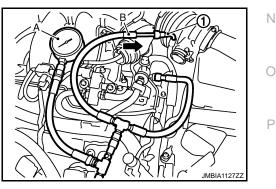
# FUEL PRESSURE CHECK

#### **CAUTION:**

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger. NOTE:

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because Z51 models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains seal ability.
- Use Fuel Pressure Gauge Kit [SST (J-44321)] and Fuel Pressure Adapter [SST (J-44321-6)] to check fuel pressure.
- 1. Release fuel pressure to zero.
- 2. Remove fuel hose using Quick Connector Release [SST (J-45488)].
  - Do not twist or kink fuel hose because it is plastic hose.
  - Do not remove fuel hose (1) from quick connector.
  - Keep fuel hose connections clean.
- 3. Install Fuel Pressure Adapter [SST (J-44321-6)] (B) and Fuel Pressure Gauge kit [SST (J44321)] (A) as shown in figure.
  - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
  - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
- 4. Turn ignition switch ON (reactivate fuel pump) and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- 6. Read the indication of fuel pressure gauge kit [SST (J-44321)].
  - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)



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#### < ON-VEHICLE MAINTENANCE >

- 7. If result is unsatisfactory, go to next step.
- 8. Check the following.
  - Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging
  - Fuel pump
  - Fuel pressure regulator for clogging
- 9. If OK, replace fuel pressure regulator. If NG, repair or replace malfunctioning part.
- 10. Before disconnecting Fuel Pressure Gauge kit [SST (J-44321)] and Fuel Pressure Adapter [SST (J-44321-6)], release fuel pressure to zero.

# **EVAP LEAK CHECK**

# < ON-VEHICLE MAINTENANCE >

# EVAP LEAK CHECK

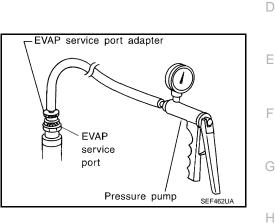
### Inspection

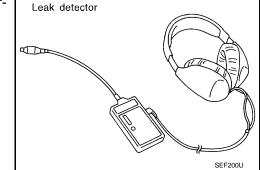
#### **CAUTION:**

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.
- NOTE:
- Do not start engine.
- Improper installation of EVAP service port adapter (commercial service tool) to the EVAP service port may cause a leakage.

#### (P) WITH CONSULT-III

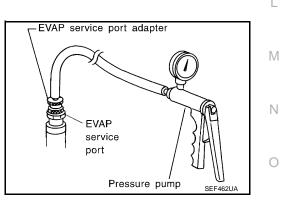
- To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Turn ignition switch ON.
- Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-III.
- 4. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 5. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.
- Locate the leakage using a leakage detector (commercial service tool). Refer to <u>EC-77, "System Diagram"</u>.





#### **WITHOUT CONSULT-III**

- 1. To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Apply battery voltage between the terminals of EVAP canister vent control valve to make a closed EVAP system.
- To locate the leakage, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).
- 4. Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.



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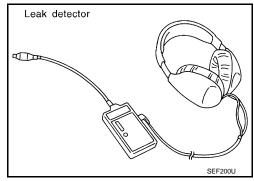
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# **EVAP LEAK CHECK**

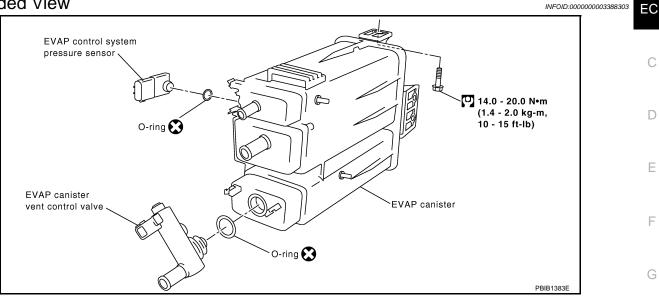
# < ON-VEHICLE MAINTENANCE >

5. Locate the leakage using a leak detector (commercial service tool). Refer to <u>EC-77, "System Diagram"</u>.



# < ON-VEHICLE REPAIR > ON-VEHICLE REPAIR EVAP CANISTER

# Exploded View



# Removal and Installation

#### REMOVAL

- 1. Lift up the vehicle.
- 2. Remove EVAP canister fixing bolt.
- 3. Remove EVAP canister.

#### NOTE:

The EVAP canister vent control valve and EVAP canister system pressure sensor can be removed without removing the EVAP canister.

