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SECTION EC

ENGINE CONTROL SYSTEM

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| Description | 1346 | P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) | 1377 | O |
| DTC Logic | 1346 | Description | 1377 | |
| Diagnosis Procedure | 1346 | DTC Logic | 1377 | |
| Special Repair Requirement | 1347 | Diagnosis Procedure | 1377 | |
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| Description | 1348 | Description | 1379 | |
| DTC Logic | 1348 | DTC Logic | 1379 | |
| Diagnosis Procedure | 1348 | Diagnosis Procedure | 1379 | |
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| DTC Logic | 1350 | | | |
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| | | | |
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| Description | 1383 | Description | 1409 |
| DTC Logic | 1383 | DTC Logic | 1409 |
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| | | Special Repair Requirement | 1412 |
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| Description | 1386 | Description | 1413 |
| DTC Logic | 1386 | DTC Logic | 1413 |
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| Description | 1389 | Description | 1416 |
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| Diagnosis Procedure | 1389 | Diagnosis Procedure | 1416 |
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| Description | 1391 | Description | 1421 |
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| Diagnosis Procedure | 1391 | Diagnosis Procedure | 1421 |
| Component Inspection | 1393 | | |
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| Diagnosis Procedure | 1397 | Diagnosis Procedure | 1426 |
| Special Repair Requirement | 1398 | | |
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| Description | 1399 | Description | 1428 |
| DTC Logic | 1399 | Component Function Check | 1428 |
| Diagnosis Procedure | 1399 | Diagnosis Procedure | 1428 |
| Component Inspection | 1401 | Component Inspection | 1429 |
| Special Repair Requirement | 1401 | | |
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| Description | 1402 | Description | 1431 |
| DTC Logic | 1402 | Component Function Check | 1431 |
| Diagnosis Procedure | 1402 | Diagnosis Procedure | 1431 |
| Component Inspection | 1404 | Component Inspection | 1433 |
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| Description | 1406 | Description | 1434 |
| DTC Logic | 1406 | Component Function Check | 1434 |
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| ENGINE CONTROL SYSTEM SYMPTOMS | 1513 | | | |

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

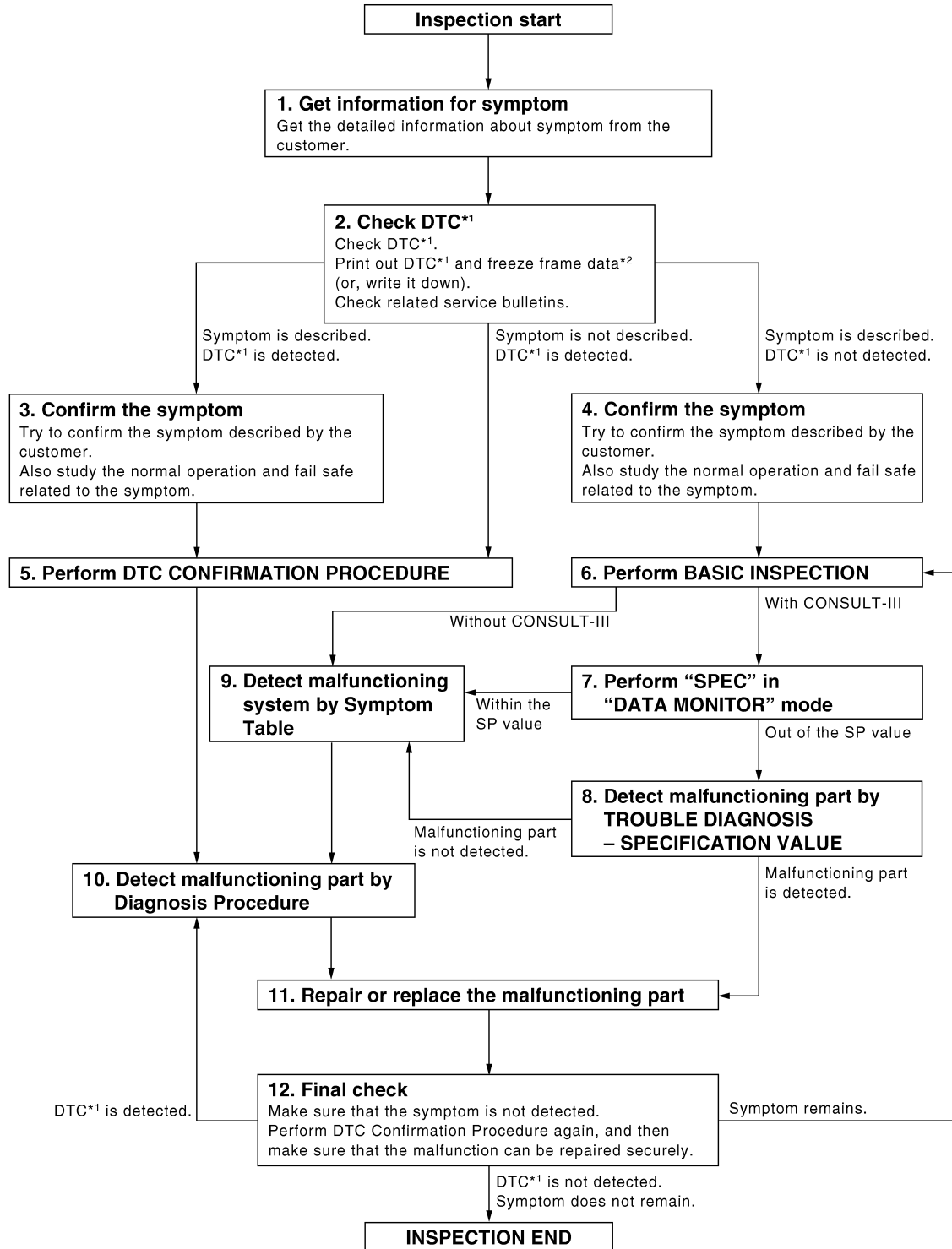
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001343589

OVERALL SEQUENCE



*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

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 [EC-22, "Diagnostic Work Sheet"](#).)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-112, "Diagnosis Description"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-522, "Symptom Table"](#).)
3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.

Symptom is described, DTC is not detected>>GO TO 4.

Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON).

Also study the normal operation and fail safe related to the symptom. Refer to [EC-526, "Description"](#) and [EC-511, "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-526, "Description"](#) and [EC-511, "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 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-513, "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [EC-515, "DTC Index"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

Do you have CONSULT-III?

DIAGNOSIS AND REPAIR WORKFLOW

[QR25DE FOR CALIFORNIA]

< BASIC INSPECTION >

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

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL" and "A/F ALPHA-B1" are within the SP value using CONSULT-III in "SPEC" of "DATA MONITOR" mode. Refer to [EC-136, "Component Function Check"](#).

Is the measurement value within the SP value?

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

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-137, "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 [EC-522, "Symptom Table"](#) 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 DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in [GI-45, "Circuit Inspection"](#).

Is malfunctioning part detected?

- YES >> GO TO 11.
- NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to [EC-474, "Reference Value"](#).

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [EC-112, "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 make sure that the malfunction have been repaired securely.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure 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, make sure to erase unnecessary DTC in ECM and TCM (Transmission Control Module). (Refer to [EC-112, "Diagnosis Description"](#).) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in [EC-518, "How to Set SRT Code"](#).

Diagnostic Work Sheet

INFOID:000000001343590

DESCRIPTION

INSPECTION AND ADJUSTMENT

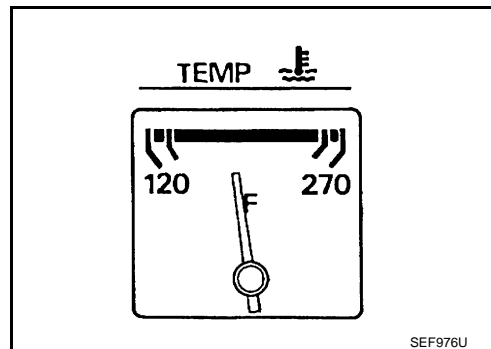
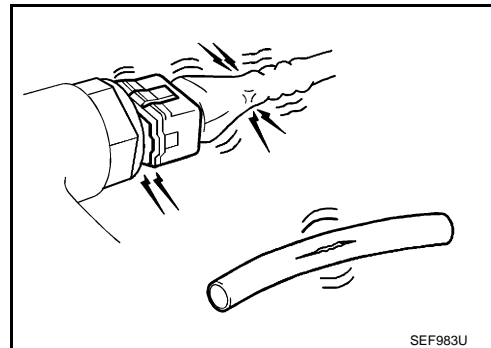
BASIC INSPECTION

BASIC INSPECTION : Special Repair Requirement

INFOID:000000001343591

1.INSPECTION START

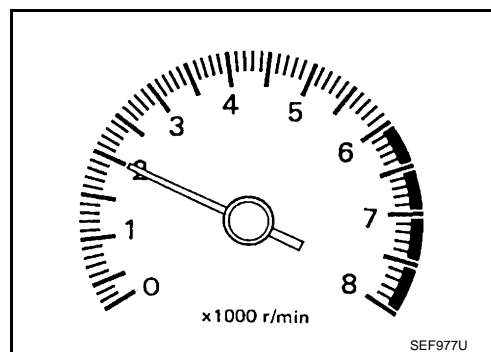
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses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



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

Is any DTC 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

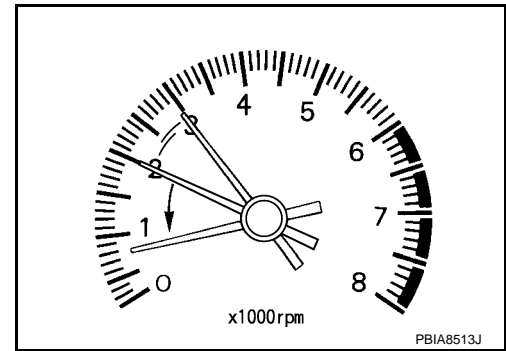
1. Run engine at about 2,000 rpm for about 2 minutes under no load.

INSPECTION AND ADJUSTMENT

[QR25DE FOR CALIFORNIA]

< BASIC INSPECTION >

- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed.
For procedure, refer to [EC-28, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Idle Speed"](#).



Is the inspection result normal?

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

4.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

5.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 6.

6.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7.CHECK TARGET IDLE SPEED AGAIN

- Start engine and warm it up to normal operating temperature.
- Check idle speed.
For procedure, refer to [EC-28, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Idle Speed"](#).

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART

Check the Following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-274, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-270, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4.

9.CHECK ECM FUNCTION

- Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

10.CHECK IGNITION TIMING

- Run engine at idle.

INSPECTION AND ADJUSTMENT

[QR25DE FOR CALIFORNIA]

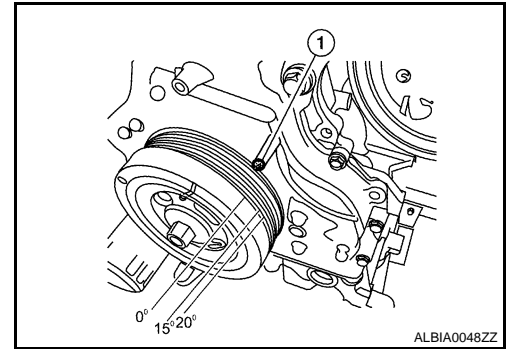
< BASIC INSPECTION >

2. Check ignition timing with a timing light.
For procedure, refer to [EC-28, "IGNITION TIMING : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Ignition Timing"](#).

1 : Timing indicator

Is the inspection result normal?

- YES >> GO TO 19.
NO >> GO TO 11.



11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 12.

12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 13.

13.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-30, "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 TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to [EC-28, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Idle Speed"](#).

Is the inspection result normal?

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

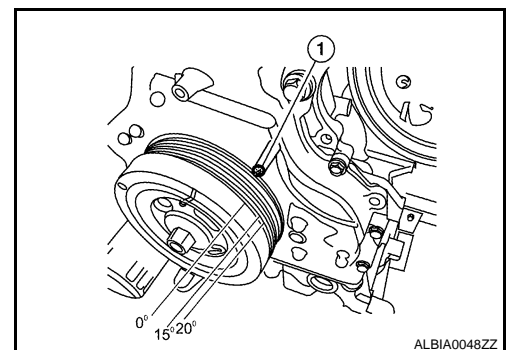
15.CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to [EC-28, "IGNITION TIMING : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Ignition Timing"](#).

1 : Timing indicator

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-52, "Removal and Installation"](#).

Is the inspection result normal?

- YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-274, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-270, "DTC Logic"](#).

Is the inspection result normal?

YES >> GO TO 18.

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

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000001343592

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:000000001343593

1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 5.

5. PERFORM IDLE AIR VOLUME LEARNING

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

Refer to [EC-27. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> END
IDLE SPEED

IDLE SPEED : Description

INFOID:000000001343594

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

IDLE SPEED : Special Repair Requirement

INFOID:000000001343595

1. CHECK IDLE SPEED

 **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

INFOID:000000001343596

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

IGNITION TIMING : Special Repair Requirement

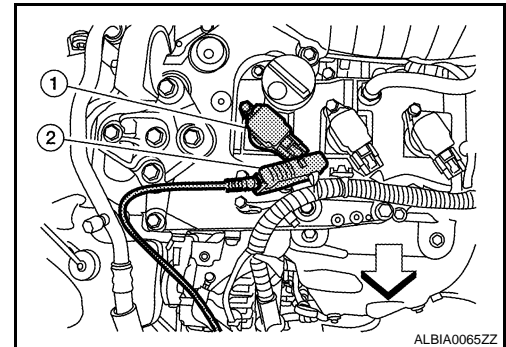
INFOID:000000001343597

1. CHECK IGNITION TIMING

1. Attach timing light to No. 1 igniton coil (1) wire as shown.

2 : Timing light

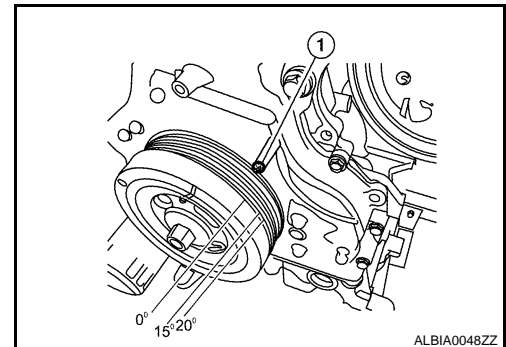
 : Vehicle front



2. Check ignition timing.

1 : Timing indicator

>> INSPECTION END



VIN REGISTRATION

VIN REGISTRATION : Description

INFOID:000000001343598

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

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

NOTE:

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

VIN REGISTRATION : Special Repair Requirement

INFOID:000000001343599

1. CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-22. "Identification Number - Sedan"](#) or [GI-23. "Identification Number - Coupe"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION

With CONSULT-III

1. Turn ignition switch ON and engine stopped.
2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
3. Follow the instruction of CONSULT-III display.

>> END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description

INFOID:000000001343600

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 harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:000000001343601

1. START

1. Make sure 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

INFOID:000000001343602

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 harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:000000001343603

1. START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:000000001343604

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:000000001343605

1. PRECONDITIONING

Make sure that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - CVT models
- With CONSULT-III: Drive vehicle until "ATF TENP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT-III?

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

2. IDLE AIR VOLUME LEARNING**Ⓟ With CONSULT-III**

1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-29, "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. 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.

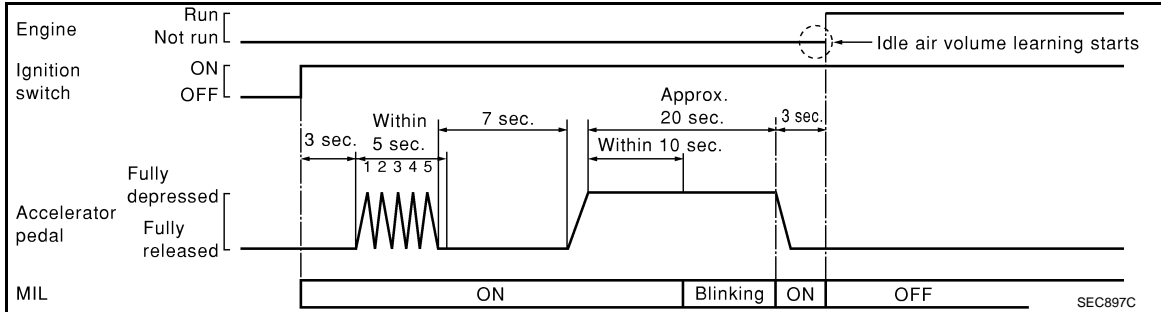
1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
3. 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 five times within 5 seconds.

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE FOR CALIFORNIA]

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
- 8. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



>> GO TO 4.

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

| ITEM | SPECIFICATION |
|-----------------|---|
| Idle speed | CVT: 650 ± 50 rpm (in P or N position) M/T: 650 ± 50 rpm (in Neutral position) |
| Ignition timing | CVT: 15 ± 5° (in P or N position) M/T: 15 ± 5° (in Neutral position) |

Is the inspection result normal?

YES >> INSPECTION END

5. DETECT MALFUNCTIONING PART

Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to [EC-136. "Description"](#).

If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:

- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000001343606

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in "Diagnosis Procedure".

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000001343607

1. START

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching "CLEAR".

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
7. Select Service \$04 with GST to erase the DTC P0102.

>> END

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:000000001343608

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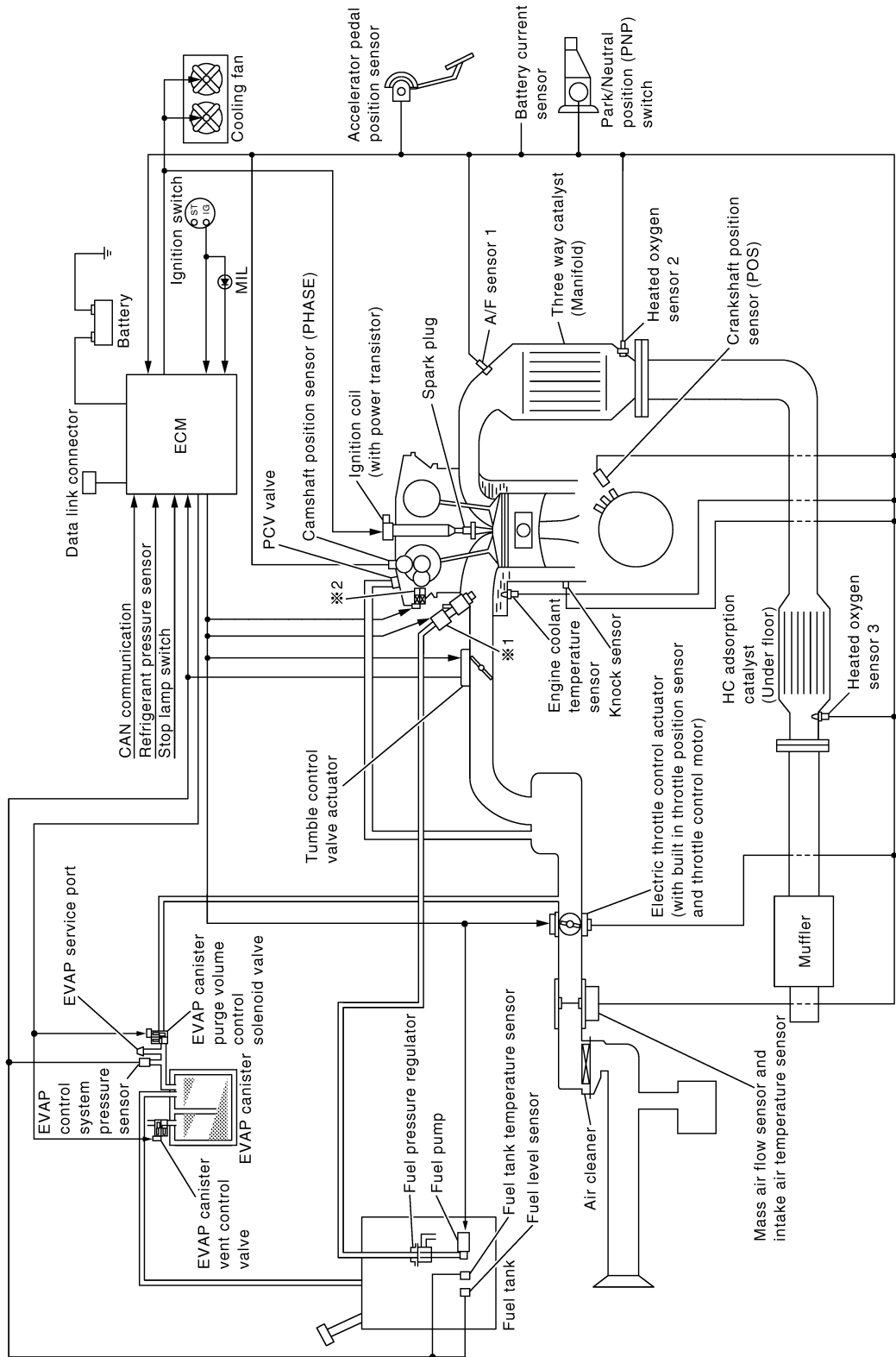
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※1 : Fuel injector
 ※2 : Intake valve timing control solenoid valve

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ENGINE CONTROL SYSTEM

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< FUNCTION DIAGNOSIS >

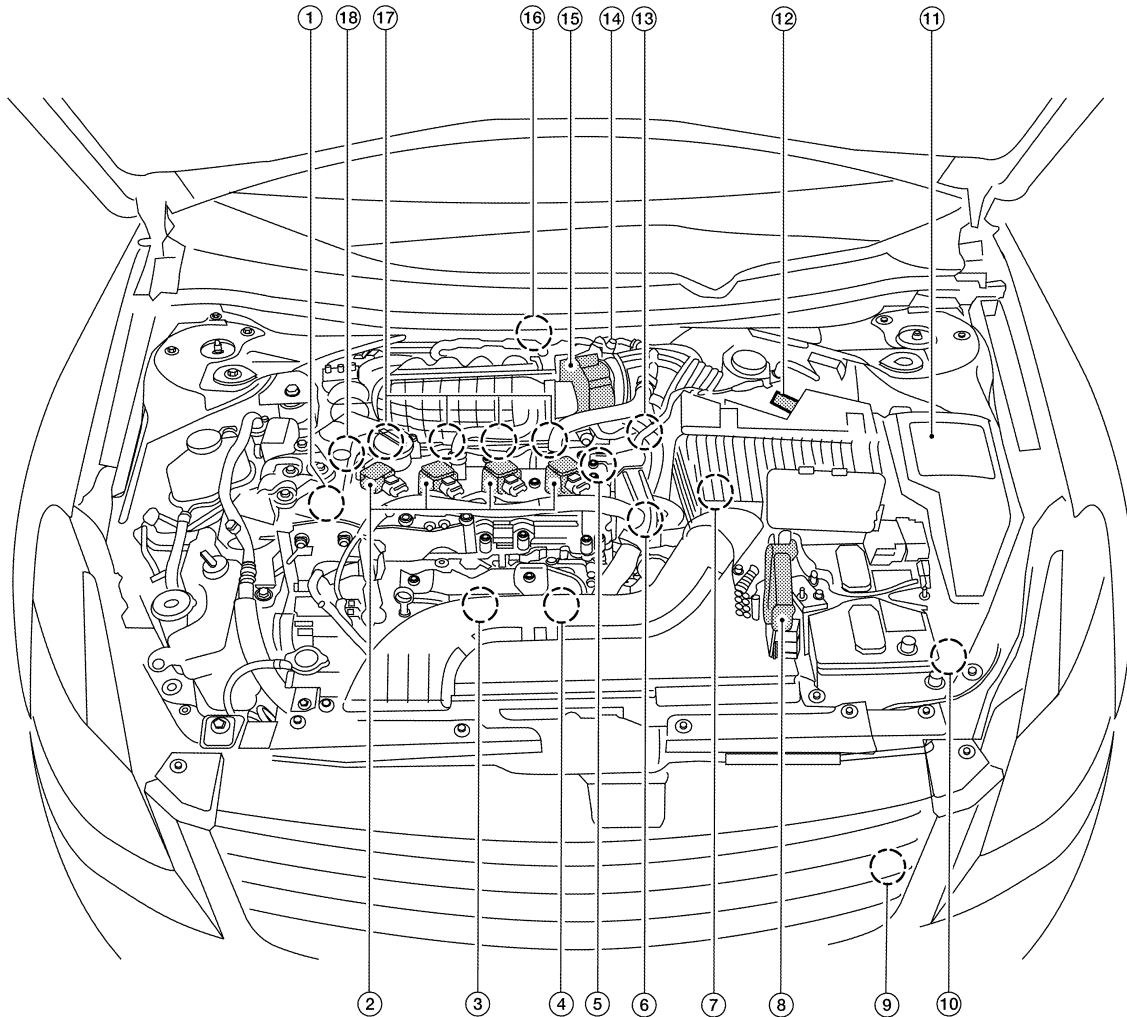
System Description

INFOID:000000001343609

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

Component Parts Location

INFOID:000000001343610



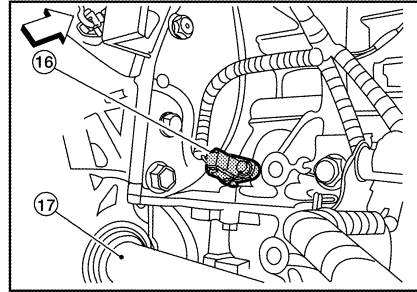
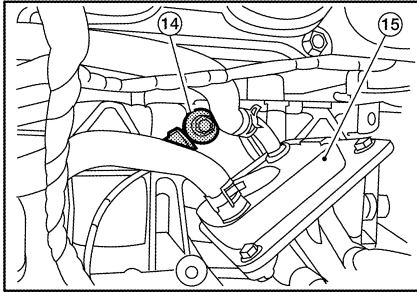
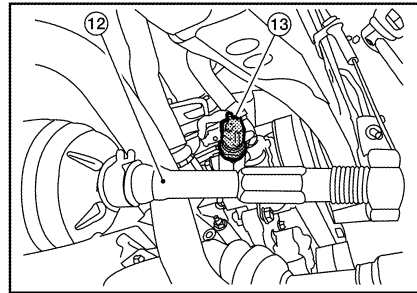
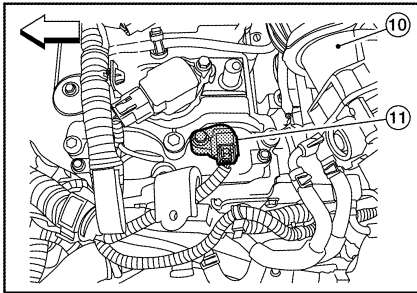
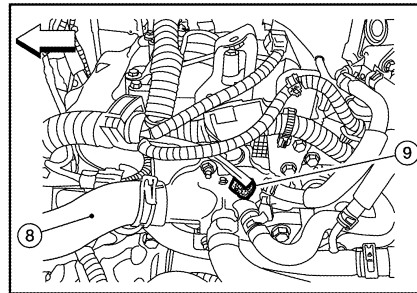
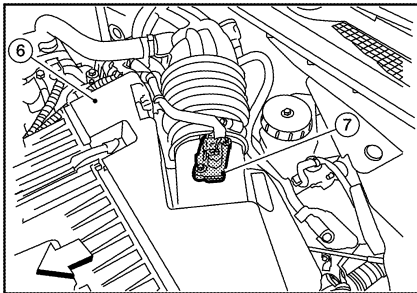
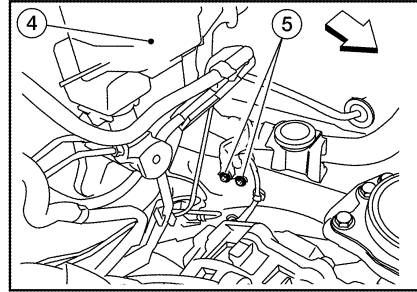
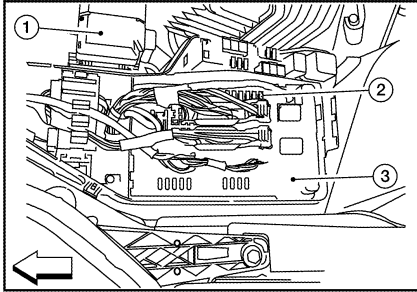
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

ENGINE CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↔: Vehicle front

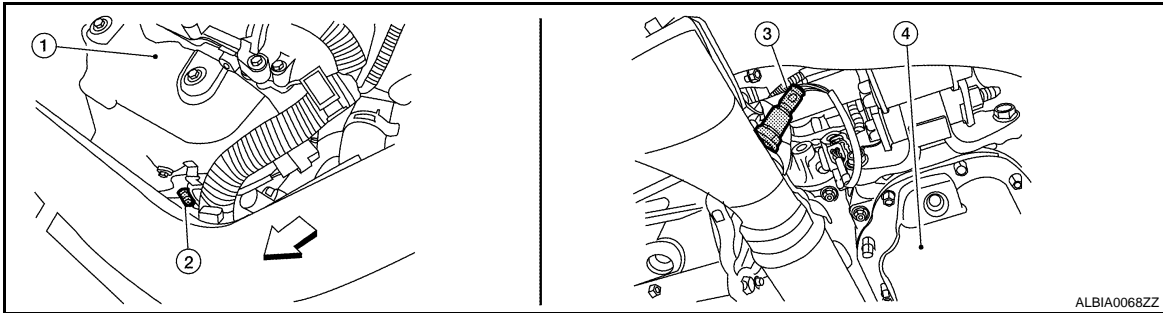
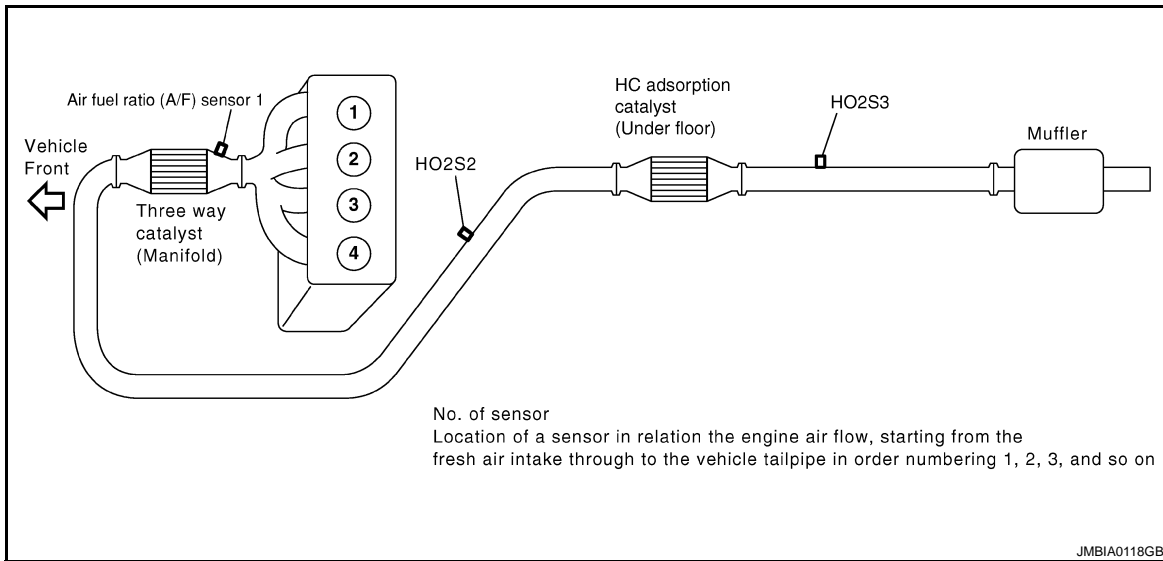
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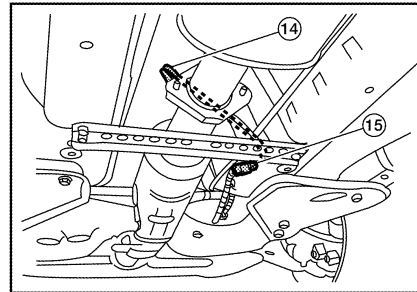
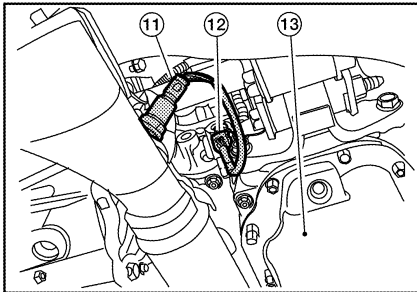
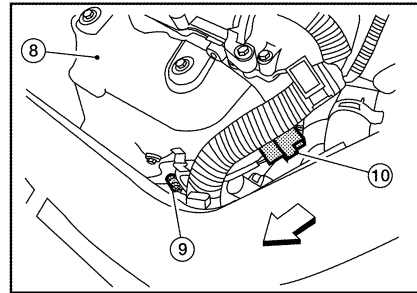
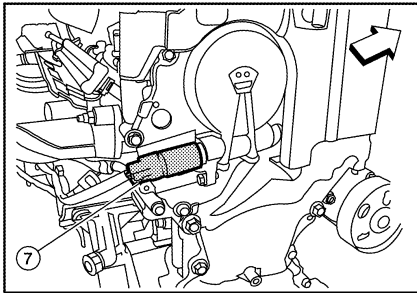
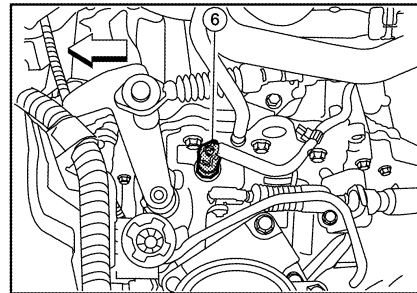
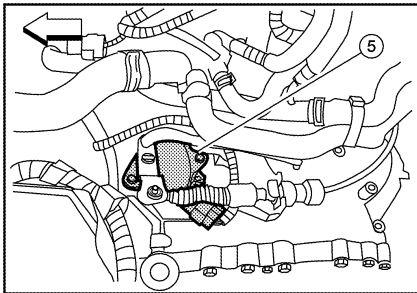
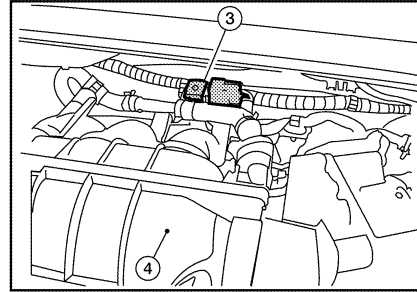
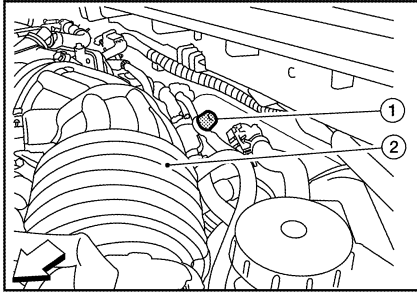
ENGINE CONTROL SYSTEM

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- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front



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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

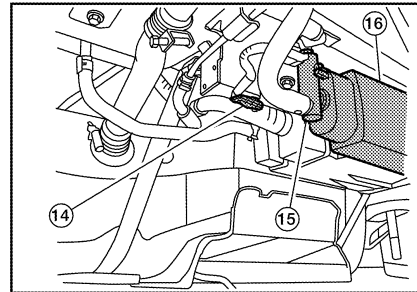
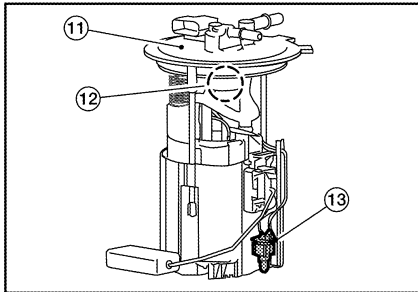
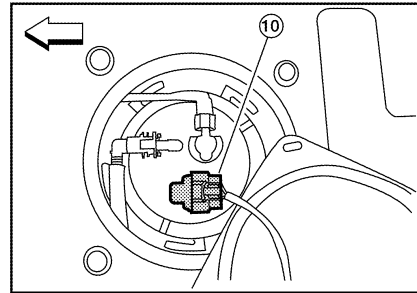
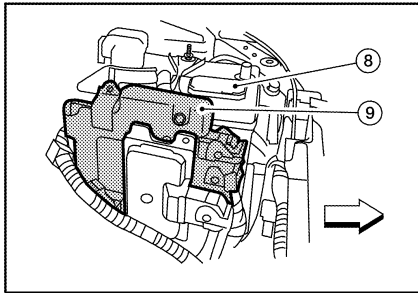
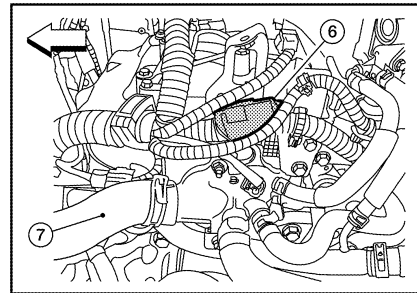
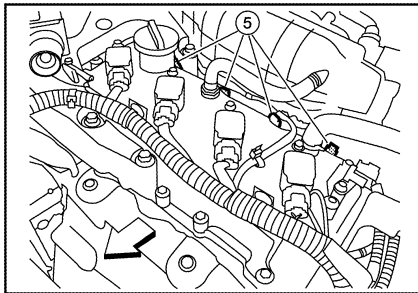
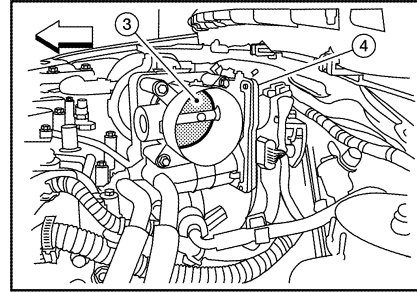
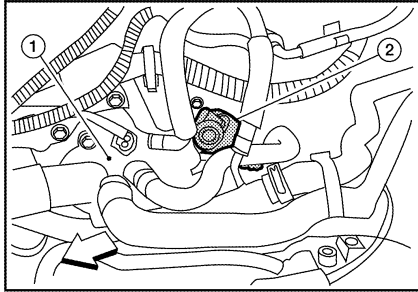
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ENGINE CONTROL SYSTEM

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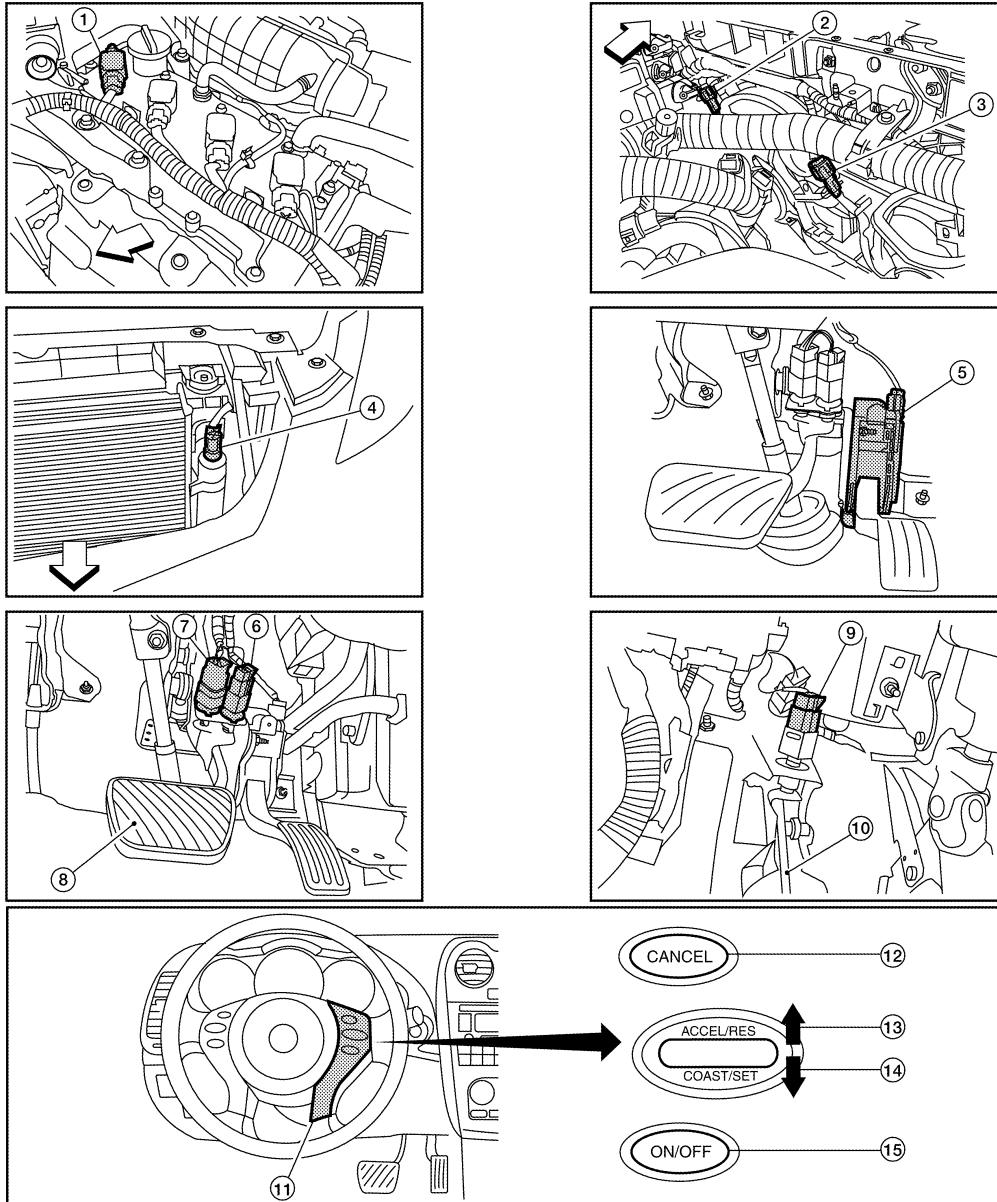
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

ENGINE CONTROL SYSTEM

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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343611

| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-192. "Description" |
| A/F sensor 1 heater | EC-154. "Description" |
| Accelerator pedal position sensor | EC-418. "Description" |
| ASCD brake switch | EC-386. "Description" |

ENGINE CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

< FUNCTION DIAGNOSIS >

| Component | Reference |
|---|---|
| ASCD steering switch | EC-383, "Description" |
| ASCD vehicle speed sensor | EC-393, "Description" |
| Battery current sensor | EC-371, "Description" |
| Camshaft position sensor (PHASE) | EC-274, "Description" |
| Crankshaft position sensor (POS) | EC-270, "Description" |
| Cooling fan motor | EC-77, "System Description" |
| Electric throttle control actuator | EC-416, "Description" |
| Engine coolant temperature sensor | EC-179, "Description" |
| EVAP canister purge volume control solenoid valve | EC-294, "Description" |
| EVAP canister vent control valve | EC-301, "Description" |
| EVAP control system pressure sensor | EC-309, "Description" |
| Fuel injector | EC-453, "Description" |
| Fuel level sensor | EC-336, "Description" |
| Fuel pump | EC-456, "Description" |
| Fuel tank temperature sensor | EC-254, "Description" |
| Heated oxygen sensor 2 | EC-207, "Description" |
| Heated oxygen sensor 2 heater | EC-157, "Description" |
| Heated oxygen sensor 3 | EC-226, "Description" |
| Heated oxygen sensor 3 heater | EC-160, "Description" |
| Ignition signal | EC-460, "Description" |
| Intake air temperature sensor | EC-176, "Description" |
| Intake valve timing control solenoid valve | EC-97, "System Description" |
| Knock sensor | EC-268, "Description" |
| Mass air flow sensor | EC-165, "Description" |
| Park/neutral position switch | EC-357, "Description" |
| PCV valve | EC-471, "Description" |
| Power steering pressure sensor | EC-348, "Description" |
| Refrigerant pressure sensor | EC-472, "Description" |
| Stop lamp switch | EC-397, "Description" |
| Throttle control motor | EC-414, "Description" |
| Throttle control motor relay | EC-408, "Description" |
| Throttle position sensor | EC-182, "Description" |
| Tumble control valve | EC-400, "Description" |
| Tumble control valve position sensor | EC-405, "Description" |
| Vehicle speed sensor | EC-342, "Description" |

MULTIPOINT FUEL INJECTION SYSTEM

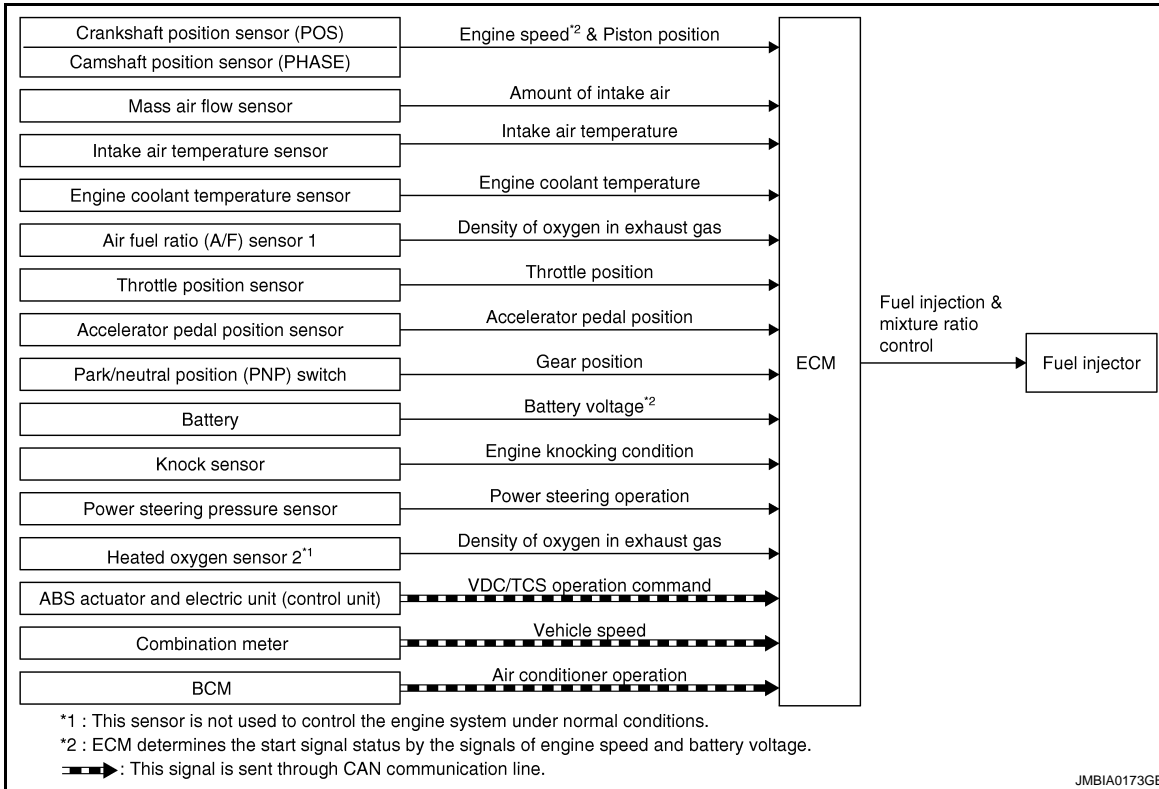
< FUNCTION DIAGNOSIS >

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MULTIPOINT FUEL INJECTION SYSTEM

System Diagram

INFOID:000000001343612



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 Piston position | Fuel injection & mixture ratio control | Fuel injector |
| 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 | | |
| Park/neutral position (PNP) switch | Gear position | | |
| 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)*2 | ABS operation command | | |
| Air conditioner switch*2 | Air conditioner operation | | |
| Wheel sensor*2 | Vehicle speed | | |

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

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

MULTIPOINT FUEL INJECTION SYSTEM

[QR25DE FOR CALIFORNIA]

< 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.

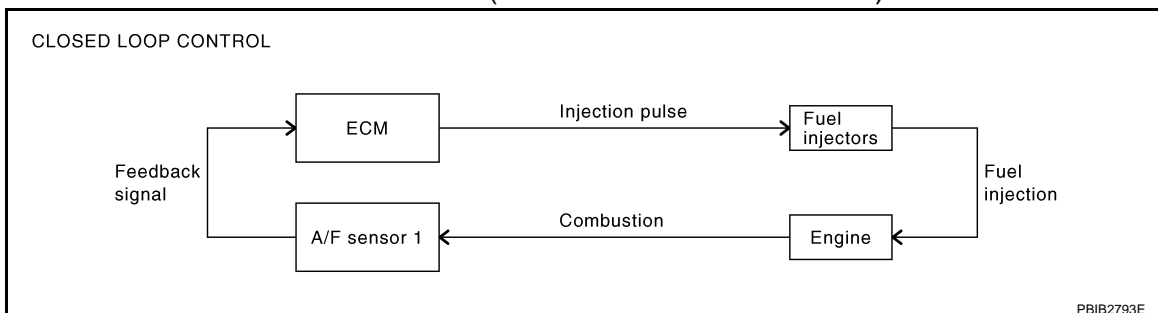
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- 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 driveability and emission control. The three way catalyst (manifold) can then 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 [EC-192, "DTC Logic"](#). 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 control 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 (CVT models)
- 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

MULTIPOINT FUEL INJECTION SYSTEM

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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.

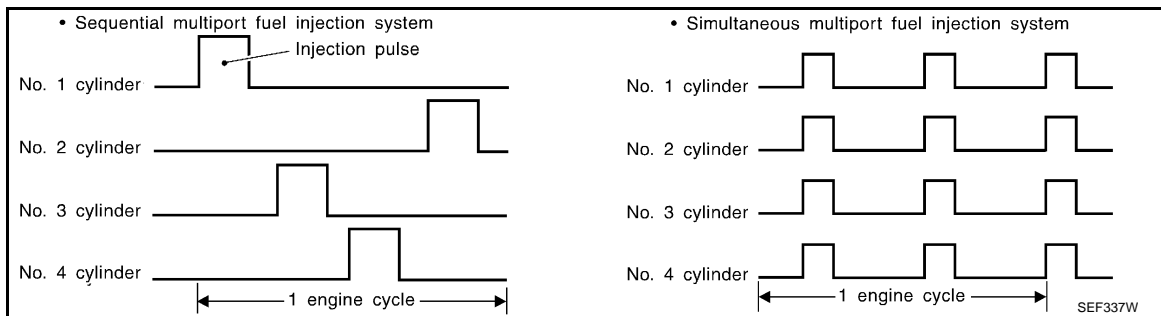
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

- Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two 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.

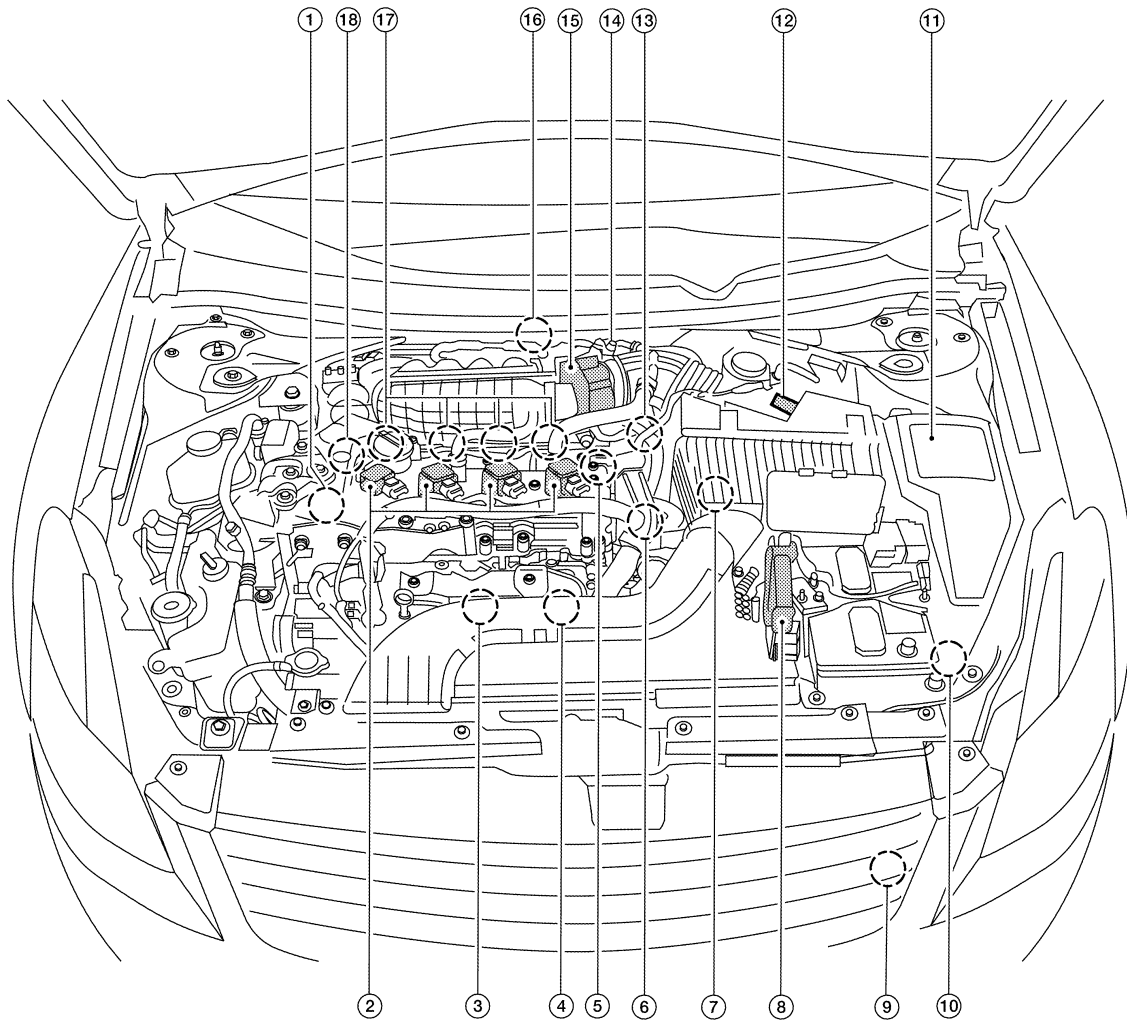
MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

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Component Parts Location

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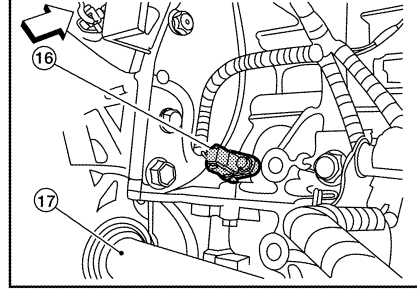
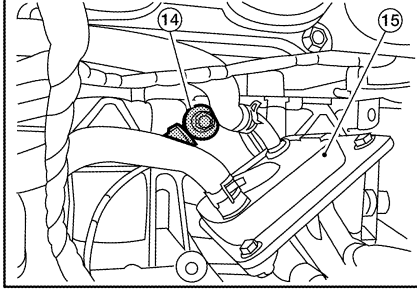
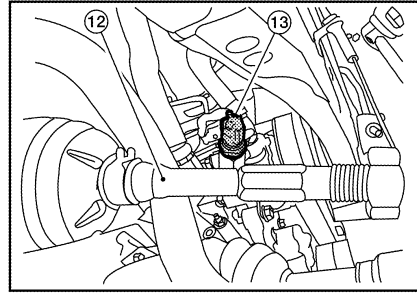
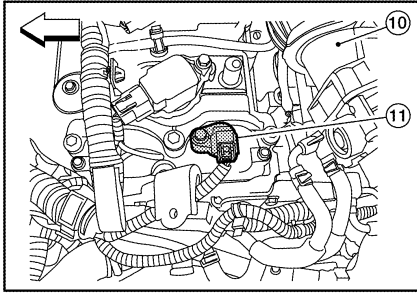
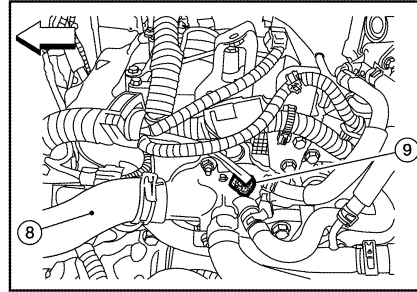
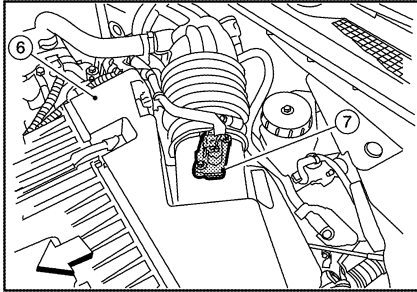
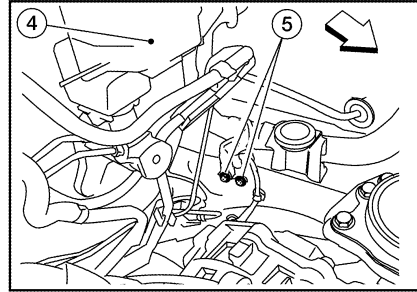
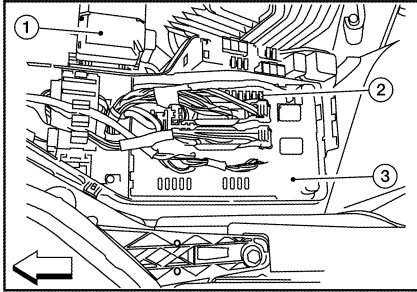
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

MULTIPOINT FUEL INJECTION SYSTEM

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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↔: Vehicle front

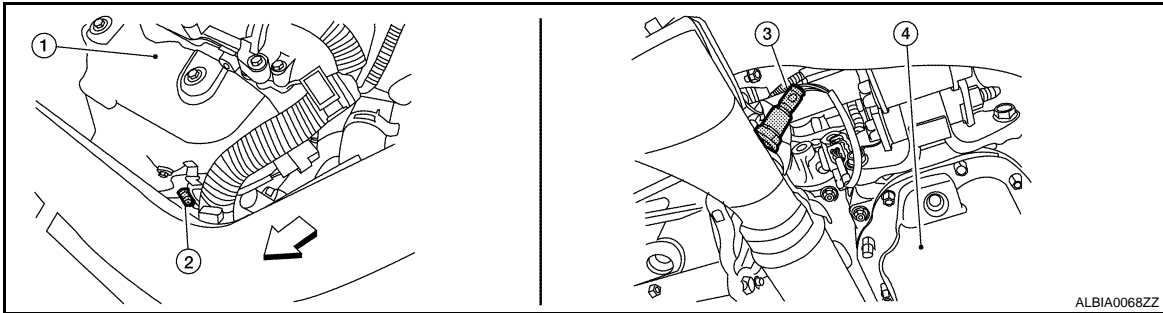
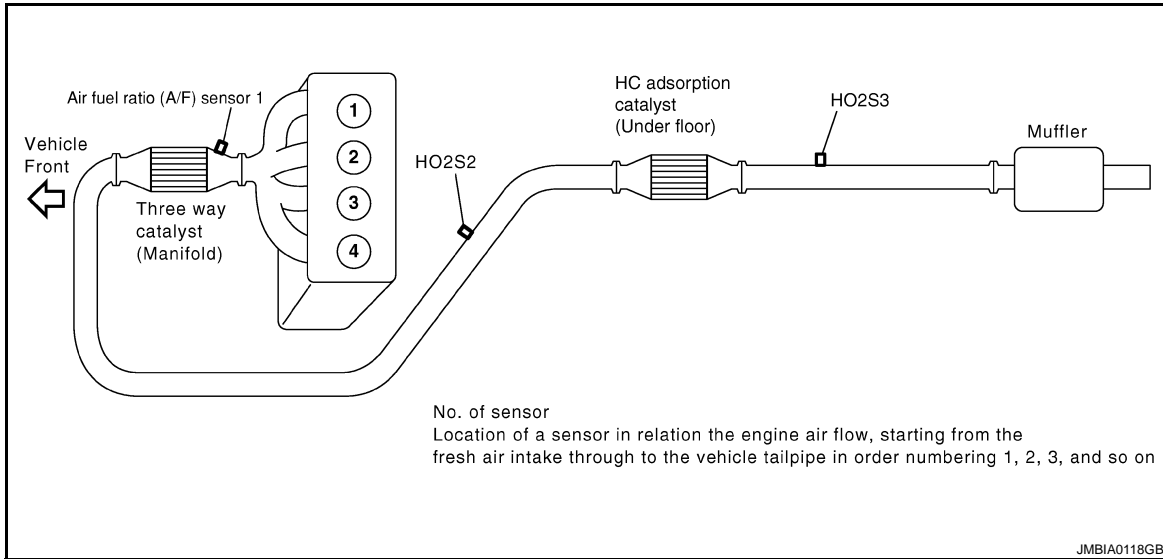
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MULTIPOINT FUEL INJECTION SYSTEM

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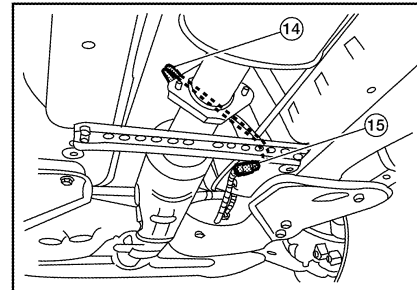
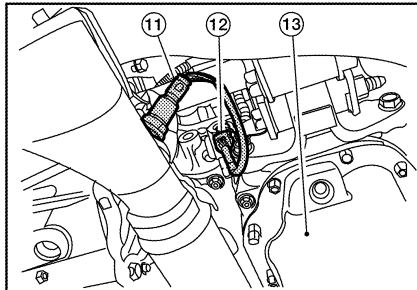
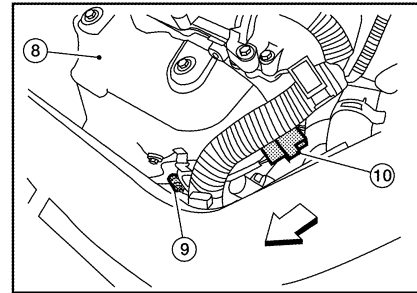
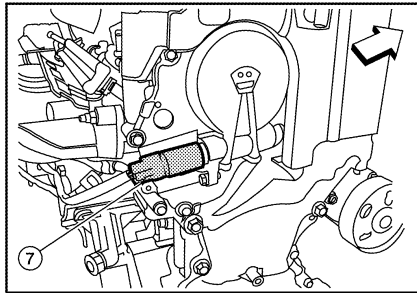
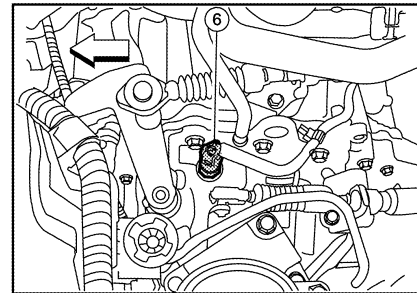
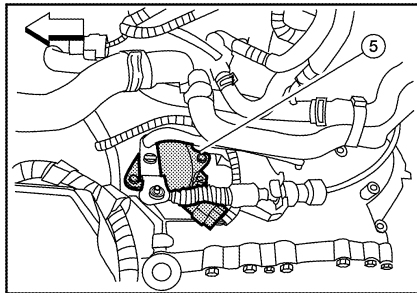
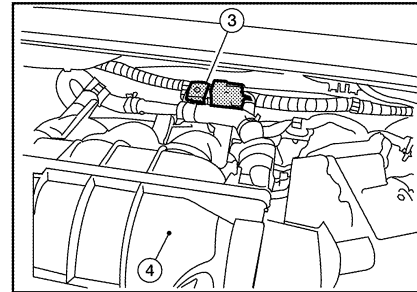
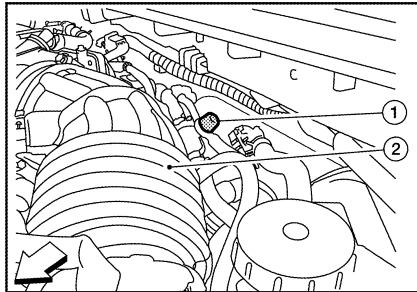


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ↔: Vehicle front

MULTIPOINT FUEL INJECTION SYSTEM

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

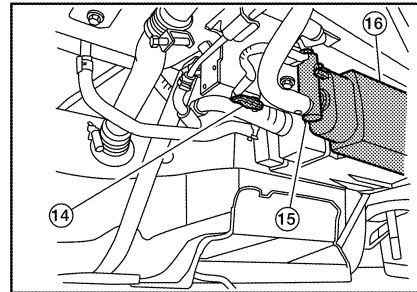
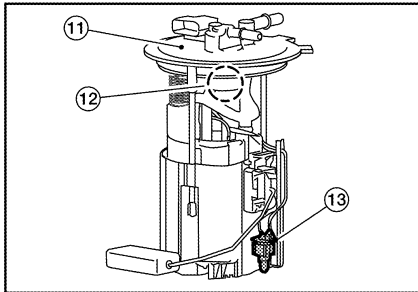
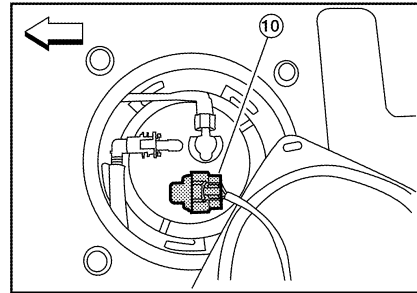
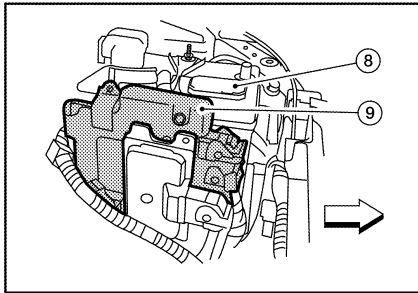
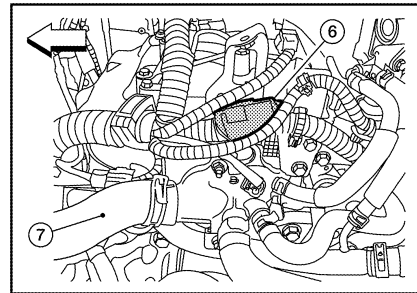
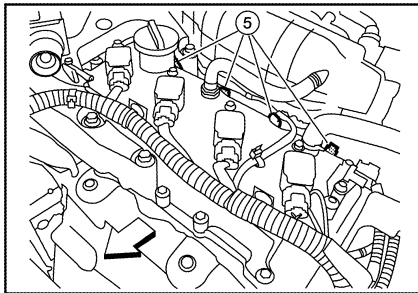
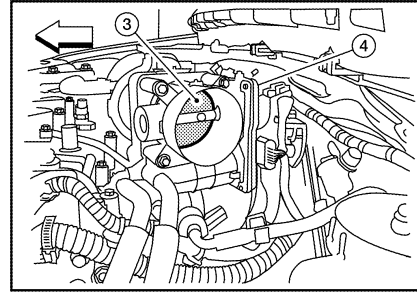
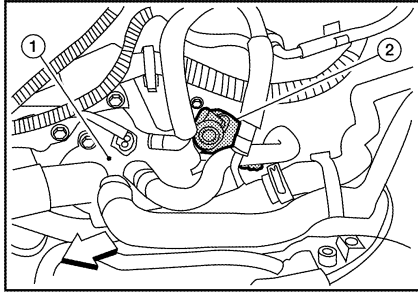
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MULTIPOINT FUEL INJECTION SYSTEM

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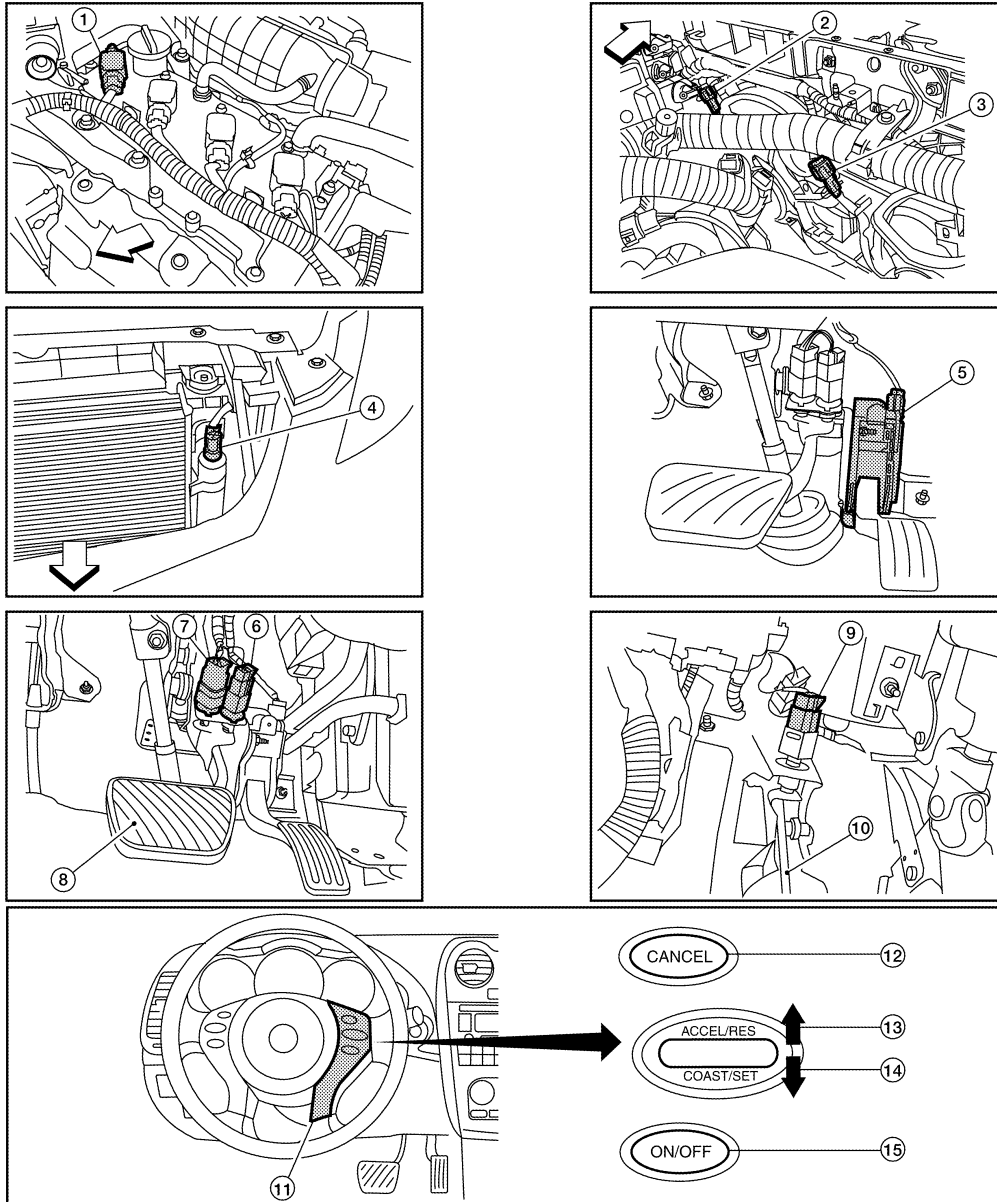
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

MULTIPOINT FUEL INJECTION SYSTEM

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343615

| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-192. "Description" |
| Accelerator pedal position sensor | EC-418. "Description" |
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |

MULTIPOINT FUEL INJECTION SYSTEM

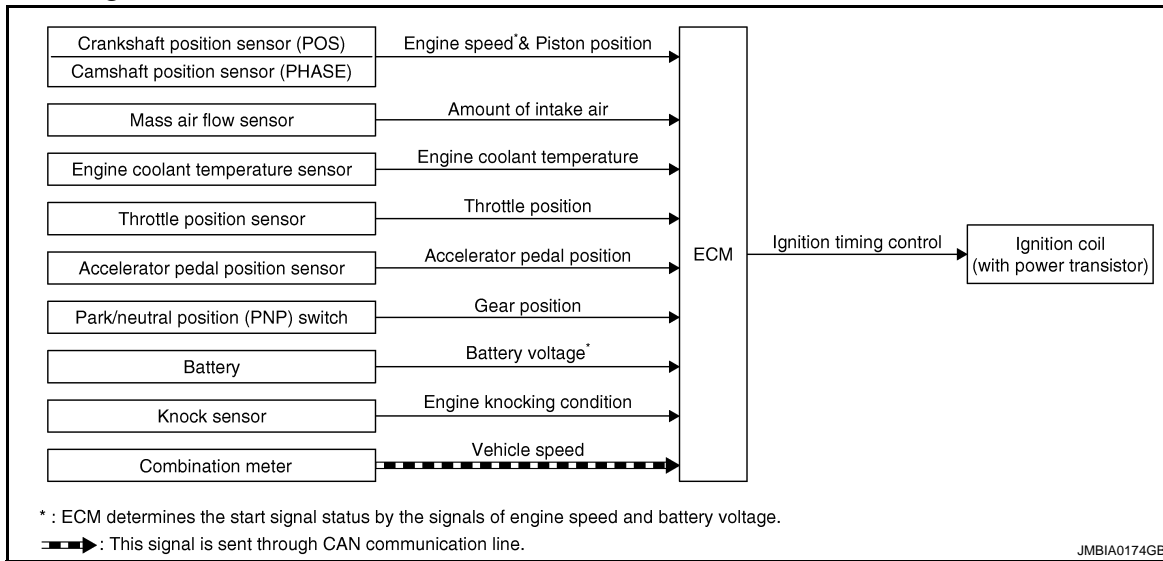
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| Component | Reference |
|-----------------------------------|---------------------------------------|
| Engine coolant temperature sensor | EC-179, "Description" |
| Fuel injector | EC-453, "Description" |
| Heated oxygen sensor 2 | EC-157, "Description" |
| Intake air temperature sensor | EC-176, "Description" |
| Knock sensor | EC-268, "Description" |
| Mass air flow sensor | EC-165, "Description" |
| Park/neutral position switch | EC-357, "Description" |
| Power steering pressure sensor | EC-348, "Description" |
| Throttle position sensor | EC-182, "Description" |
| Vehicle speed sensor | EC-342, "Description" |

ELECTRIC IGNITION SYSTEM

System Diagram



System Description

INFOID:000000001343617

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input Signal to ECM | ECM function | Actuator |
|------------------------------------|-----------------------------------|-------------------------|---------------------------------------|
| Crankshaft position sensor (POS) | Engine speed*2 Piston position | Ignition timing control | Ignition coil (with power transistor) |
| Camshaft position sensor (PHASE) | | | |
| Mass air flow sensor | Amount of intake air | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Throttle position sensor | Throttle position | | |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Battery | Battery voltage*2 | | |
| Knock sensor | Engine knocking | | |
| Park/neutral position (PNP) switch | Gear position | | |
| Wheel sensor*1 | Vehicle speed | | |

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

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

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

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

ELECTRIC IGNITION SYSTEM

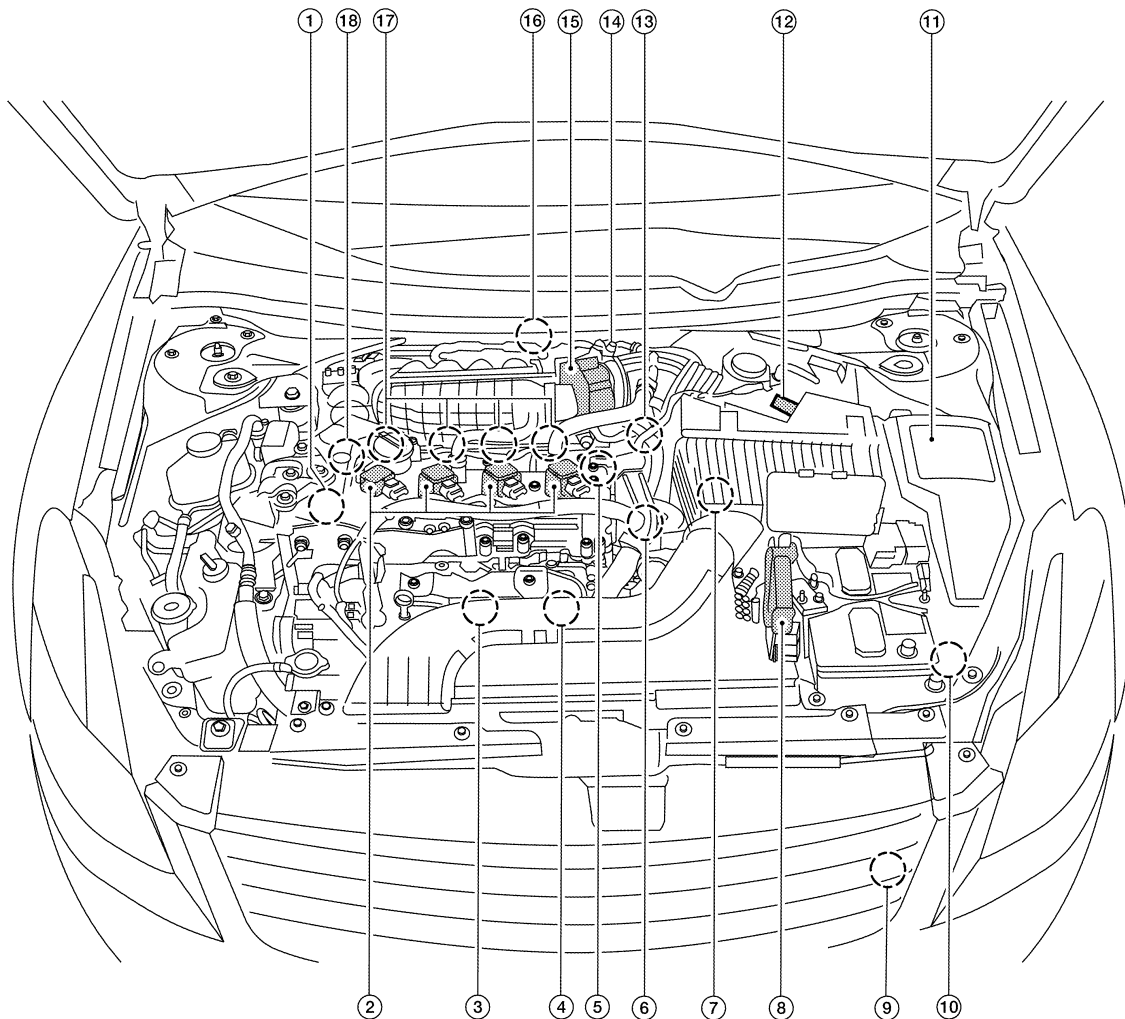
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operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Component Parts Location

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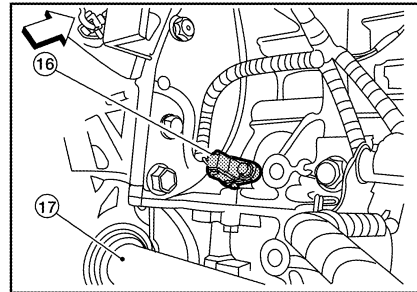
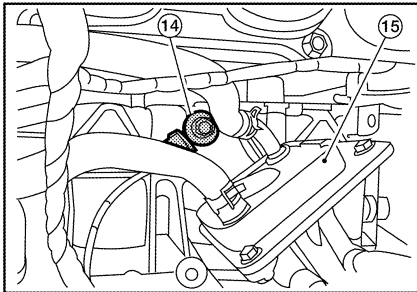
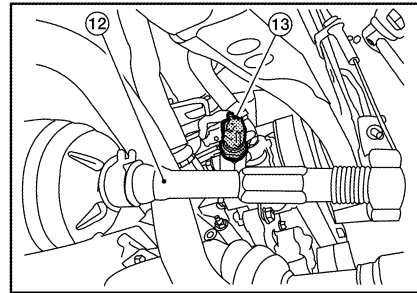
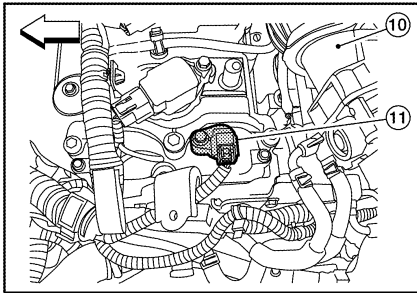
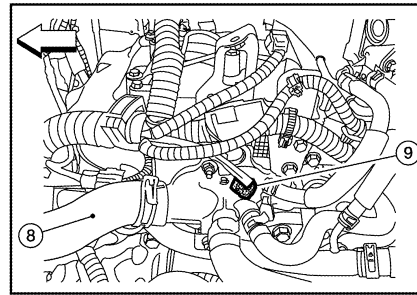
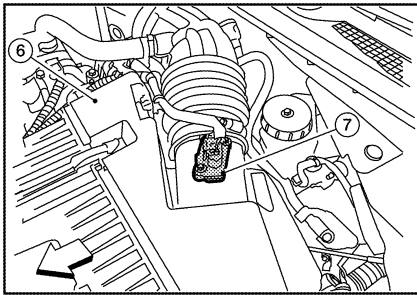
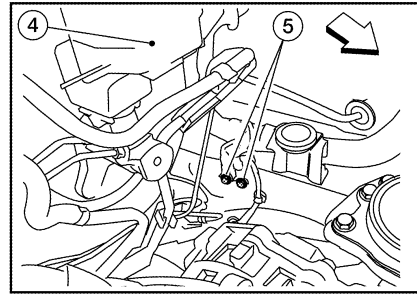
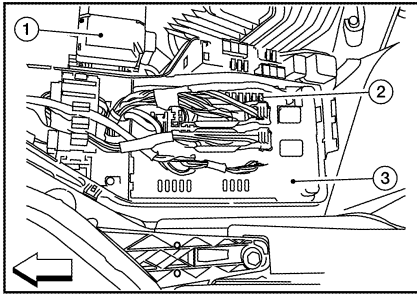
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

ELECTRIC IGNITION SYSTEM

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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↔: Vehicle front

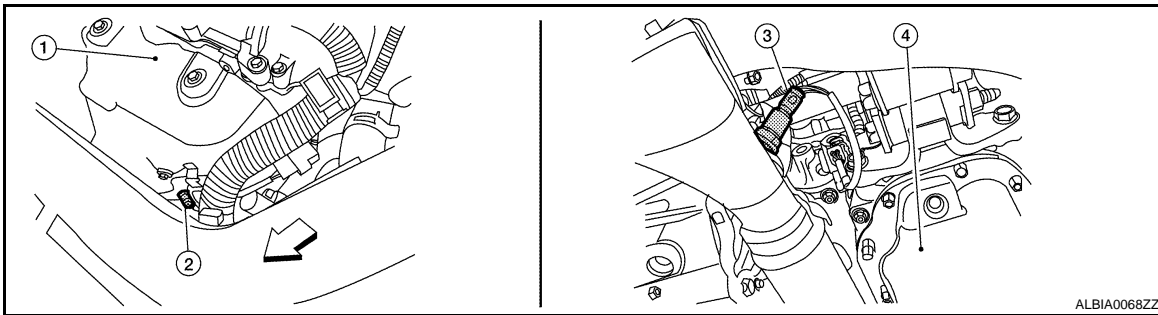
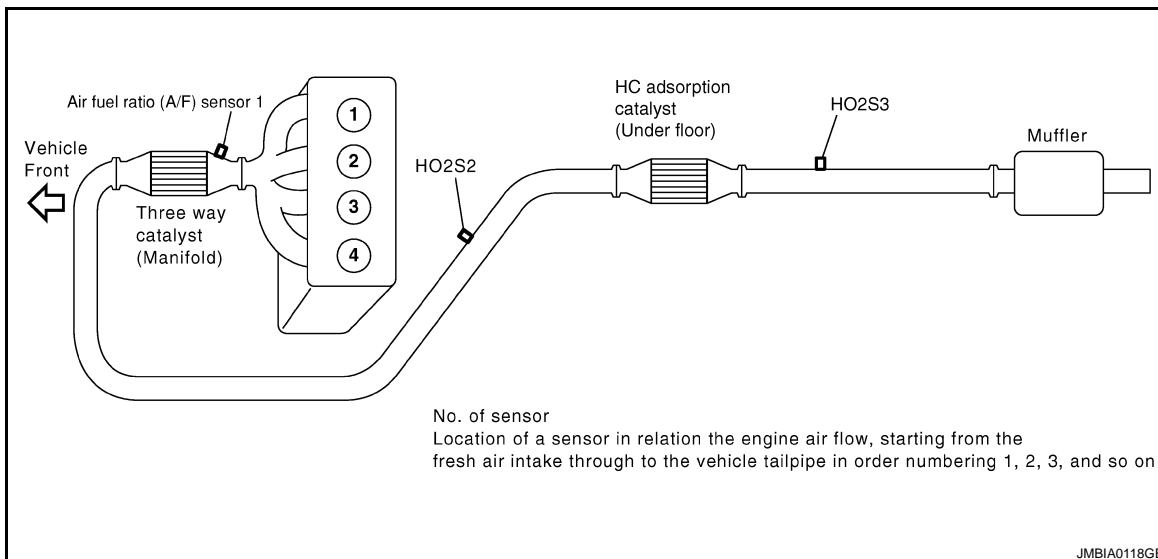
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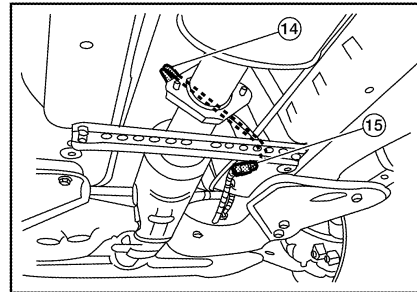
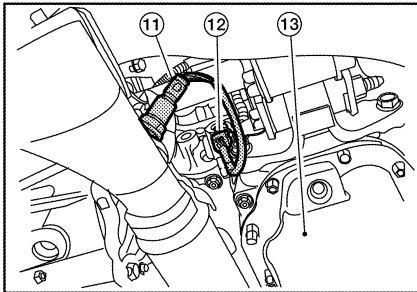
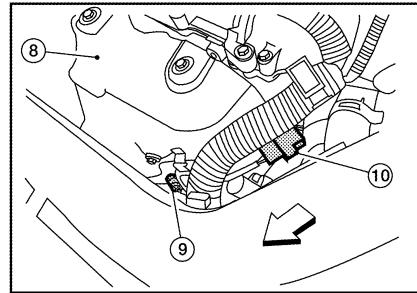
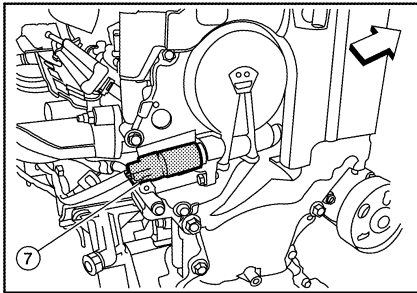
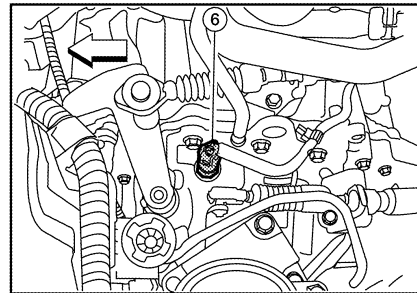
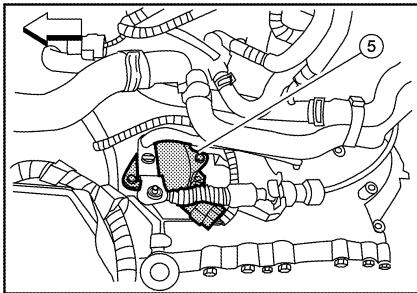
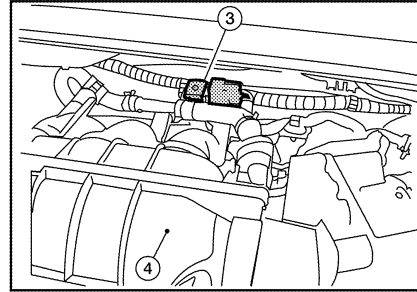
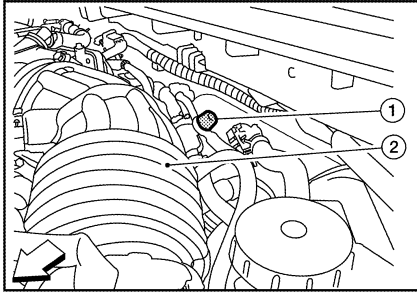


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ↔: Vehicle front

ELECTRIC IGNITION SYSTEM

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

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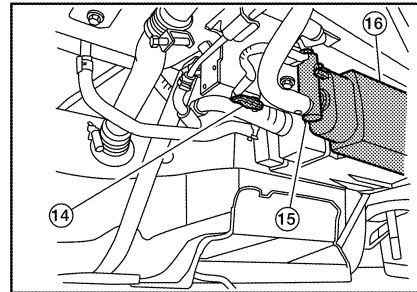
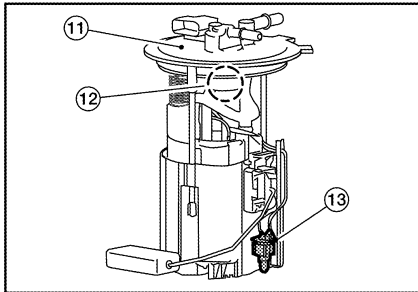
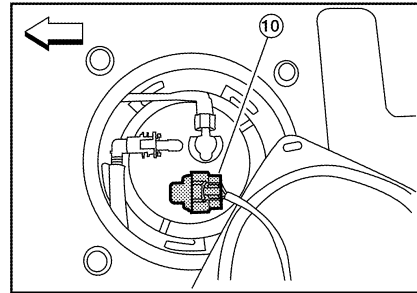
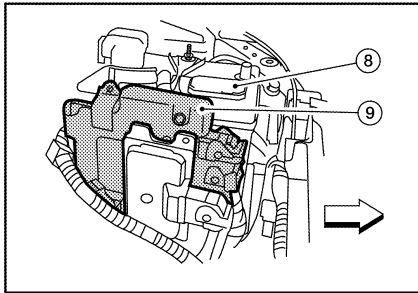
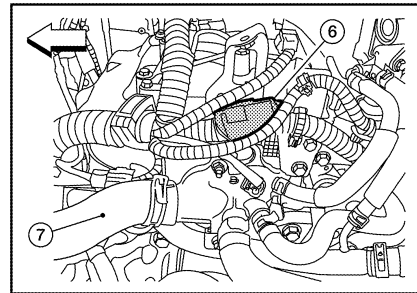
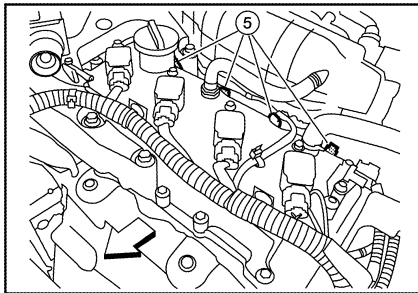
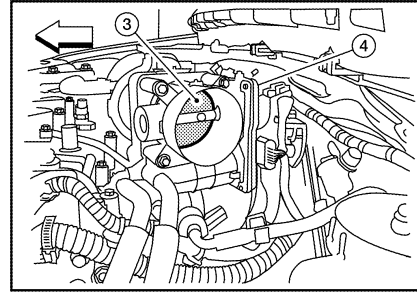
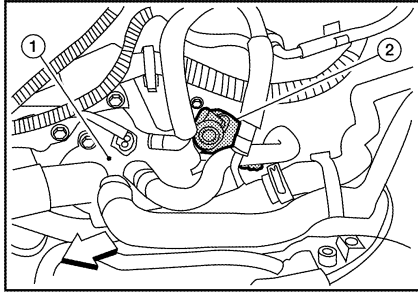
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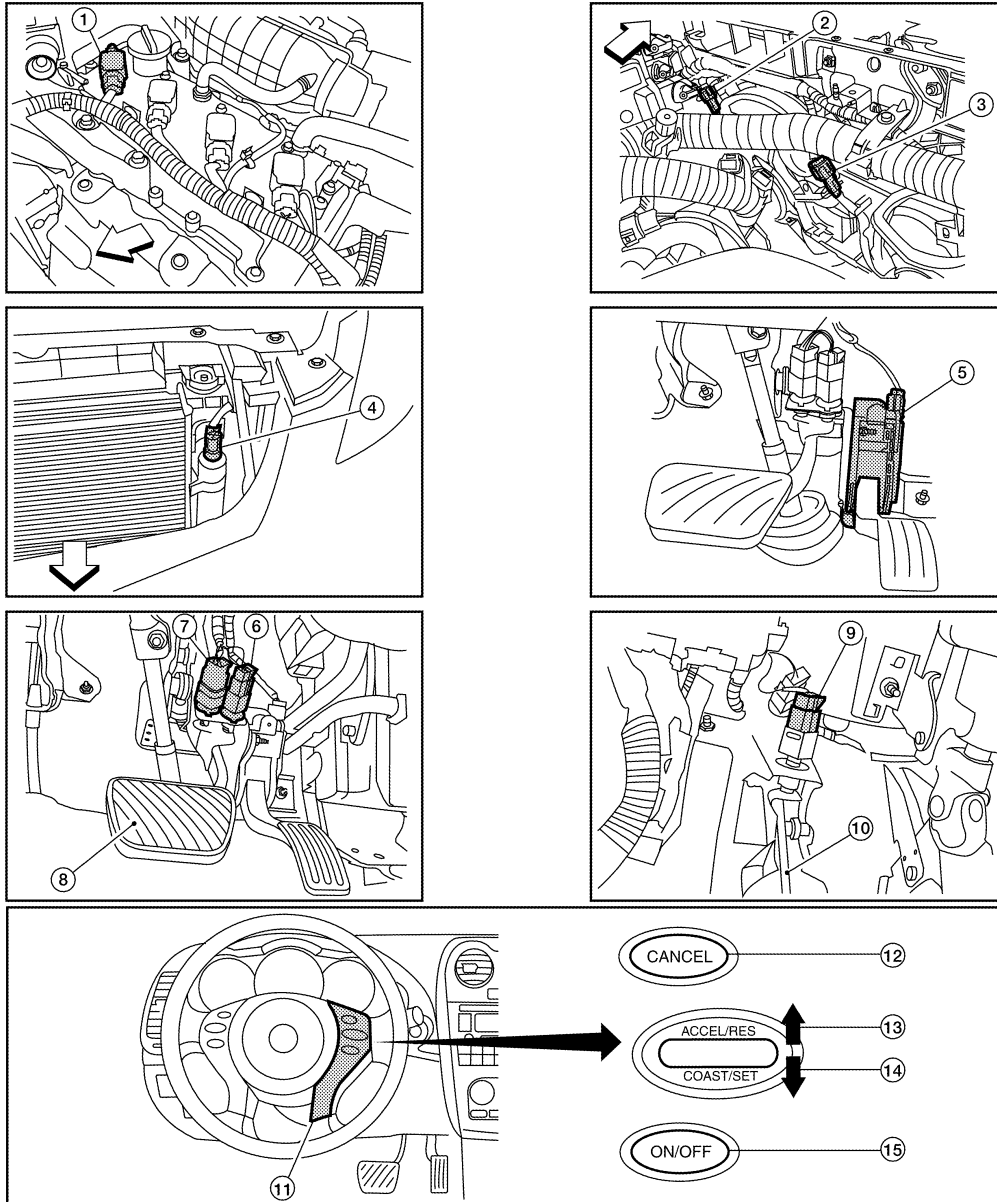
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↶: Vehicle front

Component Description

INFOID:000000001343619

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Accelerator pedal position sensor | EC-418. "Description" |
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |
| Engine coolant temperature sensor | EC-179. "Description" |

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

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| Component | Reference |
|------------------------------|---------------------------------------|
| Ignition signal | EC-460. "Description" |
| Knock sensor | EC-268. "Description" |
| Mass air flow sensor | EC-165. "Description" |
| Park/neutral position switch | EC-357. "Description" |
| Throttle position sensor | EC-182. "Description" |
| Vehicle speed sensor | EC-342. "Description" |

AIR CONDITIONING CUT CONTROL

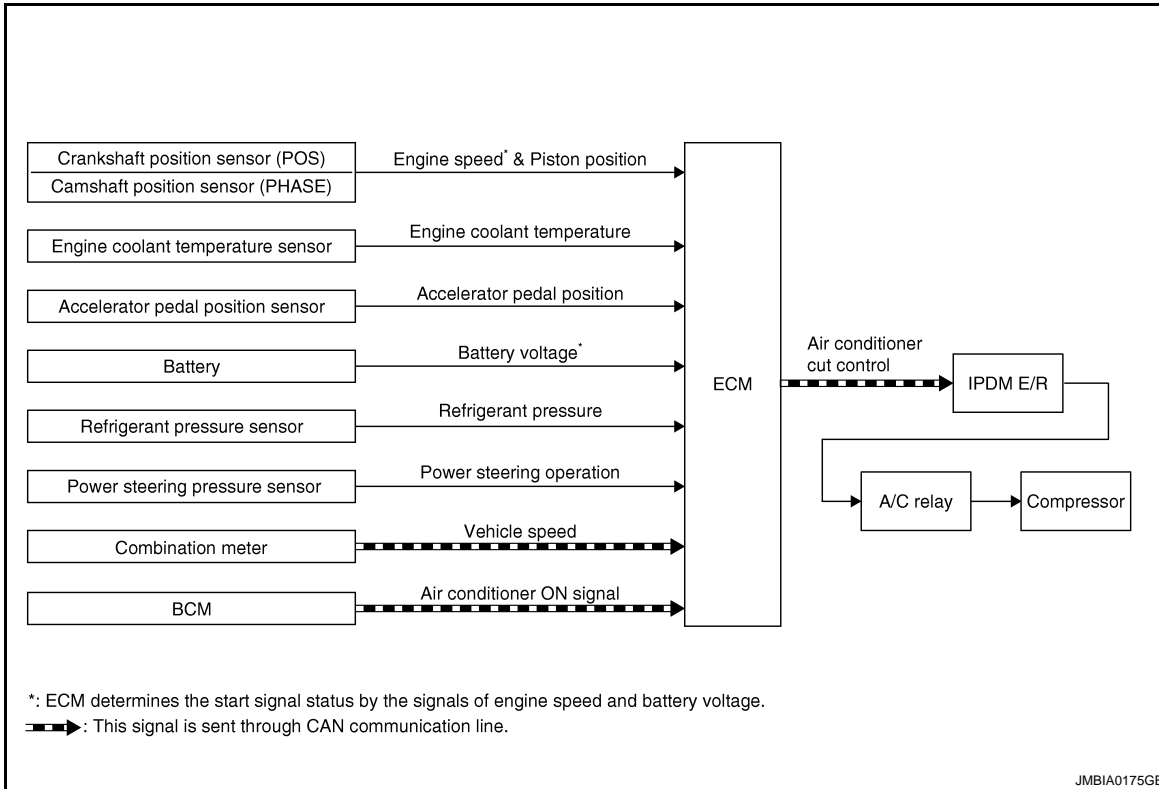
< FUNCTION DIAGNOSIS >

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AIR CONDITIONING CUT CONTROL

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input Signal to ECM | ECM function | Actuator |
|--|-------------------------------|-----------------------------|---|
| Air conditioner switch* ¹ | Air conditioner ON signal | Air conditioner cut control | IPDM E/R ↓ Air conditioner relay ↓ Compressor |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* ² | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Battery | Battery voltage* ² | | |
| Refrigerant pressure sensor | Refrigerant pressure | | |
| Power steering pressure sensor | Power steering operation | | |
| Wheel sensor* ¹ | Vehicle speed | | |

*1: This signal is sent to the ECM through 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.