#### INSTALLATION

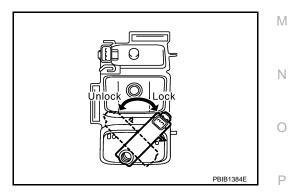
Install in the reverse order of removal.

#### NOTE:

Tighten EVAP canister fixing bolt to the specified torque.

#### DISASSEMBLY

- 1. Turn EVAP canister vent control valve counterclockwise.
- 2. Remove the EVAP canister vent control valve.



ASSEMBLY Assemble in the reverse order of disassembly.

CAUTION:

Always replace O-ring with a new one.

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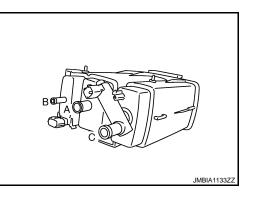
# **EVAP CANISTER**

# < ON-VEHICLE REPAIR >

# Inspection

Check EVAP canister as per the following:

- 1. Block port (B).
- 2. Blow air into port (A) and check that it flows freely out of port (C).
- 3. Release blocked port (B).
- 4. Apply vacuum pressure to port (B) and check that vacuum pressure exists at the ports (A) and (C).
- 5. Block port (A) and (B).
- 6. Apply pressure to port (C) and check that there is no leakage.



# \*: Under the f • A/C switch: · Electric loa • Steering wl Calculate At idle At 2,500 rpn

# Mass Air

|  |  | K |
|--|--|---|
| Supply voltage                           | Battery voltage (11 – 14 V)                                    |   |
| Output voltage at idle (in N position)   | 0.9 – 1.2 V*   |   |
| Mass air flow (Using CONSULT-III or GST) | 2.0 – 6.0 g⋅m/sec at idle*<br>7.0 – 20.0 g⋅m/sec at 2,500 rpm* |   |

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| SERVICE DATA AND SPECIFICATIONS (SDS)   |
|---|
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| SERVICE DATA AND SPECIFICATIONS (SDS)   |

# SERVICE DATA AND SPECIFICATIONS (SDS)

# Idle Speed

| Condition   | Specification  |
|---|--|
| No load* (in P or N position)   | $600\pm50$ rpm   |
| *: Under the following conditions   |  |
| A/C switch: OFF   |  |
| <ul> <li>Electric load: OFF (Lights, heater fan &amp; rear window defogger)</li> </ul>  |  |
| <ul> <li>Steering wheel: Kept in straight-ahead position</li> </ul>   |  |
| Ignition Timing   | INFOID:00000000338830  |
| Condition   | Specification  |
| No load* (in P or N position)   | $12\pm5^\circ$ BTDC  |
| *: Under the following conditions   |  |
| A/C switch: OFF   |  |
| <ul> <li>Electric load: OFF (Lights, heater fan &amp; rear window defogger)</li> </ul>  |  |
| <ul> <li>Steering wheel: Kept in straight-ahead position</li> </ul>   |  |
| • Steering wheel. Rept in straight-anead position   |  |
|   |  |
|   | INFOID:00000000338830  |
| Condition   | INFOID:00000000338830<br>Specification (Using CONSULT-III or GST)  |
| Calculated Load Value   |  |
| Calculated Load Value   | Specification (Using CONSULT-III or GST)   |
| Calculated Load Value Condition At idle   | Specification (Using CONSULT-III or GST)<br>10 – 35 %<br>10 – 35 %   |
| Calculated Load Value Condition At idle At 2,500 rpm  | Specification (Using CONSULT-III or GST)<br>10 – 35 %<br>10 – 35 %   |
| Calculated Load Value Condition At idle At 2,500 rpm Mass Air Flow Sensor   | Specification (Using CONSULT-III or GST)           10 – 35 %           10 – 35 %   |
| Calculated Load Value Condition At idle At 2,500 rpm Mass Air Flow Sensor Supply voltage  | Specification (Using CONSULT-III or GST)           10 – 35 %           10 – 35 %           INFOID:00000000338830           Battery voltage (11 – 14 V)   |
| Calculated Load Value         Condition         At idle         At 2,500 rpm         Mass Air Flow Sensor         Supply voltage         Output voltage at idle (in N position) | Specification (Using CONSULT-III or GST)           10 – 35 %           10 – 35 %           INFOID:000000003388300           Battery voltage (11 – 14 V)           0.9 – 1.2 V*           2.0 – 6.0 g·m/sec at idle*           7.0 – 20.0 g·m/sec at 2,500 rpm* |

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