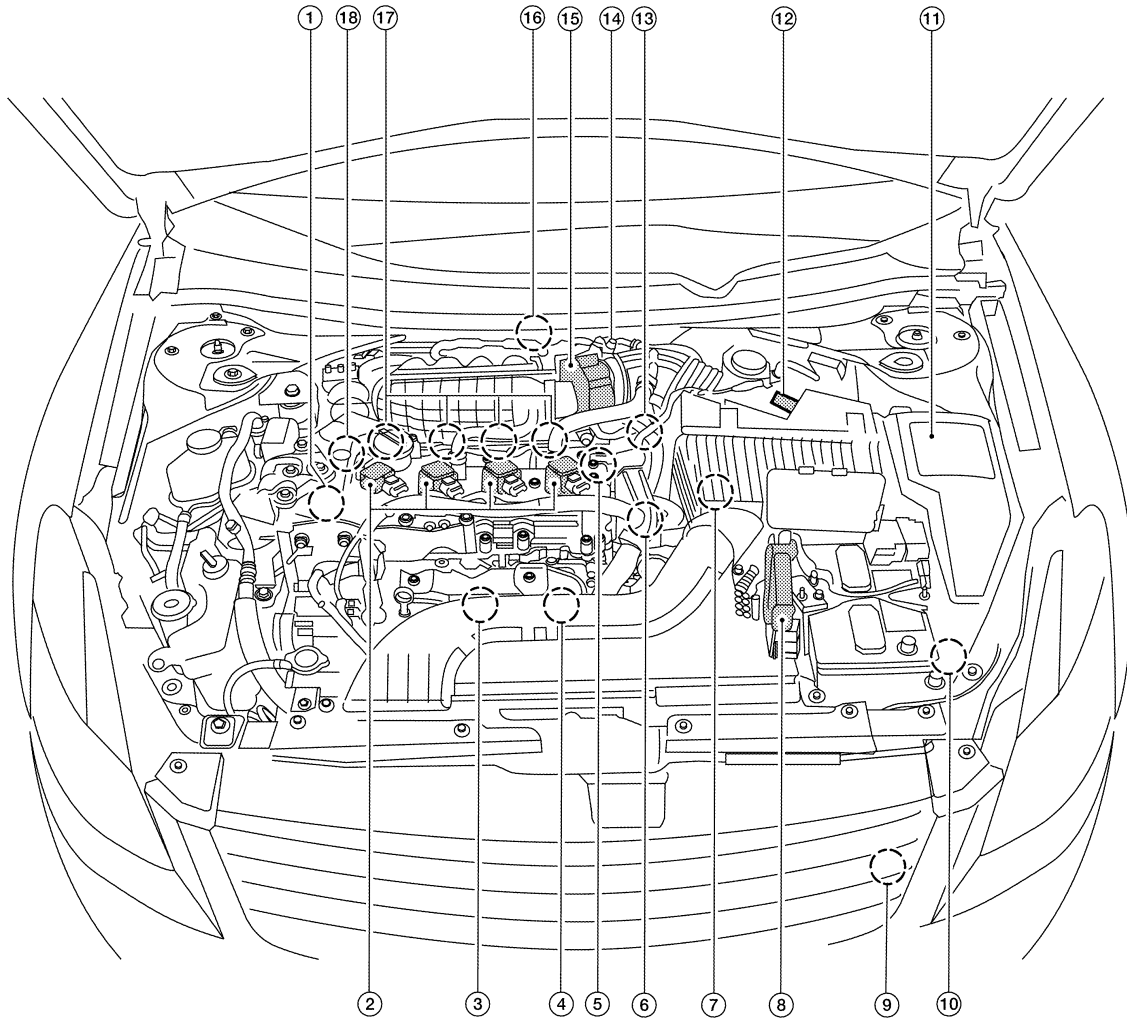
AIR CONDITIONING CUT CONTROL

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Component Parts Location

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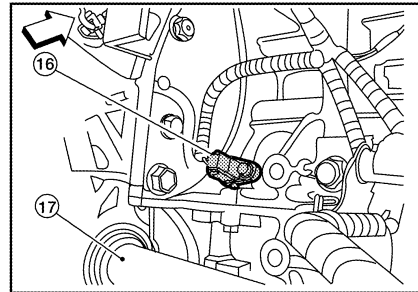
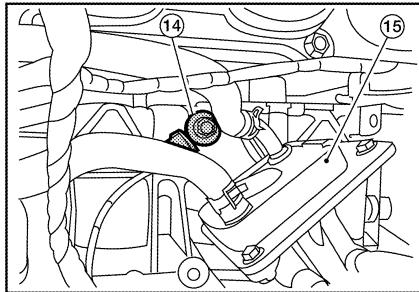
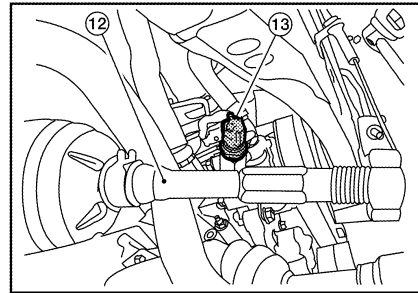
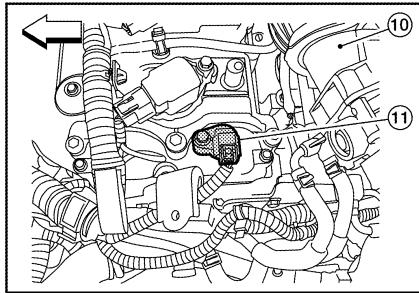
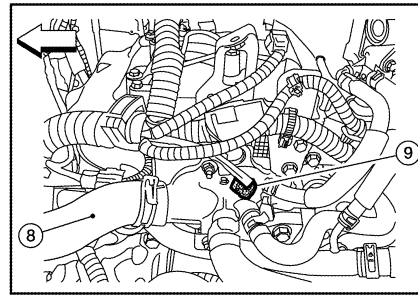
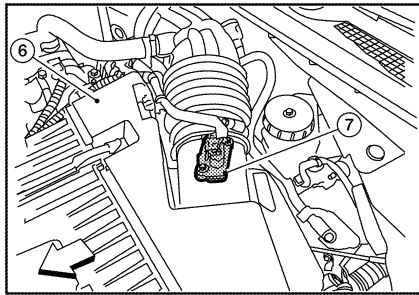
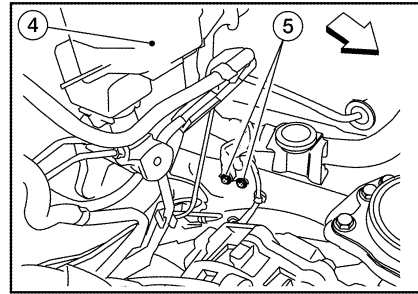
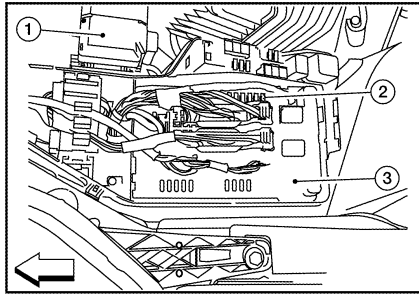
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| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

AIR CONDITIONING CUT CONTROL

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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

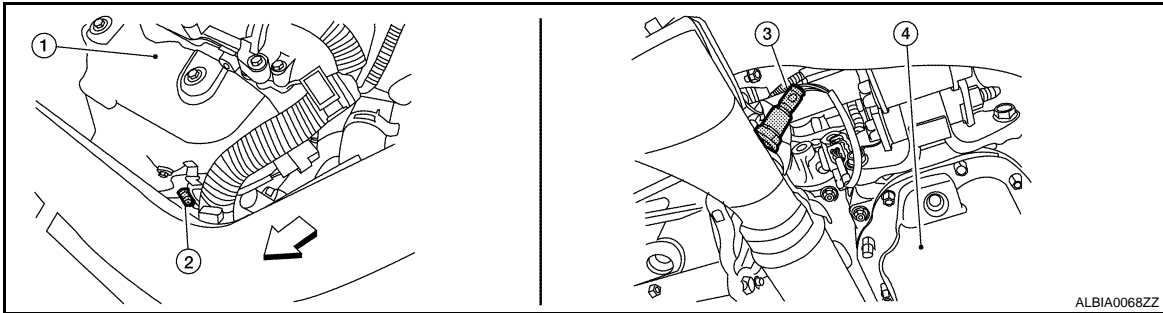
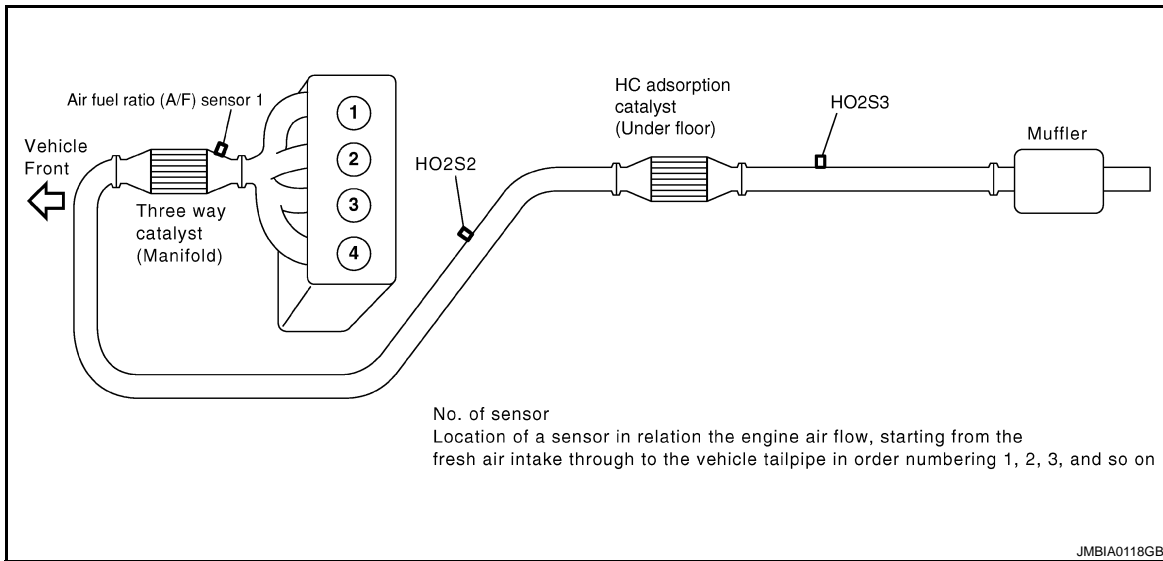
↔: Vehicle front

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AIR CONDITIONING CUT CONTROL

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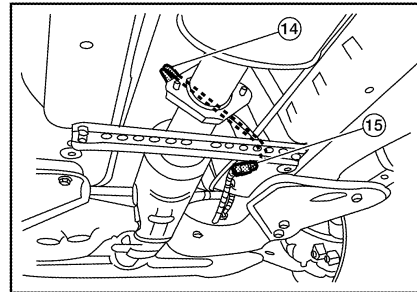
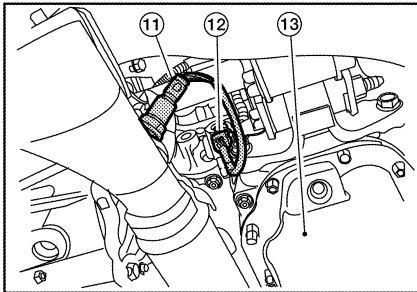
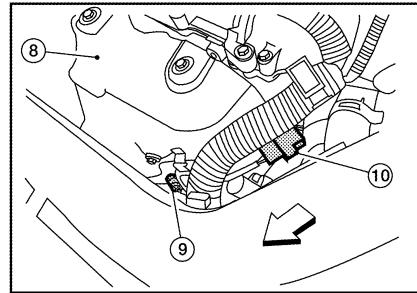
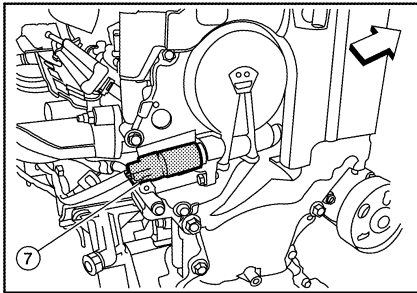
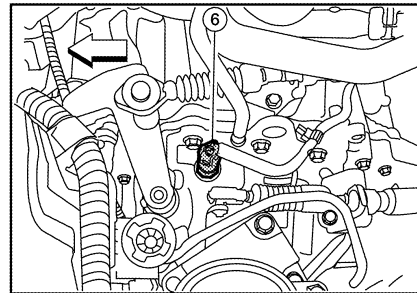
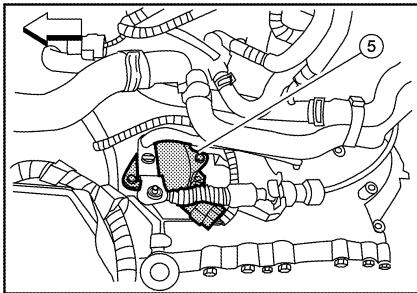
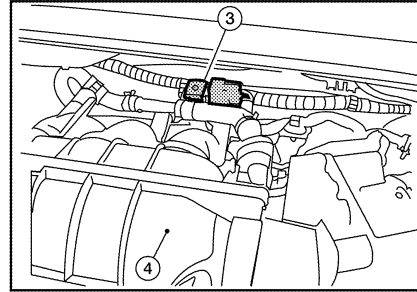
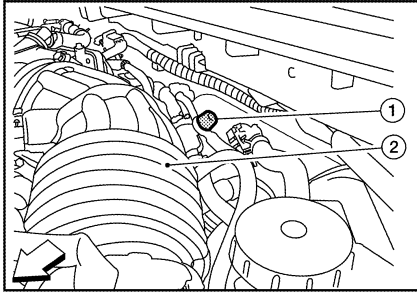


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ↶: Vehicle front

AIR CONDITIONING CUT CONTROL

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

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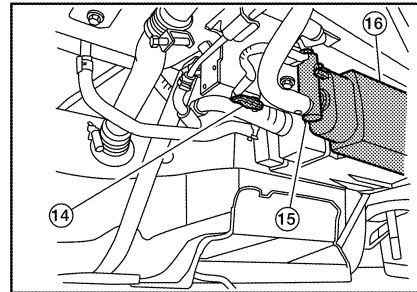
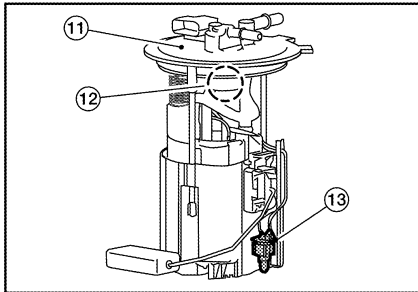
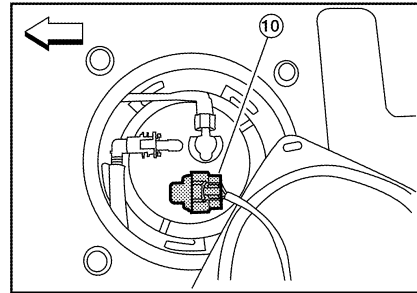
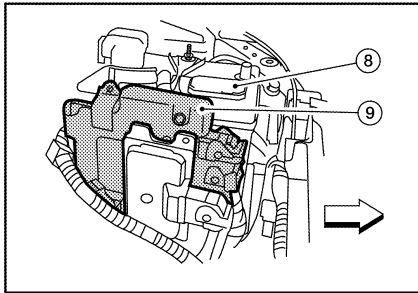
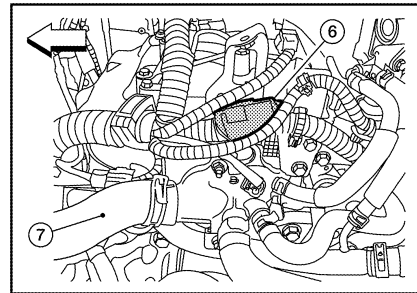
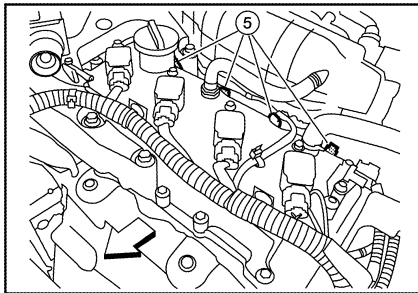
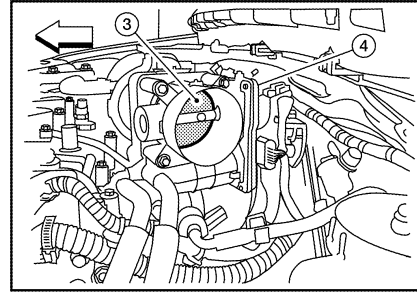
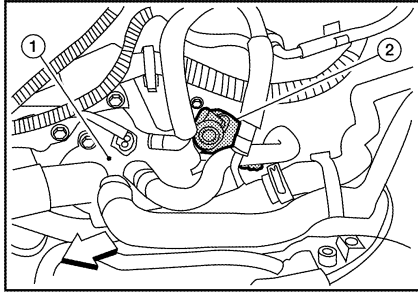
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AIR CONDITIONING CUT CONTROL

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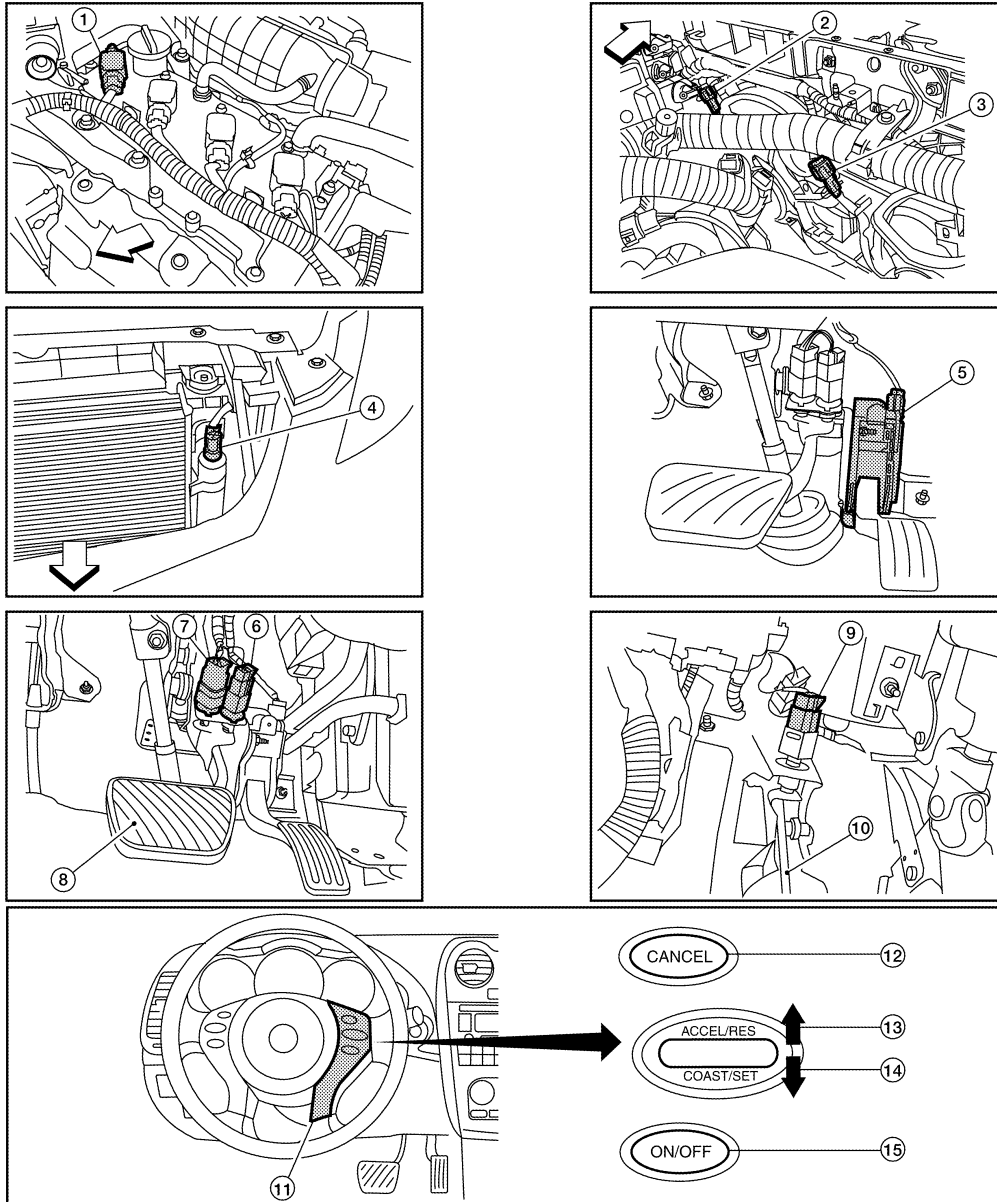
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

AIR CONDITIONING CUT CONTROL

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343623

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Accelerator pedal position sensor | EC-418. "Description" |
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |
| Engine coolant temperature sensor | EC-179. "Description" |

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

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| Component | Reference |
|--------------------------------|---------------------------------------|
| Power steering pressure sensor | EC-348. "Description" |
| Refrigerant pressure sensor | EC-472. "Description" |
| Vehicle speed sensor | EC-342. "Description" |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

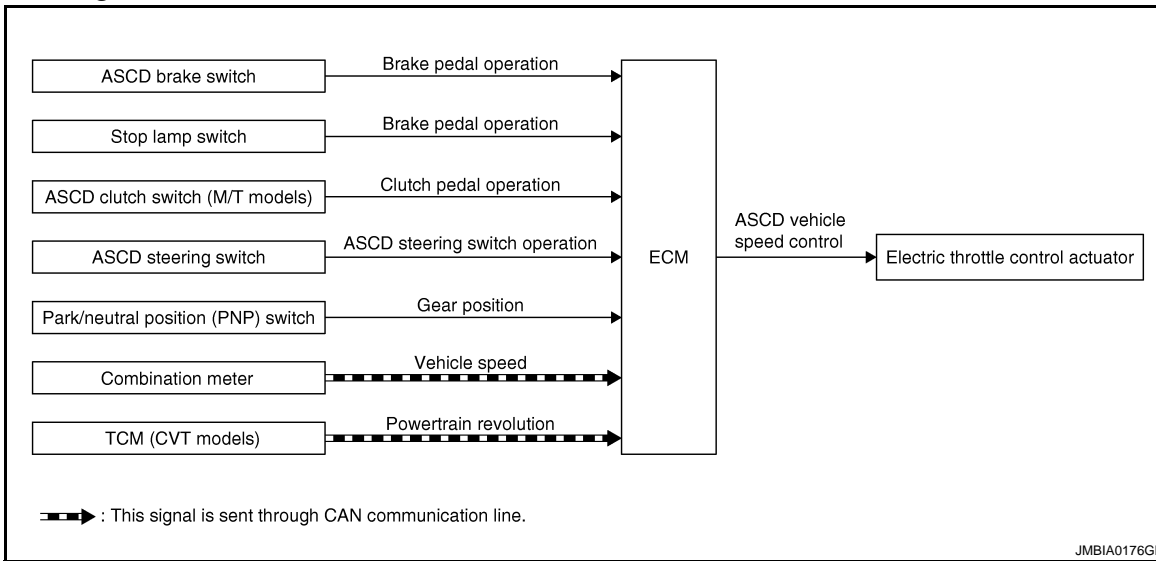
< FUNCTION DIAGNOSIS >

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|------------------------------------|--------------------------------|----------------------------|------------------------------------|
| ASCD brake switch | Brake pedal operation | ASCD vehicle speed control | Electric throttle control actuator |
| Stop lamp switch | Brake pedal operation | | |
| ASCD clutch switch (M/T models) | Clutch pedal operation | | |
| ASCD steering switch | ASCD steering switch operation | | |
| Park/neutral position (PNP) switch | Gear position | | |
| Wheel sensor* | Vehicle speed | | |
| TCM* (CVT models) | Powertrain revolution | | |

*: This signal is sent to the ECM through 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 lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press MAIN switch. (The CRUISE lamp in 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. (Then SET lamp in combination meter illuminates.)

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 keep the new set speed.

CANCEL OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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< FUNCTION DIAGNOSIS >

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

- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position. (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

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

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during 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 keep the new set speed.

RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing 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
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

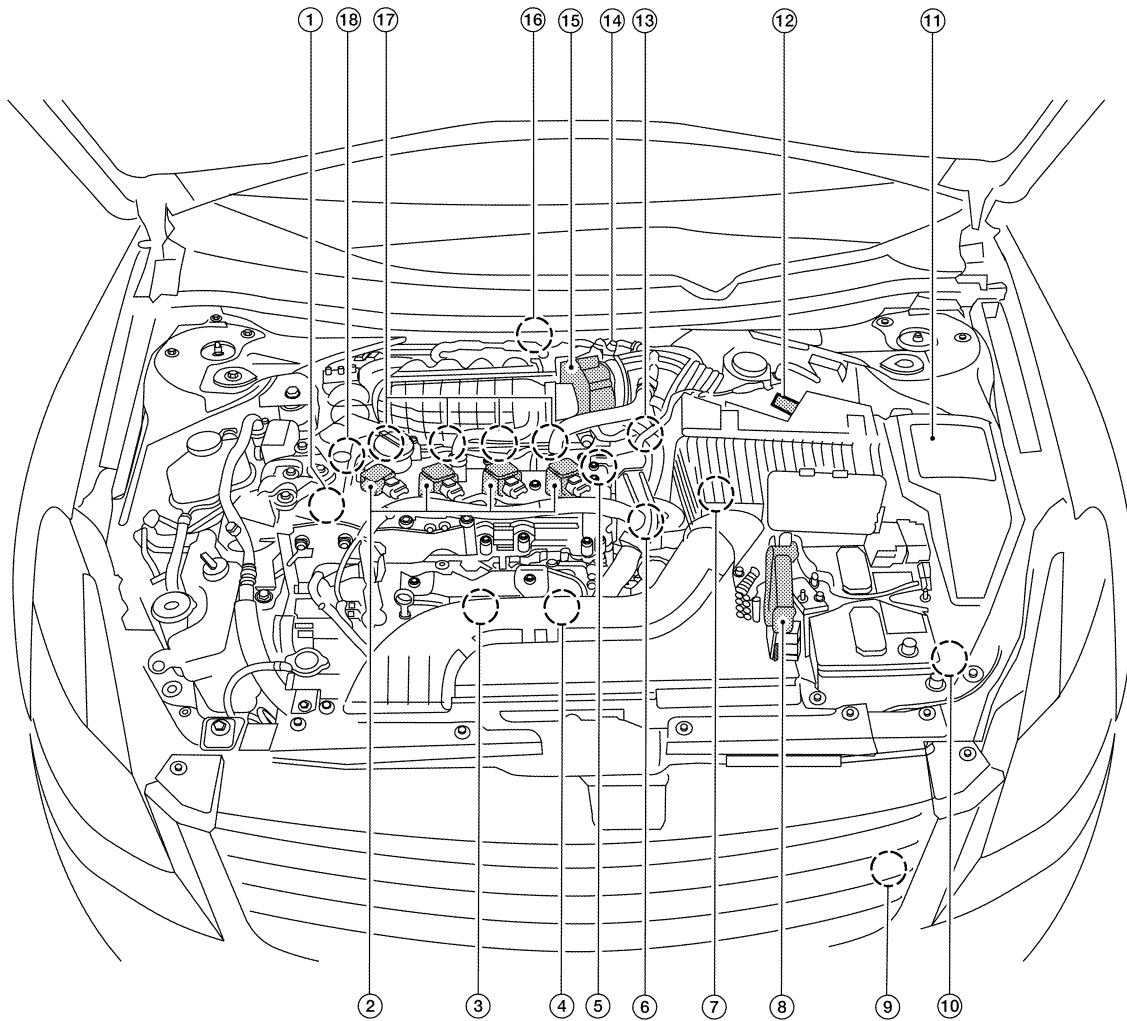
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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Component Parts Location

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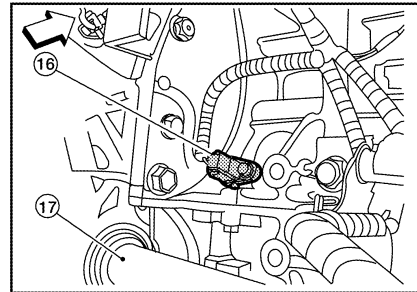
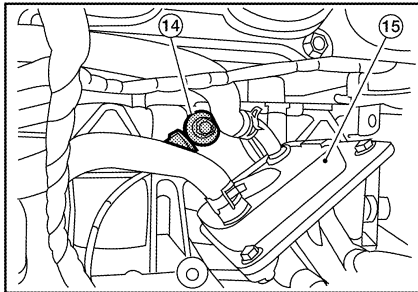
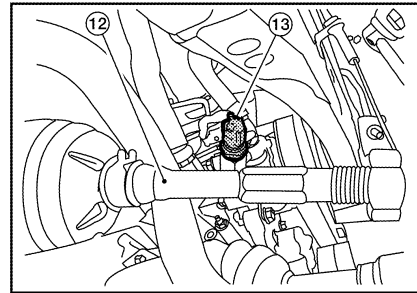
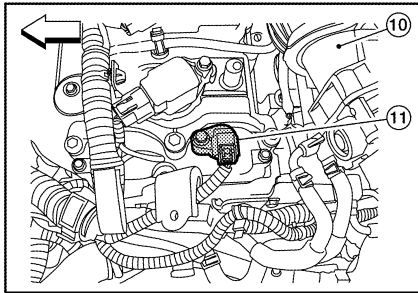
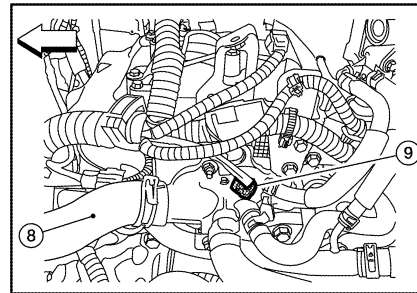
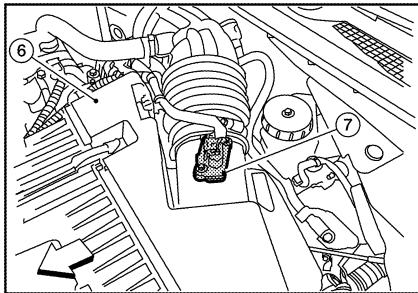
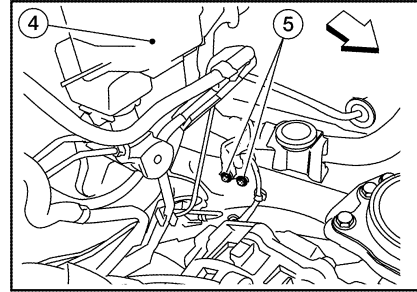
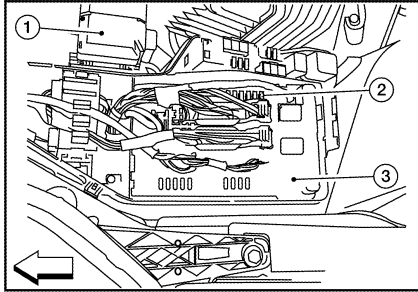
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| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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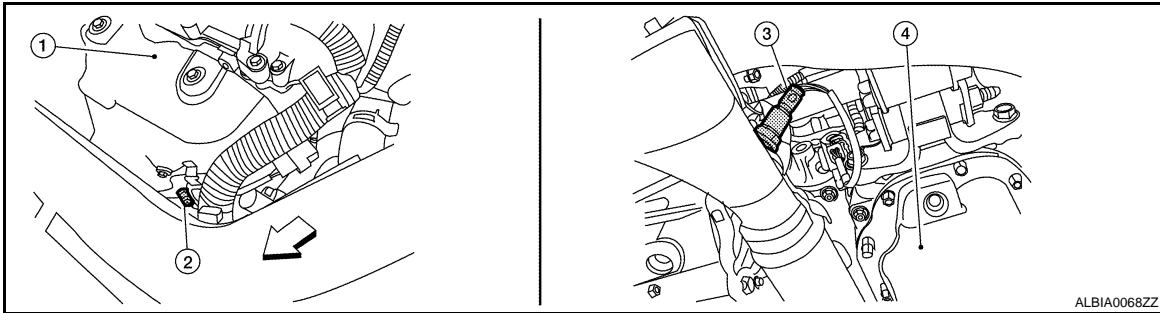
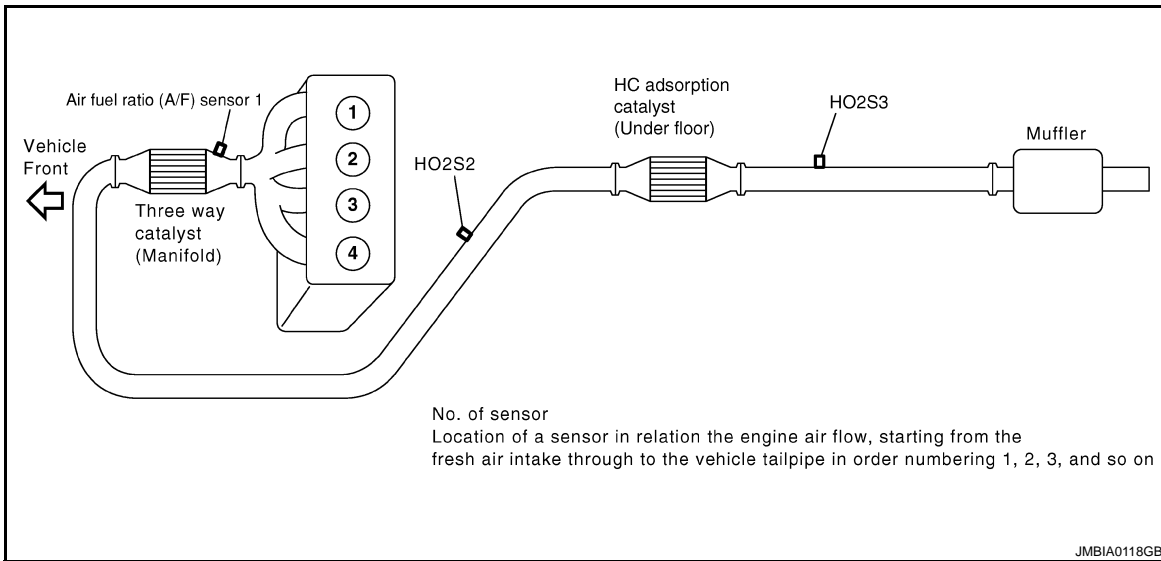
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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙ Vehicle front

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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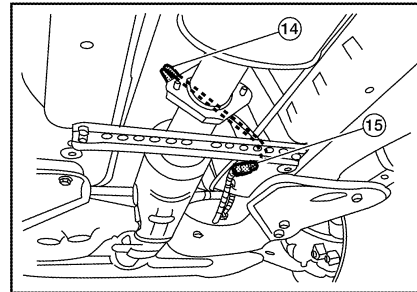
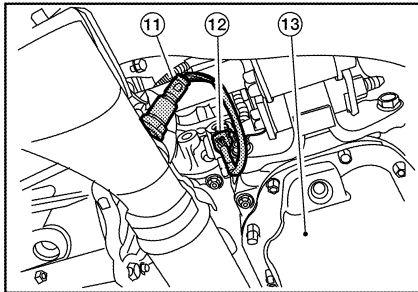
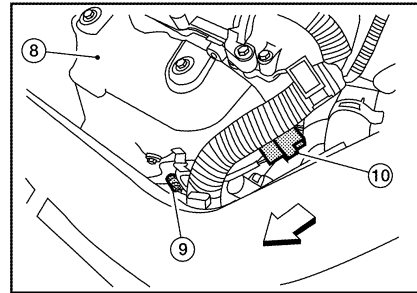
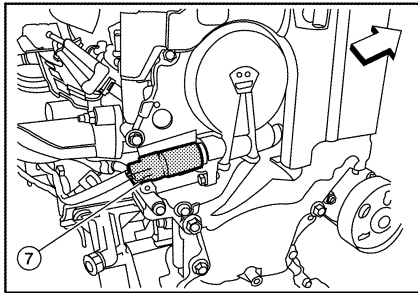
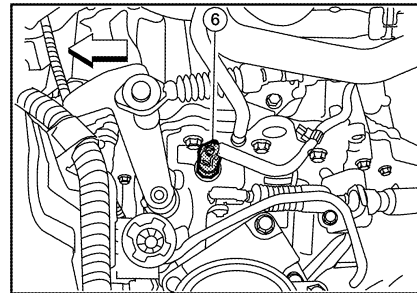
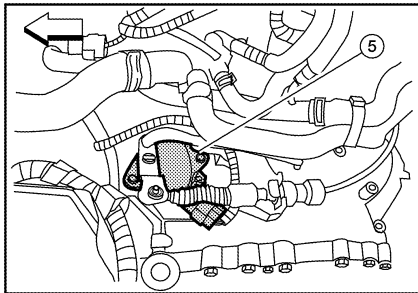
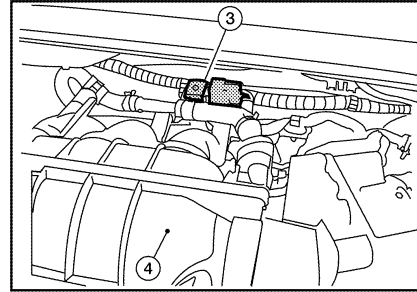
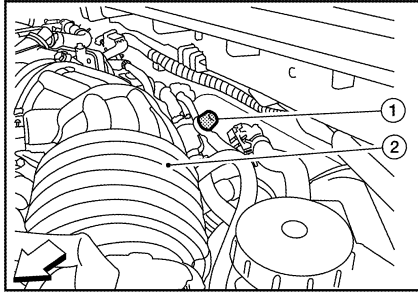
- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



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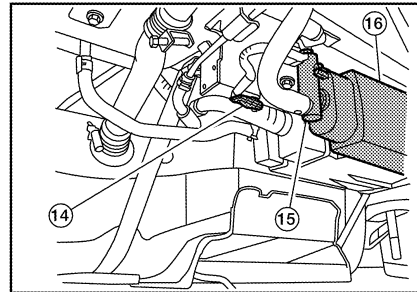
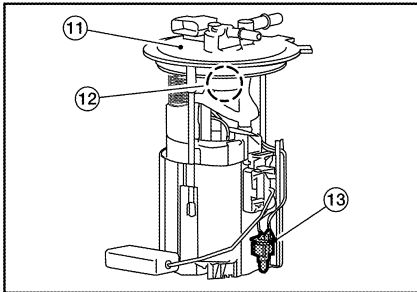
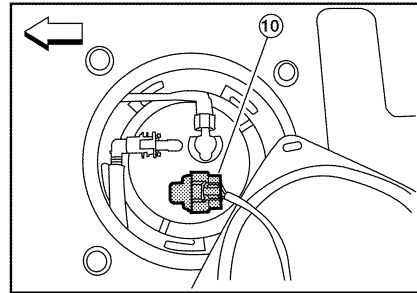
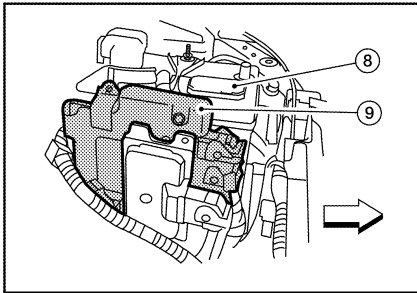
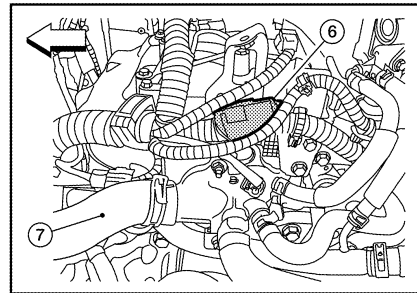
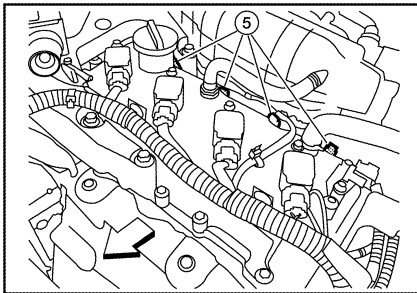
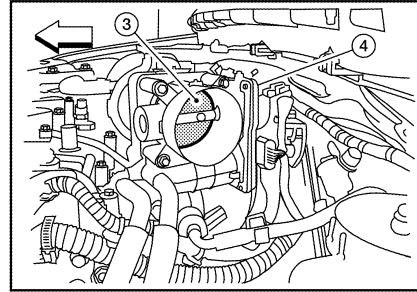
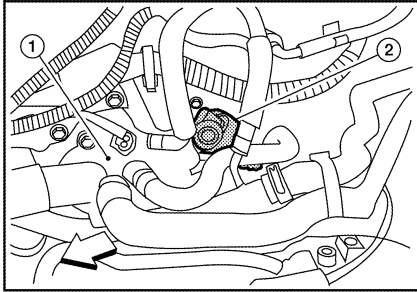
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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

← : Vehicle front

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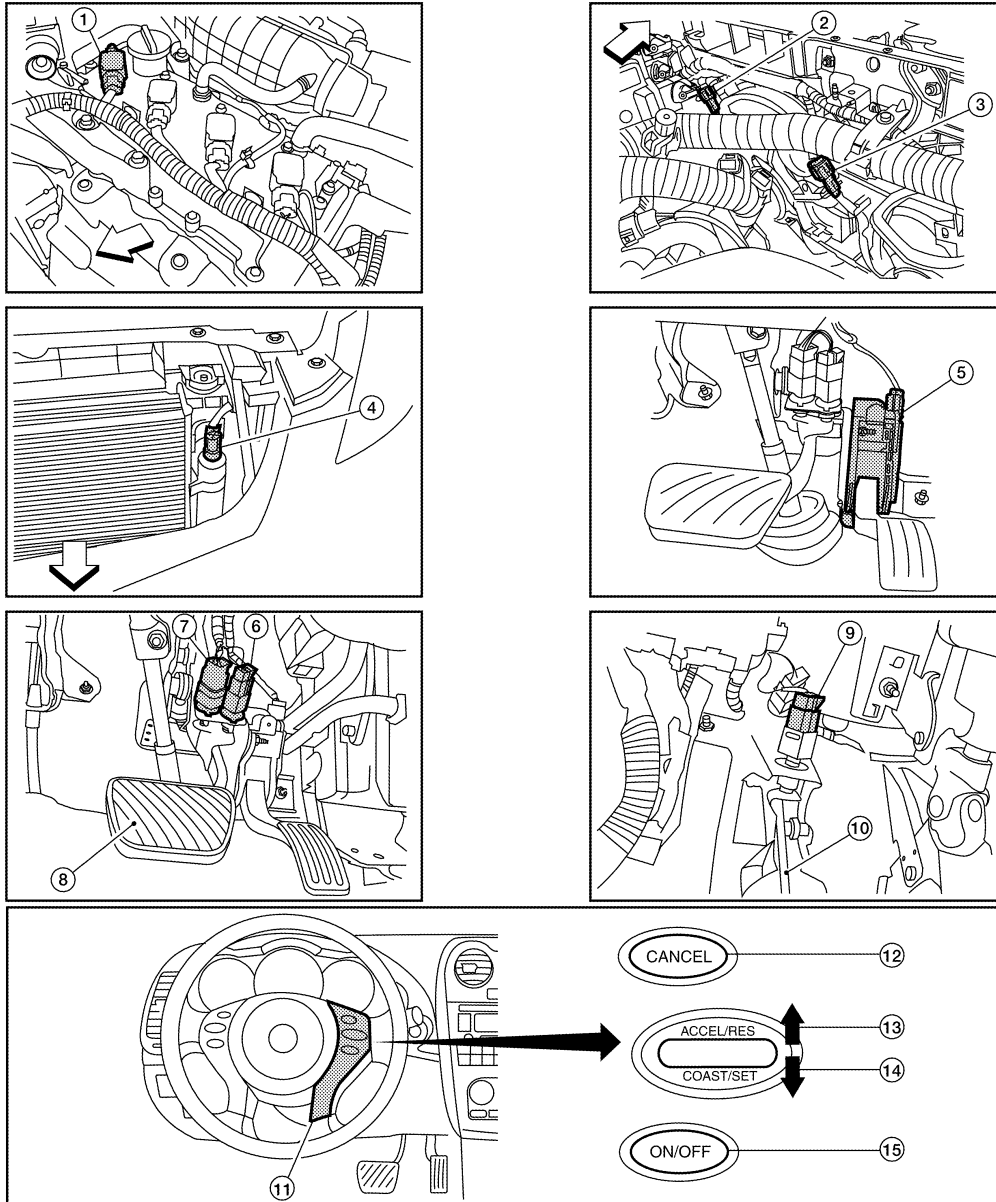
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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↶: Vehicle front

Component Description

INFOID:000000001343627

| Component | Reference |
|----------------------|---------------------------------------|
| ASCD steering switch | EC-383. "Description" |
| ASCD clutch switch | EC-386. "Description" |
| ASCD brake switch | EC-386. "Description" |
| Stop lamp switch | EC-397. "Description" |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Component | Reference |
|------------------------------------|---------------------------------------|
| Electric throttle control actuator | EC-416. "Description" |
| ASCD indicator | EC-444. "Description" |

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CAN COMMUNICATION

System Description

INFOID:000000001343628

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.

Refer to [LAN-25, "CAN Communication Signal Chart"](#), about CAN communication for detail..

COOLING FAN CONTROL

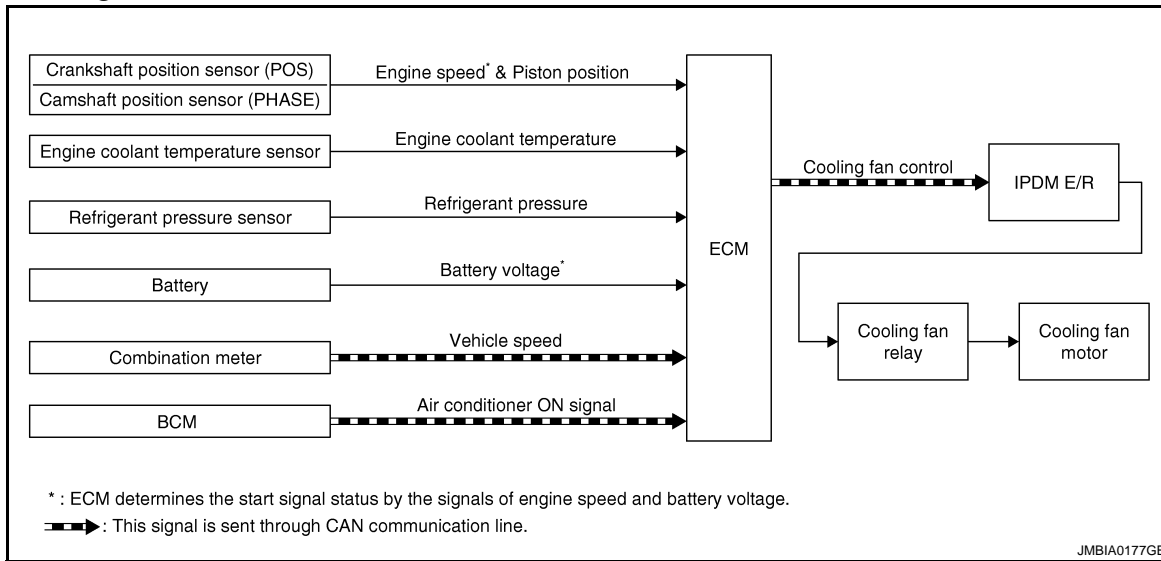
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COOLING FAN CONTROL

System Diagram

INFOID:000000001343629



System Description

INFOID:000000001343630

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|-----------------------------|---------------------|--|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed*1 | Cooling fan control | IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor |
| Battery | Battery voltage*1 | | |
| Wheel sensor | Vehicle speed*2 | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Air conditioner switch | Air conditioner ON signal*2 | | |
| Refrigerant pressure sensor | Refrigerant pressure | | |

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

*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

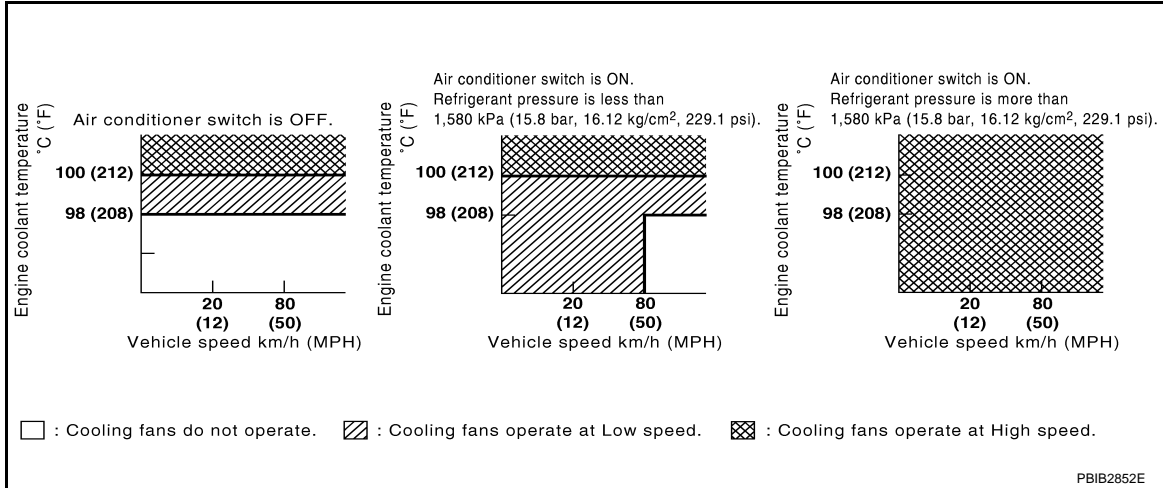
ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Cooling Fan Operation



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

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

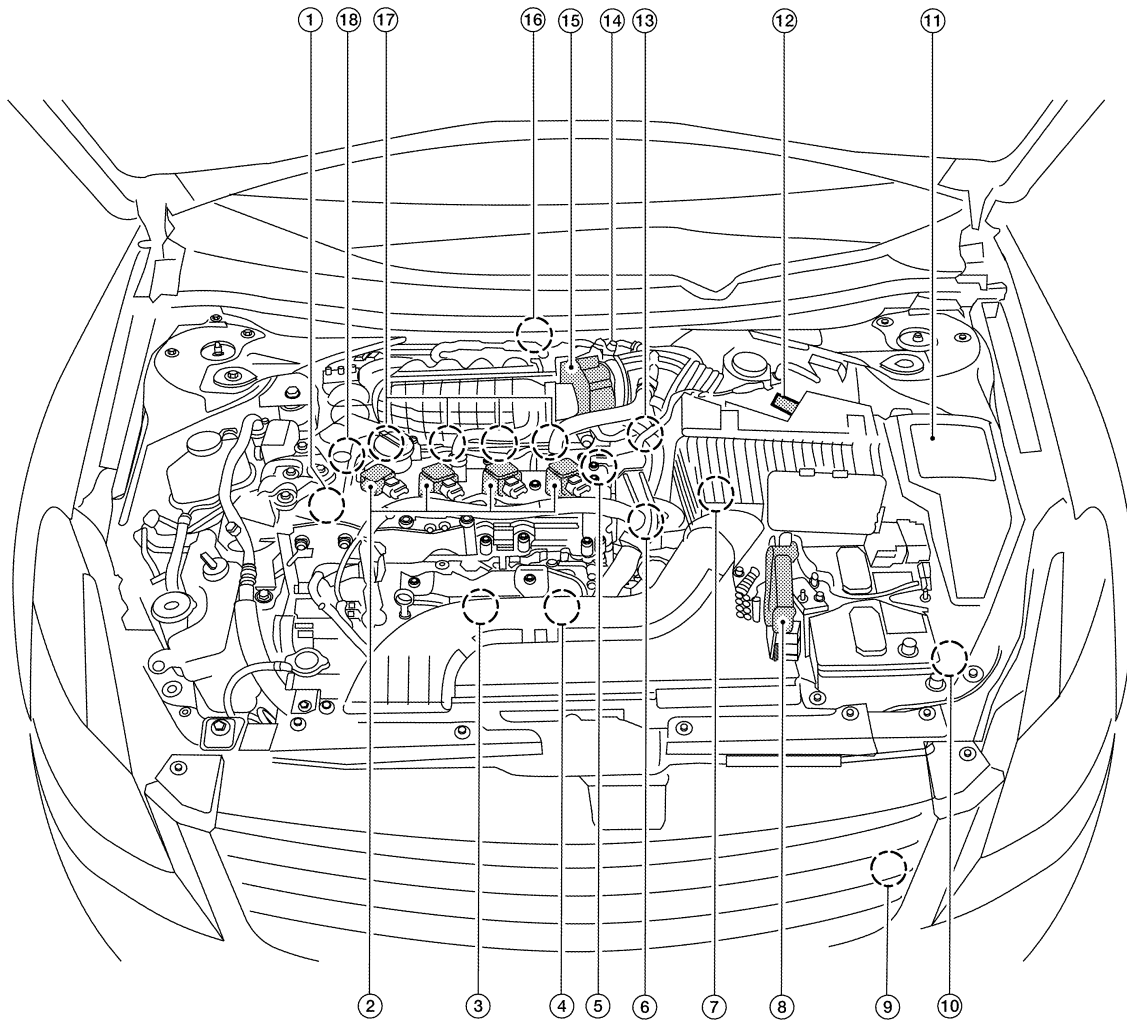
COOLING FAN CONTROL

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Component Parts Location

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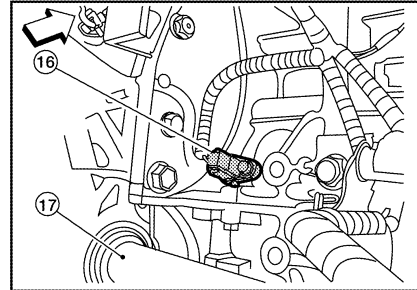
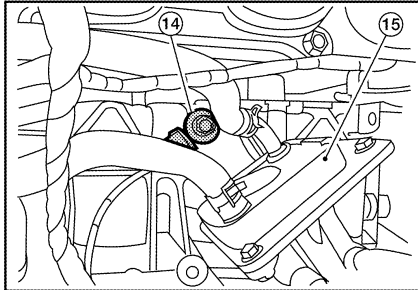
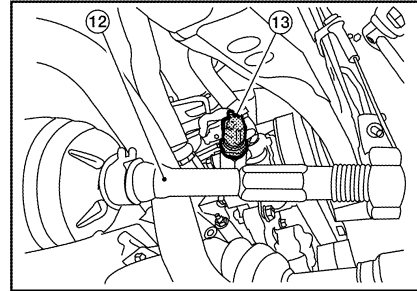
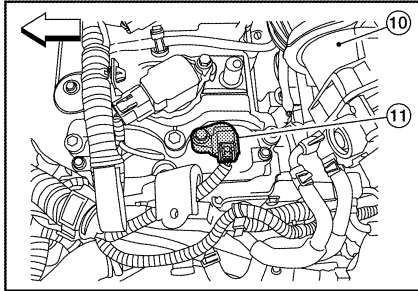
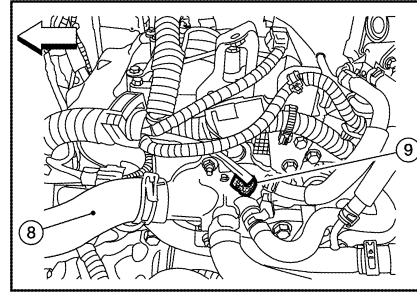
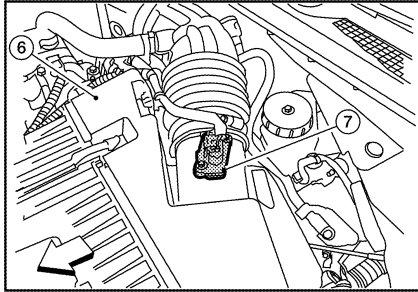
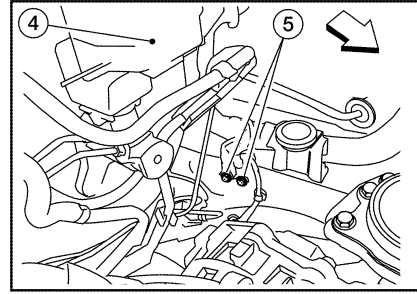
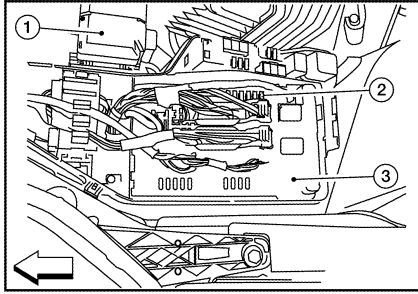
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

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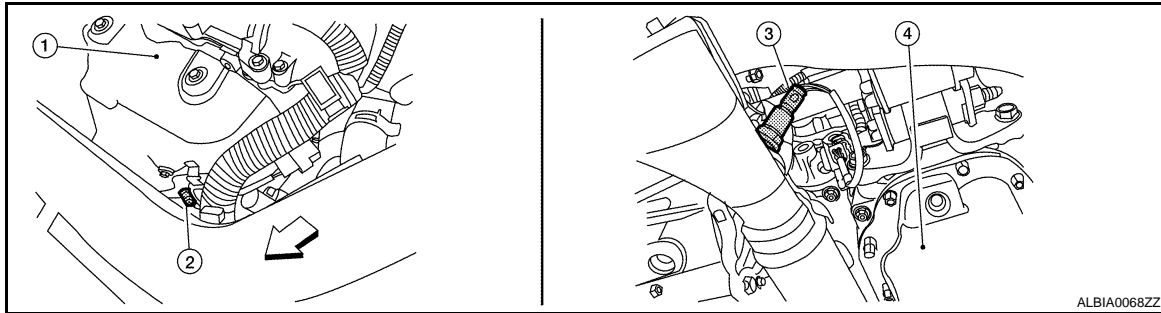
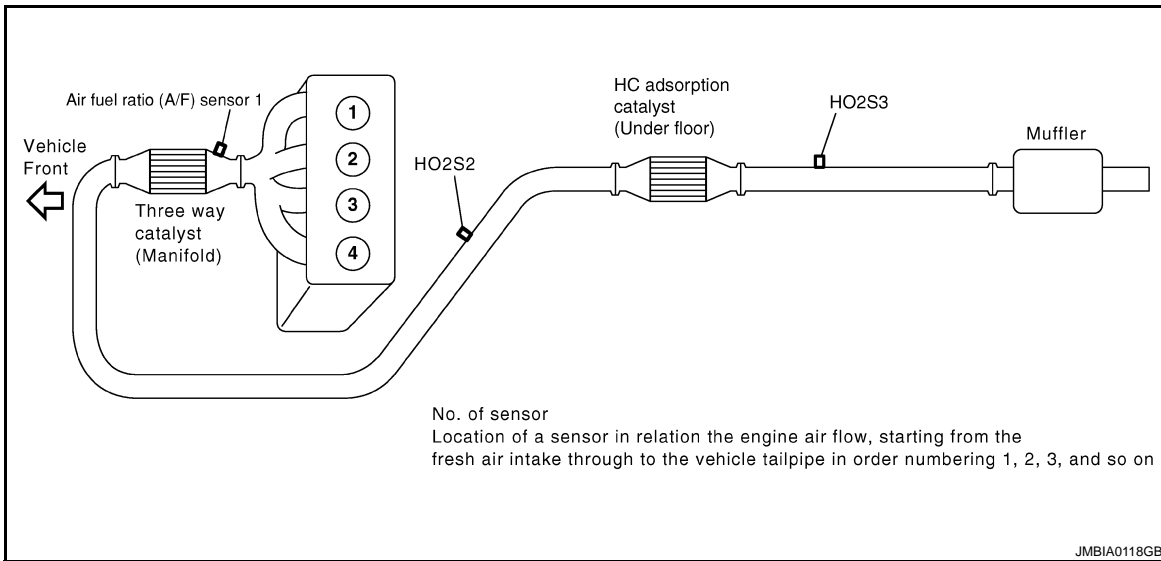
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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

COOLING FAN CONTROL

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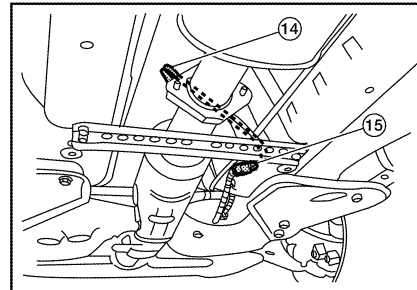
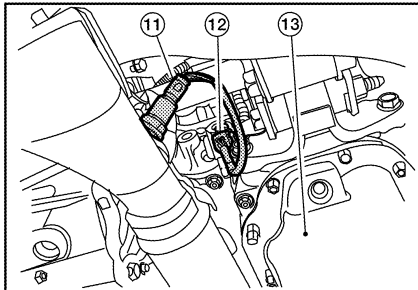
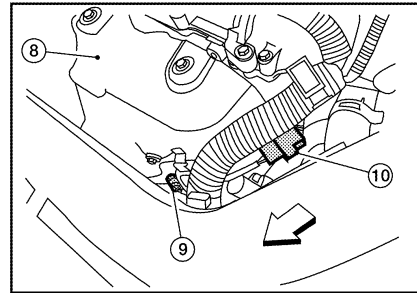
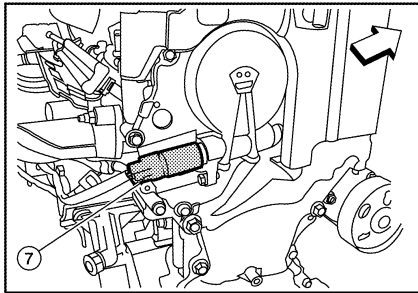
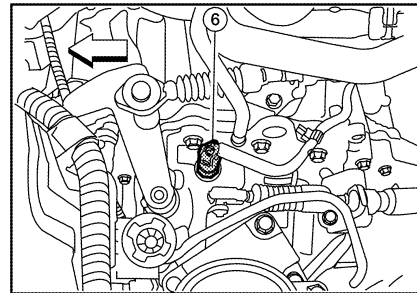
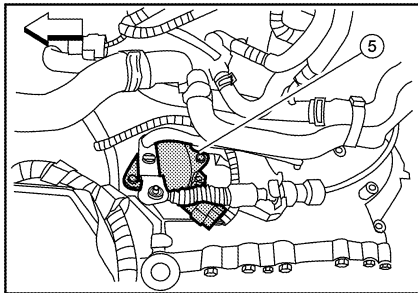
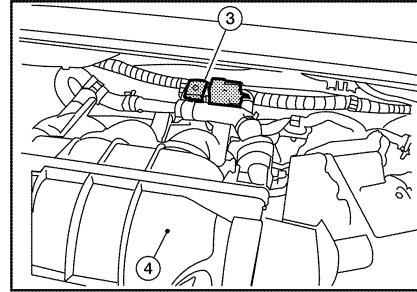
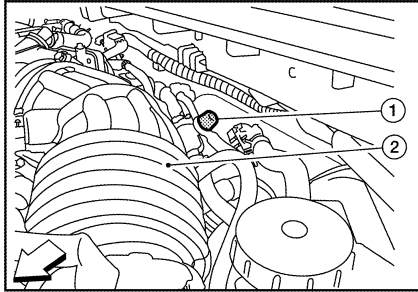
- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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COOLING FAN CONTROL

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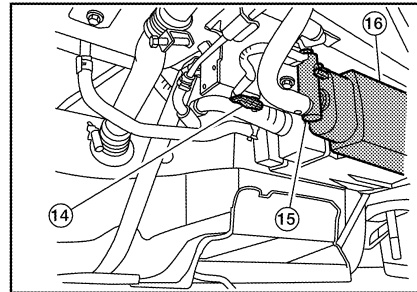
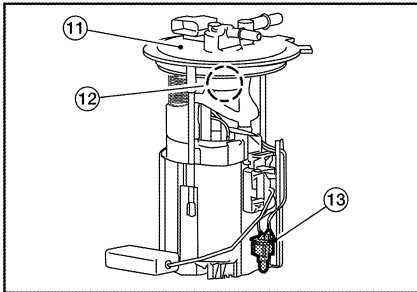
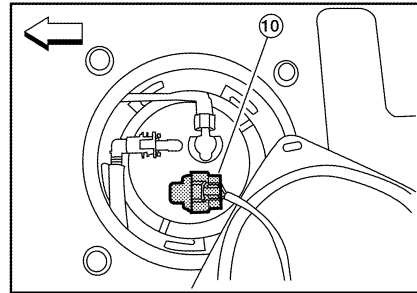
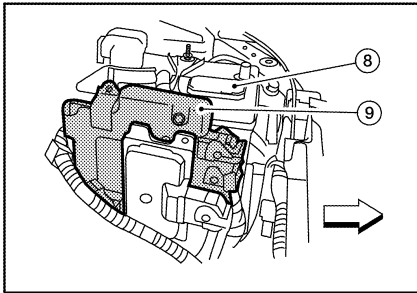
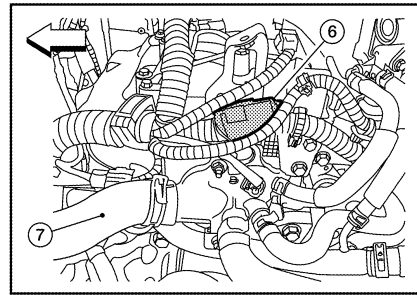
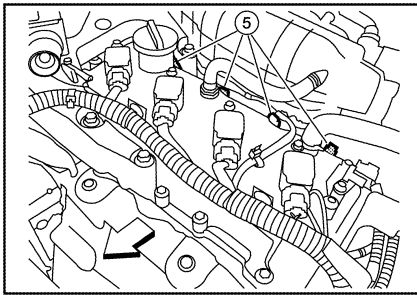
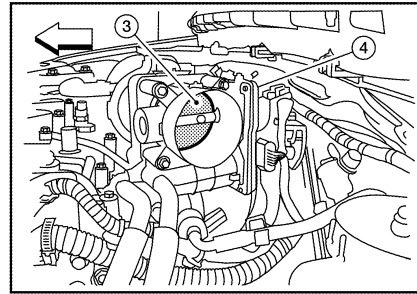
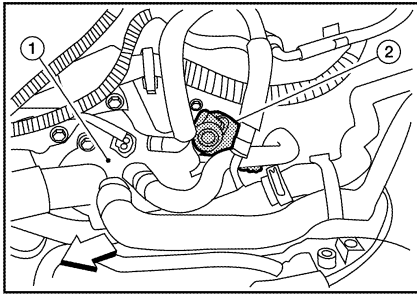
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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

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| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

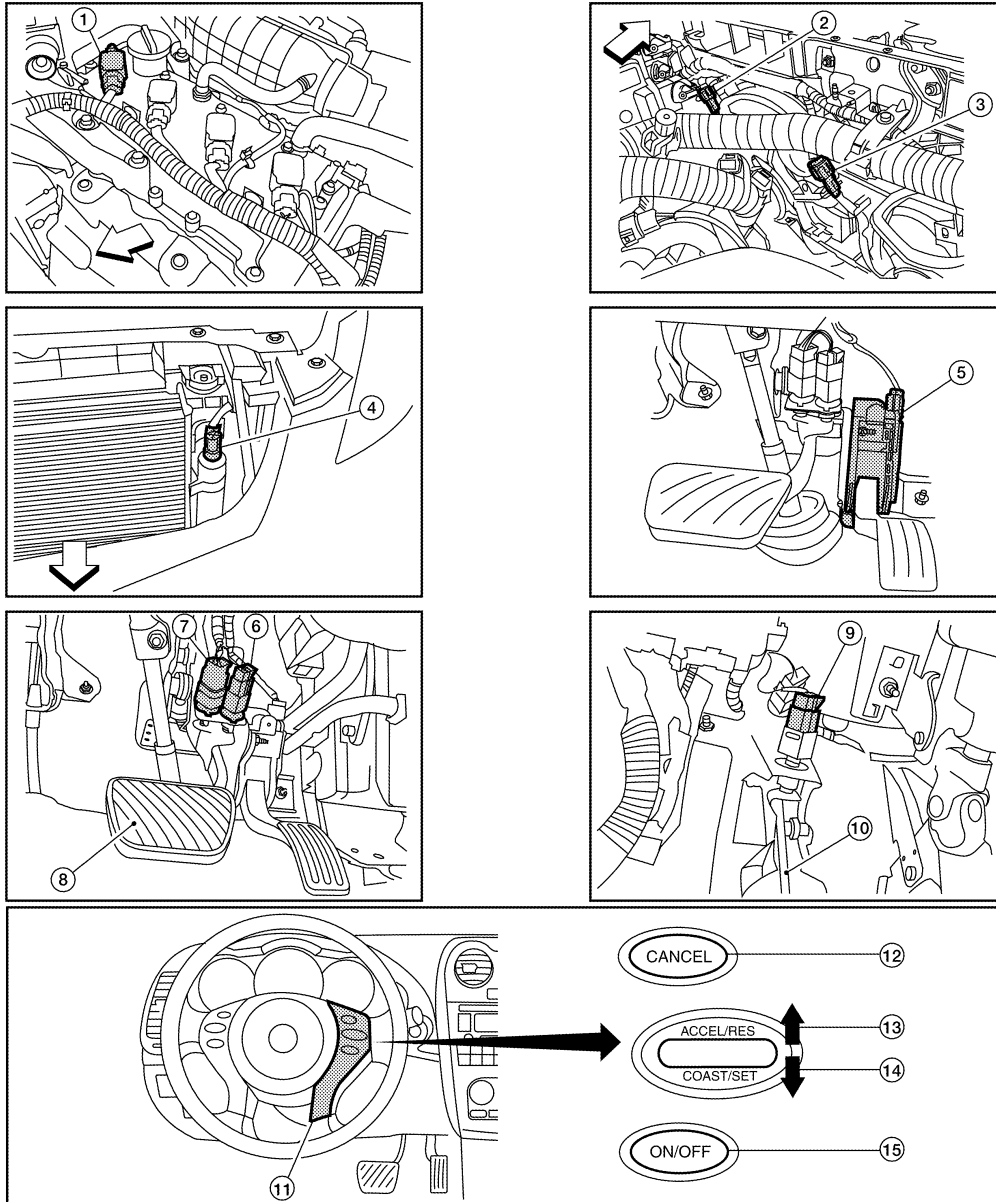
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COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343632

| Component | Reference |
|----------------------------------|---|
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |
| Cooling fan motor | EC-77. "System Description" |

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Engine coolant temperature sensor | EC-179. "Description" |
| Refrigerant pressure sensor | EC-472. "Description" |

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EVAPORATIVE EMISSION SYSTEM

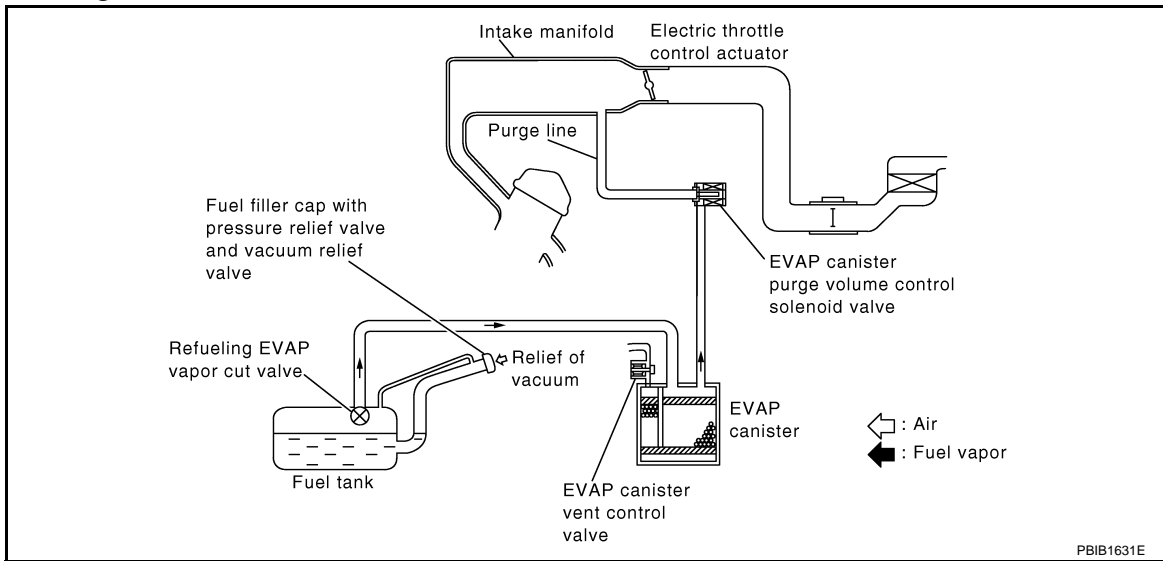
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[QR25DE FOR CALIFORNIA]

EVAPORATIVE EMISSION SYSTEM

System Diagram

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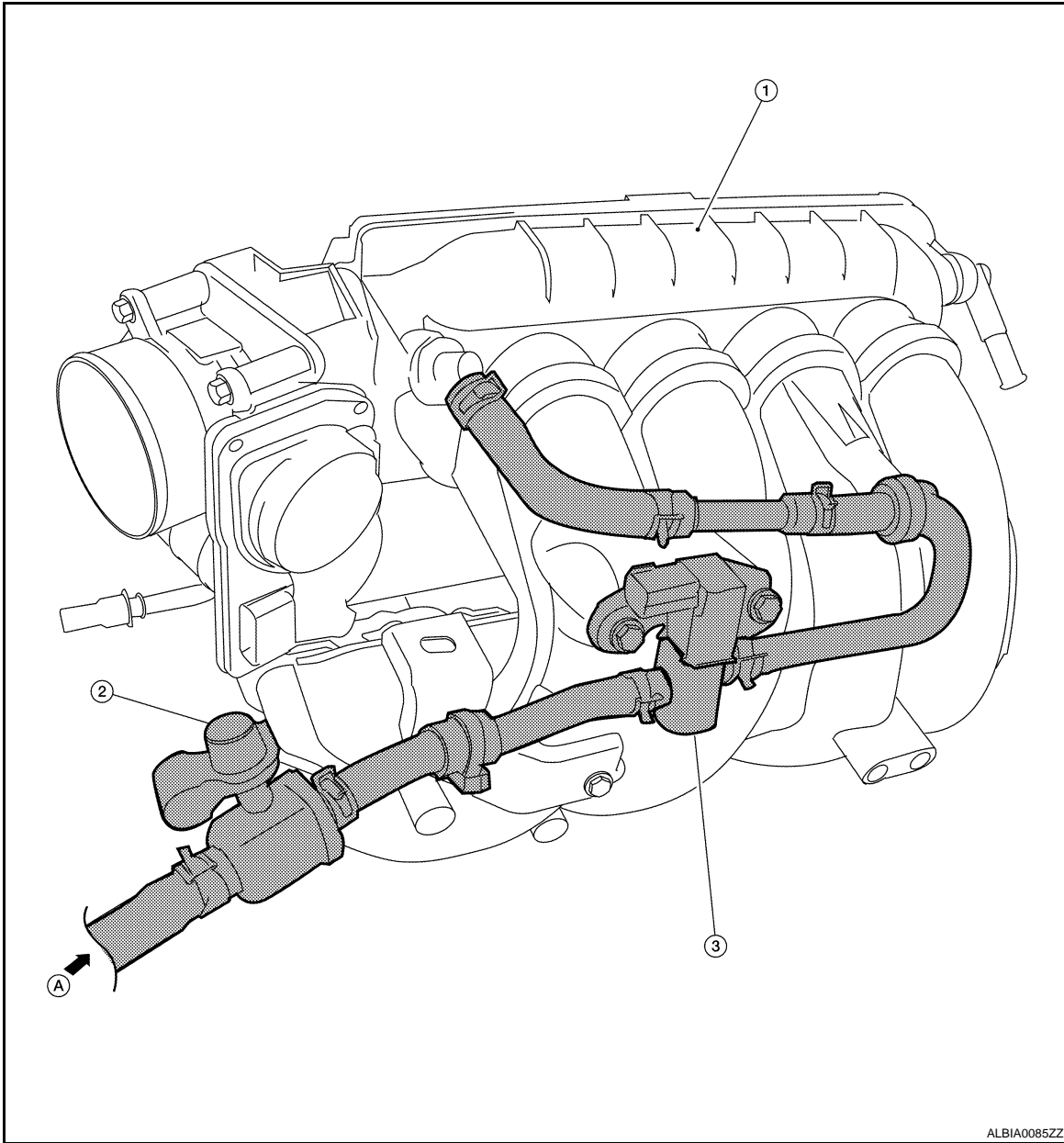


EVAPORATIVE EMISSION LINE DRAWING

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



1. Intake manifold collector

2. EVAP service port

3. EVAP canister purge volume control solenoid valve

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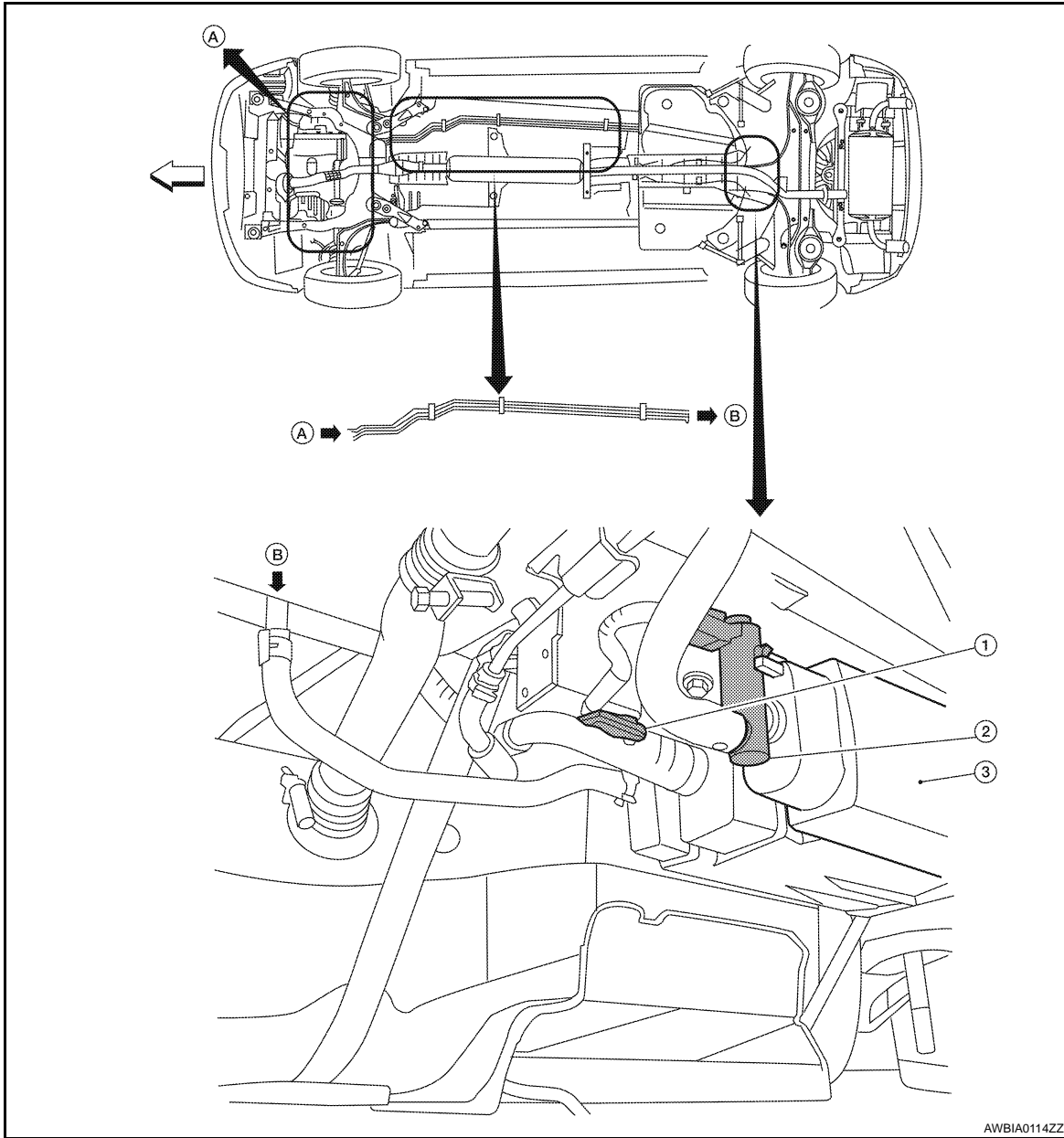
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



- 1. EVAP control system pressure sensor
- 2. EVAP canister vent control valve
- 3. EVAP canister

A. To previous figure

NOTE:

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

System Description

INFOID:000000001343634

INPUT/OUTPUT SIGNAL CHART

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

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

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

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

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.

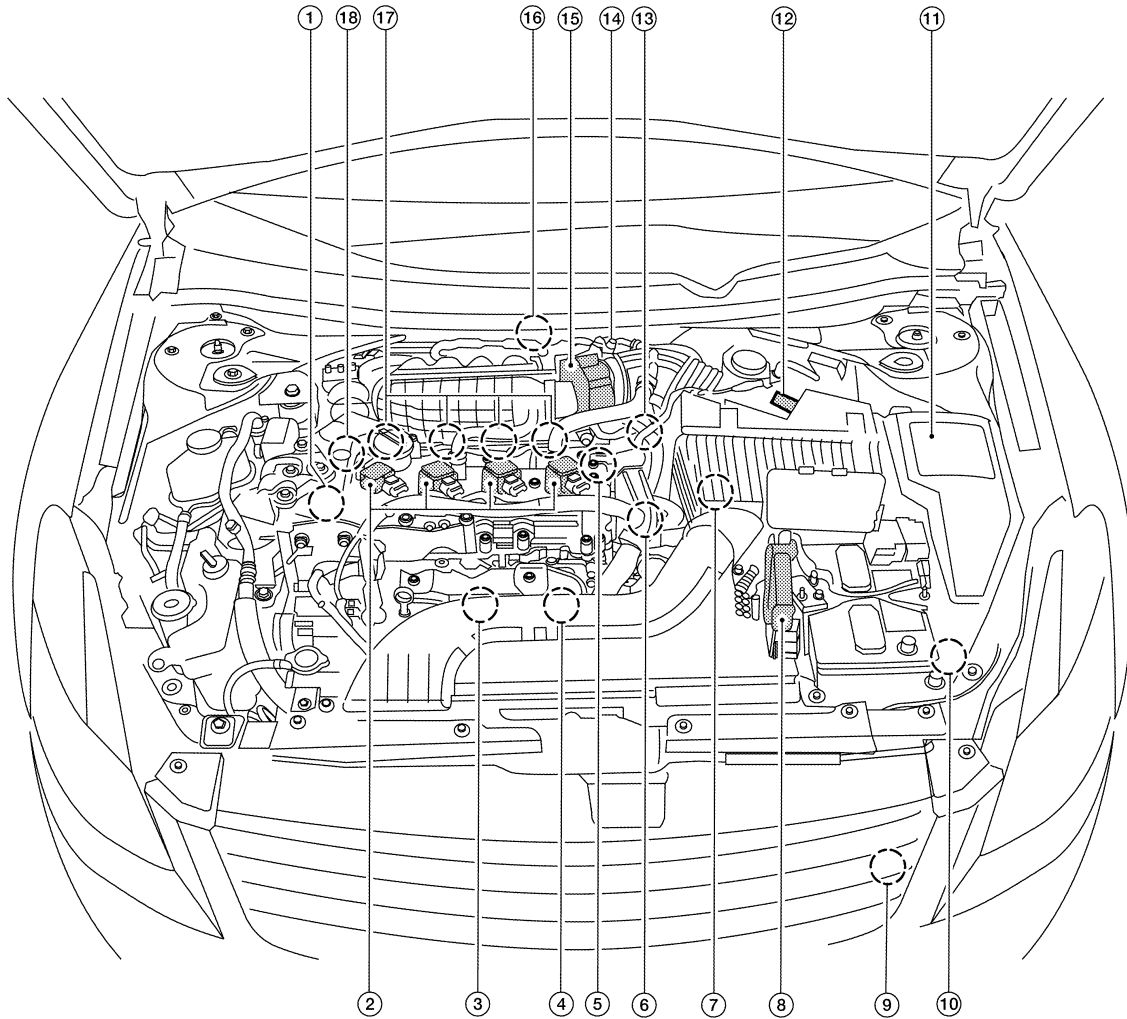
EVAPORATIVE EMISSION SYSTEM

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Component Parts Location

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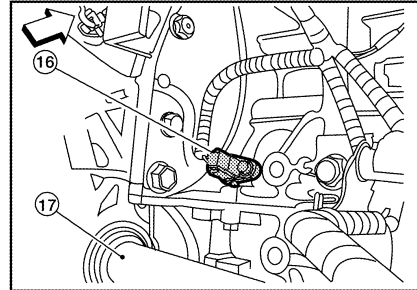
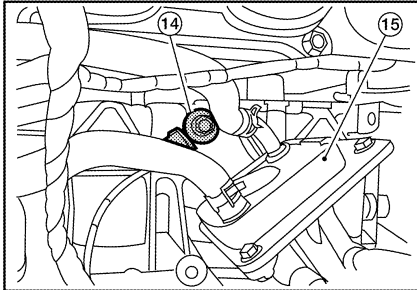
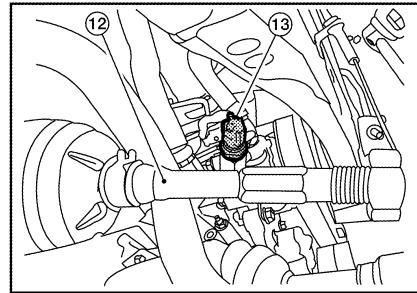
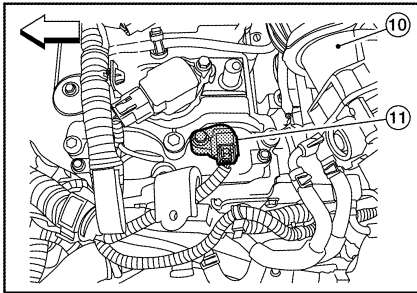
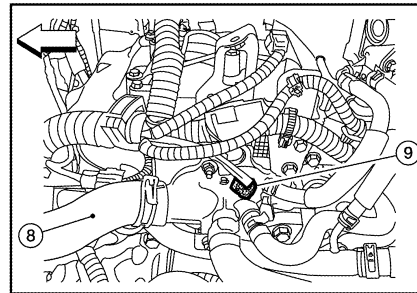
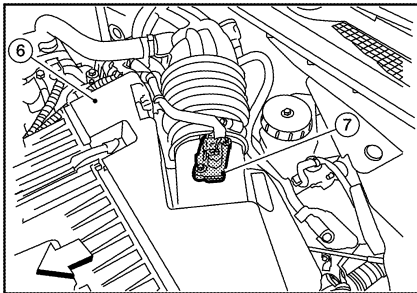
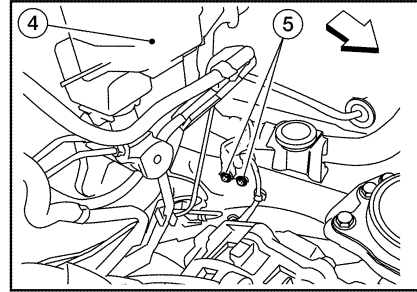
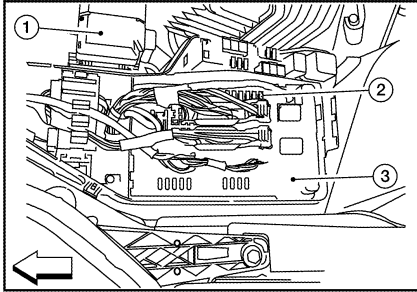
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

EVAPORATIVE EMISSION SYSTEM

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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↔: Vehicle front

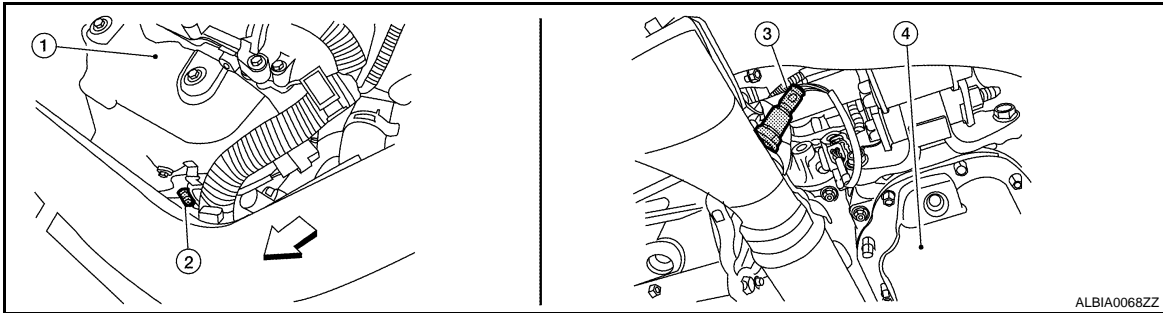
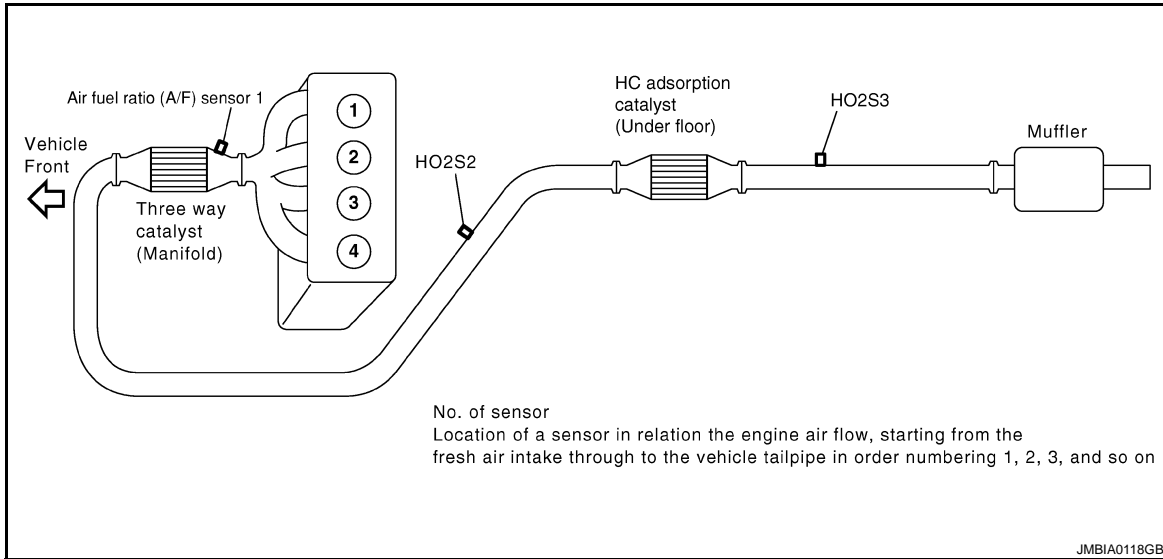
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EVAPORATIVE EMISSION SYSTEM

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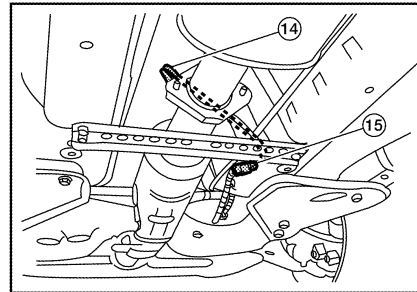
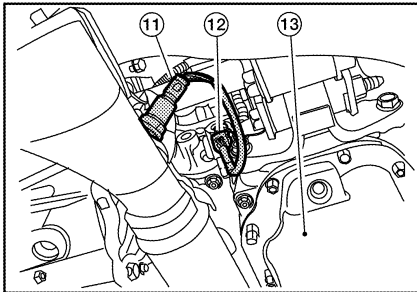
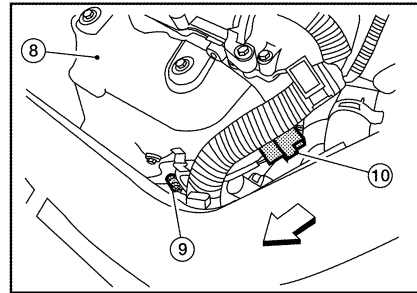
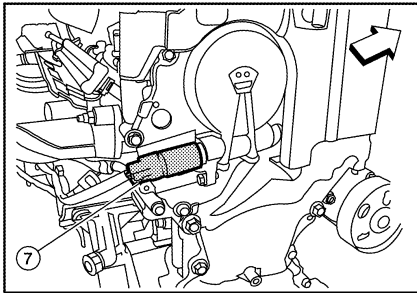
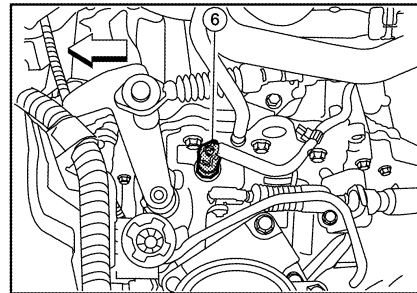
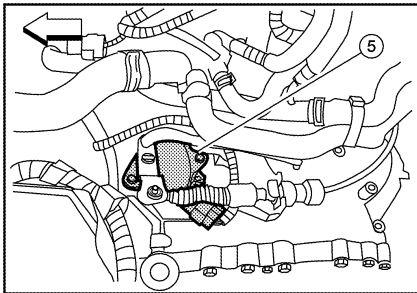
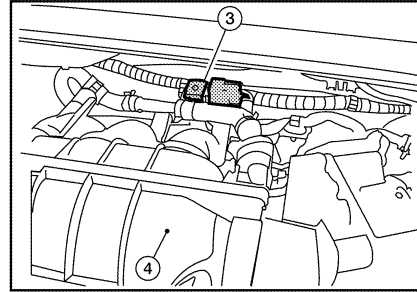
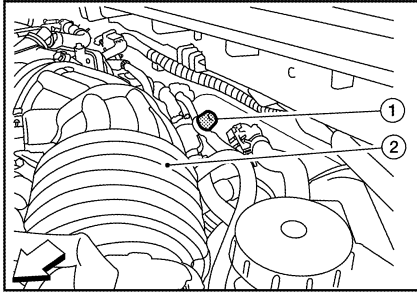


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

EVAPORATIVE EMISSION SYSTEM

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

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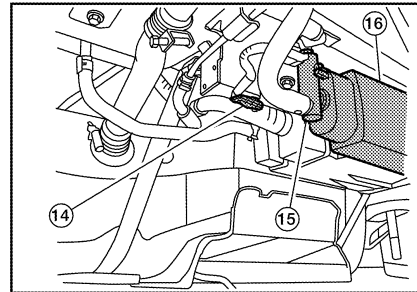
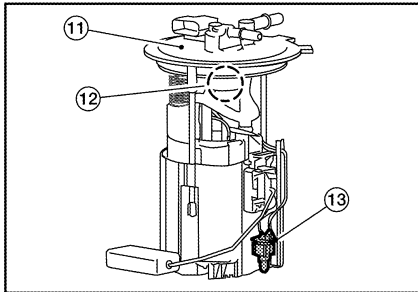
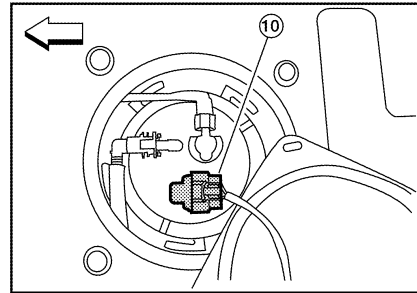
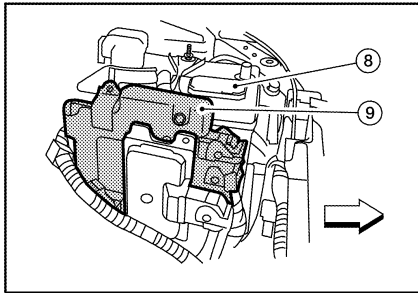
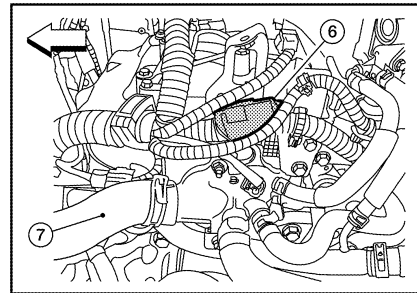
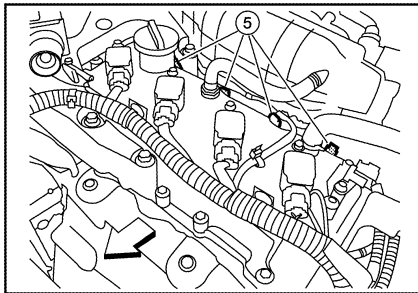
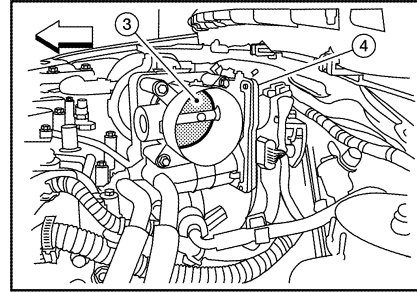
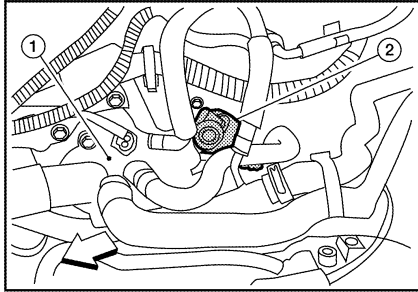
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EVAPORATIVE EMISSION SYSTEM

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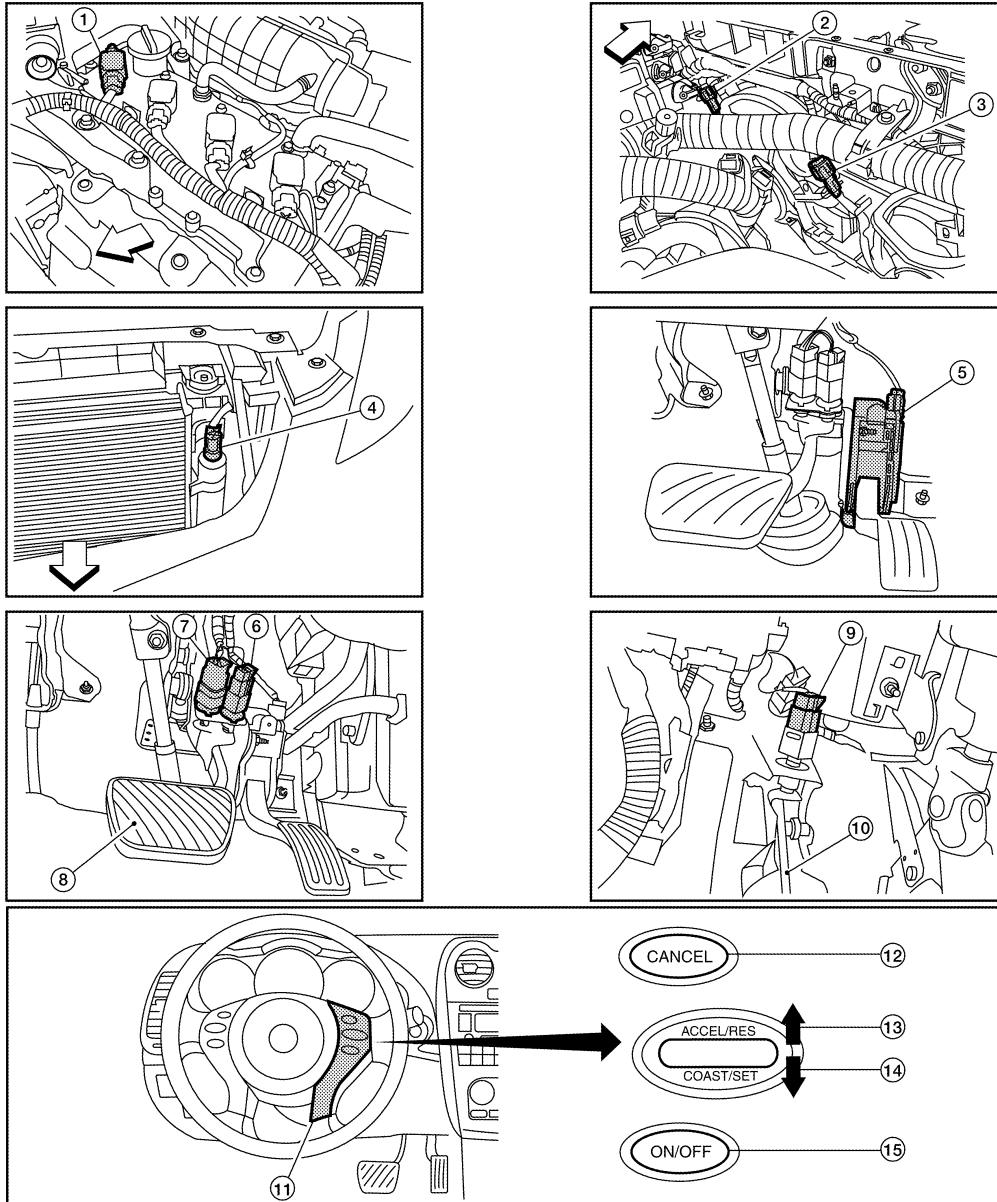
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

EVAPORATIVE EMISSION SYSTEM

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

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| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-192. "Description" |
| Accelerator pedal position sensor | EC-418. "Description" |
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |

EVAPORATIVE EMISSION SYSTEM

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| Component | Reference |
|---|---------------------------------------|
| Engine coolant temperature sensor | EC-179. "Description" |
| EVAP canister purge volume control solenoid valve | EC-294. "Description" |
| EVAP control system pressure sensor | EC-309. "Description" |
| Fuel tank temperature sensor | EC-254. "Description" |
| Mass air flow sensor | EC-165. "Description" |
| Throttle position sensor | EC-182. "Description" |
| Vehicle speed sensor | EC-342. "Description" |

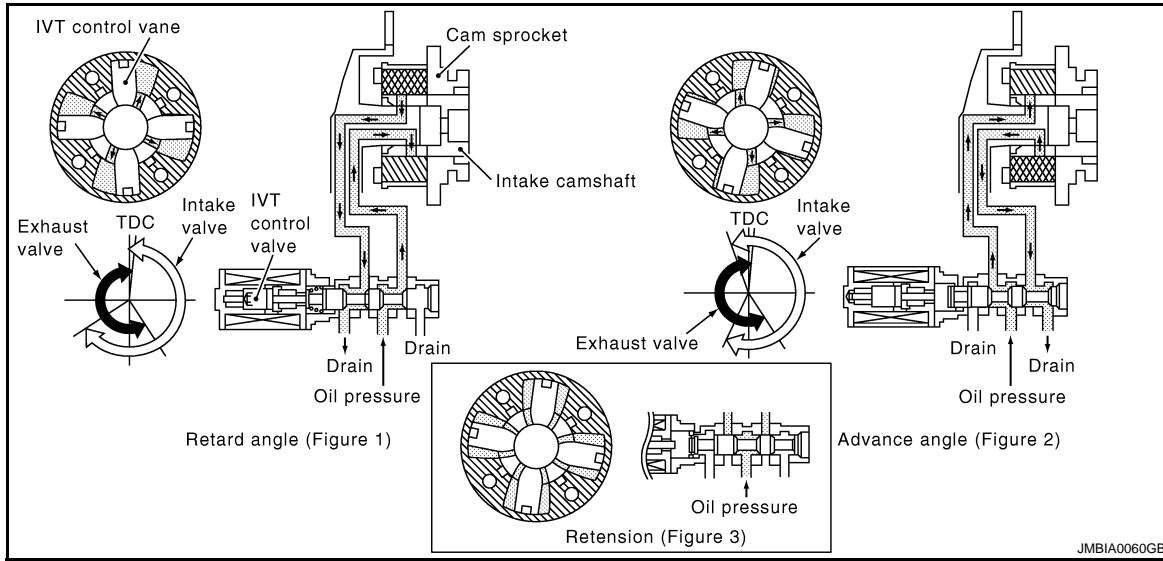
INTAKE VALVE TIMING CONTROL

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INTAKE VALVE TIMING CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|-----------------------------------|----------------------------------|-----------------------------|--|
| Crankshaft position sensor (POS) | Engine speed and piston position | Intake valve timing control | Intake valve timing control solenoid valve |
| Camshaft position sensor (PHASE) | | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Wheel sensor* | Vehicle speed | | |

*: This signal is sent to the ECM through 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.

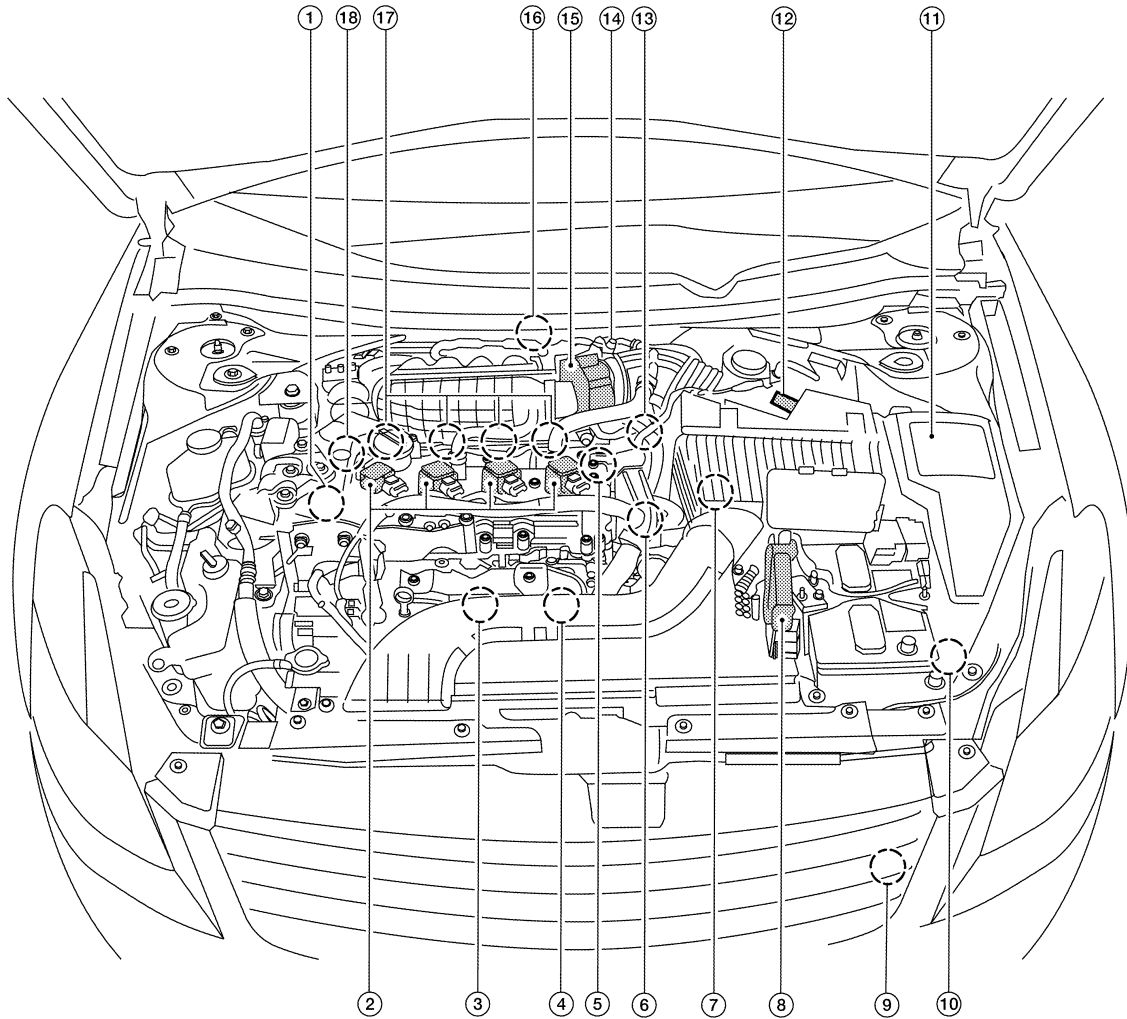
INTAKE VALVE TIMING CONTROL

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Component Parts Location

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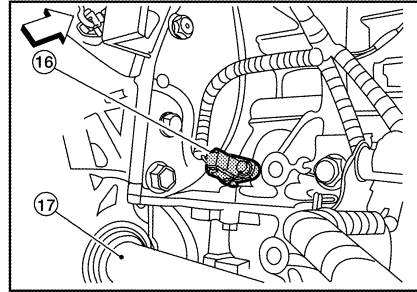
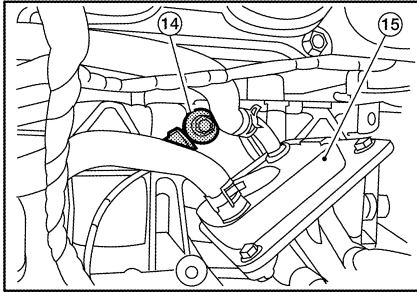
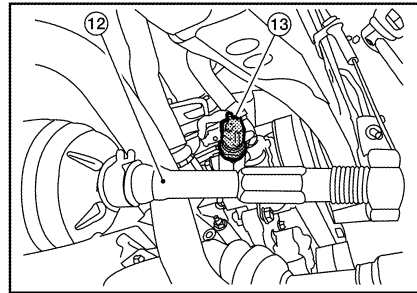
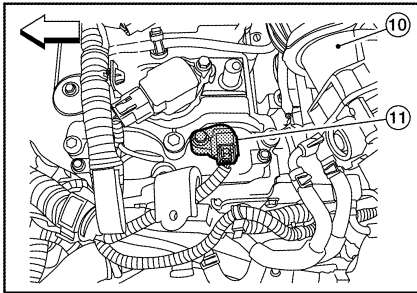
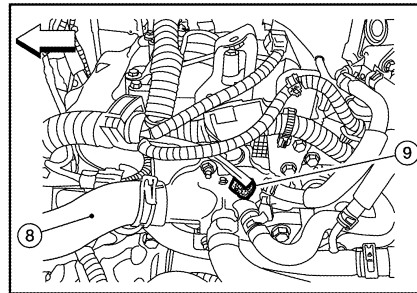
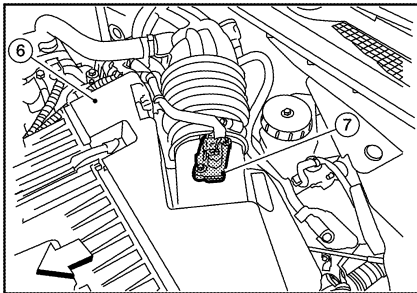
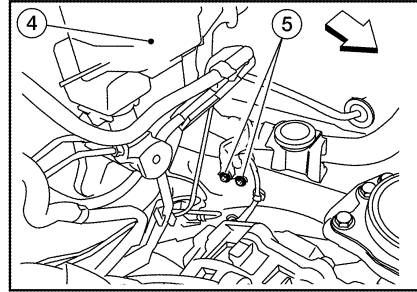
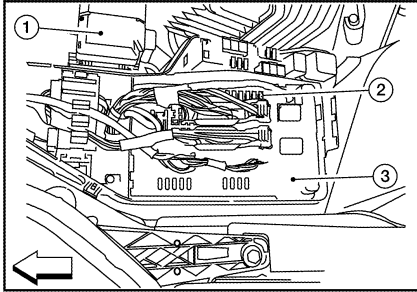
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|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

INTAKE VALVE TIMING CONTROL

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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

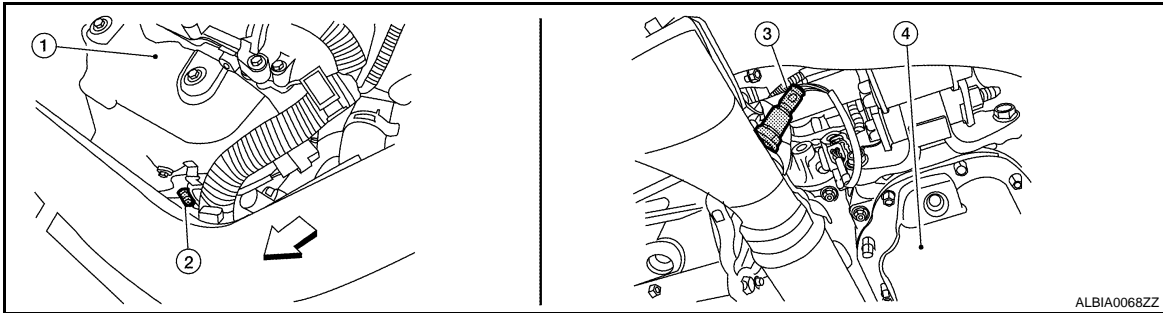
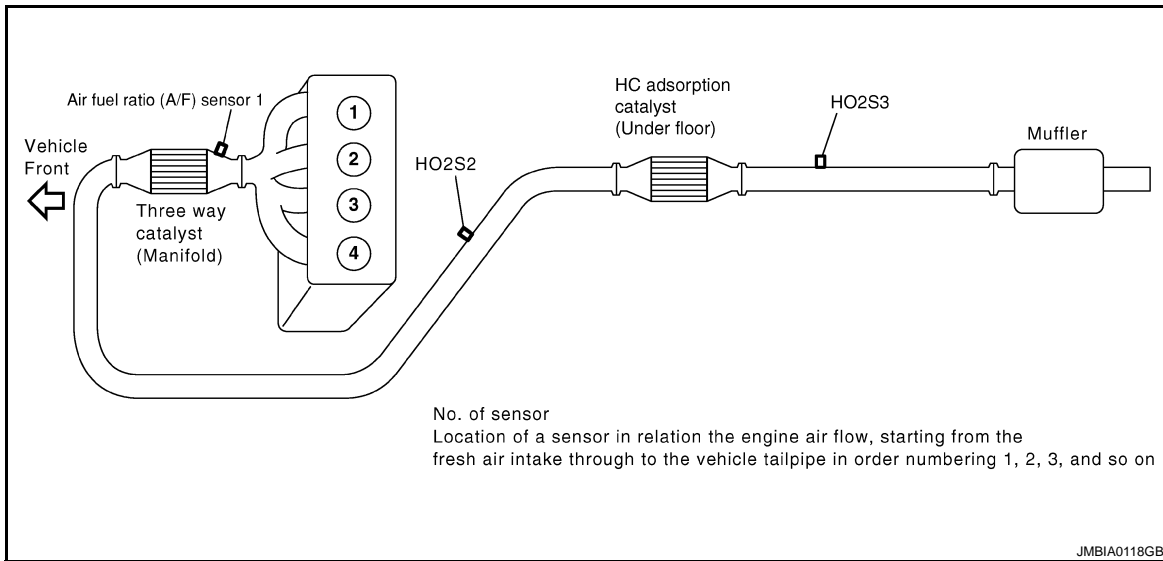
↔: Vehicle front

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INTAKE VALVE TIMING CONTROL

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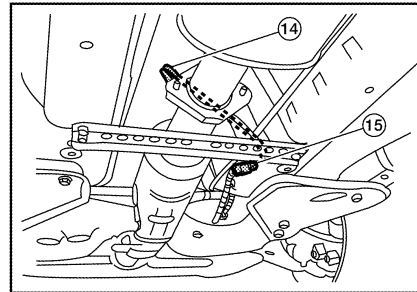
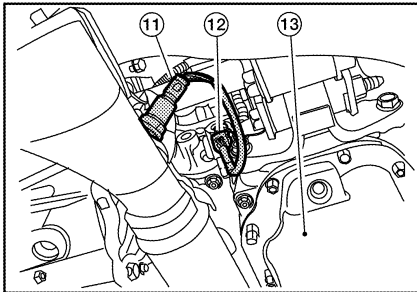
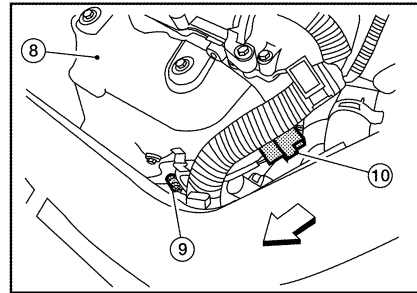
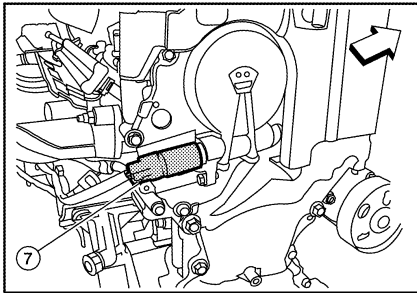
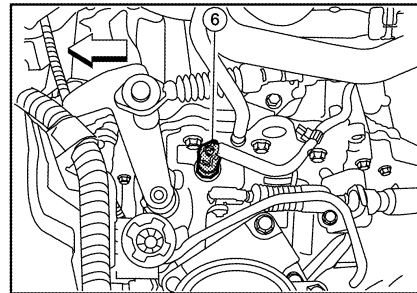
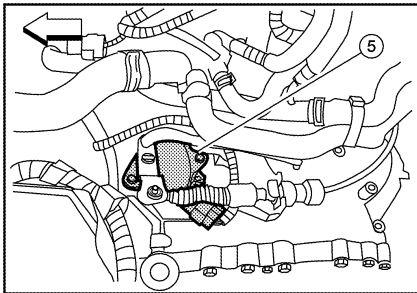
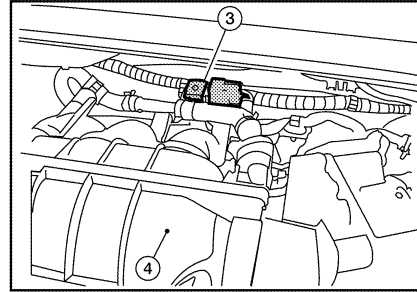
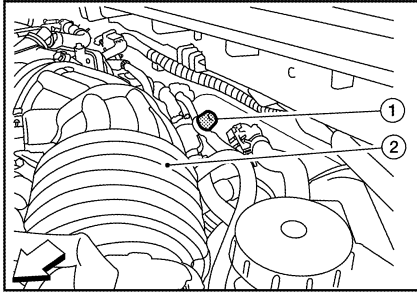


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ↔: Vehicle front

INTAKE VALVE TIMING CONTROL

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

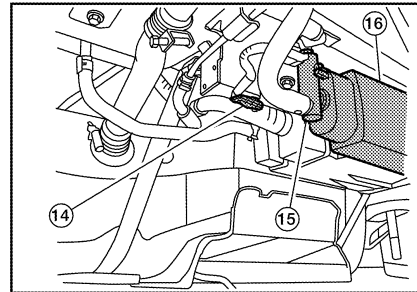
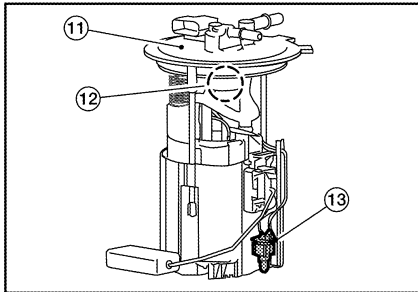
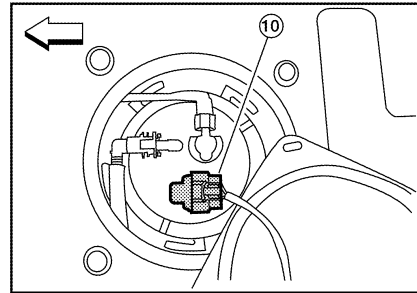
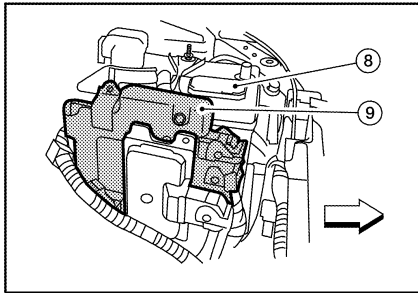
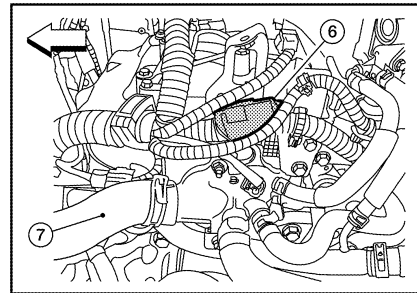
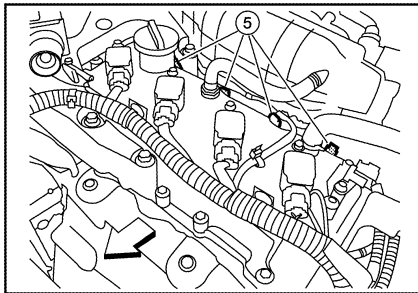
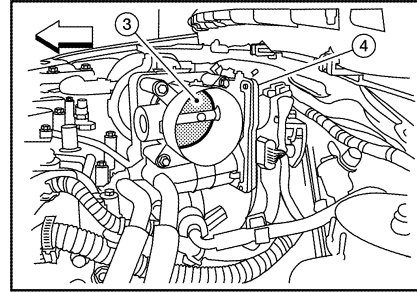
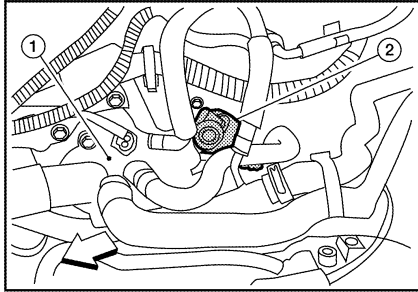
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INTAKE VALVE TIMING CONTROL

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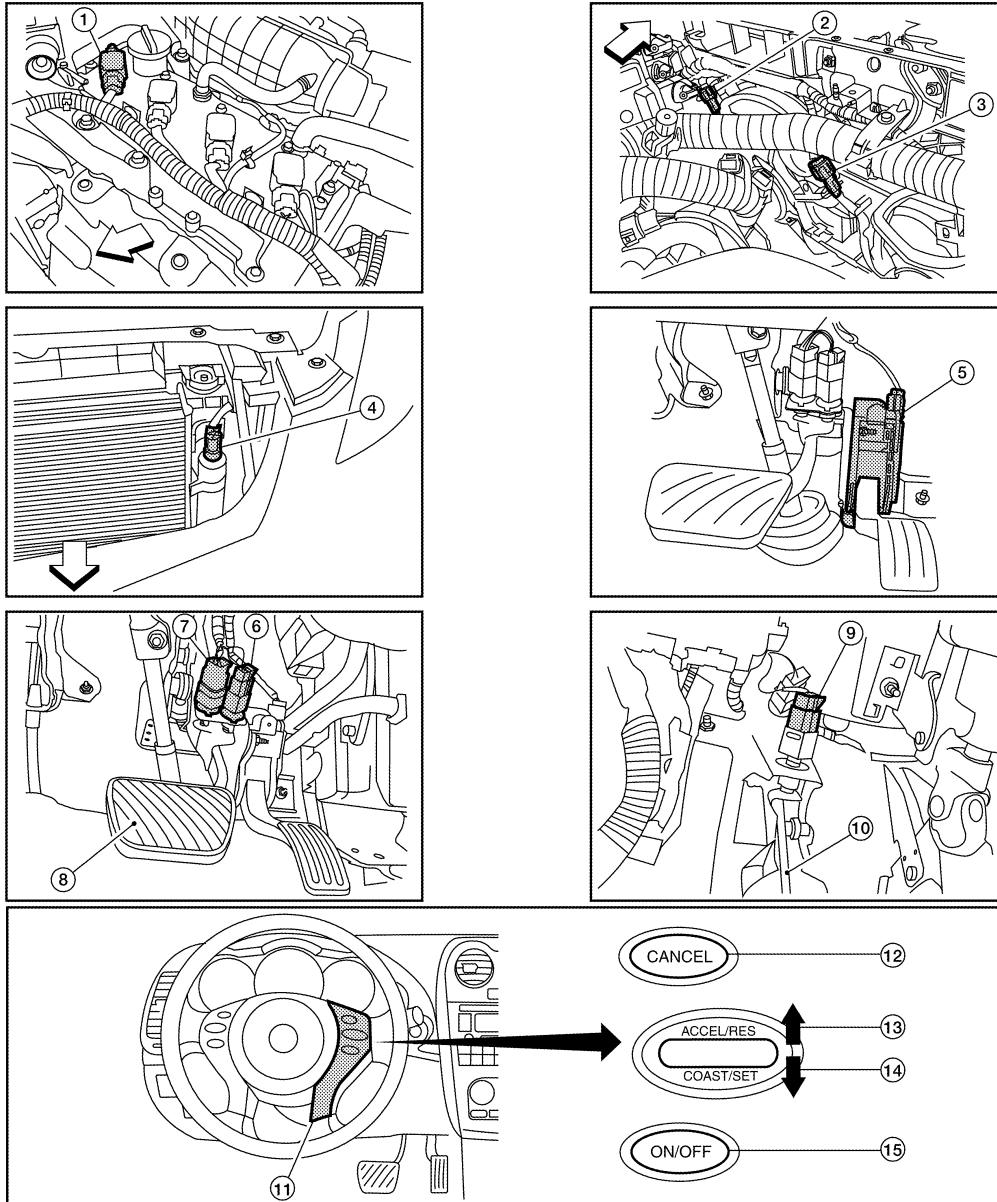
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|---|---|--|
| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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- | | | |
|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343640

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Camshaft position sensor (PHASE) | EC-274. "Description" |
| Crankshaft position sensor (POS) | EC-270. "Description" |
| Engine coolant temperature sensor | EC-179. "Description" |

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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| Component | Reference |
|--|---|
| Intake valve timing control solenoid valve | EC-97, "System Description" |
| Vehicle speed sensor | EC-342, "Description" |

TUMBLE CONTROL VALVE CONTROL

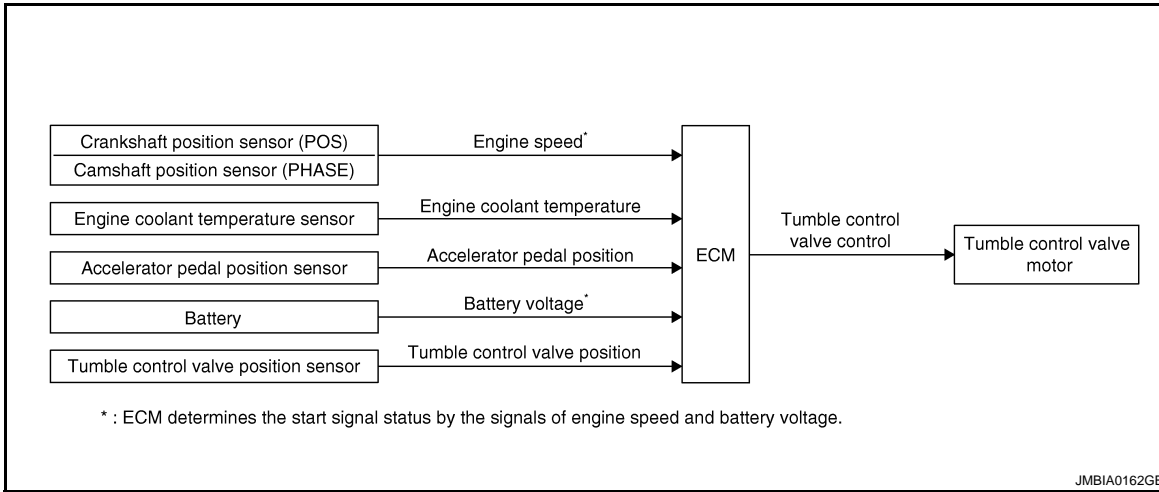
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TUMBLE CONTROL VALVE CONTROL

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------------------------------|-------------------------------|------------------------------|----------------------------|
| Crankshaft position sensor (POS) | Engine speed* | Tumble control valve control | Tumble control valve motor |
| Camshaft position sensor (PHASE) | | | |
| Battery | Battery voltage* | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Tumble control valve position sensor | Tumble control valve position | | |

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

SYSTEM DESCRIPTION

Tumble control valve has a valve portion in the intake passage of each cylinder.

While idling and during low engine coolant temperature, the tumble control valve closes. Thus the velocity of the air in the intake passage increases, promoting the vaporization of the fuel and producing a tumble in the combustion chamber.

Because of this operation, this system tends to increase the burning speed of the gas mixture, improve fuel consumption, and increase the stability in running conditions.

Also, except when idling and during low engine coolant temperature, this system opens the tumble control valve.

In this condition, this system tends to increase power by improving intake efficiency via reduction of intake flow resistance.

The tumble control valve is operated by the ECM.

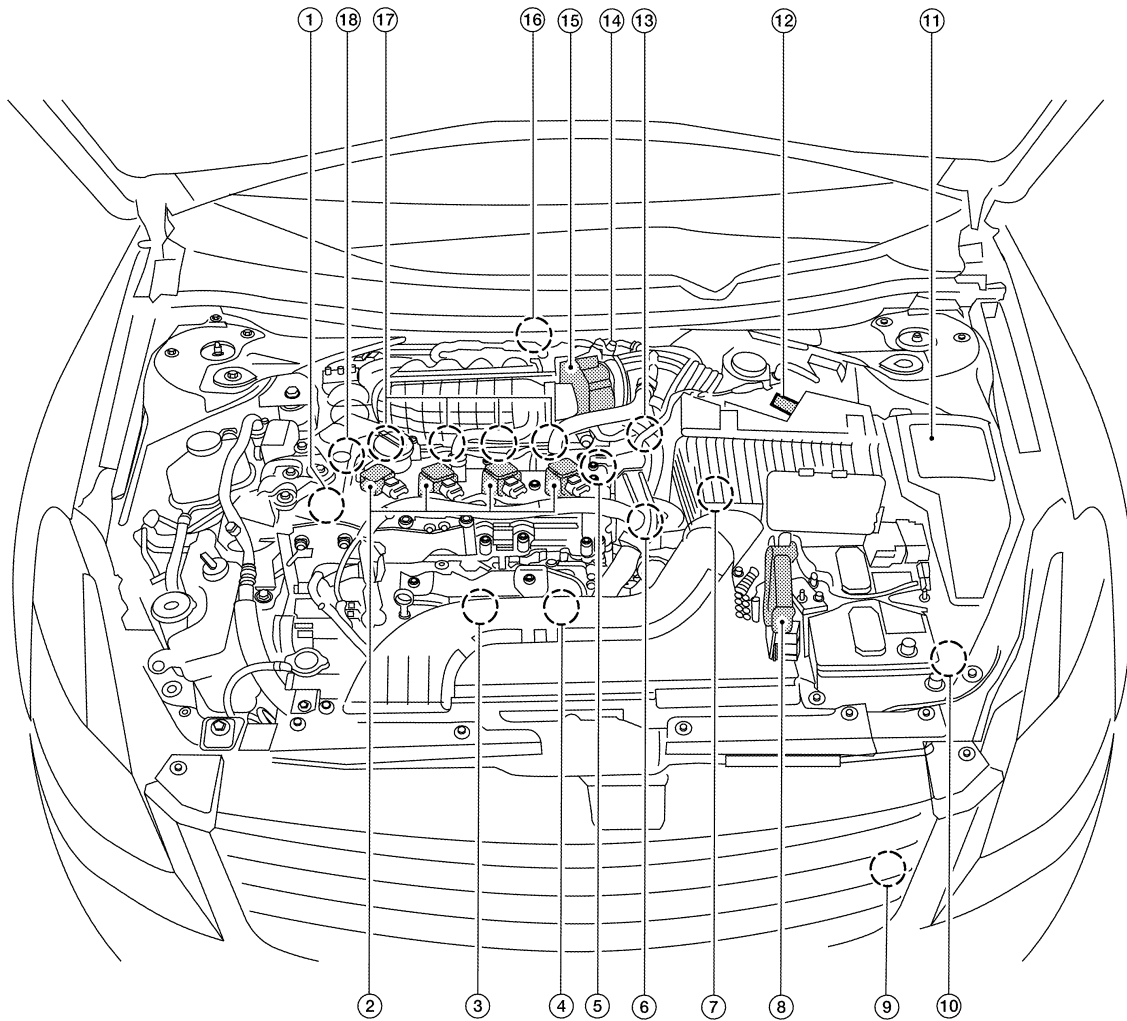
TUMBLE CONTROL VALVE CONTROL

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Component Parts Location

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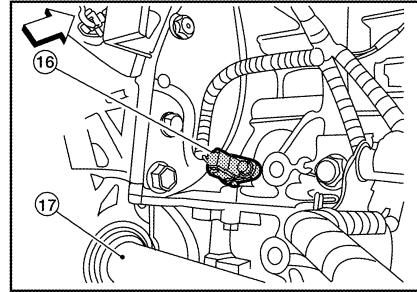
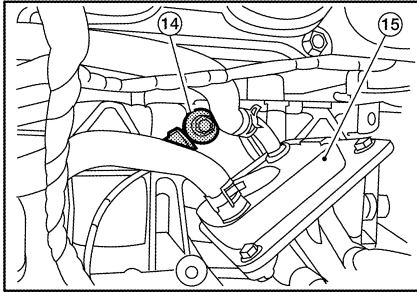
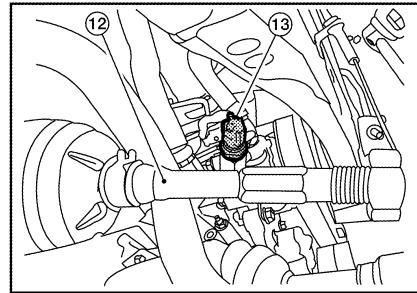
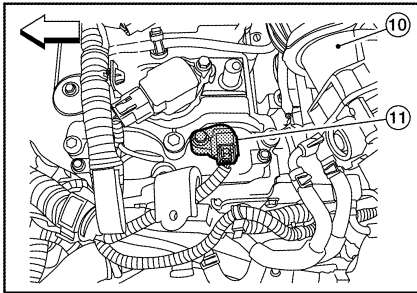
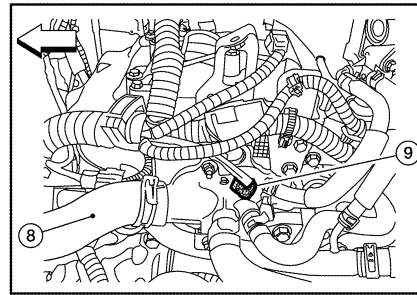
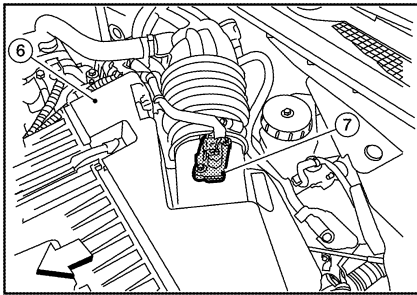
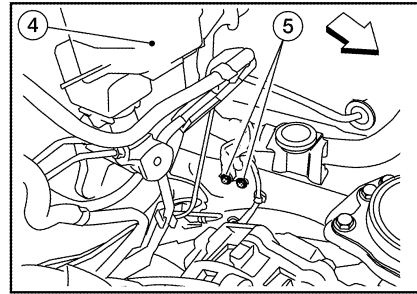
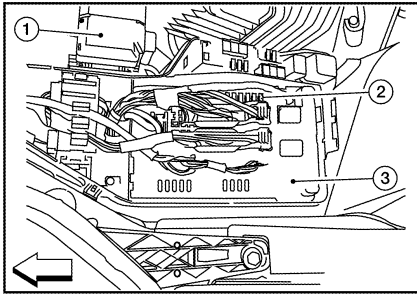
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| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. Tumble control valve actuator | 14. EVAP service port | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve | 17. Fuel injector | 18. Power steering pressure sensor |

TUMBLE CONTROL VALVE CONTROL

< FUNCTION DIAGNOSIS >

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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

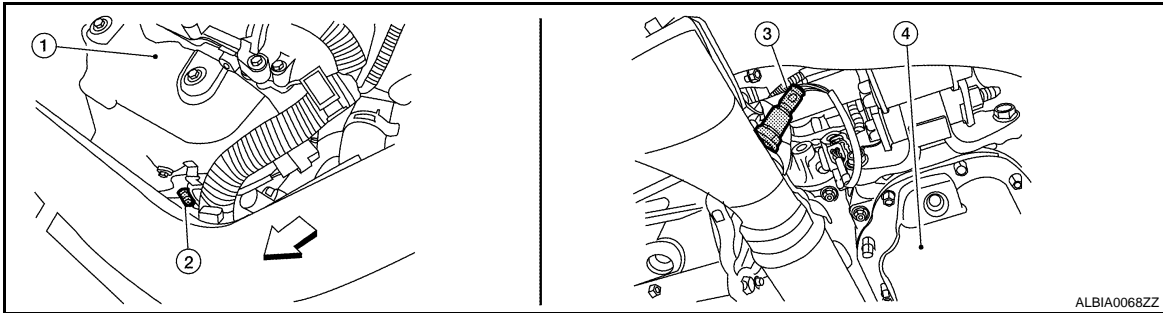
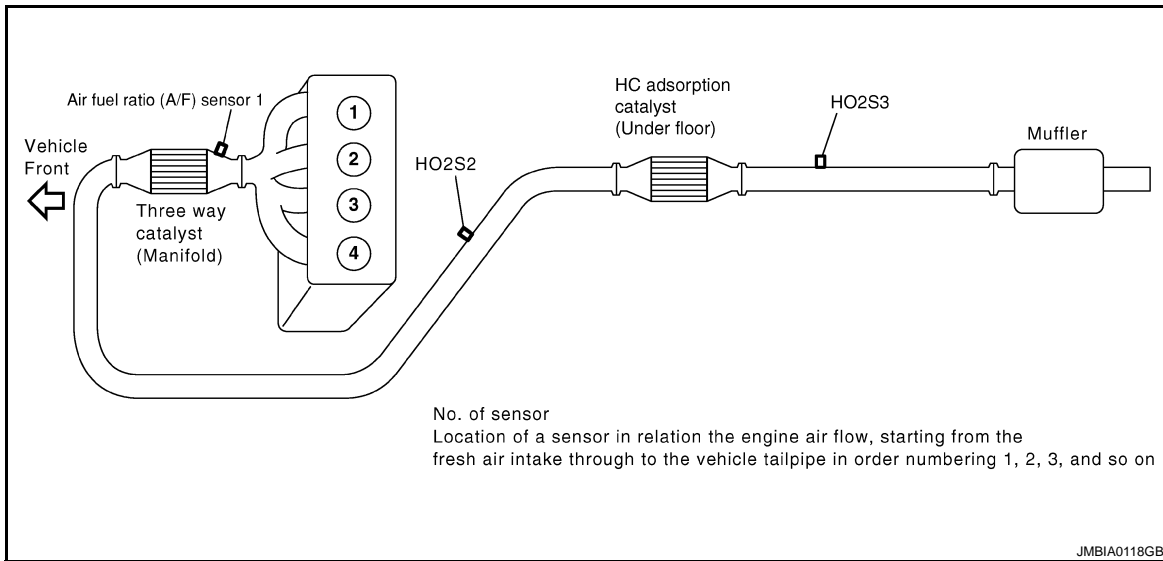
↔: Vehicle front

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TUMBLE CONTROL VALVE CONTROL

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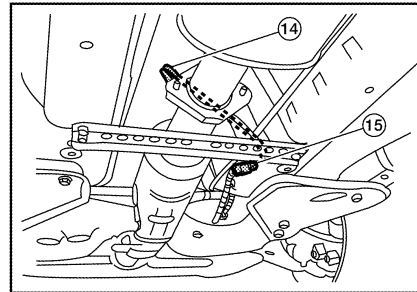
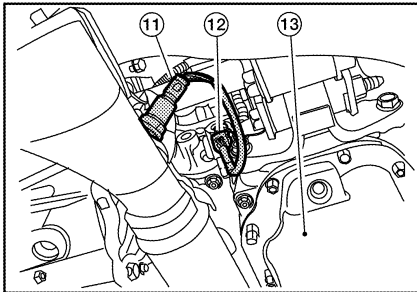
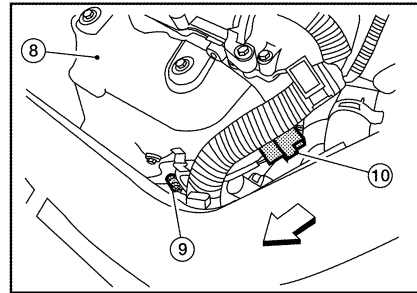
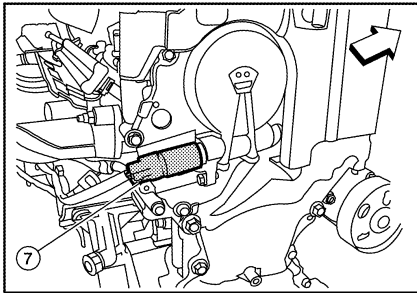
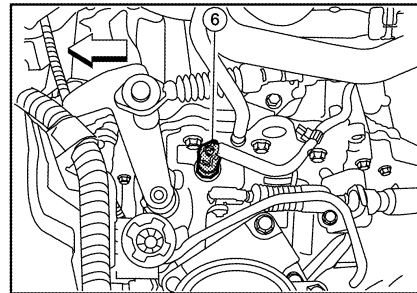
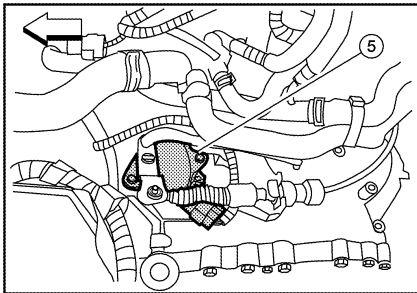
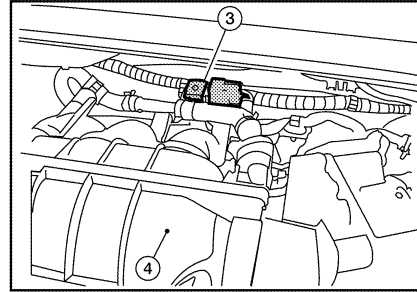
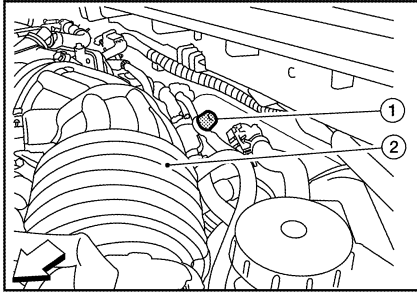


- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ↔: Vehicle front

TUMBLE CONTROL VALVE CONTROL

< FUNCTION DIAGNOSIS >

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | 14. Heated oxygen sensor 3 (This illustration is view form under vehicle.) | 15. Heated oxygen sensor 3 harness connector (This illustration is view from under vehicle.) |

↶: Vehicle front

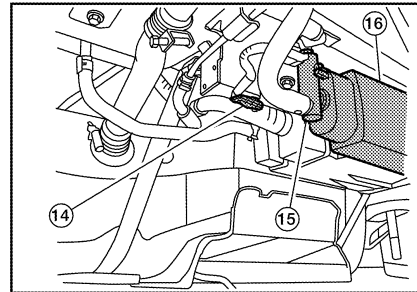
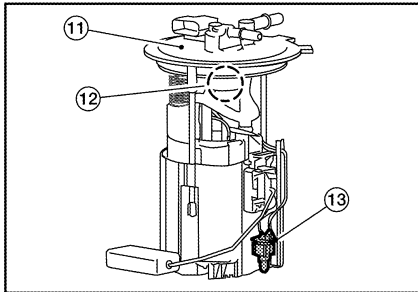
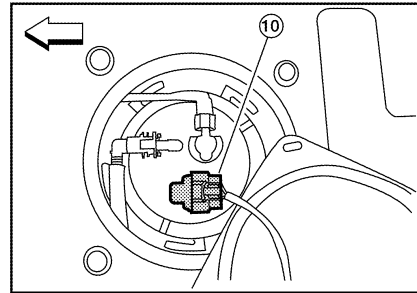
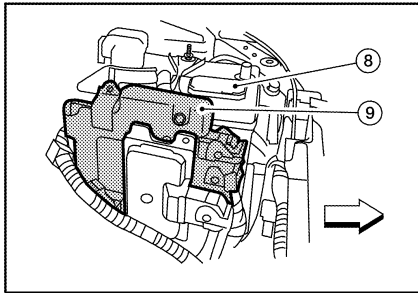
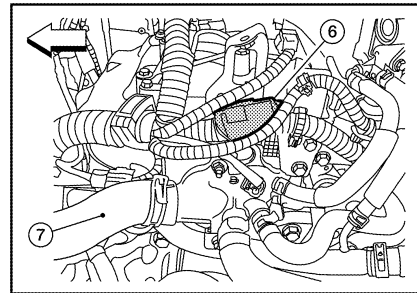
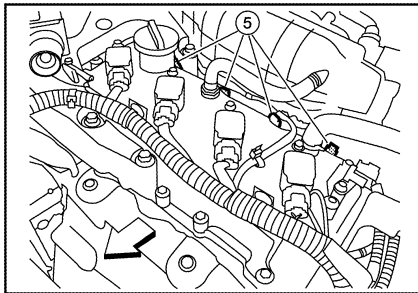
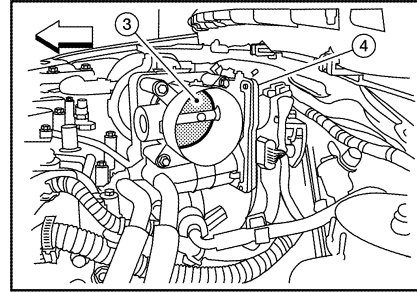
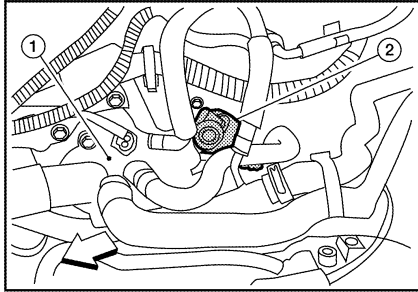
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TUMBLE CONTROL VALVE CONTROL

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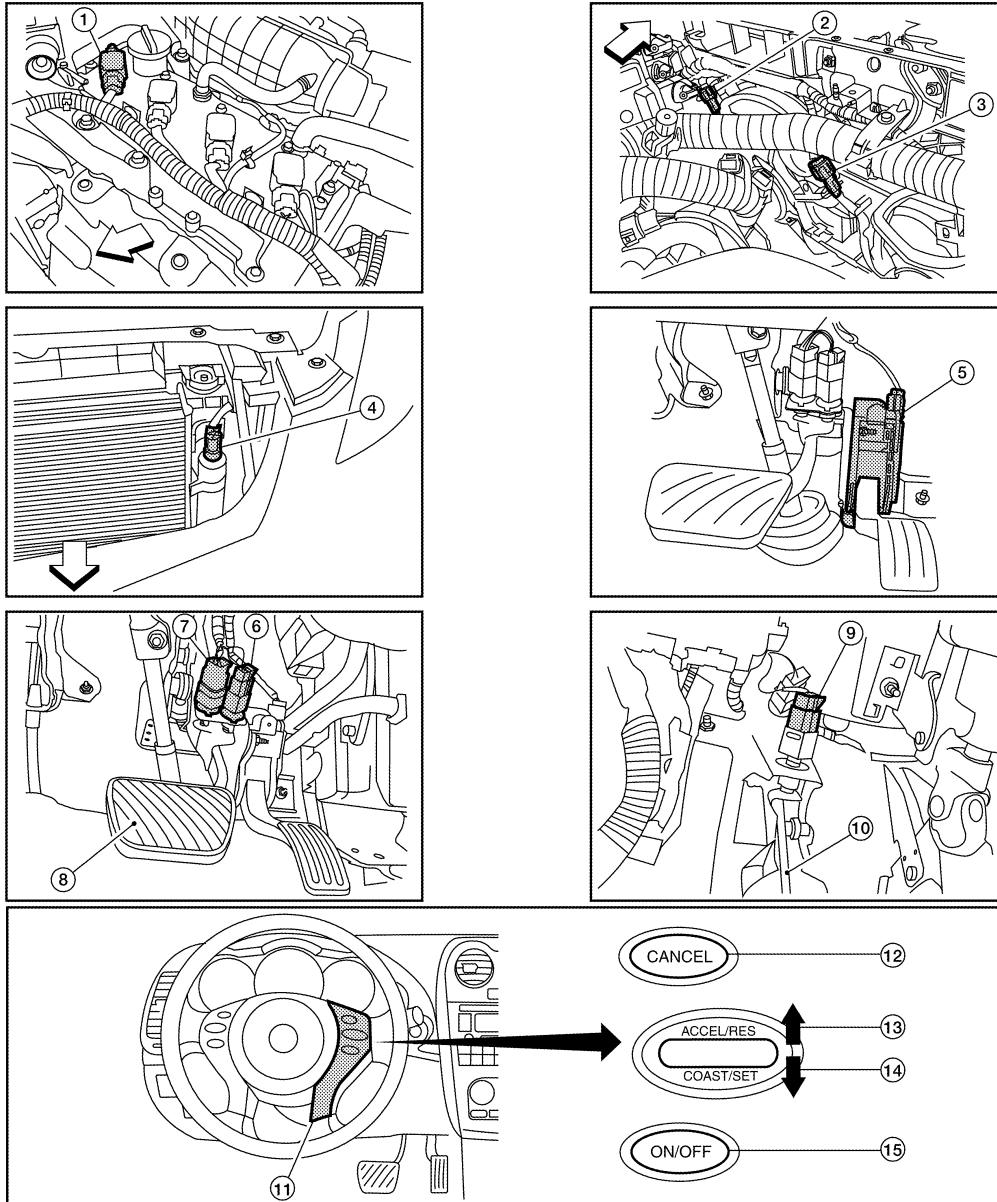
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| 1. Thermostat housing | 2. Tumble control valve actuator | 3. Throttle valve (This illustration is view with intake air duct removed.) |
| 4. Electric throttle control actuator | 5. Fuel injector harness connector | 6. Condenser-2 |
| 7. Radiator hose (upper) | 8. Battery | 9. ECM |
| 10. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 11. Fuel level sensor unit and fuel pump assembly | 12. Fuel pressure regulator |
| 13. Fuel tank temperature sensor | 14. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) | 15. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) |
| 16. EVAP canister (This illustration is view with rear suspension member removed.) | | |

↶ : Vehicle front

TUMBLE CONTROL VALVE CONTROL

< FUNCTION DIAGNOSIS >

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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001343644

| Component | Reference |
|--------------------------------------|---------------------------------------|
| Tumble control valve | EC-400. "Description" |
| Tumble control valve position sensor | EC-400. "Description" |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

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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.

x: Applicable —: Not applicable

| | DTC | 1st trip DTC | Freeze Frame data | 1st trip Freeze Frame data | SRT code | SRT status | Test value |
|-------------|-----|--------------|-------------------|----------------------------|----------|------------|------------|
| CONSULT-III | x | x | x | x | x | x | — |
| GST | x | x | x | — | x | x | x |
| ECM | x | x* | — | — | — | x | — |

*: 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 lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-511, "Fail Safe"](#).)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up 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 lights up. The MIL lights up 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 light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

x: Applicable —: Not applicable

| Items | MIL | | | | DTC | | 1st trip DTC | |
|---|----------|-------------|----------|-------------|---------------------|---------------------|---------------------|---------------------|
| | 1st trip | | 2nd trip | | 1st trip displaying | 2nd trip displaying | 1st trip displaying | 2nd trip displaying |
| | Blinking | Lighting up | Blinking | Lighting up | | | | |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | x | — | — | — | — | — | x | — |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | — | — | x | — | — | x | — | — |
| One trip detection diagnoses (Refer to EC-515, "DTC Index" .) | — | x | — | — | x | — | — | — |
| Except above | — | — | — | x | — | x | x | — |

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

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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 reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (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 lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored 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 light up 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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 lighting up 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 [EC-20, "Work Flow"](#). 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. The ECM has the following priorities to update the data.


| Priority | Items | |
|----------|----------------------------|--|
| 1 | Freeze frame data | Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172 |
| 2 | | Except the above items (Includes CVT related items) |
| 3 | 1st trip freeze frame data | |

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored 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 can be stored in the ECM). If freeze frame data is stored in the ECM memory and 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

How to Read DTC and 1st Trip DTC

 **With CONSULT-III**

 **With GST**

CONSULT-III or GST (Generic Scan Tool) Examples: P0340, P0850, P1148, etc.
These DTCs are prescribed by SAE J2012.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

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

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 or 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.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. 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].

How to Erase DTC and 1st Trip DTC

With CONSULT-III

The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

With GST

The emission related diagnostic information in the ECM can be erased by selecting Service \$04 with GST.

NOTE:

If the DTC is not for CVT related items (see [EC-515, "DTC Index"](#)), skip step 2.

1. 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.
2. Perform [TM-291, "Diagnosis Description"](#). (The DTC in TCM will be erased)
3. Select Service \$04 with GST (Generic Scan Tool).

No Tools

NOTE:

If the DTC is not for CVT related items (see [EC-515, "DTC Index"](#)), skip step 2.

1. 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.
 2. Perform [TM-291, "Diagnosis Description"](#). (The DTC in the TCM will be erased.)
 3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.
- **If the battery is disconnected, the emission-related diagnostic information will be lost 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.

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.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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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 (CONSULT-III indication) | Performance Priority* | Required self-diagnostic items to set the SRT to “CMPLT” | Corresponding DTC No. |
|-----------------------------------|-----------------------|--|-----------------------|
| CATALYST | 2 | Three way catalyst function | P0420 |
| 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 |
| | | Heated oxygen sensor 2 | P0137 |
| | | Heated oxygen sensor 2 | P0138 |
| | | Heated oxygen sensor 2 | P0139 |
| | | Heated oxygen sensor 3 | P0143 |
| | | Heated oxygen sensor 3 | P0144 |
| | | Heated oxygen sensor 3 | P0145 |

*: 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 | Ignition cycle | | | | |
| | | | ← ON → | OFF | ← ON → | OFF | ← ON → |
| 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 (Consecutive NG) | |
| | | (1st trip) DTC | 1st trip DTC | — | 1st trip DTC | DTC (= MIL ON) | |
| | | SRT of EGR | “INCMP” | “INCMP” | “INCMP” | “CMPLT” | |

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

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

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—: Self-diagnosis is not carried out.

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

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

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

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or 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.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from 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".

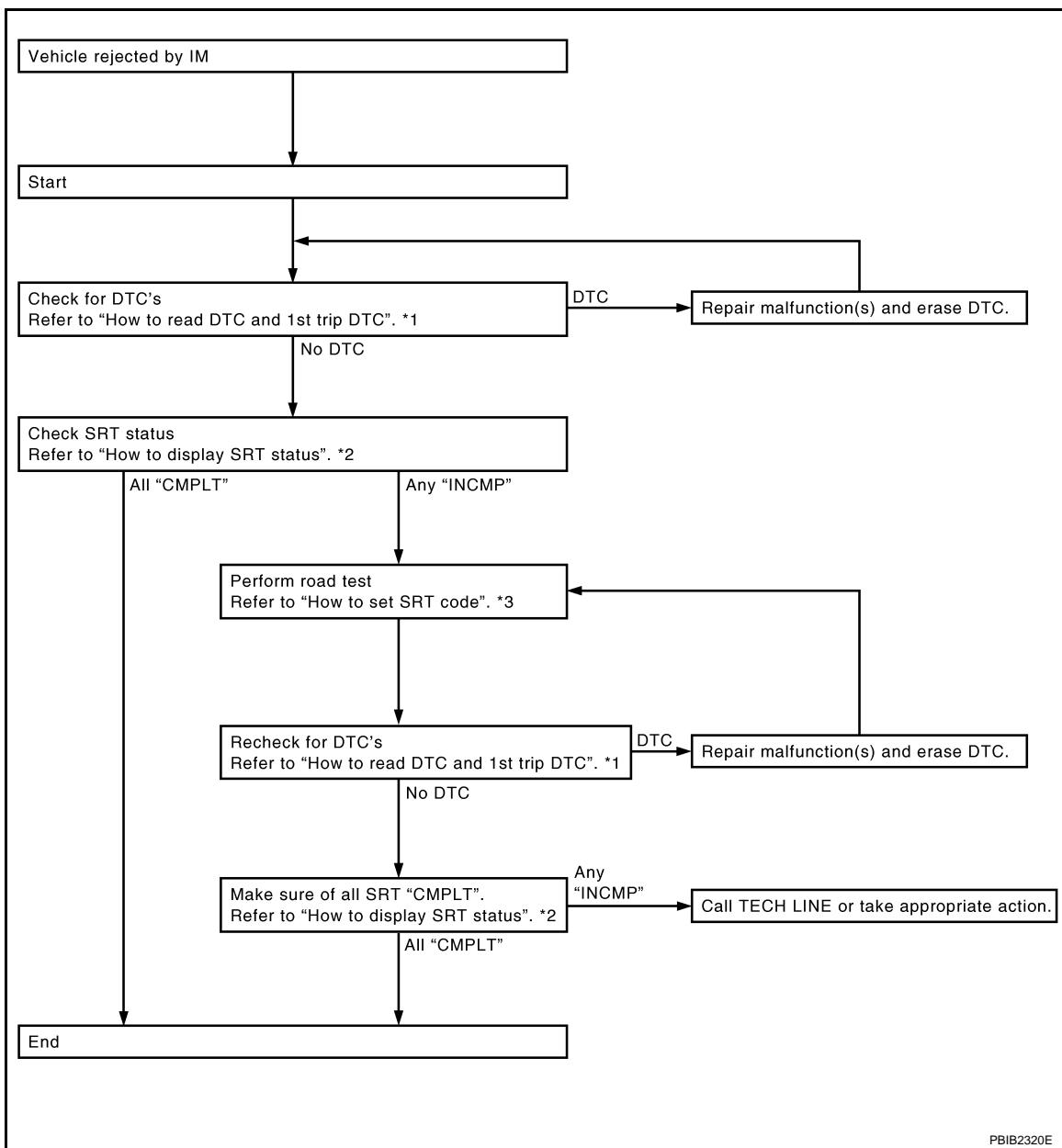
SRT Service Procedure

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.

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*1 "How to Read DTC and 1st Trip DTC" *2 "How to Display SRT Status"

*3 "How to Set SRT Code"

How to Display SRT Status

WITH CONSULT-III

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-III.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.

NOTE:

Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.

WITH GST

Selecting Service \$01 with GST (Generic Scan Tool)

NO TOOLS

A SRT code itself can not be displayed while only SRT status can be.

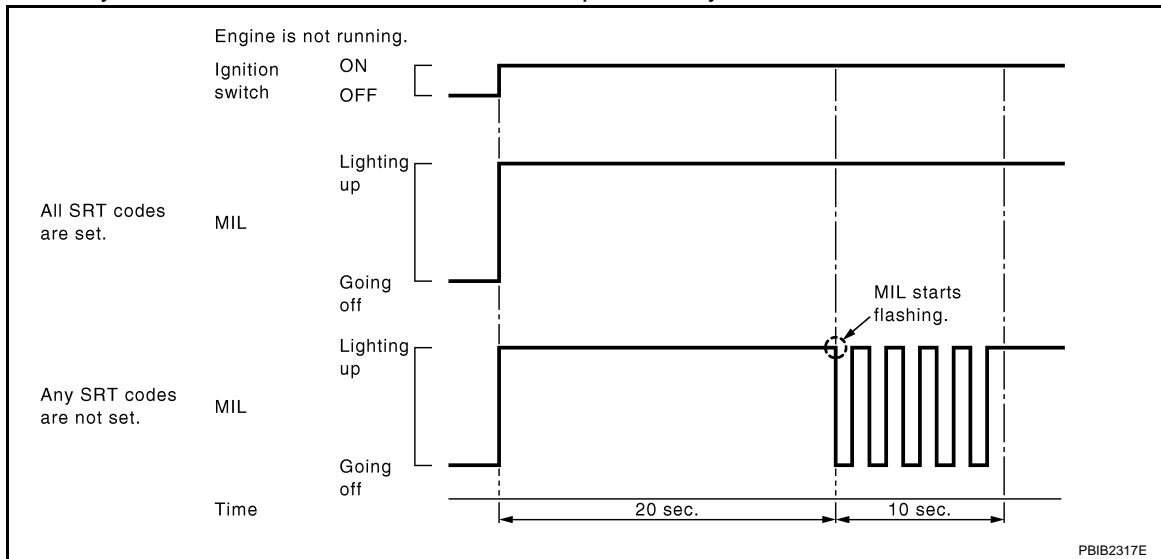
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL lights up continuously.

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- When any SRT codes are not set, MIL will flash periodically for 10 seconds.

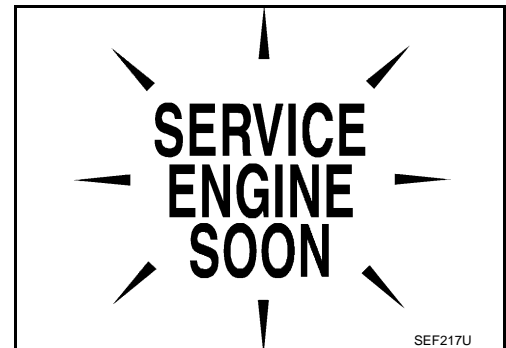


MALFUNCTION INDICATOR LAMP (MIL)

Description

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
If the MIL does not light up, refer to [MWI-28. "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).
2. When the engine is started, the MIL should go 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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| Diagnostic Test Mode | KEY and ENG. Status | Function | Explanation of Function |
|----------------------|---|-------------------------|--|
| Mode I | Ignition switch in ON position  | BULB CHECK | This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit. |
| | Engine stopped  | | |
| Mode II | Engine running  | MALFUNCTION WARNING | This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses |
| | Ignition switch in ON position  | | |
| Mode II | Engine stopped  | SELF-DIAGNOSTIC RESULTS | This function allows DTCs and 1st trip DTCs to be read. |
| | Ignition switch in ON position  | | |

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [MWI-28, "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).

Diagnostic Test Mode I — Malfunction Warning

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

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

Diagnostic Test Mode II — Self-diagnostic Results

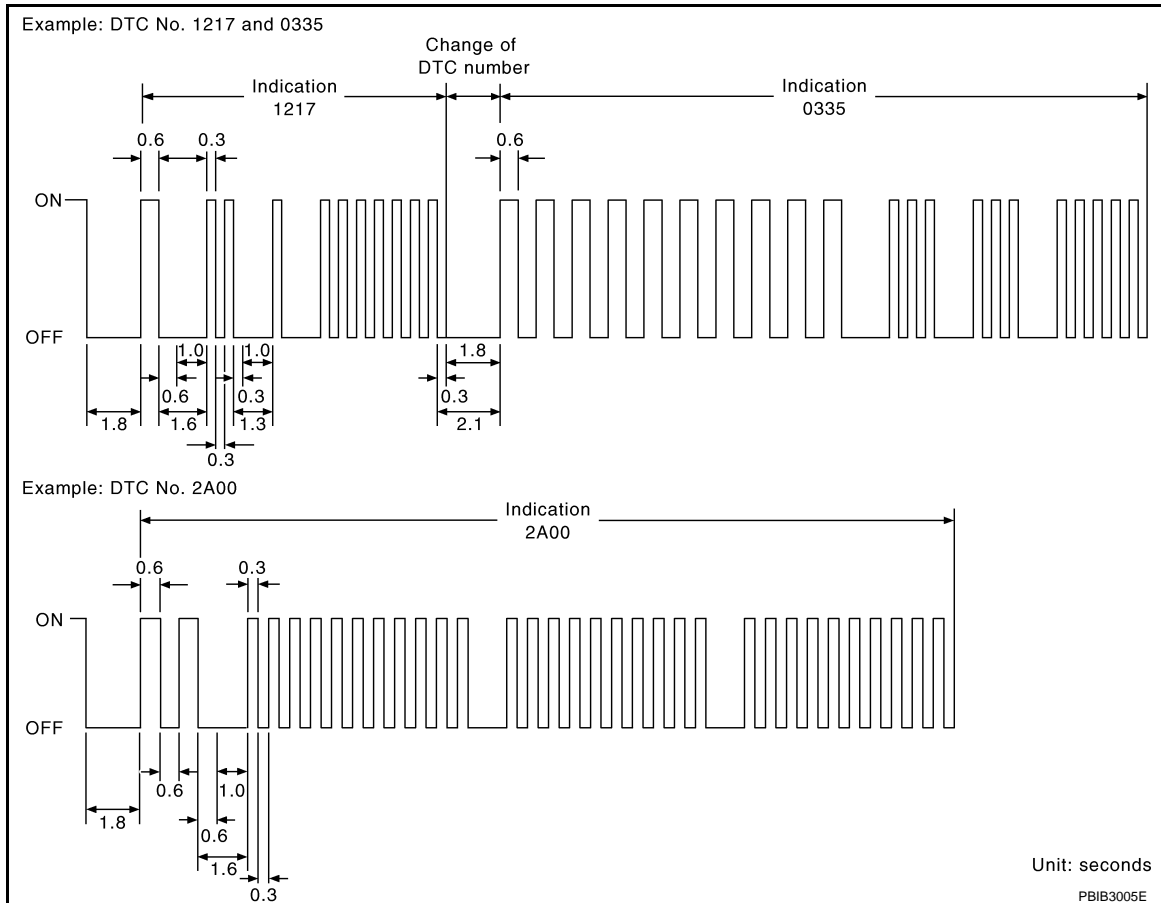
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed 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 flashes as follows.

| Number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---------|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Flashes | 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-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-515, "DTC Index"](#))

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.
- Always ECM returns to Diagnostic Test Mode I after 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 five 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 for approx. 10 seconds until the MIL starts blinking.

NOTE:

Do not release the accelerator pedal for 10 seconds if MIL may start blinking on the halfway of this 10 seconds. This blinking is displaying SRT status and is continued for another 10 seconds.

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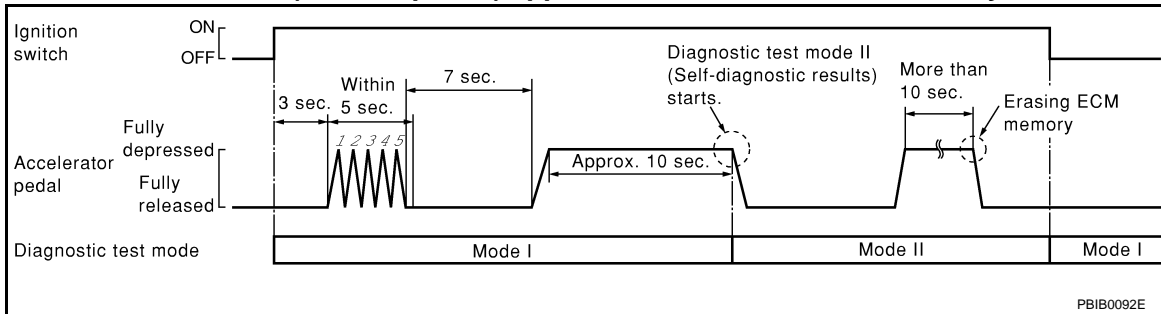
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- Fully release the accelerator pedal.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).

NOTE:

Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



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)”.
- Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
- Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “How to Erase Diagnostic Test Mode II (Self-diagnostic Results)”.

- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to 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 first 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 go off after the vehicle is driven 3 times (driving pattern B) with no malfunction. The 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 CONSULT-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 (goes 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 (clear) | *1, *2 | *1, *2 | 1 (pattern B) |

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.

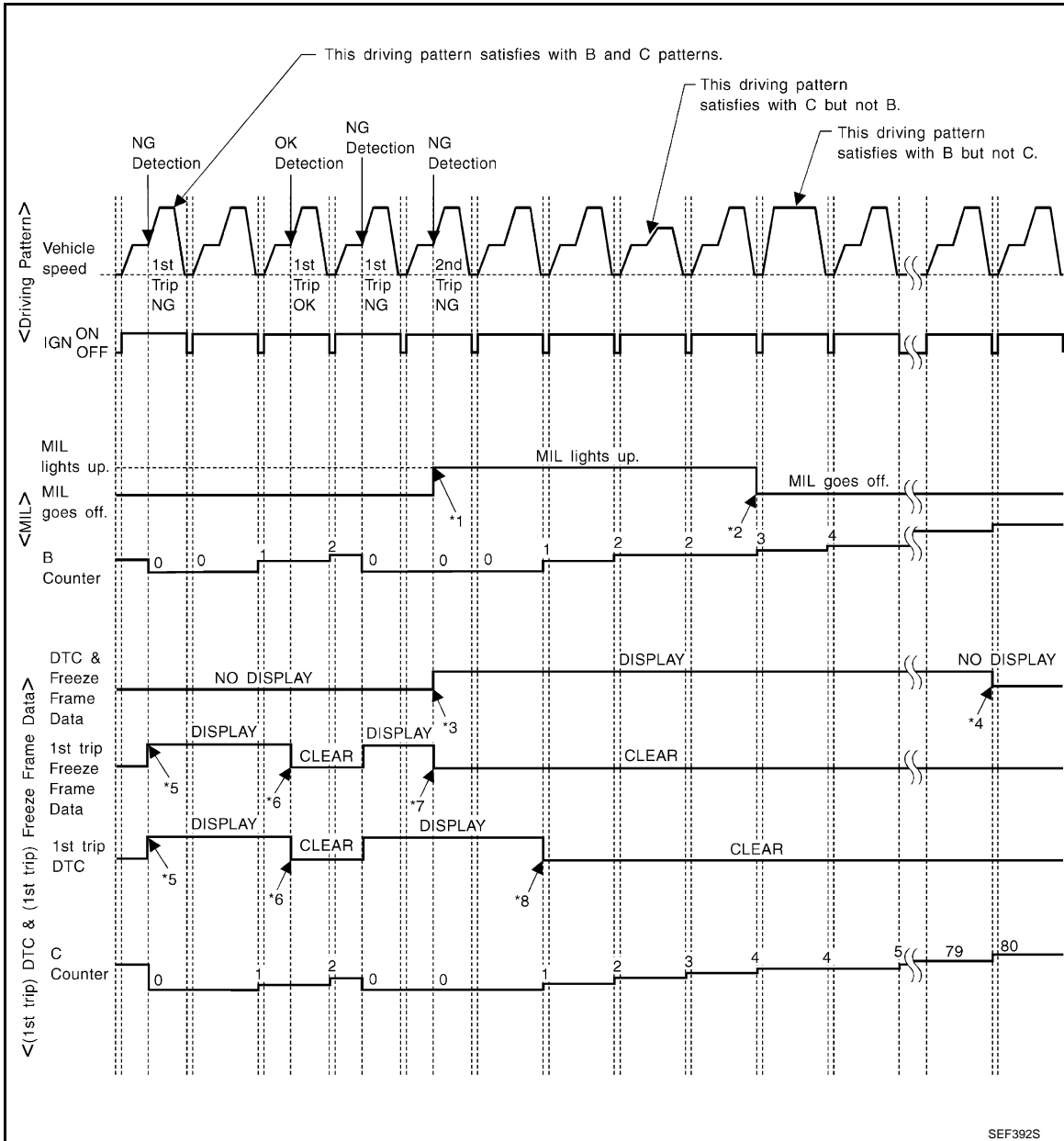
Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns for “Misfire <Exhaust Quality Deterioration>”,

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"Fuel Injection System"



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip 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.

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

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

Driving pattern B means the vehicle operation as follows:

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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 malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the 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), T should be lower than 70°C (158°F).
- 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).

Example:

If the stored freeze frame data is as follows:

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:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

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

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

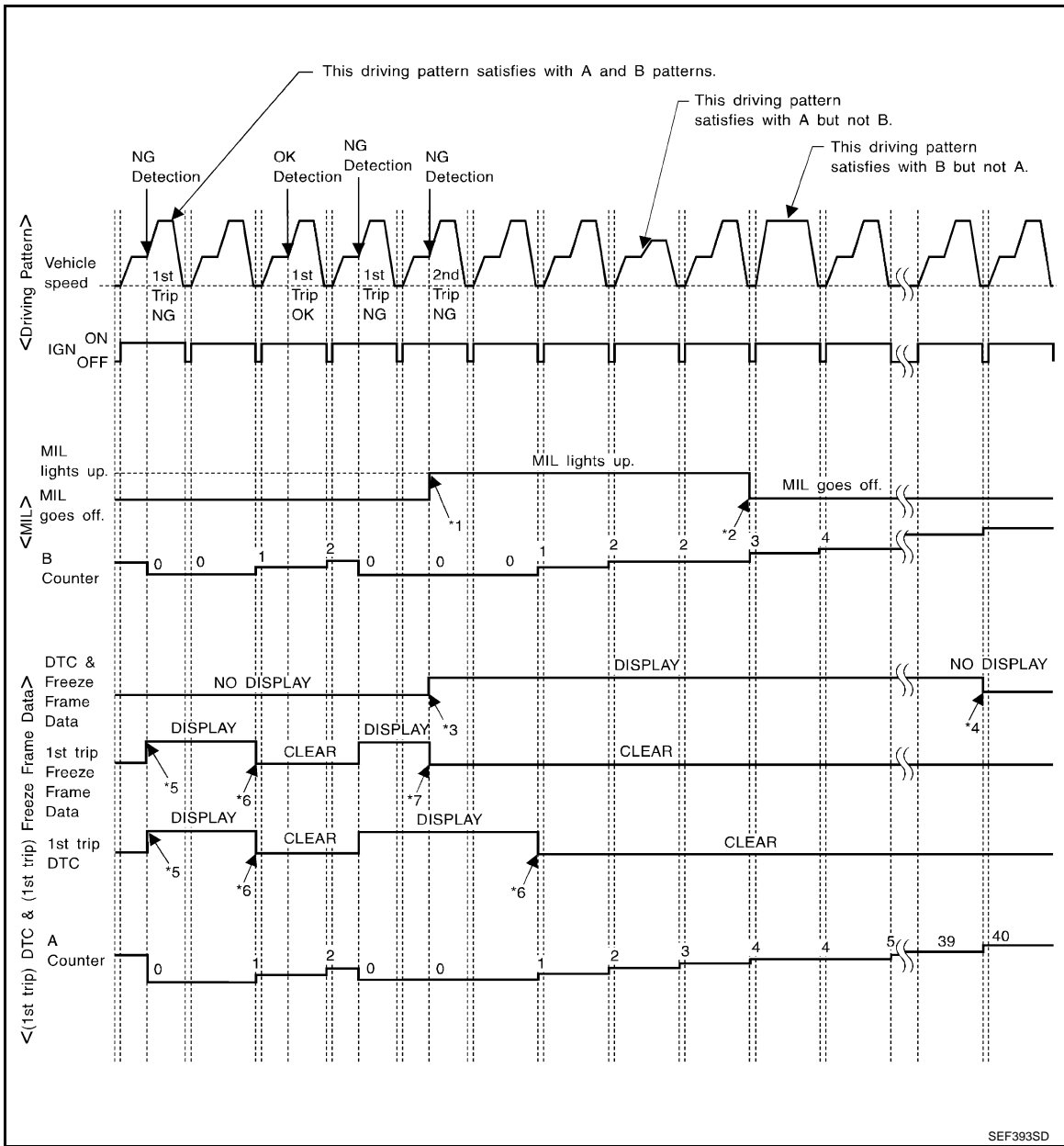
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*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first 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.

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

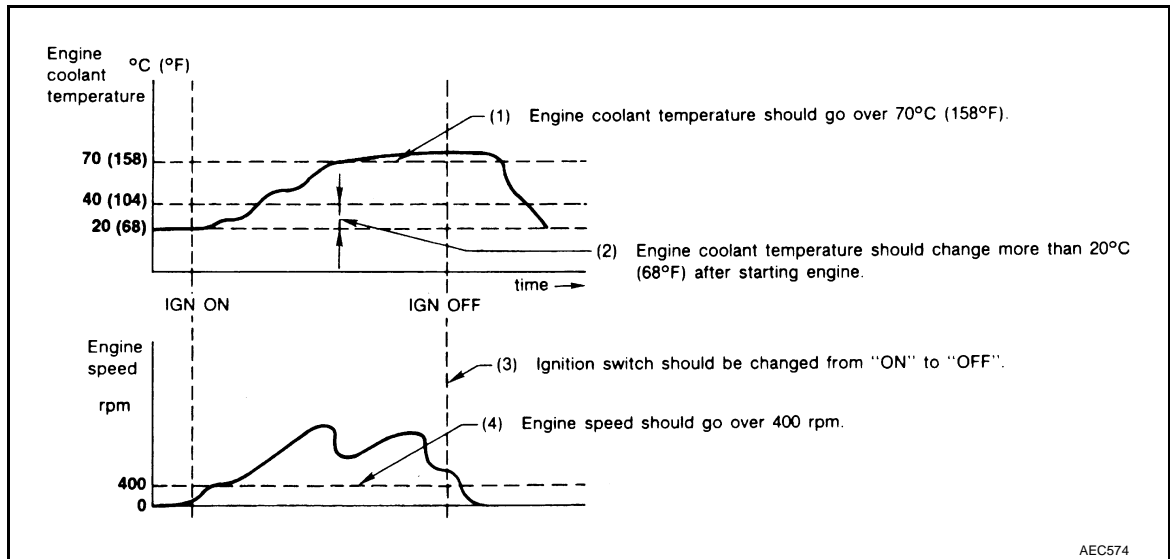
Explanation for Driving Patterns Except for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System"

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<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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 go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

CONSULT-III Function

INFOID:000000001343646

FUNCTION

| Diagnostic test mode | Function |
|-------------------------|---|
| Work support | This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit. |
| Self-diagnostic results | 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 ECMs and also shifts some parameters in a specified range. |
| DTC & SRT confirmation | The status of system monitoring tests and the self-diagnosis status/result can be confirmed. |
| Function test | This mode is used to inform customers when their vehicle condition 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
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

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| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|---|--|----------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS INPUT | Crankshaft position sensor (POS) | | × | × | × | | | |
| | Camshaft position sensor (PHASE) | | × | × | × | | | |
| | Mass air flow sensor | | × | | × | | | |
| | Engine coolant temperature sensor | | × | × | × | × | | |
| | Air fuel ratio (A/F) sensor 1 | | × | | × | | × | × |
| | Heated oxygen sensor 2 | | × | | × | | × | × |
| | Heated oxygen sensor 3 | | × | | × | | × | |
| | Vehicle speed sensor | | × | × | × | | | |
| | Accelerator pedal position sensor | | × | | × | | | |
| | Throttle position sensor | | × | × | × | | | |
| | Fuel tank temperature sensor | | × | | × | × | | |
| | EVAP control system pressure sensor | | × | | × | | | |
| | Intake air temperature sensor | | × | × | × | | | |
| | Knock sensor | | × | | | | | |
| | Refrigerant pressure sensor | | | | × | | | |
| | Closed throttle position switch (accelerator pedal position sensor signal) | | | | × | | | |
| | Air conditioner switch | | | | × | | | |
| | Park/neutral position (PNP) switch | | × | | × | | | |
| | Stop lamp switch | | × | | × | | | |
| | Power steering pressure sensor | | × | | × | | | |
| | Battery voltage | | | | × | | | |
| | Load signal | | | | × | | | |
| | Primary speed sensor | | × | | × | | | |
| | Tumble control valve position sensor | | × | | × | | | |
| | Fuel level sensor | | × | | × | | | |
| | Battery current sensor | | × | | × | | | |
| ASCD steering switch | | × | | × | | | | |
| ASCD brake switch | | × | | × | | | | |

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| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|--|---|----------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS OUTPUT | Fuel injector | | | | × | × | | |
| | Power transistor (Ignition timing) | | | | × | × | | |
| | Throttle control motor relay | | × | | × | | | |
| | Throttle control motor | | × | | | | | |
| | EVAP canister purge volume control solenoid valve | | × | | × | × | | × |
| | Air conditioner relay | | | | × | | | |
| | Fuel pump relay | × | | | × | × | | |
| | Cooling fan relay | | × | | × | × | | |
| | Air fuel ratio (A/F) sensor 1 heater | | × | | × | | ×*3 | |
| | Heated oxygen sensor 2 heater | | × | | × | | ×*3 | |
| | Heated oxygen sensor 3 heater | | × | | × | | ×*3 | |
| | EVAP canister vent control valve | × | × | | × | × | | |
| | Intake valve timing control solenoid valve | | × | | × | × | | |
| | Alternator | | | | × | × | | |
| | Tumble control valve motor | | × | | × | × | | |
| Calculated load value | | | × | × | | | | |

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-112, "Diagnosis Description"](#).

*3: Always "CMPLT" is displayed.

INSPECTION PROCEDURE

Refer to CONSULT-III Operators Manual.

WORK SUPPORT MODE

Work Item

| WORK ITEM | CONDITION | USAGE |
|-----------------------|---|---|
| FUEL PRESSURE RELEASE | <ul style="list-style-type: none"> FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. | When releasing fuel pressure from fuel line |
| IDLE AIR VOL LEARN | <ul style="list-style-type: none"> THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. | When learning the idle air volume |
| SELF-LEARNING CONT | <ul style="list-style-type: none"> THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. | When clearing mixture ratio self-learning value |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| WORK ITEM | CONDITION | USAGE |
|----------------------|---|---|
| EVAP SYSTEM CLOSE | <p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> • IGN SW ON • ENGINE NOT RUNNING • AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). • NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM • FUEL TANK TEMP. IS MORE THAN 0°C (32°F). • WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" • WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-III MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p> | When detecting EVAP vapor leak point of EVAP system |
| VIN REGISTRATION | <ul style="list-style-type: none"> • IN THIS MODE, VIN IS REGISTERED IN ECM. | When registering VIN in ECM |
| TARGET IDLE RPM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When setting target idle speed |
| TARGET IGN TIM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When adjusting target ignition timing |

*: 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-515, "DTC Index".](#))

Freeze Frame Data and 1st Trip Freeze Frame Data

| Freeze frame data item* | Description |
|------------------------------|---|
| DIAG TROUBLE CODE [PXXXX] | <ul style="list-style-type: none"> • The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-515, "DTC Index".) |
| FUEL SYS-B1 | <ul style="list-style-type: none"> • "Fuel injection system status" at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop |
| CAL/LD VALUE [%] | <ul style="list-style-type: none"> • The calculated load value at the moment a malfunction is detected is displayed. |
| COOLANT TEMP [°C] or [°F] | <ul style="list-style-type: none"> • The engine coolant temperature at the moment a malfunction is detected is displayed. |
| L-FUEL TRM-B1 [%] | <ul style="list-style-type: none"> • "Long-term fuel trim" at the moment a malfunction is detected is displayed. • 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 [%] | <ul style="list-style-type: none"> • "Short-term fuel trim" at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule. |
| ENGINE SPEED [rpm] | <ul style="list-style-type: none"> • The engine speed at the moment a malfunction is detected is displayed. |
| VEHICL SPEED [km/h] or [mph] | <ul style="list-style-type: none"> • The vehicle speed at the moment a malfunction is detected is displayed. |
| ABSOL TH-P/S [%] | <ul style="list-style-type: none"> • The throttle valve opening angle at the moment a malfunction is detected is displayed. |
| B/FUEL SCHDL [msec] | <ul style="list-style-type: none"> • The base fuel schedule at the moment a malfunction is detected is displayed. |

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< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Freeze frame data item* | Description |
|----------------------------|---|
| INT/A TEMP SE [°C] or [°F] | <ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed. |
| FUEL SYS-B2 | <ul style="list-style-type: none"> Always a certain value is displayed. These items are not efficient for L32 models. |
| L-FUEL TRM-B2 [%] | |
| S-FUEL TRM-B2 [%] | |
| INT MANI PRES [kPa] | |
| FTFMCH1 | |

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

DATA MONITOR MODE

Monitored Item

x: Applicable

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|---|--|
| ENG SPEED | rpm | <ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). | <ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated. |
| MAS A/F SE-B1 | V | <ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". |
| B/FUEL SCHDL | msec | <ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. | <ul style="list-style-type: none"> When engine is running specification range is indicated in "SPEC". |
| A/F ALPHA-B1 | % | <ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". This data also includes the data for the air-fuel ratio learning control. |
| COOLAN TEMP/S | °C or °F | <ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. | <ul style="list-style-type: none"> 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) | V | <ul style="list-style-type: none"> The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed. | |
| HO2S2 (B1) | V | <ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. | |
| HO2S3 (B1) | V | <ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 3 is displayed. | |
| HO2S2 MNTR(B1) | RICH/LEAN | <ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| BATTERY VOLT | V | <ul style="list-style-type: none"> The power supply voltage of ECM is displayed. | |
| ACCEL SEN 1 | V | <ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. | <ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| ACCEL SEN 2 | | | |

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< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|----------|---|---|
| TP SEN 1-B1 | V | <ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. | <ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| TP SEN 2-B1 | | | |
| FUEL T/TMP SE | °C or °F | <ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. | |
| INT/A TEMP SE | °C or °F | <ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. | |
| EVAP SYS PRES | V | <ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. | |
| FUEL LEVEL SE | V | <ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. | |
| START SIGNAL | ON/OFF | <ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. | <ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. |
| CLSD THL POS | ON/OFF | <ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. | |
| AIR COND SIG | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. | |
| P/N POSI SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. | |
| PW/ST SIGNAL | ON/OFF | <ul style="list-style-type: none"> [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 style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. | |
| IGNITION SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch signal. | |
| HEATER FAN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. | |
| BRAKE SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. | |
| INJ PULSE-B1 | msec | <ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. |
| IGN TIMING | BTDC | <ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| CAL/LD VALUE | % | <ul style="list-style-type: none"> "Calculated load value" indicates the value of the current air flow divided by peak air flow. | |
| MASS AIRFLOW | g-m/s | <ul style="list-style-type: none"> Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor. | |
| PURG VOL C/V | % | <ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. | |
| INT/V TIM (B1) | °CA | <ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advance angle. | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|--|---------|
| INT/V SOL-B1 | % | <ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. The advance angle becomes larger as the value increases. | A EC |
| SWRL CONT S/V | ON/OFF | <ul style="list-style-type: none"> The control condition of the tumble control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open | C |
| TMBL POS SEN | V | <ul style="list-style-type: none"> The tumble control valve position sensor signal voltage is displayed. | D |
| AIR COND RLY | ON/OFF | <ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. | E |
| FUEL PUMP RLY | ON/OFF | <ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. | F |
| VENT CONT/V | ON/OFF | <ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open | G |
| THRTL RELAY | ON/OFF | <ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. | H |
| COOLING FAN | HI/LOW/OFF | <ul style="list-style-type: none"> Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop | I J |
| HO2S2 HTR (B1) | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. | K |
| HO2S3 HTR(B1) | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 3 heater determined by ECM according to the input signals. | L |
| VEHICLE SPEED | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. | M |
| IDL A/V LEARN | YET/CMPLT | <ul style="list-style-type: none"> Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully. | N |
| TRVL AFTER MIL | km or mile | <ul style="list-style-type: none"> Distance traveled while MIL is activated. | O |
| A/F S1 HTR(B1) | % | <ul style="list-style-type: none"> Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. | P |
| AC PRESS SEN | V | <ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. | P |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| MAIN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. | |

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< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|---------------|--|--|
| CANCEL SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. | |
| RESUME/ACC SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. | |
| SET SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. | |
| BRAKE SW1 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. | |
| BRAKE SW2 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. | |
| VHCL SPD CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. | |
| LO SPEED CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off. | |
| AT OD MONITOR | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| AT OD CANCEL | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel request signal. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| CRUISE LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. | |
| SET LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. | |
| BAT CUR SEN | mV | <ul style="list-style-type: none"> The signal voltage of battery current sensor is displayed. | |
| ALT DUTY SIG | ON/OFF | <ul style="list-style-type: none"> The control condition of the power generation voltage variable control (determined by ECM according to the input signals) is indicated. ON: Power generation voltage variable control is active. OFF: Power generation voltage variable control is inactive. | |
| A/F ADJ-B1 | — | <ul style="list-style-type: none"> Indicates the correction of factor stored in ECM. The factor is calculated from the difference between the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 signal. | |
| ALT DUTY | % | <ul style="list-style-type: none"> Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal. | |
| Voltage | V | <ul style="list-style-type: none"> Voltage, frequency, duty cycle or pulse width measured by the probe. | <ul style="list-style-type: none"> Only "#" is displayed if item is unable to be measured. Figures with "#"'s are temporary ones. They are the same figures as an actual piece of data which was just previously measured. |
| Frequency | msec, Hz or % | | |
| DUTY-HI | — | | |
| DUTY-LOW | | | |
| PLS WIDTH-HI | | | |
| PLS WIDTH-LOW | | | |

NOTE:

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

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

ACTIVE TEST MODE

Test Item

| TEST ITEM | CONDITION | JUDGEMENT | CHECK ITEM (REMEDY) |
|----------------------|--|--|---|
| FUEL INJECTION | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1 |
| IGNITION TIMING | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Perform Idle Air Volume Learning. |
| POWER BALANCE | <ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Shift lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. | Engine runs rough or dies. | <ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil |
| COOLING FAN* | <ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "LOW", "HI" and "OFF" CONSULT-III. | Cooling fan moves and stops. | <ul style="list-style-type: none"> Harness and connectors IPDM E/R (Cooling fan relay) Cooling fan motor |
| ENG COOLANT TEMP | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector |
| FUEL PUMP RELAY | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. | Fuel pump relay makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Fuel pump relay |
| PURG VOL CONT/V | <ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. | Engine speed changes according to the opening percent. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| FUEL/T TEMP SEN | <ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-III. | | |
| VENT CONTROL/V | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. | Solenoid valve makes an operating sound. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| V/T ASSIGN ANGLE | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve |
| ALTERNATOR DUTY | <ul style="list-style-type: none"> Engine: Idle Change duty ratio using CONSULT-III. | Battery voltage changes. | <ul style="list-style-type: none"> Harness and connectors IPDM E/R Alternator |
| TUMBLE CONTROL VALVE | <ul style="list-style-type: none"> Ignition switch: ON Turn tumble control valve "ON" and "OFF" with CONSULT-III and listen to operating sound. | Tumble control valve motor makes an operating sound. | <ul style="list-style-type: none"> Harness and connectors Tumble control valve motor |

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

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

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< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

For details, refer to [EC-112, "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 |
|--------------------|---------------------------|-----------------------|------------------------|
| EVAPORATIVE SYSTEM | EVP SML LEAK P0442/P1442* | P0442 | EC-288 |
| | | P0455 | EC-323 |
| | EVP V/S LEAK P0456/P1456* | P0456 | EC-329 |

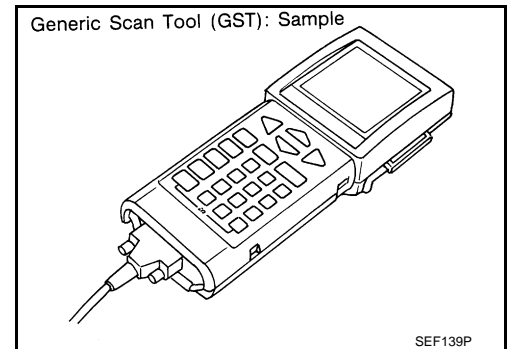
*: DTC P1442 and P1456 does not apply to L32 models but appears in DTC Work Support Mode screens.

Diagnosis Tool Function

INFOID:000000001343647

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



FUNCTION

| Diagnostic Service | | Function |
|--------------------|------------------|--|
| Service \$01 | READINESS TESTS | This diagnostic service gains access to current emission-related data values, including analog 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 which were stored by ECM during the freeze frame. For details, refer to EC-515, "DTC Index" . |
| 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 | This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07) |
| 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-related powertrain components/systems that are continuously monitored during normal driving conditions. |

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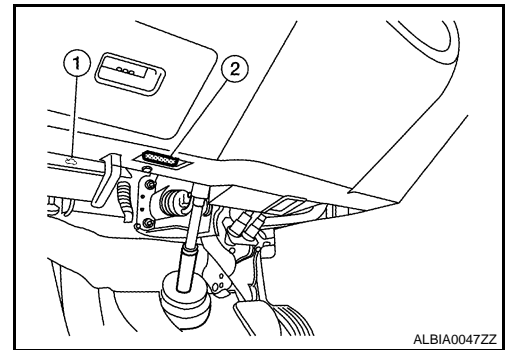
< FUNCTION DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

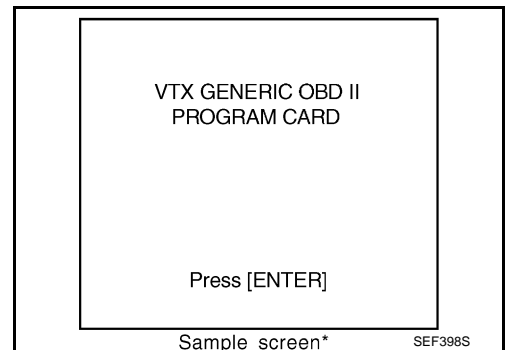
| Diagnostic Service | Function |
|--------------------|---|
| Service \$08 | <p>—</p> <p>This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed.</p> <p>In the following conditions, this diagnostic service cannot function.</p> <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system |
| Service \$09 | <p>(CALIBRATION ID)</p> <p>This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.</p> |

INSPECTION PROCEDURE

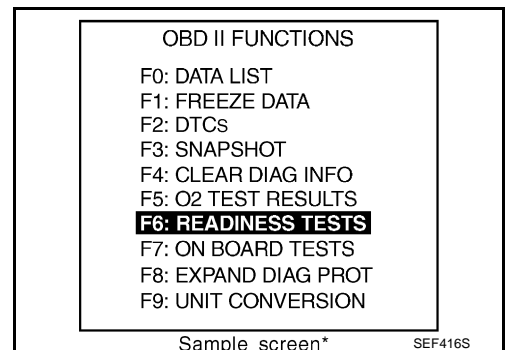
1. Turn ignition switch OFF.
2. Connect "GST" to data link connector (2), which is located under LH dash panel near the hood opener handle (1).



3. Turn ignition switch ON.
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.



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EC
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COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000001343648

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode of CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" of "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" of "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 light 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 (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

INFOID:000000001343649

1. START

Make sure 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/cm², 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
 - CVT models: 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).
 - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied*
- Engine speed: Idle

*: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

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

With CONSULT-III

NOTE:

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

1. Perform [EC-24. "BASIC INSPECTION : Special Repair Requirement"](#).
2. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

YES >> END

NO >> Go to [EC-137. "Diagnosis Procedure"](#).

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

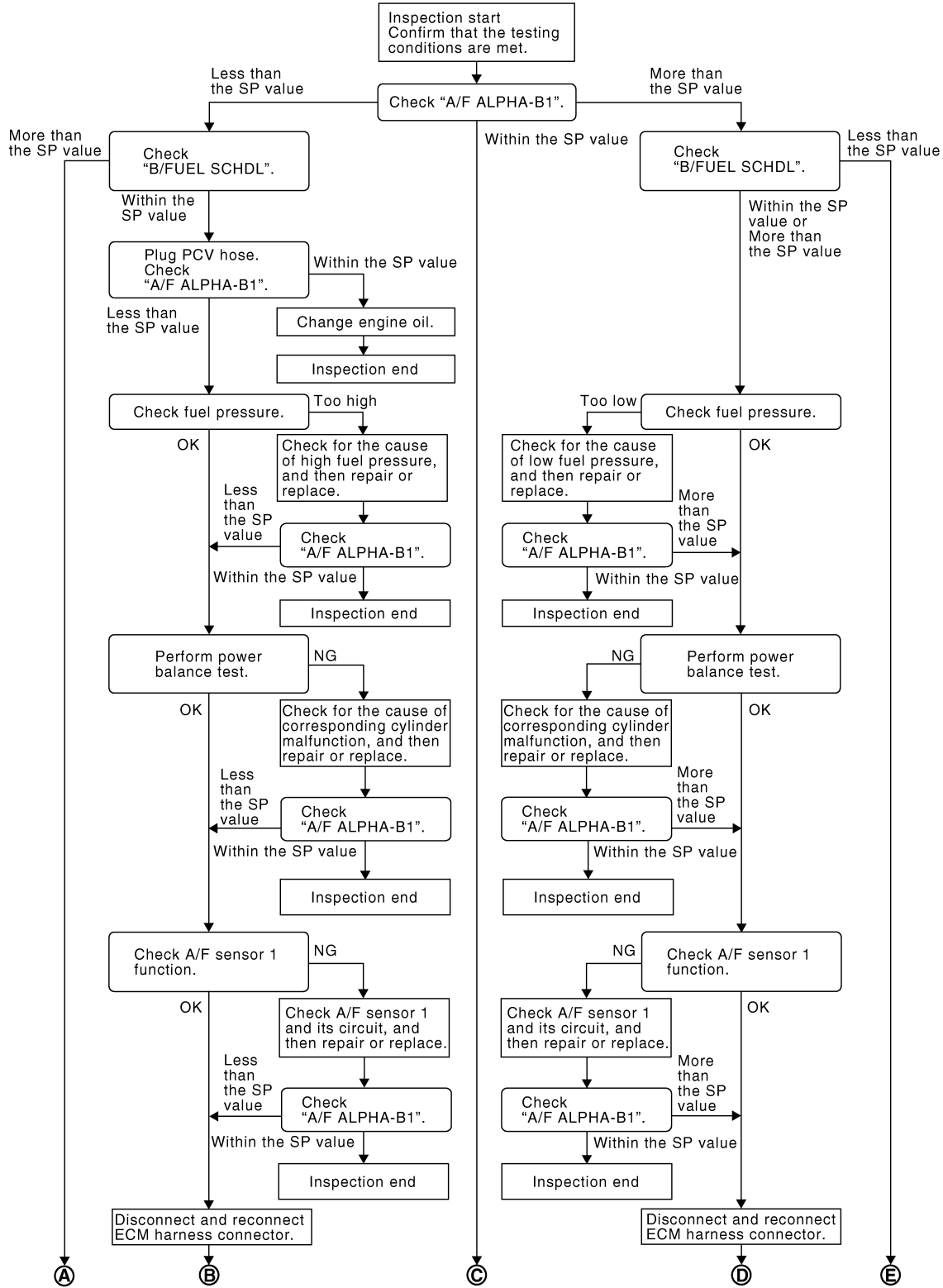
< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Diagnosis Procedure

INFOID:000000001343650

OVERALL SEQUENCE

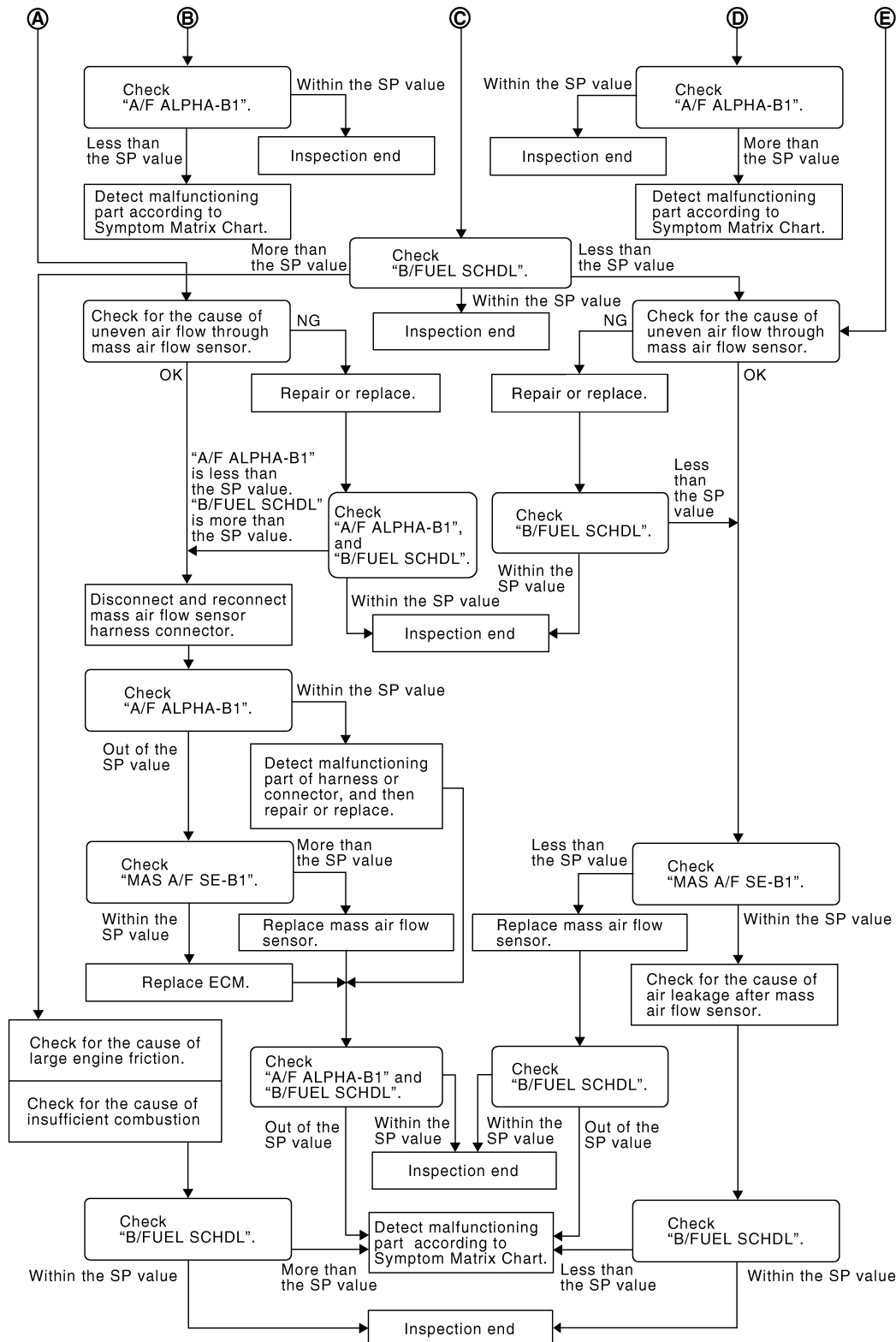


PBIB2318E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]



PBIB3213E

DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

④ With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-136, "Component Function Check"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the each indication is within the SP value.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NOTE:

Check "A/F ALPHA-B1" 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 make sure 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 make sure 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"

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the 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 condition.

>> INSPECTION END

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-533, "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.

7.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 and then GO TO 8.

8.CHECK "A/F ALPHA-B1"

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> GO TO 12.
NO >> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the following.

1. Ignition coil and its circuit (Refer to [EC-460. "Component Function Check".](#))
2. Fuel injector and its circuit (Refer to [EC-453. "Component Function Check".](#))
3. Intake air leakage
4. Low compression pressure (Refer to [EM-23. "Compression pressure".](#))

Is the inspection result normal?

- YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 12.

12.CHECK A/F SENSOR 1 FUNCTION

Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.

- For DTC P0130, refer to [EC-192. "DTC Logic".](#)
- For DTC P0131, refer to [EC-196. "DTC Logic".](#)
- For DTC P0132, refer to [EC-199. "DTC Logic".](#)
- For DTC P0133, refer to [EC-202. "DTC Logic".](#)
- For DTC P2A00, refer to [EC-436. "DTC Logic".](#)

Is any DTC detected?

- YES >> GO TO 15.
NO >> GO TO 13.

13.CHECK A/F SENSOR 1 CIRCUIT

Perform DIAGNOSTIC PROCEDURE according to corresponding DTC.

>> GO TO 14.

14.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 15.

15.DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

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"

1. Start engine.
2. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure 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 [EC-522. "Symptom Table"](#).

17.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure 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", AND "B/FUEL SCHDL"

Select "A/F ALPHA-B1" and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure that the 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" is 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.

>> GO TO 22.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

22.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-165, "DTC Logic"](#). Then GO TO 29.

NO >> GO TO 23.

23.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.

NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24.REPLACE ECM

1. Replace ECM.
2. Go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 29.

25.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 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 make sure that the indication is within the SP value.

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 make sure that the indication is within the SP value.

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

Check for the cause of air leak after the mass air flow sensor. Refer to the following.

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts

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< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- Malfunctioning seal of intake air system, etc.

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>> GO TO 30.

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

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Select "A/F ALPHA-B1" and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure 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 [EC-522, "Symptom Table"](#).

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30.CHECK "B/FUEL SCHDL"

D

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then make sure 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 [EC-522, "Symptom Table"](#).

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POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000001343651

1.INSPECTION START

Start engine.

Is engine running?

- YES >> GO TO 8.
- NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 93 | Ground | Battery voltage |

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 E18
- 10A fuse (No. 35)
- Harness for open or short between ECM and fuse

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

4.CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

Is the inspection result normal?

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

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E11
- Harness for open or short between ECM and ground

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

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F10 | 53 | Ground | Battery voltage |

Is the inspection result normal?

YES >> Go to [EC-460, "Diagnosis Procedure"](#).

NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|--|
| Connector | Terminal | | |
| E10 | 105 | Ground | After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V. |

Is the inspection result normal?

YES >> GO TO 14.

NO-1 >> Battery voltage does not exist: GO TO 9.

NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

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 and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 24 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 12.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E18.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 105 | E18 | 10 | Existed |

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

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POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Is the inspection result normal?

YES >> GO TO 17.

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Junction block connectors E44, E45
- Harness for open or short between ECM and IPDM E/R

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

12. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 24 | F10 | 69 | Existed |

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

Is the inspection result normal?

YES >> GO TO 13.

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

13. CHECK 15A FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.
2. Check 15A fuse.

Is the inspection result normal?

YES >> GO TO 17.

NO >> Replace 15A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 17.

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

NO >> GO TO 16.

16.DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors F2, E11
- Harness for open or short between ECM and ground

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

17.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

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

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U1000, U1001 CAN COMM CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

U1000, U1001 CAN COMM CIRCUIT

Description

INFOID:000000001343652

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:000000001343653

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|---|
| U1000 | CAN communication line | When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) for 2 seconds or more. | • Harness or connectors (CAN communication line is open or shorted) |
| U1001 | | When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related 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-148. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343654

Go to [LAN-16. "Trouble Diagnosis Flow Chart"](#).

U1010 CONTROL UNIT (CAN)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

U1010 CONTROL UNIT (CAN)

Description

INFOID:000000001665496

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:000000001343656

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|----------------|
| U1010 | CAN communication bus | When detecting error during the initial diagnosis 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 [EC-149, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343657

1. INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-149, "DTC Logic"](#).
5. Check DTC.

With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-149, "DTC Logic"](#).
4. Check DTC.

Is the DTC U1010 displayed again?

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

2. REPLACE ECM

1. Replace ECM.
2. Go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0011 IVT CONTROL

DTC Logic

INFOID:000000001343658

DTC DETECTION LOGIC

NOTE:

If DTC P0011 is displayed with DTC P0075, first perform the trouble diagnosis for [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | Detecting condition | Possible cause |
|---------|---|--|---|
| P0011 | Intake valve timing control performance | There is a gap between angle of target and phase-control angle degree. | <ul style="list-style-type: none"> • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

 **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. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

| | |
|---------------|--|
| VHCL SPEED SE | 100 - 120 km/h (63 - 75 mph) |
| ENG SPEED | 1,700 - 2,000 rpm |
| COOLAN TEMP/S | More than 60°C (140°F) |
| B/FUEL SCHDL | More than 3.5 msec |
| Shift lever | D position (CVT) 5th position (M/T) |

CAUTION:

Always drive at a safe speed.

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-151, "Diagnosis Procedure"](#)
 NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

 **With CONSULT-III**

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

< COMPONENT DIAGNOSIS >

| | |
|-------------------------|---|
| ENG SPEED | 1,200 - 3,175 rpm (A constant rotation is maintained.) |
| COOLAN TEMP/S | More than 70°C (221°F) |
| Shift lever | 1st or 2nd position |
| Driving location uphill | Driving vehicle uphill (Increased engine load will help maintain the driving conditions required 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 [EC-151. "Diagnosis Procedure"](#)
- NO >> INSPECTION END

Diagnosis Procedure

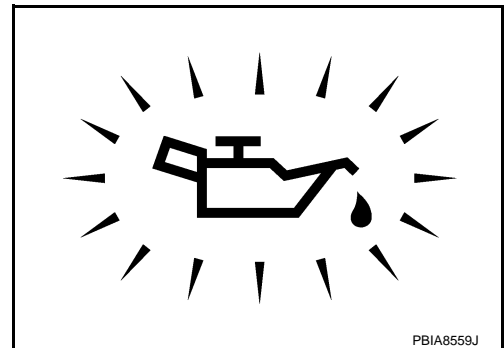
INFOID:000000001343659

1. CHECK OIL PRESSURE WARNING LAMP

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

Is oil pressure warning lamp illuminated?

- YES >> Go to [LU-9. "Inspection"](#).
- NO >> GO TO 2.



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2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-152. "Component Inspection"](#).

Is the inspection result normal?

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

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-273. "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-276. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

P0011 IVT CONTROL

[QR25DE FOR CALIFORNIA]

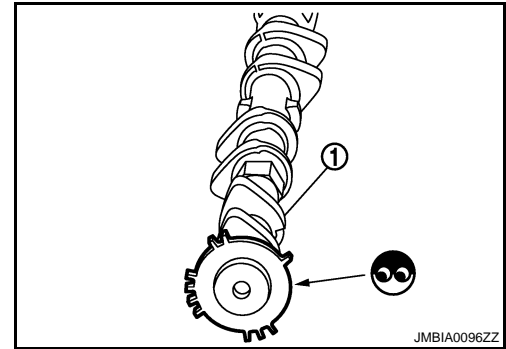
< COMPONENT DIAGNOSIS >

- Accumulation of debris to the signal plate of camshaft (1) 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 misaligned.

Are there any service records that may cause timing chain misaligned?

YES >> Check timing chain installation. Refer to [EM-52, "Removal and Installation"](#).

NO >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to [EM-48, "Inspection After Installation"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343660

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (Continuity should not exist) |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

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

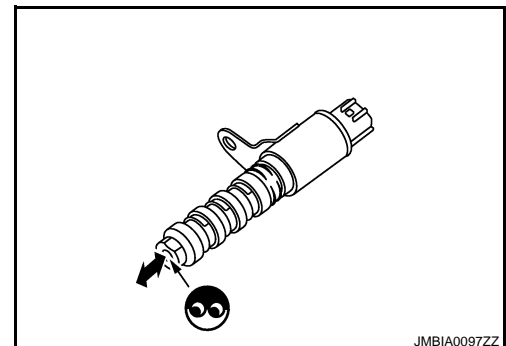
CAUTION:

Do not apply 12V 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?



P0011 IVT CONTROL

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- YES >> INSPECTION END
- NO >> Replace intake valve timing control solenoid valve.

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

O

P

P0031, P0032 A/F SENSOR 1 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0031, P0032 A/F SENSOR 1 HEATER

Description

INFOID:000000001343661

SYSTEM DESCRIPTION

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

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 at the specified range.

DTC Logic

INFOID:000000001343662

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P0031 | Air fuel ratio (A/F) sensor 1 heater control circuit low | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)• A/F sensor 1 heater |
| P0032 | Air fuel ratio (A/F) sensor 1 heater control circuit high | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 heater circuit is shorted.)• A/F sensor 1 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than between 11V 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-154, "Diagnosis Procedure"](#).

NG >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343663

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 air fuel ratio (A/F) sensor 1 harness connector.
2. Turn ignition switch ON.

P0031, P0032 A/F SENSOR 1 HEATER

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check the voltage between A/F sensor 1 harness connector and ground.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- 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 the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 3 | F14 | 4 | 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 or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-155, "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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

>> Repair or replace.

Component Inspection

INFOID:000000001343664

1. CHECK AIR FUEL RATIO (A/F) SENSOR 1

1. Turn ignition switch OFF.

P0031, P0032 A/F SENSOR 1 HEATER

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Disconnect A/F sensor 1 harness connector.
3. Check resistance between A/F sensor 1 terminals as follows.

| Terminals | Resistance |
|------------|---|
| 3 and 4 | 1.98 - 2.66 Ω [at 25°C (77°F)] |
| 3 and 1, 2 | $\infty\Omega$ (Continuity should not exist) |
| 4 and 1, 2 | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

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

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

CAUTION:

- Discard any 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 sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0037, P0038 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0037, P0038 HO2S2 HEATER

Description

INFOID:000000001343665

SYSTEM DESCRIPTION

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|----------------------------|--|-------------------------------|
| Camshaft position sensor (PHASE) Crankshaft position sensor (POS) | Engine speed | Heated oxygen sensor 2 heater control | Heated oxygen sensor 2 heater |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| 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 rpm | Heated oxygen sensor 2 heater |
|---|-------------------------------|
| Above 3,600 | OFF |
| Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none">• Engine: After warming up• Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | ON |

DTC Logic

INFOID:000000001343666

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0037 | Heated oxygen sensor 2 heater control circuit low | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)• Heated oxygen sensor 2 heater |
| P0038 | Heated oxygen sensor 2 heater control circuit high | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)• Heated oxygen sensor 2 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. 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. 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. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

P0037, P0038 HO2S2 HEATER

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is 1st tip DTC detected?

- YES >> Go to [EC-158, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343667

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

| HO2S2 | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F42 | 2 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector F10
- 15A fuse (No. 37)
- Harness for open or short between heated oxygen sensor 2 and fuse

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

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 3 | F14 | 13 | 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 or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-159, "Component Inspection"](#).

Is the inspection result normal?

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

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

P0037, P0038 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343668

1. CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

| Terminals | Resistance |
|---------------|-------------------------------------|
| 2 and 3 | 3.3 - 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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0043, P0044 HO2S3 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0043, P0044 HO2S3 HEATER

Description

INFOID:000000001343669

SYSTEM DESCRIPTION

| Sensor | Input signal to ECM | ECM function | Actuator |
|-----------------------------------|----------------------------|---------------------------------------|-------------------------------|
| Camshaft position sensor (PHASE) | Engine speed | Heated oxygen sensor 3 heater control | Heated oxygen sensor 3 heater |
| Crankshaft position sensor (POS) | | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Mass air flow sensor | Amount of intake air | | |

The ECM performs ON/OFF control of the heated oxygen sensor 3 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

| Engine speed | Heated oxygen sensor 3 heater |
|---|-------------------------------|
| Above 3,600 rpm | OFF |
| Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none">• Engine: After warming up• Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | ON |

DTC Logic

INFOID:000000001343670

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0043 | Heated oxygen sensor 3 heater control circuit low | The current amperage in the heated oxygen sensor 3 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 3 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 3 heater circuit is open or shorted.)• Heated oxygen sensor 3 heater |
| P0044 | Heated oxygen sensor 3 heater control circuit high | The current amperage in the heated oxygen sensor 3 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 3 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 3 heater circuit is shorted.)• Heated oxygen sensor 3 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

CAUTION:

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

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.

P0043, P0044 HO2S3 HEATER

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

- Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-161, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343671

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK HO2S3 POWER SUPPLY CIRCUIT

- Disconnect heated oxygen sensor 3 harness connector.
- Turn ignition switch ON.
- Check the voltage between HO2S3 harness connector and ground.

| HO2S3 | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F102 | 2 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F58, F101
- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between heated oxygen sensor 3 and fuse

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

4. CHECK HO2S3 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 3 | F14 | 17 | Existed |

- 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

P0043, P0044 HO2S3 HEATER

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Check the following.

- Harness connectors F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

6. CHECK HEATED OXYGEN SENSOR 3 HEATER

Refer to [EC-162, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 7.

7. REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343672

1. CHECK HEATED OXYGEN SENSOR 3 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 3 harness connector.
3. Check resistance between HO2S3 terminals as follows.

| Terminal | 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 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0075 IVT CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0075 IVT CONTROL SOLENOID VALVE

Description

INFOID:000000001343673

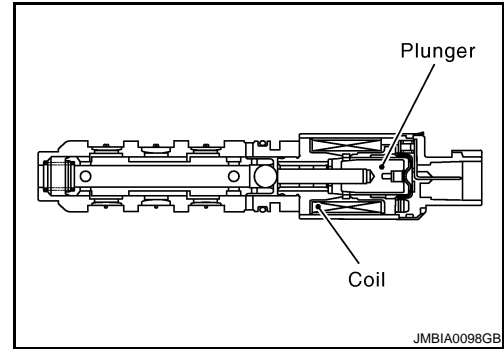
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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 angle.

The shorter pulse width retards valve angle.

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.



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DTC Logic

INFOID:000000001343674

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P0075 | Intake valve timing control solenoid valve circuit | An improper voltage is sent to the ECM through intake valve timing control solenoid valve. | <ul style="list-style-type: none"> Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) Intake valve timing control solenoid valve |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Go to [EC-163, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343675

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

- Turn ignition switch OFF.
- Disconnect intake valve timing control solenoid valve harness connector.
- Turn ignition switch ON.
- Check the voltage between intake valve timing control solenoid valve harness connector and ground.

| IVT control solenoid valve | | Ground | Voltage |
|----------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F59 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

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

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

P0075 IVT CONTROL SOLENOID VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

| IVT control solenoid valve | | ECM | | Continuity |
|----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F59 | 2 | F13 | 78 | 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 or 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 intake valve timing control solenoid valve.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665497

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (Continuity should not exist) |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

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

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

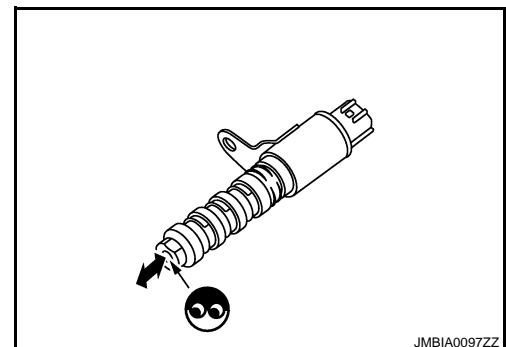
NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve.



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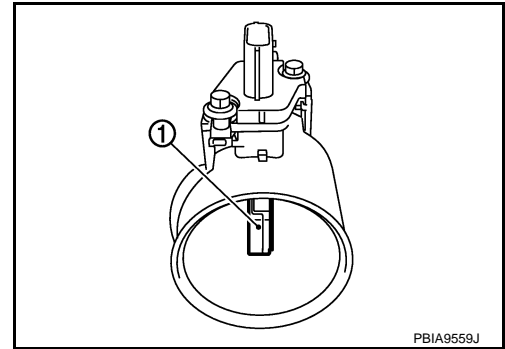
P0101 MAF SENSOR

Description

INFOID:000000001343677

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 more air, 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.



DTC Logic

INFOID:000000001343678

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|--|-------------------------|---|--|
| P0101 | Mass air flow sensor circuit range/performance | A) | A high voltage from the sensor is sent to ECM under light load driving condition. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor • EVAP control system pressure sensor |
| | | B) | A low voltage from the sensor is sent to ECM under heavy load driving condition. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor • EVAP control system pressure sensor • Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch ON) instead of running engine at idle speed.

>> 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-167, "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.
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-167, "Diagnosis Procedure"](#).

P0101 MAF SENSOR

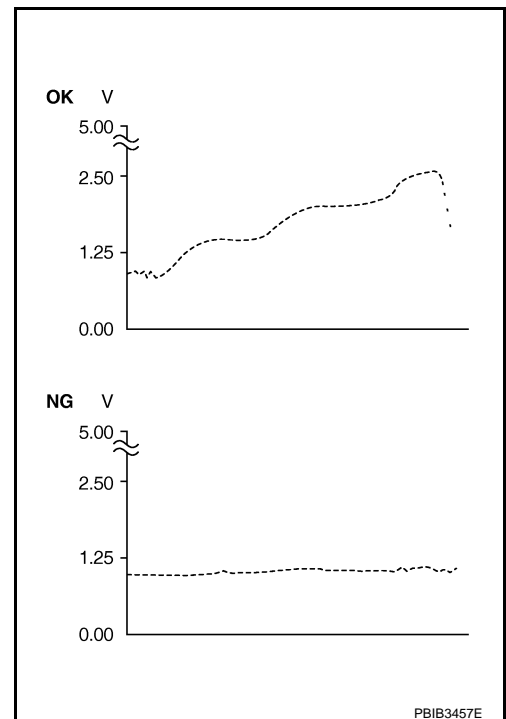
[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
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-167, "Diagnosis Procedure"](#).



4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

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

| | |
|------------------|--|
| ENG SPEED | More than 2,000 rpm |
| THRTL SEN 1-B1 | More than 3V |
| THRTL SEN 2-B1 | More than 3V |
| Shift lever | Suitable position |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

CAUTION:

Always drive vehicle at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-167, "Diagnosis Procedure"](#).
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to [EC-166, "Component Function Check"](#).

NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-167, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343679

1. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.

P0101 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check the mass air flow sensor signal with Service \$01.
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-167, "Diagnosis Procedure"](#).

| | |
|--------------|-------------------|
| CALC LOAD | 20% |
| COOLANT TEMP | 95°C |
| SHORT FT #1 | 2% |
| LONG FT #1 | 0% |
| SHORT FT #2 | 4% |
| LONG FT #2 | 0% |
| ENGINE SPD | 2637RPM |
| VEHICLE SPD | 0MPH |
| IGN ADVANCE | 41.0° |
| INTAKE AIR | 41°C |
| MAF | 14.1gm/sec |
| THROTTLE POS | 3% |

SEF534P

Diagnosis Procedure

INFOID:000000001343680

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-165, "DTC Logic"](#).

Which malfunction is detected?

- A >> GO TO 3.
B >> GO TO 2.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 5 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44
- Harness connector E11,F2
- 15A fuse (No. 42)
- 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 or short to ground or short to power in harness or connectors.

P0101 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8. CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor.

Refer to [EC-177, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-311, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-168, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

11. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343681

1. CHECK MASS AIR FLOW SENSOR-I

 With CONSULT-III

1. Turn ignition switch OFF.

P0101 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Reconnect all harness connectors disconnected.
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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

P0101 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

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

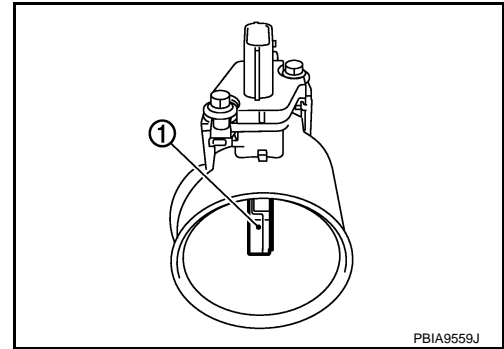
P0102, P0103 MAF SENSOR

Description

INFOID:000000001665499

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 more air, 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.



DTC Logic

INFOID:000000001343683

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0102 | Mass air flow sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor |
| P0103 | Mass air flow sensor circuit high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

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-172. "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-172. "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.

Is DTC detected?

- YES >> Go to [EC-172. "Diagnosis Procedure"](#).

P0102, P0103 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343684

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.

NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 5 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44
- Harness connector E11,F2
- 15A fuse (No. 42)
- 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 56 | Existed |

P0102, P0103 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-168, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665500

1. CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

P0102, P0103 MAF SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

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

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

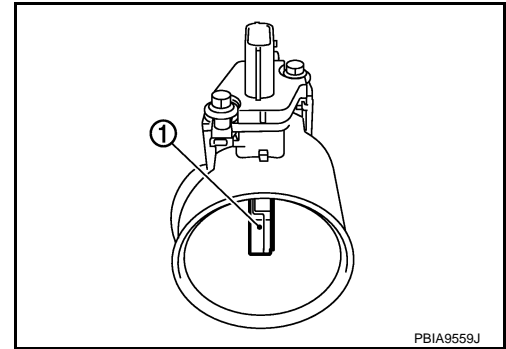
P0112, P0113 IAT SENSOR

Description

INFOID:000000001343686

The intake air temperature sensor is built-into 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 temperature rise.



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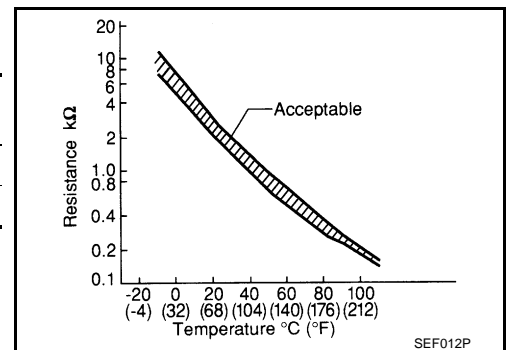
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



SEF012P

DTC Logic

INFOID:000000001343687

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0112 | Intake air temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor |
| P0113 | Intake air temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-177, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

P0112, P0113 IAT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

INFOID:000000001343688

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "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 | Terminal | | |
| F31 | 2 | Ground | Approx. 5V |

Is the inspection result normal?

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

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| MAF sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 1 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-177. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343689

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 follows.

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminals | Condition | | Resistance kΩ |
|-----------|--------------------------------|---------|---------------|
| 1 and 2 | Intake air temperature °C (°F) | 25 (77) | 1.800 - 2.200 |

Is the inspection result normal?

YES >> INSPECTION END

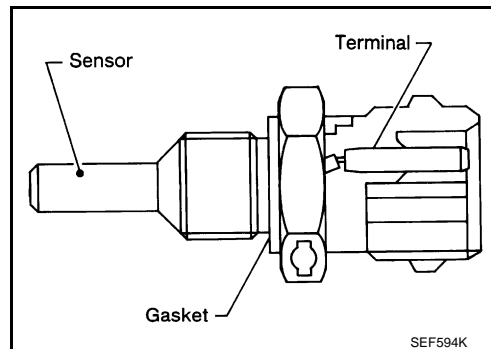
NO >> Replace mass air flow sensor (with intake air temperature sensor).

P0117, P0118 ECT SENSOR

Description

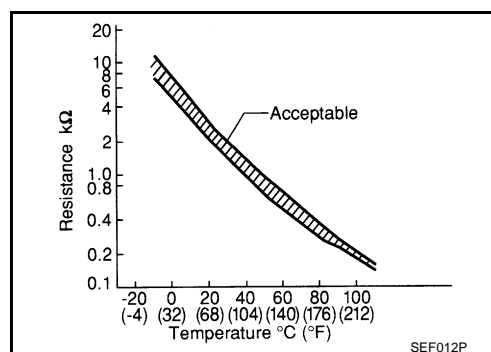
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The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor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



<Reference data>

| Engine coolant temperature °C (°F) | Voltage* V | Resistance kΩ |
|---------------------------------------|------------|---------------|
| -10 (14) | 4.4 | 7.0 - 11.4 |
| 20 (68) | 3.5 | 2.37 - 2.63 |
| 50 (122) | 2.2 | 0.68 - 1.00 |
| 90 (194) | 0.9 | 0.236 - 0.260 |



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

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001343691

DTC DETECTION LOGIC

| DTC No. | Trouble Diagnosis Name | DTC Detecting Condition | Possible Cause |
|---------|--|---|---|
| P0117 | Engine coolant temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor |
| P0118 | Engine coolant temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-180. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

P0117, P0118 ECT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

INFOID:000000001343692

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

| ECT sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| F11 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| ECT sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F11 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-180. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343693

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

P0117, P0118 ECT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

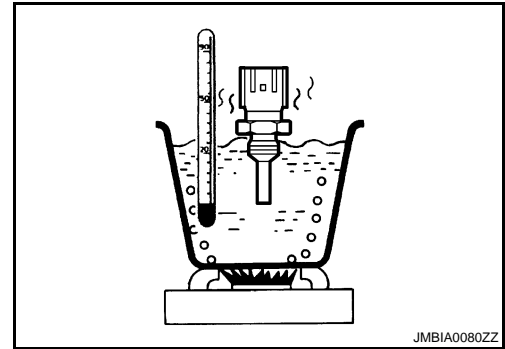
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition | | Resistance |
|-----------|---------------------|----------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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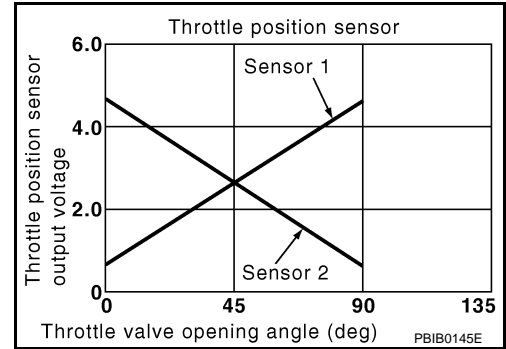
P0122, P0123 TP SENSOR

Description

INFOID:000000001343694

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 signal 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.



DTC Logic

INFOID:000000001343695

DTC DETECTION LOGIC

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0122 | Throttle position sensor 2 circuit low input | An excessively low voltage from the TP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> 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 style="list-style-type: none"> Electric throttle control actuator (TP sensor 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-182, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343696

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

P0122, P0123 TP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator | | Ground | Voltage |
|------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-184, "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. Go to [EC-184, "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-184, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

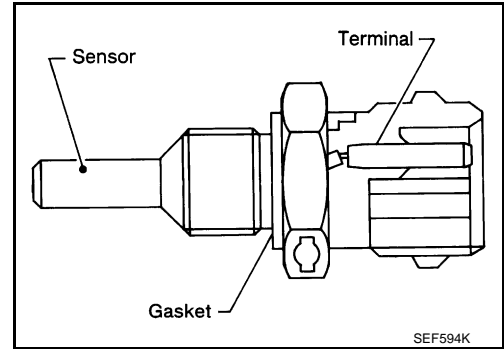
>> END

P0125 ECT SENSOR

Description

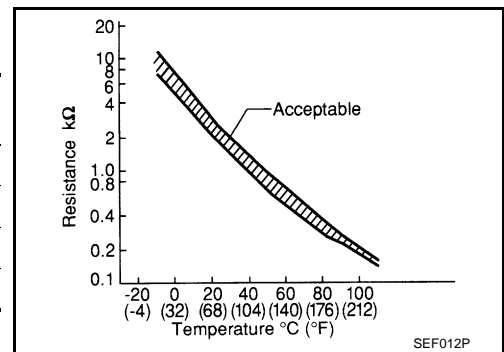
INFOID:000000001665501

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.



<Reference data>

| Engine coolant temperature °C (°F) | Voltage* V | Resistance kΩ |
|---------------------------------------|------------|---------------|
| -10 (14) | 4.4 | 7.0 - 11.4 |
| 20 (68) | 3.5 | 2.37 - 2.63 |
| 50 (122) | 2.2 | 0.68 - 1.00 |
| 90 (194) | 0.9 | 0.236 - 0.260 |



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

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001343700

DTC DETECTION LOGIC

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-179, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0125 | Insufficient engine coolant temperature for closed loop fuel control | <ul style="list-style-type: none"> Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. Engine coolant temperature is insufficient for closed loop fuel control. | <ul style="list-style-type: none"> Harness or connectors (High resistance in the circuit) Engine coolant temperature sensor Thermostat |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

With CONSULT-III

- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Check that "COOLAN TEMP/S" is above 10°C (50°F).

< COMPONENT DIAGNOSIS >

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is it above 10°C (50°F)?

- YES >> INSPECTION END
- NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Start engine and run it for 65 minutes at idle speed.
2. Check 1st trip DTC.

If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.

CAUTION:

Be careful not to overheat engine.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> [EC-186, "Diagnosis Procedure"](#)
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343701

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-180, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace engine coolant temperature sensor.

3. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace thermostat. Refer to [CO-20, "Removal and Installation"](#).

4. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665502

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

P0125 ECT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

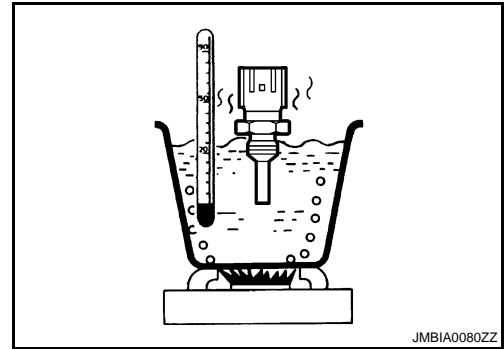
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition | | Resistance |
|-----------|---------------------|----------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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P0127 IAT SENSOR

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[QR25DE FOR CALIFORNIA]

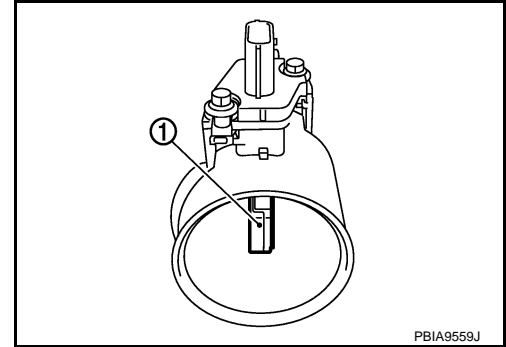
P0127 IAT SENSOR

Description

INFOID:000000001665504

The intake air temperature sensor is built-into 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 temperature rise.



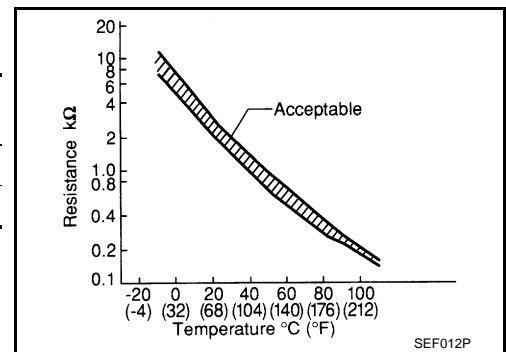
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000001343704

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------|---|--|
| P0127 | Intake air temperature too high | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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.
 - If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.

P0127 IAT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NOTE:

- Perform the following steps before engine coolant temperature is above 90°C (194°F).
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Start engine.
- Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

- Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-189, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343705

1.CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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-177, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665505

1.CHECK INTAKE AIR TEMPERATURE SENSOR

- Turn ignition switch OFF.
- Disconnect mass air flow sensor harness connector.
- Check resistance between mass air flow sensor terminals as follows.

| Terminals | Condition | Resistance kΩ |
|-----------|--|---------------|
| 1 and 2 | Intake air 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 >

[QR25DE FOR CALIFORNIA]

P0128 THERMOSTAT FUNCTION

DTC Logic

INFOID:000000001343707

DTC DETECTION LOGIC

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P0128 | Thermostat function | The engine coolant temperature does not reach to specified temperature even though the engine has run long enough. | <ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

- 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 71°C (160°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Replace thermostat with new one. Refer to [CO-20. "Removal and Installation"](#). Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch ON.
3. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
4. Check the indication of "COOLAN TEMP/S"
If it is below 71°C (160°F), go to following step.
If it is above 71°C (160°F), cool down the engine to less than 71°C (160°F). Then go to next steps.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

| | |
|---------------|-----------------------------|
| VHCL SPEED SE | 80 - 120 km/h (50 - 75 mph) |
|---------------|-----------------------------|

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-190. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343708

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-186. "Component Inspection"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

P0128 THERMOSTAT FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Component Inspection

INFOID:000000001665506

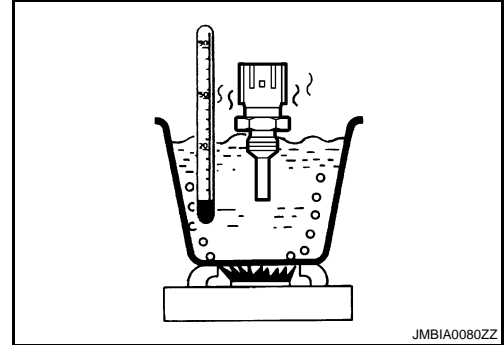
1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

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 by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance | |
|-----------|---------------------|------------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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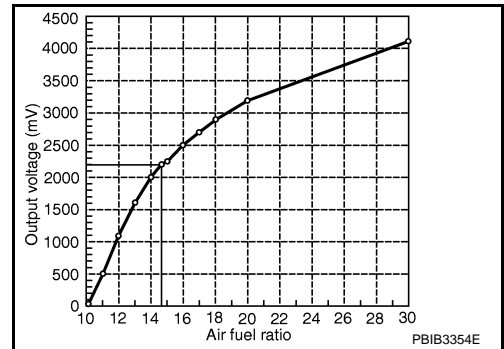
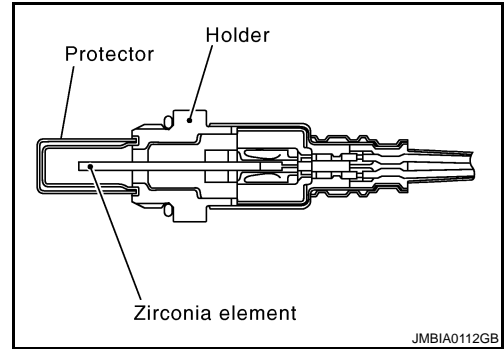
P

P0130 A/F SENSOR 1

Description

INFOID:000000001343710

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001343711

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 fluctuates according to fuel feedback control.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible Cause |
|---------|---------------------------------------|-------------------------|---|--|
| P0130 | Air fuel ratio (A/F) sensor 1 circuit | A) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2V. | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1 |
| | | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2V. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Let it idle for 2 minutes.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-194, "Diagnosis Procedure"](#).
- NO-1 >> With CONSULT-III: GO TO 3.

< COMPONENT DIAGNOSIS >

NO-2 >> Without CONSULT-III: GO TO 7.

3.CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

1. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
2. Check "A/F SEN1 (B1)" indication.

Does the indication fluctuates around 2.2V?

- YES >> GO TO 4.
 NO >> Go to [EC-194, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-I

1. Select "A/F SEN1 (B1) P1276" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
2. Touch "START".
3. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen.

| | |
|---------------|--|
| ENG SPEED | 1,750 - 2,600 rpm |
| VHCL SPEED SE | More than 64 km/h (40 mph) |
| B/FUEL SCHDL | 1.0 - 8.0 msec |
| Shift lever | D position (CVT) 5th position (M/T) |

If "TESTING" is not displayed after 20 seconds, retry from step 2.

CAUTION:

Always drive vehicle at a safe speed.

Is "TESTING" displayed on CONSULT-III screen?

- YES >> GO TO 5.
 NO >> Check A/F sensor 1 function again. GO TO 3.

5.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-II

Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

Which does "TESTING" change to?

- COMPLETED>>GO TO 6.
 OUT OF CONDITION>>Retry DTC CONFIRMATION PROCEDURE. GO TO 4.

6.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-III

Touch "SELF-DIAG RESULT"

Which is displayed on CONSULT-III screen?

- YES >> INSPECTION END
 NO >> Go to [EC-194, "Diagnosis Procedure"](#).

7.PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform Component Function Check. Refer to [EC-193, "Component Function Check"](#).

NOTE:

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
 NO >> Go to [EC-194, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343712

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.

P0130 A/F SENSOR 1

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Set D (CVT) or 1st (M/T) position, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-194, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343713

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

P0130 A/F SENSOR 1

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

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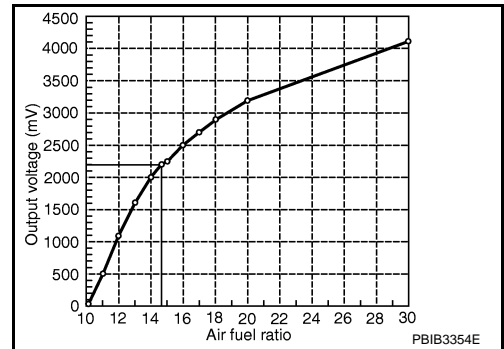
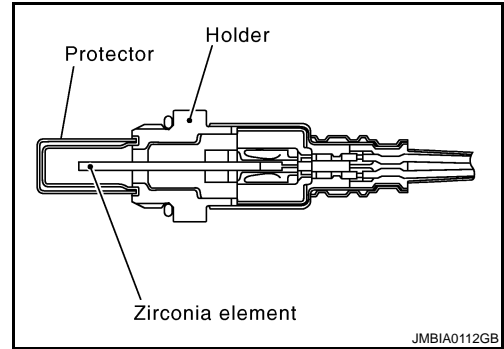
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P0131 A/F SENSOR 1

Description

INFOID:000000001665514

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001343715

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 circuit low voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR FUNCTION

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 0V?

YES >> Go to [EC-197. "Diagnosis Procedure"](#).

< COMPONENT DIAGNOSIS >

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|---------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Shift lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-197, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343716

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0131 A/F SENSOR 1

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

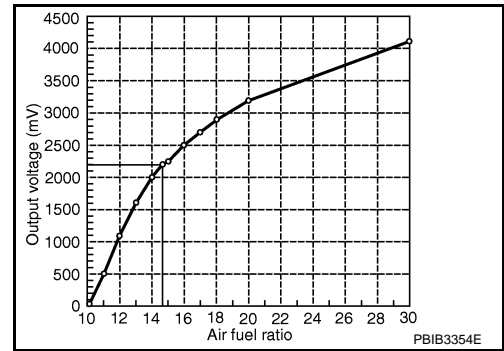
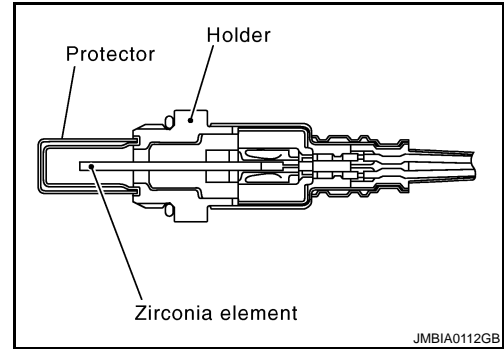
>> INSPECTION END

P0132 A/F SENSOR 1

Description

INFOID:000000001665515

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001343718

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 circuit high voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR FUNCTION

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 5V?

YES >> Go to [EC-200. "Diagnosis Procedure"](#).

< COMPONENT DIAGNOSIS >

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|---------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Shift lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC is detected?

- YES >> Go to [EC-200, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343719

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0132 A/F SENSOR 1

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

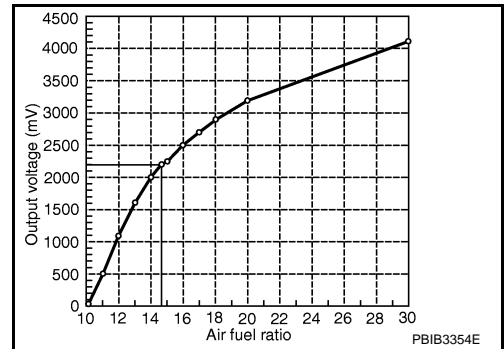
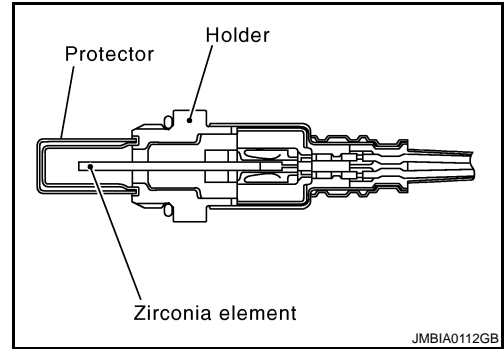
>> INSPECTION END

P0133 A/F SENSOR 1

Description

INFOID:000000001665516

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001343721

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 circuit slow response | <ul style="list-style-type: none"> The response of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks Exhaust gas leaks PCV Mass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

2. 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. 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. Select "A/F SEN1(B1) P1278/P1279" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
6. Touch "START".

Is "COMPLETED" displayed on COUSULT-III?

- YES >> GO TO 3
 NO >> GO TO 4.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
 NG >> Go to [EC-204, "Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE

1. After perform the following procedure, "TESTING" will be displayed on the CONSULT-III screen.
 - Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
 - Fully release accelerator pedal and then let engine idle for about 10 seconds.

If "TESTING" is not displayed after 10 seconds, refer to [EC-136, "Component Function Check"](#).
2. Wait for about 20 seconds at idle at under the condition that "TESTING" is displayed on the CONSULT-III screen.
3. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-136, "Component Function Check"](#).
4. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
 NG >> Go to [EC-204, "Diagnosis Procedure"](#).

5. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.
3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.

Is the total percentage within $\pm 15\%$?

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

6. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

7. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

A
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< COMPONENT DIAGNOSIS >

3. Let engine idle for 1 minute.
4. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
5. Fully release accelerator pedal and then let engine idle for about 1 minute.
6. Check 1st trip DTC detected?.

Is 1st trip DTC detected?

- YES >> Go to [EC-204, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343722

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. RETIGHTEN A/F SENSOR 1

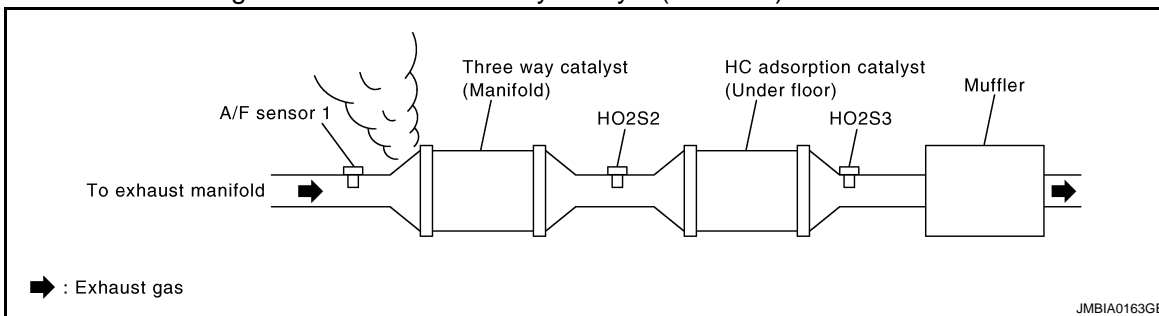
Loosen and retighten the A/F sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> Repair or replace.
 NO >> GO TO 4.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
 NO >> GO TO 5.

5. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-246, "DTC Logic"](#) or [EC-250, "DTC Logic"](#).
 NO >> GO TO 6.

P0133 A/F SENSOR 1

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

6. 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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-155. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.

Refer to [EC-168. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

< COMPONENT DIAGNOSIS >

11. CHECK PCV VALVE

Refer to [EC-471, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve.

12. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

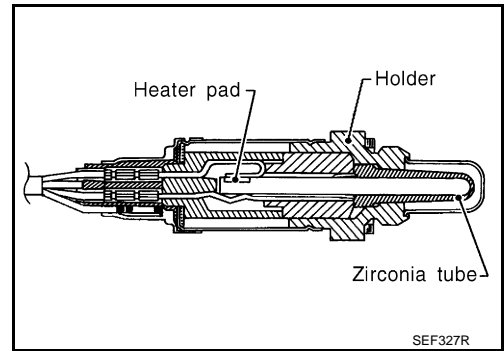
>> INSPECTION END

P0137 HO2S2

Description

INFOID:000000001343723

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

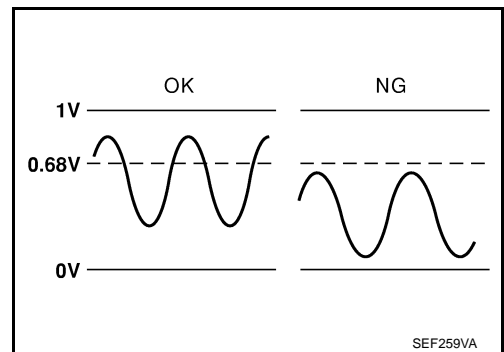


DTC Logic

INFOID:000000001343724

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 maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0137 | Heated oxygen sensor 2 circuit low voltage | The maximum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

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

TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

< COMPONENT DIAGNOSIS >

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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-209. "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-208. "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-209. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343725

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. 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V 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 and ground under the following condition.

< COMPONENT DIAGNOSIS >

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-209. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343726

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171. Refer to [EC-246. "DTC Logic"](#).
- 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 HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | 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 or 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.

< COMPONENT DIAGNOSIS >

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-210, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343727

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

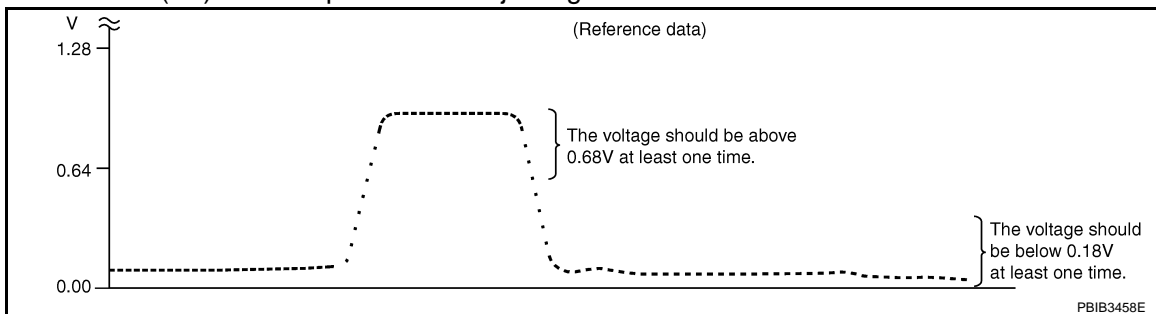
2.CHECK HEATED OXYGEN SENSOR 2

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)" as the monitor item with CONSULT-III.

< COMPONENT DIAGNOSIS >

7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

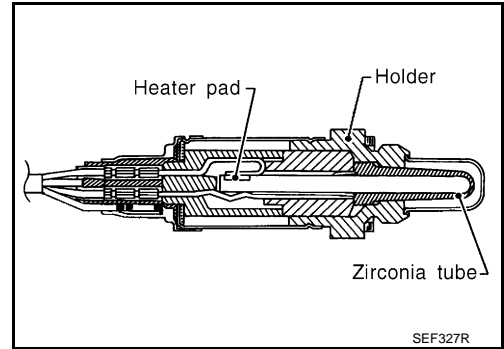
>> INSPECTION END

P0138 HO2S2

Description

INFOID:000000001665530

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



DTC Logic

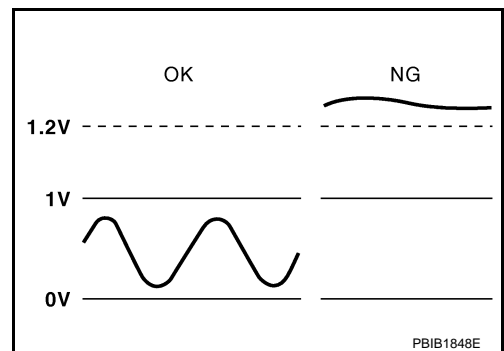
INFOID:000000001343729

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.

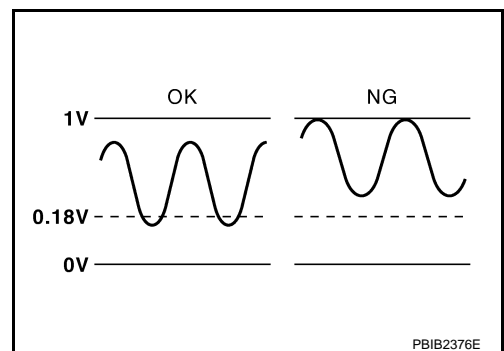
MALFUNCTION A

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition 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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|---|-------------------------|--|---|
| P0138 | Heated oxygen sensor 2 circuit high voltage | A) | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 |
| | | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector |

DTC CONFIRMATION PROCEDURE

< COMPONENT DIAGNOSIS >

1. PRECONDITIONING

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

>> 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. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-215. "Diagnosis Procedure"](#).
- 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. 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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III

- OK >> INSPECTION END
- NG >> Go to [EC-215. "Diagnosis Procedure"](#).
- CAN NOT BE DIAGNOSED >> GO TO 4.

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

Perform component function check. Refer to [EC-215. "Diagnosis Procedure"](#).

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-215. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343730

1. PERFORM COMPONENT FUNCTION CHECK-I

⊗ **Without CONSULT-III**

1. Start engine and warm it up to the normal operating temperature.

< 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-215, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343731

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-213, "DTC Logic"](#).

Which malfunction is detected?

- A >> GO TO 2.
 B >> GO TO 9.

2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace ground connection.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

< COMPONENT DIAGNOSIS >

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | 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 or 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.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-218, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

< COMPONENT DIAGNOSIS >

9. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.
 NO >> Repair or replace ground connection.

10. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0172. Refer to [EC-250, "DTC Logic"](#).
 NO >> GO TO 11.

11. 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 HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 12.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not existed |

3. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 13.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-218, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
 NO >> GO TO 14.

14. REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

15. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665531

1. INSPECTION START

Do you have CONSULT-III?

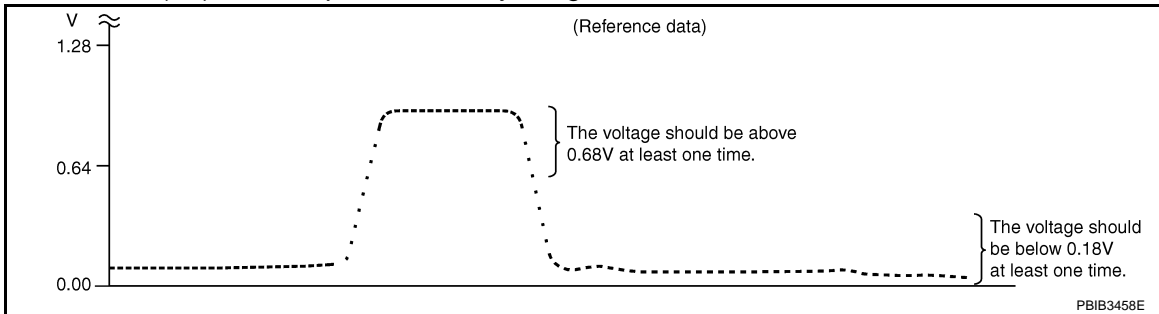
Do you have CONSULT-III?

- 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)" as the monitor item with CONSULT-III.
7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



**"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

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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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

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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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

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Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

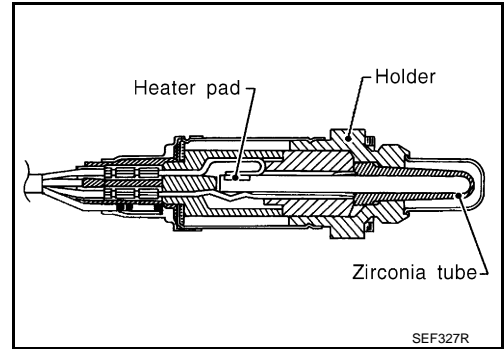
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P0139 HO2S2

Description

INFOID:000000001665532

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

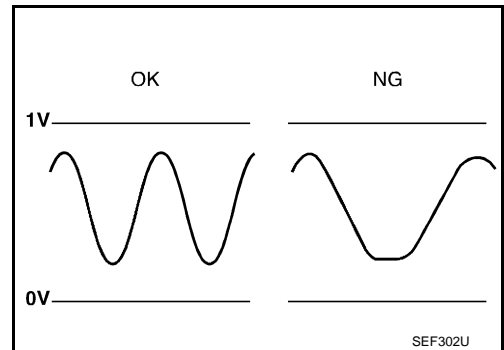


DTC Logic

INFOID:000000001343734

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 (mamifold) 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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0139 | Heated oxygen sensor 2 circuit slow response | It takes more time for the sensor to respond between rich and lean than the specified time. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

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.

< COMPONENT DIAGNOSIS >

3. Start engine and warm it up to the normal operating temperature.
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. Open engine hood.
7. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
8. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

9. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
- NG >> GO TO 4.
- CAN NOT BE DIAGNOSED>>GO TO 4.

4.PERFORM THE RESULT OF DTC CONFIRMATION PROCEDURE

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-221. "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-222. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343735

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. 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.30V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.30V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END

< COMPONENT DIAGNOSIS >

NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.30V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-222, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343736

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-246, "DTC Logic"](#) or [EC-250, "DTC Logic"](#).

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 HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | 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 or 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.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

< COMPONENT DIAGNOSIS >

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-223. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665533

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

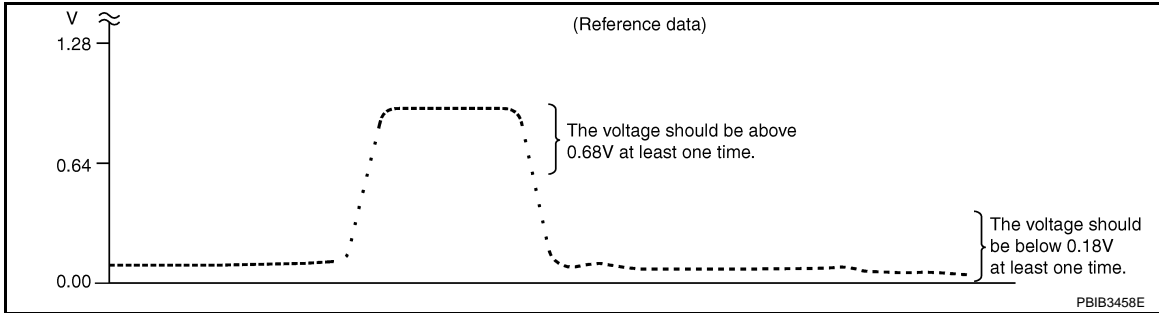
2.CHECK HEATED OXYGEN SENSOR 2

Ⓜ 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)" as the monitor item with CONSULT-III.

< COMPONENT DIAGNOSIS >

7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

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Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

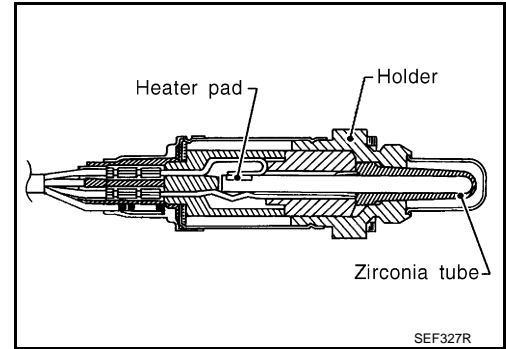
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P0143 HO2S3

Description

INFOID:000000001343738

The heated oxygen sensor 3, after HC adsorption catalyst (Under floor), monitors the oxygen level in the exhaust gas on each bank. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 3 is not used for engine control operation.

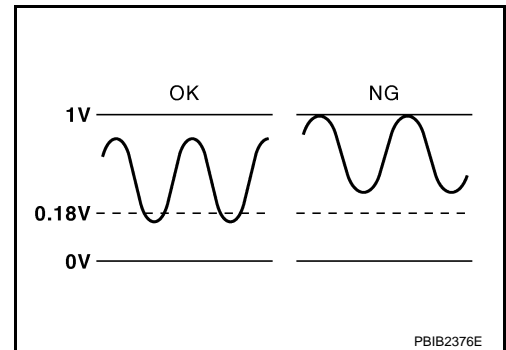


DTC Logic

INFOID:000000001343739

DTC DETECTION LOGIC

The heated oxygen sensor 3 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 3, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0143 | Heated oxygen sensor 3 circuit high voltage | The minimum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 3 • Fuel pressure • Fuel injector |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

CAUTION:

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

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 and select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
4. Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more until "INCMP" of "CATALYST" changes to "CMPLT".

NOTE:

- Keep the vehicle speed as steady as possible during the cruising.
 - It will take at most 3 minutes until "INCMP" of "CATALYST" changes to "CMPLT".
5. Select "HO2S3 HTR(B1)" in "DATA MONITOR" mode with CONSULT-III.

< COMPONENT DIAGNOSIS >

6. Drive vehicle at a speed of 80 km/h (50 MPH) or more until "OFF" of "HO2S3 HTR(B1)" changes to "ON".
NOTE:
 - **Keep the vehicle speed as steady as possible during the cruising.**
 - **It will take at most 3 minutes until "OFF" of "HO2S3 HTR(B1)" changes to "ON".**
 - **Never raise engine speed above 3,600 rpm in this step.**
7. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.
NOTE:
Keep the vehicle speed as steady as possible during the cruising.
8. Release accelerator pedal fully and stop vehicle with engine running.
9. Check 1st trip DTC.

 **With GST**

CAUTION:

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

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Stop vehicle with engine running.
5. Repeat steps 3 to 4 for 2 times.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-227, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343740

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0172. Refer to [EC-251, "Diagnosis Procedure"](#).
 NO >> GO TO 3.

3.CHECK HO2S3 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 3 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 1 | F13 | 35 | 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

< COMPONENT DIAGNOSIS >

Check the following.

- Harness connectors F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

5.CHECK HO2S3 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 4 | F13 | 34 | Existed |

2. Check the continuity between HO2S3 harness connector or ECM harness connector and ground.

| HO2S3 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F102 | 4 | F13 | 34 | Ground | Not existed |

3. Also check harness for 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 F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

7.CHECK HEATED OXYGEN SENSOR 3

Refer to [EC-228, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8.REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343741

1.INSPECTION START

Do you have CONSULT-III?

< COMPONENT DIAGNOSIS >

Do you have CONSULT-III?

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

2. CHECK HEATED OXYGEN SENSOR 3

With CONSULT-III

CAUTION:

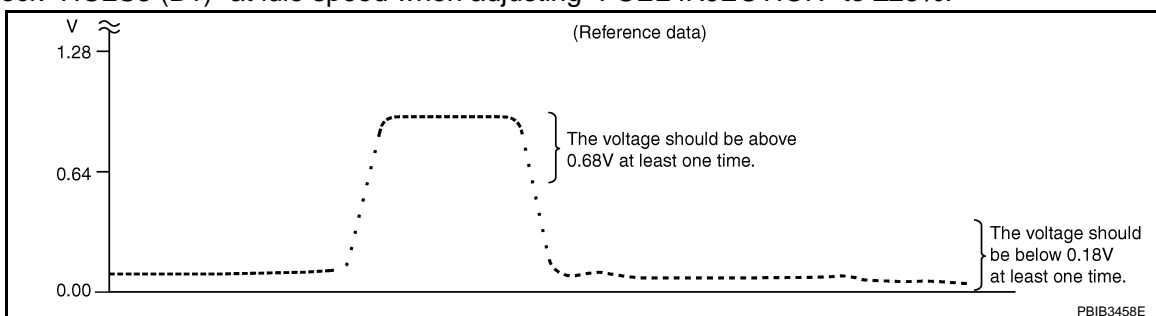
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S3 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S3 (B1)" should be below 0.18V 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 3-I

Without CONSULT-III

CAUTION:

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

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

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

4. CHECK HEATED OXYGEN SENSOR 3-II

1. Keep vehicle at idling for 10 minutes.

< COMPONENT DIAGNOSIS >

2. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 5.

5.CHECK HEATED OXYGEN SENSOR 3-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

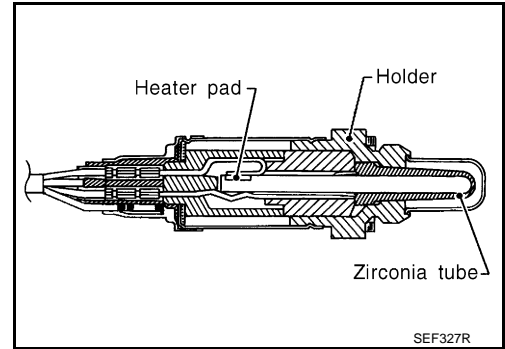
>> INSPECTION END

P0144 HO2S3

Description

INFOID:000000001665534

The heated oxygen sensor 3, after HC adsorption catalyst (Under floor), monitors the oxygen level in the exhaust gas on each bank. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 3 is not used for engine control operation.

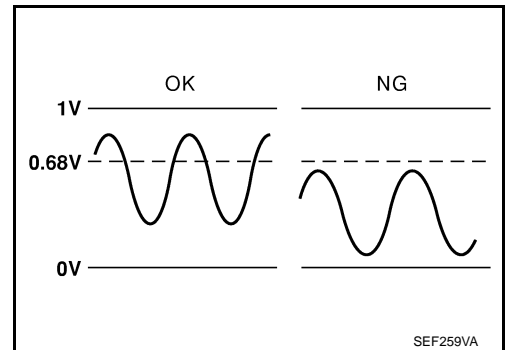


DTC Logic

INFOID:000000001343743

DTC DETECTION LOGIC

The heated oxygen sensor 3 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 3, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0144 | Heated oxygen sensor 3 circuit low voltage | The maximum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 3 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

CAUTION:

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

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 and select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
4. Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more until "INCMP" or "CATALYST" changes to "CMPLT".

NOTE:

< COMPONENT DIAGNOSIS >

- **Keep the vehicle speed as steady as possible during the cruising.**
 - **It will take at most 3 minutes until “INCMP” of “CATALYST” changes to “CMPLT”.**
5. Select “HO2S3 HTR(B1)” in “DATA MONITOR” mode with CONSULT-III.
 6. Drive vehicle at a speed of 80 km/h (50 MPH) or more until “OFF” of “HO2S3 HTR(B1)” changes to “ON”.
NOTE:
 - **Keep the vehicle speed as steady as possible during the cruising.**
 - **It will take at most 3 minutes until “OFF” of “HO2S3 HTR(B1)” changes to “ON”.**
 - **Never raise engine speed above 3,600 rpm in this step.**
 7. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.
NOTE:

Keep the vehicle speed as steady as possible during the cruising.
 8. Release accelerator pedal fully and stop vehicle with engine running.
 9. Check 1st trip DTC.

 **With GST**

CAUTION:

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

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.
NOTE:

Keep the vehicle speed as steady as possible during the cruising.
4. Stop vehicle with engine running.
5. Repeat steps 3 to 4 for 2 times.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-232, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343744

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-246, "DTC Logic"](#) or [EC-250, "DTC Logic"](#).
- NO >> GO TO 3.

3. CHECK HO2S3 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 3 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 1 | F13 | 35 | Existed |

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

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5.
- NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

5. CHECK HO2S3 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 4 | F13 | 34 | Existed |

2. Check the continuity between HO2S3 harness connector or ECM harness connector and ground.

| HO2S3 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F102 | 4 | F13 | 34 | Ground | Not existed |

3. Also check harness for 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 F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

7. CHECK HEATED OXYGEN SENSOR 3

Refer to [EC-234, "Component Inspection"](#).

Is the inspection result normal?

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

8. REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 3

Ⓜ With CONSULT-III

CAUTION:

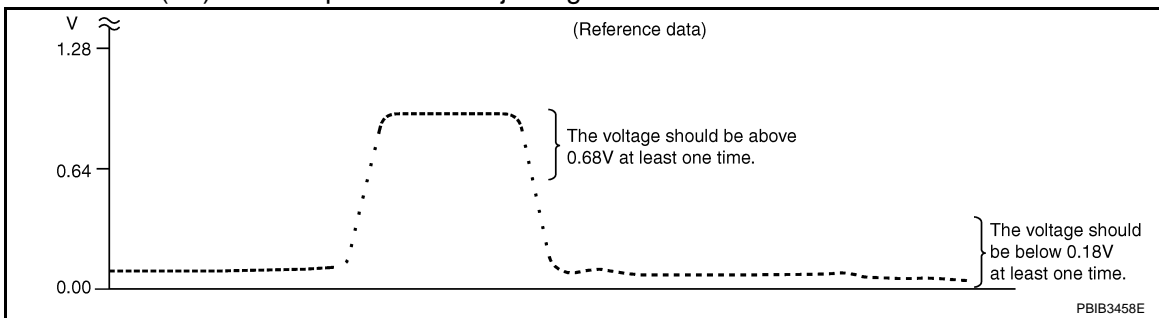
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S3 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.18V 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 3-I

ⓧ Without CONSULT-III

CAUTION:

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

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

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

4.CHECK HEATED OXYGEN SENSOR 3-II

1. Keep vehicle at idling for 10 minutes.
2. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END
 NO >> GO TO 5.

5.CHECK HEATED OXYGEN SENSOR 3-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END
 NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

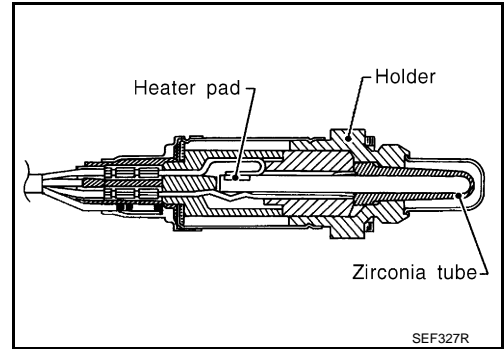
>> INSPECTION END

P0145 HO2S3

Description

INFOID:000000001665536

The heated oxygen sensor 3, after HC adsorption catalyst (Under floor), monitors the oxygen level in the exhaust gas on each bank. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 3 is not used for engine control operation.

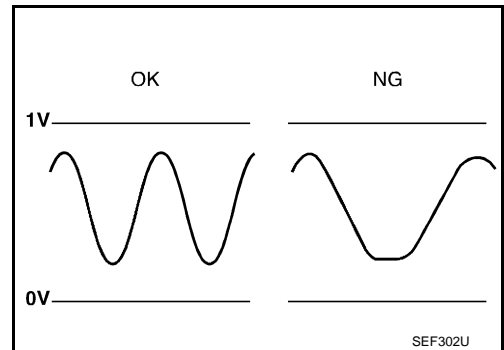


DTC Logic

INFOID:000000001343747

DTC DETECTION LOGIC

The heated oxygen sensor 3 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 3, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0145 | Heated oxygen sensor 3 circuit slow response | It takes more time for the sensor to respond between rich and lean than the specified time. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 3 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

CAUTION:

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

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 and select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
4. Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more until "INCMP" of "CATALYST" changes to "CMPLT".

NOTE:

< COMPONENT DIAGNOSIS >

- **Keep the vehicle speed as steady as possible during the cruising.**
 - **It will take at most 3 minutes until “INCMP” of “CATALYST” changes to “CMPLT”.**
5. Select “HO2S3 HTR(B1)” in “DATA MONITOR” mode with CONSULT-III.
 6. Drive vehicle at a speed of 80 km/h (50 MPH) or more until “OFF” of “HO2S3 HTR(B1)” changes to “ON”.
NOTE:
 - **Keep the vehicle speed as steady as possible during the cruising.**
 - **It will take at most 3 minutes until “OFF” of “HO2S3 HTR(B1)” changes to “ON”.**
 - **Never raise engine speed above 3,600 rpm in this step.**
 7. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.
NOTE:

Keep the vehicle speed as steady as possible during the cruising.
 8. Release accelerator pedal fully and stop vehicle with engine running.
 9. Check 1st trip DTC.

 **With GST**

CAUTION:

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

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Stop vehicle with engine running.
5. Repeat steps 3 to 4 for 2 times.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-237, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343748

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-246, "DTC Logic"](#) or [EC-250, "DTC Logic"](#).
- NO >> GO TO 3.

3.CHECK HO2S3 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 3 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 1 | F13 | 35 | Existed |

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

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5.
- NO >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

5. CHECK HO2S3 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 4 | F13 | 34 | Existed |

2. Check the continuity between HO2S3 harness connector or ECM harness connector and ground.

| HO2S3 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F102 | 4 | F13 | 34 | Ground | Not existed |

3. Also check harness for 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 F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

7. CHECK HEATED OXYGEN SENSOR 3

Refer to [EC-239, "Component Inspection"](#).

Is the inspection result normal?

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

8. REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-45, "Circuit Inspection"](#).

>> INSPECTION END

Component Inspection

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 3

With CONSULT-III

CAUTION:

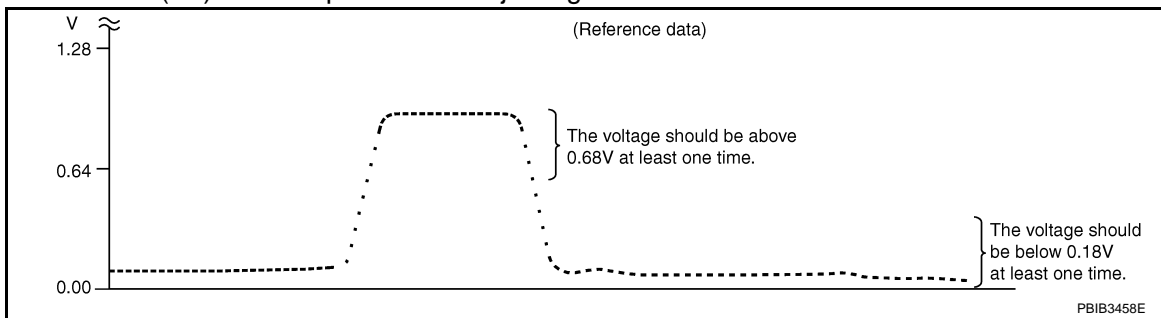
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S3 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.18V 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 3-I

Without CONSULT-III

CAUTION:

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

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

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

4.CHECK HEATED OXYGEN SENSOR 3-II

1. Keep vehicle at idling for 10 minutes.
2. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END
 NO >> GO TO 5.

5.CHECK HEATED OXYGEN SENSOR 3-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END
 NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

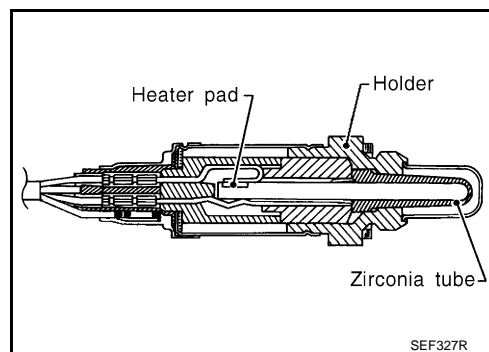
P0146 HO2S3

Description

INFOID:000000001665538

The heated oxygen sensor 3, after HC adsorption catalyst (Under floor), monitors the oxygen level in the exhaust gas on each bank. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 3 is not used for engine control operation.

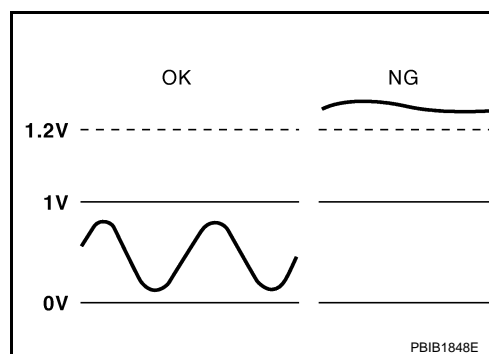


DTC Logic

INFOID:000000001343751

DTC DETECTION LOGIC

The heated oxygen sensor 3 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 3, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P0146 | Heated oxygen sensor 3 circuit no activity detected | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 3 |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

CAUTION:

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

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 and select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
4. Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more until "INCMP" of "CATALYST" changes to "CMPLT".

NOTE:

- Keep the vehicle speed as steady as possible during the cruising.
- It will take at most 3 minutes until "INCMP" of "CATALYST" changes to "CMPLT".

5. Select "HO2S3 HTR(B1)" in "DATA MONITOR" mode with CONSULT-III.
6. Drive vehicle at a speed of 80 km/h (50 MPH) or more until "OFF" of "HO2S3 HTR(B1)" changes to "ON".

NOTE:

< COMPONENT DIAGNOSIS >

- Keep the vehicle speed as steady as possible during the cruising.
- It will take at most 3 minutes until “OFF” of “HO2S3 HTR(B1)” changes to “ON”.
- Never raise engine speed above 3,600 rpm in this step.

7. Stop vehicle with engine running.
8. Let engine idle for 1 minute.
9. Check 1st trip DTC.

 With GST

CAUTION:

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

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Stop vehicle with engine running.
5. Repeat steps 3 to 4.
6. Let engine idle for 1 minute.
7. Check 1st trip DTC.

Is 1st tip DTC detected?

- YES >> Go to [EC-242, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343752

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CHECK HO2S3 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 3 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S3 harness connector and ECM harness connector.

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 1 | F13 | 35 | Existed |

5. 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 F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

4.CHECK HO2S3 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S3 harness connector and ECM harness connector.

< COMPONENT DIAGNOSIS >

| HO2S3 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F102 | 4 | F13 | 34 | Existed |

2. Check the continuity between HO2S3 harness connector or ECM harness connector and ground.

| HO2S3 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F102 | 4 | F13 | 34 | Ground | Not existed |

3. Also check harness for 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 F58, F101
- Harness for open or short between heated oxygen sensor 3 and ECM

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

6. CHECK HO2S3 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 3

Refer to [EC-243, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8. REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665539

1. INSPECTION START

Do you have CONSULT-III?

< COMPONENT DIAGNOSIS >

Do you have CONSULT-III?

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

2. CHECK HEATED OXYGEN SENSOR 3

Ⓟ With CONSULT-III

CAUTION:

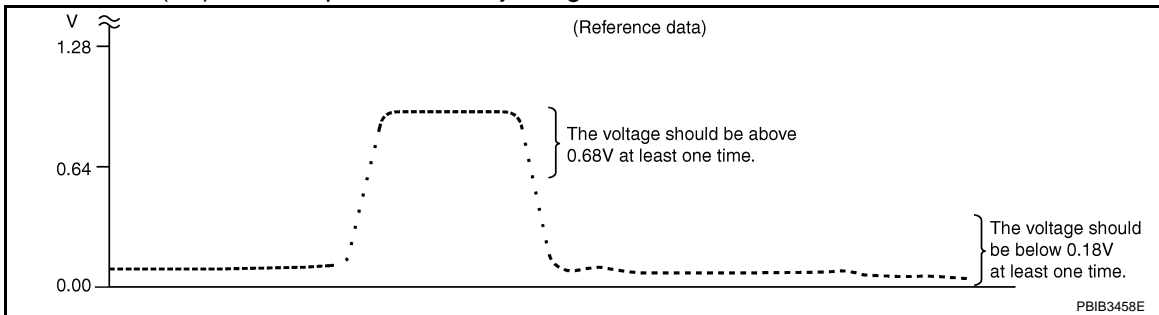
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S3 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S3 (B1)" should be below 0.18V 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 3-I

ⓧ Without CONSULT-III

CAUTION:

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

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 the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

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

4. CHECK HEATED OXYGEN SENSOR 3-II

1. Keep vehicle at idling for 10 minutes.

< COMPONENT DIAGNOSIS >

2. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 5.

5.CHECK HEATED OXYGEN SENSOR 3-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 34 (HO2S3 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 3

Replace heated oxygen sensor 3.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

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P0171 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0171 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000001343754

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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 | <ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) | <ul style="list-style-type: none">Intake air leaksA/F sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureLack of fuelMass air flow sensorIncorrect PCV hose connection |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).

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.

Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to [EC-247, "Diagnosis Procedure"](#).

NO >> Check exhaust and intake air leak visually.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-247, "Diagnosis Procedure"](#).

NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE-III

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

P0171 FUEL INJECTION SYSTEM FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

- Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-247. "Diagnosis Procedure"](#).

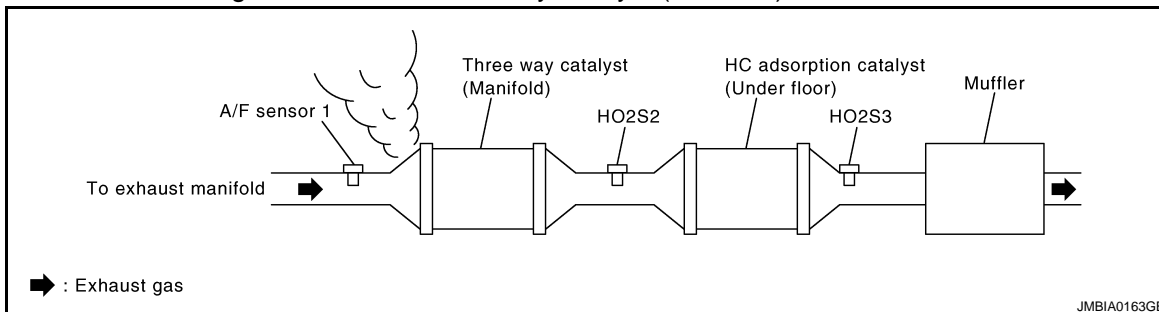
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343755

1.CHECK EXHAUST GAS LEAK

- Start engine and run it at idle.
- Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 2.

2.CHECK FOR INTAKE AIR LEAK

- Listen for an intake air leak after the mass air flow sensor.
- Check PCV hose connection.

Intake air leak detected?

YES >> Repair or replace.

NO >> GO TO 3.

3.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect corresponding A/F sensor 1 harness connector.
- Disconnect ECM harness connector.
- Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F14 | 45 | Existed |
| | 2 | | 49 | |

- Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

P0171 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F14 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-533, "Inspection"](#).

2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-533, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

YES >> GO TO 6.

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

6.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.
3. For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in Service \$01 with GST.
3. For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

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 grounds. Refer to [EC-165, "DTC Logic"](#).

7.CHECK FUNCTION OF FUEL INJECTOR

 **With CONSULT-III**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

 **Without CONSULT-III**

1. Let engine idle.

P0171 FUEL INJECTION SYSTEM FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

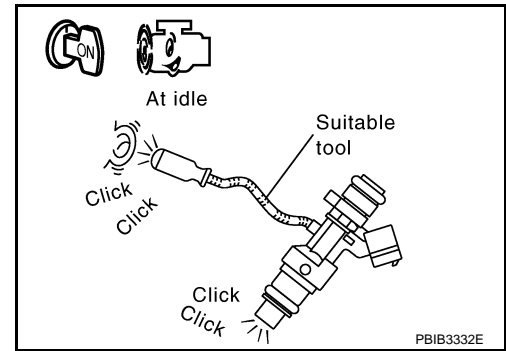
- Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-453. "Component Function Check"](#).



8. CHECK FUEL INJECTOR

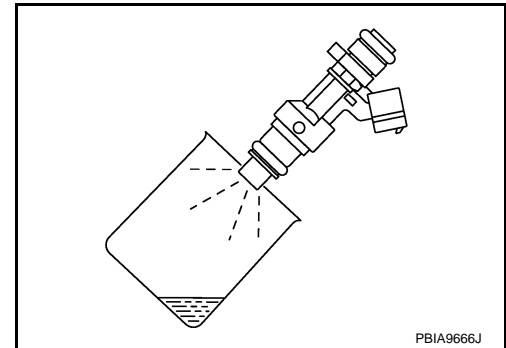
- Turn ignition switch OFF.
- Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- Disconnect all fuel injector harness connectors.
- Remove fuel tube assembly. Refer to [EM-36. "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
- Disconnect all ignition coil harness connectors.
- Prepare pans or saucers under each fuel injector.
- Crank engine for about 3 seconds.

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-42. "Intermittent Incident"](#).

>> INSPECTION END

P0172 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0172 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000001343756

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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 | <ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) | <ul style="list-style-type: none">A/F sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureMass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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.
Crank engine while depressing accelerator pedal.

Does engine start?

- YES >> Go to [EC-251, "Diagnosis Procedure"](#).
NO >> Remove spark plugs and check for fouling, etc.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.

Is 1st trip DTC detected?

- YES >> Go to [EC-251, "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 the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| | |
|--|--|
| 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

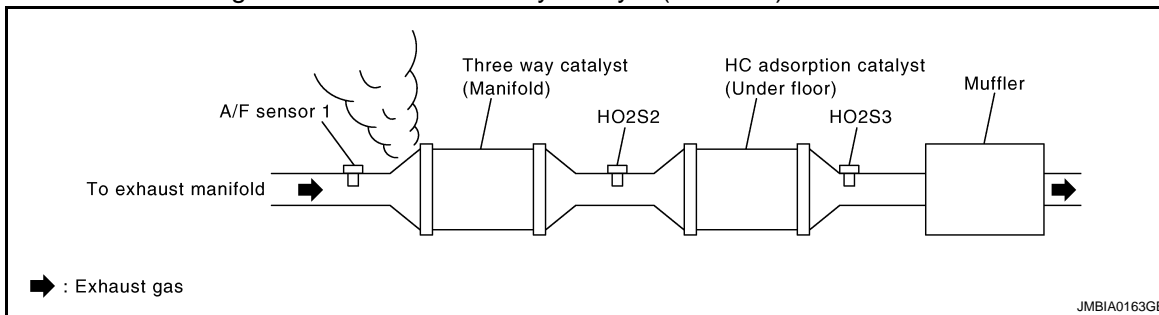
- YES >> Go to [EC-251, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343757

1.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

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

2.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
 NO >> GO TO 3.

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F14 | 45 | Existed |
| | 2 | | 49 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F14 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-533, "Inspection"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-533, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

- YES >> GO TO 6.
- 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

6. 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.
3. For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in "Service \$01" with GST.
3. For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

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 grounds. Refer to [EC-165, "DTC Logic"](#).

7. CHECK FUNCTION OF FUEL INJECTOR

With CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

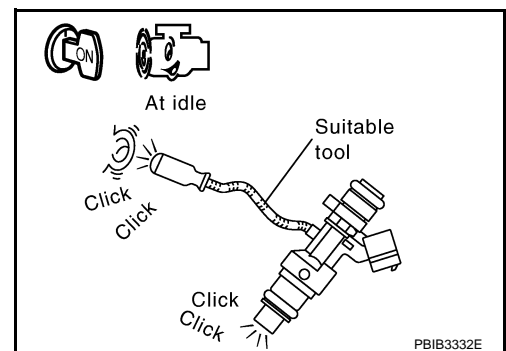
Without CONSULT-III

1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-453, "Component Function Check"](#).



8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-36, "Removal and Installation"](#). Keep fuel hose and all fuel injectors connected to fuel tube.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.

P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Disconnect all fuel injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from fuel injector.

A

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.

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9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

D

>> INSPECTION END

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P0181 FTT SENSOR

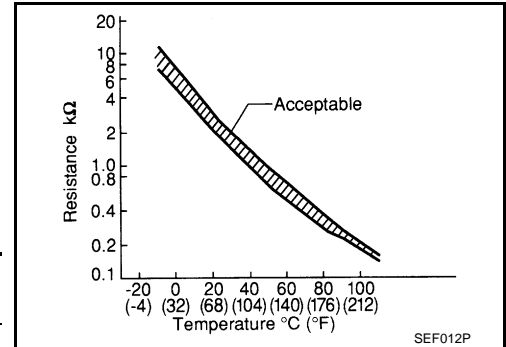
Description

INFOID:000000001343758

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001343759

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0181 | Fuel tank temperature sensor circuit range/performance | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Fuel tank temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Turn ignition switch and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-255. "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3. CHECK ENGINE COOLANT TEMPERATURE

With CONSULT-III

1. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
2. Check "COOLAN TEMP/S" value.

With GST

Follow the procedure "With CONSULT-III" above.

"COOLAN TEMP/S" less than 60°C (140°F)?

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

4. PERFORM DTC CONFIRMATION PROCEDURE-II

< COMPONENT DIAGNOSIS >

With CONSULT-III

1. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
2. Wait at least 10 seconds.
3. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-255. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343760

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4.CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. 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 | |
| B42 | 5 | E10 | 104 | Existed |

3. 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 B1, M6

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P0181 FTT SENSOR

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< COMPONENT DIAGNOSIS >

- Harness connectors E30, M1
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

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

6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-256, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343761

1.CHECK FUEL TANK TEMPERATURE SENSOR

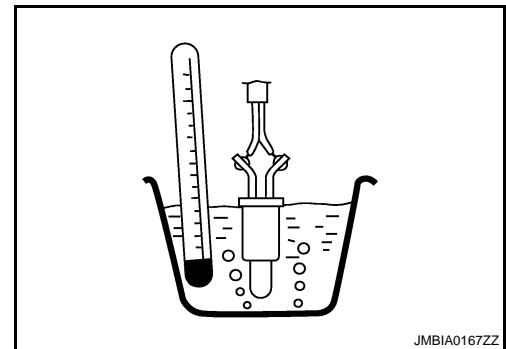
1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Remove fuel level sensor unit.
4. Check resistance between “fuel level sensor unit and fuel pump” terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance |
|-----------|---------------------|-------------------------|
| 4 and 5 | Temperature °C (°F) | 20 (68) 2.3 - 2.7 kΩ |
| | | 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

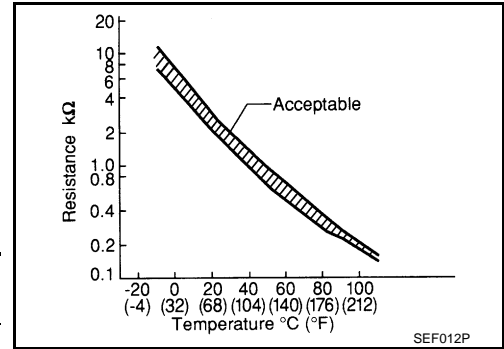
Description

INFOID:000000001665542

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001343763

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0182 | Fuel tank temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Fuel tank temperature sensor |
| P0183 | Fuel tank temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-257, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665543

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

P0182, P0183 FTT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4.CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. 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 | |
| B42 | 5 | E10 | 104 | Existed |

3. 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 B1, M6
- Harness connectors E30, M1
- Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

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

6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-256. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343765

1.CHECK FUEL TANK TEMPERATURE SENSOR

1. Turn ignition switch OFF.

P0182, P0183 FTT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

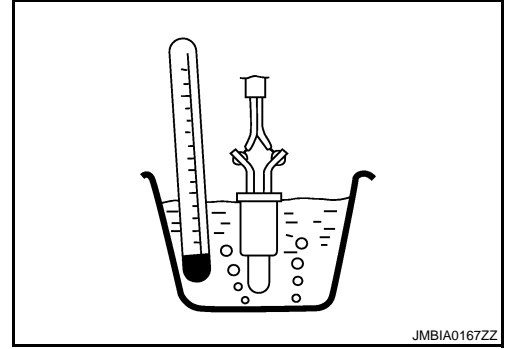
2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
3. Remove fuel level sensor unit.
4. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance | |
|-----------|---------------------|------------|----------------|
| 4 and 5 | Temperature °C (°F) | 20 (68) | 2.3 - 2.7 kΩ |
| | | 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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P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

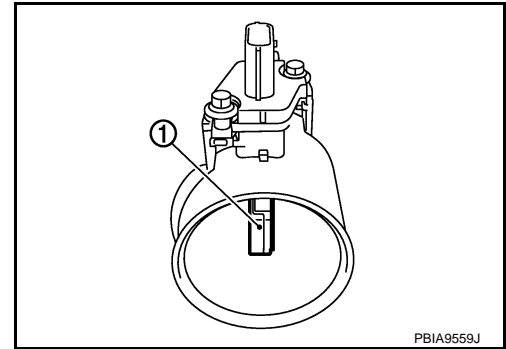
P0222, P0223 TP SENSOR

Description

INFOID:000000001665507

The intake air temperature sensor is built-into 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 temperature rise.



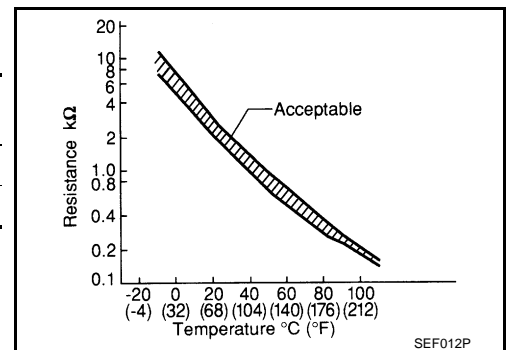
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000001343767

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0222 | Throttle position sensor 1 circuit low input | An excessively low voltage from the TP sensor 1 is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (TP sensor 1 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1) |
| P0223 | Throttle position sensor 1 circuit high input | An excessively high voltage from the TP sensor 1 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-261. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CHECK THROTTLE POSITION SENSOR 1 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 | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 2 | F13 | 37 | 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 or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-262. "Component Inspection"](#).

Is the inspection result normal?

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

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P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343769

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665511

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P0300, P0301, P0302, P0303, P0304 MISFIRE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0300, P0301, P0302, P0303, P0304 MISFIRE

DTC Logic

INFOID:000000001343771

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 |
|----------------------------------|---------------------|-------------------------------|
| Crankshaft position sensor (POS) | Engine speed | On board diagnosis of misfire |

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**
On the 1st trip that 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 light 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 on any one cylinder or on multiple cylinders.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|----------------------------|---|
| P0300 | Multiple cylinder misfire detected | Multiple cylinder misfire. | <ul style="list-style-type: none">• Improper spark plug• Insufficient compression• Incorrect fuel pressure• The fuel injector circuit is open or shorted• Fuel injector• Intake air leak• The ignition signal circuit is open or shorted• Lack of fuel• Signal plate• A/F sensor 1• Incorrect PCV hose connection |
| P0301 | No.1 cylinder misfire detected | No. 1 cylinder misfires. | |
| P0302 | No. 2 cylinder misfire detected | No. 2 cylinder misfires. | |
| P0303 | No. 3 cylinder misfire detected | No. 3 cylinder misfires. | |
| P0304 | No. 4 cylinder misfire detected | No. 4 cylinder misfires. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-264, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

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

P0300, P0301, P0302, P0303, P0304 MISFIRE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Start engine and drive the vehicle under the 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.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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 \pm 400 rpm |
| Vehicle speed | Vehicle speed in the freeze frame data \pm 10 km/h (6 MPH) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

The time to driving 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 |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-264, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343772

1.CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

Is intake air leak detected?

- YES >> Discover air leak 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 it.

3.PERFORM POWER BALANCE TEST

ⓅWith CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> GO TO 4.

4.CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let engine idle.

P0300, P0301, P0302, P0303, P0304 MISFIRE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

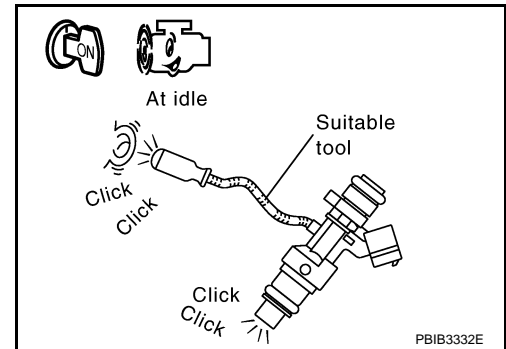
- Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-454. "Component Inspection"](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

- Turn ignition switch OFF.
- 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.

- Start engine.
- After engine stalls, crank it two or three times to release all fuel pressure.
- Turn ignition switch OFF.
- Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- Remove ignition coil and spark plug of the cylinder to be checked.
- Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- Connect spark plug and harness connector to ignition coil.
- 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.
- Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

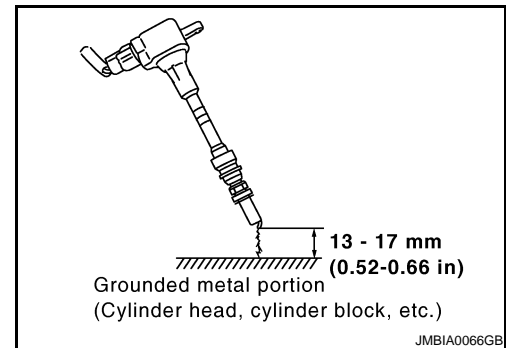
- Turn ignition switch OFF.
- Disconnect spark plug and connect a known-good spark plug.
- Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

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-460. "Component Function Check"](#).



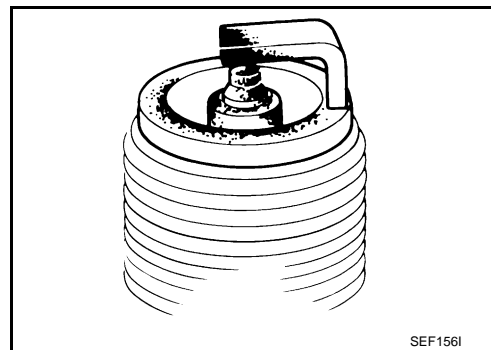
< COMPONENT DIAGNOSIS >

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 [MA-20. "SPARK PLUG : Removal and Installation"](#).
- NO >> Repair or clean spark plug. Then GO TO 8.

**8.CHECK FUNCTION OF IGNITION COIL-III**

1. Reconnect the initial spark plugs.
2. Crank engine for about 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 [MA-20. "SPARK PLUG : Removal and Installation"](#).

9.CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-23. "Compression pressure"](#).

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

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-533. "Inspection"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-533. "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 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.

12.CHECK IGNITION TIMING

Check the following items. Refer to [EC-24. "BASIC INSPECTION : Special Repair Requirement"](#). For specification, refer to [EC-538. "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Follow the [EC-24. "BASIC INSPECTION : Special Repair Requirement"](#).

13.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding A/F sensor 1 harness connector.

P0300, P0301, P0302, P0303, P0304 MISFIRE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Disconnect ECM harness connector.
4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

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

14.CHECK A/F SENSOR 1 HEATER

Refer to [EC-155, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace A/F sensor 1.

15.CHECK MASS AIR FLOW SENSOR

With CONSULT-III

Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

With GST

Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to [EC-538, "Mass Air Flow Sensor"](#).

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 [EC-165, "DTC Logic"](#).

16.CHECK SYMPTOM TABLE

Check items on the rough idle symptom in [EC-522, "Symptom Table"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace.

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 [EC-112, "Diagnosis Description"](#).

>> GO TO 18.

18.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0327, P0328 KS

Description

INFOID:000000001343773

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:000000001343774

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detected condition | Possible cause |
|---------|---------------------------------|---|--|
| P0327 | Knock sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor |
| P0328 | Knock sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-268, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343775

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

| Knock sensor | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F45 | 2 | F13 | 67 | Existed |

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

Is the inspection result normal?

YES >> GO TO 3.

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

< COMPONENT DIAGNOSIS >

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Knock sensor | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F45 | 1 | F13 | 61 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK KNOCK SENSOR

Refer to [EC-269, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343776

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

| Terminals | Resistance |
|-----------|---------------------------------------|
| 1 and 2 | Approx. 532 - 588 kΩ [at 20°C (68°F)] |

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P0335 CKP SENSOR (POS)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

P0335 CKP SENSOR (POS)

Description

INFOID:000000001343777

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.

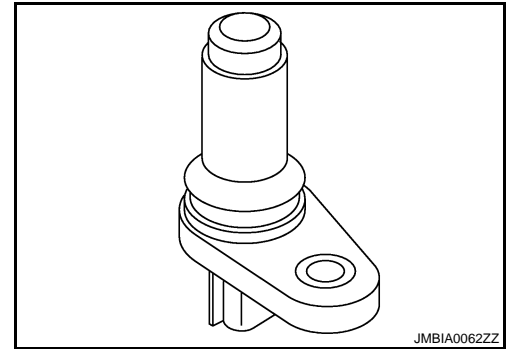
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

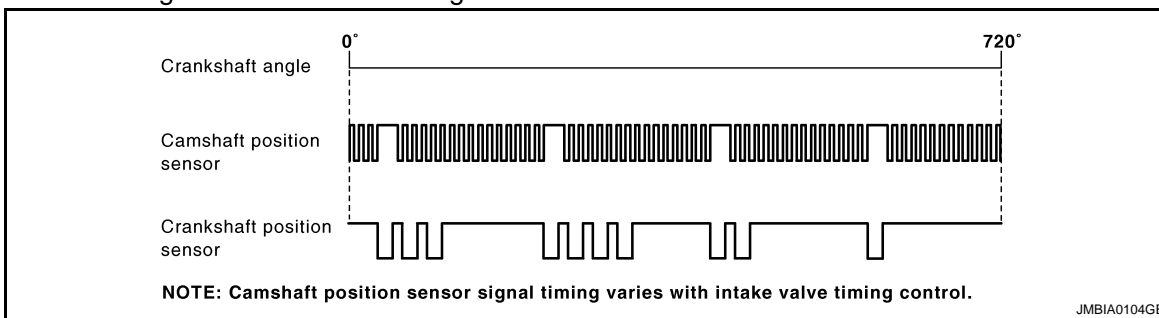
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



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DTC Logic

INFOID:000000001343778

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0335 | Crankshaft position sensor (POS) circuit | <ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) Crankshaft position sensor (POS) Refrigerant pressure sensor Accelerator pedal position sensor EVAP control system pressure sensor Tumble control valve position sensor Signal plate |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

P0335 CKP SENSOR (POS)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.
If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-271, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343779

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

| CKP sensor (POS) | | Ground | Voltage |
|------------------|----------|--------|------------|
| Connector | Terminal | | |
| F30 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch ON.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 1 | F13 | 76 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

P0335 CKP SENSOR (POS)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

5. CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to [HAC-48. "Diagnosis Procedure"](#).)
- EVAP control system pressure sensor (Refer to [EC-311. "Component Inspection"](#).)
- Tumble control valve position sensor (Refer to [EC-401. "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace malfunctioning components.

6. CHECK APP SENSOR

Refer to [EC-431. "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. Go to [EC-29. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

8. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 2 | F13 | 60 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 3 | F13 | 65 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-273. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
NO >> Replace crankshaft position sensor (POS).

P0335 CKP SENSOR (POS)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

11. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace the signal plate.

12. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343780

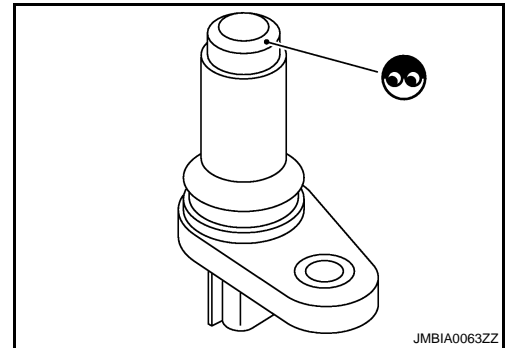
1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace crankshaft position sensor (POS).



2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

| Terminals (Polarity) | Resistance Ω [at 25°C (77°F)] |
|----------------------|--------------------------------------|
| 1 (+) - 2 (-) | Except 0 or ∞ |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace crankshaft position sensor (POS).

P0340 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0340 CMP SENSOR (PHASE)

Description

INFOID:000000001343781

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

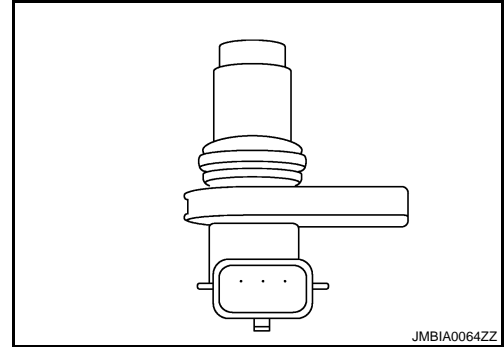
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

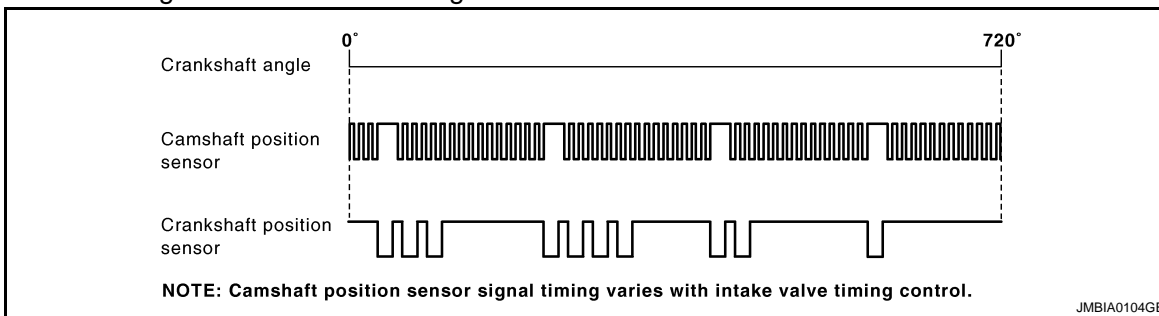
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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.



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DTC Logic

INFOID:000000001343782

DTC DETECTION LOGIC

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P0340 | Camshaft position sensor (PHASE) circuit | <ul style="list-style-type: none"> The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not sent to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to STR-6, "System Diagram".) Starting system circuit (Refer to STR-6, "System Diagram".) Dead (Weak) battery |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.

P0340 CMP SENSOR (PHASE)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

If engine does not start, crank engine for at least 2 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-275, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-275, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343783

1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.

NO >> Check starting system.

2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

3.CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.

2. Turn ignition switch ON.

3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

| CMP sensor (PHASE) | | Ground | Voltage |
|--------------------|----------|--------|------------|
| Connector | Terminal | | |
| F55 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

| CMP sensor (PHASE) | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F55 | 2 | F13 | 64 | 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 ground or short to power in harness or connectors.

5.CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

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P0340 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| CMP sensor (PHASE) | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F55 | 3 | F13 | 69 | 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 or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-276, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

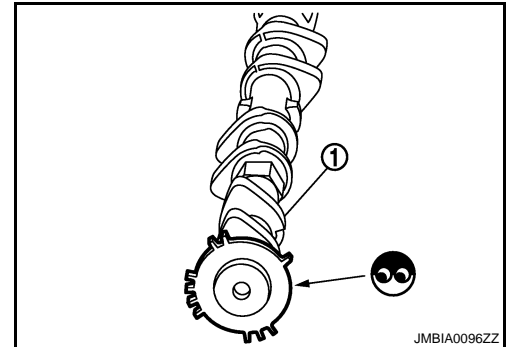
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) 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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343784

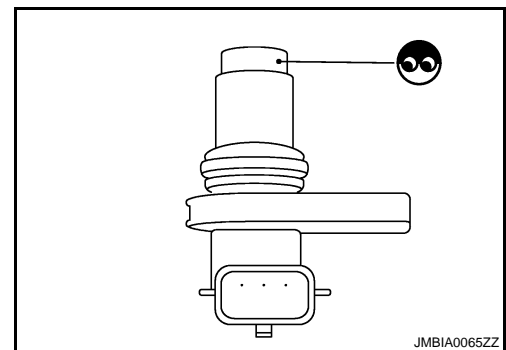
1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

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 camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

P0340 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminals (Polarity) | Resistance |
|----------------------|--|
| 1 (+) - 2 (-) | Except 0 or ∞ Ω [at 25°C (77°F)] |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

A

EC

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace camshaft position sensor (PHASE).

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P0420 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0420 THREE WAY CATALYST FUNCTION

DTC Logic

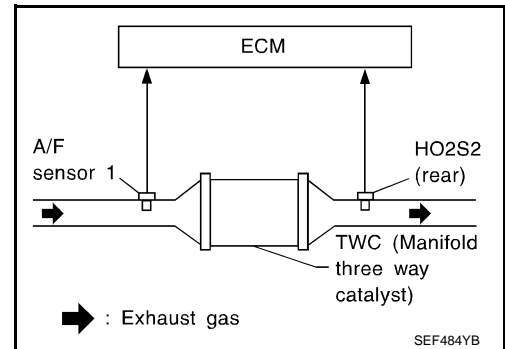
INFOID:000000001343785

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 efficiency below threshold | <ul style="list-style-type: none"> Three way catalyst (manifold) does not operate properly. Three way catalyst (manifold) does not have enough oxygen storage capacity. | <ul style="list-style-type: none"> Three way catalyst (manifold) Exhaust tube Intake air leaks Fuel injector Fuel injector leaks Spark plug Improper ignition timing |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 7.

2.PRECONDITIONING

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

TESTING CONDITION:

Do not hold 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.
- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- Let engine idle for 1 minute.
- Make sure 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 to 70°C (158°F).
- Open engine hood.
- Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
- Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
- Check the indication of "CATALYST".

Which is displayed on CONSULT-III screen?

P0420 THREE WAY CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- CMPLT >> GO TO 6.
- INCMP >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.
2. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).

Does the indication change to "CMPLT"?

- YES >> GO TO 6.
- NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than 70°C (158°F).
2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

6.PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-279. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-279. "Component Function Check"](#).

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
- NO >> Go to [EC-279. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343786

1.PERFORM COMPONENT FUNCTION CHECK

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. Open engine hood.
6. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at 2,500 rpm constant under no load | The voltage fluctuation cycle takes more than 5 seconds. 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0 |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-279. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343787

1.CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

P0420 THREE WAY CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

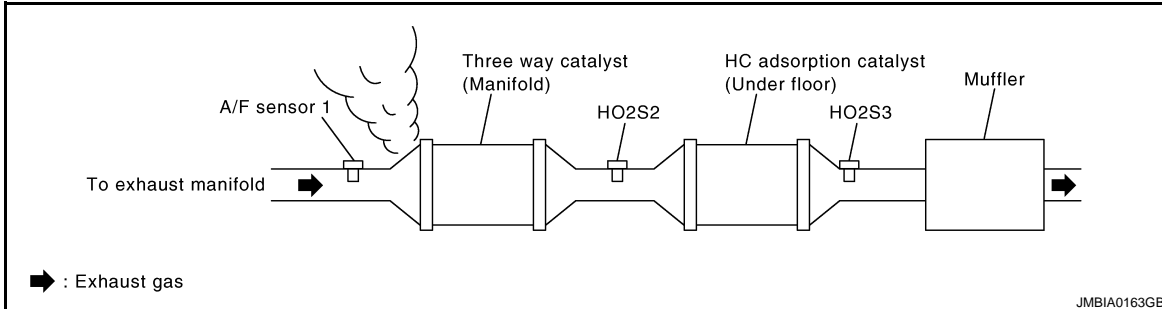
< COMPONENT DIAGNOSIS >

Is the inspection result normal?

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

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> Repair or replace.
- NO >> GO TO 3.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
- NO >> GO TO 4.

4.CHECK IGNITION TIMING

For procedure, refer to [EC-28, "IGNITION TIMING : Special Repair Requirement"](#).
For specification, refer to [EC-538, "Idle Speed"](#) and [EC-538, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Follow the [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

5.CHECK FUEL INJECTOR

1. Stop engine and then turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 29 | Ground | Battery voltage |
| | 30 | | |
| | 31 | | |
| | 32 | | |

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Perform [EC-453, "Diagnosis Procedure"](#).

6.CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. 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.

P0420 THREE WAY CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. 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.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 7.

7.CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 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?

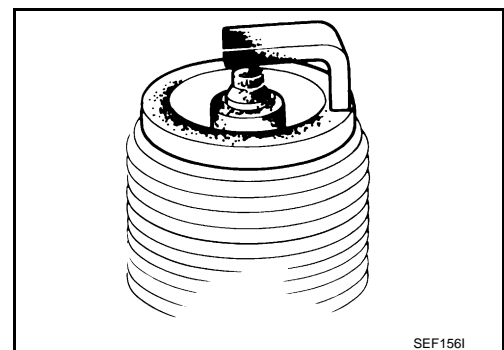
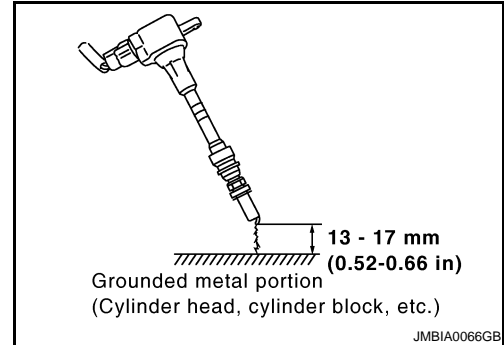
- YES >> GO TO 8.
NO >> Check ignition coil, power transistor and their circuits. Refer to [EC-460. "Diagnosis Procedure"](#).

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 [MA-20. "SPARK PLUG : Removal and Installation"](#).
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 about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

P0420 THREE WAY CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [MA-20. "SPARK PLUG : Removal and Installation"](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-36. "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.

Does fuel drip from fuel injector?

YES >> GO TO 11.

NO >> Replace the fuel injector(s) from which fuel is dripping.

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the trouble fixed?

YES >> INSPECTION END

NO >> Replace three way catalyst assembly.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0441 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001343788

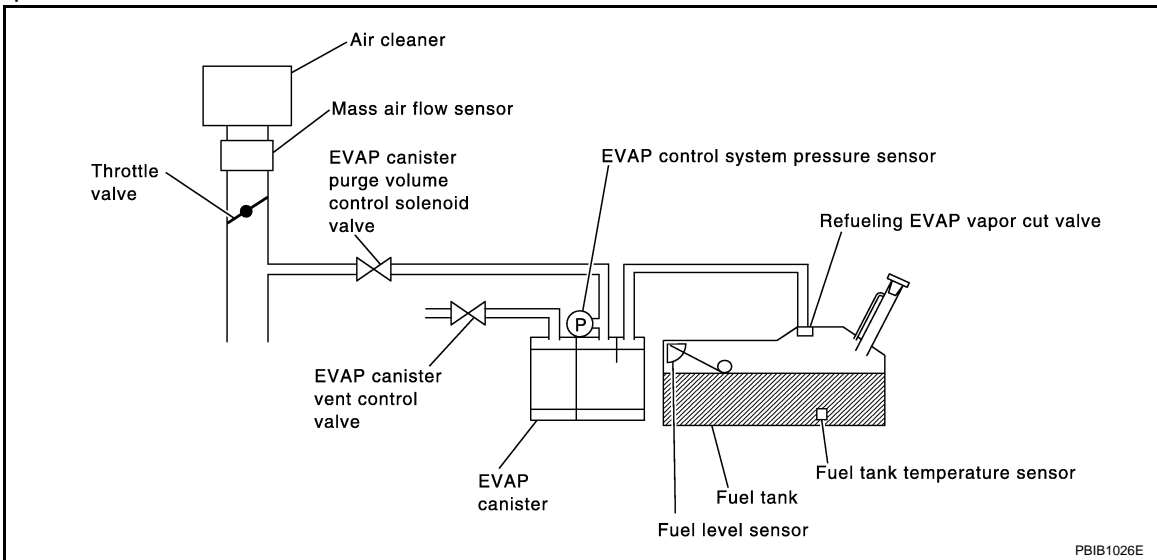
DTC DETECTION LOGIC

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 incorrect purge flow | EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. | <ul style="list-style-type: none"> • EVAP canister purge volume control solenoid valve stuck closed • EVAP control system pressure sensor and the circuit • Loose, disconnected or improper connection of rubber tube • Blocked rubber tube • Cracked EVAP canister • EVAP canister purge volume control solenoid valve circuit • Accelerator pedal position sensor • Blocked purge port • EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 6.

2.PRECONDITIONING

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

TESTING CONDITION:

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

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. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. 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 - 3,800 rpm |
| B/FUEL SCHDL | 1.0 - 10.0 msec |
| COOLAN TEMP/S | More than 0°C (32°F) |

CAUTION:

Always drive vehicle at a safe speed.

If "TESTING" is not changed for a long time, retry from step 2.

Is "COMPLETED" displayed on CONSULT-III screen?

YES >> GO TO 5.

NG >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 3.

5. PERFORM DTC CONFIRMATION PROCEDURE-II

Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to [EC-285, "Diagnosis Procedure"](#).

6. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-284, "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-285, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343789

1. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM harness connector and ground.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground |
|-----------|--|--------|
| Connector | Terminal | |
| E10 | 86 (EVAP control system pressure sensor signal) | Ground |

- Check EVAP control system pressure sensor value at idle speed and note it.
- Establish and maintain the following conditions for at least 1 minute.

| | |
|-----------------------------|-----------------------------------|
| Air conditioner switch | ON |
| Headlamp switch | ON |
| Rear window defogger switch | ON |
| Engine speed | Approx. 3,000 rpm |
| Shift lever | Any position other than P, N or R |

- Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-285, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343790

1.CHECK EVAP CANISTER

- Turn ignition switch OFF.
- Check EVAP canister for cracks.

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

 **With CONSULT-III**

- 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-86, "System Diagram"](#).
- Start engine and let it idle.
- Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
- Rev engine up to 2,000 rpm.
- Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

| PURG VOL CONT/V | Vacuum |
|-----------------|-------------|
| 100% | Existed |
| 0% | Not existed |

Is the inspection result normal?

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

3.CHECK PURGE FLOW

 **Without CONSULT-III**

- Start engine and warm it up to normal operating temperature.
- 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 [EC-86, "System Diagram"](#).

P0441 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

4. Start engine and let it idle.
Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

6. Revving engine up to 2,000rpm after 100 seconds passed after starting engine.

Vacuum should exist.

Is the inspection result normal?

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

4.CHECK EVAP PURGE LINE

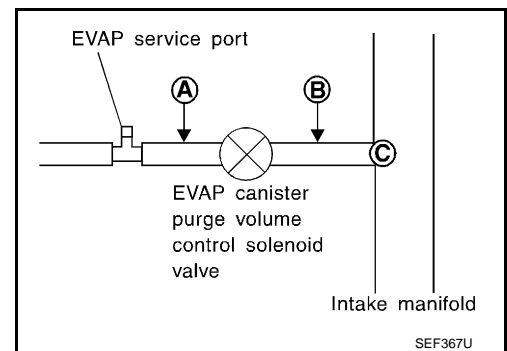
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-86, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair it.

5.CHECK EVAP PURGE HOSE AND PURGE PORT

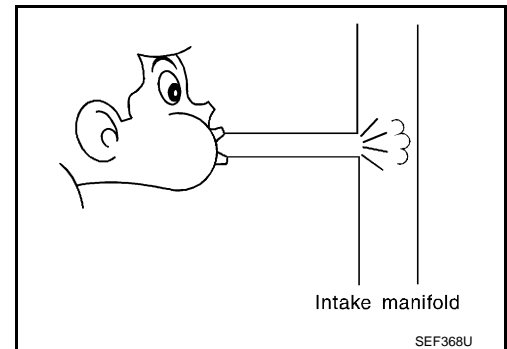
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



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 CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 7.

7.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-297, "Component Inspection"](#).

Is the inspection result normal?

P0441 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

YES >> GO TO 8.

NO >> Replace EVAP canister purge volume control solenoid valve.

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP control system pressure sensor.

9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-312. "DTC Logic"](#) for DTC P0452, [EC-317. "DTC Logic"](#) for DTC P0453.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor.

10.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 11.

NO >> Clean the rubber tube using an air blower.

11.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-303. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace EVAP canister vent control valve.

12.CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-86. "System Diagram"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace it.

13.CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

14.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

A

EC

C

D

E

F

G

H

I

J

K

L

M

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O

P

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0442 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001343791

DTC DETECTION LOGIC

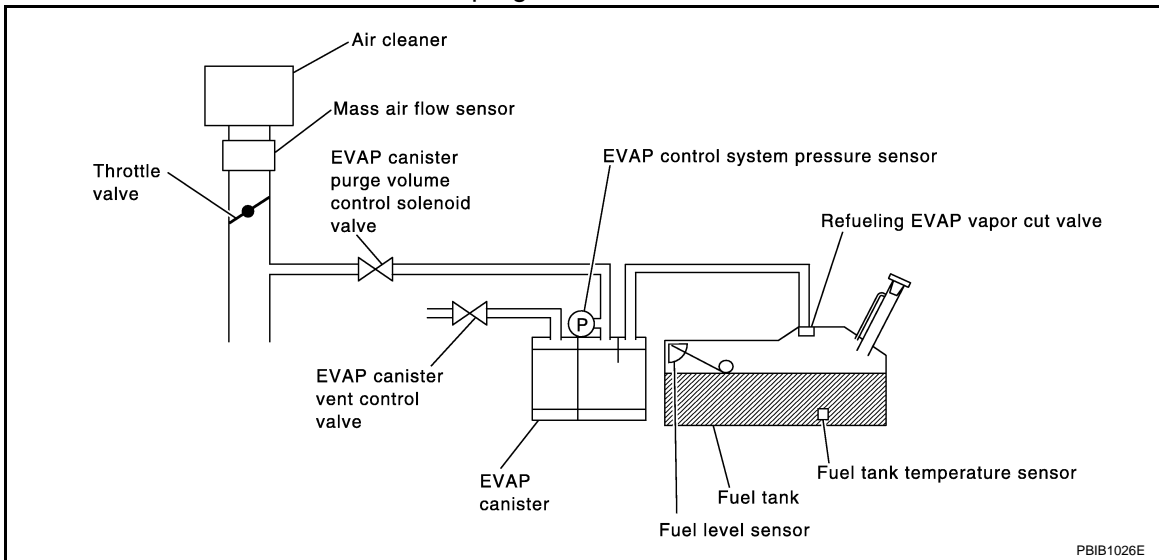
NOTE:

If DTC P0442 is displayed with DTC P0456, first perform the trouble diagnosis for DTC P0456. Refer to [EC-329, "DTC Logic"](#).

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks 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 small leak detected (negative pressure) | EVAP control system has a leak, EVAP control system does not operate properly. | <ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Do you have CONSULT-III?

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

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
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. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-289, "Diagnosis Procedure"](#).

3. PERFORM COMPONENT FUNCTION CHECK

With GST

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-518, "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Select Service \$07 with GST.

Is 1st trip DTC displayed?

- YES-1 >> P0441: Go to [EC-285, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-289, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343792

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

P0442 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

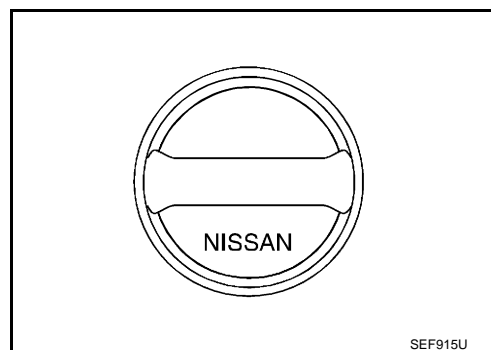
< COMPONENT DIAGNOSIS >

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.



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. Then 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-293, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5. CHECK FOR EVAP LEAK

Refer to [EC-86, "System Diagram"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [EC-536, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-303, "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 SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

P0442 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

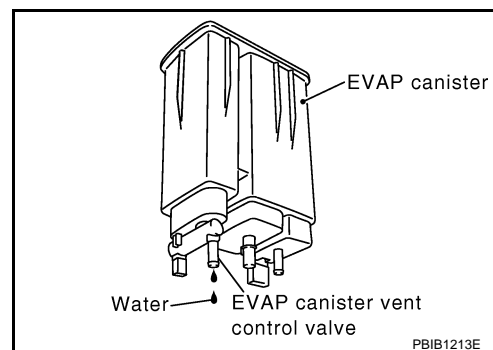
2. Does water drain from the EVAP canister?

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.



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 to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/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**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.

NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-86. "System Diagram"](#).

Is the inspection result normal?

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- YES >> GO TO 13.
NO >> Repair or reconnect the hose.

13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-297, "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-256, "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-309, "DTC Logic"](#).

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 [EC-86, "System Diagram"](#).

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, kink, looseness and improper connection. For location, refer to [EC-466, "Description"](#).

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, kink, 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-469, "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.

P0442 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Replace fuel level sensor unit.

22.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

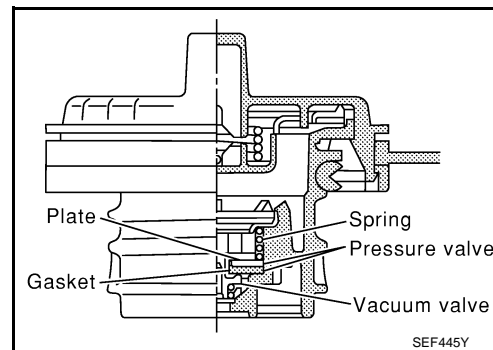
>> INSPECTION END

Component Inspection

INFOID:000000001343793

1.CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



4. Check valve opening pressure and vacuum.

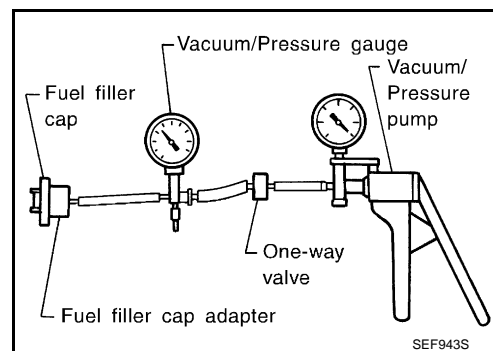
Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -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 come on.

>> INSPECTION END

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

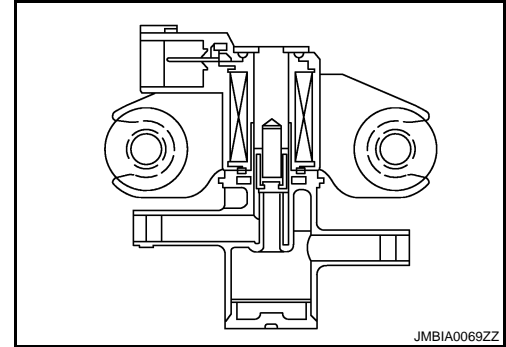
[QR25DE FOR CALIFORNIA]

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000001343794

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:000000001343795

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0443 | EVAP canister purge volume control solenoid 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 style="list-style-type: none">• EVAP control system pressure sensor• EVAP canister purge volume control solenoid valve (The valve is stuck open.)• EVAP canister vent control valve• EVAP canister• Hoses (Hoses are connected incorrectly or clogged.) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

Do you have CONSULT-III?

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. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. 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.
7. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

OK >> INSPECTION END

NG >> Go to [EC-295, "Diagnosis Procedure"](#).

3. PERFORM DTC CONFIRMATION PROCEDURE

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC displayed?

- YES >> Go to [EC-295, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343796

1. 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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

| EVAP canister purge volume control solenoid valve | | Ground | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART

Check the following.

- Junction block E44, E45
- Harness connectors E11, F2
- 15A fuse (No.42)
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 25 | 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 or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Water should not exist.

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-311, "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 CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-297, "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-303, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP canister vent control valve.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

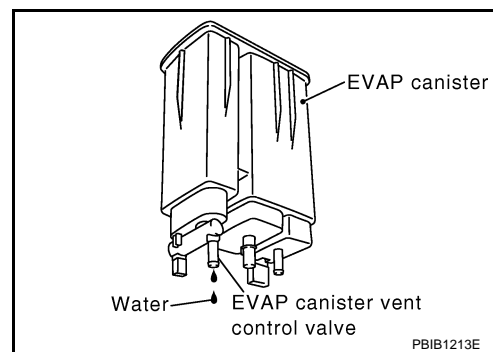
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

2. Check if water will drain from EVAP canister.

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 >

[QR25DE FOR CALIFORNIA]

11. 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 13.

NO >> GO TO 12.

12. 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.

13. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

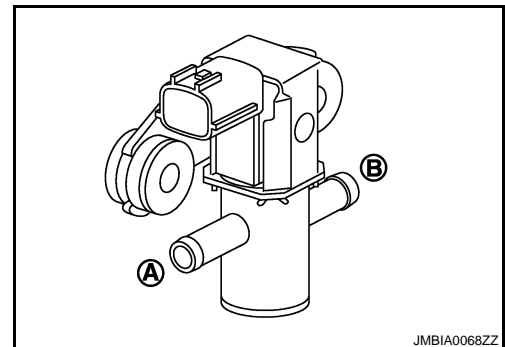
INFOID:000000001343797

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |



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Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V 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

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

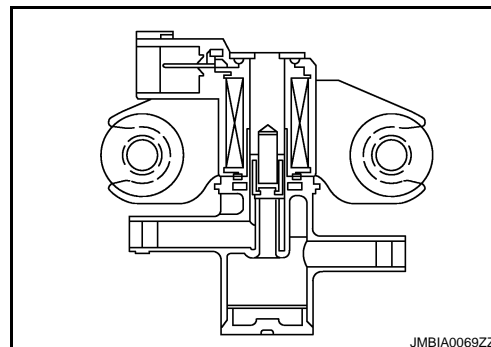
[QR25DE FOR CALIFORNIA]

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000001665546

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:000000001343799

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0444 | EVAP canister purge volume control solenoid valve circuit open | An excessively low voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is open or shorted.)• EVAP canister purge volume control solenoid valve |
| P0445 | EVAP canister purge volume control solenoid valve circuit shorted | An excessively high voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is shorted.)• EVAP canister purge volume control solenoid valve |

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-298. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343800

1.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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| EVAP canister purge volume control solenoid valve | | Ground | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Junction block E44, E45
- Harness connectors E11, F2
- 15A fuse (No.42)
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 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 or 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 CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-300. "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-42. "Intermittent Incident"](#).

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

>> INSPECTION END

Component Inspection

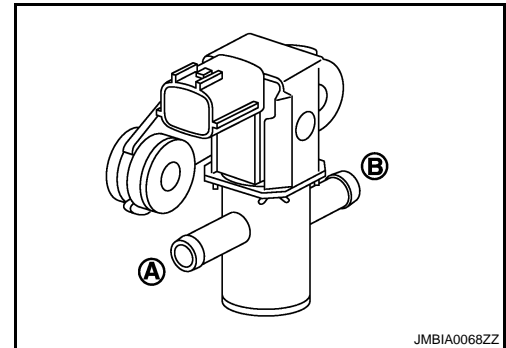
INFOID:000000001665547

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |



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Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V 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

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0447 EVAP CANISTER VENT CONTROL VALVE

Description

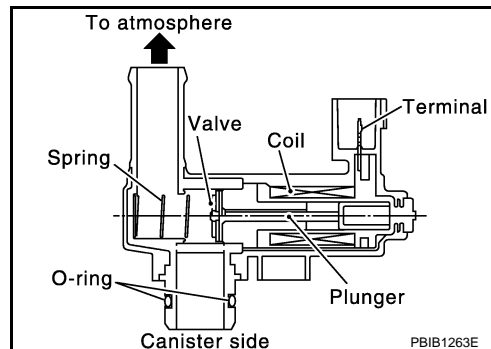
INFOID:000000001343802

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

INFOID:000000001343803

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0447 | EVAP canister vent control valve circuit open | An improper voltage signal is sent to ECM through EVAP canister vent control valve. | <ul style="list-style-type: none">• Harness or connectors (The valve circuit is open or shorted.)• EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-301. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343804

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT-III

1. Turn ignition switch OFF and then turn ON.
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
3. Touch "ON/OFF" on CONSULT-III screen.
4. Check for operating sound of the valve.

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Clicking sound should be heard.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 3.

3.CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

| EVAP canister vent control valve | | Ground | Voltage |
|----------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| B39 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E11, F2
- Harness connectors E29, B10
- 15A fuse (No.42)
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

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

5.CHECK EVAP CANISTER VENT CONTROL 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 vent control valve harness connector and ECM harness connector.

| EVAP canister vent control valve | | ECM | | Continuity |
|----------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| B39 | 2 | E10 | 109 | Existed |

4. 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.

- Junction block connector E44, E45
- Harness connectors E29, B10
- Harness for open or short between EVAP canister vent control valve and ECM

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

7.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 8.

P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Clean the rubber tube using an air blower.

8.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-303. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343805

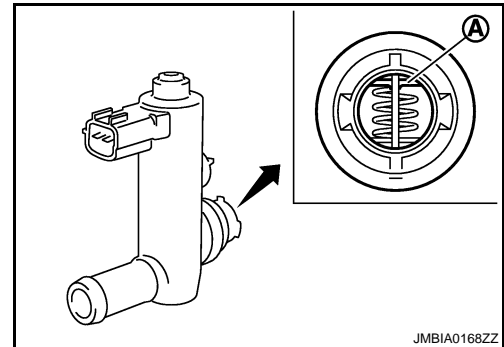
1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (B) of EVAP canister vent control valve for being rusted.

Is it rusted?

YES >> Replace EVAP canister vent control valve

NO >> GO TO 2.



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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.
Make sure 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

Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

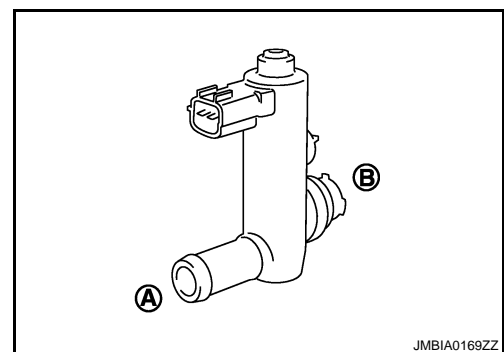
| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve



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P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

④ 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.
Make sure 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

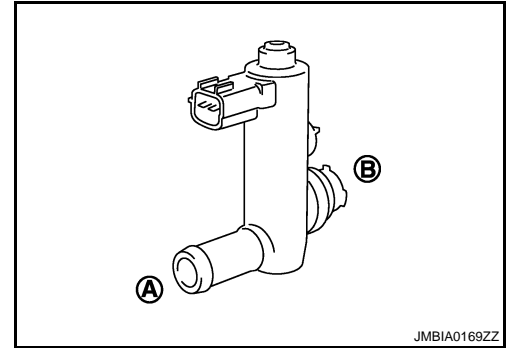
1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace EVAP canister vent control valve



P0448 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0448 EVAP CANISTER VENT CONTROL VALVE

Description

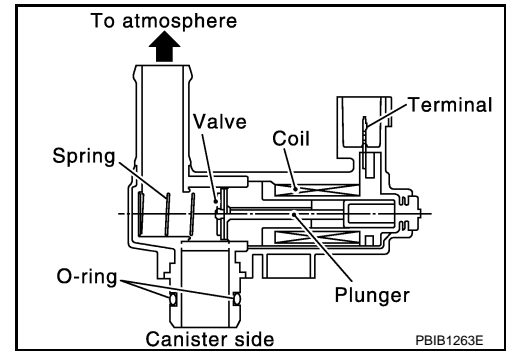
INFOID:000000001665580

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

INFOID:000000001343807

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0448 | EVAP canister vent control valve close | EVAP canister vent control valve remains closed under specified driving conditions. | <ul style="list-style-type: none">• EVAP canister vent control valve• EVAP control system pressure sensor and the circuit• Blocked rubber tube to EVAP canister vent control valve• EVAP canister is saturated with water |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

④ 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 three 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.

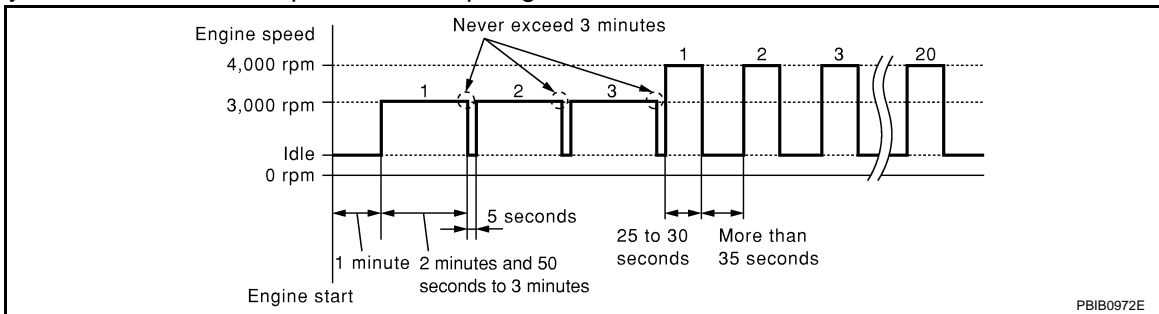
- Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. Repeat next procedure 20 times.
 - Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Fully released accelerator pedal and keep engine idle for at least 35 seconds.



7. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-306, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343808

1. CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Clean rubber tube using an air blower.

2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-307, "Component Inspection"](#).

Is the inspection result normal?

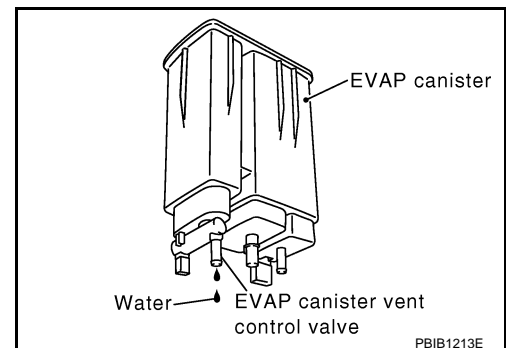
- YES >> GO TO 3.
- NO >> Replace EVAP canister vent control valve.

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 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

P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

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-311, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665581

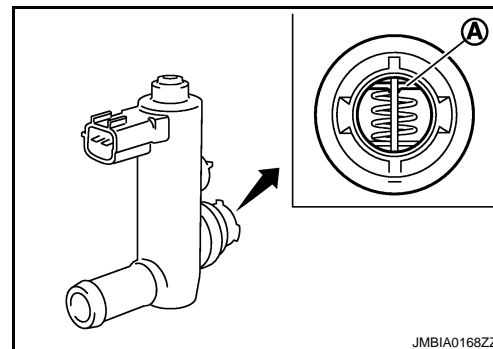
1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (B) of EVAP canister vent control valve for being rusted.

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.

P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

4. Check air passage continuity and operation delay time.
Make sure 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

Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

Ⓟ With CONSULT-III

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.
Make sure 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

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

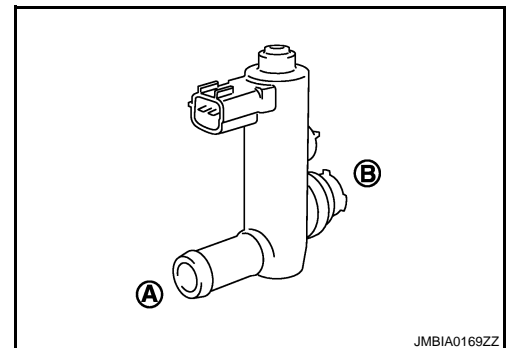
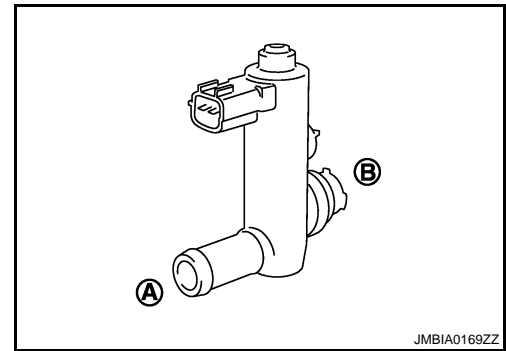
| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve



P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

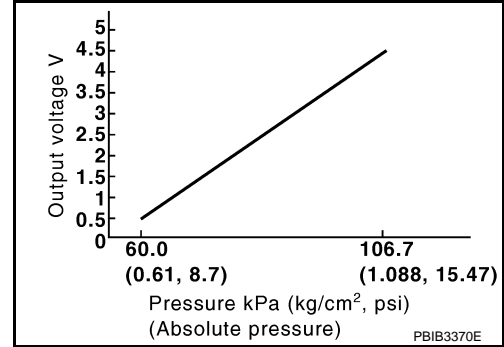
[QR25DE FOR CALIFORNIA]

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001343810

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

INFOID:000000001343811

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0451 | EVAP control system pressure sensor performance | ECM detects a sloshing signal from the EVAP control system pressure sensor | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • Tumble control valve position sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and wait at least 40 seconds.

NOTE:

Do not depress accelerator pedal even slightly.

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-309, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343812

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor harness connector.

2. Check sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness connector.

3.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.

2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 4.

4.CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Tumble control valve position sensor (Refer to [EC-401, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning component.

6.CHECK APP SENSOR

Refer to [EC-420, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 7.

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly
2. Go to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-311, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343813

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. **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 harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace EVAP control system pressure sensor

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

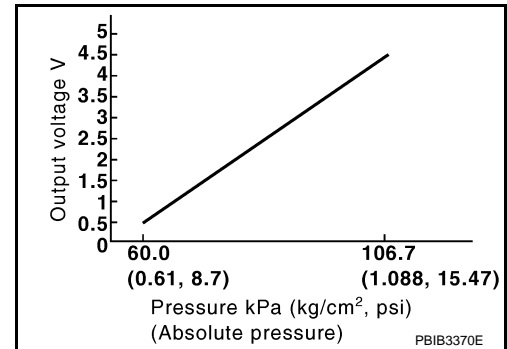
[QR25DE FOR CALIFORNIA]

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001665582

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

INFOID:000000001343815

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0452 | EVAP control system pressure sensor low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • Tumble control valve position sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. 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 and ground as follows.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-313, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343816

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace harness connector.

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 system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

Is the inspection result normal?

- YES >> GO TO 6.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6. CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 7.

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

7. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Tumble control valve position sensor (Refer to [EC-401, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

8. CHECK APP SENSOR

Refer to [EC-431, "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. Go to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : 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.
3. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| EVAP control system pressure sensor | | ECM | | Continuity |
|-------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| B41 | 1 | E10 | 96 | Existed |

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

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-315. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343817

1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch ON and check output voltage between ECM harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

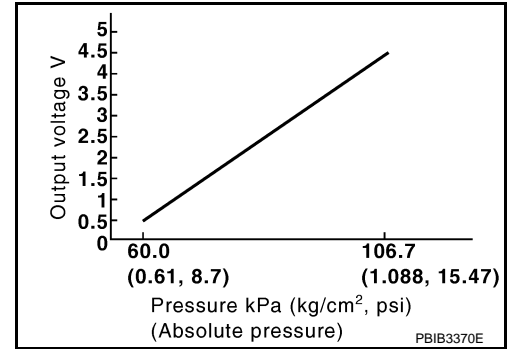
[QR25DE FOR CALIFORNIA]

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001665583

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

INFOID:000000001343819

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0453 | EVAP control system pressure sensor high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • Tumble control valve position sensor • EVAP canister vent control valve • EVAP canister • Rubber hose from EVAP canister vent control valve to vehicle frame |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.

With GST

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes to ECM harness connector and ground as follows.

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-318, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343820

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6.CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair short to ground or short to power in harness or connectors.

7.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Tumble control valve position sensor (Refer to [EC-401, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace malfunctioning component.

8.CHECK APP SENSOR

Refer to [EC-431, "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. Go to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : 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.
3. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| EVAP control system pressure sensor | | ECM | | Continuity |
|-------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| B41 | 1 | E10 | 96 | Existed |

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

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14.CHECK RUBBER TUBE

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 15.

NO >> Clean the rubber tube using an air blower, repair or replace rubber tube.

15.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-303, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace EVAP canister vent control valve.

16.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-321, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 17.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Replace EVAP control system pressure sensor.

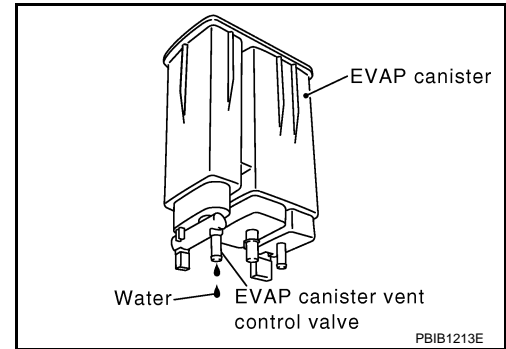
17. CHECK IF EVAP CANISTER SATURATED WITH WATER

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 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 15.

NO >> GO TO 14.

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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343821

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. **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 harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

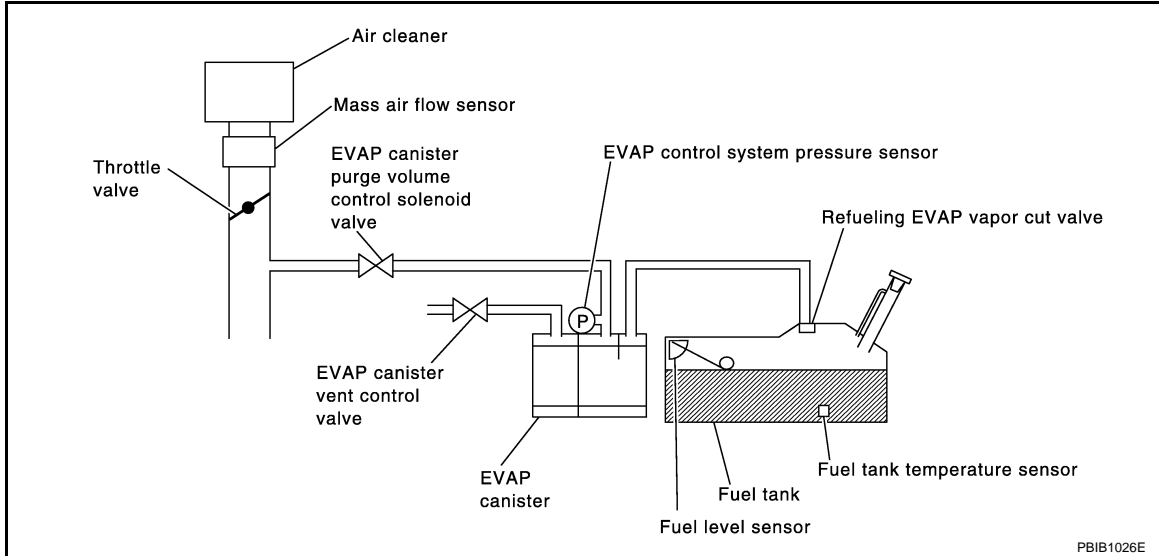
P0455 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001343822

DTC DETECTION LOGIC

This diagnosis detects a very large leak (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 gross leak detected | EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly. | <ul style="list-style-type: none"> Fuel filler cap remains open or fails to close. Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Foreign matter caught in fuel filler cap. Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent. Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

CAUTION:

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Never remove fuel filler cap during the DTC CONFIRMATION PROCEDURE.

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

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> Go to [EC-324, "Diagnosis Procedure"](#).
- NG >> GO TO 3.

3.CHECK DTC

Check DTC.

Which DTC is detected?

- P0455 >> Go to [EC-324, "Diagnosis Procedure"](#).
- P0442 >> Go to [EC-289, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

 **With GST**

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-518, "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES-1 >> P0455: Go to [EC-324, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-289, "Diagnosis Procedure"](#).
- YES-3 >> P0441: Go to [EC-285, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343823

1.CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

P0455 EVAP CONTROL SYSTEM

[QR25DE FOR CALIFORNIA]

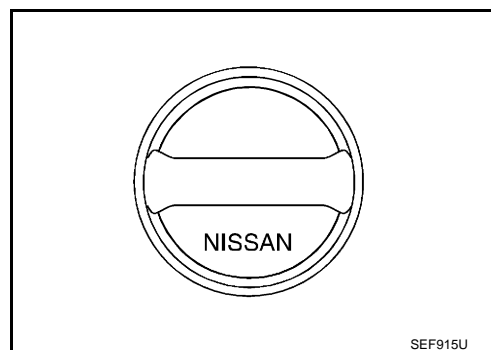
< COMPONENT DIAGNOSIS >

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.



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. Then 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-327. "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-86. "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 [EC-536. "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-303. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace EVAP canister vent control valve and O-ring.

8. CHECK FOR EVAP LEAK

Refer to [EC-86. "System Diagram"](#).

Is there any leak in EVAP line?

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- YES >> Repair or replace.
NO-1 >> With CONSULT-III: GO TO 9.
NO-2 >> Without CONSULT-III: GO TO 10.

9. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

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

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.
NO >> GO TO 11.

11. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-86. "System Diagram"](#).

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

1. Start engine.
2. Perform "PURG VOL CONT/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 14.
NO >> GO TO 13.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-297. "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-256. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
NO >> Replace fuel level sensor unit.

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-311, "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, kink, looseness and improper connection. For location, refer to [EC-466, "Description"](#).

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, kink, 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-469, "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-42, "Intermittent Incident"](#).

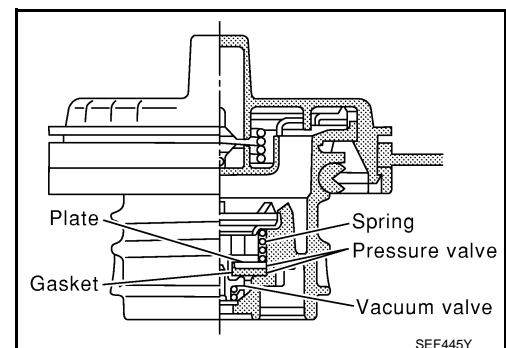
>> INSPECTION END

Component Inspection

INFOID:000000001665544

1. CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

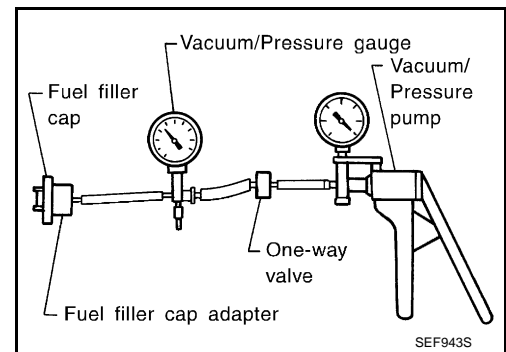
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0456 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001343825

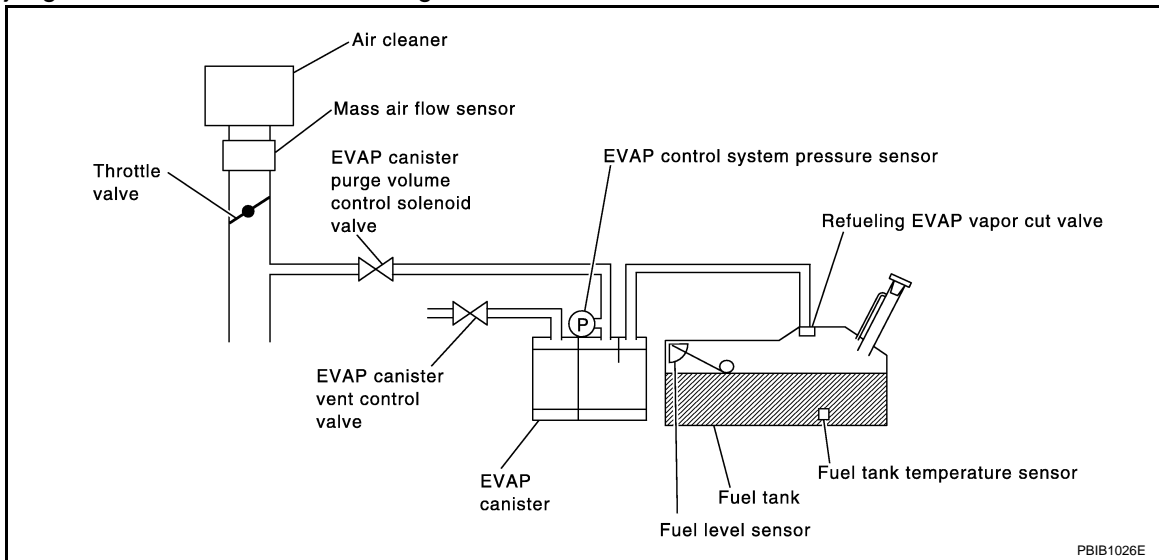
DTC DETECTION LOGIC

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0456 | Evaporative emission control system very small leak (negative pressure check) | <ul style="list-style-type: none"> EVAP system has a very small leak. EVAP system does not operate properly. | <ul style="list-style-type: none"> Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Fuel filler cap remains open or fails to close. Foreign matter caught in fuel filler cap. Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged EVAP canister is saturated with water EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 4.

2. PRECONDITIONING

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

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC CONFIRMATION PROCEDURE, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Fuel is refilled or drained.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

ⓑ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.4V

COOLAN TEMP/S: 0 - 32°C (32 - 90°F)

FUEL T/TMP SE: 0 - 35°C (32 - 95°F)

INT A/TEMP SE: More than 0°C (32°F)

If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.

Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III?

OK >> INSPECTION END

NG >> Go to [EC-331, "Diagnosis Procedure"](#).

4. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-331, "Component Function Check"](#).

NOTE:

Use component function check to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-331, "Diagnosis Procedure"](#).

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

INFOID:000000001343826

Component Function Check

1. PERFORM COMPONENT FUNCTION CHECK

 With GST

CAUTION:

- Do not use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port adapter 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 kg/cm², 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 kg/cm², 0.06 psi).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-331, "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

INFOID:000000001343827

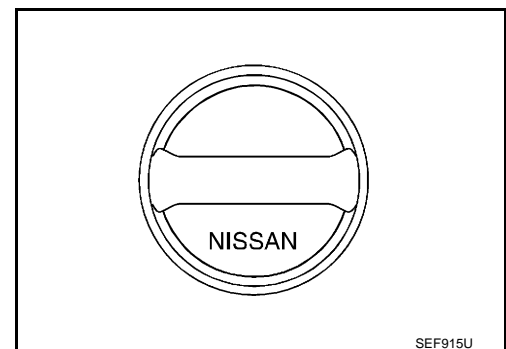
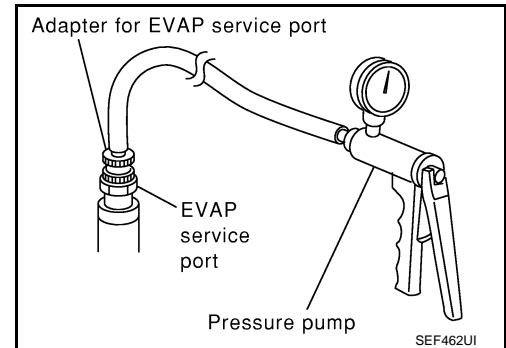
1. CHECK FUEL FILLER CAP DESIGN

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?

P0456 EVAP CONTROL SYSTEM

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< COMPONENT DIAGNOSIS >

YES >> GO TO 3.

NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Then 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-334, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5. CHECK FOR EVAP LEAK

Refer to [EC-86, "System Diagram"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [EC-536, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-303, "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 SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

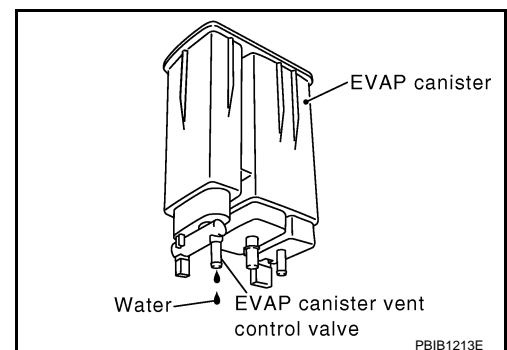
2. Check if water will drain from the EVAP canister.

Does water drain from EVAP canister?

YES >> GO TO 8.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.



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.

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

A

>> Repair hose or replace EVAP canister.

10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

EC

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

C

D

Vacuum should exist.

Is the inspection result normal?

E

- YES >> GO TO 13.
- NO >> GO TO 12.

11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

F

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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.

G

H

Vacuum should exist.

Is the inspection result normal?

I

- YES >> GO TO 14.
- NO >> GO TO 12.

J

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-86, "System Diagram"](#).

Is the inspection result normal?

K

- YES >> GO TO 13.
- NO >> Repair or reconnect the hose.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

L

Refer to [EC-295, "Diagnosis Procedure"](#).

Is the inspection result normal?

M

- YES >> GO TO 14.
- NO >> Replace EVAP canister purge volume control solenoid valve.

14. CHECK FUEL TANK TEMPERATURE SENSOR

N

Refer to [EC-256, "Component Inspection"](#).

Is the inspection result normal?

O

- YES >> GO TO 15.
- NO >> Replace fuel level sensor unit.

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

P

Refer to [EC-311, "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.

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Refer to [EC-86. "System Diagram"](#).

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, kink, looseness and improper connection. For location, refer to [EC-466. "Description"](#).

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, kink, 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-469. "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.

NO >> Replace fuel level sensor unit.

22. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

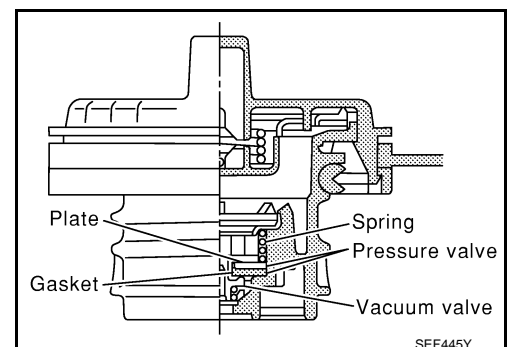
>> INSPECTION END

Component Inspection

INFOID:000000001665545

1. CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

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4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

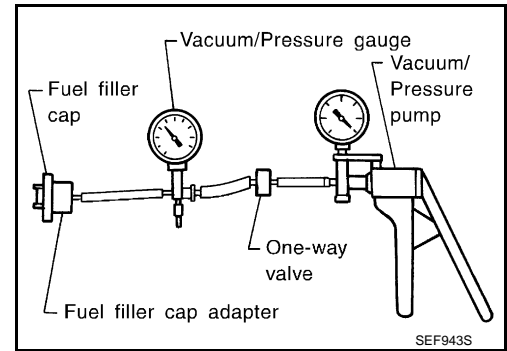
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



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P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0460 FUEL LEVEL SENSOR

Description

INFOID:000000001343829

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 through 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:000000001343830

DTC DETECTION LOGIC

NOTE:

- If DTC P0460 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-148, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is 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 |
|---------|---------------------------------|---|---|
| P0460 | Fuel level sensor circuit noise | Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-336, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343831

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

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>> INSPECTION END

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P0461 FUEL LEVEL SENSOR

Description

INFOID:000000001665584

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 through 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:000000001343833

DTC DETECTION LOGIC

NOTE:

- If DTC P0461 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "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 been driven.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0461 | Fuel level sensor circuit range/performance | The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance. | <ul style="list-style-type: none"> • Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The sensor circuit is open or shorted) • Combination meter • Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-338, "Component Function Check"](#). Use component function check to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-339, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343834

1. PRECONDITIONING

WARNING: When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-10, "Removal and Installation"](#).

TESTING CONDITION:

Before starting component function check, preparation of draining fuel and refilling fuel is required.

Do you have CONSULT-III?

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

2. PERFORM COMPONENT FUNCTION CHECK

 With CONSULT-III

NOTE:

P0461 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-533, "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 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 ℓ (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 0.03V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-339, "Diagnosis Procedure"](#).

3.PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

NOTE:

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-533, "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 ℓ (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-339, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001665585

1.CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0462, P0463 FUEL LEVEL SENSOR

Description

INFOID:000000001665586

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 through 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:000000001343837

DTC DETECTION LOGIC

NOTE:

- If DTC P0462 or P0463 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

This diagnosis indicates the former, to detect open or short circuit malfunction.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|---|---|
| P0462 | Fuel level sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |
| P0463 | Fuel level sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11V and 16V at ignition switch ON.

>> 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-340, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665587

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

>> INSPECTION END

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P0500 VSS

Description

INFOID:000000001343839

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:000000001343840

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|--|
| P0500 | Vehicle speed sensor | The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. | <ul style="list-style-type: none"> • Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Vehicle speed sensor • Combination meter • ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

3.CHECK VEHICLE SPEED SENSOR FUNCTION

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.

Ⓜ With CONSULT-III

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III. The vehicle speed on CONSULT-III should exceed 10 km/h (6 mph) when rotating wheels with suitable gear position.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Go to [EC-343, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.

< COMPONENT DIAGNOSIS >

3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

| | |
|---------------|---|
| ENG SPEED | CVT: 1,350 - 6,000 rpm M/T: 1,650 - 6,000 rpm |
| COOLAN TEMP/S | More than 70°C (158°F) |
| B/FUEL SCHDL | CVT: 5.5 - 31.8 msec M/T: 4.8 - 31.8 msec |
| Shift lever | Except P or N position (CVT) Except Neutral position (M/T) |
| PW/ST SIGNAL | OFF |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-343, "Diagnosis Procedure"](#).

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-343, "Component Function Check"](#).

Use component function check to check the overall function of the vehicle speed 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-343, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343841

1.PERFORM COMPONENT FUNCTION CHECK

 **With GST**

1. Lift up drive wheels.

2. Start engine.

3. Read vehicle speed sensor signal in Service \$01 with GST.

The vehicle speed sensor 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-343, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343842

1.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to [BRC-12, "CONSULT-III Function \(ABS\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

2.CHECK COMBINATION METER

Refer to [MWI-38, "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

P0506 ISC SYSTEM

Description

INFOID:000000001343843

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:000000001343844

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 system RPM lower than expected | The idle speed is less than the target idle speed by 100 rpm or more. | <ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#), before conducting DTC Confirmation Procedure.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C(14°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-344, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343845

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Discover air leak location and repair.
- NO >> GO TO 2.

2. REPLACE ECM

1. Stop engine.

P0506 ISC SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Replace ECM.
3. Go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

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P0507 ISC SYSTEM

Description

INFOID:000000001665588

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:000000001343847

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 system RPM higher than expected | The idle speed is more than the target idle speed by 200 rpm or more. | <ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak • PCV system |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform **EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"**, before conducting DTC Confirmation Procedure.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C(14°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to **EC-346, "Diagnosis Procedure"**.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343848

1. CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

Is the inspection result normal?

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

2. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

P0507 ISC SYSTEM

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is intake air leak detected?

YES >> Discover air leak location and repair.

NO >> GO TO 3.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Go to [EC-27. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

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P0550 PSP SENSOR

Description

INFOID:000000001343849

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

INFOID:000000001343850

DTC DETECTION LOGIC

NOTE:

If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0550 | Power steering pressure sensor circuit | An excessively low or high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Power steering pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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-348, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343851

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

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 | | |
| F40 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

P0550 PSP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3.CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| PSP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 3 | F13 | 48 | 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 or 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 sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK PSP SENSOR

Refer to [EC-349, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace PSP sensor.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343852

1.CHECK POWER STEERING PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|---|------------------------------|------------|
| Connector | Terminal | | |
| F13 | 41 (Power steering pressure sensor signal) | Steering wheel Being turned. | 0.5 - 4.5V |
| | | Not being turned. | 0.4 - 0.8V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace power steering pressure sensor.

P0603 ECM POWER SUPPLY

< COMPONENT DIAGNOSIS >

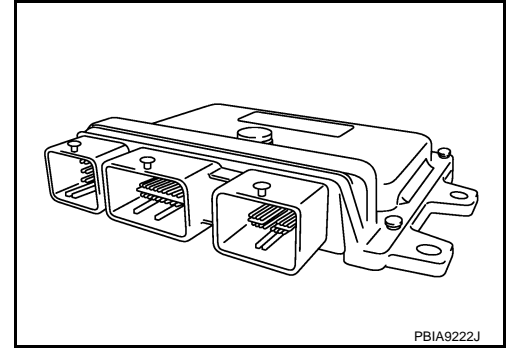
[QR25DE FOR CALIFORNIA]

P0603 ECM POWER SUPPLY

Description

INFOID:000000001343853

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.



PBIA9222J

DTC Logic

INFOID:000000001343854

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------|--|--|
| P0603 | ECM power supply circuit | ECM back-up RAM system does not function properly. | <ul style="list-style-type: none">• Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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 ON.
4. Repeat steps 2 and 3 for four times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-350. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343855

1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F13 | 77 | Ground | Battery voltage |

Is the inspection result normal?

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

< COMPONENT DIAGNOSIS >

2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse (No. 42)
- IPDM E/R harness connector F10
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**

See [EC-350, "DTC Logic"](#).

 With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**

See [EC-350, "DTC Logic"](#).

Is the 1st trip DTC P0603 displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

5. REPLACE ECM

1. Replace ECM.
2. Go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

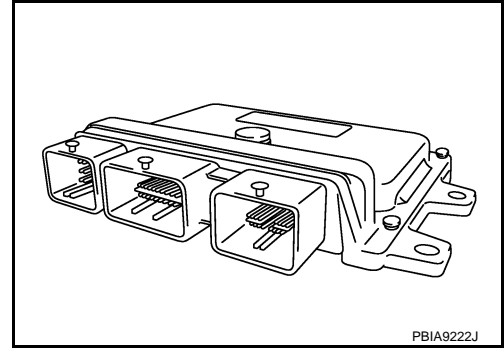
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P0605 ECM

Description

INFOID:000000001343856

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:000000001343857

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|---|----------------|
| P0605 | Engine control module | A) | ECM calculation function is malfunctioning. | • ECM |
| | | B) | ECM EEPROM system is malfunctioning. | |
| | | C) | ECM self shut-off function is malfunctioning. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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-353, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-353, "Diagnosis Procedure"](#).

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-353, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343858

1.INSPECTION START

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-352. "DTC Logic"](#).

 With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-352. "DTC Logic"](#).

Is the 1st trip DTC P0605 displayed again?

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

2.REPLACE ECM

1. Replace ECM.
2. Go to [EC-27. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

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P0607 ECM

Description

INFOID:000000003159699

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:000000003159700

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|---|
| P0607 | CAN communication bus | When detecting error during the initial diagnosis of CAN controller of ECM. | <ul style="list-style-type: none"> ECM |

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

- YES >> Go to [EC-354, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003159701

1. INSPECTION START

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-354, "DTC Logic"](#).
5. Check DTC.

 With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-354, "DTC Logic"](#).
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-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P0643 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000001343859

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|-----------------------------------|--|--|
| P0643 | Sensor power supply circuit short | ECM detects a voltage of power source for sensor is excessively low or high. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) (Battery current sensor circuit is shorted.) (PSP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Battery current sensor • Power steering pressure sensor • Camshaft position sensor (PHASE) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-355, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343860

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 7.

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

NO >> GO TO 3.

3. CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 47 | Electric throttle control actuator | F57 | 1 |
| | 51 | Battery current sensor | F5 | 1 |
| | 55 | PSP sensor | F40 | 1 |
| | 59 | CMP sensor (PHASE) | F55 | 1 |
| E10 | 83 | APP sensor | E40 | 5 |

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.

- Battery current sensor (Refer to [EC-372, "Component Inspection"](#).)
- Power steering pressure sensor (Refer to [EC-349, "Component Inspection"](#).)
- Camshaft position sensor (PHASE) (Refer to [EC-276, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

5. CHECK TP SENSOR

Refer to [EC-184, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

7. CHECK APP SENSOR

Refer to [EC-420, "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-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0850 PNP SWITCH

Description

INFOID:000000001343861

When the shift lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) switch is ON. ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:000000001343862

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) switch is not changed in the process of engine starting and driving. | <ul style="list-style-type: none"> Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] Park/neutral position (PNP) switch |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

3.CHECK PNP SWITCH FUNCTION

 With CONSULT-III

- Turn ignition switch ON.
- 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 (Shift lever) | Known-good signal |
|---|-------------------|
| N or P position (CVT) Neutral position (M/T) | ON |
| Except above position | OFF |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Go to [EC-358. "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

- Select "DATA MONITOR" mode with CONSULT-III.
- Start engine and warm it up to normal operating temperature.
- Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

| | |
|---------------|--|
| ENG SPEED | CVT: 1,300 - 6,375 rpm M/T: 1,500 - 6,375 rpm |
| COOLAN TEMP/S | More than 70°C (158°F) |

P0850 PNP SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| | |
|---------------|--|
| B/FUEL SCHDL | CVT: 3.0 - 31.8 msec M/T: 2.1 - 31.8 msec |
| VHCL SPEED SE | More than 64 km/h (40 mph) |
| Shift lever | Suitable position |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-358, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-358, "Component Function Check"](#).

NOTE:

Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-358, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343863

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-------------------------------|-----------------|
| Connector | Terminal | | | |
| E10 | 102 (PNP switch signal) | Ground | P or N (CVT) Neutral (M/T) | Approx. 0V |
| | | | Except above | BATTERY VOLTAGE |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-358, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343864

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

| PNP switch | | Ground | Voltage |
|------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F25 (CVT) F32 (M/T) | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

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

P0850 PNP SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| PNP switch | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F25 (CVT) F32 (M/T) | 2 | E10 | 102 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

NO-1 >> Repair open circuit or short to ground or short to power in harness or connectors.

NO-2 >> CVT: GO TO 3.

3.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between PNP switch harness connector and ECM harness connector.

| PNP switch | | IPDM E/R | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F25 | 2 | F10 | 72 | Existed |

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

| ECM | | IPDM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 102 | E18 | 30 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK PNP SWITCH

Refer to [TM-303. "Component Inspection \(Park/Neutral Position Switch\)"](#) (CVT) or [TM-20. "Inspection"](#) (M/T).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace PNP switch.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

P1148 CLOSED LOOP CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1148 CLOSED LOOP CONTROL

DTC Logic

INFOID:000000001343865

DTC DETECTION LOGIC

NOTE:

**DTC P1148 is displayed with another DTC for A/F sensor 1.
Perform the trouble diagnosis for the corresponding DTC.**

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------|---|---|
| P1148 | Closed loop control function | The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition. | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)• A/F sensor 1• A/F sensor 1 heater |
| | | The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition. | |

P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:000000001343866

DTC DETECTION LOGIC

NOTE:

- If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

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 |
|---------|------------------------------------|--|---|
| P1217 | Engine over temperature (Overheat) | <ul style="list-style-type: none">• Cooling fan does not operate properly (Overheat).• Cooling fan system does not operate properly (Overheat).• Engine coolant was not added to the system using the proper filling method.• Engine coolant is not within the specified range. | <ul style="list-style-type: none">• Harness or connectors (The cooling fan circuit is open or shorted.)• IPDM E/R (Cooling fan relay-1)• Cooling fan relays-2 and -3• Cooling fan motor• Radiator hose• Radiator• Radiator cap• Reservoir tank• Water pump• Thermostat• Water control valve |

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-12, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-10, "Changing Engine Oil"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-12, "Engine Oil Recommendation"](#).
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-361, "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-362, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343867

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.

P1217 ENGINE OVER TEMPERATURE

[QR25DE FOR CALIFORNIA]

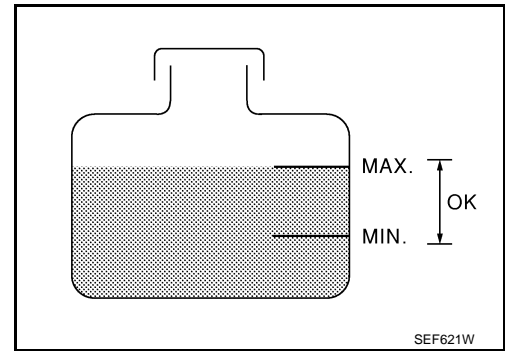
< COMPONENT DIAGNOSIS >

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 [EC-362, "Diagnosis Procedure"](#).
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-362, "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. Make sure that cooling fan motors-1 and -2 operate at each speed (LOW/HI).

Without CONSULT-III

Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-362, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343868

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. Make sure that cooling fan motors-1 and -2 operate at each speed (LOW/HI).

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).
2. Make sure that cooling fan motors-1 and -2 operate at each speed (Low/High).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [EC-445, "Diagnosis Procedure"](#).

2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to [CO-11, "System Inspection"](#).

Is leakage detected?

- YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak. Refer to [CO-11, "System Inspection"](#).

- Hose
- Radiator
- Water pump

P1217 ENGINE OVER TEMPERATURE

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

>> Repair or replace malfunctioning part.

4. CHECK RADIATOR CAP

Check radiator cap. Refer to [CO-15, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap.

5. CHECK THERMOSTAT

Check thermostat. Refer to [CO-20, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat.

6. CHECK WATER CONTROL VALVE

Check water control valve. Refer to [CO-22, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace water control valve

7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-180, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace engine coolant temperature sensor.

8. CHECK MAIN 13 CAUSES

If the cause cannot be isolated, check the following.

| Engine | Step | Inspection item | Equipment | Standard | Reference page |
|--------|------|--|--|--|--|
| OFF | 1 | <ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper | <ul style="list-style-type: none"> Visual | No blocking | — |
| | 2 | <ul style="list-style-type: none"> Coolant mixture | <ul style="list-style-type: none"> Coolant tester | 50 - 50% coolant mixture | MA-12, "Engine Oil Recommendation" |
| | 3 | <ul style="list-style-type: none"> Coolant level | <ul style="list-style-type: none"> Visual | Coolant up to MAX level in reservoir tank and radiator filler neck | CO-12, "Changing Engine Coolant" |
| | 4 | <ul style="list-style-type: none"> Radiator cap | <ul style="list-style-type: none"> Pressure tester | 59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit) | CO-15, "Removal and Installation" |
| ON*2 | 5 | <ul style="list-style-type: none"> Coolant leaks | <ul style="list-style-type: none"> Visual | No leaks | CO-11, "System Inspection" |
| ON*2 | 6 | <ul style="list-style-type: none"> Thermostat | <ul style="list-style-type: none"> Touch the upper and lower radiator hoses | Both hoses should be hot | CO-20, "Removal and Installation" |
| ON*1 | 7 | <ul style="list-style-type: none"> Cooling fan motor | <ul style="list-style-type: none"> CONSULT-III | Operating | EC-445, "Component Function Check" |
| OFF | 8 | <ul style="list-style-type: none"> Combustion gas leak | <ul style="list-style-type: none"> Color checker chemical tester 4 Gas analyzer | Negative | — |
| ON*3 | 9 | <ul style="list-style-type: none"> Coolant temperature gauge | <ul style="list-style-type: none"> Visual | Gauge less than 3/4 when driving | — |
| | | <ul style="list-style-type: none"> Coolant overflow to reservoir tank | <ul style="list-style-type: none"> Visual | No overflow during driving and idling | CO-11, "System Inspection" |
| OFF*4 | 10 | <ul style="list-style-type: none"> Coolant return from reservoir tank to radiator | <ul style="list-style-type: none"> Visual | Should be initial level in reservoir tank | CO-11, "System Inspection" |

P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Engine | Step | Inspection item | Equipment | Standard | Reference page |
|--------|------|--|--|--|---|
| OFF | 11 | <ul style="list-style-type: none">Water control valve | <ul style="list-style-type: none">Remove and inspect the valve | Within the specified value | CO-22, "Removal and Installation" |
| OFF | 12 | <ul style="list-style-type: none">Cylinder head | <ul style="list-style-type: none">Straight gauge feeler gauge | 0.1 mm (0.004 in) Maximum distortion (warping) | EM-64, "On-Vehicle Service" |
| | 13 | <ul style="list-style-type: none">Cylinder block and pistons | <ul style="list-style-type: none">Visual | No scuffing on cylinder walls or piston | EM-82, "Inspection After Disassembly" |

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 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-9, "Troubleshooting Chart"](#).

>> INSPECTION END

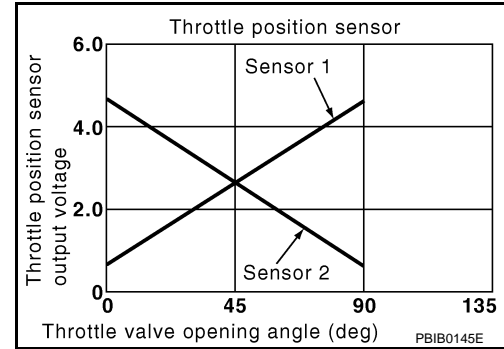
P1225 TP SENSOR

Description

INFOID:000000001665508

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 signal 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.



DTC Logic

INFOID:000000001343870

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P1225 | Closed throttle position learning performance | Closed throttle position learning value is excessively low. | <ul style="list-style-type: none"> Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-365, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343871

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1225 TP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

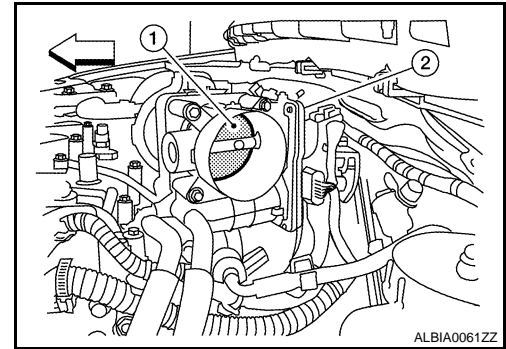
2. Electric throttle control actuator

← : 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-417. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665512

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

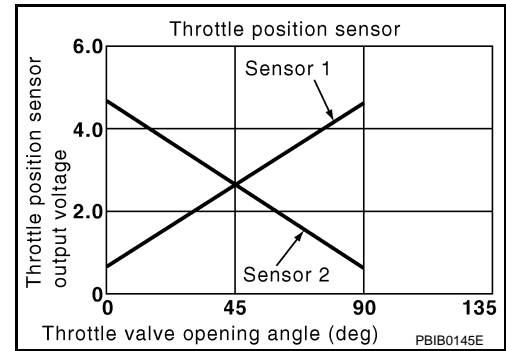
P1226 TP SENSOR

Description

INFOID:000000001665509

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 signal 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.



DTC Logic

INFOID:000000001343874

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P1226 | Closed throttle position learning performance | Closed throttle position learning is not performed successfully, repeatedly. | <ul style="list-style-type: none"> Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-367, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665589

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1226 TP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

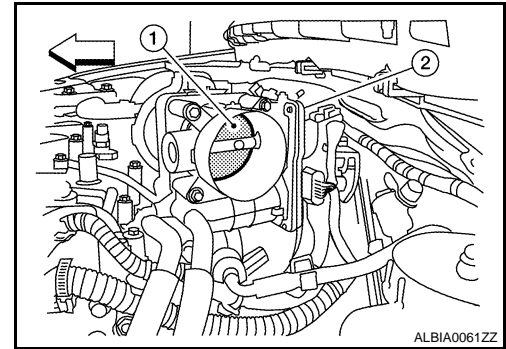
2. Electric throttle control actuator

⇐ : 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-368. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665513

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P1421 COLD START CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1421 COLD START CONTROL

Description

INFOID:000000001343877

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

DTC Logic

INFOID:000000001343878

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 idle speed properly when engine is started with prewarming up condition. | <ul style="list-style-type: none">Lack of intake air volumeFuel injection systemECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Check that the "COOLAN TEMP/S" indication is between 4°C (39°F) and 36°C (97°F).
If "COOLAN TEMP/S" indication is within the specified value, go to the following step.
If "COOLANT TEMP/S" indication is out of the specified value, cool engine down or warm engine up and go to step 1.
- Start engine and let it idle for 5 minutes.
- Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-369, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343879

1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 2.
NO >> Follow the instruction of Idle Air Volume Learning.

2. CHECK INTAKE SYSTEM

Check for the cause of intake air volume lacking. Refer to the following.

- Crushed intake air passage
- Intake air passage clogging

P1421 COLD START CONTROL

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part

3. CHECK FUEL INJECTION SYSTEM FUNCTION

Perform DTC CONFIRMATION PROCEDURE for DTC P0171. Refer to [EC-246. "DTC Logic"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-247. "Diagnosis Procedure"](#) for DTC P0171.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-369. "DTC Logic"](#).

With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-369. "DTC Logic"](#).

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-27. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P1550 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1550 BATTERY CURRENT SENSOR

Description

INFOID:000000001343880

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001343881

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P1550 | Battery current sensor circuit range/performance | The output voltage of the battery current sensor remains within the specified range while engine is running. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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:000000001343882

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1550 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-372, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343883

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1550 BATTERY CURRENT SENSOR

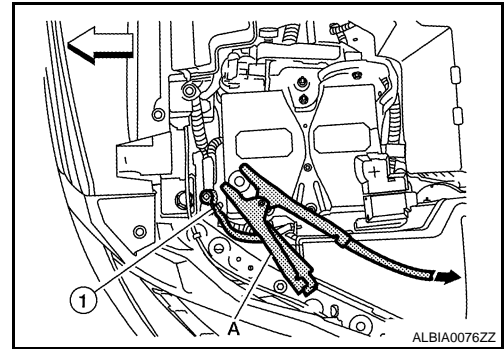
[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

A

EC

C

D

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P

P1551, P1552 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1551, P1552 BATTERY CURRENT SENSOR

Description

INFOID:000000001665591

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001343885

DTC DETECTION LOGIC

NOTE:

If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P1551 | Battery current sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |
| P1552 | Battery current sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V with ignition switch ON

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-374, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665592

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

P1551, P1552 BATTERY CURRENT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-375. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665593

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1551, P1552 BATTERY CURRENT SENSOR

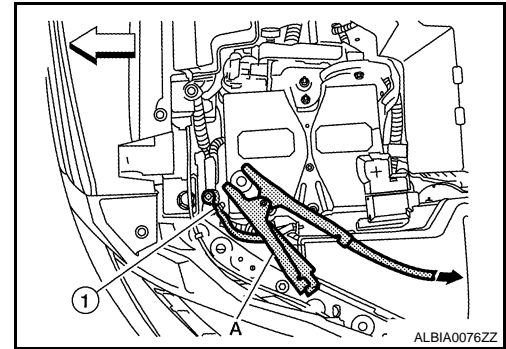
< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1553 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1553 BATTERY CURRENT SENSOR

Description

INFOID:000000001665595

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001343889

DTC DETECTION LOGIC

NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1553 | Battery current sensor performance | The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-377, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665596

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1553 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-378, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665597

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1553 BATTERY CURRENT SENSOR

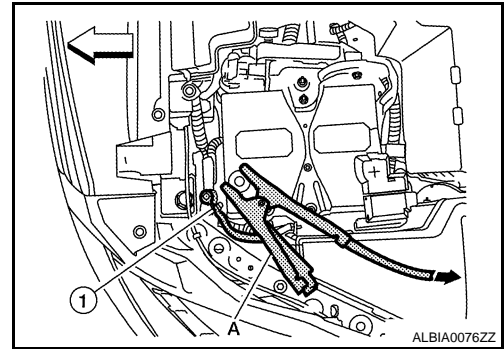
[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

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P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1554 BATTERY CURRENT SENSOR

Description

INFOID:000000001665598

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001343893

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1554 | Battery current sensor performance | The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-380, "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 [EC-381, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001343894

1.PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8V 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

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.

P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Above 2.3V at least once |

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-381. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001665599

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 42 | Existed |

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

Is the inspection result normal?

P1554 BATTERY CURRENT SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-382. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

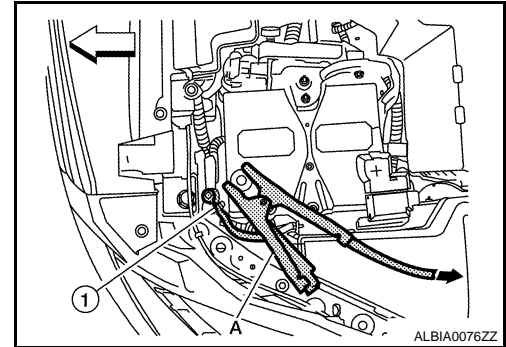
INFOID:000000001665600

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.
2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace battery negative cable assembly.

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1564 ASCD STEERING SWITCH

Description

INFOID:000000001343897

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 [EC-67, "System Description"](#) for the ASCD function.

DTC Logic

INFOID:000000001343898

DTC DETECTION LOGIC

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-352, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P1564 | ASCD steering switch | <ul style="list-style-type: none">An excessively high voltage signal from the ASCD steering switch is sent to ECM.ECM detects that input signal from the ASCD steering switch is out of the specified range.ECM detects that the ASCD steering switch is stuck ON. | <ul style="list-style-type: none">Harness or connectors (The switch circuit is open or shorted.)ASCD steering switchECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON.
- Wait at least 10 seconds.
- Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 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.
- Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> Go to [EC-383, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343899

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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

- Turn ignition switch ON.

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

- Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT-III.
- Check each item indication under the following conditions.

| Monitor item | Condition | Indication | |
|---------------|--------------------------|------------|-----|
| MAIN SW | MAIN switch | Pressed | ON |
| | | Released | OFF |
| CANCEL SW | CANCEL switch | Pressed | ON |
| | | Released | OFF |
| RESUME/ACC SW | RESUME/ACCELERATE switch | Pressed | ON |
| | | Released | OFF |
| SET SW | SET/COAST switch | Pressed | ON |
| | | Released | OFF |

⊗ Without CONSULT-III

- Turn ignition switch ON.
- Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------------|--------|--------------------------------------|------------|
| Connector | Terminal | | | |
| E10 | 85 (ASCD steering switch signal) | Ground | MAIN switch: Pressed | Approx. 0V |
| | | | CANSEL switch: Pressed | Approx. 1V |
| | | | SET/COAST switch: Pressed | Approx. 2V |
| | | | RESUME/ACCELERATE switch: Pressed | Approx. 3V |
| | | | All ASCD steering switches: Released | Approx. 4V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Disconnect combination switch harness connector M88.
- Check the continuity between combination switch and ECM harness connector.

| Combination switch | ECM | | Continuity |
|--------------------|----------|-----------|------------|
| | Terminal | Connector | |
| 16 | E10 | 92 | Existed |

- 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

1. Check the continuity between ECM harness connector and combination switch.

| Combination switch Terminal | ECM | | Continuity |
|--------------------------------|-----------|----------|------------|
| | Connector | Terminal | |
| 13 | E10 | 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

7. CHECK ASCD STEERING SWITCH

Refer to [EC-385, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343900

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M303.
2. Check the continuity between combination switch harness connector terminals under following conditions.

| Combination meter | | Condition | Resistance |
|-------------------|-----------|--------------------------------------|-----------------|
| Connector | Terminals | | |
| M88 | 13 and 16 | MAIN switch: Pressed | Approx. 0 Ω |
| | | CANCEL switch: Pressed | Approx. 250 Ω |
| | | SET/COAST switch: Pressed | Approx. 660 Ω |
| | | RESUME/ACCELERATE switch: Pressed | Approx. 1,480 Ω |
| | | All ASCD steering switches: Released | Approx. 4,000 Ω |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1572 ASCD BRAKE SWITCH

Description

INFOID:000000001343901

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 this input of two kinds (ON/OFF signal). Refer to [EC-67, "System Description"](#) for the ASCD function.

DTC Logic

INFOID:000000001343902

DTC DETECTION LOGIC

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-352, "DTC Logic"](#).
- 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 OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|--|--|
| P1572 | ASCD brake switch | 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 style="list-style-type: none">• Harness or connectors (The stop lamp switch circuit is shorted.)• Harness or connectors (The ASCD brake switch circuit is shorted.)• Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T)• Stop lamp switch• ASCD brake switch• ASCD clutch switch (M/T)• Incorrect stop lamp switch installation• Incorrect ASCD brake switch installation• Incorrect ASCD clutch switch installation (M/T)• ECM |
| | | B) | ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
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.

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| | |
|---------------|----------------------------|
| VHCL SPEED SE | More than 30 km/h (19 mph) |
| Shift lever | Suitable position |

5. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-387. "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

 **With CONSULT-III**

1. 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 |
| Driving location | Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed. |

2. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-387. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343903

1.CHECK OVERALL FUNCTION-I

 **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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

 **Without CONSULT-III**

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage | |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.

P1572 ASCD BRAKE SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- NO-1 >> CVT models: GO TO 3.
- NO-1 >> M/T models: GO TO 7.

2.CHECK OVERALL FUNCTION-II

With CONSULT-III

Select "BRAKE SW2" and check indication in "DATA MONITOR" mode.

| Monitor item | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW2 | Brake pedal (CVT) | Slightly depressed | ON |
| | Brake pedal and clutch pedal (M/T) | Fully released | OFF |

Without CONSULT-III

Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | | Voltage |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 19.
- NO >> GO TO 14.

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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 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 E6
- Junction block connector E44, E46
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or 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 ASCD harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

| ASCD brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | Existed |

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

P1572 ASCD BRAKE SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK ASCD BRAKE SWITCH

Refer to [EC-391, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD brake switch.

7.CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | Voltage (V) | |
|--------------------|----------|--------|----------------|--------------------|-----------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | Fully released | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 8.

8.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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

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

10.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 ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

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

Is the inspection result normal?

YES >> GO TO 11.

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

11.CHECK ASCD BRAKE SWITCH

Refer to [EC-391, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD brake switch.

12.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 ECM harness connector and ASCD clutch switch harness connector.

| ECM | | ASCD clutch switch | | Continuity |
|-----------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 110 | E37 | 2 | Existed |

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

Is the inspection result normal?

YES >> GO TO 13.

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

13.CHECK ASCD CLUTCH SWITCH

Refer to [EC-392, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD clutch switch.

14.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 15.

15.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.7)
- Harness for open or short between stop lamp switch and battery

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

16.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

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| ECM | | ASCD clutch switch | | Continuity |
|-----------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 106 | E38 | 2 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 18.
- NO >> GO TO 17.

17. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Harness for open or short between ECM and stop lamp switch

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

18. CHECK STOP LAMP SWITCH

Refer to [EC-392, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 19.
- NO >> Replace stop lamp switch.

19. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:000000001343904

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 |
| | | 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 [BR-12, "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 |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace ASCD brake switch.

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

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Component Inspection (ASCD Clutch Switch)

INFOID:000000001343905

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to [CL-5, "Inspection and Adjustment"](#).
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:000000001343906

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

P1574 ASCD VEHICLE SPEED SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:000000001343907

The ECM receives two vehicle speed sensor 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 [EC-67, "System Description"](#) for ASCD functions.

DTC Logic

INFOID:000000001343908

DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-342, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-352, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------|---|--|
| P1574 | ASCD vehicle speed sensor | ECM detects a difference between two vehicle speed signals is out of the specified range. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.)• Combination meter• ABS actuator and electric unit (control unit)• Wheel sensor• TCM (CVT models)• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
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 [EC-393, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343909

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-291, "Diagnosis Description"](#).

P1574 ASCD VEHICLE SPEED SENSOR

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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-12. "CONSULT-III Function \(ABS\)".](#)

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.

Refer to [MWI-38. "CONSULT-III Function \(METER/M&A\)".](#)

>> INSPECTION END

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

Description

INFOID:000000001343910

ECM receives primary speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

DTC Logic

INFOID:000000001343911

DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-149, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to [EC-270, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0340, first perform the trouble diagnosis for DTC P0340. Refer to [EC-274, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-352, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-354, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P1715 | Input speed sensor (Primary speed sensor) (TCM output) | Primary speed sensor signal is different from the theoretical value calculated by ECM from secondary speed sensor signal and engine rpm signal. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (Primary speed sensor circuit is open or shorted)• TCM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and drive the vehicle at more than 50 km/h (31 MPH) for at least 5 seconds.

CAUTION:

Always drive vehicle at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-395, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343912

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-291, "Diagnosis Description"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

2. REPLACE TCM

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

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Replace TCM.

>> INSPECTION END

P1805 BRAKE SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

P1805 BRAKE SWITCH

Description

INFOID:000000001343913

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 driving.

DTC Logic

INFOID:000000001343914

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 extremely long time while the vehicle is driving. | <ul style="list-style-type: none"> Harness or connectors (Stop lamp switch circuit is open or shorted.) Stop lamp switch |

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON.
- Fully depress the brake pedal for at least 5 seconds.
- Erase the DTC with CONSULT-III.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-397, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343915

1. CHECK STOP LAMP SWITCH CIRCUIT

- Turn ignition switch OFF.
- Check the stop lamp when depressing and releasing the brake pedal.

| Brake pedal | Stop lamp |
|--------------------|-----------------|
| Fully released | Not illuminated |
| Slightly depressed | Illuminated |

Is 1st trip DTC detected?

- YES >> GO TO 4.
 NO >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect stop lamp switch harness connector.
- Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E6

P1805 BRAKE SWITCH

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- 10A fuse (No. 7)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or 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 ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

| ECM | | Stop lamp switch | | Continuity |
|-----------|----------|------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 106 | E38 | 2 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 6.
- NG >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44, E45
- Harness for open or short between ECM and stop lamp switch

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

6.CHECK STOP LAMP SWITCH

Refer to [EC-398, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace stop lamp switch.

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:000000001665611

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

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

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

P1805 BRAKE SWITCH

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| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace stop lamp switch.

A

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P

P2004 TUMBLE CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2004 TUMBLE CONTROL VALVE

Description

INFOID:000000001343917

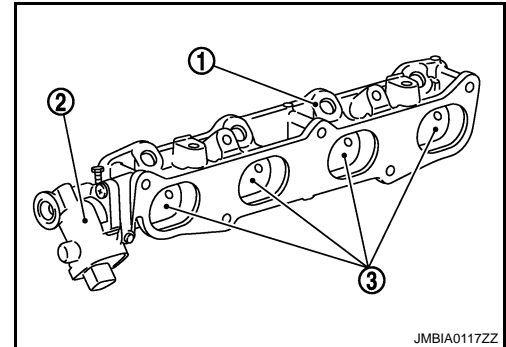
Tumble control valve (3) is installed in the intake manifold adapter (1).

Tumble control valve actuator (2) is connected to the front end of the valve shaft.

Tumble control valve actuator consists of motor and position sensor, etc.

The motor opens or closes the valve by the output signal of the ECM.

The sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.



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DTC Logic

INFOID:000000001343918

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|----------------------------|---|---|
| P2004 | Tumble control valve stuck | The target angle of tumble control valve controlled by ECM and the input signal from tumble control valve position sensor is not in the normal range. | <ul style="list-style-type: none"> • Harness or connectors (Tumble control valve motor circuit is open or shorted.) (Tumble control valve position sensor circuit is open or shorted.) (Accelerator pedal position sensor 2 circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Tumble control valve actuator (Tumble control valve motor) (Tumble control valve position sensor) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • EVAP control system pressure sensor • Refrigerant pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above 0°C (32°F)

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "COOLAN TEMP/S" indicates between 5°C (41°F) to 60°C (140°F).
If not, cool engine down or warm engine up until "COOLAN TEMP/S" indicates between 5°C (41°F) to 60°C (140°F). Then go to the following steps.

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4. Fully release accelerator pedal and wait at least 5 seconds.
5. Depress accelerator pedal and wait at least 5 seconds.
6. Check 1st trip DTC.

With GST

Following the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-401, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343919

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK TUMBLE CONTROL VALVE MOTOR POWER SUPPLY CIRCUIT-I

Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------|--------|---------------------|-----------------|
| Connector | Terminal | | | |
| F14 | 7 | Ground | Ignition switch OFF | Approx. 0V |
| | | | Ignition switch ON | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK TUMBLE CONTROL VALVE MOTOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 53 | F14 | 7 | Existed |

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

Is the inspection result normal?

- YES >> Refer to [EC-144, "Diagnosis Procedure"](#).
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK TUMBLE CONTROL VALVE MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect tumble control valve actuator harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

P2004 TUMBLE CONTROL VALVE

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| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|-------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 4 | F14 | 1 | Not existed |
| | | | 3 | Existed |
| | 5 | | 1 | Existed |
| | | | 3 | Not 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 or short to ground or short to power in harness or connectors.

5. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Reconnect ECM harness connector disconnected.
2. Turn ignition switch ON.
3. Check the voltage between tumble control valve actuator harness connector and ground.

| Tumble control valve actuator | | Ground | Voltage |
|-------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F43 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 6.

6. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 1 | F13 | 72 | Existed |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit.

7. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve actuator | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 8.

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

P2004 TUMBLE CONTROL VALVE

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8. CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-311, "Component Inspection"](#).)

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Replace malfunctioning components.

9. CHECK APP SENSOR

Refer to [EC-420, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.
NO >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Refer to [EC-420, "Special Repair Requirement"](#).

>> INSPECTION END

11. CHECK TUMBLE CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 2 | F13 | 52 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK TUMBLE CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 3 | F13 | 54 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 13.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK TUMBLE CONTROL VALVE

Refer to [EC-404, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.
NO >> Replace intake manifold adapter.

P2004 TUMBLE CONTROL VALVE

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14. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace intake manifold adapter.
- NO >> Repair or replace harness or connectors.

Component Inspection

INFOID:000000001343920

1. CHECK TUMBLE CONTROL VALVE

With CONSULT-III

1. Turn ignition switch OFF.
2. Remove intake manifold adapter. Refer to [EM-26. "Removal and Installation"](#).
3. Visually check the valve for damage and check if foreign matter is caught between the valve and the housing.
4. Connect tumble control valve actuator harness connector.
5. Turn ignition switch ON.
6. Perform "TUMBLE CONTROL VALVE" in "ACTIVE TEST" mode with CONSULT-III.
7. Touch "ON/OFF" and check that the valve opens and closes.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Remove intake manifold adapter. Refer to [EM-26. "Removal and Installation"](#).
3. Visually check the valve for damage and check if foreign matter is caught between the valve and the housing.
4. Supply tumble control valve actuator terminals with battery voltage within 2 seconds and check operation.

| Tumble control valve actuator | | Operation |
|-------------------------------|-----|-----------|
| Terminal | | |
| (+) | (-) | |
| 4 | 5 | Open |
| 5 | 4 | Close |

CAUTION:

Do not apply 12V DC continuously for 30 seconds or more. Doing so may result in damage to the coil in tumble control valve motor.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace intake manifold adaptor.

P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2014 TUMBLE CONTROL VALVE POSITION SENSOR

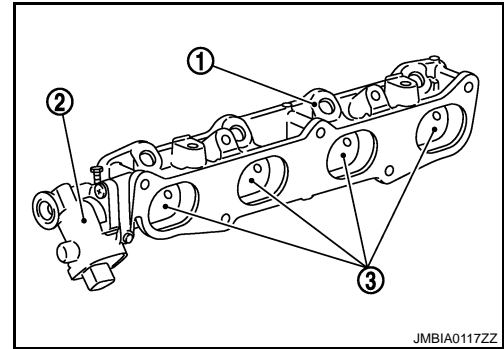
Description

INFOID:000000001343921

Tumble control valve position sensor is built into the tumble control valve actuator (2).

- 1 : Intake manifold adapter
- 3 : Tumble control valve

The sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.



JMBIA0117ZZ

DTC Logic

INFOID:000000001343922

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P2014 | Tumble control valve position sensor circuit | An excessively low or high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (Tumble control valve position sensor circuit is open or shorted.) (Accelerator pedal position sensor 2 circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Tumble control valve actuator (Tumble control valve position sensor) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • EVAP control system pressure sensor • Refrigerant pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

- YES >> Go to [EC-405. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343923

1. CHECK GROUND CONNECTION

P2014 TUMBLE CONTROL VALVE POSITION SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Reconnect ECM harness connector disconnected.
2. Turn ignition switch ON.
3. Check the voltage between tumble control valve actuator harness connector and ground.

| Tumble control valve actuator | | Ground | Voltage |
|-------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F43 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 1 | F13 | 72 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve actuator | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

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

5.CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-311, "Component Inspection"](#).)

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace malfunctioning components.

P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

6. CHECK APP SENSOR

Refer to [EC-420. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 7.

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-420. "Special Repair Requirement"](#).

>> INSPECTION END

8. CHECK TUMBLE CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 2 | F13 | 52 | 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 or short to ground or short to power in harness or connectors.

9. CHECK TUMBLE CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between tumble control valve actuator harness connector and ECM harness connector.

| Tumble control valve actuator | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F43 | 3 | F13 | 54 | 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 or short to ground or short to power in harness or connectors.

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake manifold adapter.

NO >> Repair or replace harness or connectors.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:000000001343924

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled 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:000000001343925

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P2100 | Throttle control motor relay circuit open | ECM detects a voltage of power source for throttle control motor is excessively low. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay |
| P2103 | Throttle control motor relay circuit short | ECM detect the throttle control motor relay is stuck ON. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

With DTC is detected?

P2100 >> GO TO 2.

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-408, "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-408, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343926

1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector F10.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 15 | F10 | 70 | 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 or short to ground or short to power in harness or connectors.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

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

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 2 | F10 | 54 | Existed |

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.

2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15A fuse.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

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P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000001343927

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000001343928

DTC DETECTION LOGIC

NOTE:

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-408, "DTC Logic"](#) or [EC-416, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|--|
| P2101 | Electric throttle control performance | Electric throttle control function does not operate properly. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is open or shorted)• Electric throttle control actuator |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V 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 [EC-410, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343929

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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 and ground.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|----------|--------|---------------------|-----------------|
| Connector | Terminal | | | |
| F14 | 2 | Ground | Ignition switch OFF | Approx. 0V |
| | | | Ignition switch ON | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 70 | F14 | 15 | 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 or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

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

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 54 | F14 | 2 | 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 or short to ground or short to power in harness or connectors.

5. CHECK FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace 15A fuse.

6. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

7. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

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

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|-------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 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.

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.

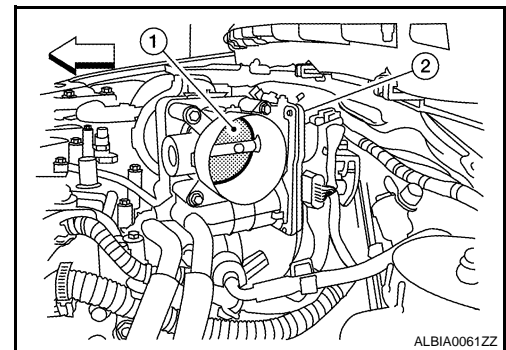
2. Electric throttle control actuator

← : Vehicle front

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-412, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "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 malfunction electric throttle control actuator.
2. Go to [EC-413, "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343930

1. CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

| Terminals | Resistance |
|-----------|---|
| 5 and 6 | Approx. 1 - 15 Ω [at 25 °C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

NO >> GO TO 2.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-413. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001343931

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

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P2118 THROTTLE CONTROL MOTOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2118 THROTTLE CONTROL MOTOR

Description

INFOID:000000001343932

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000001343933

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|--|---|
| P2118 | Throttle control motor circuit short | ECM detects short in both circuits between ECM and throttle control motor. | <ul style="list-style-type: none"> • Harness or connectors (Throttle control motor circuit is shorted.) • Electric throttle control actuator (Throttle control motor) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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-414, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343934

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|-------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 5 | Existed |
| | | | 6 | Not existed |

P2118 THROTTLE CONTROL MOTOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-415, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-415, "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343935

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

| Terminals | Resistance |
|-----------|---|
| 5 and 6 | Approx. 1 - 15 Ω [at 25 °C (77°F)] |

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-415, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001343936

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:000000001343937

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 feeds 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.

DTC Logic

INFOID:000000001343938

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------------------|-------------------------|---|--------------------------------------|
| P2119 | Electric throttle control actuator | A) | Electric throttle control actuator does not function properly due to the return spring malfunction. | • Electric throttle control actuator |
| | | B) | Throttle valve opening angle in fail-safe mode is not in specified range. | |
| | | C) | ECM detect the throttle valve is stuck open. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to P (CVT) or Neutral (M/T) position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set shift lever to P (CVT) or Neutral (M/T) position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to [EC-416, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to N, P (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to [EC-416, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665590

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

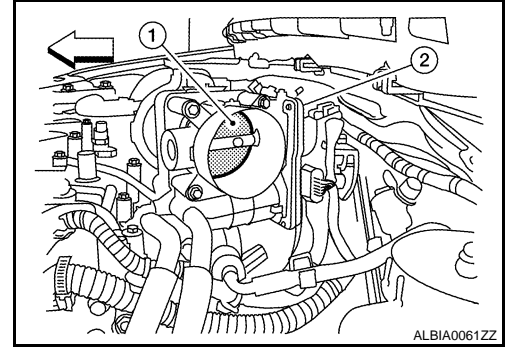
2. Electric throttle control actuator

← : 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-417, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001343940

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

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P2122, P2123 APP SENSOR

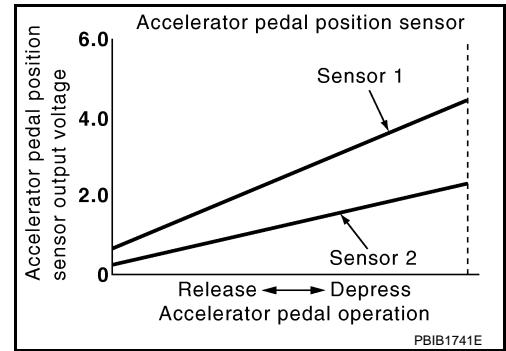
Description

INFOID:000000001343941

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001343942

DTC DETECTION LOGIC

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P2122 | Accelerator pedal position sensor 1 circuit low input | An excessively low voltage from the APP sensor 1 is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (APP sensor 1 circuit is open or shorted.) Accelerator pedal position sensor (APP sensor 1) |
| P2123 | Accelerator pedal position sensor 1 circuit high input | An excessively high voltage from the APP sensor 1 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-418, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343943

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.

< COMPONENT DIAGNOSIS >

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 4 | E10 | 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 3 | E10 | 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 or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-420. "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. Go to [EC-420. "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

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Component Inspection

INFOID:000000001343944

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

| ECM | | Ground | Condition | Voltage | |
|-----------|-----------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.5 - 1.0V |
| | | | | Fully depressed | 4.2 - 4.8V |
| | 82 (APP sensor 2 signal) | | | Fully released | 0.25 - 0.5V |
| | | | | Fully depressed | 2.0 - 2.5V |

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-420, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001343945

1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

P2127, P2128 APP SENSOR

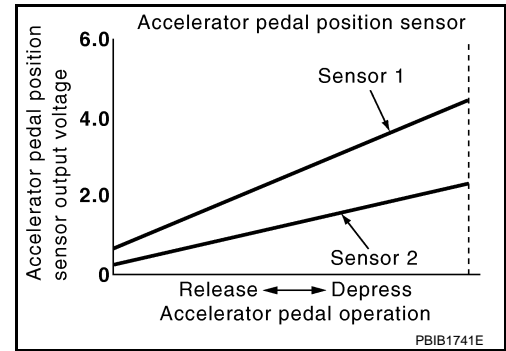
Description

INFOID:000000001665612

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001343947

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P2127 | Accelerator pedal position sensor 2 circuit low input | An excessively low voltage from the APP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor • Tumble control valve position sensor |
| P2128 | Accelerator pedal position sensor 2 circuit high input | An excessively high voltage from the APP sensor 2 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-422, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 6 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> GO TO 3.

3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 3 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

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

5. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-273. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-311. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48. "Diagnosis Procedure"](#).)
- Tumble control valve position sensor (Refer to [EC-401. "Diagnosis Procedure"](#).)

P2127, P2128 APP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 2 | E10 | 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 or short to ground or short to power in harness or connectors.

7.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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 1 | E10 | 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 or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR

Refer to [EC-423, "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. Go to [EC-424, "Special Repair Requirement"](#).

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665613

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

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

P2127, P2128 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage | |
|-----------|-----------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.5 - 1.0V |
| | | | | Fully depressed | 4.2 - 4.8V |
| | 82 (APP sensor 2 signal) | | | Fully released | 0.25 - 0.5V |
| | | | | Fully depressed | 2.0 - 2.5V |

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-424, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665614

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

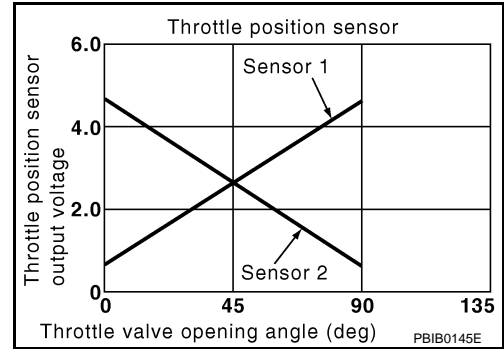
P2135 TP SENSOR

Description

INFOID:000000001343951

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 signal 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.



DTC Logic

INFOID:000000001343952

DTC DETECTION LOGIC

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P2135 | Throttle position sensor circuit range/performance | Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2. | <ul style="list-style-type: none"> Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-425, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343953

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

- Disconnect electric throttle control actuator harness connector.

P2135 TP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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 | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 1 | F13 | 47 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 36 | 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 or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 2 | F13 | 37 | Existed |
| | 3 | | 38 | |

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 or short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to [EC-427, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 7.

P2135 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. [EC-427, "Special Repair Requirement"](#)

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001343954

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-427, "Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-427, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001343955

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2138 APP SENSOR

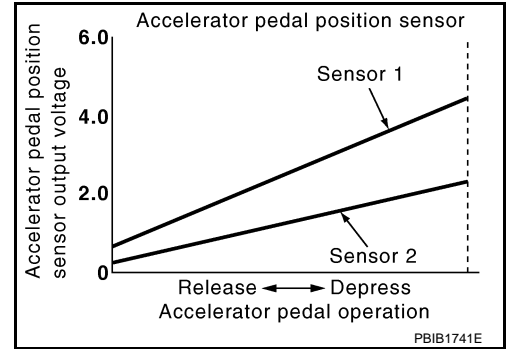
Description

INFOID:000000001665615

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001343957

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-355, "DTC Logic"](#).

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-429, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "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 |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair open circuit or short to ground or shot 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 |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 6 | Ground | Approx. 5V |

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

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

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|--------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Tumble control valve position sensor | F43 | 1 |
| | | Refrigerant pressure sensor | E219 | 3 |
| | 76 | CKP sensor (POS) | F30 | 1 |

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P2138 APP SENSOR

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-273, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-311, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- Tumble control valve position sensor (Refer to [EC-401, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 2 | F10 | 84 | Existed |
| | 4 | | 100 | |

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

Is the inspection result normal?

YES >> GO TO 8.

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

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

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 1 | F10 | 82 | Existed |
| | 3 | | 81 | |

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

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK APP SENSOR

Refer to [EC-423, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

11. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665616

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

| ECM | | Ground | Condition | Voltage |
|-----------|-----------------------------|--------|-----------------|-------------|
| Connector | Terminal | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Fully released | 0.5 - 1.0V |
| | | | Fully depressed | 4.2 - 4.8V |
| | 82 (APP sensor 2 signal) | | Fully released | 0.25 - 0.5V |
| | | | Fully depressed | 2.0 - 2.5V |

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-431, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665617

1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-29, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-29, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-30, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

P2423 HC ADSORPTION CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

P2423 HC ADSORPTION CATALYST FUNCTION

DTC Logic

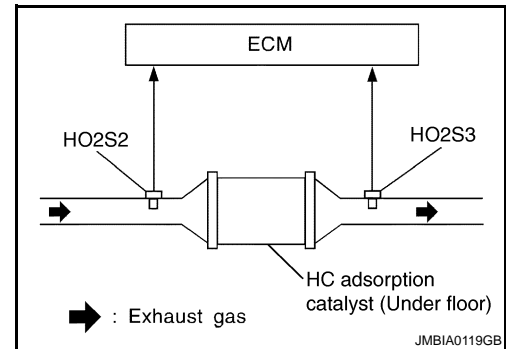
INFOID:000000001343961

DTC DETECTION LOGIC

The ECM monitors the phase gap between heated oxygen sensor 2 signal and heated oxygen sensor 3 signal.

The phase gap between heated oxygen sensor 2 signal and heated oxygen sensor 3 signal becomes small as the HC adsorption catalyst (under floor) is deteriorated.

When the phase gap between heated oxygen sensor 2 signal and heated oxygen sensor 3 signal approaches a specified limit value, the HC adsorption catalyst (under floor) malfunction is diagnosed.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P2423 | HC adsorption catalyst efficiency below threshold | <ul style="list-style-type: none"> HC adsorption catalyst (under floor) does not operate properly. HC adsorption catalyst (under floor) does not have enough oxygen storage capacity. | <ul style="list-style-type: none"> HC adsorption catalyst (under floor) Exhaust tube Intake air leaks Fuel injector Fuel injector leaks Spark plug Improper ignition timing |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

CAUTION:

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

Ⓜ With CONSULT-III

- 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 and select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
- Start the engine and drive vehicle at a speed of 80 km/h (50 MPH) or more until "INCMP" of "CATALYST" changes to "CMPLT".

NOTE:

- Keep the vehicle speed as steady as possible during the cruising.
- It will take at most 3 minutes until "INCMP" of "CATALYST" changes to "CMPLT".

- Select "HO2S3 HTR(B1)" in "DATA MONITOR" mode with CONSULT-III.
- Drive vehicle at a speed of 80 km/h (50 MPH) or more until "OFF" of "HO2S3 HTR(B1)" changes to "ON".

NOTE:

- Keep the vehicle speed as steady as possible during the cruising.
- It will take at most 3 minutes until "OFF" of "HO2S3 HTR(B1)" changes to "ON".
- Never raise engine speed above 3,600 rpm in this step.

- Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

- Check 1st trip DTC.

Ⓜ With GST

- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.

P2423 HC ADSORPTION CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Drive vehicle at a speed of 80 km/h (50 MPH) or more for at least 3 consecutive minutes.

NOTE:

Keep the vehicle speed as steady as possible during the cruising.

4. Stop vehicle with engine running.
5. Repeat steps 3 to 4 for 2 times.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-433, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001343962

1.CHECK EXHAUST SYSTEM

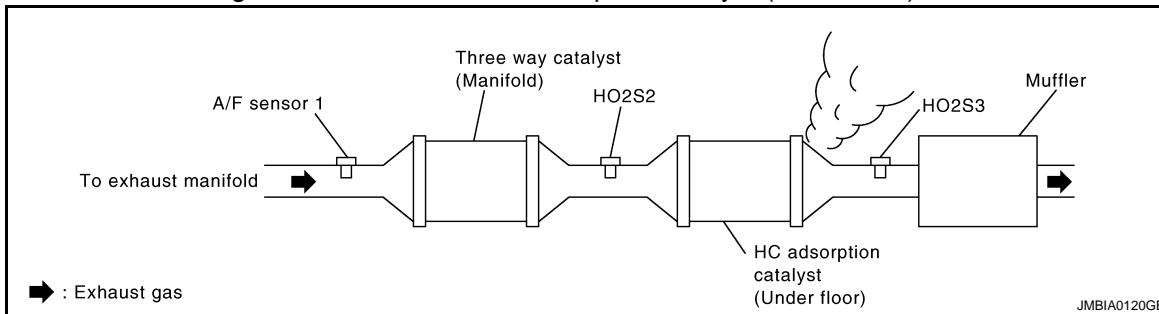
Visually check exhaust tubes and muffler for dent.

Is the inspection result normal?

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

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the HC adsorption catalyst (under floor).



Is exhaust gas leak detected?

- OK >> Repair or replace.
NG >> GO TO 3.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
NO >> GO TO 4.

4.CHECK IGNITION TIMING

For procedure, refer to [EC-28, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-538, "Idle Speed"](#) and [EC-538, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Follow the [EC-24, "BASIC INSPECTION : Special Repair Requirement"](#).

5.CHECK FUEL INJECTOR

1. Stop engine and then turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

P2423 HC ADSORPTION CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 29 | Ground | Battery voltage |
| | 30 | | |
| | 31 | | |
| | 32 | | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform [EC-453, "Diagnosis Procedure"](#).

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. 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.

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. 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.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 7.

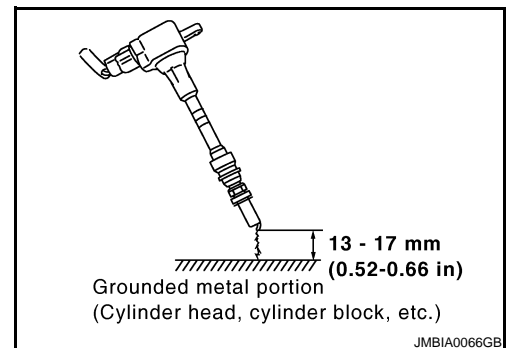
7. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 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 8.



P2423 HC ADSORPTION CATALYST FUNCTION

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Check ignition coil, power transistor and their circuits. Refer to [EC-460, "Diagnosis Procedure"](#).

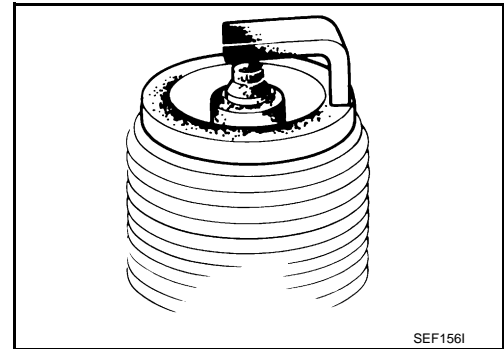
8.CHECK SPARK PLUG

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 [MA-20, "SPARK PLUG : Removal and Installation"](#).

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 about three 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 [MA-20, "SPARK PLUG : Removal and Installation"](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-36, "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.
Make sure fuel does not drip from fuel injector.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace the fuel injector(s) from which fuel is dripping.

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the trouble fixed?

YES >> INSPECTION END

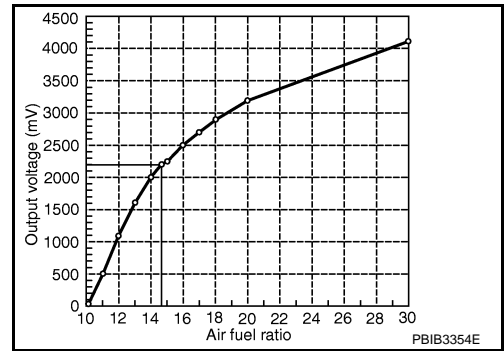
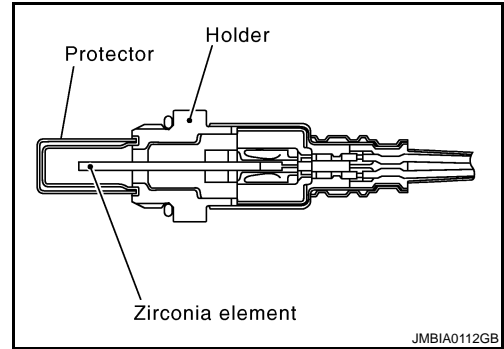
NO >> Replace HC adsorption catalyst (under floor).

P2A00 A/F SENSOR 1

Description

INFOID:000000001665517

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001343964

DTC DETECTION LOGIC

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible Cause |
|---------|---|--|---|
| P2A00 | Air fuel ratio (A/F) sensor 1 circuit range/performance | <ul style="list-style-type: none"> The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period. | <ul style="list-style-type: none"> A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear the mixture ratio self-learning value. Refer to [EC-32. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 1 minute under no load.
4. Let engine idle for 1 minute.
5. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
6. Check 1st trip DTC\$.

< COMPONENT DIAGNOSIS >

Is 1st trip DTC detected?

- YES >> Go to [EC-437, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

A

Diagnosis Procedure

INFOID:000000001343965



1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

C

Is the inspection result normal?

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

D

2. RETIGHTEN A/F SENSOR 1

1. Loosen and retighten the A/F sensor 1.

E

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

F

>> GO TO 3.

3. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle.
2. Listen for an intake air leak after the mass air flow sensor.

G

Is intake air leak detected?

- YES >> GO TO 4.
- NO >> Repair or replace.

H

4. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-32, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

I

J

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-246, "DTC Logic"](#) or [EC-250, "DTC Logic"](#).
- NO >> GO TO 5.

K

5. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.
3. Check harness connector for water.

L

M

Water should not exit.

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace harness connector.

N

6. CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

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

O

P

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 8.

< COMPONENT DIAGNOSIS >

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between ECM harness connector or A/F sensor 1 harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK A/F SENSOR 1 HEATER

Refer to [EC-155, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Do you have CONSULT-III?

YES >> GO TO 12.

NO >> GO TO 13.

12. CONFIRM A/F ADJUSTMENT DATA

 With CONSULT-III

< COMPONENT DIAGNOSIS >

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

A

Is "0.000" displayed?

- YES >> INSPECTION END
- NO >> GO TO 13.

EC

13.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

Clear the mixture ratio self-learning value. Refer to [EC-32. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).

C

Do you have CONSULT-III?

- YES >> GO TO 14.
- NO >> INSPECTION END

D

14.CONFIRM A/F ADJUSTMENT DATA

E

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

F

>> INSPECTION END

G

H

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P

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

ASCD BRAKE SWITCH

Description

INFOID:000000001665604

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 this input of two kinds (ON/OFF signal). Refer to [EC-67, "System Description"](#) for the ASCD function.

Component Function Check

INFOID:000000001343967

1. CHECK FOR 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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | | Voltage |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Refer to [EC-440, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343968

1. CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

Is the inspection result normal?

CVT >> GO TO 2.

M/T >> GO TO 6.

2. 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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

ASCD BRAKE SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No. 3)
- Harness for open or short between ASCD brake switch and fuse

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

4. 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 brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | 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 or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH

Refer to [EC-443, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch.

6. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the continuity between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | Voltage (V) | |
|--------------------|----------|--------|----------------|--------------------|-----------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | Fully released | Battery voltage | |

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 7.

7. 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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

ASCD BRAKE SWITCH

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

8. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No. 3)
- Harness for open or short between ASCD brake switch and fuse

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

9. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

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

Is the inspection result normal?

YES >> GO TO 10.

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

10. CHECK ASCD BRAKE SWITCH

Refer to [EC-443, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch.

11. 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 clutch switch harness connector and ECM harness connector.

| ASCD clutch switch | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E39 | 2 | E10 | 110 | Existed |

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

Is the inspection result normal?

YES >> GO TO 12.

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

12. CHECK ASCD CLUTCH SWITCH

Refer to [EC-443, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD clutch switch.

13. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Component Inspection (ASCD Brake Switch)

INFOID:000000001665609

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 |
| | | 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 [BR-12, "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 |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:000000001665610

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to [CL-5, "Inspection and Adjustment"](#).
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch.

ASC D INDICATOR

Description

INFOID:000000001343971

ASC D indicator lamp illuminates to indicate ASC D operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE lamp illuminates when MAIN switch on ASC D steering switch is turned ON to indicated that ASC D system is ready for operation.

SET lamp illuminates when following conditions are met.

- CRUISE lamp is illuminated.
- SET/COAST switch on ASC D steering switch is turned ON while vehicle speed is within the range of ASC D setting.

SET lamp remains lit during ASC D control.

Refer to [EC-67, "System Description"](#) for the ASC D function.

Component Function Check

INFOID:000000001343972

1. ASC D INDICATOR FUNCTION

Check ASC D indicator under the following conditions.

| ASC D INDICATOR | CONDITION | | SPECIFICATION |
|-----------------|---|---|---------------|
| CRUISE LAMP | <ul style="list-style-type: none"> • Ignition switch: ON | <ul style="list-style-type: none"> • MAIN switch: Pressed at the 1st time →at the 2nd time | ON → OFF |
| SET LAMP | <ul style="list-style-type: none"> • MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH) | <ul style="list-style-type: none"> • ASC D: Operating | ON |
| | | <ul style="list-style-type: none"> • ASC D: Not operating | OFF |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-444, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343973

1. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-148, "DTC Logic"](#).

2. CHECK COMBINATION METER OPERATION

Refer to [MWI-38, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check combination meter circuit. Refer to [MWI-5, "METER SYSTEM : System Diagram"](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

COOLING FAN

Description

INFOID:000000001343974

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows. Refer to [EC-77. "System Diagram"](#) for cooling fan operation.

| Cooling fan Speed | Cooling fan motor terminals | |
|-------------------|-----------------------------|---------|
| | (+) | (-) |
| Low (LO) | 1 | 4 |
| | 2 | 3 |
| High (HI) | 1 and 2 | 3 and 4 |

Component Function Check

INFOID:000000001343975

1. CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III and touch "LOW" on the CONSULT-III screen.
3. Make sure that cooling fans operates at low speed.

Without CONSULT-III

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Check cooling fan low speed control circuit.

2. CHECK COOLING FAN HIGH SPEED FUNCTION

With CONSULT-III

1. Touch "HI" on the CONSULT-III screen.
2. Make sure that cooling fans operates at higher speed than low speed.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Check cooling fan high speed control circuit.

Diagnosis Procedure

INFOID:000000001343976

PROCEDURE A

1. CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E16.
3. Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E16 | 1 | Ground | Battery voltage |

COOLING FAN

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

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

2. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan motor-1 harness connector.
2. Check the voltage between cooling fan motor-1 harness connector and ground.

| Cooling fan motor-1 | | Ground | Voltage |
|---------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E220 | 1 | Ground | Battery voltage |

3. Also check harness for short to ground or short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible link (letter M)
- Harness for open or short between cooling fan motor-1 and battery

>> Repair or replace malfunctioning part.

4. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.
3. Check the continuity between cooling fan motor-1, 2 harness connectors and IPDM E/R harness connector.

| Cooling fan motor | | | IPDM E/R | | Continuity |
|-------------------|-----------|----------|-----------|----------|------------|
| Motor | Connector | Terminal | Connector | Terminal | |
| 1 | E220 | 4 | E18 | 35 | Existed |
| 2 | E221 | 1 | E18 | 38 | |

4. Check the continuity between cooling fan motor-2 harness connector or IPDM E/R harness connector and ground.

| Cooling fan motor-2 | | IPDM E/R | | Ground | Continuity |
|---------------------|----------|-----------|----------|--------|------------|
| Connector | Terminal | Connector | Terminal | | |
| E221 | 4 | E17 | 41 | Ground | Existed |
| | | E18 | 12 | | |

5. 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 E12, E203
- Harness for open or short between cooling fan motor-1, -2 and IPDM E/R
- Harness for open or short between cooling fan motor-2 and ground
- Harness for open or short between IPDM E/R and ground

>> Repair or replace malfunctioning part.

COOLING FAN

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< COMPONENT DIAGNOSIS >

6. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
 NO >> Repair or replace ground connection.

7. CHECK COOLING FAN RELAYS

Refer to [EC-449, "Component Inspection \(Cooling Fan Relay\)"](#).

Is the inspection result normal?

- YES >> GO TO 8.
 NO >> Replace malfunctioning cooling fan relay.

8. CHECK COOLING FAN MOTORS

Refer to [EC-449, "Component Inspection \(Cooling Fan Motor\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.
 NO >> Replace malfunctioning cooling fan motor.

9. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
 NO >> Repair or replace harness or connector.

PROCEDURE B

1. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 harness connector.
3. Check the voltage between cooling fan motor-1 harness connector and ground.

| Cooling fan motor-1 | | Ground | Voltage |
|---------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E220 | 2 | Ground | Battery voltage |

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

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT-II

1. Disconnect cooling fan relay-2 and -3.
2. Check the voltage between cooling fan relays terminals and ground.

| Cooling fan relay | | | Ground | Voltage |
|-------------------|-----------|----------|--------|-----------------|
| Relay | Connector | Terminal | | |
| 2 | E42 | 5 | Ground | Battery voltage |
| 3 | E42 | 5 | | |

3. Also check harness for short to ground or short to power.

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

COOLING FAN

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Check the following.

- 40A fusible link (letter K)
- Harness for open or short between cooling fan relay-2, -3 and battery

>> Repair or replace malfunctioning part.

4. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.
3. Check the continuity between cooling fan relay-1, -2 terminals and cooling fan motor-1, -2 harness connector.

| Cooling fan relay | | | Cooling fan motor | | | Continuity |
|-------------------|-----------|----------|-------------------|-----------|----------|------------|
| Relay | Connector | Terminal | motor | Connector | Terminal | |
| 2 | E42 | 7 | 1 | E220 | 3 | Existed |
| 3 | E43 | | | | 4 | |
| 2 | E42 | 3 | 2 | E221 | 2 | |
| 3 | E43 | | | | 1 | |

4. Check the continuity between cooling fan relay-1, -2 terminals and IPDM E/R harness connector.

| Cooling fan relay | | | IPDM E/R | | Continuity |
|-------------------|-----------|----------|-----------|----------|------------|
| Relay | Connector | Terminal | Connector | Terminal | |
| 2 | E42 | 1 | E17 | 42 | Existed |
| | | 2 | E18 | 15 | |
| 3 | E43 | 1 | E18 | 34 | |
| | | 2 | | 15 | |

5. Check the continuity between cooling fan relay-2, 3 or IPDM E/R harness connector or cooling fan motor-1, -2 harness connector ground.

| Cooling fan relay | | | IPDM E/R | | Cooling fan motor-2 | | Ground | Continuity |
|-------------------|-----------|----------|-----------|----------|---------------------|----------|--------|------------|
| Relay | Connector | Terminal | Connector | Terminal | Connector | Terminal | | |
| 2 | E42 | 6 | E17 | 41 | E221 | 3 | Ground | Existed |
| 3 | E43 | | E18 | 12 | | 4 | | |

6. 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 E12, E203
- Harness for open or short between cooling fan motor-1 and cooling fan relay-2, -3
- Harness for open or short between cooling fan relay-2, -3 and IPDM E/R
- Harness for open or short between cooling fan relay-2, -3 and ground
- Harness for open or short between cooling fan motor-2 and cooling fan relay-2, -3
- Harness for open or short between cooling fan motor-2 and ground
- Harness for open or short between IPDM E/R and ground

>> Repair or replace malfunctioning part.

6. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

COOLING FAN

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace ground connection.

7.CHECK COOLING FAN RELAYS

Refer to [EC-449, "Component Inspection \(Cooling Fan Relay\)"](#).

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace malfunctioning cooling fan relay.

8.CHECK COOLING FAN MOTORS

Refer to [EC-449, "Component Inspection \(Cooling Fan Motor\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace malfunctioning cooling fan motor.

9.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
- NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:000000001343977

1.CHECK COOLING FAN MOTORS

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 and -2 harness connectors E220, E221.
3. Supply cooling fan motor terminals with battery voltage and check operation.

| Speed | Terminals | | Operation |
|-------|-----------|---------|--------------------------------------|
| | (+) | (-) | |
| Low | 1 | 4 | Cooling fans operates at low speed. |
| | 2 | 3 | |
| High | 1 and 2 | 3 and 4 | Cooling fans operates at high speed. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace cooling fan motor.

Component Inspection (Cooling Fan Relay)

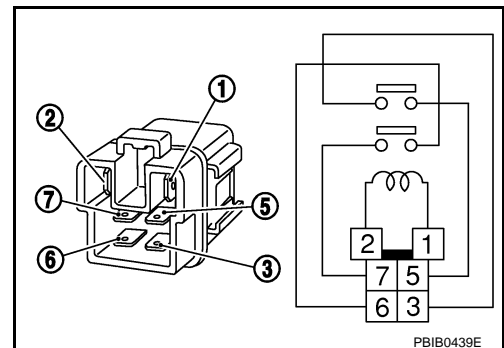
INFOID:000000001343978

1.CHECK COOLING FAN RELAYS

1. Turn ignition switch OFF.
2. Remove cooling fan relay.
3. Check the continuity between cooling fan relay terminals under the following conditions.

| Terminals | Conditions | Continuity |
|-----------|---|-------------|
| 3 and 5 | 12V direct current supply between terminals 1 and 2 | Existed |
| | No current supply | Not existed |
| 6 and 7 | 12V direct current supply between terminals 1 and 2 | Existed |
| | No current supply | Not existed |

Is the inspection result normal?



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COOLING FAN

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

YES >> INSPECTION END
NO >> Replace cooling fan relay.

ELECTRICAL LOAD SIGNAL

Description

INFOID:000000001343979

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:000000001343980

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 |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-451, "Diagnosis Procedure"](#).

2.CHECK LIGHTING SWITCH FUNCTION

Check "LOAD SIGNAL" indication under the following conditions.

| Monitor item | Condition | | Indication |
|--------------|-----------------|--------------------|------------|
| LOAD SIGNAL | Lighting switch | ON at 2nd position | ON |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Go to [EC-451, "Diagnosis Procedure"](#).

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-451, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343981

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to [EC-451, "Component Function Check"](#).

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-6, "System Diagram"](#).

ELECTRICAL LOAD SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to [EXL-7, "System Diagram"](#) (XENON TYPE) or [EXL-9, "System Diagram"](#) (HALOGEN TYPE).

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to [GI-42, "Intermittent Incident"](#).

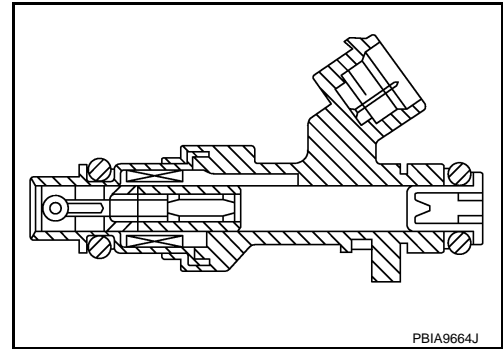
>> INSPECTION END

FUEL INJECTOR

Description

INFOID:000000001343982

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:000000001343983

1.INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to [EC-453, "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. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

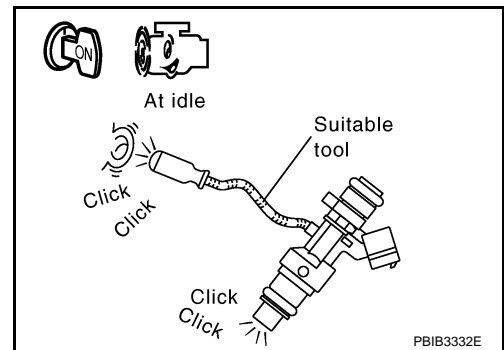
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-453, "Diagnosis Procedure"](#).



INFOID:000000001343984

Diagnosis Procedure

1.CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

FUEL INJECTOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Fuel injector | | | Ground | Voltage |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F17 | 1 | Ground | Battery voltage |
| 2 | F18 | 1 | | |
| 3 | F19 | 1 | | |
| 4 | F20 | 1 | | |

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 10A fuse (No. 35)
- Harness for open or short between fuel injector and fuse

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

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Fuel injector | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F17 | 2 | F14 | 32 | Existed |
| 2 | F18 | 2 | | 31 | |
| 3 | F19 | 2 | | 30 | |
| 4 | F20 | 2 | | 29 | |

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 or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to [EC-454, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:000000001343985

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

FUEL INJECTOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminals | Resistance |
|-----------|---|
| 1 and 2 | 11.1 - 14.3Ω [at 10 -60°C (50 - 140°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector.

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FUEL PUMP

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

FUEL PUMP

Description

INFOID:000000001343986

| Sensor | Input signal to ECM | ECM Function | Actuator |
|--|---------------------|-------------------|----------------------|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* | Fuel pump control | Fuel pump relay ↓ |
| 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 startability. 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 |
|----------------------------------|------------------------|
| Ignition switch is turned to ON. | Operates for 1 second. |
| Engine running and cranking | Operates. |
| When engine is stopped | Stops in 1.5 seconds. |
| Except as shown above | Stops. |

Component Function Check

INFOID:000000001343987

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose (2) with two fingers.

1 : Air cleaner assembly

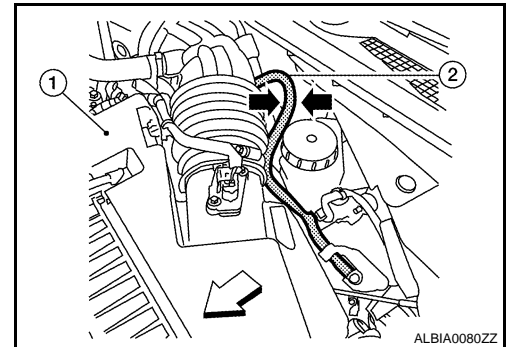
⇐ : Vehicle front

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-456. "Diagnosis Procedure"](#).



ALBIA0080ZZ

Diagnosis Procedure

INFOID:000000001343988

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 and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 14 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

FUEL PUMP

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< COMPONENT DIAGNOSIS >

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 14 | F10 | 77 | Existed |

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-I

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

| Condenser-1 | | Ground | Voltage |
|-------------|----------|--------|---|
| Connector | Terminal | | |
| B17 | 1 | Ground | Battery voltage should exist for 1 second after ignition switch is turned ON. |

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15A fuse (No. 32) from IPDM E/R.
3. Check 15A fuse.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuse.

5.CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector E18.
2. Check the continuity between IPDM E/R harness connector and condenser-1 harness connector.

| IPDM E/R | | Condenser-I | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F18 | 13 | B17 | 1 | Existed |

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

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 7.

6.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- IPDM E/R connector F10
- Harness for open or short between IPDM E/R and condenser-I

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

7. CHECK CONDENSER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector.
3. Check the continuity between condenser-I harness connector and ground.

| Condenser-I | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| B17 | 2 | Ground | Existed |

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

Is the inspection result normal?

YES >> GO TO 8.

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

8. CHECK CONDENSER-1

Refer to [EC-459, "Component Inspection \(Condenser-1\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace condenser-1.

9. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Check the continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" and ground.

| IPDM E/R | | Fuel level sensor unit and fuel pump | | Continuity |
|-----------|----------|--------------------------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E18 | 13 | B42 | 1 | Existed |

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E29, B10
- Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R
- 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.

11. CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between "fuel level sensor unit and fuel pump" and ground.

| Fuel level sensor unit and fuel pump | | Ground | Continuity |
|--------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B42 | 3 | Ground | Existed |

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 12.

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

12. CHECK FUEL PUMP

FUEL PUMP

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Refer to [EC-459, "Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace fuel pump.

13.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
- NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:000000001343989

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 follows.

| Terminals | Resistance |
|-----------|-----------------------------|
| 1 and 3 | 0.2 - 5.0Ω [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)

INFOID:000000001343990

1.CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser-1 harness connector.
3. Check resistance between condenser-1 terminals as follows.

| Terminal | Resistance |
|----------|----------------------------|
| 1 and 2 | Above 1MΩ [at 25°C (77°F)] |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace condenser-1.

IGNITION SIGNAL

Description

INFOID:000000001343991

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:000000001343992

1. INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

- YES-1 >> With CONSULT-III: GO TO 2.
- YES-2 >> Without CONSULT-III: GO TO 3.
- NO >> Go to [EC-460, "Diagnosis Procedure"](#).

2. IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

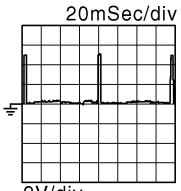
Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-460, "Diagnosis Procedure"](#).

3. IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

| ECM | | Ground | Voltage signal |
|-----------|----------|--------|---|
| Connector | Terminal | | |
| F14 | 9 | Ground |  |
| | 10 | | |
| | 11 | | |
| | 21 | | |

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NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-460, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343993

1. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 105 | Ground | Battery voltage |

IGNITION SIGNAL

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-144, "Diagnosis Procedure"](#).

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser-2 harness connector and ground.

| Condenser | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F26 | 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 F10.
3. Check the continuity between IPDM E/R harness connector and condenser-2 harness connector.

| IPDM E/R | | Condenser-2 | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 53 | F26 | 1 | Existed |

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

Is the inspection result normal?

YES >> Go to [EC-144, "Diagnosis Procedure"](#).

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

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser-2 harness connector and ground.

| Condenser-2 | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| F26 | 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 ground or short to power in harness or connectors.

5.CHECK CONDENSER

Refer to [EC-463, "Component Inspection \(Condenser-2\)"](#)

Is the inspection result normal?

YES >> GO TO 6.

NG >> Replace condenser.

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 SIGNAL

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| Ignition coil | | | Ground | Voltage |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F34 | 3 | Ground | Battery voltage |
| 2 | F35 | 3 | | |
| 3 | F36 | 3 | | |
| 4 | F37 | 3 | | |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit or short to ground or short to power in 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 | | |
| 1 | F34 | 2 | Ground | Existed |
| 2 | F35 | 2 | | |
| 3 | F36 | 2 | | |
| 4 | F37 | 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 ground 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 ECM harness connector and ignition coil harness connector.

| Ignition coil | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F34 | 1 | F14 | 11 | Existed |
| 2 | F35 | 1 | | 10 | |
| 3 | F36 | 1 | | 9 | |
| 4 | F37 | 1 | | 21 | |

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

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-463, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

IGNITION SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000001343994

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 follows.

| Terminals | Resistance Ω [at 25°C (77°F)] |
|-----------|--------------------------------------|
| 1 and 2 | Except 0 or ∞ |
| 1 and 3 | Except 0 |
| 2 and 3 | |

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:

Do the following procedure in the place where ventilation is good without the combustible.

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 two or three 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 about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser-2)

INFOID:000000001343995

1. CHECK CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.

A

EC

C

D

E

F

G

H

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J

K

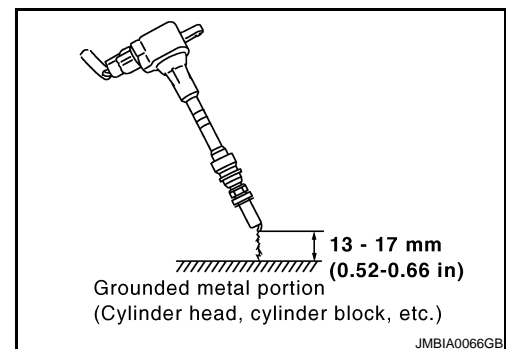
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M

N

O

P



IGNITION SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

3. Check resistance between condenser-2 terminals as follows.

| Terminals | Resistance |
|-----------|-------------------------------------|
| 1 and 2 | Above 1 M Ω [at 25°C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser-2.

MALFUNCTION INDICATOR LAMP

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

MALFUNCTION INDICATOR LAMP

Description

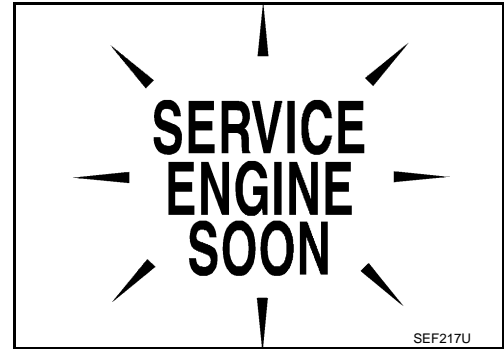
INFOID:000000001343996

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to [EC-465. "Diagnosis Procedure"](#).



Component Function Check

INFOID:000000001343997

1.CHECK MIL FUNCTION

1. Turn ignition switch ON.
2. Make sure that MIL lights up.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-465. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001343998

1.CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-148. "Diagnosis Procedure"](#).

2.CHECK DTC WITH METER

Refer to [MWI-38. "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace combination meter.
NO >> Repair or replace.

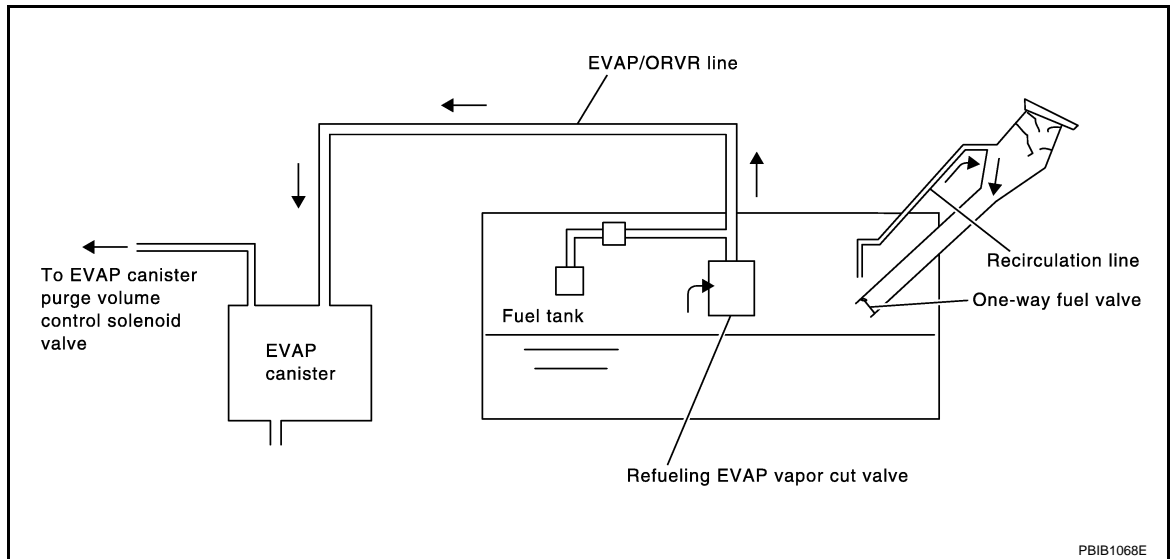
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

Description



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is 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 refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a “CAUTION: FLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - Put drained fuel in an explosion-proof container and put lid on securely.
 - Release fuel pressure from fuel line. Refer to [EC-533, "Inspection"](#).
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Component Function Check

INFOID:000000001344000

1. CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Is any symptom present?

- YES >> Go to [EC-466, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344001

1. INSPECTION START

Check whether the following symptoms are present.

- A: Fuel odor from EVAP canister is strong.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Which symptom is present?

- 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?

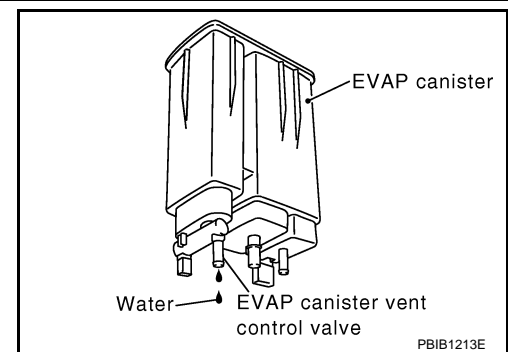
- YES >> GO TO 3.
- NO >> GO TO 4.

3.CHECK IF EVAP CANISTER 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-469. "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.
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 8.
- NO >> GO TO 9.

8.CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE FOR CALIFORNIA]

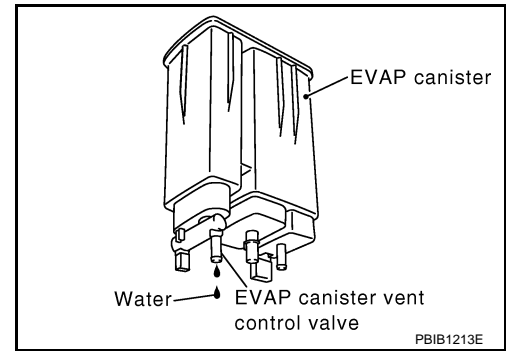
< COMPONENT DIAGNOSIS >

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

YES >> GO TO 9.

NO >> GO TO 11.



9. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

11. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace hoses and tubes.

12. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace filler neck tube.

13. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-469. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

14. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace fuel filler tube.

15. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

YES >> GO TO 16.

NO >> Repair or replace one-way fuel valve with fuel tank.

16. CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

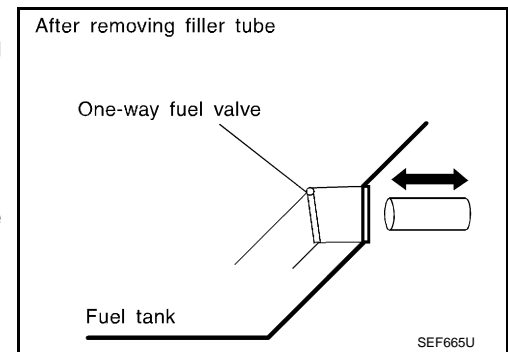
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

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.



INFOID:000000001344002

Component Inspection

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

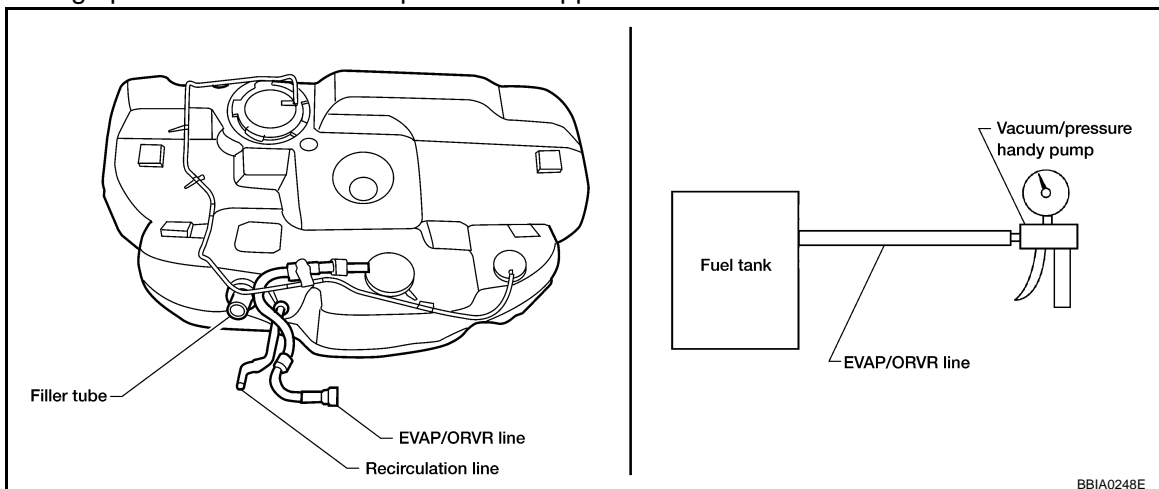
2.CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-III

1. Remove fuel tank. Refer to [FL-6, "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
 - 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.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
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.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.

Always replace O-ring with new one.

 - Put fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -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.

3.CHECK REFUELING EVAP VAPOR CUT VALVE

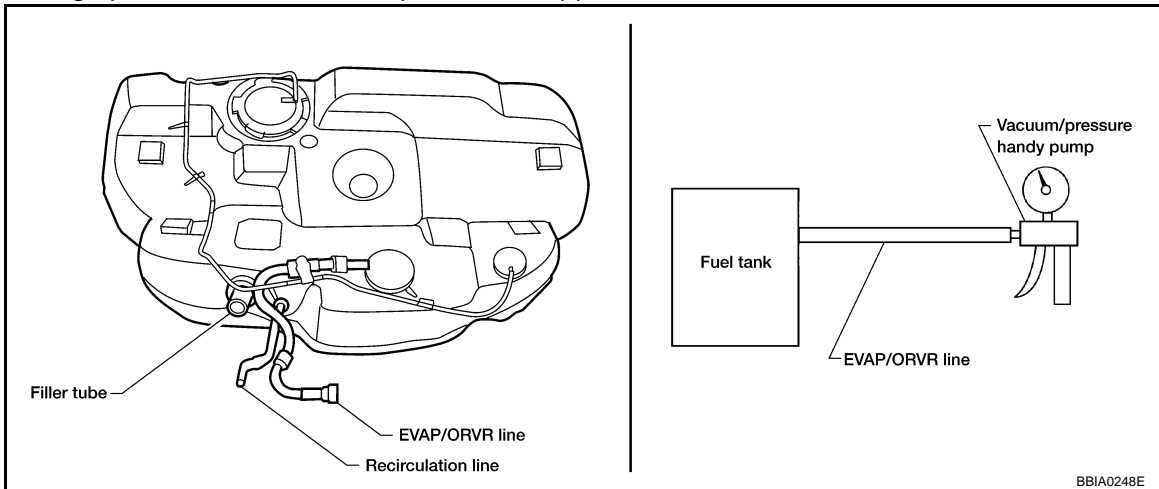
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

⊗ Without CONSULT-III

1. Remove fuel tank. Refer to [FL-6. "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
 - Remove fuel gauge retainer.
 - Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
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.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.**Always replace O-ring with new one.**
 - Put fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -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.

POSITIVE CRANKCASE VENTILATION

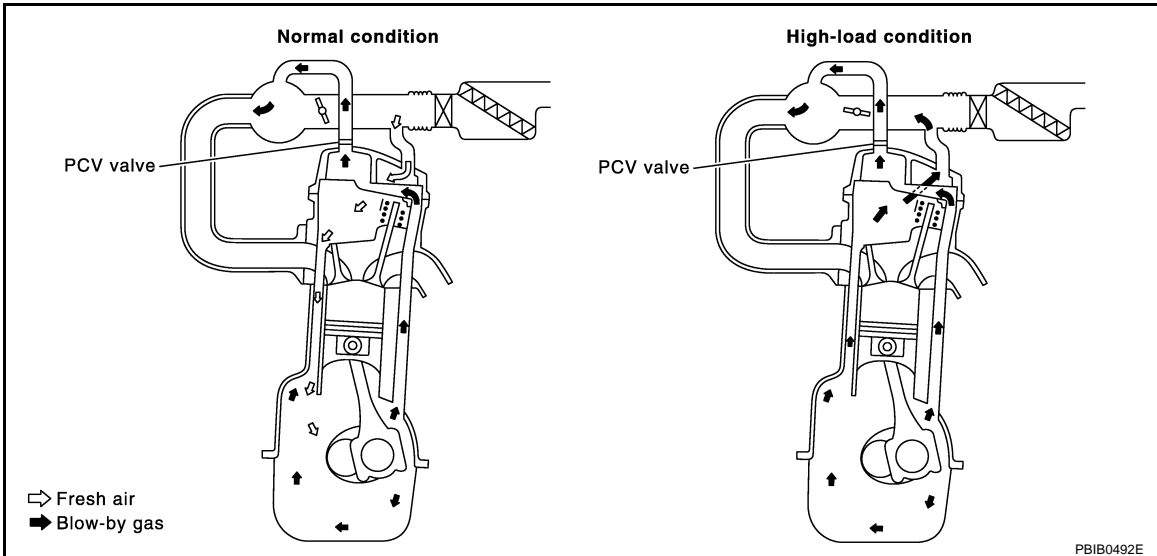
< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000001344003



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.

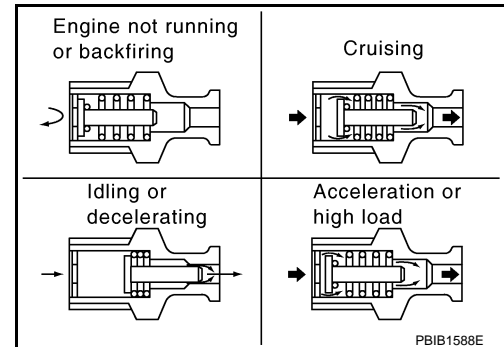
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then 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.



Component Inspection

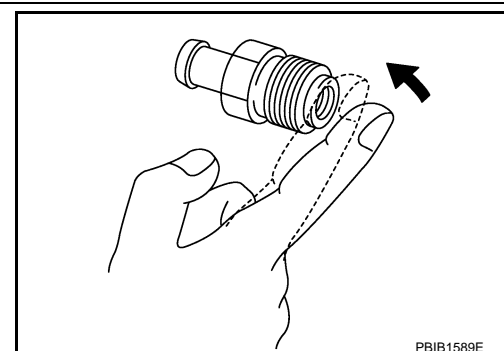
INFOID:000000001344004

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.



REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

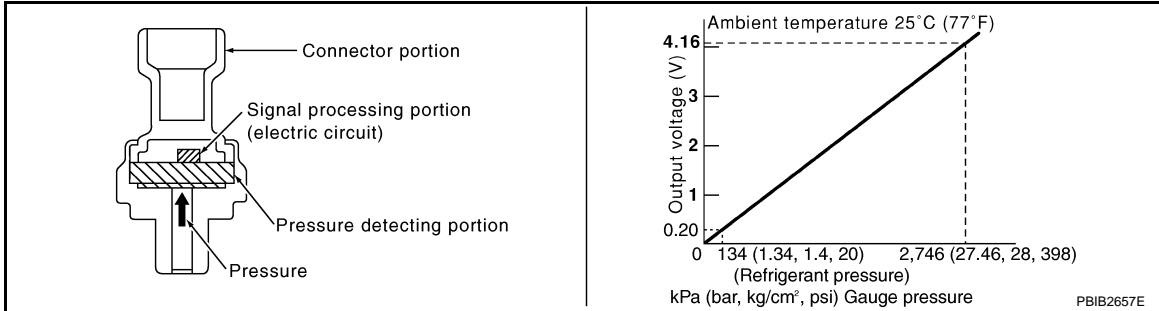
[QR25DE FOR CALIFORNIA]

REFRIGERANT PRESSURE SENSOR

Description

INFOID:000000001344005

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

INFOID:000000001344006

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL 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 and ground.

| ECM | | Ground | Voltage |
|-----------|--|--------|------------|
| Connector | Terminal | | |
| E219 | 39 (Refrigerant pressure sensor signal) | Ground | 1.0 - 4.0V |

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-472, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344007

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

| Refrigerant pressure sensor | | Ground | Voltage |
|-----------------------------|----------|--------|------------|
| Connector | Terminal | | |
| E219 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or 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.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 3 | F13 | 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 F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

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

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 2 | F13 | 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 F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

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

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

< ECU DIAGNOSIS >

ECU DIAGNOSIS**ECM****Reference Value**

INFOID:000000001344008

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 TIMING 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 | Condition | | Values/Status |
|-----------------|--|---------------------------------------|---|
| ENG SPEED | • Run engine and compare CONSULT-III value with the tachometer indication. | | Almost the same speed as the tachometer indication. |
| MAS A/F SE-B1 | See EC-137, "Diagnosis Procedure" . | | |
| B/FUEL SCHDL | See EC-137, "Diagnosis Procedure" . | | |
| A/F ALPHA-B1 | See EC-137, "Diagnosis Procedure" . | | |
| 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 |
| HO2S2 (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S3 (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ↔ RICH |
| HO2S3 MNTR (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | | LEAN ↔ RICH |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as speedometer indication |
| BATTERY VOLT | • Ignition switch: ON (Engine stopped) | | 11 - 14V |
| ACCEL SEN 1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| ACCEL SEN 2*1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| THRL SEN 1-B1 | • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |
| THRL SEN 2-B1*1 | • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |
| FUEL T/TMP SE | • Ignition switch: ON | | Indicates fuel tank temperature |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Monitor Item | Condition | Values/Status | |
|----------------|--|--|-------------------|
| INT/A TEMP SE | • Ignition switch: ON | Indicates intake air temperature | A |
| EVAP SYS PRES | • Ignition switch: ON | Approx. 1.8 - 4.8V | EC |
| FUEL LEVEL SE | • Ignition switch: ON | Depending on fuel level of fuel tank | |
| START SIGNAL | • Ignition switch: ON → START → ON | OFF → ON → OFF | C |
| CLSD THL POS | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates.) | ON |
| P/N POSI SW | • Ignition switch: ON | Shift lever: P or N (CVT), Neutral (M/T) | ON |
| | | Selector lever: Except above | OFF |
| PW/ST SIGNAL | • Engine: After warming up, idle the engine | Steering wheel: Not being turned | OFF |
| | | Steering wheel: Being turned | ON |
| LOAD SIGNAL | • Ignition switch: ON | Rear window defogger switch: ON and/or Lighting switch: 2nd position | ON |
| | | Rear window defogger switch and lighting switch: OFF | OFF |
| IGNITION SW | • Ignition switch: ON → OFF → ON | ON → OFF → ON | H |
| HEATER FAN SW | • Engine: After warming up, idle the engine | Heater fan switch: ON | ON |
| | | Heater fan switch: OFF | OFF |
| BRAKE SW | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| INJ PULSE-B1 | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| IGN TIMING | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 10° - 20° BTDC |
| | | 2,000 rpm | 25° - 45° BTDC |
| CAL/LD VALUE | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 10% - 35% |
| | | 2,500 rpm | 10% - 35% |
| MASS AIRFLOW | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 1.0 - 4.0 g-m/s |
| | | 2,500 rpm | 4.0 - 10.0 g-m/s |
| PURG VOL C/V | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle (Accelerator pedal: Not depressed even slightly, after engine starting.) | 0% |
| | | 2,000 rpm | 20% - 90% |
| INT/V TIM (B1) | • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | Idle | -5° - 5°C |
| | | 2,000 rpm | Approx. 0° - 20°C |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Monitor Item | Condition | | Values/Status |
|-----------------|---|---|---|
| INT/V SOL (B1) | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 0% |
| | | 2,000 rpm | Approx. 0% - 60% |
| SWRL CONT S/V | <ul style="list-style-type: none"> Ignition switch: ON Engine coolant temperature: Between 5°C (41°F) and 40°C (104°F) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND RLY | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates) | ON |
| FUEL PUMP RLY | <ul style="list-style-type: none"> For 1 seconds after turning ignition switch: ON Engine running or cranking | | ON |
| | | <ul style="list-style-type: none"> Except above | OFF |
| VENT CONT/V | <ul style="list-style-type: none"> Ignition switch: ON | | OFF |
| THRTL RELAY | <ul style="list-style-type: none"> Ignition switch: ON | | ON |
| HO2S2 HTR (B1) | <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | | <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm | OFF |
| HO2S3 HTR (B1) | <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | | ON |
| | | <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm | OFF |
| I/P PULLY SPD | <ul style="list-style-type: none"> Vehicle speed: More than 20 km/h (12 MPH) | | Almost the same speed as the tachometer indication |
| VEHICLE SPEED | <ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| IDL A/V LEARN | <ul style="list-style-type: none"> Engine: running | Idle air volume learning has not been performed yet. | YET |
| | | Idle air volume learning has already been performed successfully. | CMPLT |
| TRVL AFTER MIL | <ul style="list-style-type: none"> Ignition switch: ON | Vehicle has traveled after MIL has turned ON. | 0 - 65,535 km (0 - 40,723 miles) |
| A/F S1 HTR (B1) | <ul style="list-style-type: none"> Engine: After warming up, idle the engine (More than 140 seconds after starting engine.) | | 4 - 100% |
| AC PRESS SEN | <ul style="list-style-type: none"> Engine: Idle Both A/C switch and blower fan switch: ON (Compressor operates) | | 1.0 - 4.0V |
| VHCL SPEED SE | <ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| SET VHCL SPD | <ul style="list-style-type: none"> Engine: Running | ASCD: Operating | The preset vehicle speed is displayed |
| MAIN SW | <ul style="list-style-type: none"> Ignition switch: ON | MAIN switch: Pressed | ON |
| | | MAIN switch: Released | OFF |
| CANCEL SW | <ul style="list-style-type: none"> Ignition switch: ON | CANCEL switch: Pressed | ON |
| | | CANCEL switch: Released | OFF |
| RESUME/ACC SW | <ul style="list-style-type: none"> Ignition switch: ON | RESUME/ACCELERATE switch: Pressed | ON |
| | | RESUME/ACCELERATE switch: Released | OFF |

ECM

< ECU DIAGNOSIS >

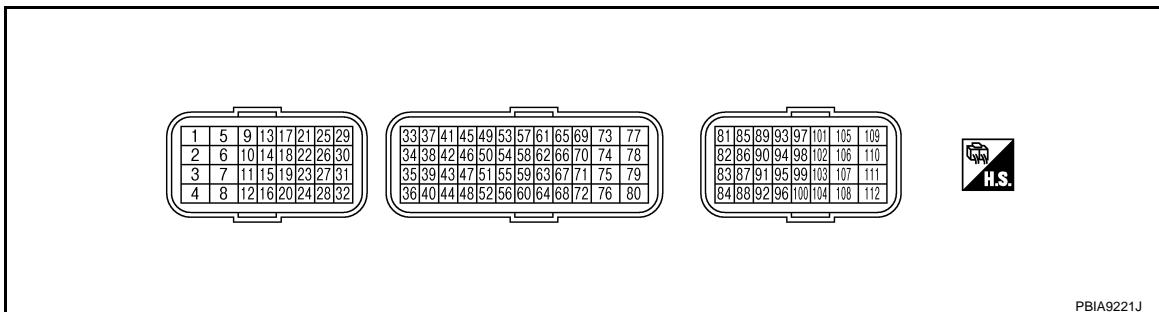
[QR25DE FOR CALIFORNIA]

| Monitor Item | Condition | Values/Status | |
|----------------------------------|--|--|-------------------------|
| SET SW | • Ignition switch: ON | SET/COAST switch: Pressed | ON |
| | | SET/COAST switch: Released | OFF |
| BRAKE SW1 (ASCD brake switch) | • Ignition switch: ON | • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) | ON |
| | | • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) | OFF |
| BRAKE SW2 (Stop lamp switch) | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | 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 → at the 2nd time | ON → OFF |
| SET LAMP | • MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH) | ASCD: Operating | ON |
| | | ASCD: Not operating | OFF |
| ALT DUTY | • Engine: Idle | | 0 - 80% |
| BAT CUR SEN | • Engine speed: Idle • Battery: Fully charged*2 • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | | Approx. 2,600 - 3,500mV |
| ALT DUTY SIG | • Power generation voltage variable control: Operating • Power generation voltage variable control: Not operating | | ON |
| | | | OFF |
| A/F ADJ B1 | • Engine: running | | -0.330 - 0.330 |
| TMBL POS SEN | • Ignition switch: ON • Engine coolant temperature: Between 5°C (41°F) and 60°C (140°F) | Accelerator pedal: Fully released | Less than 1.2V |
| | | Accelerator pedal: Slightly depressed | More than 2.9V |

*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-68. "How to Handle Battery"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

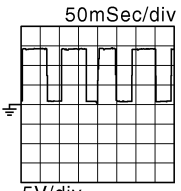
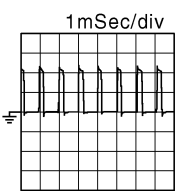
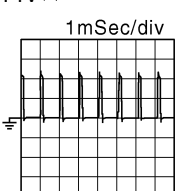
- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.

< ECU DIAGNOSIS >

- Pulse signal is measured by CONSULT-III.

CAUTION:

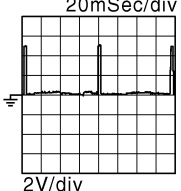
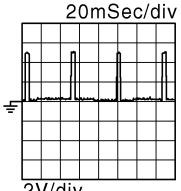
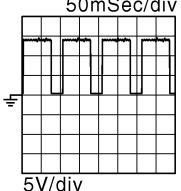
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--|
| + | — | | Signal name | Input/Output | | |
| 1 | Ground | L/G | Tumble control valve motor (Close) | Output | [Ignition switch ON] • Engine coolant temperature: Between 5°C (41°F) and 60°C (140°F) • Accelerator pedal: Depressed → fully released | Battery voltage appears for about 1 second. |
| 2 | Ground | G/W | Throttle control motor relay power supply | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| 3 | Ground | L/R | Tumble control valve motor (Open) | Output | [Ignition switch ON] • Engine coolant temperature: Between 5°C (41°F) and 60°C (140°F) • Accelerator pedal: Fully released → depressed | Battery voltage appears for about 1 second. |
| 4 | Ground | BR/Y | A/F sensor 1 heater | Output | [Engine is running] • Warm-up condition • Idle speed | 2.9 - 8.8V★  5V/div 50mSec/div JMBIA0082GB |
| 5 | Ground | L | Throttle control motor (Open) | Output | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | 0 - 14V★  5V/div 1mSec/div JMBIA0083GB |
| 6 | Ground | P | Throttle control motor (Close) | Output | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | 0 - 14V★  5V/div 1mSec/div JMBIA0084GB |
| 7 | Ground | R | Tumble control valve motor power supply | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

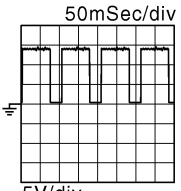
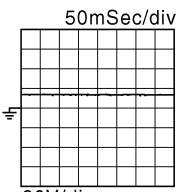
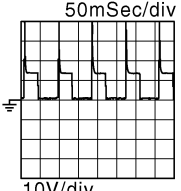
| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|---------------------|--------|--------------------------|--|--------------|---|--|
| + | — | | Signal name | Input/Output | | |
| 9 10 11 21 | Ground | L/B G/R Y/R G/Y | Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1 Ignition signal No. 4 | Output | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 0 - 0.1V★  |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 0 - 0.2V★  |
| 12 16 | Ground | B | ECM ground | — | [Engine is running] • Idle speed | Body ground |
| 13 | Ground | R | Heated oxygen sensor 2 heater | Output | [Engine is running] • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10V★  |
| | | | | | [Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14V) |
| 14 | Ground | B/R | Fuel pump relay | Output | [Ignition switch: ON] • For 1 second after turning ignition switch ON | 0 - 1.0V |
| | | | | | [Engine is running] • More than 1 second after turning ignition switch ON | BATTERY VOLTAGE (11 - 14V) |
| 15 | Ground | O | Throttle control motor relay | Output | [Ignition switch: ON → OFF] | 0 - 1.0V ↓ BATTERY VOLTAGE (11 - 14V) ↓ 0V |
| | | | | | [Ignition switch: ON] | 0 - 1.0V |

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| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--|
| + | — | | Signal name | Input/Output | | |
| 17 | Ground | L | Heated oxygen sensor 3 heater | Output | [Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met <ul style="list-style-type: none"> - Engine: after warming up - Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | 10V★  |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14V) |
| 24 | Ground | W/B | ECM relay (Self shut-off) | Output | [Engine is running] <ul style="list-style-type: none"> • [Ignition switch: OFF] • A few seconds after turning ignition switch OFF | 0 - 1.0V |
| | | | | | [Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF | BATTERY VOLTAGE (11 - 14V) |
| 25 | Ground | P/L | EVAP canister purge volume control solenoid valve | Output | [Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting | BATTERY VOLTAGE (11 - 14V)★  |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.) | BATTERY VOLTAGE (11 - 14V)★  |

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< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|----------------------|--------|---------------------------|--|--------------|--|------------------------------------|
| + | — | | Signal name | Input/Output | | |
| 29 30 31 32 | Ground | LG/R R/Y R/W R/B | Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1 | Output | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | BATTERY VOLTAGE (11 - 14V)★ |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm | BATTERY VOLTAGE (11 - 14V)★ |
| 33 | Ground | LG | Heated oxygen sensor 2 | Input | [Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0V |
| 34 | Ground | W/L | Heated oxygen sensor 3 | Input | [Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Driving for 3 minutes at a speed of 80 km/h (50 MPH) or more (Keep the vehicle speed as steady as possible during the cruising.) | 0 - 1.0V |
| 35 | Ground | B/Y | Sensor ground (Heated oxygen sensor 2, Heated oxygen sensor 3) | — | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed | 0V |
| 36 | Ground | B | Sensor ground (Throttle position sensor) | — | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed | 0V |
| 37 | Ground | W | Throttle position sensor 1 | Input | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | More than 0.36V |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | Less than 4.75V |

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< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--|
| + | — | | Signal name | Input/Output | | |
| 38 | Ground | R | Throttle position sensor 2 | Input | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | Less than 4.75V |
| | | | | | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | More than 0.36V |
| 39 | Ground | R | Refrigerant pressure sensor | Input | [Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates) | 1.0 - 4.0V |
| 40 | Ground | G | Sensor ground (Refrigerant pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 41 | Ground | O/B | Power steering pressure sensor | Output | [Engine is running] • Steering wheel: Being turned | 0.5 - 4.0V |
| | | | | | [Engine is running] • Steering wheel: Not being turned | 0.4 - 0.8V |
| 42 | Ground | G/R | Battery current sensor | Input | [Engine is running] • Battery: Fully charged* • Idle speed | 2.6 - 3.5V |
| 44 | Ground | R/B | Sensor ground (Battery current sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 45 | Ground | B/W | A/F sensor 1 (bank 1) | Input | [Ignition switch: ON] | 2.2V |
| 46 | Ground | Y | Engine coolant temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with engine coolant temperature. |
| 47 | Ground | G | Sensor power supply (Throttle position sensor) | — | [Ignition switch: ON] | 5V |
| 48 | Ground | B/P | Sensor ground (Power steering pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 49 | Ground | L | A/F sensor 1 | Input | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 1.8V Output voltage varies with air fuel ratio. |
| 50 | Ground | L/Y | Intake air temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with intake air temperature. |
| 51 | Ground | O/L | Sensor power supply | — | [Ignition switch: ON] | 5V |
| 52 | Ground | LG | Sensor ground (Tumble control valve position sensor, Engine coolant temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--------------------------|
| + | — | | Signal name | Input/Output | | |
| 54 | Ground | V | Tumble control valve position sensor | Input | [Ignition switch ON] • Engine coolant temperature: Between 5°C (41°F) and 40°C (104°F) • Accelerator pedal: Fully released | Less than 1.2V |
| | | | | | [Ignition switch ON] • Engine coolant temperature: Between 5°C (41°F) and 40°C (104°F) • Accelerator pedal: Slightly depressed | More than 2.9V |
| 55 | Ground | R/L | Sensor power supply (Power steering pressure sensor) | — | [Ignition switch: ON] | 5V |
| 56 | Ground | G/B | Sensor ground (Mass air flow sensor, Intake air temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 58 | Ground | O | Mass air flow sensor | Input | [Engine is running] • Warm-up condition • Idle speed | 0.9 - 1.1V |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,500 rpm | 1.4 - 1.7V |
| 59 | Ground | G/W | Sensor power supply [Camshaft position sensor (PHASE)] | — | [Ignition switch: ON] | 5V |
| 60 | Ground | Y/B | Sensor ground [Crankshaft position sensor (POS)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 61 | Ground | W | Knock sensor | Input | [Engine is running] • Idle speed | 2.5V |
| 64 | Ground | B/R | Sensor ground [Camshaft position sensor (PHASE)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 65 | Ground | W | Crankshaft position sensor (POS) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 3.0V★ JMBIA0091GB |
| | | | | | [Engine is running] • Engine speed: 2,000 rpm | 3.0V★ JMBIA0092GB |
| 67 | Ground | — | Sensor ground (Knock sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |

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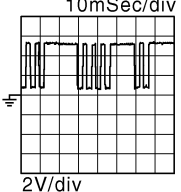
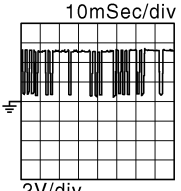
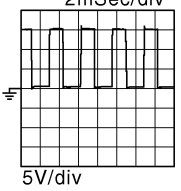
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< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|--|--------------|--|--|
| + | — | | Signal name | Input/Output | | |
| 69 | Ground | W/R | Camshaft position sensor (PHASE) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 1.0 - 4.0★  JMBIA0093GB |
| | | | | | [Engine is running] • Engine speed is 2,000 rpm | 1.0 - 4.0★  JMBIA0094GB |
| 72 | Ground | LG/B | Sensor power supply (Tumble control valve position sensor) | — | [Ignition switch: ON] | 5V |
| 76 | Ground | R/G | Sensor power supply [Crankshaft position sensor (POS)] | — | [Ignition switch: ON] | 5V |
| 77 | Ground | W/L | Power supply for ECM (Back-up) | Input | [Ignition switch: OFF] | BATTERY VOLTAGE (11 - 14V) |
| 78 | Ground | R/L | Intake valve timing control solenoid valve | Output | [Engine is running] • Warm-up condition • Idle speed | 0V |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000rpm | 7 - 10V★  JMBIA0095GB |
| 81 | Ground | W | Accelerator pedal position sensor 1 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| 82 | Ground | G/B | Accelerator pedal position sensor 2 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.25 - 0.5V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 2.0 - 2.5V |
| 83 | Ground | R/W | Sensor power supply (Accelerator pedal position sensor 1) | — | [Ignition switch: ON] | 5V |

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< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) | |
|--------------|--------|------------|---|--------------|---|---|----|
| + | — | | Signal name | Input/Output | | | |
| 84 | Ground | B | Sensor ground (Accelerator pedal position sensor 1) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | EC |
| 85 | Ground | G/Y | ASCD steering switch | Input | [Ignition switch: ON] • ASCD steering switch: OFF | 4V | C |
| | | | | | [Ignition switch: ON] • MAIN switch: Pressed | 0V | D |
| | | | | | [Ignition switch: ON] • CANCEL switch: Pressed | 1V | E |
| | | | | | [Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed | 3V | F |
| | | | | | [Ignition switch: ON] • SET/COAST switch: Pressed | 2V | G |
| 86 | Ground | LG | EVAP control system pressure sensor | Input | [Ignition switch: ON] | 1.8 - 4.8V | H |
| 87 | Ground | P/L | Sensor power supply (Accelerator pedal position sensor 2) | — | [Ignition switch: ON] | 5V | I |
| 88 | Ground | O | Data link connector | Input/Output | [Ignition switch: ON] • CONSULT-III or GST: Disconnected | BATTERY VOLTAGE (11 - 14V) | J |
| 91 | Ground | BR/L | Sensor power supply (EVAP control system pressure sensor) | — | [Ignition switch: ON] | 5V | K |
| 92 | Ground | R | Sensor ground (ASCD steering switch) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | L |
| 93 | Ground | L/Y | Ignition switch | Input | [Ignition switch: OFF] | 0V | M |
| | | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | N |
| 95 | Ground | R/Y | Fuel tank temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with fuel tank temperature. | O |
| 96 | Ground | V | Sensor ground (EVAP control system pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | P |
| 97 | Ground | P | CAN communication line | Input/Output | — | — | O |
| 98 | Ground | L | CAN communication line | Input/Output | — | — | P |
| 100 | Ground | G | Sensor ground (Accelerator pedal position sensor 2) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | O |
| 102 | Ground | R/B | PNP switch | Input | [Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T) | BATTERY VOLTAGE (11 - 14V) | P |
| | | | | | [Ignition switch: ON] • Shift lever: Except above | 0V | O |
| 104 | Ground | B/W | Sensor ground (Fuel tank temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | O |

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< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

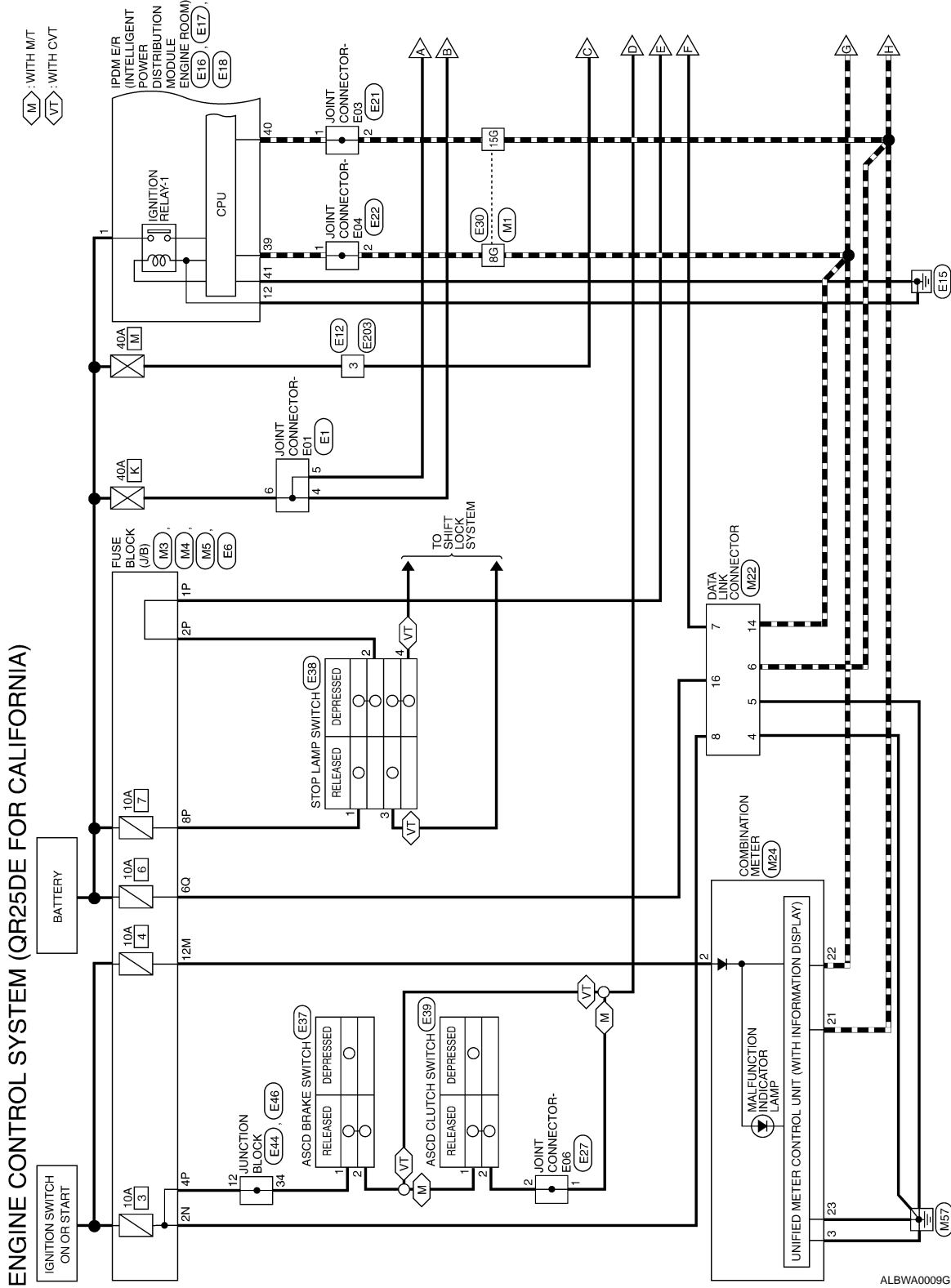
| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
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| + | — | | Signal name | Input/Output | | |
| 105 | Ground | R/G | Power supply for ECM | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| 106 | Ground | SB | Stop lamp switch | Input | [Ignition switch: OFF] • Brake pedal: Fully released | 0V |
| | | | | | [Ignition switch: OFF] • Brake pedal: Slightly depressed | BATTERY VOLTAGE (11 - 14V) |
| 107 108 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | Body ground |
| 109 | Ground | LG | EVAP canister vent control valve | Output | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| 110 | Ground | G/B | ASCD brake switch | Input | [Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T) | 0V |
| | | | | | [Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T) | BATTERY VOLTAGE (11 - 14V) |
| 111 112 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | Body ground |

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

** : Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-68, "How to Handle Battery"](#)

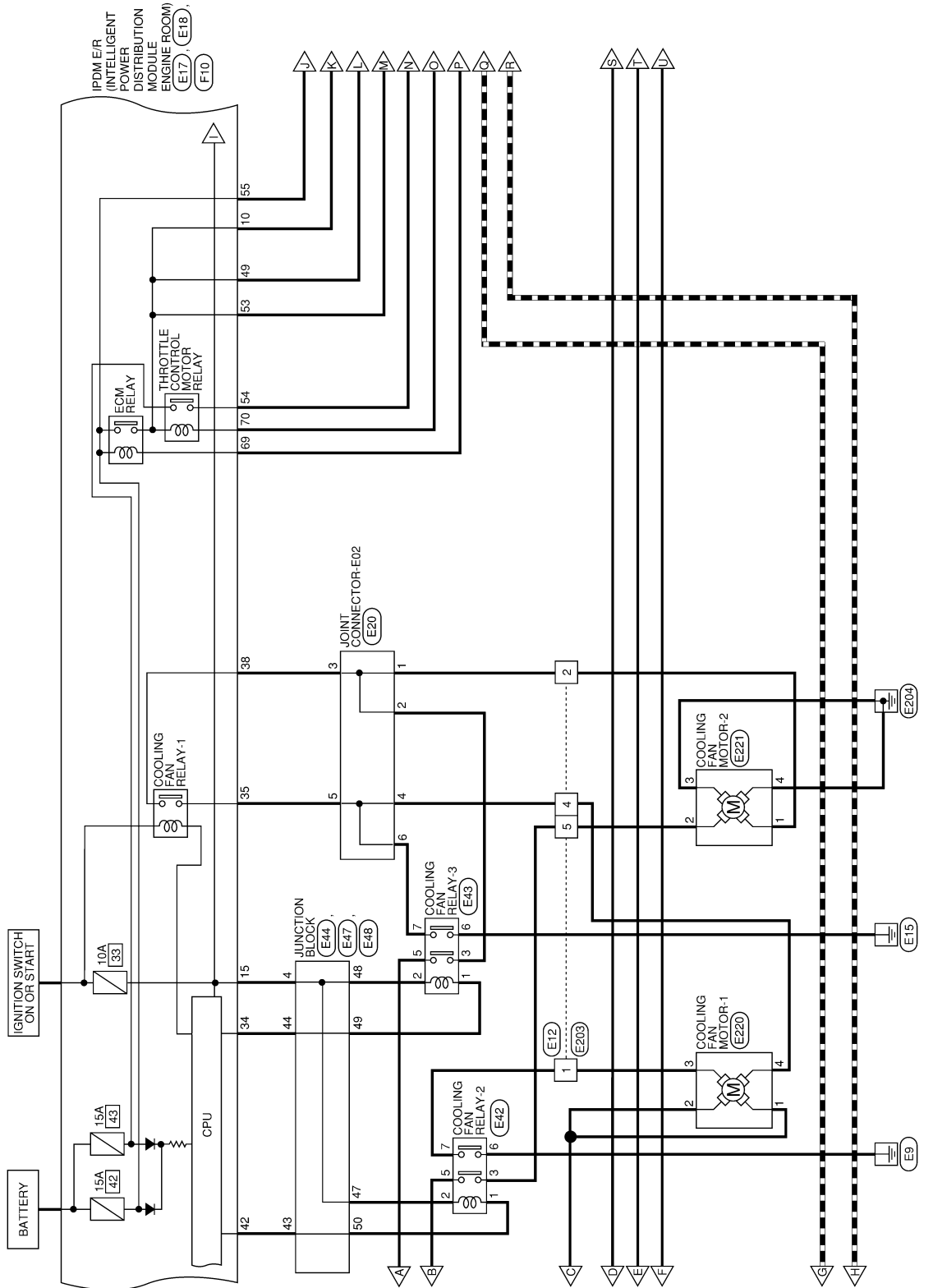
Wiring Diagram — ENGINE CONTROL SYSTEM —

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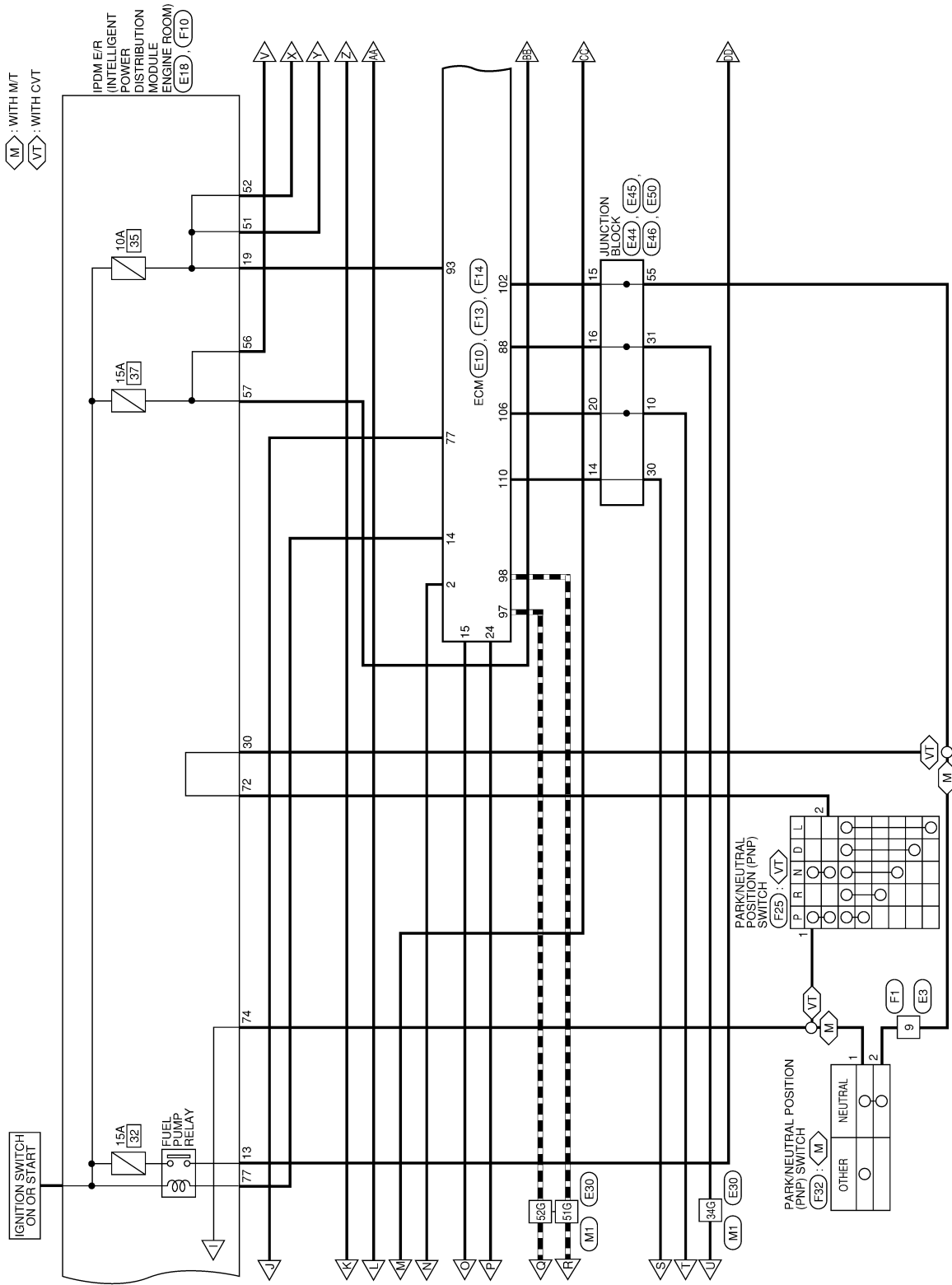


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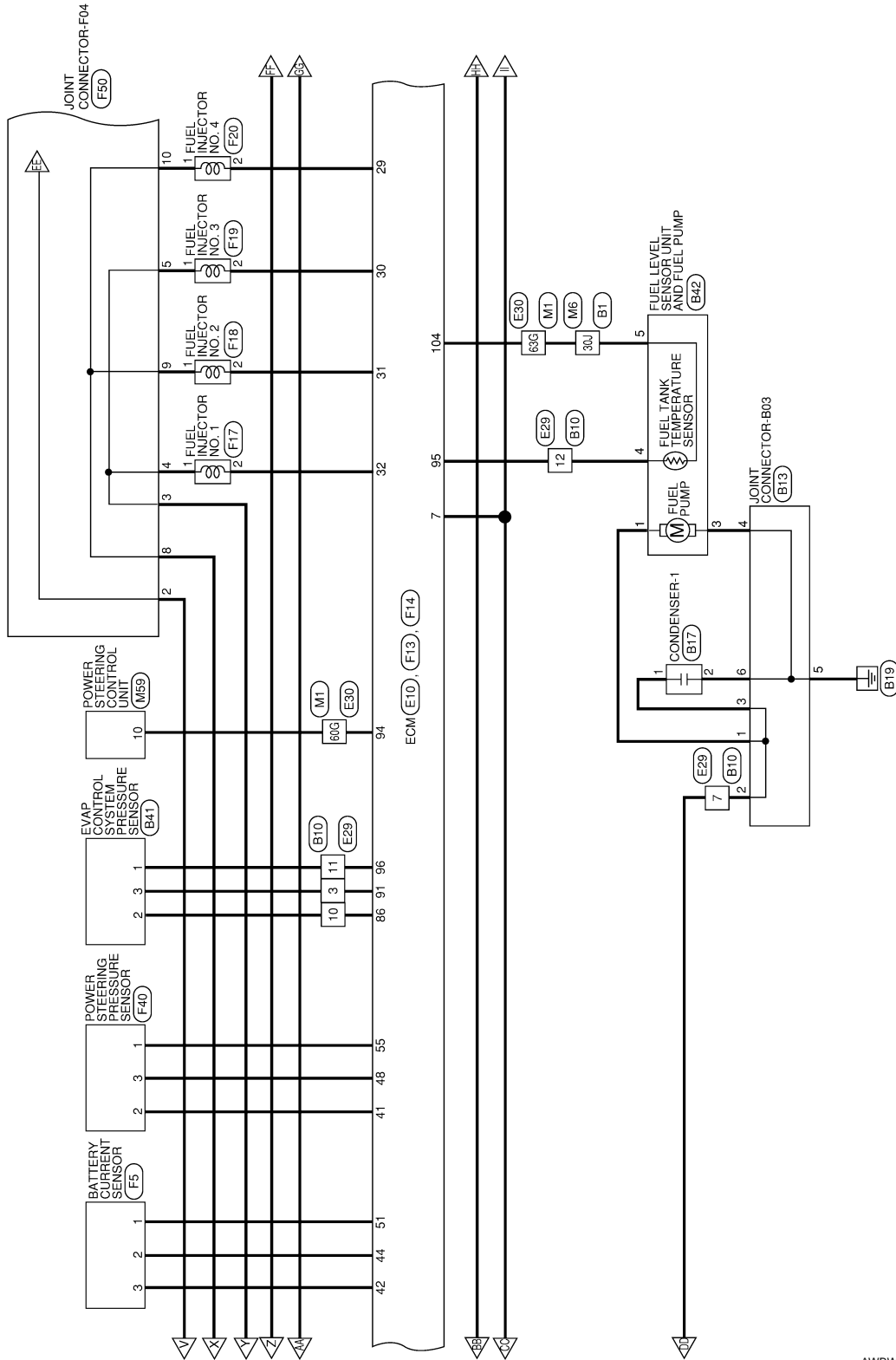


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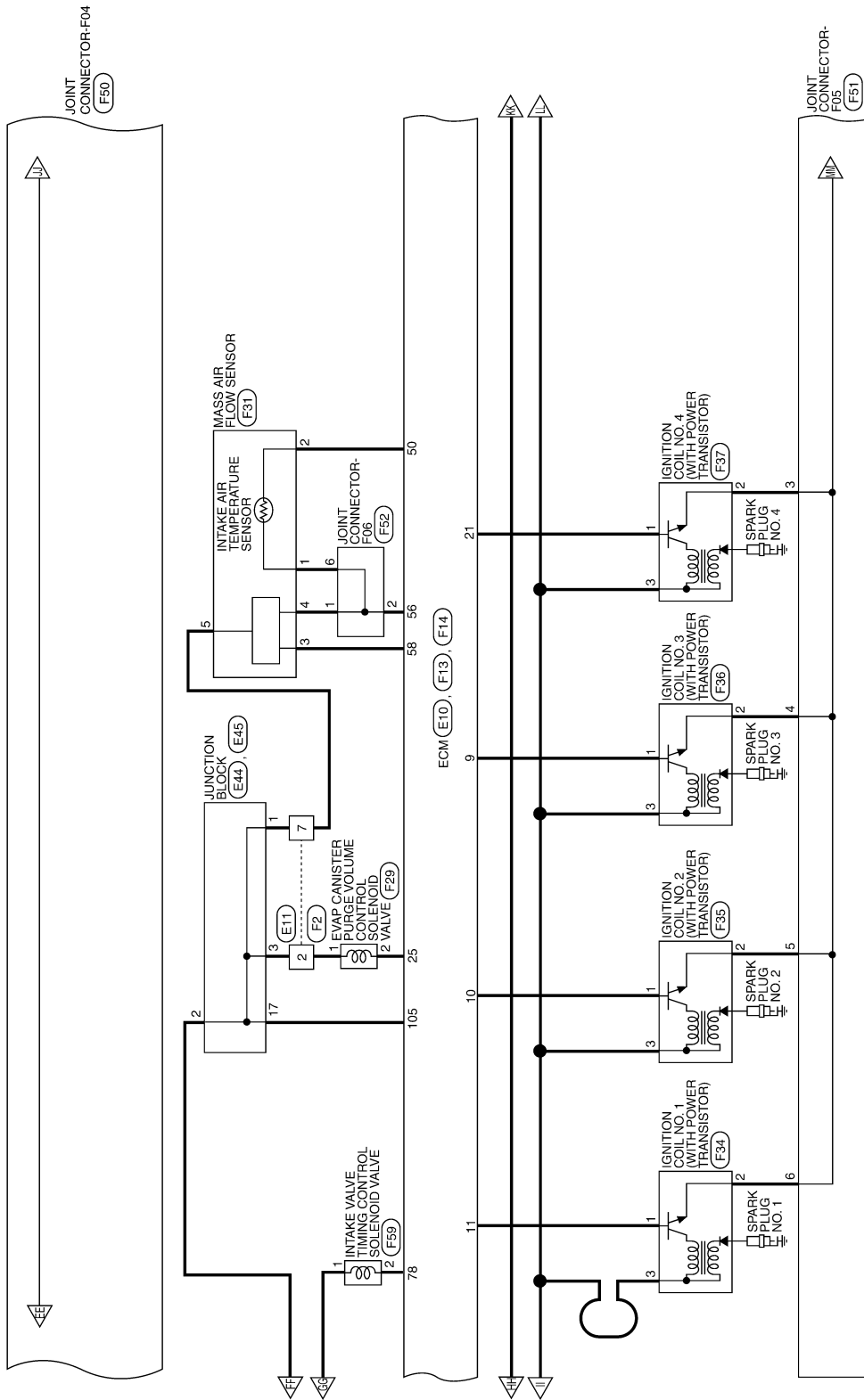


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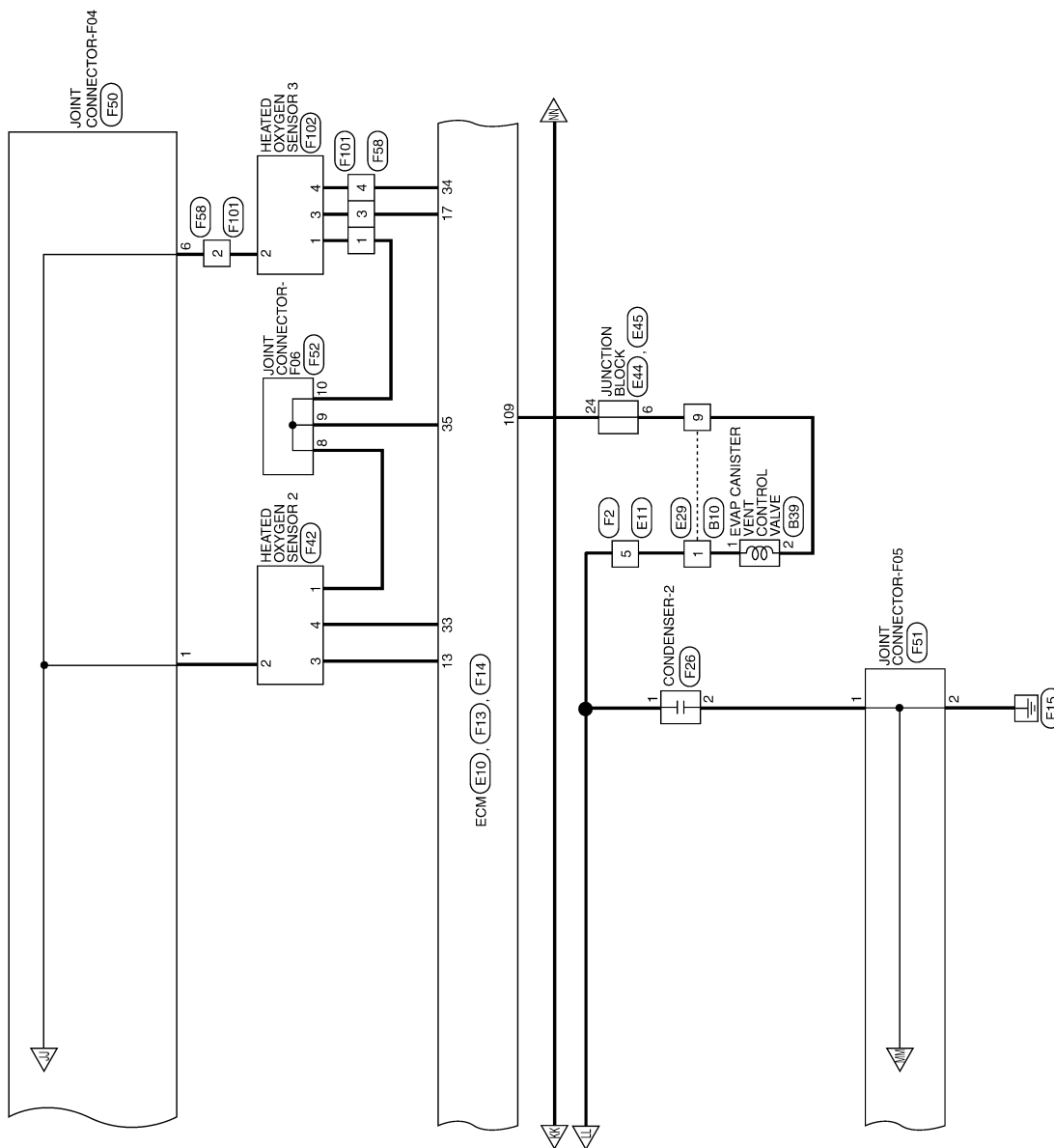


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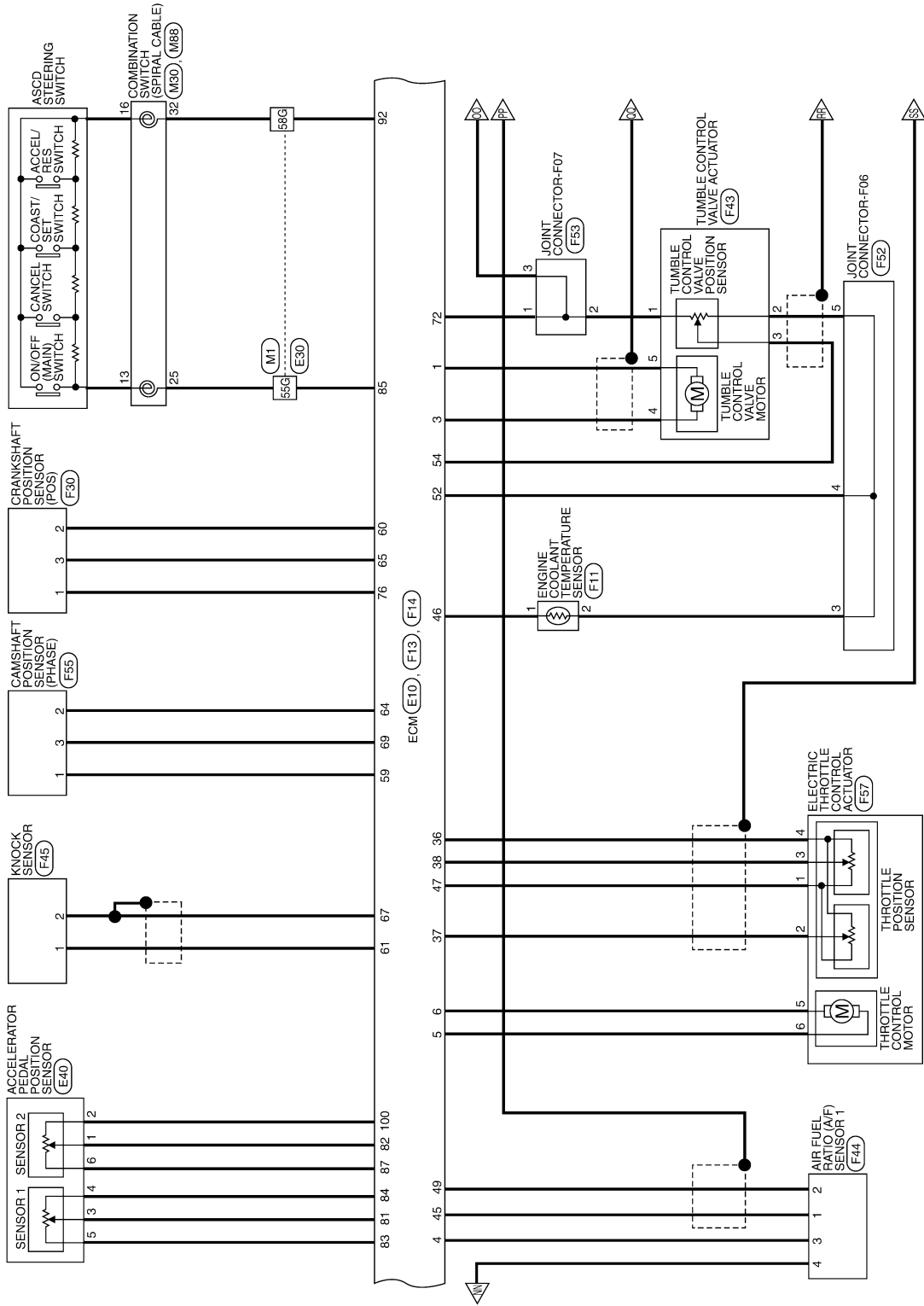


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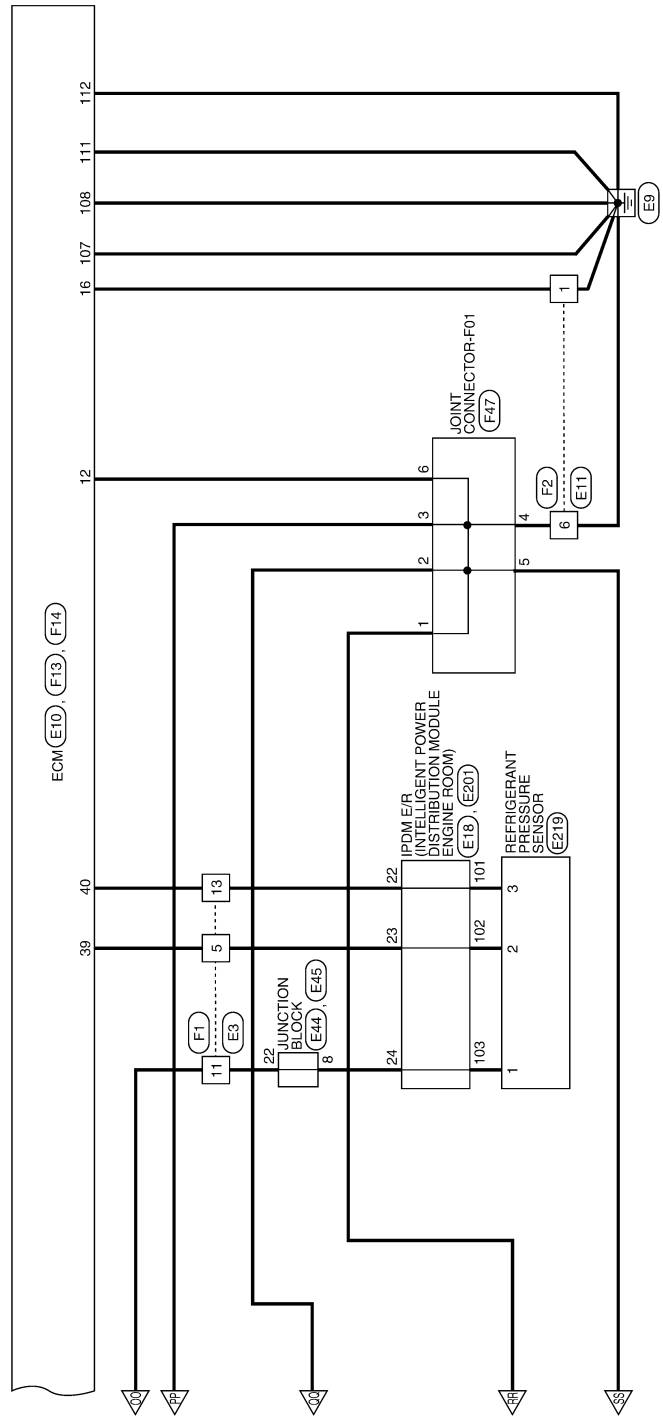


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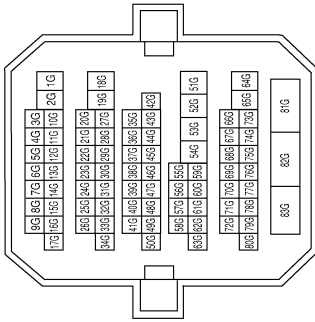
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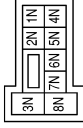
ENGINE CONTROL SYSTEM (QR25DE EXCEPT FOR CALIFORNIA) CONNECTORS

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| Connector No. | M1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



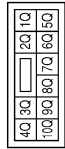
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 8G | P | - |
| 15G | L | - |
| 34G | O | - |
| 51G | L | - |
| 52G | P | - |
| 55G | G/Y | - |
| 58G | R | - |
| 60G | V/W | - |
| 63G | B/W | - |

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| Connector No. | M3 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



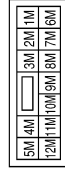
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|--------------|----|---------------|---|-------------|---|
| Terminal No. | 2N | Color of wire | G | Signal Name | - |
|--------------|----|---------------|---|-------------|---|

| | |
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| Connector No. | M4 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



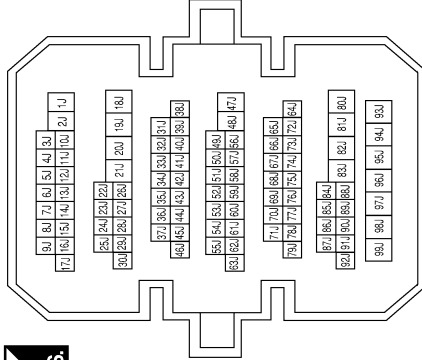
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|--------------|----|---------------|-----|-------------|---|
| Terminal No. | 6Q | Color of wire | Y/R | Signal Name | - |
|--------------|----|---------------|-----|-------------|---|

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| Connector No. | M5 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



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|--------------|-----|---------------|---|-------------|---|
| Terminal No. | 12M | Color of wire | P | Signal Name | - |
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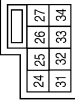
| | |
|-----------------|--------------|
| Connector No. | M6 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| | | | | | |
|--------------|-----|---------------|-----|-------------|---|
| Terminal No. | 30J | Color of wire | B/W | Signal Name | - |
|--------------|-----|---------------|-----|-------------|---|

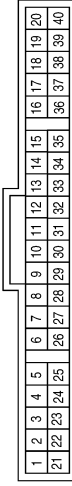
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| Connector No. | M30 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



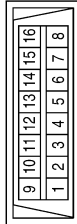
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 25 | G/Y | ASCD_SW |
| 32 | R | ASCD_GND |

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| Connector No. | M24 |
| Connector Name | COMBINATION METER |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2 | O | IGN |
| 3 | B | GND |
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 23 | B | GND |

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| Connector No. | M22 |
| Connector Name | DATA LINK CONNECTOR |
| Connector Color | WHITE |



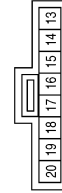
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | B | GND |
| 5 | B | GND |
| 6 | L | CAN-H |
| 7 | O | KLINE |
| 8 | G | IGN_SW |
| 14 | P | CAN-L |
| 16 | Y/R | BATT |

| | |
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| Connector No. | E1 |
| Connector Name | JOINT CONNECTOR-E01 |
| Connector Color | WHITE |



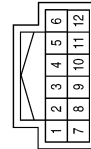
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | W/L | - |
| 5 | W/L | - |
| 6 | W/L | - |

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|-----------------|-----------------------------------|
| Connector No. | M88 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



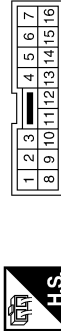
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 13 | Y | ASCD_SW |
| 16 | B | ASCD_GND |

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| Connector No. | M59 |
| Connector Name | POWER STEERING CONTROL UNIT |
| Connector Color | WHITE |



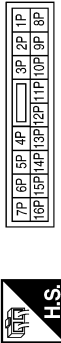
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 10 | V/W | ENG_TACHO |

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| Connector No. | E3 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



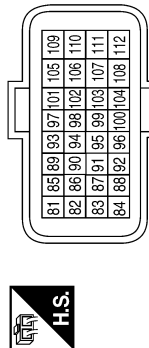
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5 | B/R | - |
| 9 | R/B | - |
| 11 | BR/W | - |
| 13 | W/R | - |

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| Connector No. | E6 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1P | SB | - |
| 2P | R/G | - |
| 4P | G/R | - |
| 8P | Y/R | - |

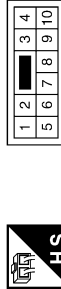
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| Connector No. | E10 |
| Connector Name | ECM |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 81 | W | APS1 |
| 82 | G/B | APS2 |
| 83 | R/W | AVCC1-APS1 |
| 84 | B | GND-APS1 |
| 85 | G/Y | ASCDSW |
| 86 | LG | FTPRES |
| 87 | P/L | AVCC2-APS2 |
| 88 | O | KLINE |
| 91 | BR/L | AVCC2-FTPRES |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|---------------|
| 92 | R | GND-ASCDSW |
| 93 | L/Y | IGNSW |
| 94 | V/W | TACHO (CABIN) |
| 95 | R/Y | TF |
| 96 | V | GND-FTPRES |
| 97 | P | CAN-L |
| 98 | L | CAN-H |
| 100 | G | GND-APS2 |
| 102 | R/B | NEUT-H |
| 104 | B/W | GND-TF |
| 105 | R/G | VBR |
| 106 | SB | BRAKE |
| 107 | B | GND |
| 108 | B | GND |
| 109 | LG | CDCV |
| 110 | G/B | BNCSW |
| 111 | B | GND |
| 112 | B | GND |

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| Connector No. | E11 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

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| Connector No. | E12 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



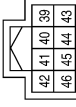
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| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

| | |
|-----------------|--|
| Connector No. | E16 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | BLACK |



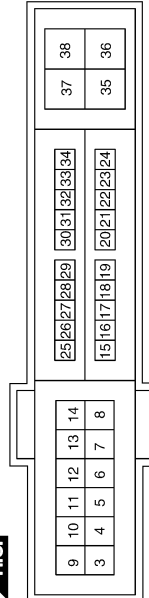
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | F/L_MAIN |

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| Connector No. | E17 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------------|
| 39 | P | CAN-L |
| 40 | L | CAN-H |
| 41 | B | S-GND |
| 42 | SB | MOTOR_FAN_RLY_MID |

| | |
|-----------------|--|
| Connector No. | E18 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|------------------|
| 10 | R/B | ECM_VB |
| 12 | B | P-GND |
| 13 | W | FUEL_PUMP |
| 15 | G/W | START_IG-E/R |
| 19 | L/Y | BCM_IGNSW |
| 22 | W/R | PD_SENS_GND-E/R |
| 23 | B/R | PD_SENS_SIG-E/R |
| 24 | BR/W | PD_SENSPW/E/R |
| 30 | R/B | CLUTCH_I/L_SW |
| 34 | O/L | MOTOR_FAN_RLY_HI |
| 35 | L/B | MOTOR_FAN_LO |
| 38 | R/W | F/L_MOTOR_FAN |

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|-----------------|---------------------|
| Connector No. | E20 |
| Connector Name | JOINT CONNECTOR-E02 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | - |
| 2 | R/W | - |
| 3 | R/W | - |
| 4 | L/B | - |
| 5 | L/B | - |
| 6 | L/B | - |

| | |
|-----------------|---------------------|
| Connector No. | E27 |
| Connector Name | JOINT CONNECTOR-E06 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |

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|-----------------|---------------------|
| Connector No. | E22 |
| Connector Name | JOINT CONNECTOR-E04 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | - |
| 2 | P | - |

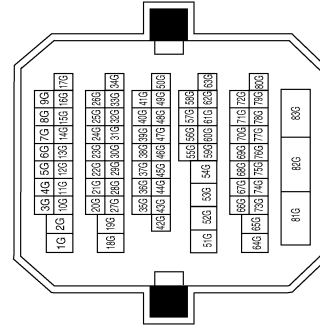
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| Connector No. | E21 |
| Connector Name | JOINT CONNECTOR-E03 |
| Connector Color | WHITE |



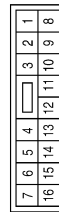
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L | - |
| 2 | L | - |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 8G | P | - |
| 15G | L | - |
| 34G | O | - |
| 51G | L | - |
| 52G | P | - |
| 55G | G/Y | - |
| 58G | R | - |
| 60G | V/W | - |
| 63G | B/W | - |

| | |
|-----------------|--------------|
| Connector No. | E30 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| | |
|-----------------|--------------|
| Connector No. | E29 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/B | - |
| 3 | BR/L | - |
| 7 | W | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

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| Connector No. | E37 |
| Connector Name | ASCD BRAKE SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | - |
| 2 | G/B | - |

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|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH CVT) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |
| 3 | G/R | - |
| 4 | R/W | - |

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|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH M/T) |
| Connector Color | BLACK |



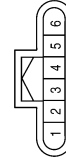
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |

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| Connector No. | E39 |
| Connector Name | ASCD CLUTCH SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | BR | - |
| 2 | G/B | - |

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|-----------------|-----------------------------------|
| Connector No. | E40 |
| Connector Name | ACCELERATOR PEDAL POSITION SENSOR |
| Connector Color | BLACK |



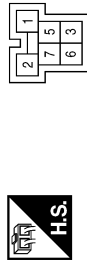
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | APS2 |
| 2 | G | GND-A2 |
| 3 | W | APS1 |
| 4 | B | GND-A1 |
| 5 | R/W | AVCC1 |
| 6 | P/L | AVCC2 |

| | |
|-----------------|---------------------|
| Connector No. | E42 |
| Connector Name | COOLING FAN RELAY-2 |
| Connector Color | BROWN |



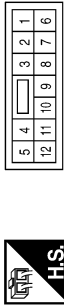
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | G/W | - |
| 3 | L | - |
| 5 | W/L | - |
| 6 | B | - |
| 7 | R | - |

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|-----------------|---------------------|
| Connector No. | E43 |
| Connector Name | COOLING FAN RELAY-3 |
| Connector Color | BROWN |



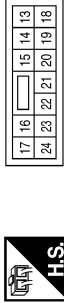
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O/L | - |
| 2 | Y | - |
| 3 | R/W | - |
| 5 | W/L | - |
| 6 | B | - |
| 7 | L/B | - |

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|-----------------|----------------|
| Connector No. | E44 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | BROWN |



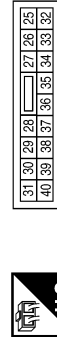
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | - |
| 2 | R/B | - |
| 3 | R/W | - |
| 4 | G/W | - |
| 6 | LG/W | - |
| 8 | BR/W | - |
| 10 | SB | - |
| 12 | G/R | - |

| | |
|-----------------|----------------|
| Connector No. | E45 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 14 | G/B | - |
| 15 | R/B | - |
| 16 | O | - |
| 17 | R/G | - |
| 20 | SB | - |
| 22 | BR/W | - |
| 24 | LG | - |

| | |
|-----------------|----------------|
| Connector No. | E46 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 30 | G/B | - |
| 31 | O | - |
| 34 | G/R | - |

| | |
|-----------------|----------------|
| Connector No. | E47 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 43 | SB | - |
| 44 | O/L | - |

| | |
|-----------------|----------------|
| Connector No. | E48 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 47 | G/W | - |
| 48 | Y | - |
| 49 | O/L | - |
| 50 | SB | - |

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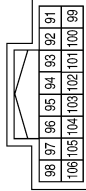
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| Connector No. | E50 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 55 | R/B | - |

| | |
|-----------------|--|
| Connector No. | E201 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 101 | O/L | PD_SENS_GND |
| 102 | R/B | PD_SENS_SIG |
| 103 | P | PD_SEND_PWR |

| | |
|-----------------|--------------|
| Connector No. | E203 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E219 |
| Connector Name | REFRIGERANT PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | AVCC2 |
| 2 | R | SIGNAL |
| 3 | W | GND |

| | |
|-----------------|---------------------|
| Connector No. | E220 |
| Connector Name | COOLING FAN MOTOR-1 |
| Connector Color | GRAY |



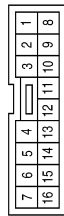
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/Y | LO + |
| 2 | R/Y | HI + |
| 3 | R | HI - |
| 4 | L/B | LO - |

| | |
|-----------------|---------------------|
| Connector No. | E221 |
| Connector Name | COOLING FAN MOTOR-2 |
| Connector Color | GRAY |



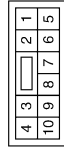
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | LO + |
| 2 | L | HI + |
| 3 | B | HI - |
| 4 | B | LO - |

| | |
|-----------------|--------------|
| Connector No. | F1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5 | R | - |
| 9 | R/B | - |
| 11 | LG/B | - |
| 13 | G | - |

| | |
|-----------------|--------------|
| Connector No. | F2 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



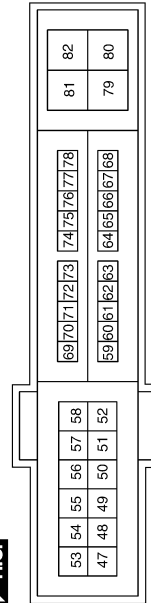
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

| | |
|-----------------|------------------------|
| Connector No. | F5 |
| Connector Name | BATTERY CURRENT SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O/L | AVCC1 |
| 2 | R/B | GND |
| 3 | G/R | SIGNAL |

| | |
|-----------------|--|
| Connector No. | F10 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 49 | B/R | ENG_SOL |
| 51 | LG | INJECTOR_#1 |
| 52 | Y/G | INJECTOR_#2 |
| 53 | R/B | IGN_COIL |
| 54 | G/W | ETC |
| 55 | W/L | ECM_BAT |
| 56 | R/Y | O2_SENS_#1 |
| 57 | O | O2_SENS_#2 |
| 69 | W/B | SSOFF |
| 70 | O | MOTRLY |
| 72 | R/B | NPSW |
| 74 | Y | START_IG_EGI |
| 77 | B/R | FPR |

| | |
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| Connector No. | F11 |
| Connector Name | ENGINE COOLANT TEMPERATURE SENSOR |
| Connector Color | GRAY |

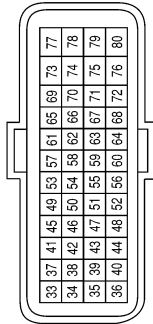


| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | TW |
| 2 | B/G | GND |

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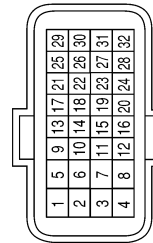
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| Connector No. | F13 |
| Connector Name | ECM |
| Connector Color | BROWN |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|--------------|
| 33 | LG | OSR1 |
| 34 | W/L | 3RDO2S |
| 35 | B/Y | GND A-02SR2 |
| 36 | B | GND A-TPS-B1 |
| 37 | W | TPS1-B1 |
| 38 | R | TPS2-B1 |
| 39 | R | PDPRES |
| 40 | G | GND A-PDPRES |
| 41 | O/B | PSPRES |
| 42 | G/R | CURSEN |
| 44 | R/B | GND A-CURSEN |
| 45 | B/W | AF+1 |
| 46 | Y | TW |
| 47 | G | AVCC1-TPS-B1 |
| 48 | B/P | GND A-PSPRES |
| 49 | L | AF-1 |
| 50 | L/Y | TA1 |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|---------------|
| 51 | O/L | AVCC1-CURSEN |
| 52 | LG | GND A-TW |
| 54 | V | SCVPOS |
| 55 | R/L | AVCC1-PSPRES |
| 56 | G/B | GND A-TA1 |
| 58 | O | QA1+ |
| 59 | G/W | AVCC1-PHASE#1 |
| 60 | Y/B | GND-POS |
| 61 | W | KNK1 |
| 64 | B/R | GND-PHASE#1 |
| 65 | W | POS |
| 67 | - | GND A-KNK 1 |
| 69 | W/R | PHASE#1 |
| 72 | LG/B | AVCC2-PDPRES |
| 76 | R/G | AVCC2-POS |
| 77 | W/L | BATT |
| 78 | R/L | CVTC#1 |

| | |
|-----------------|------|
| Connector No. | F14 |
| Connector Name | ECM |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/G | SCV2 |
| 2 | G/W | VMOT-B1 |
| 3 | L/R | SCV1 |
| 4 | BR/Y | AFH1 |
| 5 | L | MOTOR1-B1 |
| 6 | P | MOTOR2-B1 |
| 7 | R | VSCV |
| 9 | L/B | IGN #3 |
| 10 | G/R | IGN #2 |
| 11 | Y/R | IGN #1 |
| 12 | B | GND |
| 13 | R | 02HR1 |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 14 | B/R | FPR |
| 15 | O | MOTRLY-B1 |
| 16 | B | GND |
| 17 | L | 3RD02H |
| 21 | G/Y | IGN #4 |
| 24 | W/B | SSOF |
| 25 | P/L | EVAP |
| 29 | LG/R | INU #4 |
| 30 | R/Y | INU #3 |
| 31 | R/W | INU #2 |
| 32 | R/B | INU #1 |

| | |
|-----------------|---------------------|
| Connector No. | F19 |
| Connector Name | FUEL INJECTOR NO. 3 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/Y | C/U |

| | |
|-----------------|---------------------|
| Connector No. | F18 |
| Connector Name | FUEL INJECTOR NO. 2 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | R/W | C/U |

| | |
|-----------------|---------------------|
| Connector No. | F17 |
| Connector Name | FUEL INJECTOR NO. 1 |
| Connector Color | GRAY |



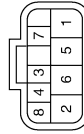
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/B | C/U |

| | |
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| Connector No. | F26 |
| Connector Name | CONDENSER-2 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | VBR |
| 2 | B | GND |

| | |
|-----------------|------------------------------------|
| Connector No. | F25 |
| Connector Name | PARK/NEUTRAL POSITION (PNP) SWITCH |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | R/B | - |

| | |
|-----------------|---------------------|
| Connector No. | F20 |
| Connector Name | FUEL INJECTOR NO. 4 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | LG/R | C/U |

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| Connector No. | F31 |
| Connector Name | MASS AIR FLOW SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | TA- |
| 2 | L/Y | TA+ |
| 3 | O | QA+ |
| 4 | G/B | GND |
| 5 | R/G | VB |

| | |
|-----------------|----------------------------------|
| Connector No. | F30 |
| Connector Name | CRANKSHAFT POSITION SENSOR (POS) |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | AVCC2 |
| 2 | Y/B | GND |
| 3 | W | POS |

| | |
|-----------------|---|
| Connector No. | F29 |
| Connector Name | EVAP CAMISTER PURGE VOLUME CONTROL SOLENOID VALVE |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | P/L | C/U |

| | |
|-----------------|---|
| Connector No. | F35 |
| Connector Name | IGNITION COIL NO. 2 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F34 |
| Connector Name | IGNITION COIL NO. 1 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|------------------------------------|
| Connector No. | F32 |
| Connector Name | PARK/NEUTRAL POSITION (PNP) SWITCH |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | R/B | - |

| | |
|-----------------|--------------------------------|
| Connector No. | F40 |
| Connector Name | POWER STEERING PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/L | AVCC1 |
| 2 | O/B | OUTPUT |
| 3 | B/P | GND |

| | |
|-----------------|---|
| Connector No. | F37 |
| Connector Name | IGNITION COIL NO. 4 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/Y | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F36 |
| Connector Name | IGNITION COIL NO. 3 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/B | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|-------------------------------|
| Connector No. | F44 |
| Connector Name | AIR FUEL RATIO (A/F) SENSOR 1 |
| Connector Color | DARK GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/W | AF(+) |
| 2 | L | AF(-) |
| 3 | BR/Y | HEATER(-) |
| 4 | O | HEATER(+) |

| | |
|-----------------|-------------------------------|
| Connector No. | F43 |
| Connector Name | TUMBLE CONTROL VALVE ACTUATOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG/B | VDD |
| 2 | LG | GND |
| 3 | V | OUT |
| 4 | L/R | OPEN |
| 5 | L/G | CLOSE |

| | |
|-----------------|------------------------|
| Connector No. | F42 |
| Connector Name | HEATED OXYGEN SENSOR 2 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/Y | SENSOR(-) |
| 2 | R/Y | HEATER(+) |
| 3 | R | HEATER(-) |
| 4 | LG | SENSOR(+) |

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| Connector No. | F45 |
| Connector Name | KNOCK SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | KNK |
| 2 | - | GND |

| | |
|-----------------|---------------------|
| Connector No. | F47 |
| Connector Name | JOINT CONNECTOR-F01 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SHIELD | - |
| 2 | SHIELD | - |
| 3 | SHIELD | - |
| 4 | B | - |
| 5 | SHIELD | - |
| 6 | B | - |

| | |
|-----------------|---------------------|
| Connector No. | F50 |
| Connector Name | JOINT CONNECTOR-F04 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/Y | - |
| 2 | R/Y | - |
| 3 | LG | - |
| 4 | LG | - |
| 5 | LG | - |
| 6 | R/Y | - |
| 8 | Y/G | - |
| 9 | Y/G | - |
| 10 | Y/G | - |

| | |
|-----------------|---------------------|
| Connector No. | F51 |
| Connector Name | JOINT CONNECTOR-F05 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | B | - |
| 3 | B | - |
| 4 | B | - |
| 5 | B | - |
| 6 | B | - |

| | |
|-----------------|---------------------|
| Connector No. | F52 |
| Connector Name | JOINT CONNECTOR-F06 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |
| 3 | LG | - |
| 4 | LG | - |
| 5 | LG | - |
| 6 | G/B | - |
| 8 | B/Y | - |
| 9 | B/Y | - |
| 10 | B/L | - |

| | |
|-----------------|---------------------|
| Connector No. | F53 |
| Connector Name | JOINT CONNECTOR-F07 |
| Connector Color | BLACK |



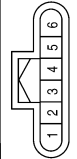
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG/B | - |
| 2 | LG/B | - |
| 3 | LG/B | - |

| | |
|-----------------|--------------|
| Connector No. | F58 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/Y | - |
| 3 | L | - |
| 4 | W | - |

| | |
|-----------------|------------------------------------|
| Connector No. | F57 |
| Connector Name | ELECTRIC THROTTLE CONTROL ACTUATOR |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G | INPUT |
| 2 | W | OUTPUT1 |
| 3 | R | OUTPUT2 |
| 4 | B | GND |
| 5 | P | MOTOR2 |
| 6 | L | MOTOR1 |

| | |
|-----------------|----------------------------------|
| Connector No. | F55 |
| Connector Name | CAMSHAFT POSITION SENSOR (PHASE) |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/W | AVCC1 |
| 2 | B/R | GND |
| 3 | W/R | PHASE |

| | |
|-----------------|------------------------|
| Connector No. | F102 |
| Connector Name | HEATED OXYGEN SENSOR 3 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | SENSOR(-) |
| 2 | R/Y | HEATER(+) |
| 3 | L | HEATER(-) |
| 4 | W | SENSOR(+) |

| | |
|-----------------|--------------|
| Connector No. | F101 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/Y | - |
| 3 | L | - |
| 4 | W | - |

| | |
|-----------------|--|
| Connector No. | F59 |
| Connector Name | INTAKE VALVE TIMING CONTROL SOLENOID VALVE |
| Connector Color | GRAY |

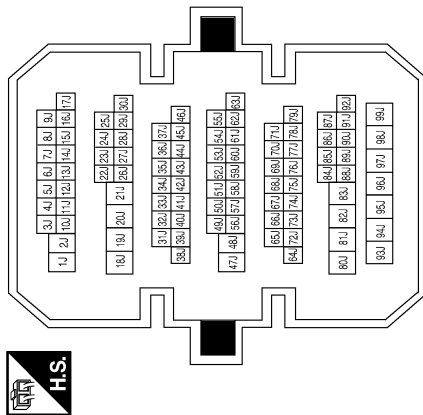


| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/R | VB |
| 2 | R/L | C/U |

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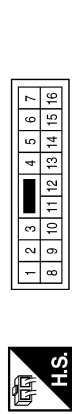
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| Connector No. | B1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



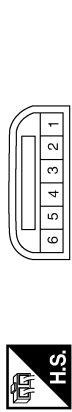
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 30J | B/W | - |

| | |
|-----------------|--------------|
| Connector No. | B10 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



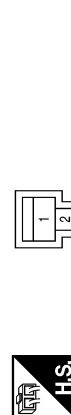
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 3 | BR/L | - |
| 7 | W | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

| | |
|-----------------|---------------------|
| Connector No. | B13 |
| Connector Name | JOINT CONNECTOR+B03 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | SB | - |
| 3 | W | - |
| 4 | B/Y | - |
| 5 | B/Y | - |
| 6 | B/Y | - |

| | |
|-----------------|-------------|
| Connector No. | B17 |
| Connector Name | CONDENSER-1 |
| Connector Color | WHITE |



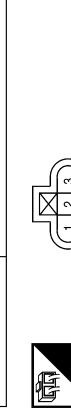
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | (+) |
| 2 | B/Y | (-) |

| | |
|-----------------|----------------------------------|
| Connector No. | B39 |
| Connector Name | EVAP CANISTER VENT CONTROL VALVE |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | BATT |
| 2 | R | C/U |

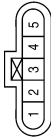
| | |
|-----------------|-------------------------------------|
| Connector No. | B41 |
| Connector Name | EVAP CONTROL SYSTEM PRESSURE SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | V | GND |
| 2 | LG | SIGNAL |
| 3 | BR/L | AVCC2 |

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|-----------------|--------------------------------------|
| Connector No. | B42 |
| Connector Name | FUEL LEVEL SENSOR UNIT AND FUEL PUMP |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | S/B | IGN |
| 3 | B/Y | GND |
| 4 | R/Y | TEMP_SENS |
| 5 | B/W | SENSOR - |

Fail Safe

NON DTC RELATED ITEM

ALBIA0196GB

INFOID:000000001344010

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Engine operating condition in fail-safe mode | Detected items | Remarks | Reference page |
|--|------------------------------------|---|------------------------|
| Engine speed will not rise more than 2,500 rpm due to the fuel cut | Malfunction indicator lamp circuit | <p>When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up MIL when there is malfunction on engine control system.</p> <p>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 fail-safe function.</p> <p>The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.</p> | EC-465 |

DTC RELATED ITEM

| DTC No. | Detected items | Engine operating condition in fail-safe mode | | | | | | | | | |
|---|--|---|--|-------------------|--|---|--------------|--|-------------------|-----------------------|--|
| P0011 | Intake valve timing control | The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function. | | | | | | | | | |
| P0102 P0103 | Mass air flow sensor circuit | Engine speed will not rise more than 2,400 rpm due to the fuel cut. | | | | | | | | | |
| P0117 P0118 | Engine coolant temperature sensor circuit | <p>Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START.</p> <p>CONSULT-III displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Engine coolant temperature decided (CONSULT-III display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or START</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>More than approx. 4 minutes after ignition ON or START</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p> | | Condition | Engine coolant temperature decided (CONSULT-III display) | Just as ignition switch is turned ON or START | 40°C (104°F) | More than approx. 4 minutes after ignition ON or START | 80°C (176°F) | Except as shown above | 40 - 80°C (104 - 176°F) (Depends on the time) |
| Condition | Engine coolant temperature decided (CONSULT-III display) | | | | | | | | | | |
| Just as ignition switch is turned ON or START | 40°C (104°F) | | | | | | | | | | |
| More than approx. 4 minutes after ignition ON or START | 80°C (176°F) | | | | | | | | | | |
| Except as shown above | 40 - 80°C (104 - 176°F) (Depends on the time) | | | | | | | | | | |
| P0122 P0123 P0222 P0223 P2132 P2133 P2135 | Throttle position sensor | <p>The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.</p> <p>The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.</p> <p>So, the acceleration will be poor.</p> | | | | | | | | | |
| P0500 | Vehicle speed sensor | When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running. | | | | | | | | | |
| P0643 | Sensor power supply | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | | |
| P0605 | ECM | (When ECM calculation function is malfunctioning.) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation. | | | | | | | | | |
| P1805 | Brake switch | <p>ECM controls the electric throttle control actuator by regulating the throttle opening to a small range.</p> <p>Therefore, acceleration will be poor.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 50%;">Vehicle condition</th> <th style="width: 50%;">Driving condition</th> </tr> </thead> <tbody> <tr> <td>When engine is idling</td> <td style="text-align: center;">Normal</td> </tr> <tr> <td>When accelerating</td> <td style="text-align: center;">Poor acceleration</td> </tr> </tbody> </table> | | Vehicle condition | Driving condition | When engine is idling | Normal | When accelerating | Poor acceleration | | |
| Vehicle condition | Driving condition | | | | | | | | | | |
| When engine is idling | Normal | | | | | | | | | | |
| When accelerating | Poor acceleration | | | | | | | | | | |
| P2100 P2103 | Throttle control motor relay | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | | |
| P2101 | Electric throttle control function | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | | |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| DTC No. | Detected items | Engine operating condition in fail-safe mode |
|---|------------------------------------|--|
| 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. |
| P2119 | Electric throttle control actuator | (When electric throttle control actuator does not function properly due to the return spring malfunction:) 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. |
| | | (When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less. |
| | | (When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more. |
| P2122 P2123 P2127 P2128 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. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor. |

DTC Inspection Priority Chart

INFOID:000000001344011

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 style="list-style-type: none"> • U1000 U1001 CAN communication line • U1010 CAN communication • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0643 Sensor power supply • P0605 P0607 ECM • P0705 P0850 Park/neutral position (PNP) switch • P1550 P1551 P1552 P1553 P1554 Battery current sensor • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor |
| 2 | <ul style="list-style-type: none"> • P0031 P0032 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 Heated oxygen sensor 2 heater • P0043 P0044 Heated oxygen sensor 3 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P0133 P2A00 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 Heated oxygen sensor 2 • P0143 P0144 P0145 P0146 Heated oxygen sensor 3 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0550 Power steering pressure sensor • P0603 ECM power supply • P0710 P0715 P0720 P0740 P0744 P0745 P0776 P0778 P0840 P0845 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P2004 Tumble control valve motor • P2014 Tumble control valve position sensor • P2101 Electric throttle control function • P2118 Throttle control motor • P2100 P2103 Throttle control motor relay |
| 3 | <ul style="list-style-type: none"> • P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P1148 Closed loop control • P1421 Cold start control • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Primary speed sensor • P2119 Electric throttle control actuator • P2423 HC adsorption catalyst |

DTC Index

x:Applicable —: Not applicable

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|---|----------------------|-------------|----------|---|--------------------|-------------------|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| CAN COMM CIRCUIT | U1000 | 1000*4 | — | — | 1 (CVT) 2 (M/T) | × — | EC-148 |
| CAN COMM CIRCUIT | U1001 | 1001*4 | — | — | 2 | — | EC-148 |
| CONTROL UNIT(CAN) | U1010 | 1010 | — | — | 1 (CVT) 2 (M/T) | × — | EC-149 |
| NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED. | P0000 | 0000 | — | — | — | Flashing*7 | — |
| INT/V TIM CONT-B1 | P0011 | 0011 | — | — | 2 | × | EC-150 |
| A/F SEN1 HTR (B1) | P0031 | 0031 | — | × | 2 | × | EC-154 |
| A/F SEN1 HTR (B1) | P0032 | 0032 | — | × | 2 | × | EC-154 |
| HO2S2 HTR (B1) | P0037 | 0037 | — | × | 2 | × | EC-157 |
| HO2S2 HTR (B1) | P0038 | 0038 | — | × | 2 | × | EC-157 |
| HO2S3 HTR (B1) | P0043 | 0043 | — | × | 2 | × | EC-160 |
| HO2S3 HTR (B1) | P0044 | 0044 | — | × | 2 | × | EC-160 |
| INT/V TIM V/CIR-B1 | P0075 | 0075 | — | — | 2 | × | EC-163 |
| MAF SEN/CIRCUIT-B1 | P0101 | 0101 | — | — | 2 | × | EC-165 |
| MAF SEN/CIRCUIT-B1 | P0102 | 0102 | — | — | 1 | × | EC-171 |
| MAF SEN/CIRCUIT-B1 | P0103 | 0103 | — | — | 1 | × | EC-171 |
| IAT SEN/CIRCUIT-B1 | P0112 | 0112 | — | — | 2 | × | EC-176 |
| IAT SEN/CIRCUIT-B1 | P0113 | 0113 | — | — | 2 | × | EC-176 |
| ECT SEN/CIRC | P0117 | 0117 | — | — | 1 | × | EC-179 |
| ECT SEN/CIRC | P0118 | 0118 | — | — | 1 | × | EC-179 |
| TP SEN 2/CIRC-B1 | P0122 | 0122 | — | — | 1 | × | EC-182 |
| TP SEN 2/CIRC-B1 | P0123 | 0123 | — | — | 1 | × | EC-182 |
| ECT SENSOR | P0125 | 0125 | — | — | 2 | × | EC-185 |
| IAT SENSOR-B1 | P0127 | 0127 | — | — | 2 | × | EC-188 |
| THERMSTAT FNCTN | P0128 | 0128 | — | — | 2 | × | EC-190 |
| A/F SENSOR1 (B1) | P0130 | 0130 | — | × | 2 | × | EC-192 |
| A/F SENSOR1 (B1) | P0131 | 0131 | — | × | 2 | × | EC-196 |
| A/F SENSOR1 (B1) | P0132 | 0132 | — | × | 2 | × | EC-199 |
| A/F SENSOR1 (B1) | P0133 | 0133 | × | × | 2 | × | EC-202 |
| HO2S2 (B1) | P0137 | 0137 | × | × | 2 | × | EC-207 |
| HO2S2 (B1) | P0138 | 0138 | × | × | 2 | × | EC-213 |
| HO2S2 (B1) | P0139 | 0139 | × | × | 2 | × | EC-220 |
| HO2S3 (B1) | P0143 | 0143 | × | × | 2 | × | EC-226 |
| HO2S3 (B1) | P0144 | 0144 | × | × | 2 | × | EC-231 |
| HO2S3 (B1) | P0145 | 0145 | × | × | 2 | × | EC-236 |
| HO2S3 (B1) | P0146 | 0146 | — | × | 2 | × | EC-241 |
| FUEL SYS-LEAN-B1 | P0171 | 0171 | — | — | 2 | × | EC-246 |
| FUEL SYS-RICH-B1 | P0172 | 0172 | — | — | 2 | × | EC-250 |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|--|----------------------|-------|----------|---|--------------------|--------|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| FTT SENSOR | P0181 | 0181 | — | — | 2 | × | EC-254 |
| FTT SEN/CIRCUIT | P0182 | 0182 | — | — | 2 | × | EC-257 |
| FTT SEN/CIRCUIT | P0183 | 0183 | — | — | 2 | × | EC-257 |
| TP SEN 1/CIRC-B1 | P0222 | 0222 | — | — | 1 | × | EC-260 |
| TP SEN 1/CIRC-B1 | P0223 | 0223 | — | — | 1 | × | EC-260 |
| MULTI CYL MISFIRE | P0300 | 0300 | — | — | 2 | × | EC-263 |
| CYL 1 MISFIRE | P0301 | 0301 | — | — | 2 | × | EC-263 |
| CYL 2 MISFIRE | P0302 | 0302 | — | — | 2 | × | EC-263 |
| CYL 3 MISFIRE | P0303 | 0303 | — | — | 2 | × | EC-263 |
| CYL 4 MISFIRE | P0304 | 0304 | — | — | 2 | × | EC-263 |
| KNOCK SEN/CIRC-B1 | P0327 | 0327 | — | — | 2 | — | EC-268 |
| KNOCK SEN/CIRC-B1 | P0328 | 0328 | — | — | 2 | — | EC-268 |
| CKP SEN/CIRCUIT | P0335 | 0335 | — | — | 2 | × | EC-270 |
| CMP SEN/CIRC-B1 | P0340 | 0340 | — | — | 2 | × | EC-274 |
| TW CATALYST SYS-B1 | P0420 | 0420 | × | × | 2 | × | EC-278 |
| EVAP PURG FLOW/MON | P0441 | 0441 | × | × | 2 | × | EC-283 |
| EVAP SMALL LEAK | P0442 | 0442 | × | × | 2 | × | EC-288 |
| PURG VOLUME CONT/V | P0443 | 0443 | — | — | 2 | × | EC-294 |
| PURG VOLUME CONT/V | P0444 | 0444 | — | — | 2 | × | EC-298 |
| PURG VOLUME CONT/V | P0445 | 0445 | — | — | 2 | × | EC-298 |
| VENT CONTROL VALVE | P0447 | 0447 | — | — | 2 | × | EC-301 |
| VENT CONTROL VALVE | P0448 | 0448 | — | — | 2 | × | EC-305 |
| EVAP SYS PRES SEN | P0451 | 0451 | — | — | 2 | × | EC-309 |
| EVAP SYS PRES SEN | P0452 | 0452 | — | — | 2 | × | EC-312 |
| EVAP SYS PRES SEN | P0453 | 0453 | — | — | 2 | × | EC-317 |
| EVAP GROSS LEAK | P0455 | 0455 | — | — | 2 | × | EC-323 |
| EVAP VERY SML LEAK | P0456 | 0456 | ×*6 | × | 2 | × | EC-329 |
| FUEL LEV SEN SLOSH | P0460 | 0460 | — | — | 2 | × | EC-336 |
| FUEL LEVEL SENSOR | P0461 | 0461 | — | — | 2 | × | EC-338 |
| FUEL LEVL SEN/CIRC | P0462 | 0462 | — | — | 2 | × | EC-340 |
| FUEL LEVL SEN/CIRC | P0463 | 0463 | — | — | 2 | × | EC-340 |
| VEH SPEED SEN/CIRC*5 | P0500 | 0500 | — | — | 2 | × | EC-342 |
| ISC SYSTEM | P0506 | 0506 | — | — | 2 | × | EC-344 |
| ISC SYSTEM | P0507 | 0507 | — | — | 2 | × | EC-346 |
| PW ST P SEN/CIRC | P0550 | 0550 | — | — | 2 | — | EC-348 |
| ECM BACK UP/CIRCUIT | P0603 | 0603 | — | — | 2 | × | EC-350 |
| ECM | P0605 | 0605 | — | — | 1 or 2 | × or — | EC-352 |
| ECM | P0607 | 0607 | — | — | 1 (CVT) 2 (M/T) | × | EC-354 |
| SENSOR POWER/CIRC | P0643 | 0643 | — | — | 1 | × | EC-355 |
| PNP SW/CIRC | P0705 | 0705 | — | — | 2 | × | TM-302 |
| ATF TEMP SEN/CIRC | P0710 | 0710 | — | — | 1 | × | TM-305 |

ECM

< ECU DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|--|----------------------|-------|----------|---|------|-----|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| INPUT SPD SEN/CIRC | P0715 | 0715 | — | — | 2 | × | TM-307 |
| VEH SPD SEN/CIR AT*5 | P0720 | 0720 | — | — | 2 | × | TM-312 |
| TCC SOLENOID/CIRC | P0740 | 0740 | — | — | 2 | × | TM-318 |
| A/T TCC S/V FNCTN | P0744 | 0744 | — | — | 2 | × | TM-320 |
| L/PRESS SOL/CIRC | P0745 | 0745 | — | — | 2 | × | TM-322 |
| PRS CNT SOL/A FCTN | P0746 | 0746 | — | — | 1 | × | TM-324 |
| PRS CNT SOL/B FCTN | P0776 | 0776 | — | — | 2 | × | TM-326 |
| PRS CNT SOL/B CIRC | P0778 | 0778 | — | — | 2 | × | TM-329 |
| TR PRS SENS/A CIRC | P0840 | 0840 | — | — | 2 | × | TM-334 |
| TR PRS SENS/B CIRC | P0845 | 0845 | — | — | 2 | × | TM-340 |
| P-N POS SW/CIRCUIT | P0850 | 0850 | — | — | 2 | × | EC-357 |
| CLOSED LOOP-B1 | P1148 | 1148 | — | — | 1 | × | EC-360 |
| ENG OVER TEMP | P1217 | 1217 | — | — | 1 | × | EC-361 |
| CTP LEARNING-B1 | P1225 | 1225 | — | — | 2 | — | EC-365 |
| CTP LEARNING-B1 | P1226 | 1226 | — | — | 2 | — | EC-367 |
| COLD START CONTROL | P1421 | 1421 | — | — | 2 | × | EC-369 |
| BAT CURRENT SENSOR | P1550 | 1550 | — | — | 2 | — | EC-371 |
| BAT CURRENT SENSOR | P1551 | 1551 | — | — | 2 | — | EC-374 |
| BAT CURRENT SENSOR | P1552 | 1552 | — | — | 2 | — | EC-374 |
| BAT CURRENT SENSOR | P1553 | 1553 | — | — | 2 | — | EC-377 |
| BAT CURRENT SENSOR | P1554 | 1554 | — | — | 2 | — | EC-380 |
| ASCD SW | P1564 | 1564 | — | — | 1 | — | EC-383 |
| ASCD BRAKE SW | P1572 | 1572 | — | — | 1 | — | EC-386 |
| ASCD VHL SPD SEN | P1574 | 1574 | — | — | 1 | — | EC-393 |
| LOCK MODE | P1610 | 1610 | — | — | 2 | — | SEC-34 |
| ID DISCARD IMM-ECM | P1611 | 1611 | — | — | 2 | — | SEC-39 |
| CHAIN OF ECM-IMMU | P1612 | 1612 | — | — | 2 | — | SEC-40 |
| DIFFERENCE OF KEY | P1615 | 1615 | — | — | 2 | — | SEC-38 |
| IN PULY SPEED | P1715 | 1715 | — | — | 2 | — | EC-395 |
| LU-SLCT SOL/CIRC | P1740 | 1740 | — | — | 2 | × | TM-355 |
| STEP MOTOR CIRC | P1777 | 1777 | — | — | 1 | × | TM-358 |
| STEP MOTOR FNCT | P1778 | 1778 | — | — | 2 | × | TM-361 |
| BRAKE SW/CIRCUIT | P1805 | 1805 | — | — | 2 | — | EC-397 |
| TUMBLE CONT/V | P2004 | 2004 | — | — | 2 | × | EC-400 |
| TUMBLE POS SEN | P2014 | 2014 | — | — | 2 | — | EC-405 |
| ETC MOT PWR-B1 | P2100 | 2100 | — | — | 1 | × | EC-408 |
| ETC FNCTN/CIRC-B1 | P2101 | 2101 | — | — | 1 | × | EC-410 |
| ETC MOT PWR | P2103 | 2103 | — | — | 1 | × | EC-408 |
| ETC MOT-B1 | P2118 | 2118 | — | — | 1 | × | EC-414 |
| ETC ACTR-B1 | P2119 | 2119 | — | — | 1 | × | EC-416 |
| APP SEN 1/CIRC | P2122 | 2122 | — | — | 1 | × | EC-418 |
| APP SEN 1/CIRC | P2123 | 2123 | — | — | 1 | × | EC-418 |

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|--|----------------------|-------|----------|---|------|-----|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| APP SEN 2/CIRC | P2127 | 2127 | — | — | 1 | × | EC-421 |
| APP SEN 2/CIRC | P2128 | 2128 | — | — | 1 | × | EC-421 |
| TP SENSOR-B1 | P2135 | 2135 | — | — | 1 | × | EC-425 |
| APP SENSOR | P2138 | 2138 | — | — | 1 | × | EC-428 |
| HC ADS CATALYST-B1 | P2423 | 2423 | — | — | 2 | × | EC-432 |
| A/F SENSOR1 (B1) | P2A00 | 2A00 | — | × | 2 | × | EC-436 |

*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 of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

How to Set SRT Code

INFOID:000000001344013

To set all SRT codes, self-diagnosis 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.

WITH CONSULT-III

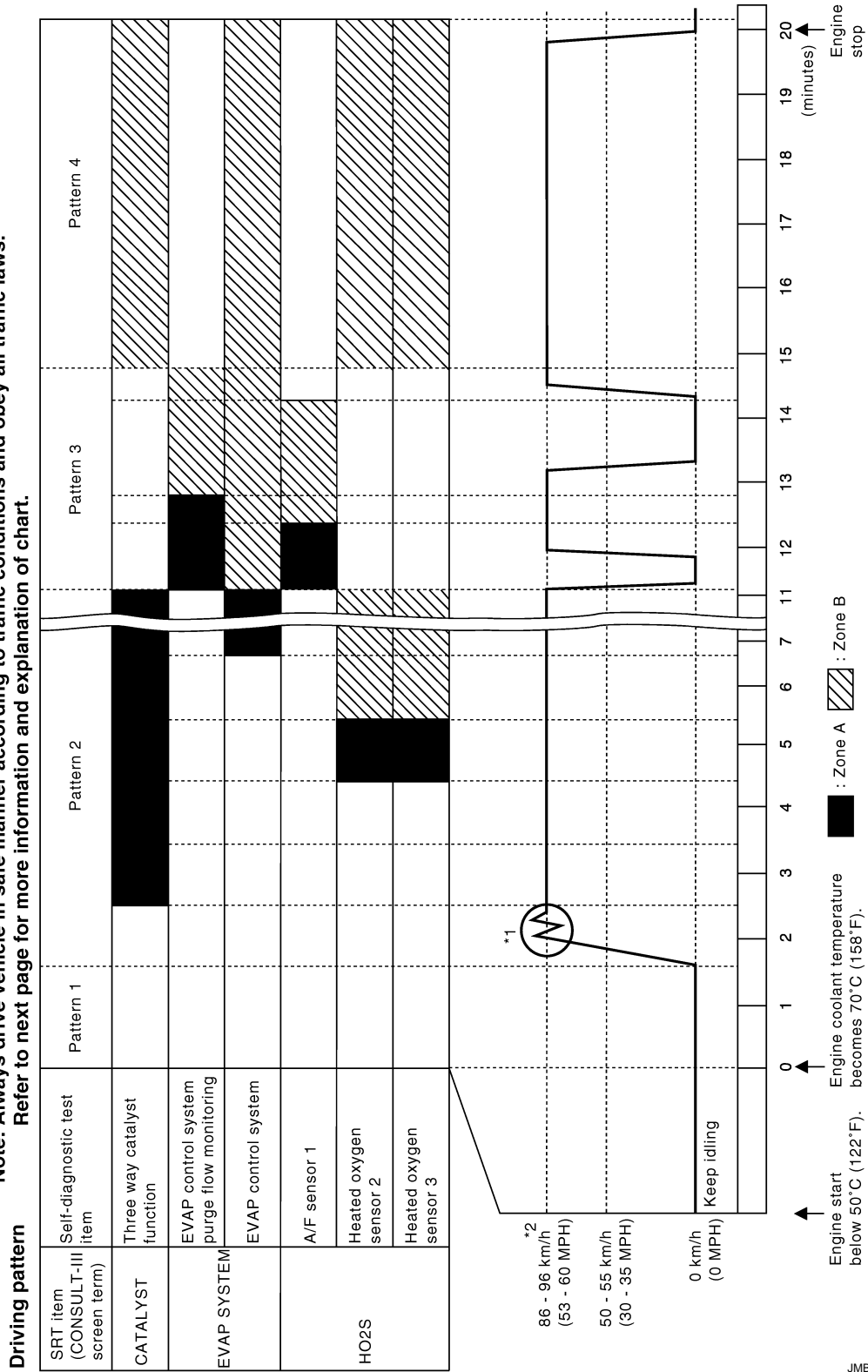
Perform corresponding DTC CONFIRMATION PROCEDURE one by one based on Performance Priority in the table on "SRT Item".

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

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.



JMBIA0164GB

- 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:

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- 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:

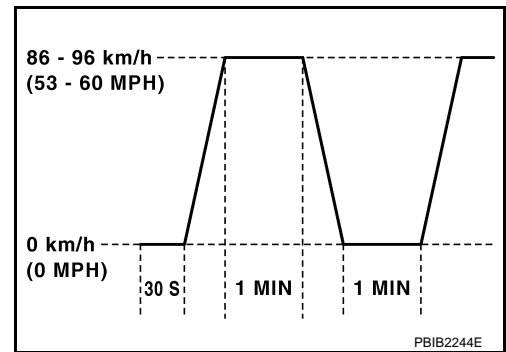
- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 46 and ground is lower than 1.4V).**
- **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 4.1V).**

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 decelerating 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 steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*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.

Suggested Upshift Speeds for M/T Models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

| Gear change | For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]: | | For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]: |
|-------------|--|-------------------------------|--|
| | ACCEL shift position km/h (MPH) | CRUISE shift point km/h (MPH) | km/h (MPH) |
| 1st to 2nd | 24 (15) | 13 (8) | 13 (8) |
| 2nd to 3rd | 40 (25) | 27 (17) | 27 (17) |
| 3rd to 4th | 53 (33) | 40 (25) | 40 (25) |
| 4th to 5th | 71 (44) | 58 (36) | 58 (36) |
| 5th to 6th | 82 (51) | 82 (51) | 82 (51) |

Test Value and Test Limit

INFOID:000000001344014

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 Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

ECM

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[QR25DE FOR CALIFORNIA]

| Item | Self-diagnostic test item | DTC | Test value (GST display) | | Test limit | Conversion |
|-------------|---|-------|-----------------------------|------|------------|-----------------------|
| | | | TID | CID | | |
| CATALYST | Three way catalyst function | P0420 | 01H | 81H | Min. | 1/128 |
| | | P0420 | 02H | 81H | Min. | 1 |
| EVAP SYSTEM | EVAP control system (Small leak) | P0442 | 05H | 03H | Max. | 1/128 mm ² |
| | EVAP control system purge flow monitoring | P0441 | 06H | 83H | Min. | 20 mV |
| | EVAP control system (Very small leak) | P0456 | 07H | 03H | Max. | 1/128 mm ² |
| HO2S | Air fuel ratio (A/F) sensor 1 | P0131 | 41H | 8EH | Min. | 5mV |
| | | P0132 | 42H | 0EH | Max. | 5mV |
| | | P2A00 | 43H | 0EH | Max. | 0.002 |
| | | P2A00 | 44H | 8EH | Min. | 0.002 |
| | | P0130 | 46H | 0EH | Max. | 5mV |
| | | P0130 | 47H | 8EH | Min. | 5mV |
| | | P0133 | 45H | 8EH | Min. | 0.004 |
| | Heated oxygen sensor 2 | P0139 | 19H | 86H | Min. | 10mV/500 ms |
| | | P0137 | 1AH | 86H | Min. | 10 mV |
| | | P0138 | 1BH | 06H | Max. | 10 mV |
| | | P0138 | 1CH | 06H | Max. | 10mV |
| | Heated oxygen sensor 3 | P0145 | 61H | 92H | Min. | 10mV/500 ms |
| | | P0144 | 62H | 92H | Min. | 10 mV |
| | | P0143 | 63H | 12H | Max. | 10 mV |
| P0146 | | 64H | 12H | Max. | 10mV | |
| HO2S HEATER | A/F sensor 1 heater | P0032 | 57H | 10H | Max. | 5 mV |
| | | P0031 | 58H | 90H | Min. | 5 mV |
| | Heated oxygen sensor 2 heater | P0038 | 2DH | 0AH | Max. | 20 mV |
| | | P0037 | 2EH | 8AH | Min. | 20 mV |
| | Heated oxygen sensor 3 heater | P0044 | 71H | 14H | Max. | 20 mV |
| | | P0043 | 72H | 94H | Min. | 20 mV |

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ENGINE CONTROL SYSTEM SYMPTOMS

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SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:000000001344015

SYSTEM — BASIC ENGINE CONTROL SYSTEM

| | | SYMPTOM | | | | | | | | | | | | Reference page | |
|---|---------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-------------------|--|
| | | 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) |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Fuel | Fuel pump circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 3 | | 2 | EC-456 |
| | Fuel pressure regulator system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | | | EC-533 |
| | Fuel injector circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-453 |
| | Evaporative emission system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | EC-86 |
| Air | Positive crankcase ventilation system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | 1 | | EC-471 |
| | Incorrect idle speed adjustment | | | | | | 1 | 1 | 1 | 1 | | 1 | | | EC-28 |
| | Electric throttle control actuator | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | | 2 | | 2 | EC-410, EC-416 |
| Ignition | Incorrect ignition timing adjustment | 3 | 3 | 1 | 1 | 1 | | 1 | 1 | | | 1 | | | EC-28 |
| | Ignition circuit | 1 | 1 | 2 | 2 | 2 | | 2 | 2 | | | 2 | | | EC-460 |
| Main power supply and ground circuit | | 2 | 2 | 3 | 3 | 3 | | 3 | 3 | | 2 | 3 | | | EC-144 |
| Mass air flow sensor circuit | | 1 | | | 2 | | | | | | | | | | EC-165, EC-171 |
| Engine coolant temperature sensor circuit | | | | | | | 3 | | | 3 | | | | | EC-179, EC-185 |
| Air fuel ratio (A/F) sensor 1 circuit | | | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-192, EC-196, EC-199, EC-202, EC-436 |
| Throttle position sensor circuit | | | | | | | 2 | | | 2 | | | | | EC-182, EC-260, EC-365, EC-367, EC-425 |
| Accelerator pedal position sensor circuit | | | | 3 | 2 | 1 | | | | | | | | | EC-418, EC-421, EC-428 |
| Knock sensor circuit | | | | 2 | | | | | | | | 3 | | | EC-268 |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

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| | SYMPTOM | | | | | | | | | | | | | Reference page |
|--|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|--|
| | 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) | |
| Warranty symptom code | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Crankshaft position sensor (POS) circuit | 2 | 2 | | | | | | | | | | | | EC-270 |
| Camshaft position sensor (PHASE) circuit | 3 | 2 | | | | | | | | | | | | EC-274 |
| Vehicle speed signal circuit | | 2 | 3 | | 3 | | | | | | 3 | | | EC-342 |
| Power steering pressure sensor circuit | | 2 | | | | | 3 | 3 | | | | | | EC-348 |
| ECM | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | EC-350 , EC-352 |
| Intake valve timing control solenoid valve circuit | | 3 | 2 | | 1 | 3 | 2 | 2 | 3 | | 3 | | | EC-163 |
| PNP switch circuit | | | 3 | | 3 | | 3 | 3 | | | 3 | | | EC-357 |
| Refrigerant pressure sensor circuit | | 2 | | | | 3 | | | 3 | | 4 | | | EC-472 |
| Electrical load signal circuit | | | | | | | 3 | | | | | | | EC-451 |
| Tumble control valve motor | | | | | 4 | 4 | | | | | | | | EC-401 |
| Tumble control valve position sensor | | | | | | | | | | | | | | EC-405 |
| Air conditioner circuit | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | 2 | HAC-83 |
| ABS actuator and electric unit (control unit) | | | 4 | | | | | | | | | | | BRC-53 |

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| | | SYMPTOM | | | | | | | | | | | | | Reference page | | | | | | | | | | | | |
|-----------------------|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|---|---|---|---|--|---|---|--|--|---|---|-----------------------|--|
| | | 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) | | | | | | | | | | | | | |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | | | | | | | | | | | | | |
| Fuel | Fuel tank | 5 | 5 | | | | | | | | | | | | FL-10 | | | | | | | | | | | | |
| | Fuel piping | | | 5 | 5 | 5 | | 5 | 5 | | 5 | | | | EM-36 | | | | | | | | | | | | |
| | Vapor lock | | | | | | | | | | | | | | | — | | | | | | | | | | | |
| | Valve deposit | | | | | | | | | | | | | | | — | | | | | | | | | | | |
| | Poor fuel (Heavy weight gasoline, Low octane) | 5 | | | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | — | | | | | | | | | | | |
| Air | Air duct | | | | | | | | | | | | | | EM-26 | | | | | | | | | | | | |
| | Air cleaner | | | | | | | | | | | | | | EM-25 | | | | | | | | | | | | |
| | Air leakage from air duct (Mass air flow sensor — electric throttle control actuator) | | 5 | 5 | | 5 | | 5 | 5 | | | 5 | | | EM-26 | | | | | | | | | | | | |
| | Electric throttle control actuator | 5 | | | 5 | | 5 | | | 5 | | | | | EM-26 | | | | | | | | | | | | |
| | Air leakage from intake manifold/Collector/Gasket | | | | | | | | | | | | | | EM-26 | | | | | | | | | | | | |
| Cranking | Battery | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | | 1 | PG-132 | | | | | | | | | | | | |
| | Generator circuit | | | | | | | | | | | | | | CHG-5 | | | | | | | | | | | | |
| | Starter circuit | 3 | | | | | | | | | | 1 | | | STR-6 | | | | | | | | | | | | |
| | Signal plate | 6 | | | | | | | | | | | | | EM-72 | | | | | | | | | | | | |
| | PNP switch | 4 | | | | | | | | | | | | | TM-302 or TM-248 | | | | | | | | | | | | |
| Engine | Cylinder head | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | EM-64 | | | | | | | | | | | | |
| | Cylinder head gasket | | | | | | | | | | | | | | | 4 | 3 | | | | | | | | | | |
| | Cylinder block | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Piston | | | | | | | | | | | | | | | | | | | | | | | | 4 | | |
| | Piston ring | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Connecting rod | 6 | | | | | | | | | | | | | 6 | 6 | 6 | 6 | | 6 | 6 | | | 6 | | EM-75 | |
| | Bearing | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Crankshaft | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Valve mechanism | Timing chain | | | | | | | | | | | | | | EM-52 | | | | | | | | | | | | |
| | Camshaft | | | | | | | | | | | | | | EM-41 | | | | | | | | | | | | |
| | Intake valve timing control | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | EM-52 | | | | | | | | | | | | | |
| | Intake valve | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Exhaust valve | | | | | | | | | | | | 3 | EM-52 | | | | | | | | | | | | | |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

| | | SYMPTOM | | | | | | | | | | | | Reference page | |
|---|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|----------------|--|
| | | 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) |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Exhaust | Exhaust manifold/Tube/Muffler/Gasket | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-30, EX-6 |
| | Three way catalyst | | | | | | | | | | | | | | |
| | HC adsorption catalyst | | | | | | | | | | | | | | |
| Lubrication | Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-32, LU-12, LU-11, LU-15 |
| | Oil level (Low)/Filthy oil | | | | | | | | | | | | | | LU-9 |
| Cooling | Radiator/Hose/Radiator filler cap | | | | | | | | | | | | | | CO-15 |
| | Thermostat | | | | | | | | | 5 | | | | | CO-20 |
| | Water pump | | | | | | | | | | | | | | CO-18 |
| | Water gallery | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | 4 | 5 | | | CO-7 |
| | Cooling fan | | | | | | | | | | | | | | CO-17 |
| | Coolant level (Low)/Contaminated coolant | | | | | | | | | 5 | | | | | CO-11 |
| NVIS (NISSAN Vehicle Immobilizer System — NATS) | | 1 | 1 | | | | | | | | | | | | SEC-18 |

1 - 6: The numbers refer to the order of inspection.

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NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[QR25DE FOR CALIFORNIA]

NORMAL OPERATING CONDITION

Description

INFOID:000000001344016

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 1,800 rpm under no load (for example, the selector lever position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-41](#), "[System Description](#)".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000001344017

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 SRC and SB section of this Service Manual.

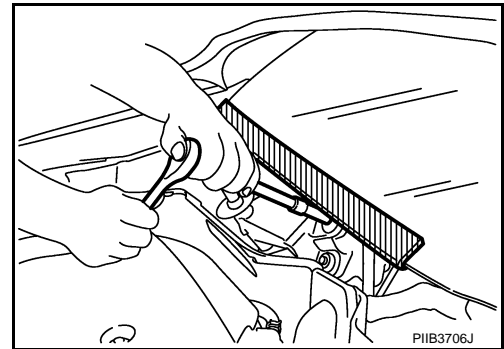
WARNING:

- 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 SRC 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.

Precaution for Procedure without Cowl Top Cover

INFOID:000000001344018

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:000000001344019

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.).

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PRECAUTIONS

< PRECAUTION >

[QR25DE FOR CALIFORNIA]

On Board Diagnostic (OBD) System of Engine and CVT

INFOID:000000001344020

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

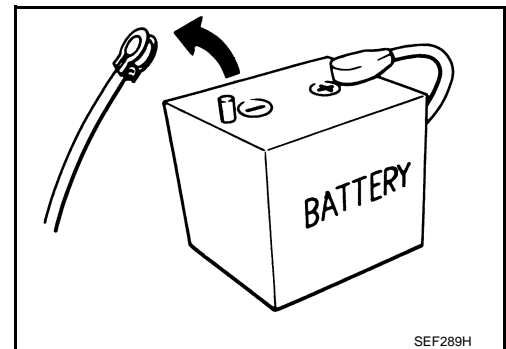
CAUTION:

- Be sure 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 light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up 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-locking type harness connector. For description and how to disconnect, refer to [PG-124, "Description"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

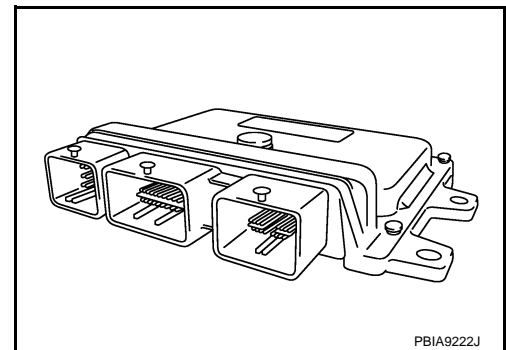
General Precautions

INFOID:000000001344021

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- 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.



- Do not 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. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not 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



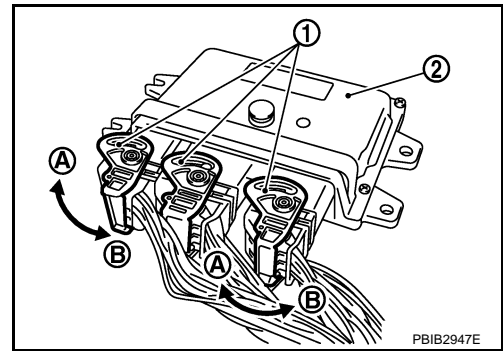
PRECAUTIONS

[QR25DE FOR CALIFORNIA]

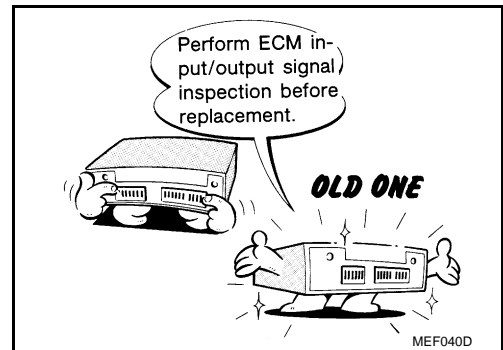
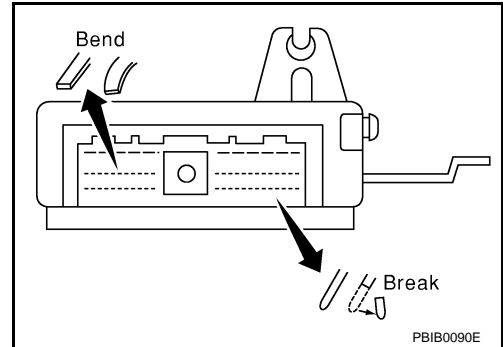
< PRECAUTION >

- When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.

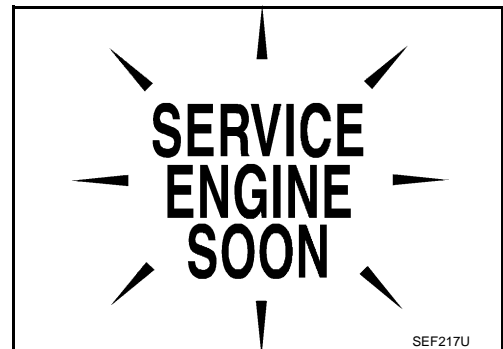
- 2. ECM
- A. Loosen



- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
Make sure 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 make sure ECM functions properly. Refer to [EC-474, "Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not 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.

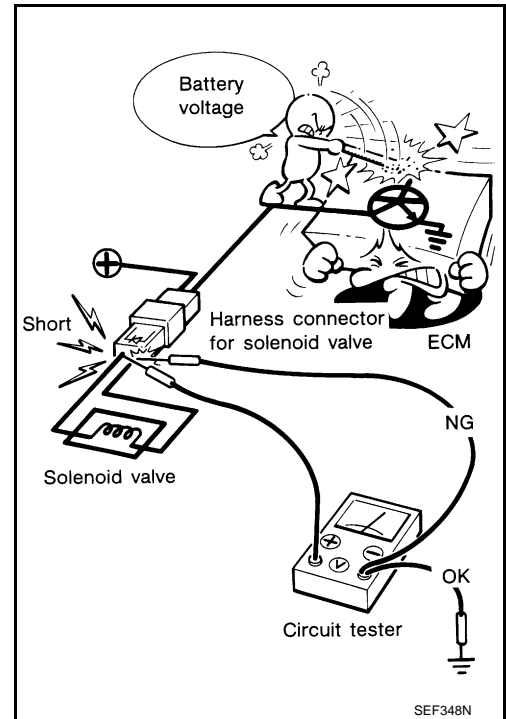


PRECAUTIONS

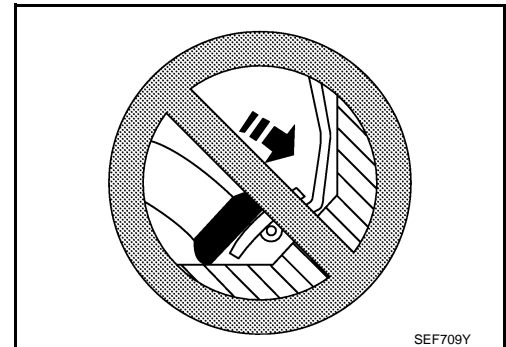
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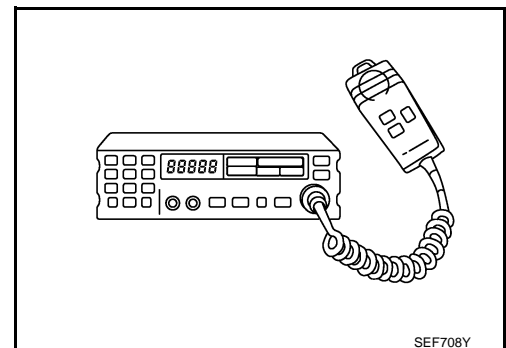
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.
- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



- 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. Do not 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.



PREPARATION

< PREPARATION >

[QR25DE FOR CALIFORNIA]

PREPARATION

PREPARATION

Special Service Tools

INFOID:000000001344022

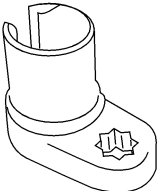
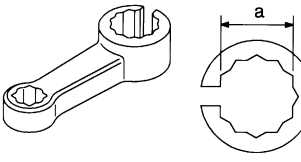
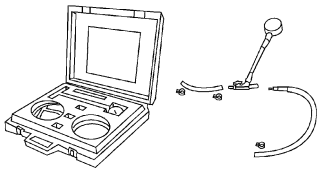
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EC

NOTE:

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

C

| Tool number (Kent-Moore No.) Tool name | Description |
|--|---|
| (J-44626) Air fuel ratio (A/F) sensor wrench  LEM054 | Loosening tightening air fuel ratio (A/F) sensor 1 |
| KV10114400 (J-38365) Heated oxygen sensor wrench  S-NT636 | Loosening or tightening heated oxygen sensor 2 a: 22 mm (0.87 in) |
| (J-44321) Fuel pressure gauge kit  LEC642 | Checking fuel pressure |

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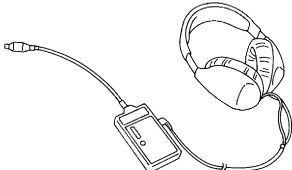
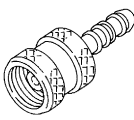
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Commercial Service Tools

INFOID:000000001344023

L

| Tool name (Kent-Moore No.) | Description |
|---|--|
| Leak detector i.e.: (J-41416)  S-NT703 | Locating the EVAP leak |
| EVAP service port adapter i.e.: (J-41413-OBID)  S-NT704 | Applying positive pressure through EVAP service port |

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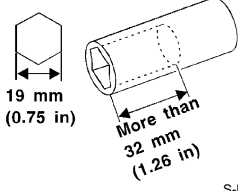
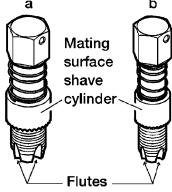

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PREPARATION

< PREPARATION >

[QR25DE FOR CALIFORNIA]

| Tool name (Kent-Moore No.) | Description |
|---|--|
| Fuel filler cap adapter i.e.: (MLR-8382) <div style="text-align: center;">  <p>S-NT815</p> </div> | Checking fuel tank vacuum relief valve opening pressure |
| Socket wrench <div style="text-align: center;">  <p>S-NT705</p> </div> | Removing and installing engine coolant temperature sensor |
| Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;">  <p>AEM488</p> </div> | Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor |
| Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) <div style="text-align: center;">  <p>S-NT779</p> </div> | Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads. |

ON-VEHICLE MAINTENANCE

FUEL PRESSURE

Inspection

INFOID:000000001344024

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FUEL PRESSURE RELEASE

④ 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 two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

⊗ With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three 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 L32 models do not have fuel return system.
- Use Fuel Pressure Gauge Kit (J-44321) to check fuel pressure.

1. Release fuel pressure to zero.
2. Connect fuel tube (B) adapter to quick connector.

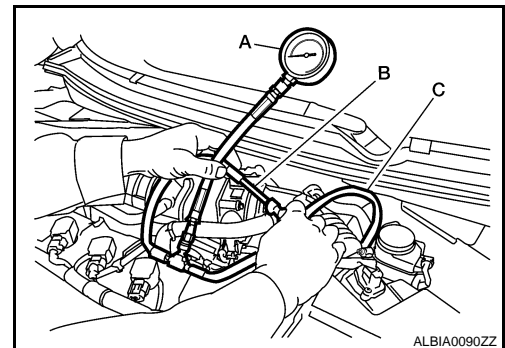
A : Fuel pressure gauge

C : Fuel feed hose

3. Turn ignition switch ON and check for fuel leakage.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idling : Approximately 350 kPa (3.57 kg/cm², 51 psi)

6. If result is unsatisfactory, check fuel hoses and fuel tubes for clogging.
If OK, Replace "fuel filter and fuel pump assembly".
If NG, Repair or replace.



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EVAP LEAK CHECK

< ON-VEHICLE MAINTENANCE >

[QR25DE FOR CALIFORNIA]

EVAP LEAK CHECK

Inspection

INFOID:000000001344025

CAUTION:

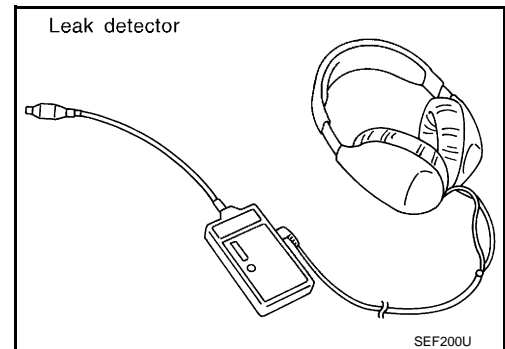
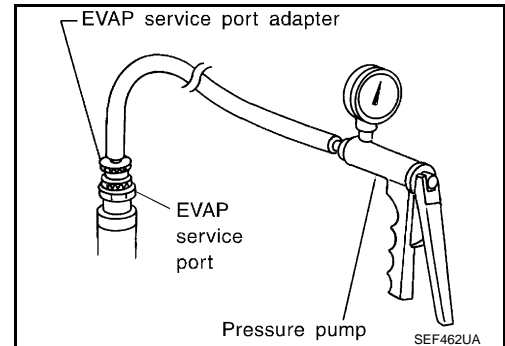
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

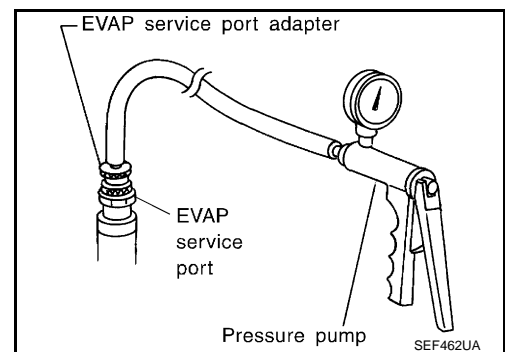
Ⓟ WITH CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port.
2. Turn ignition switch ON.
3. 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.
6. Remove EVAP service port adapter and hose with pressure pump.
7. Locate the leak using a leak detector. Refer to [EC-86, "System Diagram"](#).



ⓧ WITHOUT CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter 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.
3. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
4. Remove EVAP service port adapter and hose with pressure pump.

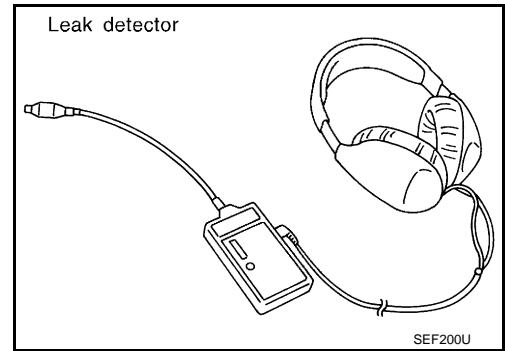


EVAP LEAK CHECK

[QR25DE FOR CALIFORNIA]

< ON-VEHICLE MAINTENANCE >

5. Locate the leak using a leak detector. Refer to [EC-86. "System Diagram"](#).



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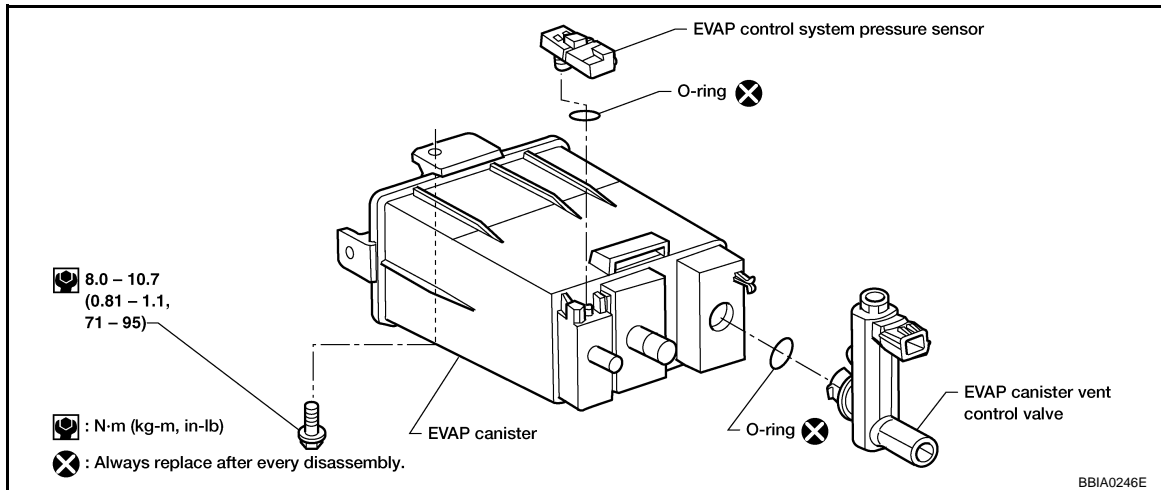
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ON-VEHICLE REPAIR

EVAP CANISTER

Exploded View

INFOID:000000001344026



Removal and Installation

INFOID:000000001344027

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:

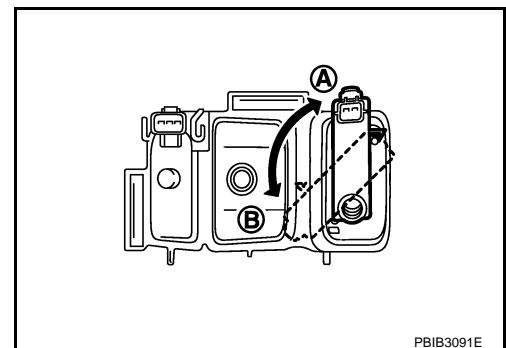
Tighten EVAP canister fixing bolt to the specified torque.

DISASSEMBLY

1. Turn EVAP canister vent control valve counterclockwise.

- A : Lock
- B : Unlock

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.

EVAP CANISTER

< ON-VEHICLE REPAIR >

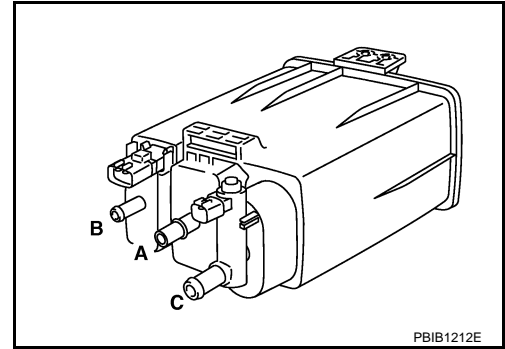
[QR25DE FOR CALIFORNIA]

Inspection

INFOID:000000001344028

Check EVAP canister as follows:

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.



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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE FOR CALIFORNIA]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:000000001686160

| Transmission | Condition | Specification |
|--------------|--------------------------------|---------------|
| CVT | No load* (in P or N position) | 650 ± 50 rpm |
| M/T | No load* (in Neutral position) | 650 ± 50 rpm |

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:000000001686161

| Transmission | Condition | Specification |
|--------------|--------------------------------|---------------|
| CVT | No load* (in P or N position) | 15 ± 5° BTDC |
| M/T | No load* (in Neutral position) | 15 ± 5° BTDC |

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:000000001686162

| Condition | Specification (Using CONSULT-III or GST) |
|--------------|--|
| At idle | 10 – 35 % |
| At 2,500 rpm | 10 – 35 % |

Mass Air Flow Sensor

INFOID:000000001686163

| | |
|--|--|
| Supply voltage | Battery voltage (11 – 14 V) |
| Output voltage at idle | 0.8 – 1.2V* |
| Mass air flow (Using CONSULT-III or GST) | 1.0 – 4.0 g-m/sec at idle* 4.0 – 10.0 g-m/sec at 2,500 rpm* |

*: Engine is warmed up to normal operating temperature and running under no load.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[QR25DE EXCEPT FOR CALIFORNIA]

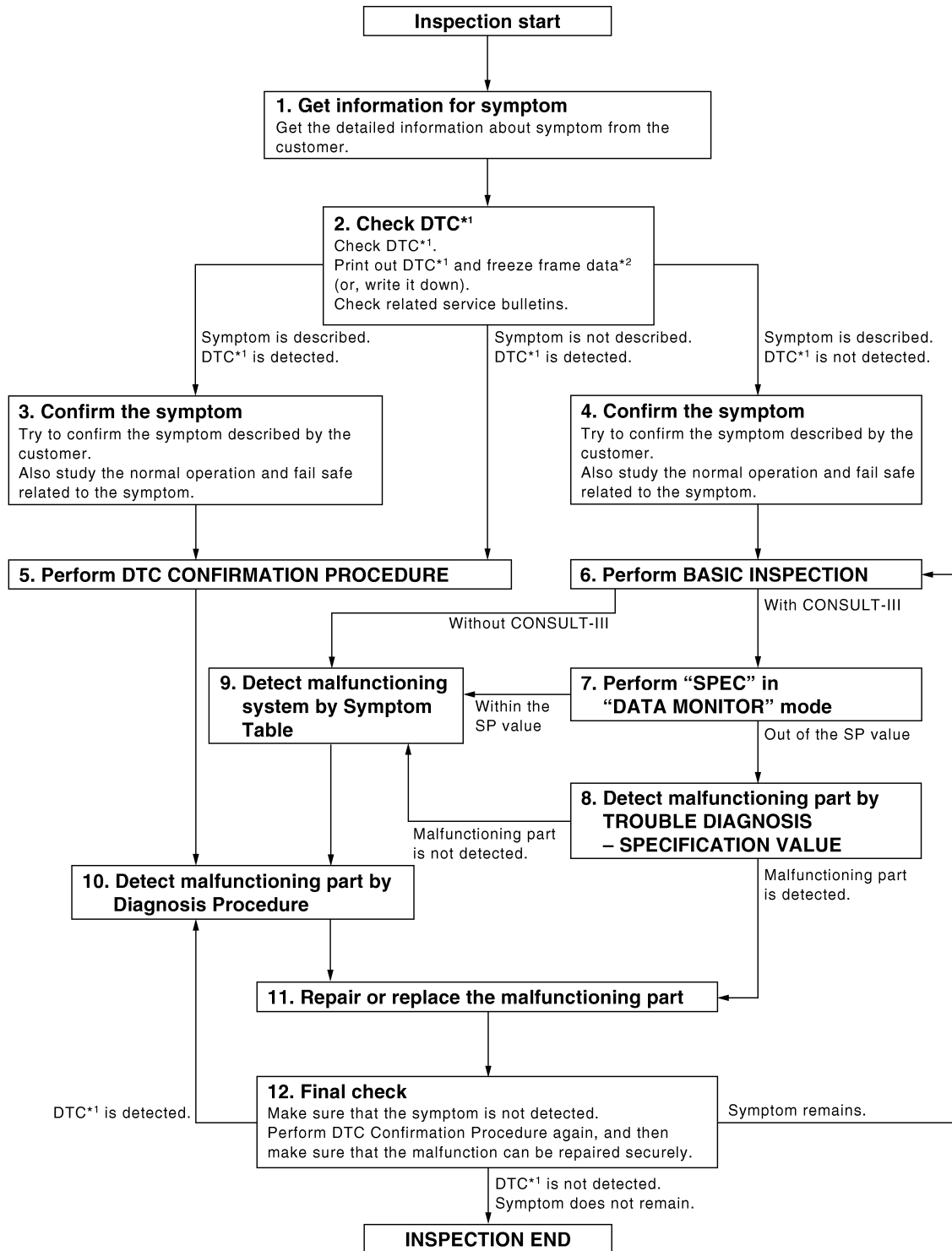
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001344029

OVERALL SEQUENCE



*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

JMBIA0078GB

DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[QR25DE EXCEPT FOR CALIFORNIA]

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 [EC-541, "Diagnostic Work Sheet"](#).)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-626, "Diagnosis Description"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-995, "Symptom Table"](#).)
3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.

Symptom is described, DTC is not detected>>GO TO 4.

Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON).

Also study the normal operation and fail safe related to the symptom. Refer to [EC-999, "Description"](#) and [EC-984, "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-999, "Description"](#) and [EC-984, "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 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-986, "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [GI-42, "Intermittent Incident"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-543, "BASIC INSPECTION : Special Repair Requirement"](#).

Do you have CONSULT-III?

DIAGNOSIS AND REPAIR WORKFLOW

[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

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

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL" and "A/F ALPHA-B1" are within the SP value using CONSULT-III in "SPEC" of "DATA MONITOR" mode. Refer to [EC-649, "Component Function Check"](#).

Is the measurement value within the SP value?

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

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-650, "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 [EC-995, "Symptom Table"](#) 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 DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

NOTE:

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection in [GI-45, "Circuit Inspection"](#).

Is malfunctioning part detected?

- YES >> GO TO 11.
- NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using CONSULT-III. Refer to [EC-951, "Reference Value"](#).

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [EC-626, "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 make sure that the malfunction have been repaired securely.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure 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, make sure to erase unnecessary DTC in ECM and TCM (Transmission Control Module). (Refer to [EC-626, "Diagnosis Description"](#).) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in [EC-991, "How to Set SRT Code"](#).

Diagnostic Work Sheet

INFOID:000000001344030

DESCRIPTION

INSPECTION AND ADJUSTMENT

BASIC INSPECTION

BASIC INSPECTION : Special Repair Requirement

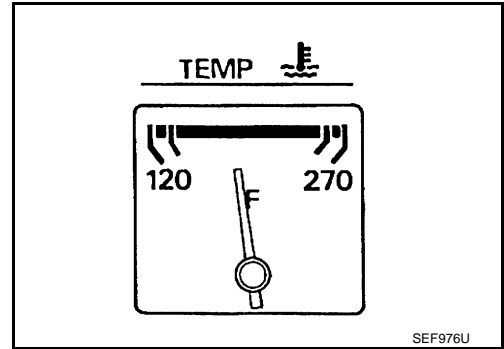
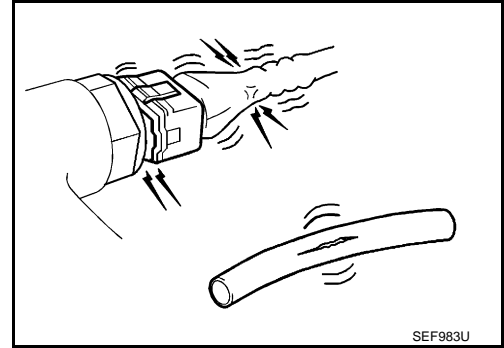
INFOID:000000001344031

A

EC

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 leaks
 - Air cleaner clogging
 - Gasket
3. Confirm that electrical or mechanical loads are not applied.
 - Headlamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
Ensure engine stays below 1,000 rpm.

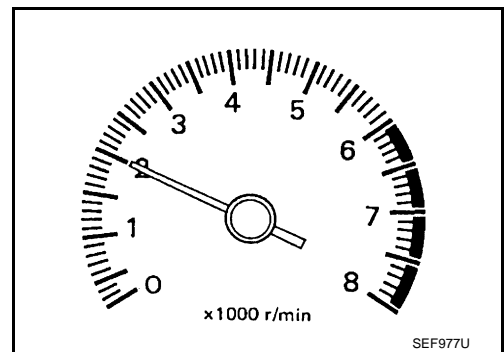


5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

Is any DTC 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 about 2,000 rpm for about 2 minutes under no load.

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INSPECTION AND ADJUSTMENT

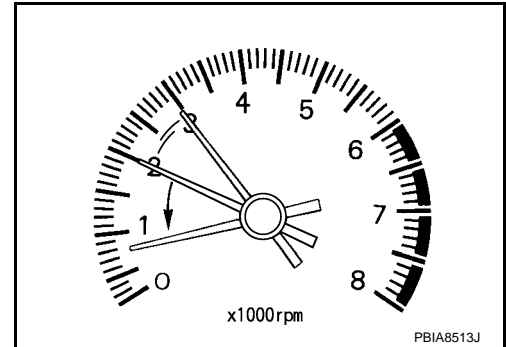
[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed.
For procedure, refer to [EC-547, "IDLE SPEED : Special Repair Requirement"](#). For specification, refer to [EC-1011, "Idle Speed"](#).

Is the inspection result normal?

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



4.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

5.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 6.

6.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7.CHECK TARGET IDLE SPEED AGAIN

- Start engine and warm it up to normal operating temperature.
- Check idle speed.
For procedure, refer to [EC-547, "IDLE SPEED : Special Repair Requirement"](#). For specification, refer to [EC-1011, "Idle Speed"](#).

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART

Check the Following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-764, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-760, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Repair or replace. Then GO TO 4.

9.CHECK ECM FUNCTION

- Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 4.

10.CHECK IGNITION TIMING

- Run engine at idle.

INSPECTION AND ADJUSTMENT

[QR25DE EXCEPT FOR CALIFORNIA]

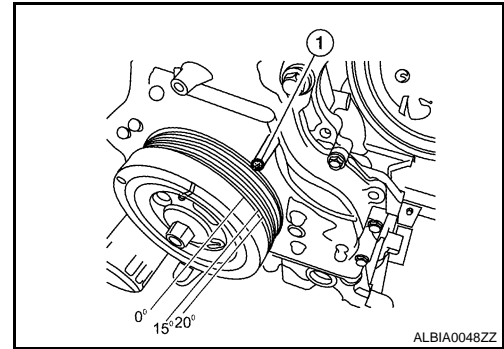
< BASIC INSPECTION >

2. Check ignition timing with a timing light.
For procedure, refer to [EC-547, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-1011, "Ignition Timing"](#).

1 : Timing indicator

Is the inspection result normal?

- YES >> GO TO 19.
NO >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-549, "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 TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to [EC-547, "IDLE SPEED : Special Repair Requirement"](#). For specification, refer to [EC-1011, "Idle Speed"](#).

Is the inspection result normal?

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

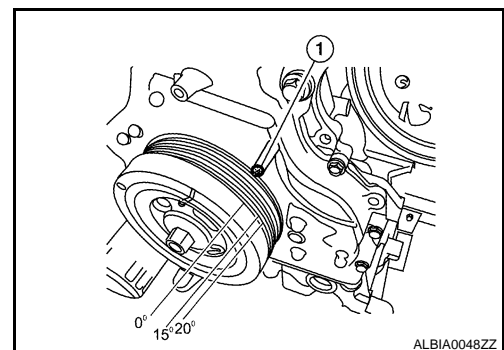
15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to [EC-547, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-1011, "Ignition Timing"](#).

1 : Timing indicator

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-52, "Removal and Installation"](#).

Is the inspection result normal?

- YES >> GO TO 17.
NO >> Repair the timing chain installation. Then GO TO 4.

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INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE EXCEPT FOR CALIFORNIA]

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-764, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-760, "DTC Logic"](#).

Is the inspection result normal?

YES >> GO TO 18.

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

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 4.

19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to [EC-27, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000001344032

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:000000001344033

1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Refer to [EC-548, "VIN REGISTRATION : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 4.

4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

5. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

INSPECTION AND ADJUSTMENT

[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

IDLE SPEED

IDLE SPEED : Description

INFOID:000000001344034

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

IDLE SPEED : Special Repair Requirement

INFOID:000000001344035

1. CHECK IDLE SPEED

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

INFOID:000000001344036

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

IGNITION TIMING : Special Repair Requirement

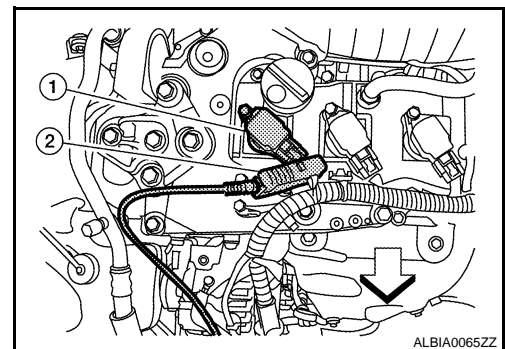
INFOID:000000001344037

1. CHECK IGNITION TIMING

1. Attach timing light to No. 1 igniton coil (1) wire as shown.

2 : Timing light

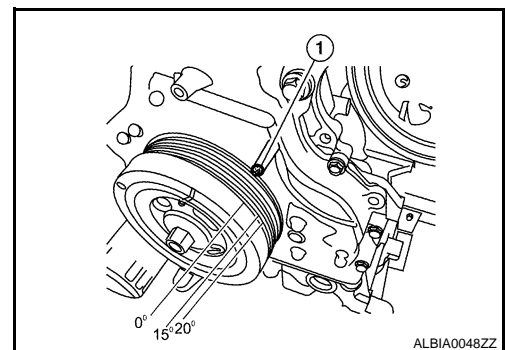
 : Vehicle front



2. Check ignition timing.

1 : Timing indicator

>> INSPECTION END



VIN REGISTRATION

VIN REGISTRATION : Description

INFOID:000000001344038

VIN Registration is an operation to registering 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).

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE EXCEPT FOR CALIFORNIA]

VIN REGISTRATION : Special Repair Requirement

INFOID:000000001344039

1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-22, "Identification Number - Sedan"](#) or [GI-23, "Identification Number - Coupe"](#).

>> GO TO 2.

2.PERFORM VIN REGISTRATION

ⓑ With CONSULT-III

1. Turn ignition switch ON and engine stopped.
2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
3. Follow the instruction of CONSULT-III display.

>> END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOID:000000001344040

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 harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

INFOID:000000001344041

1.START

1. Make sure 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 INFOID:000000001344042

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 harness connector of electric throttle control actuator or ECM is disconnected.

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:000000001344043

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

INFOID:000000001344044

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps each engine idle speed within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:000000001344045

1. PRECONDITIONING

Make sure that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - CVT models
- With CONSULT-III: Drive vehicle until "ATF TENP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT-III?

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

2. IDLE AIR VOLUME LEARNING

 With CONSULT-III

1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-548, "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. 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.

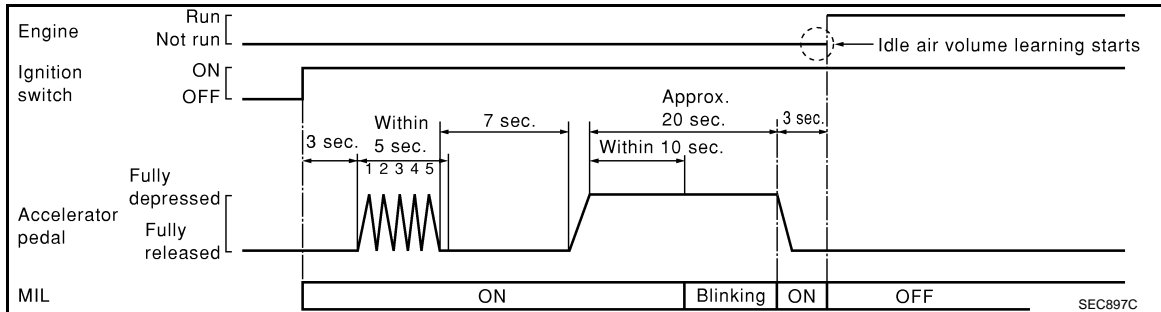
1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
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 five times within 5 seconds.

INSPECTION AND ADJUSTMENT

[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
- 8. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



>> GO TO 4.

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

| ITEM | SPECIFICATION |
|-----------------|---|
| Idle speed | CVT: 650 ± 50 rpm (in P or N position) M/T: 650 ± 50 rpm (in Neutral position) |
| Ignition timing | CVT: 15 ± 5° (in P or N position) M/T: 15 ± 5° (in Neutral position) |

Is the inspection result normal?

YES >> INSPECTION END

5. DETECT MALFUNCTIONING PART

Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to [EC-649, "Description"](#).

If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:

- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000001344046

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in "Diagnosis Procedure".

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[QR25DE EXCEPT FOR CALIFORNIA]

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000001344047

A

1.START

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching "CLEAR".

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
7. Select Service \$04 with GST to erase the DTC P0102.

>> END

FUEL PRESSURE RELEASE

FUEL PRESSURE RELEASE : Description

INFOID:000000001344048

The fuel pressure must be released before removing any components of the fuel system. This describes how to release the fuel pressure.

FUEL PRESSURE RELEASE : Special Repair Requirement

INFOID:000000001344049

1.RELEASE FUEL PRESSURE

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 two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

Without CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

>> INSPECTION END

FUEL PRESSURE CHECK

FUEL PRESSURE CHECK : Description

INFOID:000000001344050

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 L32 models do not have fuel return system.
- Use Fuel Pressure Gauge Kit (J-44321) to check fuel pressure.

FUEL PRESSURE CHECK : Special Repair Requirement

INFOID:000000001344051

1.CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-551, "FUEL PRESSURE RELEASE : Special Repair Requirement"](#).

INSPECTION AND ADJUSTMENT

[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

2. Connect fuel tube (B) adapter to quick connector.

A : Fuel pressure gauge

C : Fuel feed hose

3. Turn ignition switch ON and check for fuel leakage.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idling : Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.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.

EVAP LEAK CHECK

EVAP LEAK CHECK : Description

INFOID:000000001344052

CAUTION:

- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

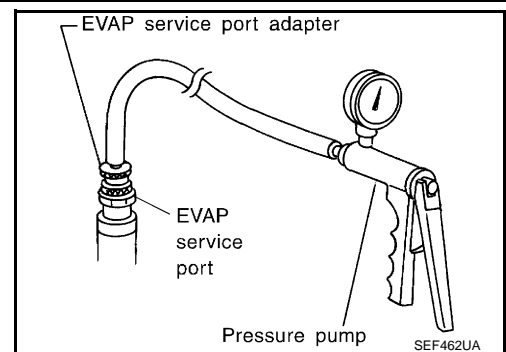
EVAP LEAK CHECK : Special Repair Requirement

INFOID:000000001344053

1.START

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port.

>> GO TO 2.



2.CHECK FOR EVAP LEAK

ⓑ With CONSULT-III

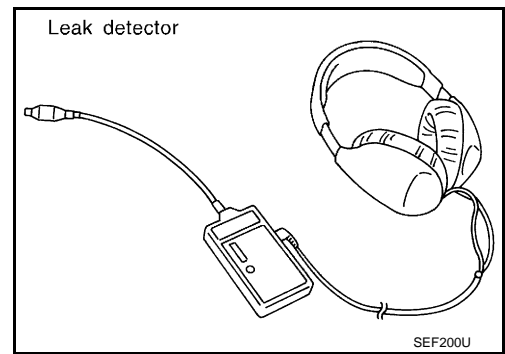
1. Turn ignition switch ON.
2. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
4. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
5. Remove EVAP service port adapter and hose with pressure pump.

INSPECTION AND ADJUSTMENT

[QR25DE EXCEPT FOR CALIFORNIA]

< BASIC INSPECTION >

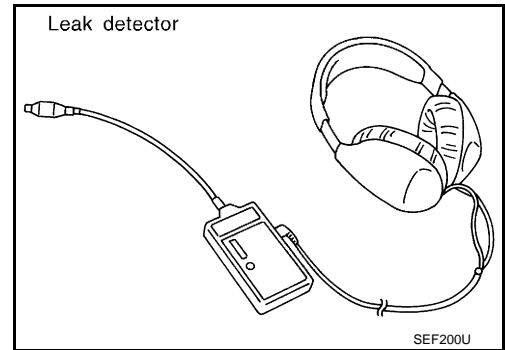
6. Locate the leak using a leak detector. Refer to [EC-555](#).
["Component Parts Location"](#).



⊗ Without CONSULT-III

1. Apply battery voltage between the terminals of EVAP canister vent control valve to make a closed EVAP system.
2. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
3. Remove EVAP service port adapter and hose with pressure pump.
4. Locate the leak using a leak detector. Refer to [EC-555](#).
["Component Parts Location"](#).

>> END



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ENGINE CONTROL SYSTEM

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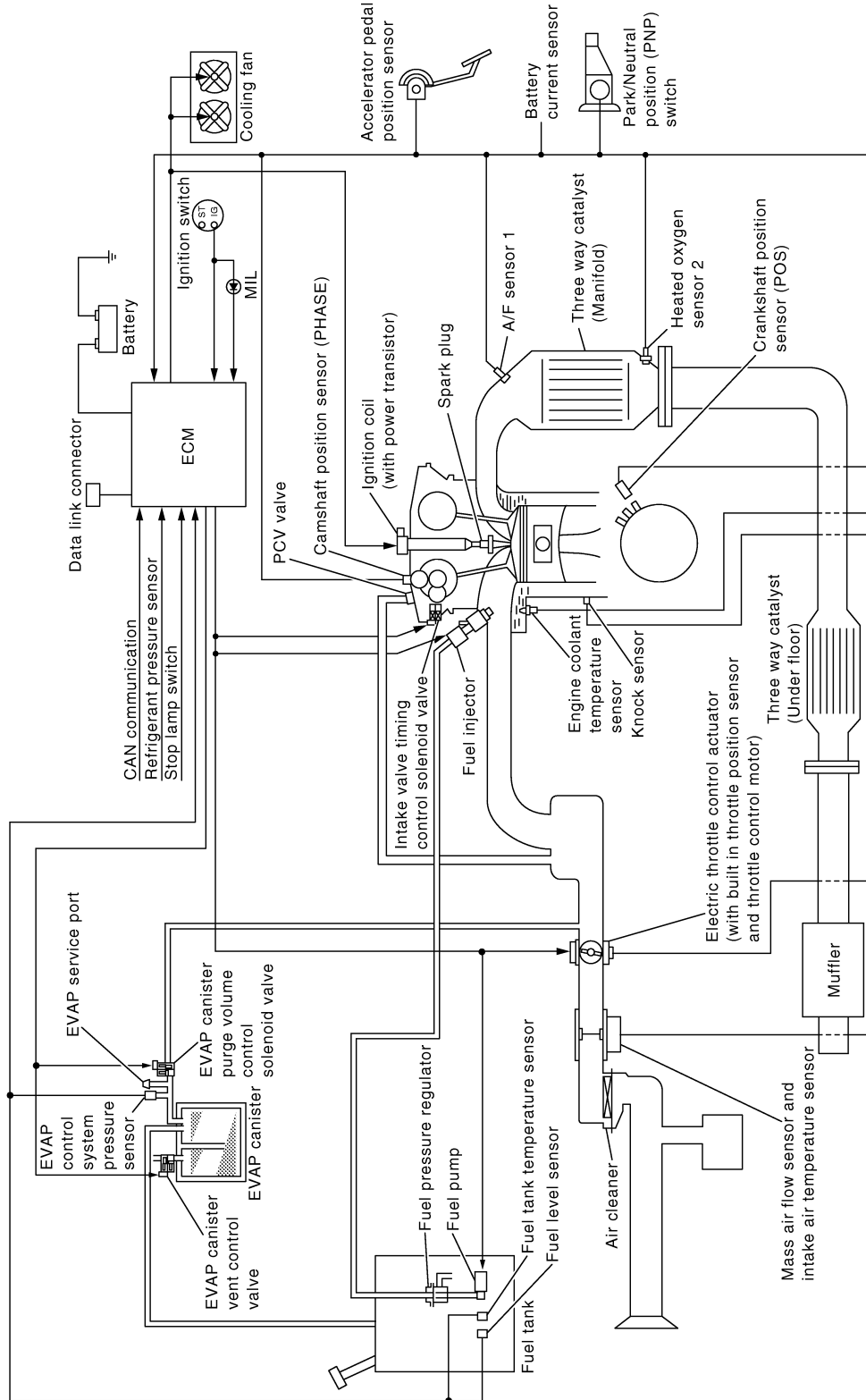
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FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

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ENGINE CONTROL SYSTEM

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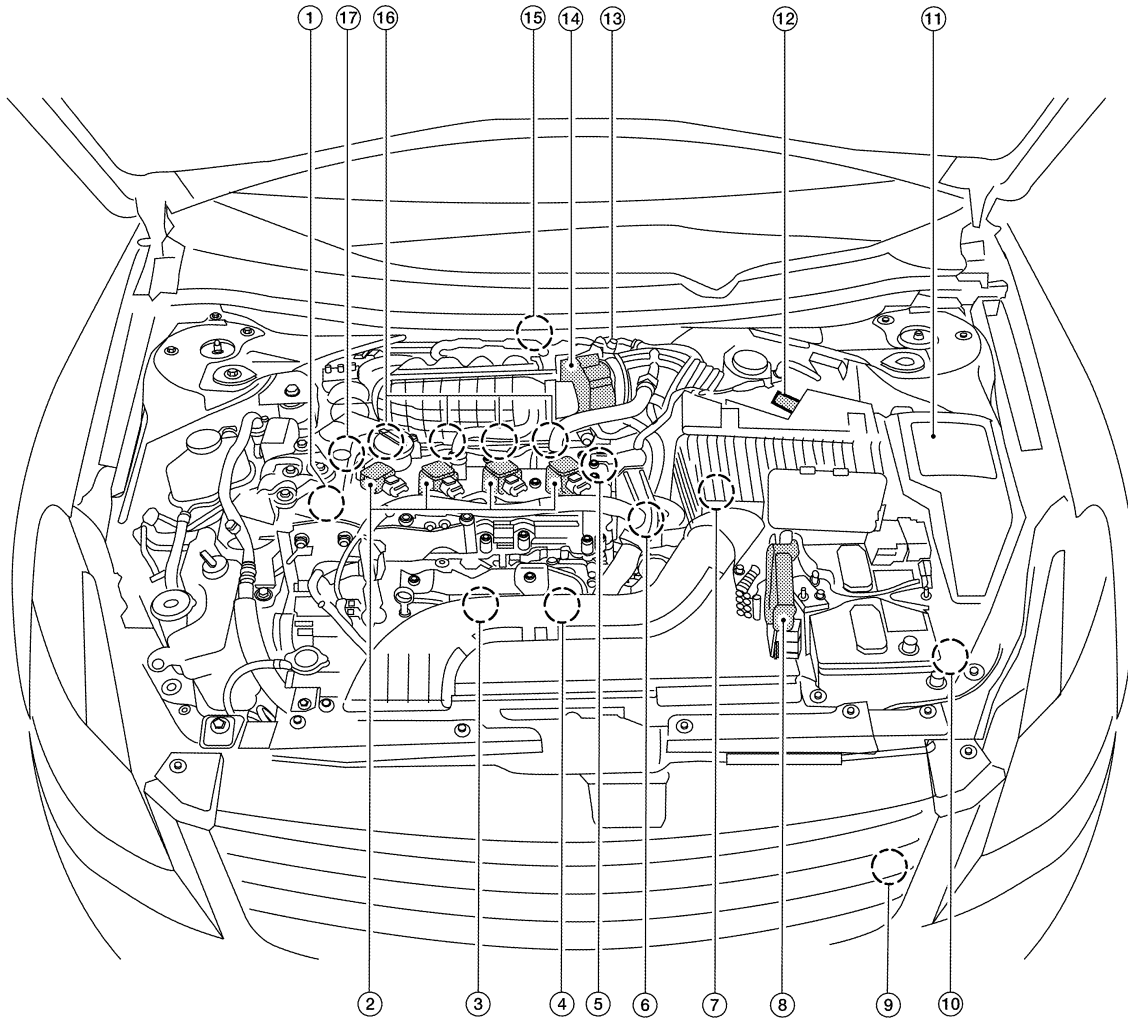
System Description

INFOID:000000001344055

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

Component Parts Location

INFOID:000000001344056



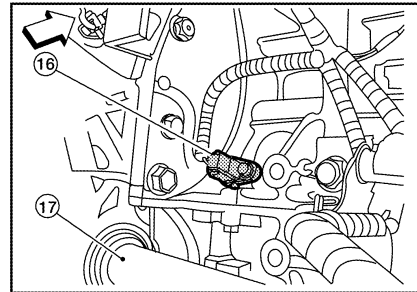
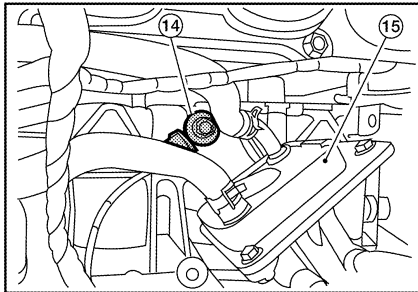
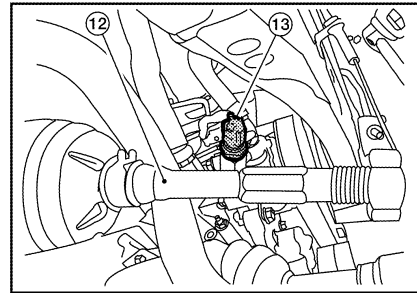
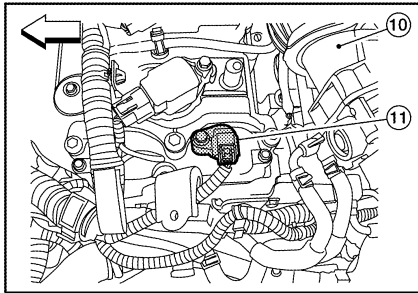
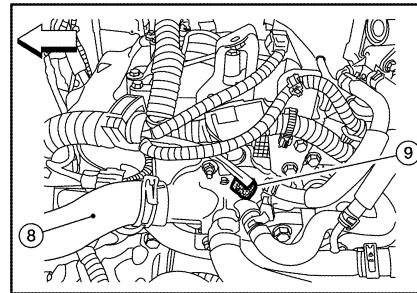
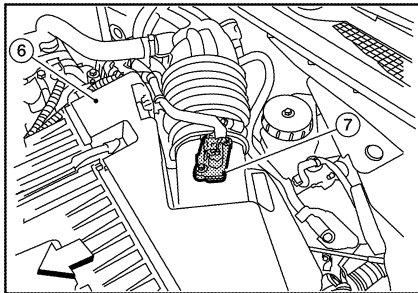
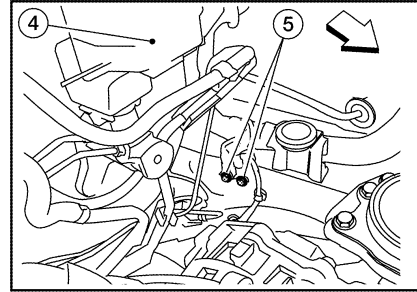
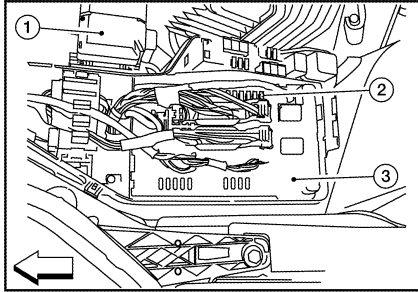
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

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ENGINE CONTROL SYSTEM

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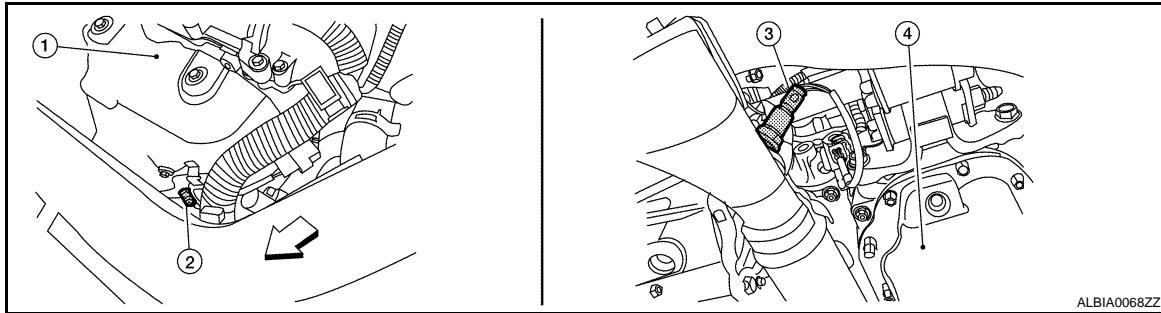
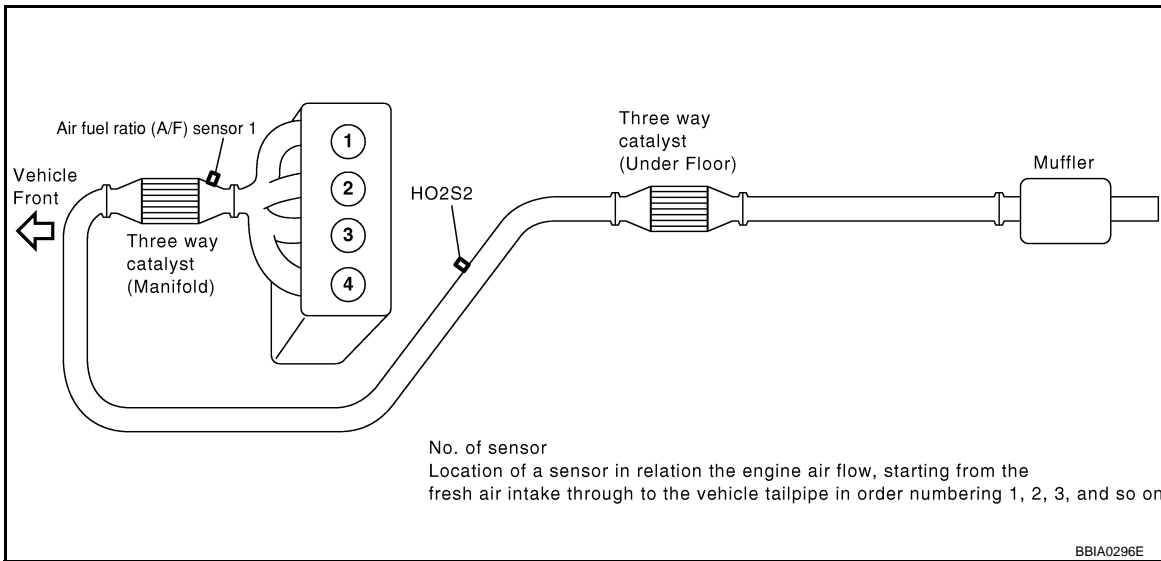
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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙ Vehicle front

ENGINE CONTROL SYSTEM

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1. Exhaust manifold cover

2. Air fuel ratio (A/F) sensor 1

3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)

4. Engine oil pan

⇐: Vehicle front

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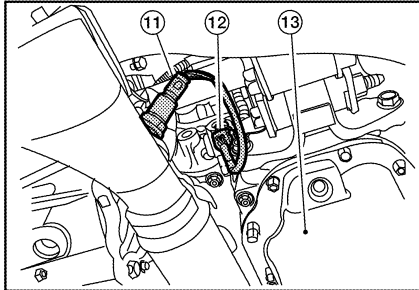
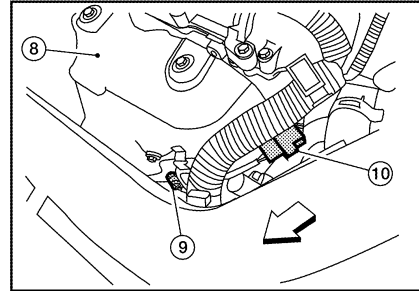
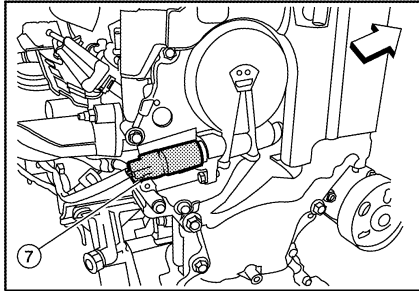
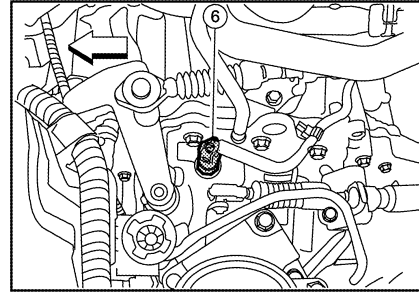
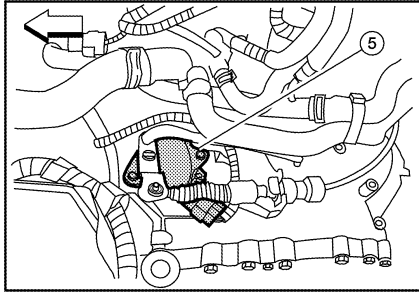
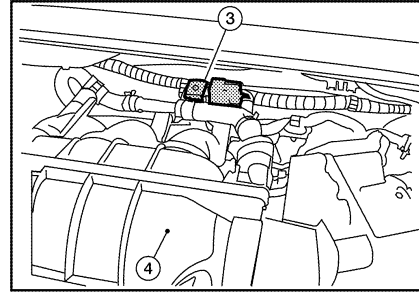
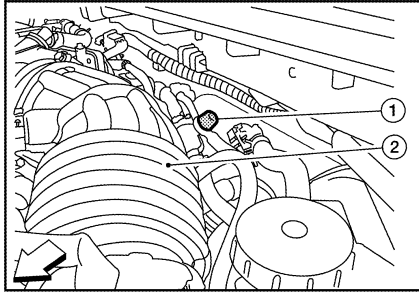
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ENGINE CONTROL SYSTEM

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |

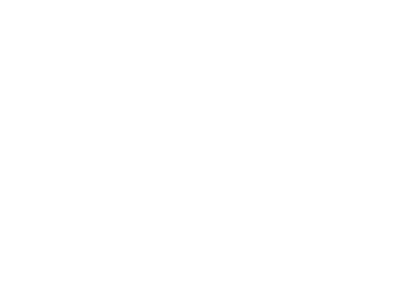
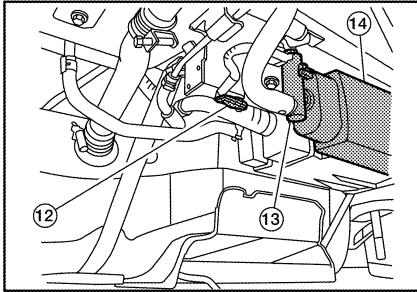
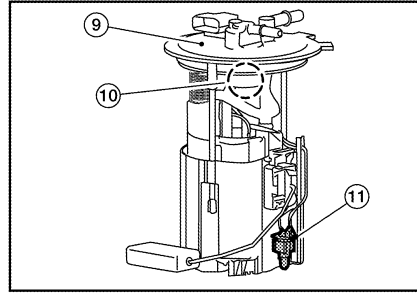
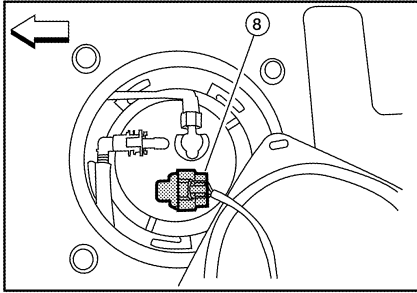
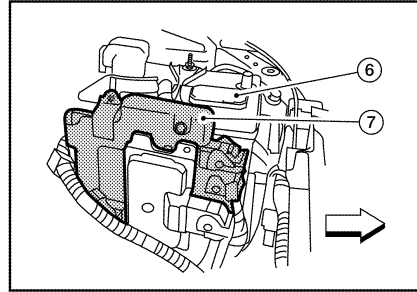
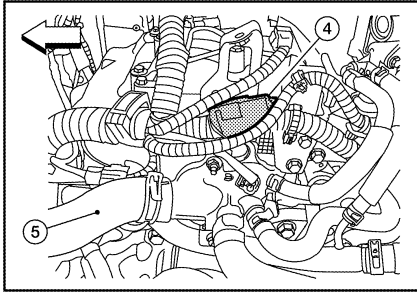
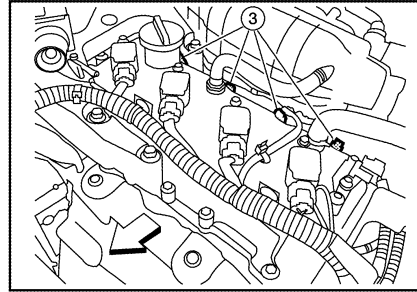
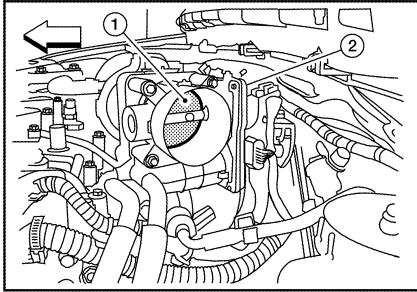
13. Engine oil pan

↶: Vehicle front

ENGINE CONTROL SYSTEM

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1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

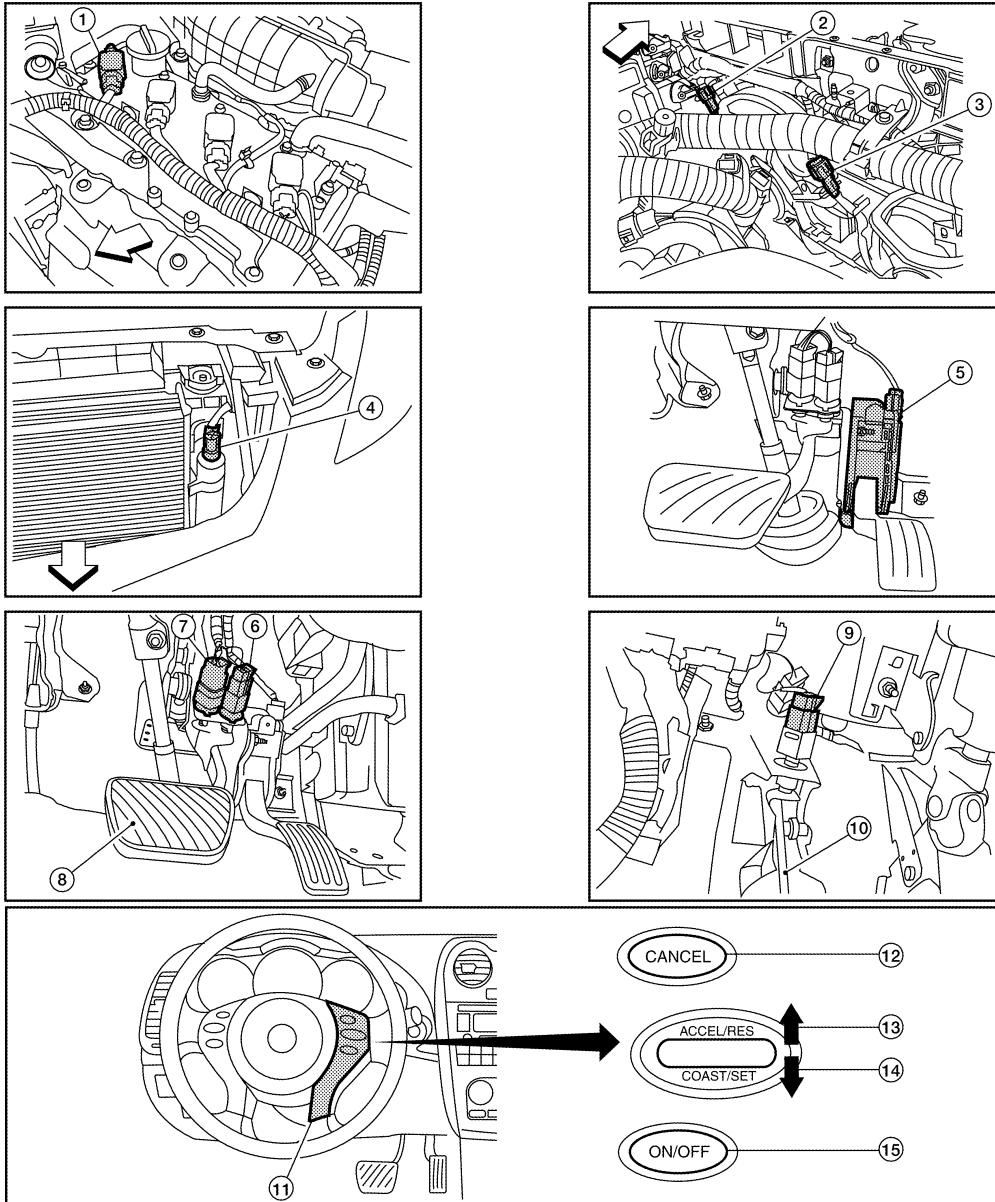
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ENGINE CONTROL SYSTEM

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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344057

| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-702. "Description" |
| A/F sensor 1 heater | EC-667. "Description" |
| Accelerator pedal position sensor | EC-899. "Description" |
| ASCD brake switch | EC-875. "Description" |

ENGINE CONTROL SYSTEM

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| Component | Reference |
|---|--|
| ASCD steering switch | EC-872, "Description" |
| ASCD vehicle speed sensor | EC-882, "Description" |
| Battery current sensor | EC-860, "Description" |
| Camshaft position sensor (PHASE) | EC-764, "Description" |
| Crankshaft position sensor (POS) | EC-760, "Description" |
| Cooling fan motor | EC-598, "System Description" |
| Electric throttle control actuator | EC-897, "Description" |
| Engine coolant temperature sensor | EC-689, "Description" |
| EVAP canister purge volume control solenoid valve | EC-784, "Description" |
| EVAP canister vent control valve | EC-791, "Description" |
| EVAP control system pressure sensor | EC-799, "Description" |
| Fuel injector | EC-930, "Description" |
| Fuel level sensor | EC-825, "Description" |
| Fuel pump | EC-933, "Description" |
| Fuel tank temperature sensor | EC-744, "Description" |
| Heated oxygen sensor 2 | EC-717, "Description" |
| Heated oxygen sensor 2 heater | EC-670, "Description" |
| Ignition signal | EC-937, "Description" |
| Intake air temperature sensor | EC-686, "Description" |
| Intake valve timing control solenoid valve | EC-618, "System Description" |
| Knock sensor | EC-758, "Description" |
| Mass air flow sensor | EC-675, "Description" |
| Park/neutral position switch | EC-846, "Description" |
| PCV valve | EC-948, "Description" |
| Power steering pressure sensor | EC-837, "Description" |
| Refrigerant pressure sensor | EC-949, "Description" |
| Stop lamp switch | EC-886, "Description" |
| Throttle control motor | EC-895, "Description" |
| Throttle control motor relay | EC-889, "Description" |
| Throttle position sensor | EC-692, "Description" |
| Vehicle speed sensor | EC-831, "Description" |

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MULTIPOINT FUEL INJECTION SYSTEM

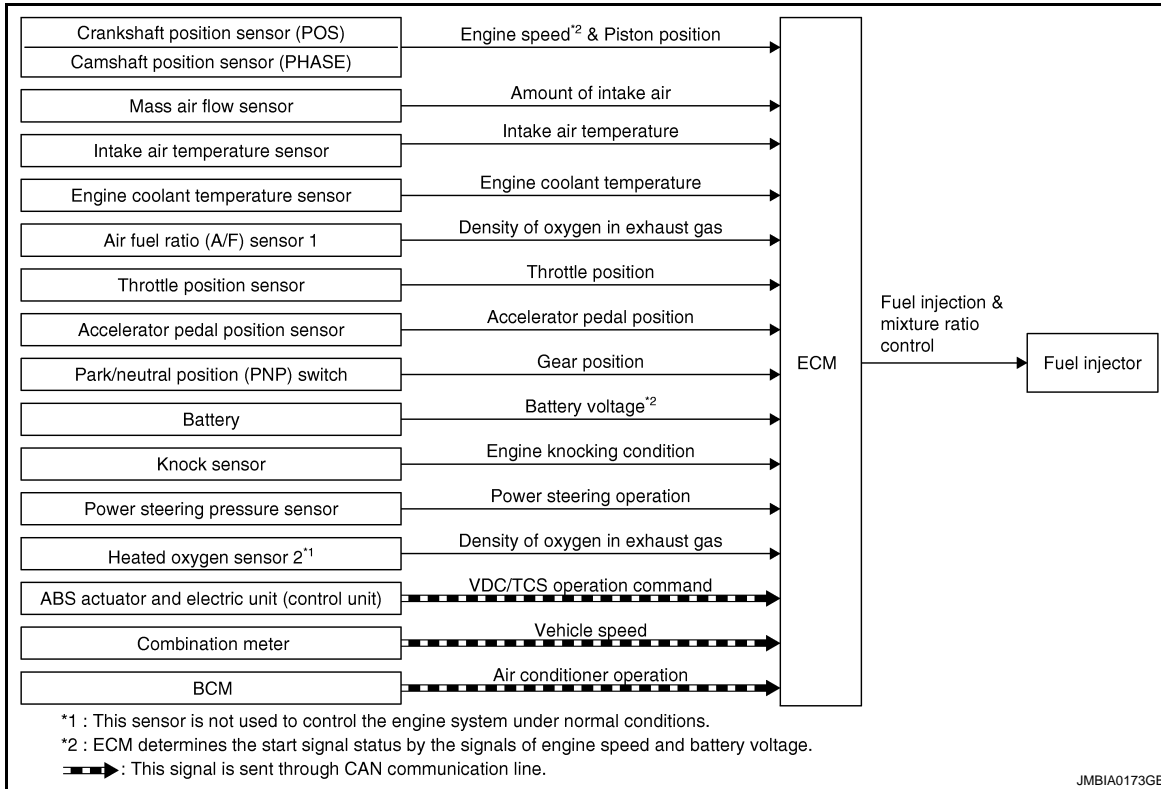
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MULTIPOINT FUEL INJECTION SYSTEM

System Diagram

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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 | Fuel injection & mixture ratio control | Fuel injector |
| Camshaft position sensor (PHASE) | Piston position | | |
| 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 | | |
| Park/neutral position (PNP) switch | Gear position | | |
| 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)*2 | ABS operation command | | |
| Air conditioner switch*2 | Air conditioner operation | | |
| Wheel sensor*2 | Vehicle speed | | |

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

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

MULTIPOINT FUEL INJECTION SYSTEM

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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.

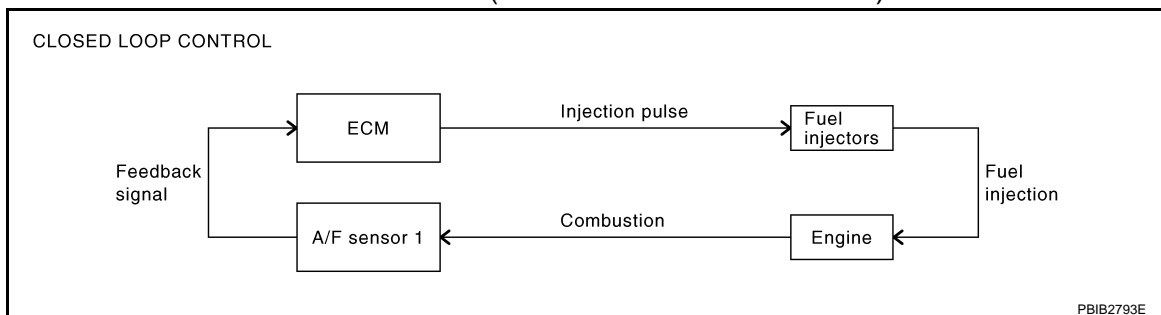
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- 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 driveability and emission control. The three way catalyst (manifold) can then 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 [EC-702, "DTC Logic"](#). 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 control 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 (CVT models)
- 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

MULTIPOINT FUEL INJECTION SYSTEM

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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.

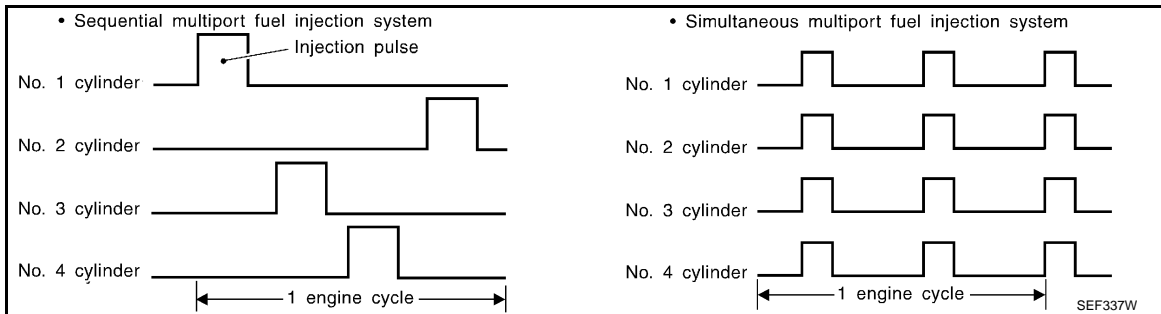
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multipoint Fuel Injection System
Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.
- Simultaneous Multipoint Fuel Injection System
Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The four injectors will then receive the signals two 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.

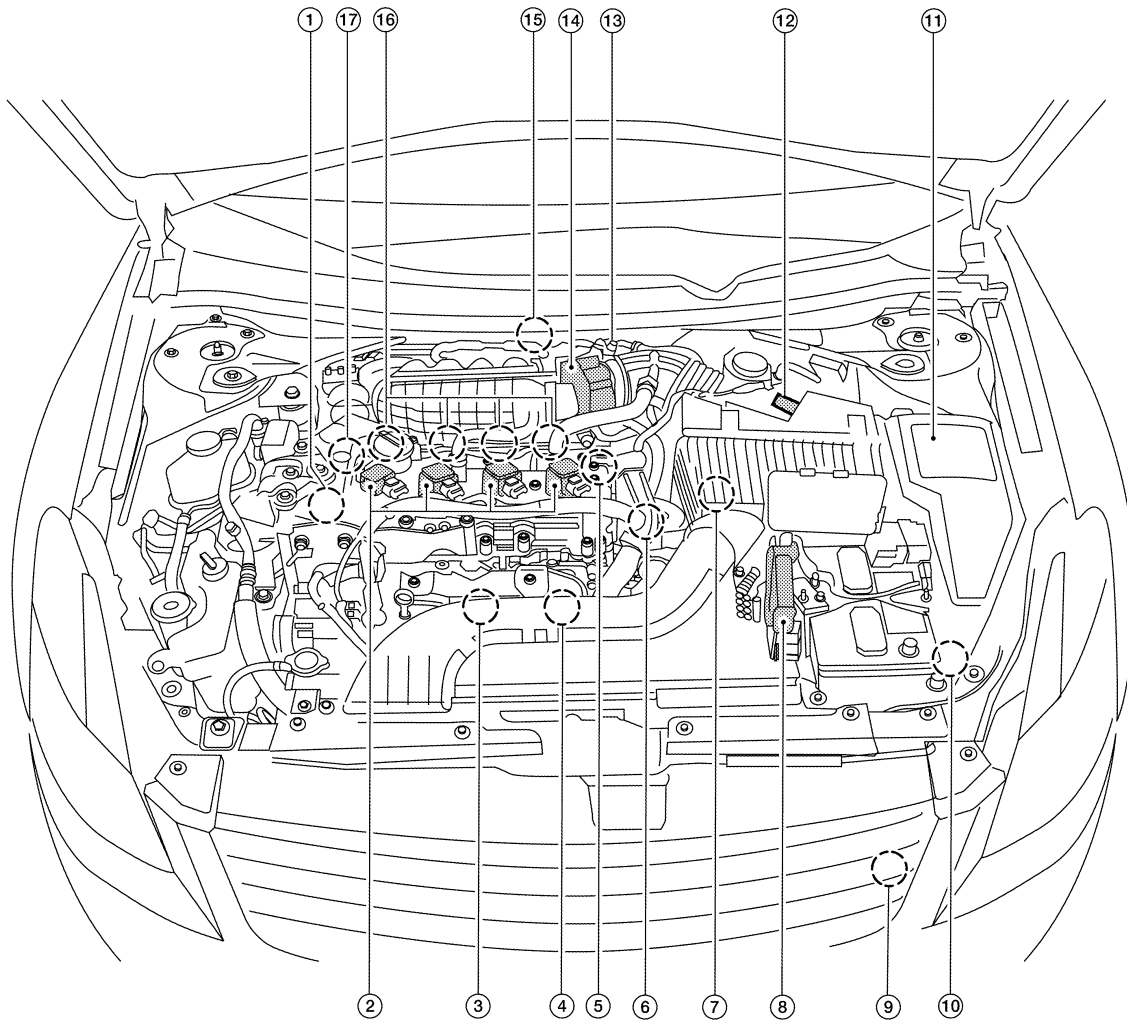
MULTIPOINT FUEL INJECTION SYSTEM

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Component Parts Location

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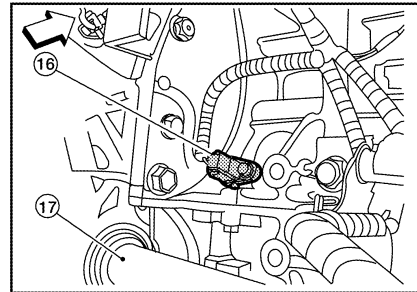
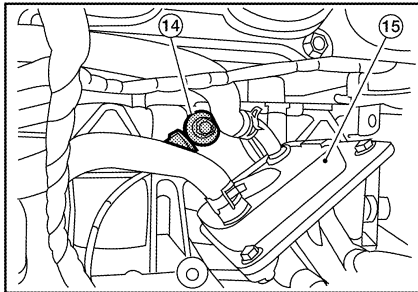
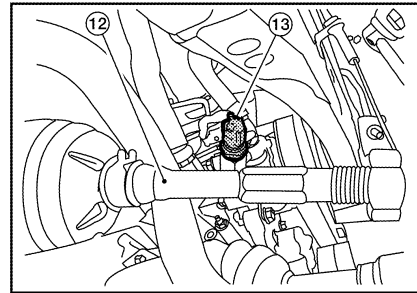
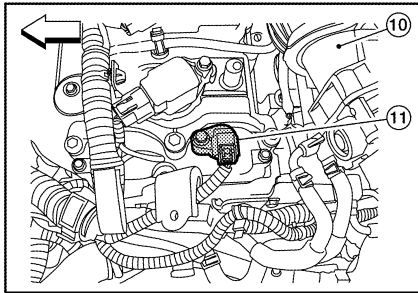
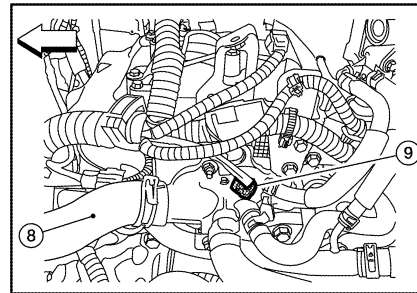
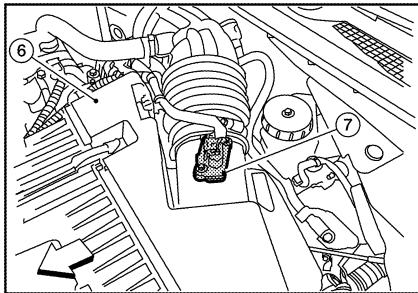
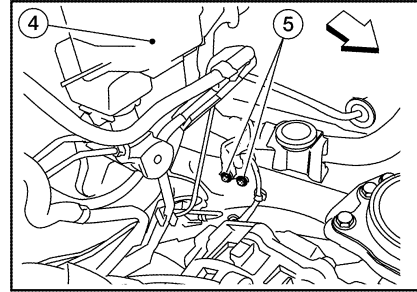
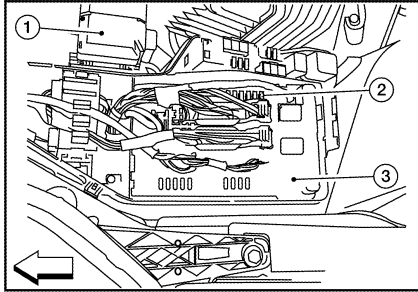
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

MULTIPOINT FUEL INJECTION SYSTEM

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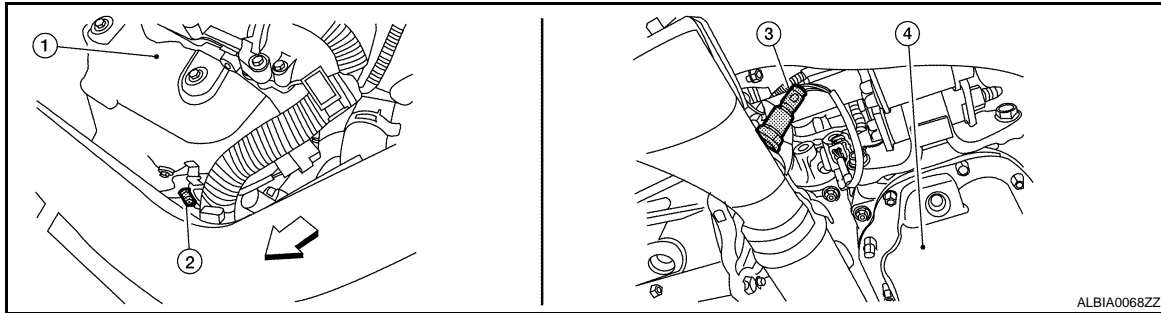
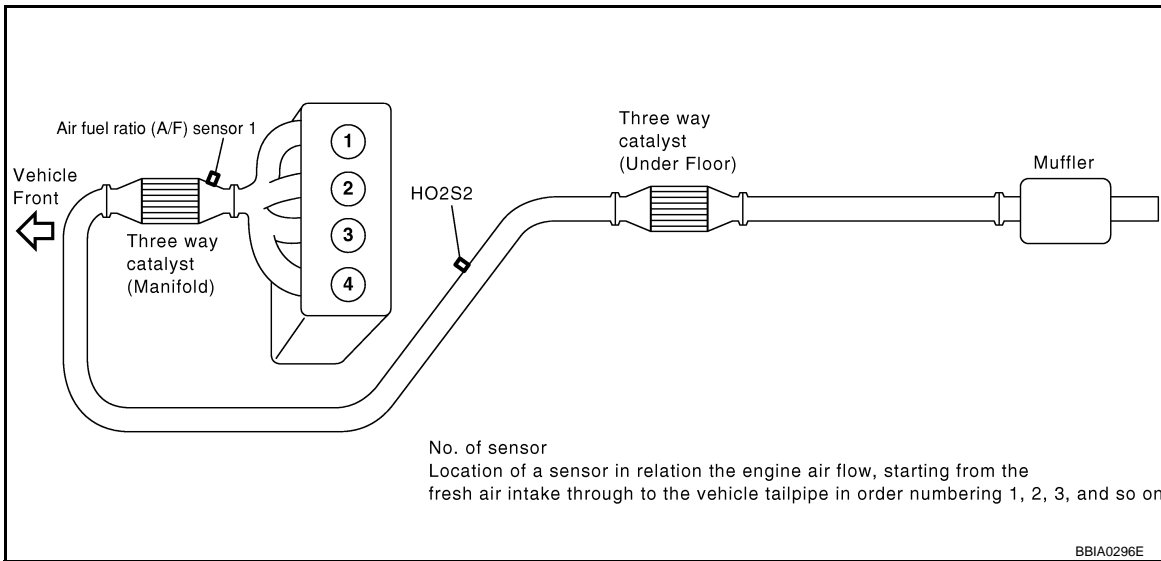
- | | | |
|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙ Vehicle front

MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



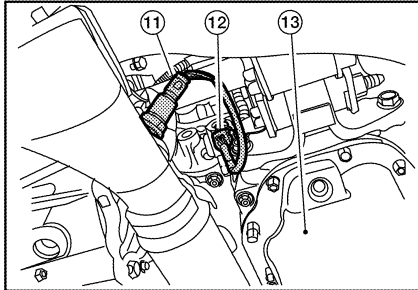
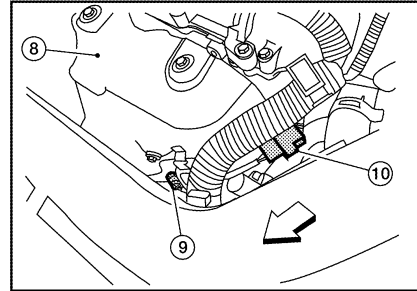
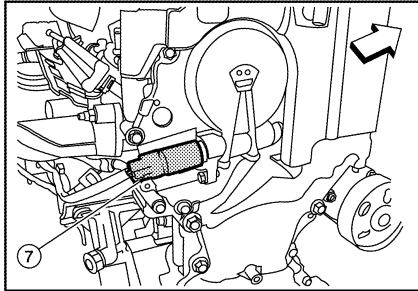
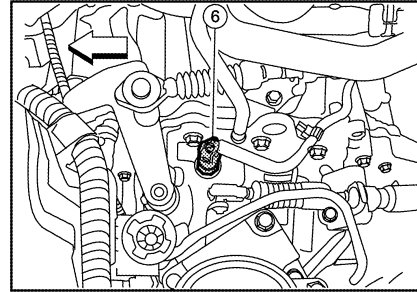
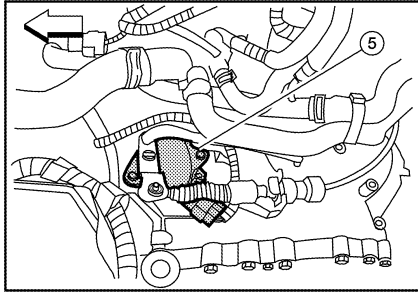
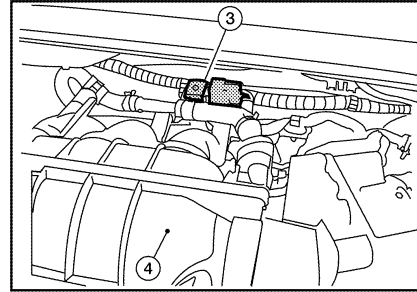
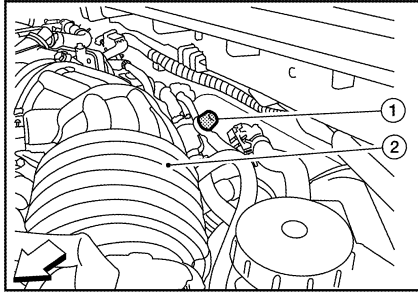
- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



- | | | |
|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | | |

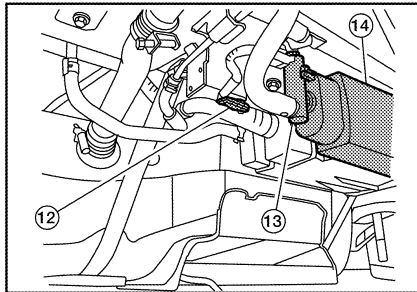
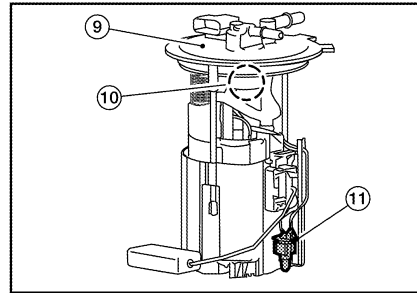
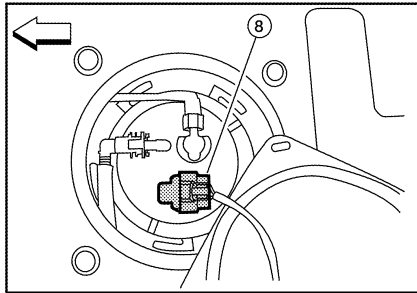
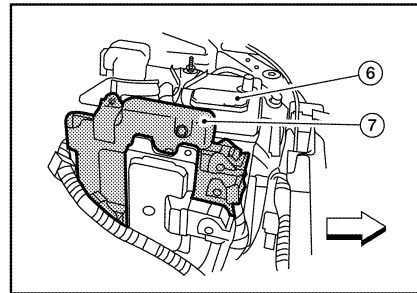
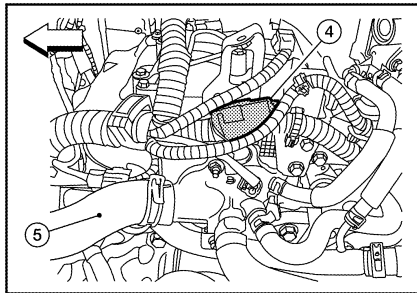
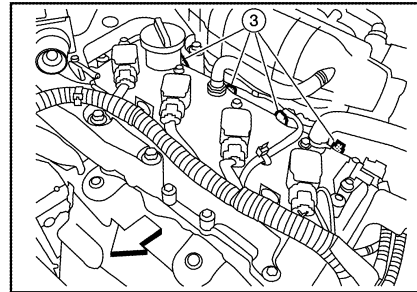
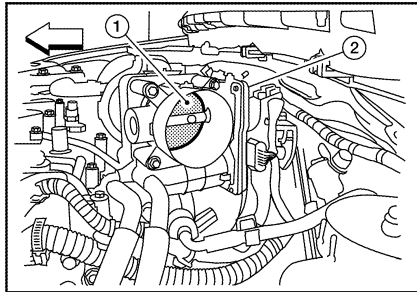
↶: Vehicle front

ALBIA0095ZZ

MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

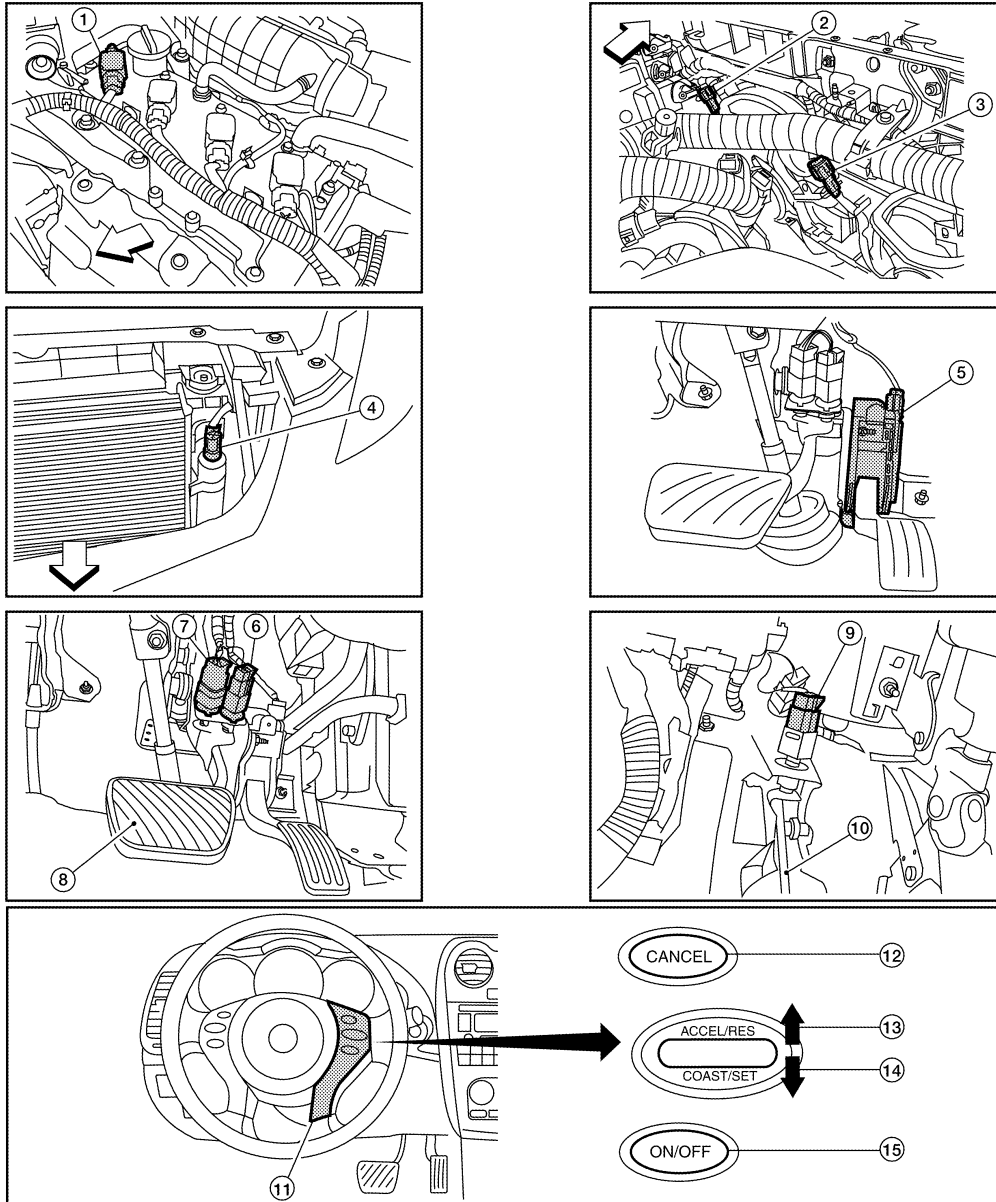
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MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344061

| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-702. "Description" |
| Accelerator pedal position sensor | EC-899. "Description" |
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |

MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Engine coolant temperature sensor | EC-689, "Description" |
| Fuel injector | EC-930, "Description" |
| Heated oxygen sensor 2 | EC-717, "Description" |
| Intake air temperature sensor | EC-686, "Description" |
| Knock sensor | EC-758, "Description" |
| Mass air flow sensor | EC-675, "Description" |
| Park/neutral position switch | EC-846, "Description" |
| Power steering pressure sensor | EC-837, "Description" |
| Throttle position sensor | EC-692, "Description" |
| Vehicle speed sensor | EC-831, "Description" |

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ELECTRIC IGNITION SYSTEM

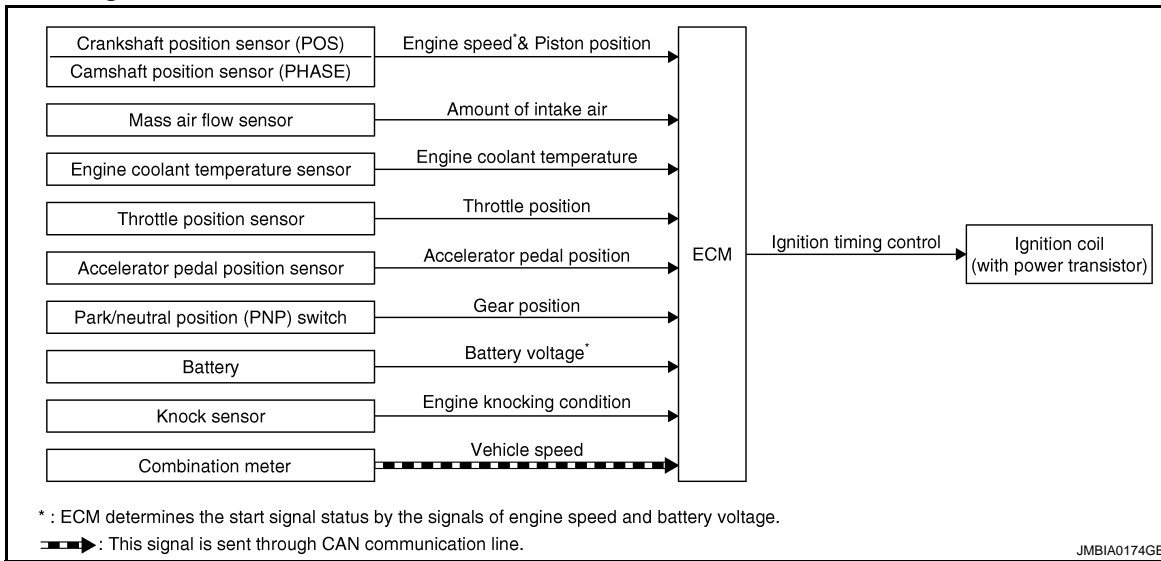
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[QR25DE EXCEPT FOR CALIFORNIA]

ELECTRIC IGNITION SYSTEM

System Diagram

INFOID:000000001344062



System Description

INFOID:000000001344063

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input Signal to ECM | ECM function | Actuator |
|------------------------------------|-----------------------------------|-------------------------|---------------------------------------|
| Crankshaft position sensor (POS) | Engine speed*2 Piston position | Ignition timing control | Ignition coil (with power transistor) |
| Camshaft position sensor (PHASE) | | | |
| Mass air flow sensor | Amount of intake air | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Throttle position sensor | Throttle position | | |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Battery | Battery voltage*2 | | |
| Knock sensor | Engine knocking | | |
| Park/neutral position (PNP) switch | Gear position | | |
| Wheel sensor*1 | Vehicle speed | | |

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

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

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

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

ELECTRIC IGNITION SYSTEM

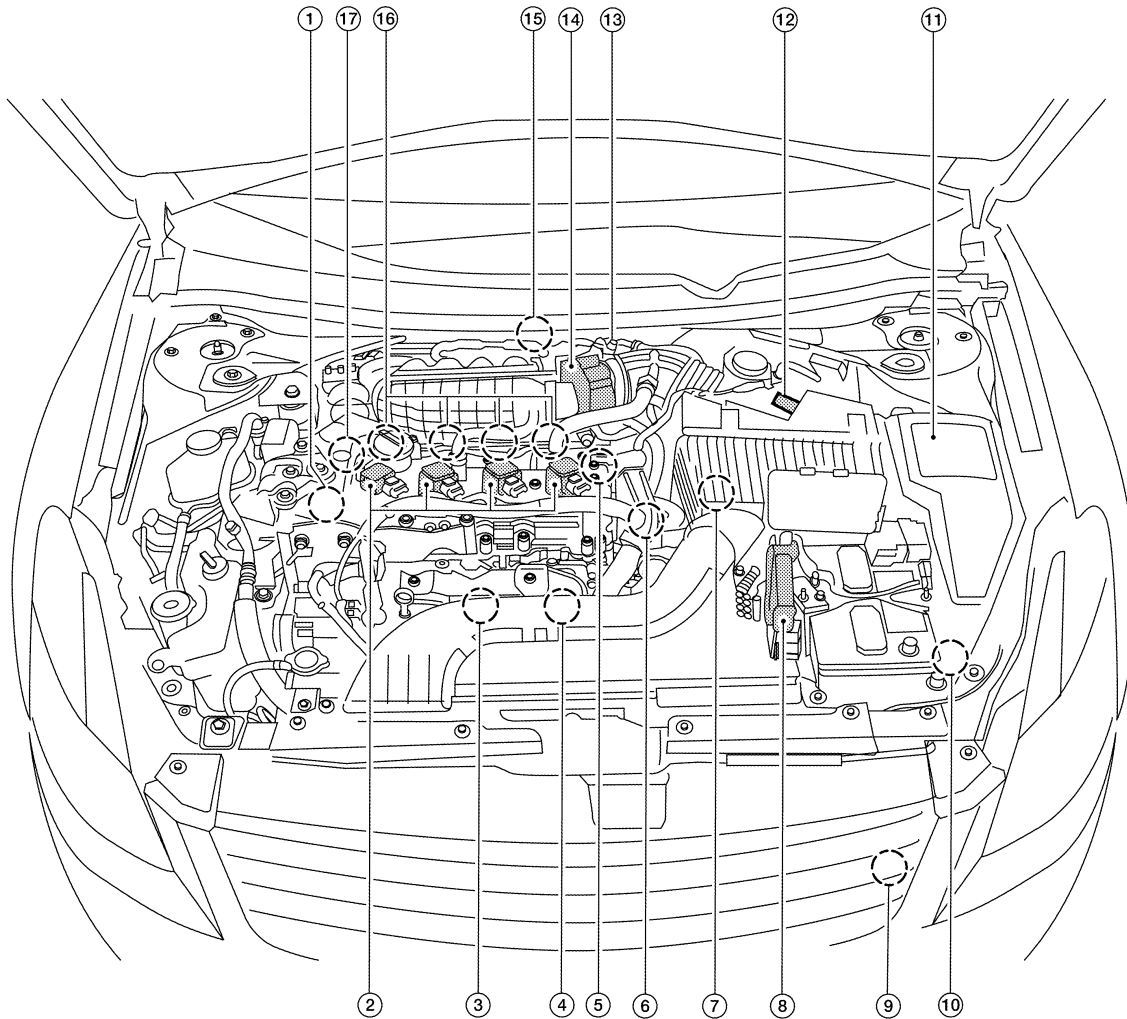
< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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

INFOID:000000001665728



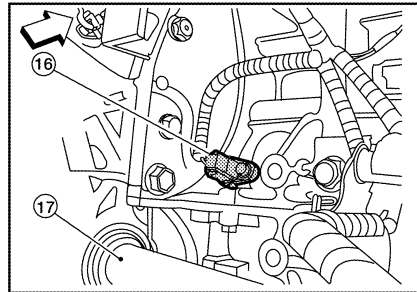
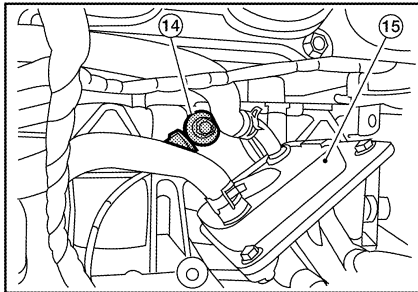
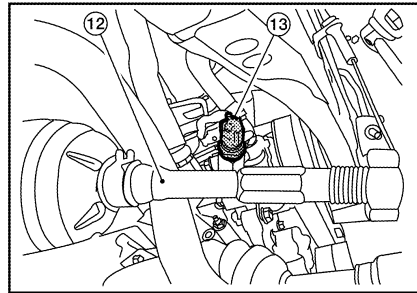
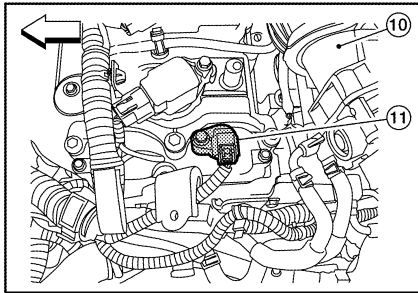
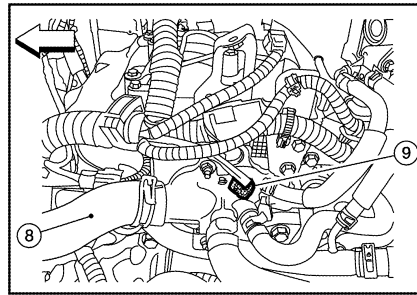
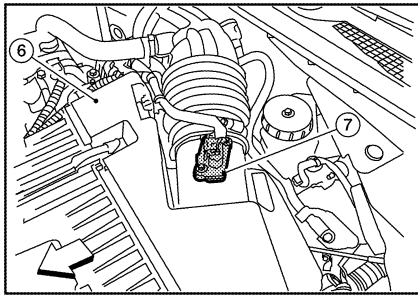
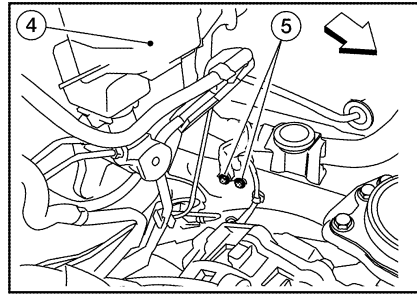
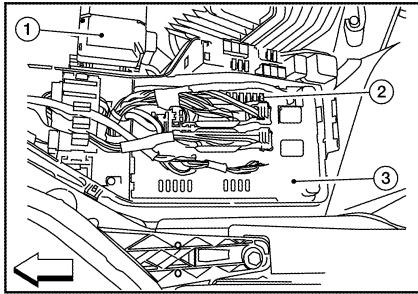
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

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ELECTRIC IGNITION SYSTEM

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[QR25DE EXCEPT FOR CALIFORNIA]



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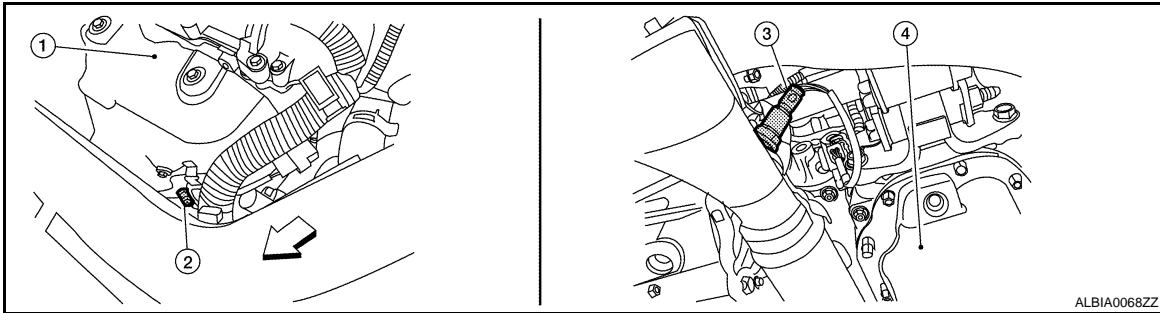
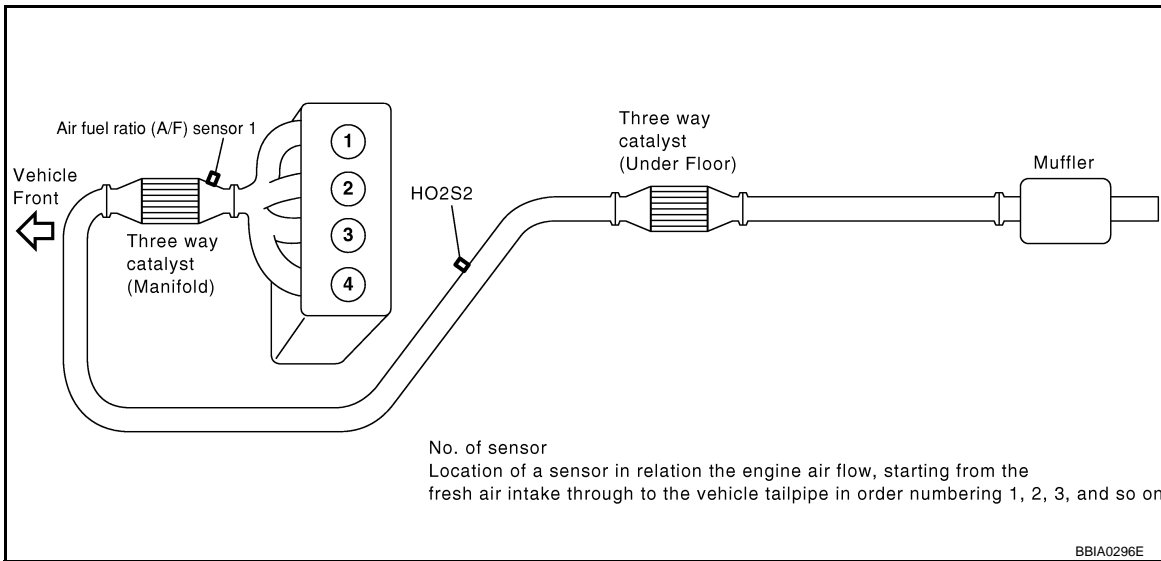
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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Exhaust manifold cover

2. Air fuel ratio (A/F) sensor 1

3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)

4. Engine oil pan

⇐: Vehicle front

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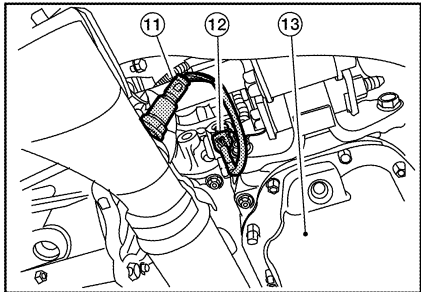
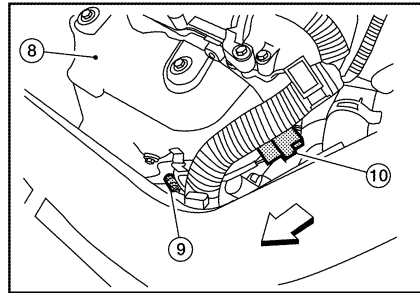
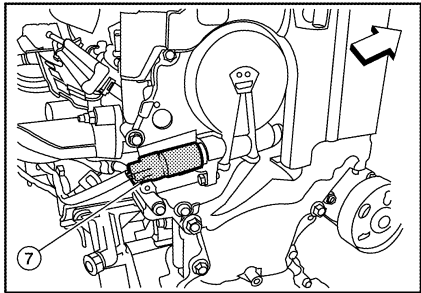
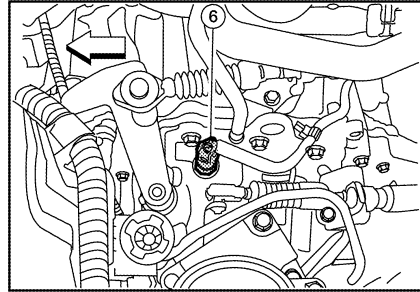
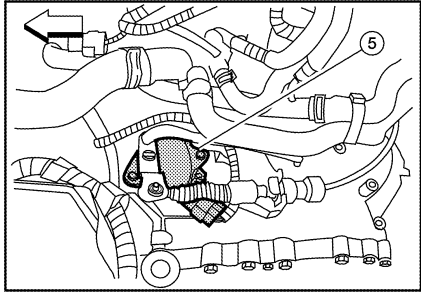
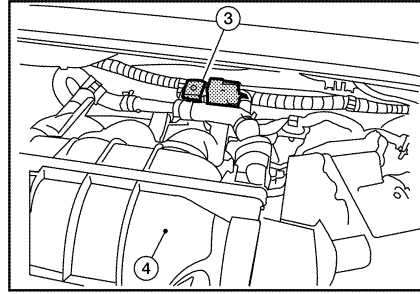
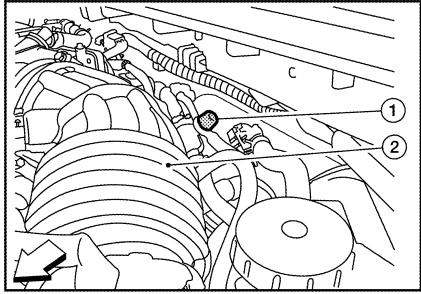
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ELECTRIC IGNITION SYSTEM

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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |

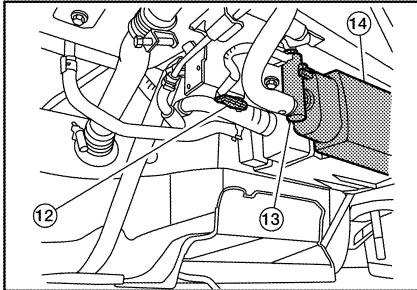
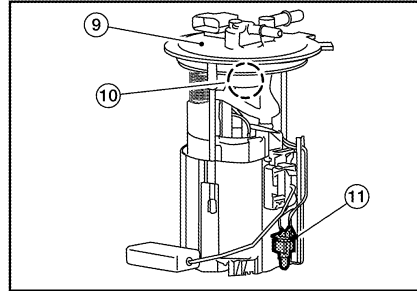
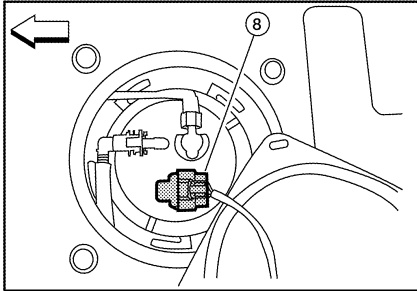
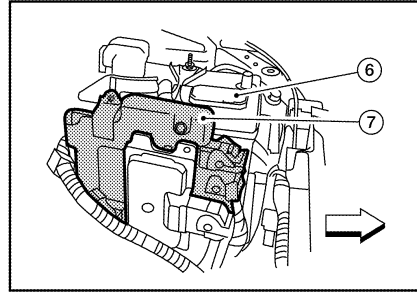
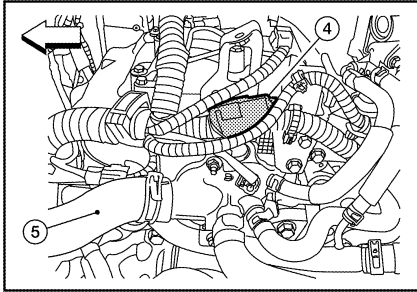
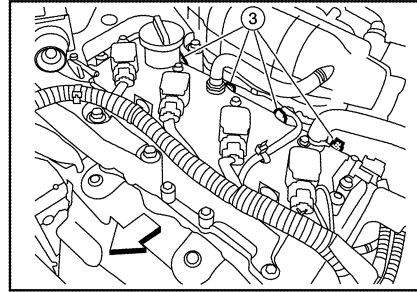
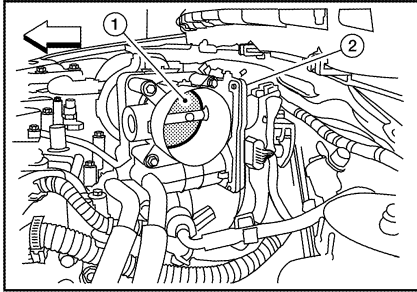
13. Engine oil pan

↶: Vehicle front

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

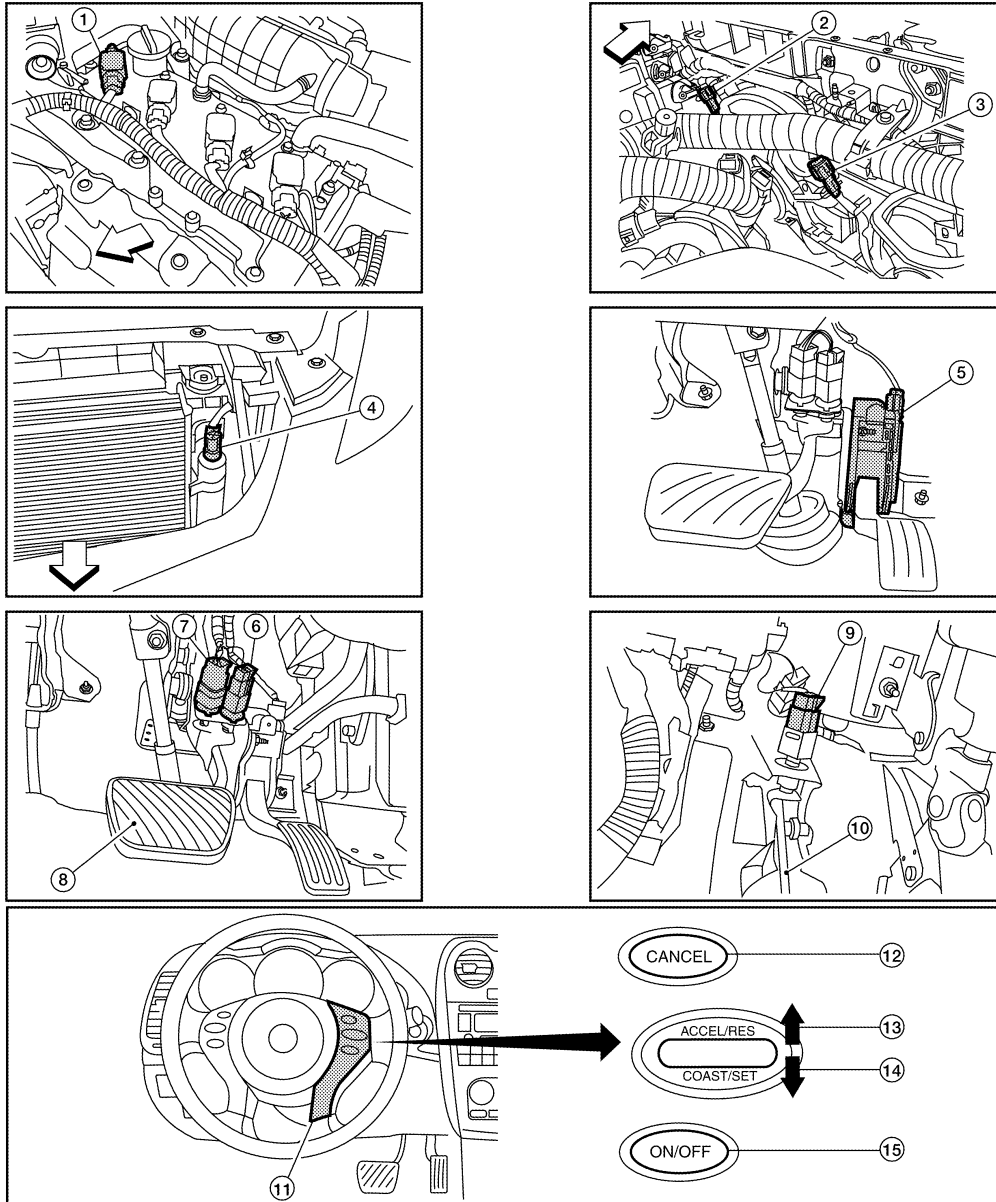
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ELECTRIC IGNITION SYSTEM

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344065

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Accelerator pedal position sensor | EC-899. "Description" |
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |
| Engine coolant temperature sensor | EC-689. "Description" |

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

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| Component | Reference | |
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| Ignition signal | EC-937, "Description" | A |
| Knock sensor | EC-758, "Description" | |
| Mass air flow sensor | EC-675, "Description" | EC |
| Park/neutral position switch | EC-846, "Description" | |
| Throttle position sensor | EC-692, "Description" | C |
| Vehicle speed sensor | EC-831, "Description" | |

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AIR CONDITIONING CUT CONTROL

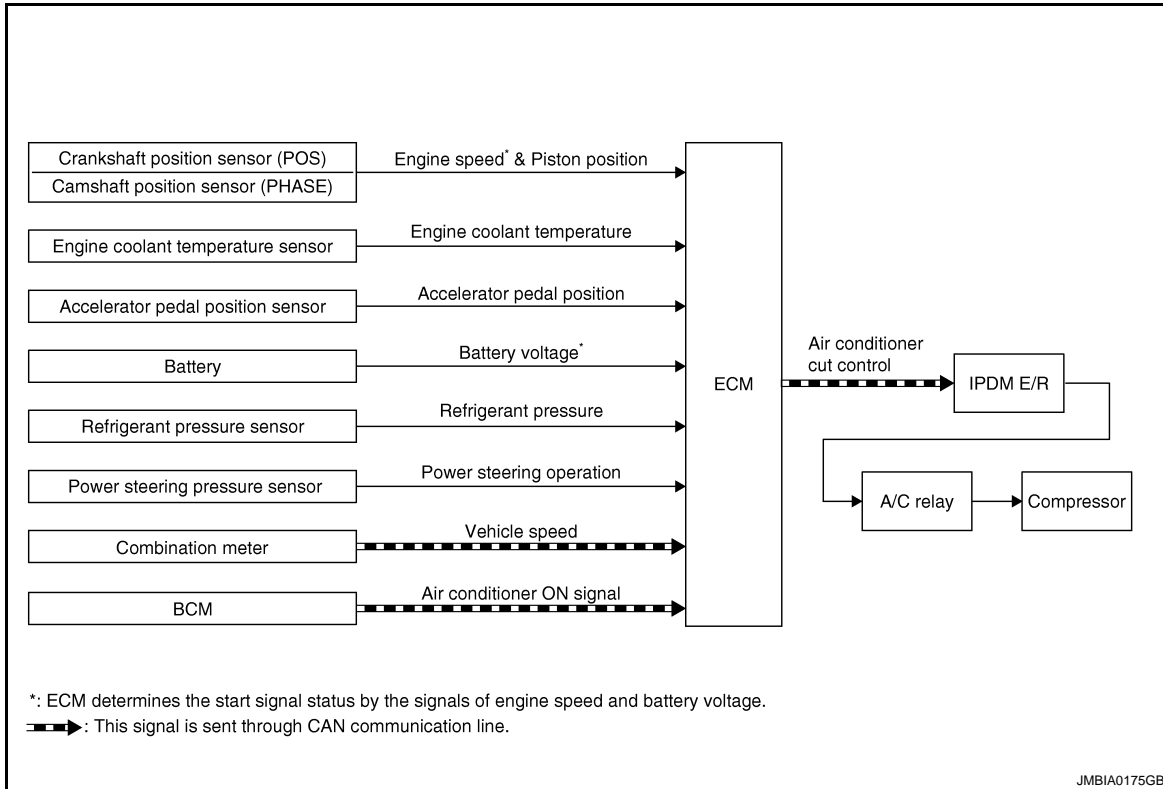
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AIR CONDITIONING CUT CONTROL

System Diagram

INFOID:000000001344066



System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input Signal to ECM | ECM function | Actuator |
|--|-------------------------------|-----------------------------|---|
| Air conditioner switch* ¹ | Air conditioner ON signal | Air conditioner cut control | IPDM E/R ↓ Air conditioner relay ↓ Compressor |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* ² | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Battery | Battery voltage* ² | | |
| Refrigerant pressure sensor | Refrigerant pressure | | |
| Power steering pressure sensor | Power steering operation | | |
| Wheel sensor* ¹ | Vehicle speed | | |

*1: This signal is sent to the ECM through 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.

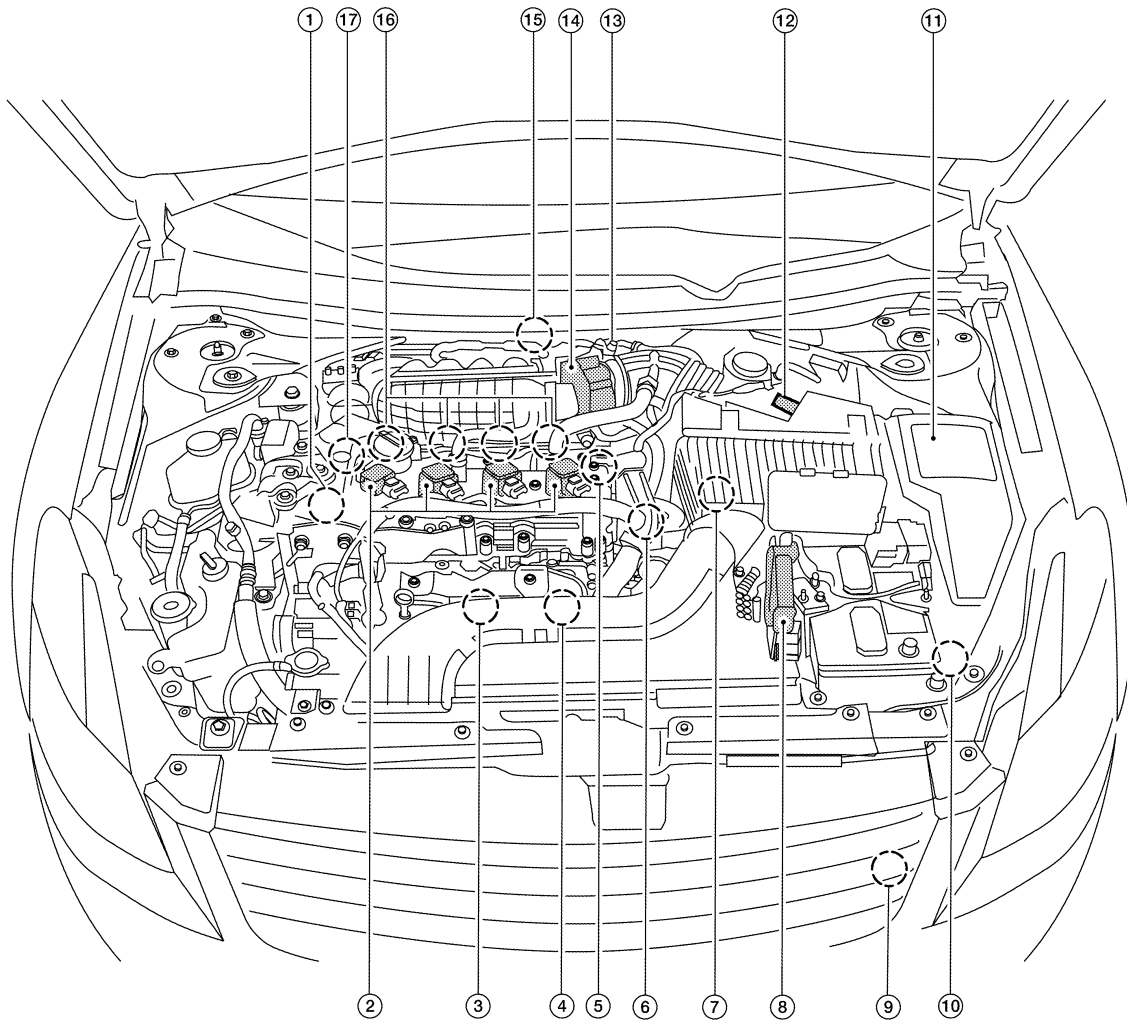
AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Parts Location

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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

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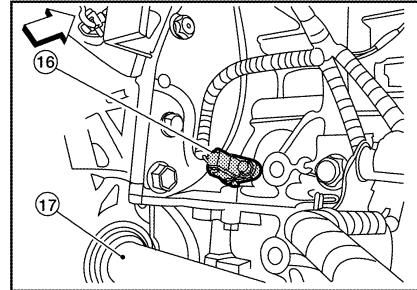
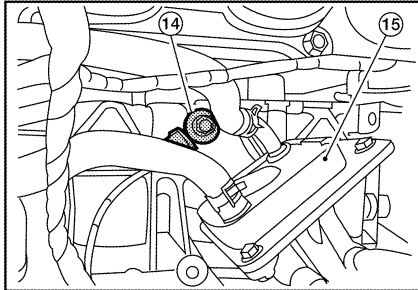
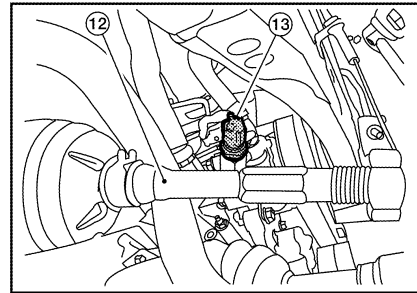
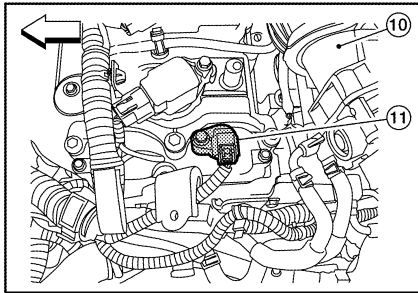
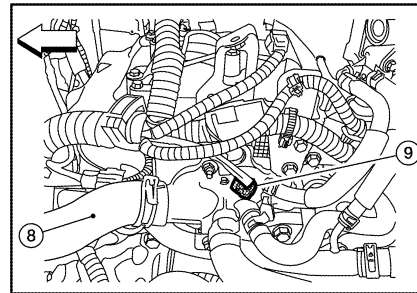
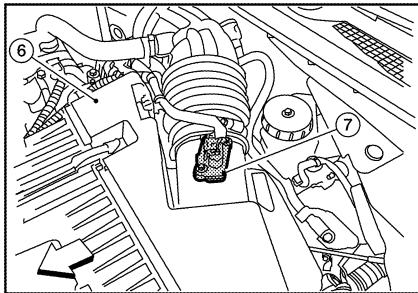
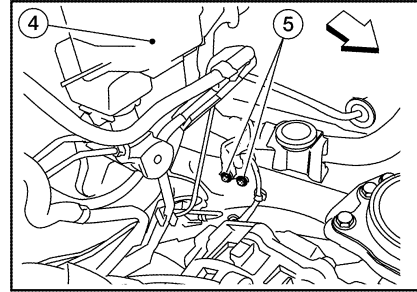
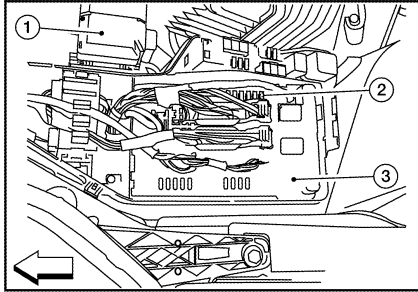
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AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

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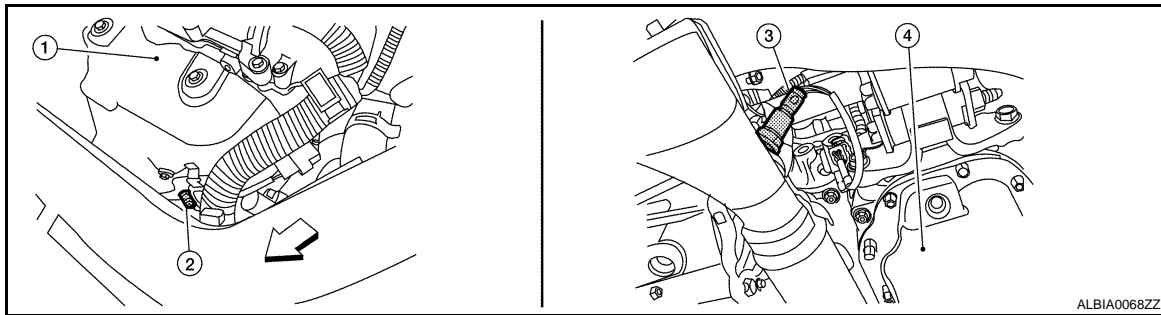
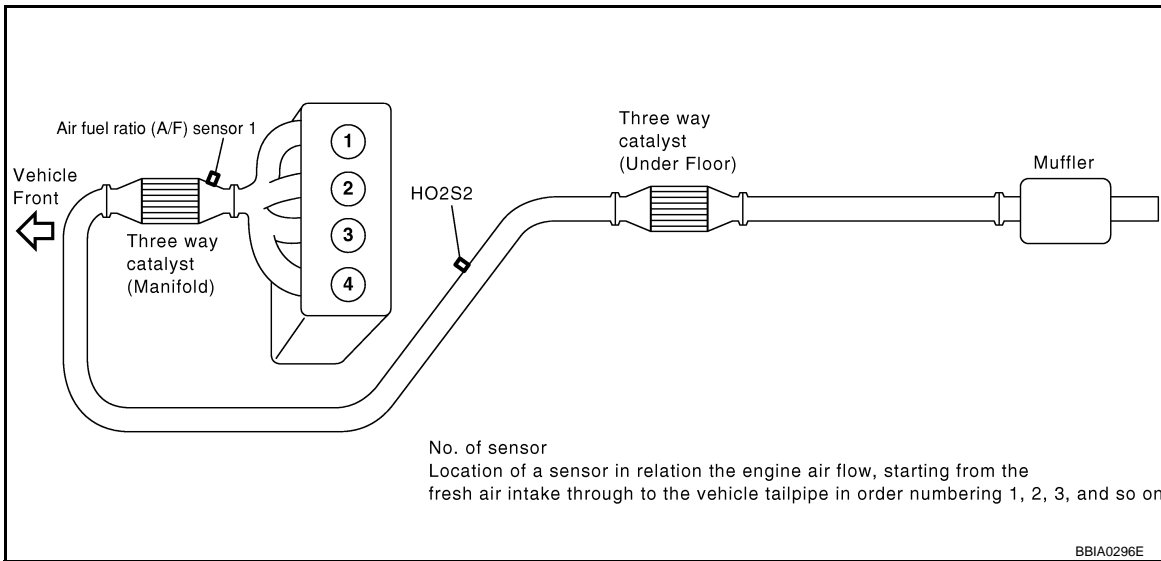
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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

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- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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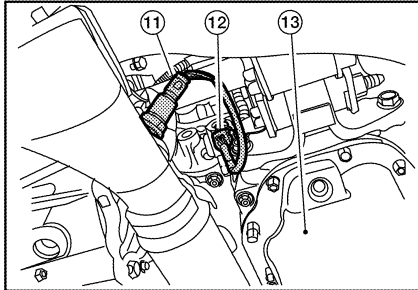
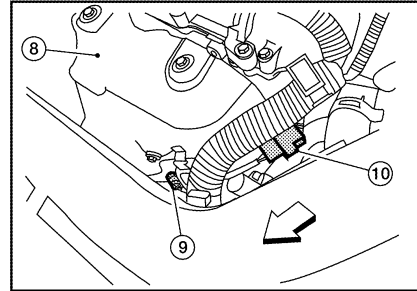
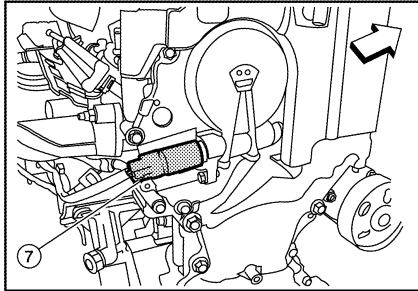
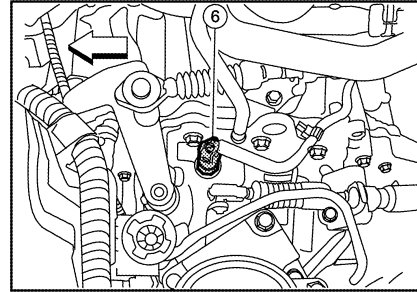
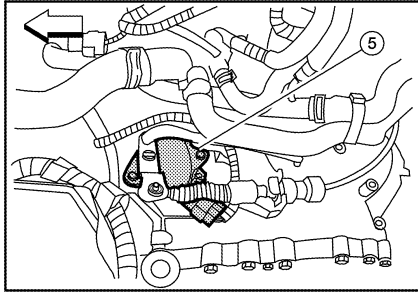
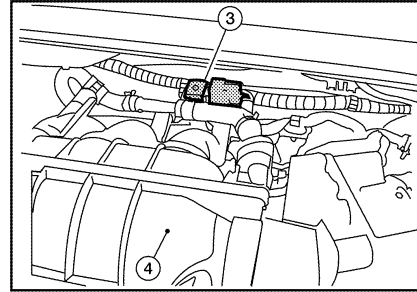
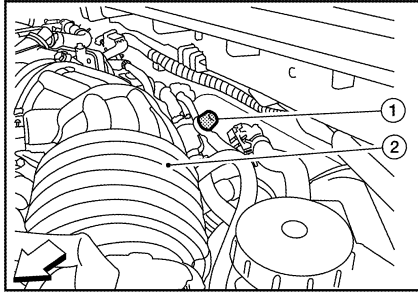
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AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

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- | | | |
|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |

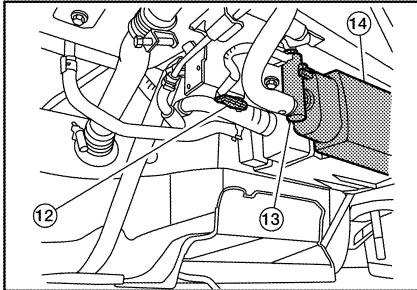
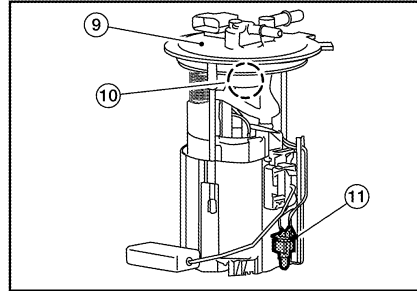
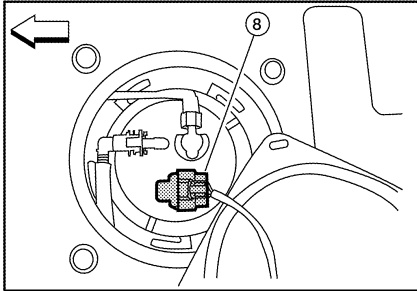
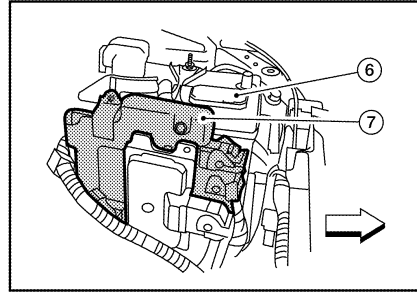
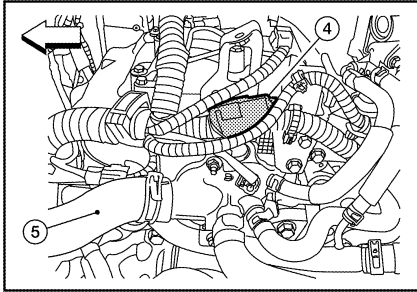
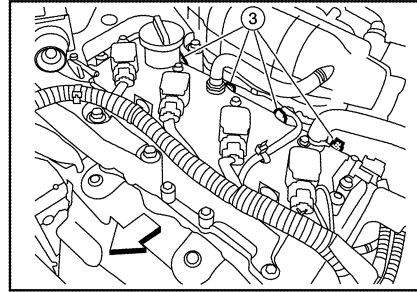
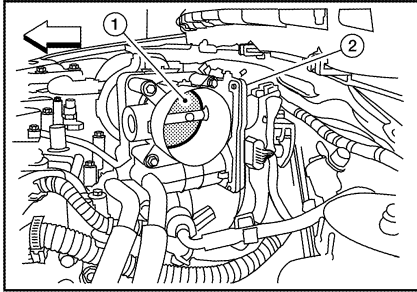
13. Engine oil pan

↶: Vehicle front

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

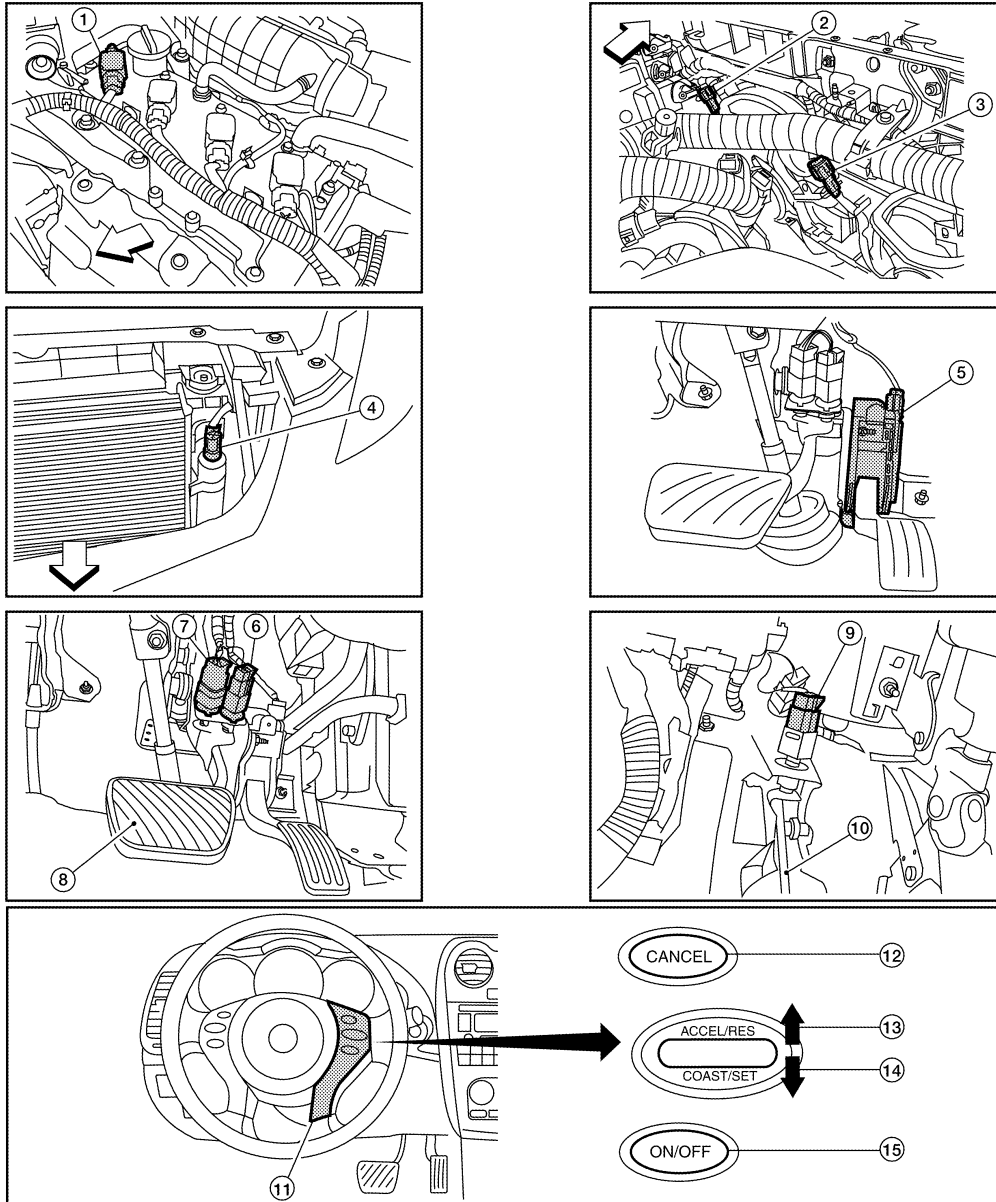
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AIR CONDITIONING CUT CONTROL

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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344069

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Accelerator pedal position sensor | EC-899. "Description" |
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |
| Engine coolant temperature sensor | EC-689. "Description" |

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Component | Reference |
|--------------------------------|---------------------------------------|
| Power steering pressure sensor | EC-837, "Description" |
| Refrigerant pressure sensor | EC-949, "Description" |
| Vehicle speed sensor | EC-831, "Description" |

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

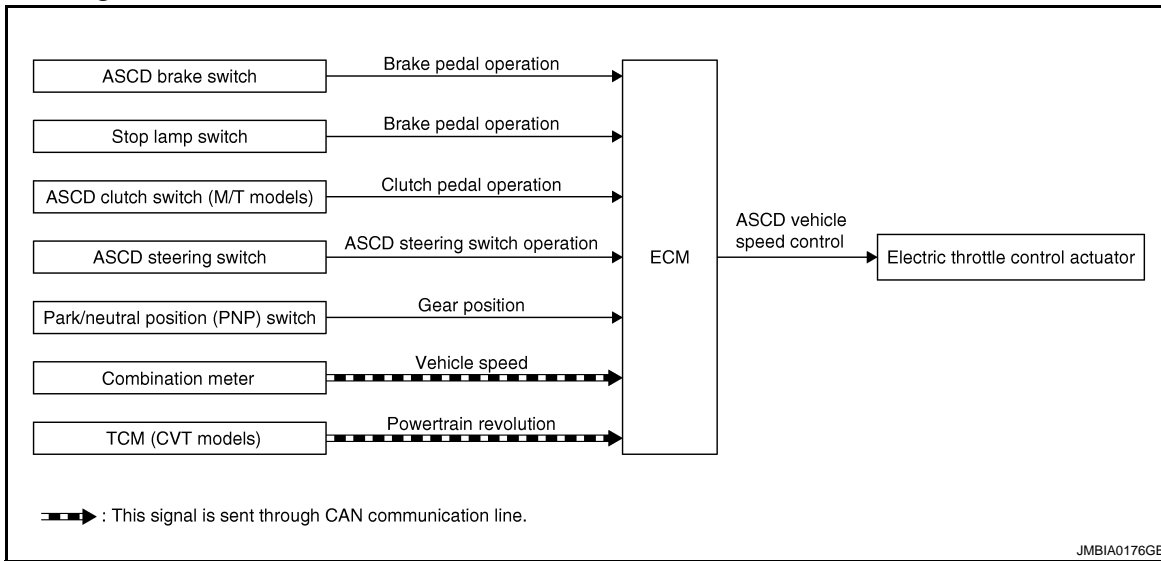
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[QR25DE EXCEPT FOR CALIFORNIA]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|------------------------------------|--------------------------------|----------------------------|------------------------------------|
| ASCD brake switch | Brake pedal operation | ASCD vehicle speed control | Electric throttle control actuator |
| Stop lamp switch | Brake pedal operation | | |
| ASCD clutch switch (M/T models) | Clutch pedal operation | | |
| ASCD steering switch | ASCD steering switch operation | | |
| Park/neutral position (PNP) switch | Gear position | | |
| Wheel sensor* | Vehicle speed | | |
| TCM* (CVT models) | Powertrain revolution | | |

*: This signal is sent to the ECM through 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 lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press MAIN switch. (The CRUISE lamp in 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. (Then SET lamp in combination meter illuminates.)

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 keep the new set speed.

CANCEL OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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< FUNCTION DIAGNOSIS >

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

- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position. (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated

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

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during 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 keep the new set speed.

RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing 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
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

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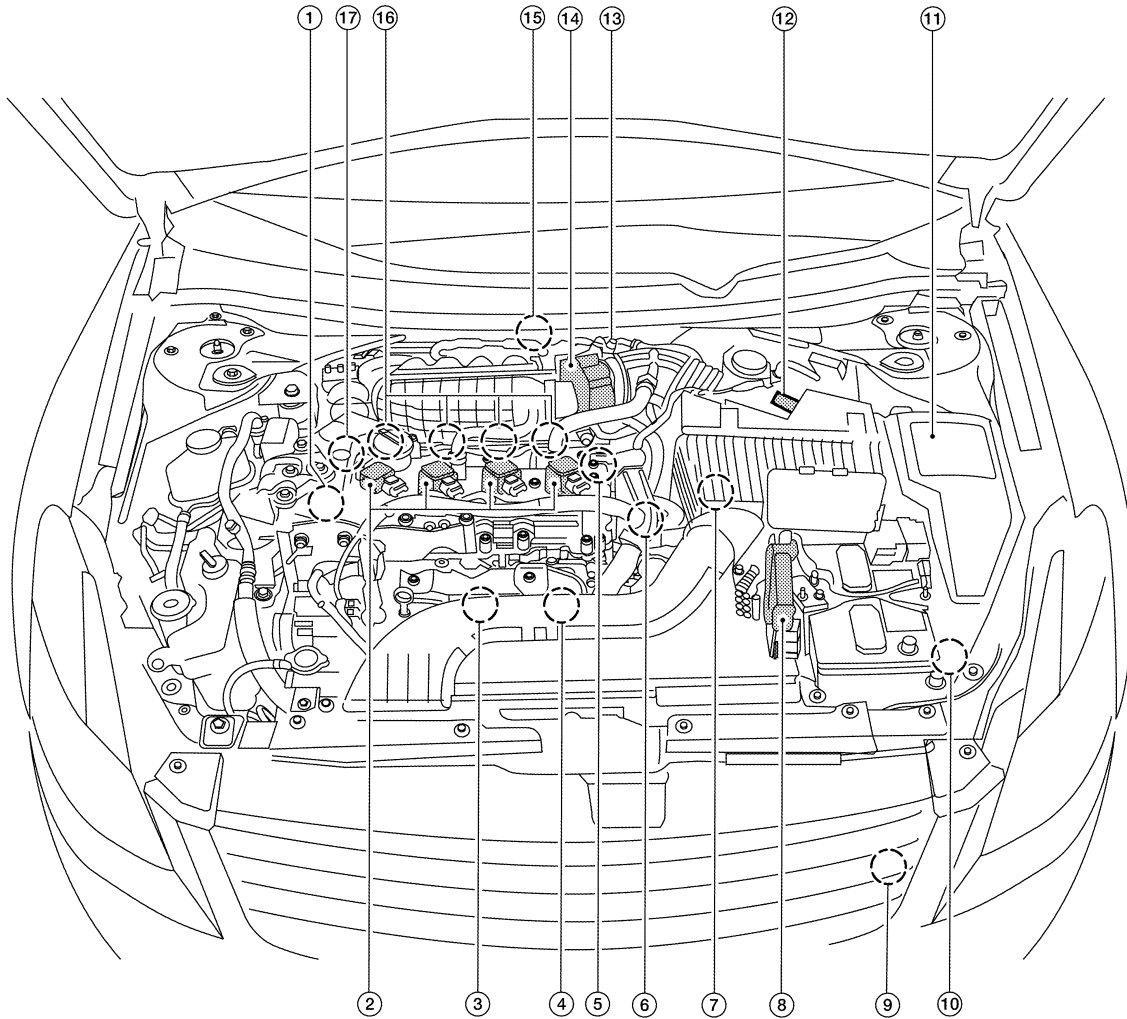
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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Component Parts Location

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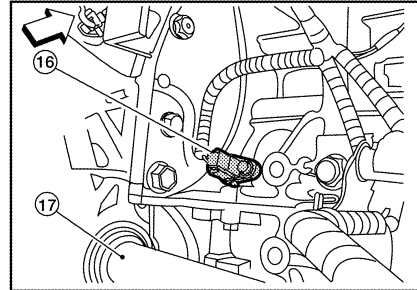
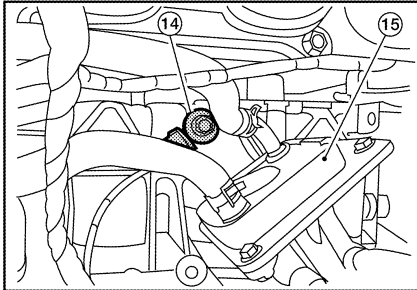
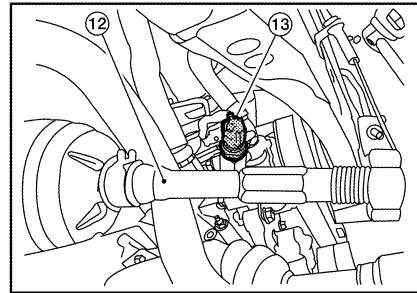
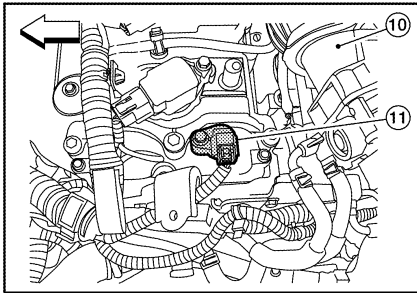
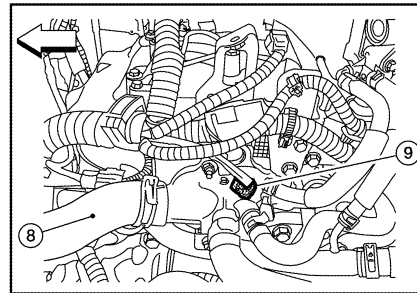
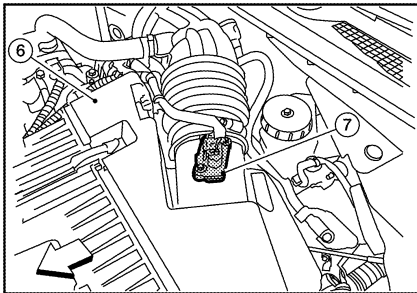
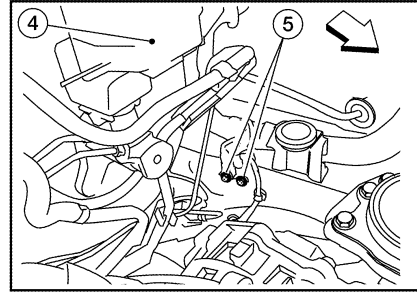
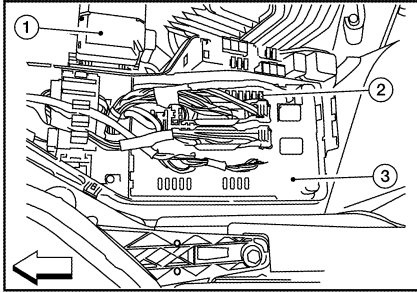
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

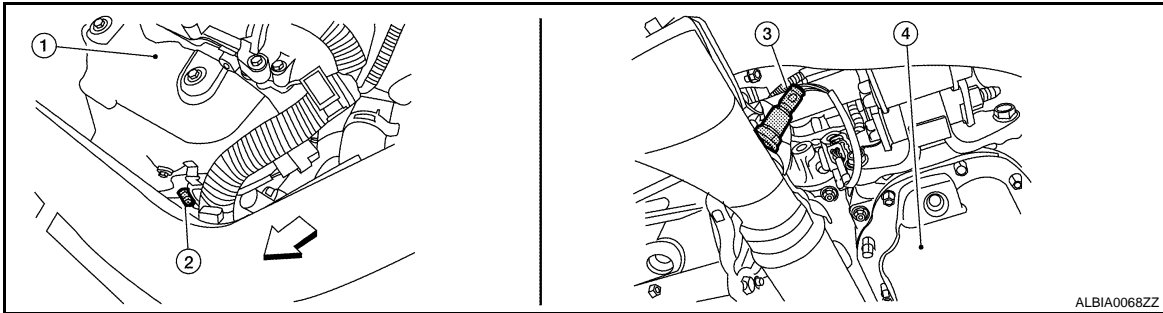
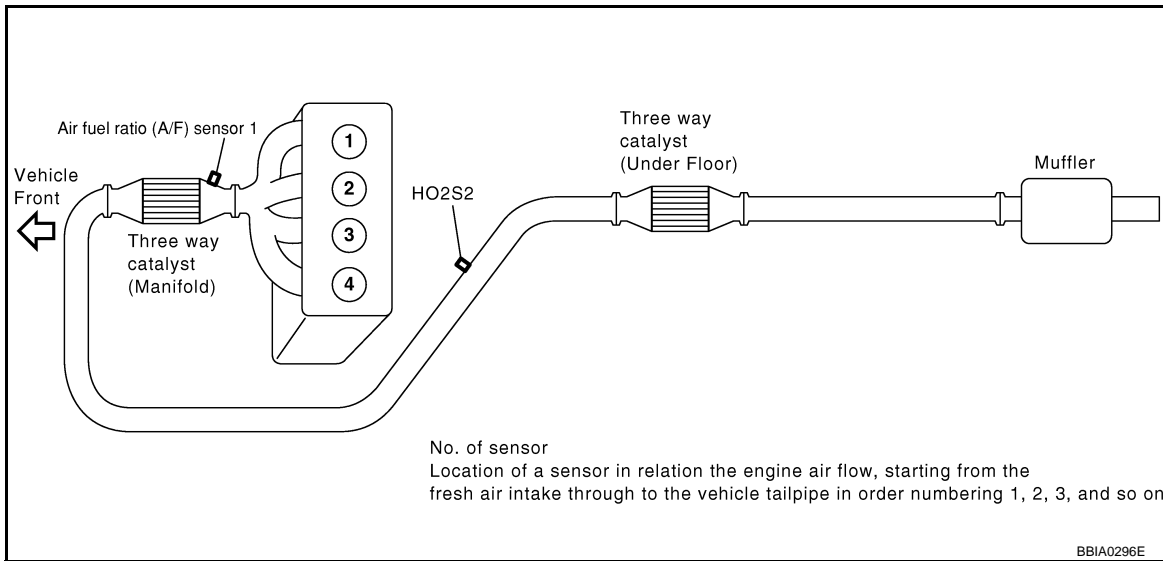
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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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1. Exhaust manifold cover

2. Air fuel ratio (A/F) sensor 1

3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)

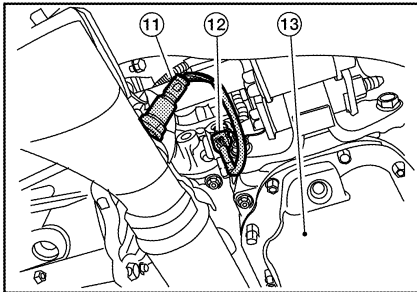
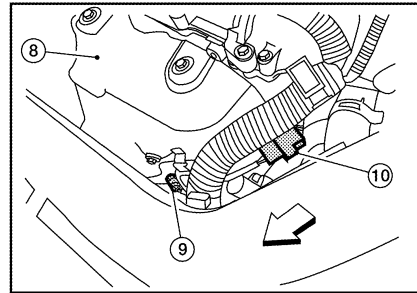
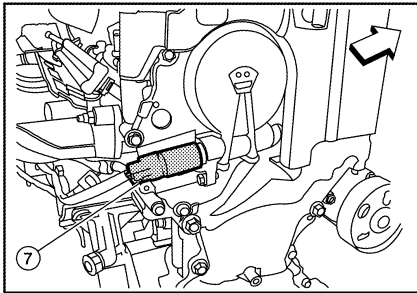
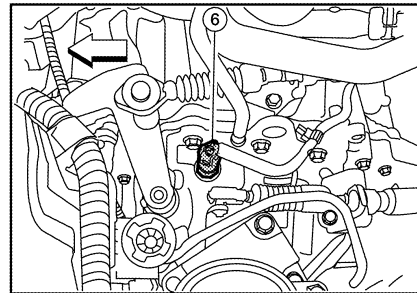
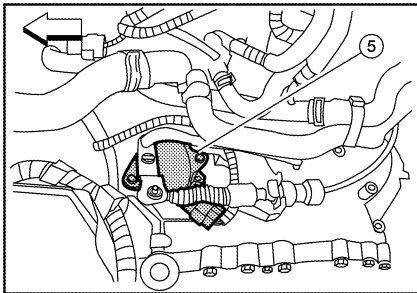
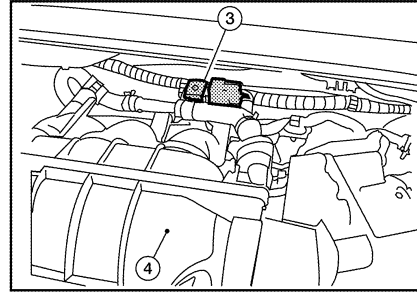
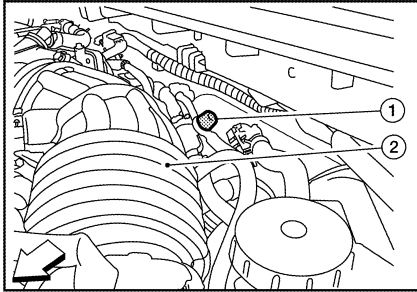
4. Engine oil pan

↔: Vehicle front

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

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- | | | |
|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | | |

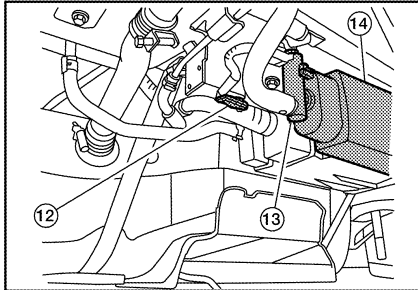
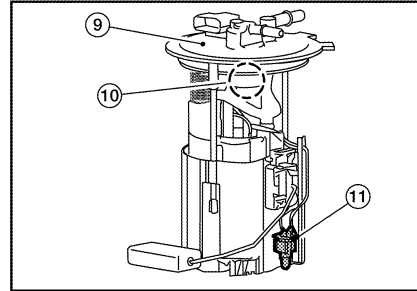
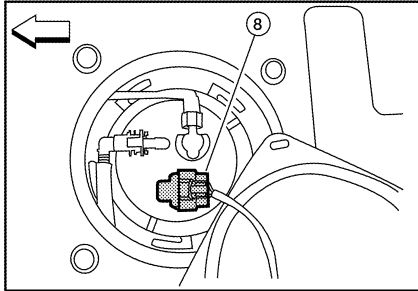
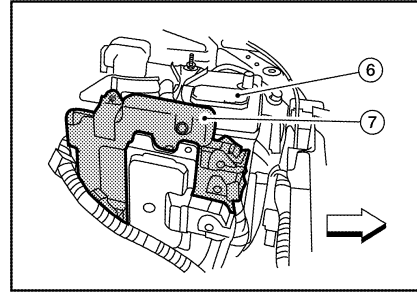
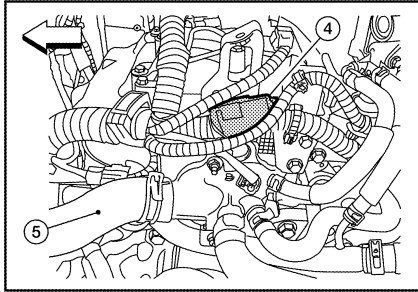
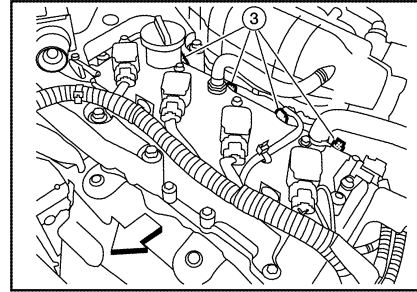
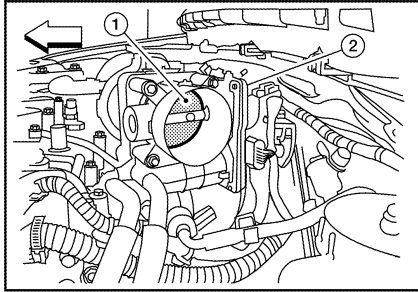
↔: Vehicle front

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

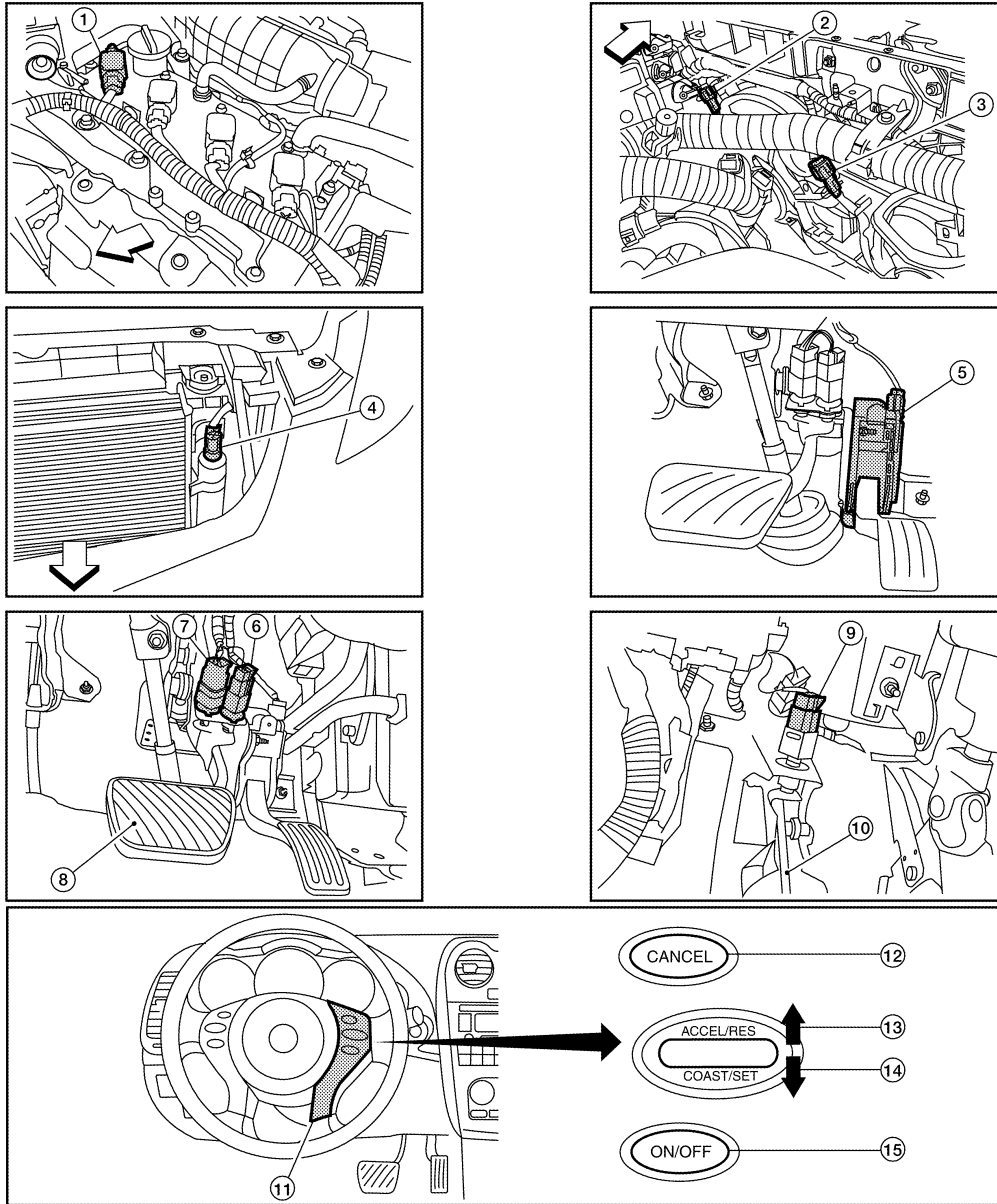
← : Vehicle front

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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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[QR25DE EXCEPT FOR CALIFORNIA]



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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344073

| Component | Reference |
|----------------------|---------------------------------------|
| ASCD steering switch | EC-872. "Description" |
| ASCD clutch switch | EC-875. "Description" |
| ASCD brake switch | EC-875. "Description" |
| Stop lamp switch | EC-886. "Description" |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Component | Reference |
|------------------------------------|---------------------------------------|
| Electric throttle control actuator | EC-897, "Description" |
| ASCD indicator | EC-921, "Description" |

CAN COMMUNICATION

System Description

INFOID:000000001344074

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.

Refer to [LAN-25. "CAN Communication Signal Chart"](#), about CAN communication for detail..

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COOLING FAN CONTROL

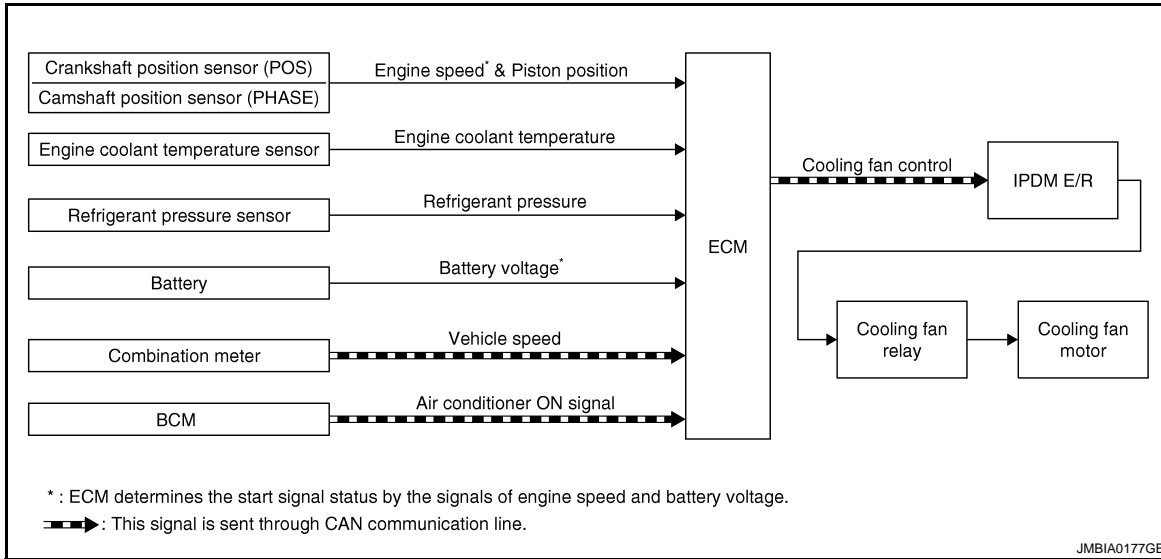
< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

COOLING FAN CONTROL

System Diagram

INFOID:000000001344075



System Description

INFOID:000000001344076

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|---|---------------------|--|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* ¹ | Cooling fan control | IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor |
| Battery | Battery voltage* ¹ | | |
| Wheel sensor | Vehicle speed* ² | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Air conditioner switch | Air conditioner ON signal* ² | | |
| Refrigerant pressure sensor | Refrigerant pressure | | |

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

*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

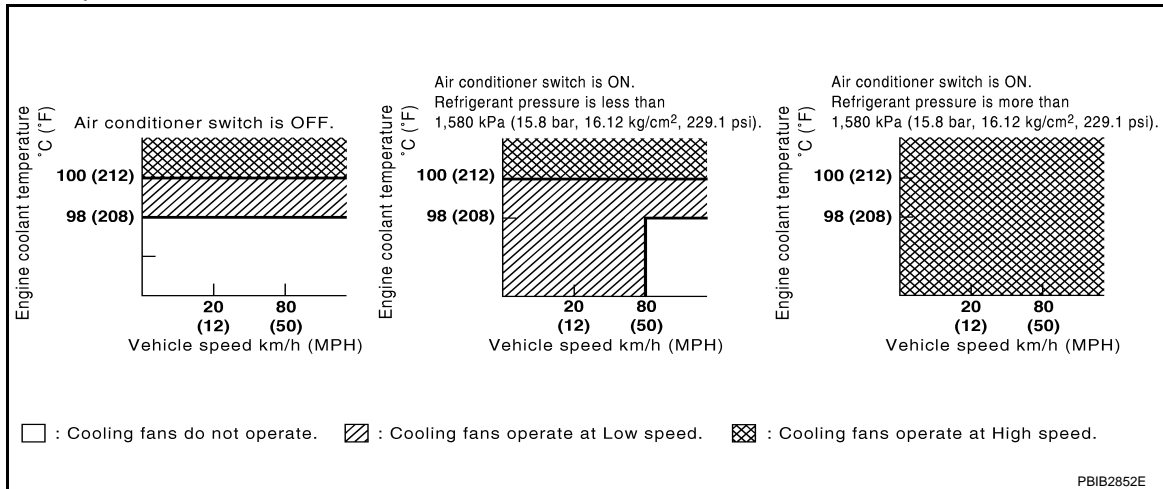
ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Cooling Fan Operation



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

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

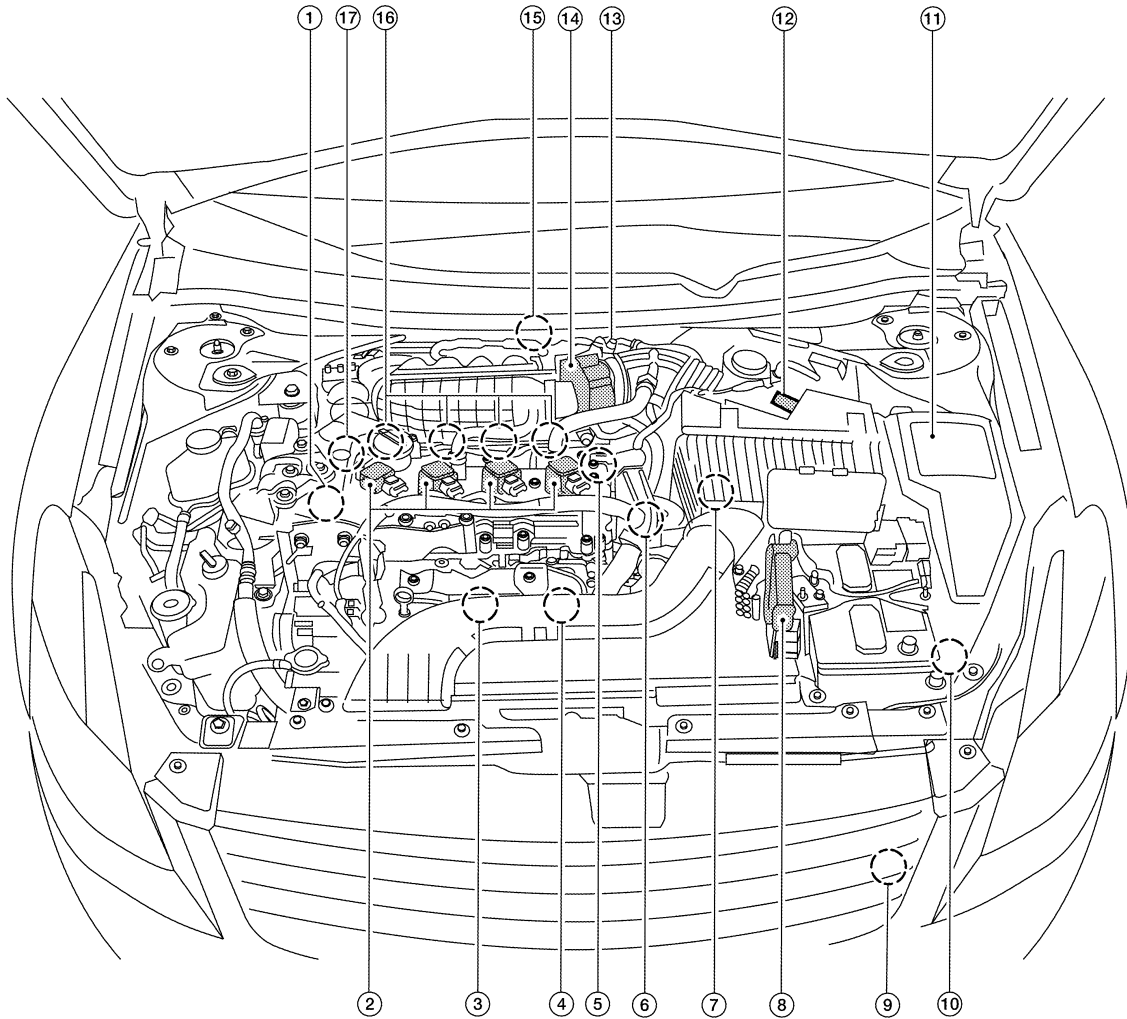
COOLING FAN CONTROL

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[QR25DE EXCEPT FOR CALIFORNIA]

Component Parts Location

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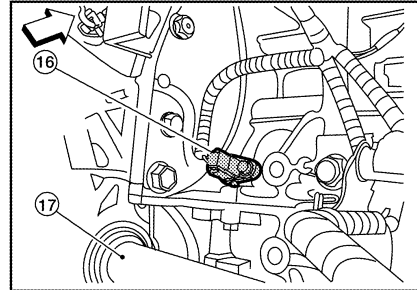
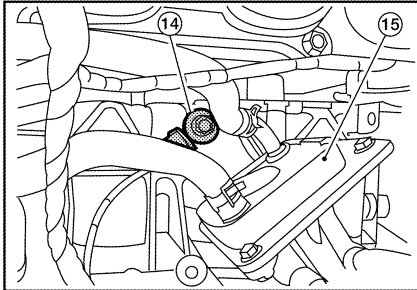
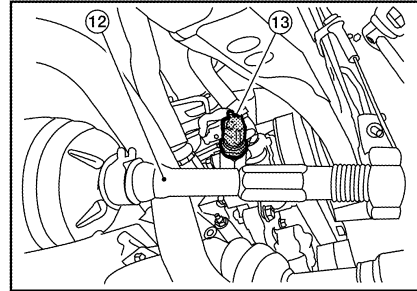
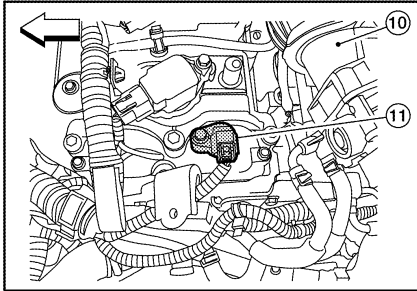
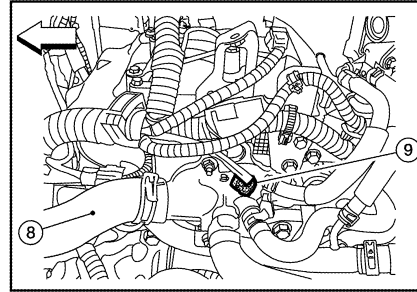
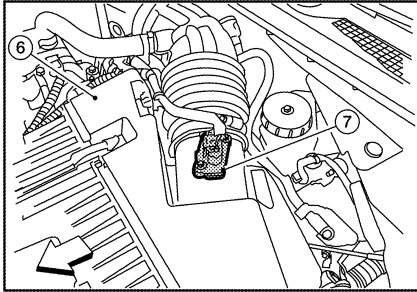
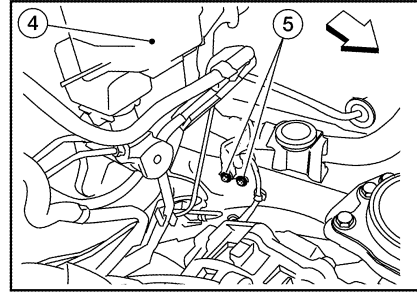
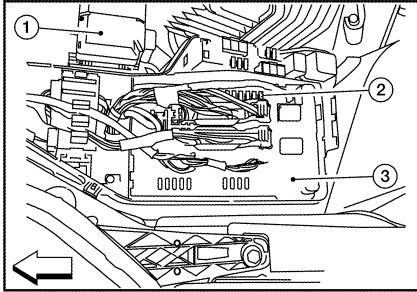
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↔: Vehicle front

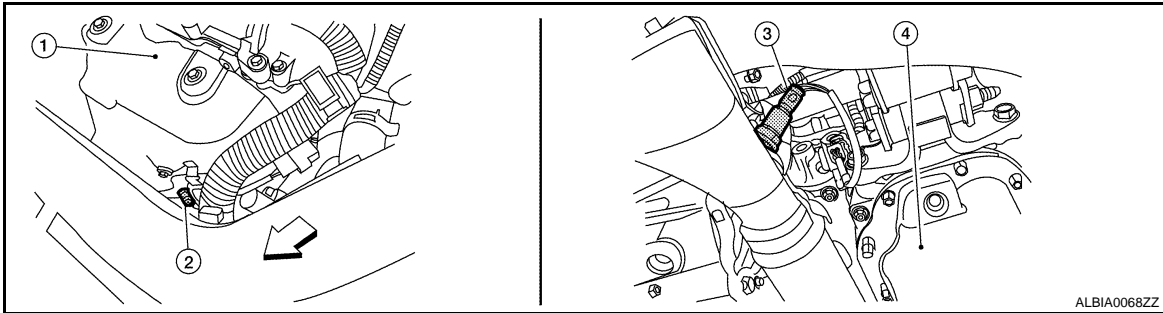
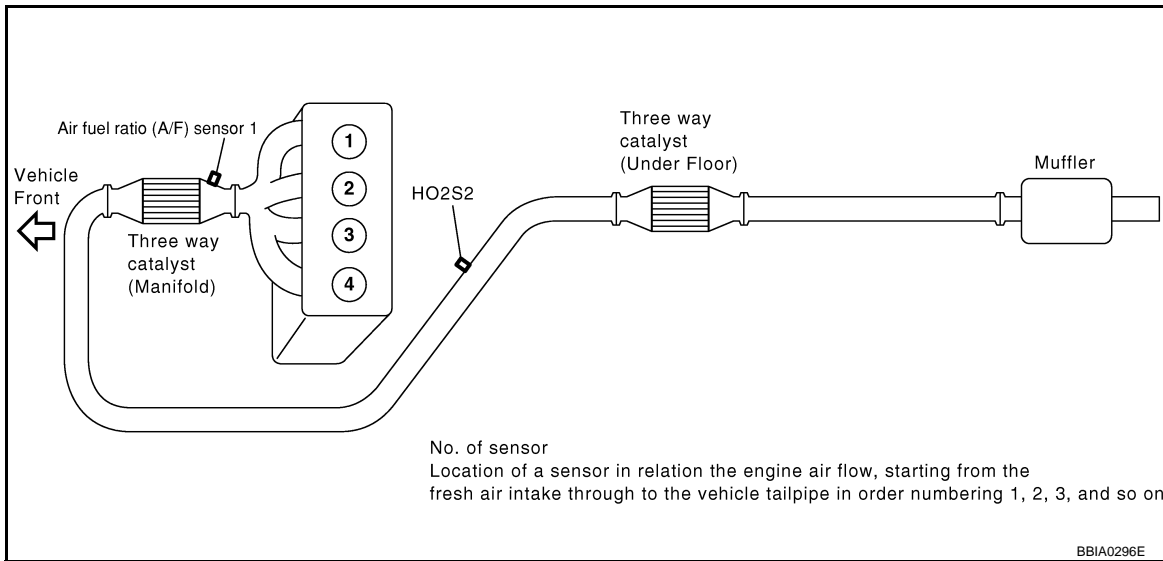
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COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Exhaust manifold cover

2. Air fuel ratio (A/F) sensor 1

3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)

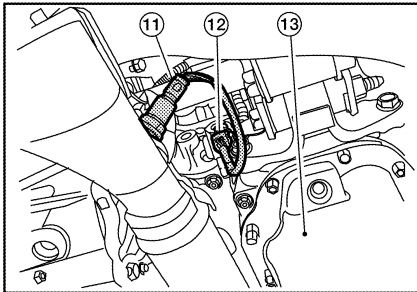
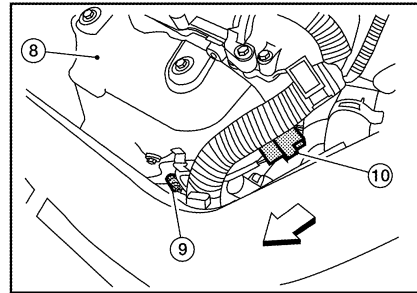
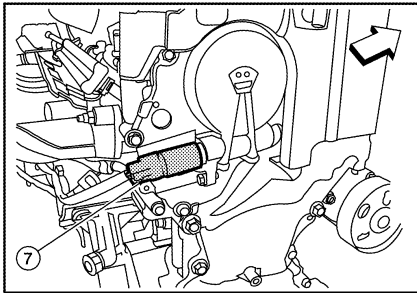
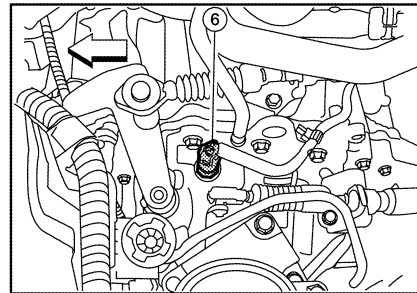
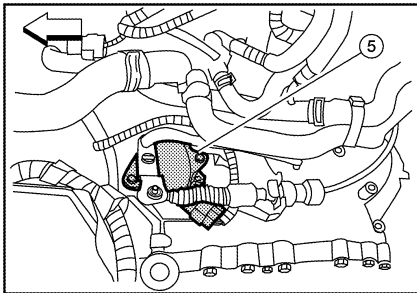
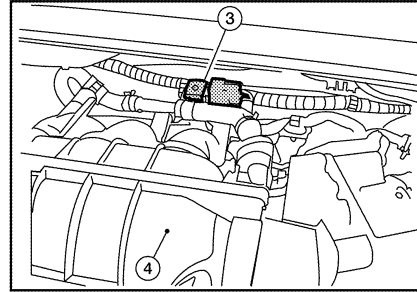
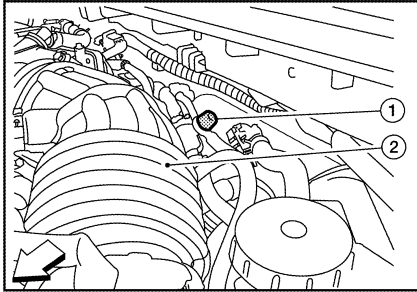
4. Engine oil pan

↔: Vehicle front

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | | |

↔: Vehicle front

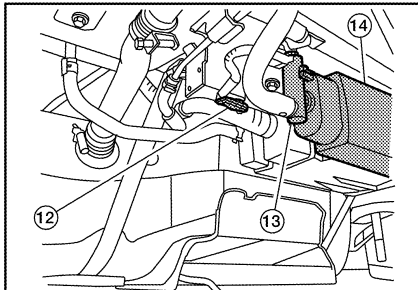
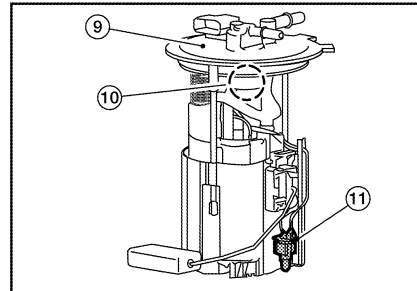
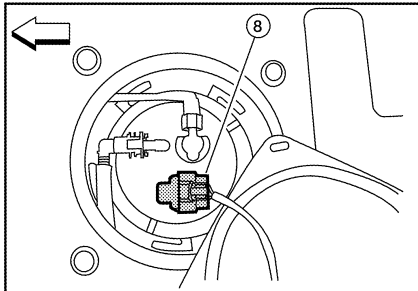
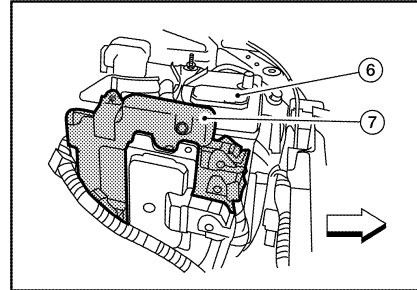
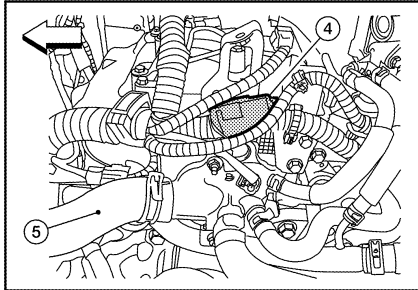
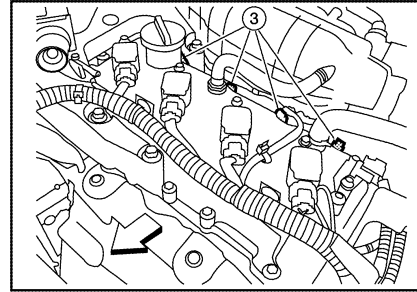
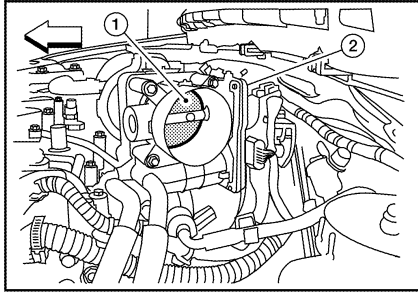
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COOLING FAN CONTROL

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[QR25DE EXCEPT FOR CALIFORNIA]



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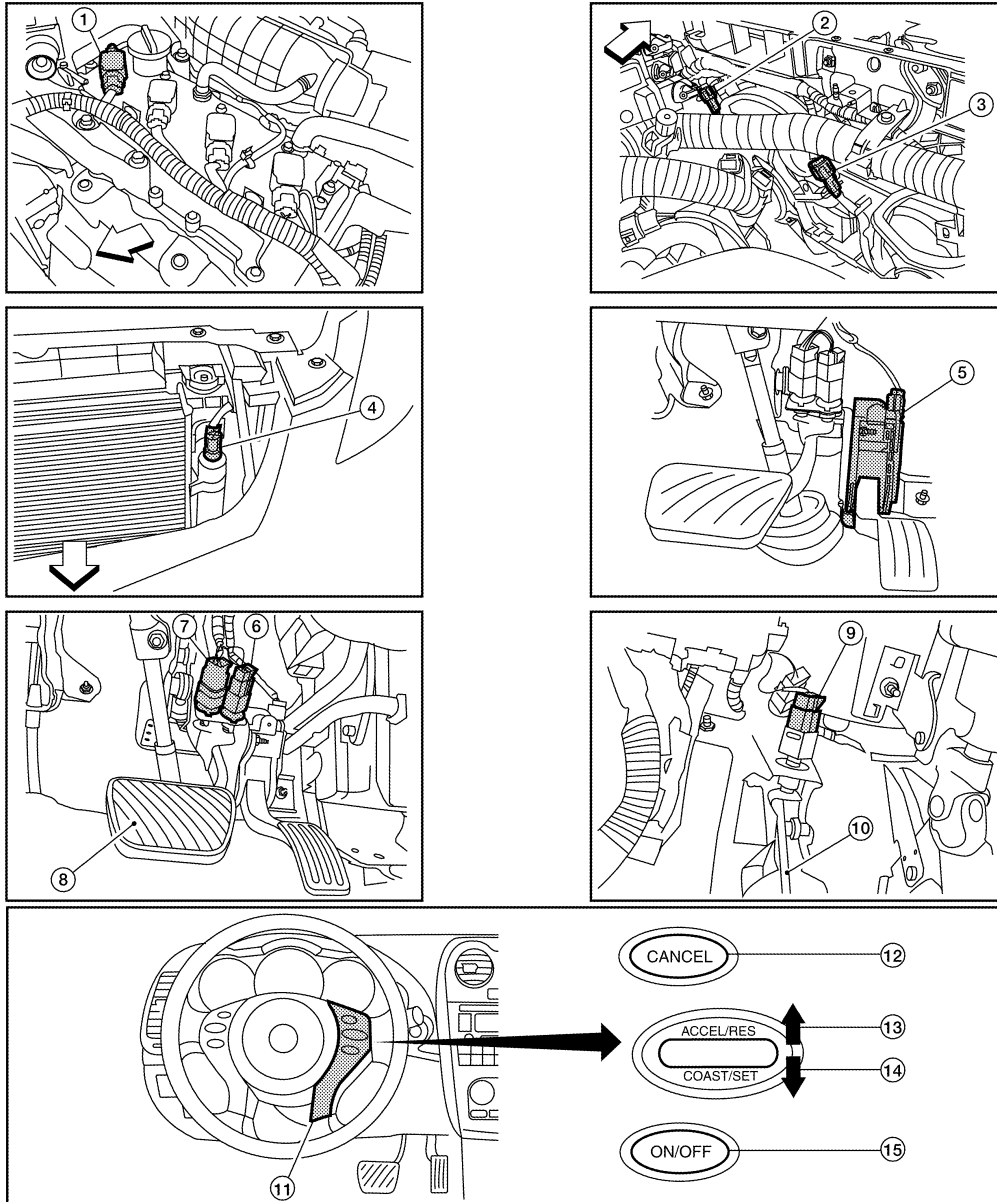
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|--|--|---|
| 1. Throttle valve (This illustration is view with intake air duct removed.) | 2. Electric throttle control actuator | 3. Fuel injector harness connector |
| 4. Condenser-2 | 5. Radiator hose (upper) | 6. Battery |
| 7. ECM | 8. Fuel level sensor unit and fuel pump harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.) | 9. Fuel level sensor unit and fuel pump assembly |
| 10. Fuel pressure regulator | 11. Fuel tank temperature sensor | 12. EVAP control system pressure sensor (This illustration is view with rear suspension member removed.) |
| 13. EVAP canister vent control valve (This illustration is view with rear suspension member removed.) | 14. EVAP canister (This illustration is view with rear suspension member removed.) | |

← : Vehicle front

COOLING FAN CONTROL

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[QR25DE EXCEPT FOR CALIFORNIA]



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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344078

| Component | Reference |
|----------------------------------|--|
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |
| Cooling fan motor | EC-598. "System Description" |

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Engine coolant temperature sensor | EC-689. "Description" |
| Refrigerant pressure sensor | EC-949. "Description" |

EVAPORATIVE EMISSION SYSTEM

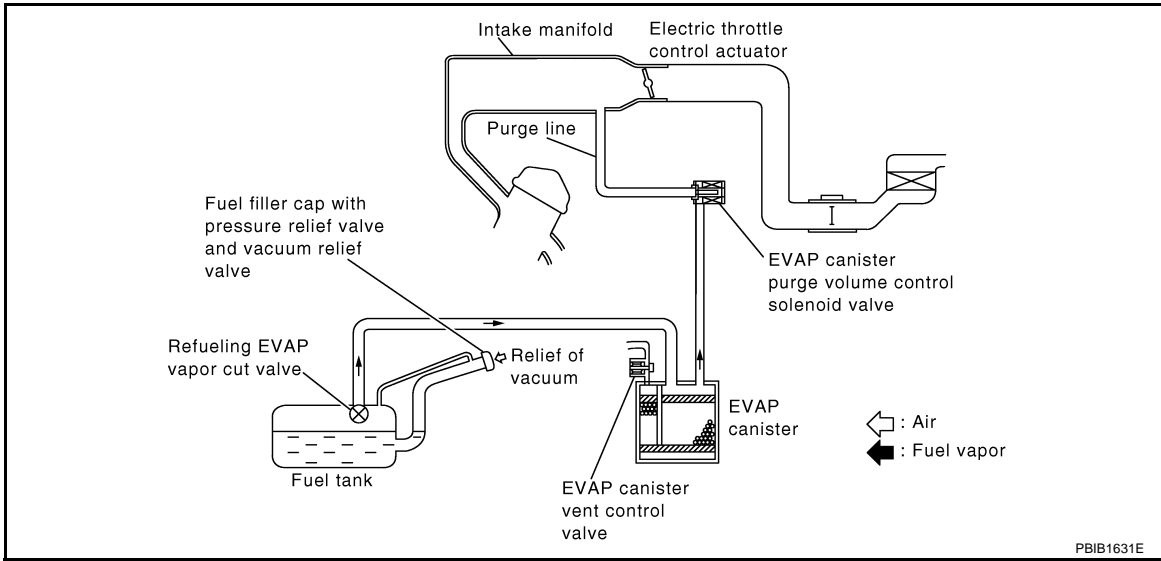
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EVAPORATIVE EMISSION SYSTEM

System Diagram

INFOID:000000001344079



EVAPORATIVE EMISSION LINE DRAWING

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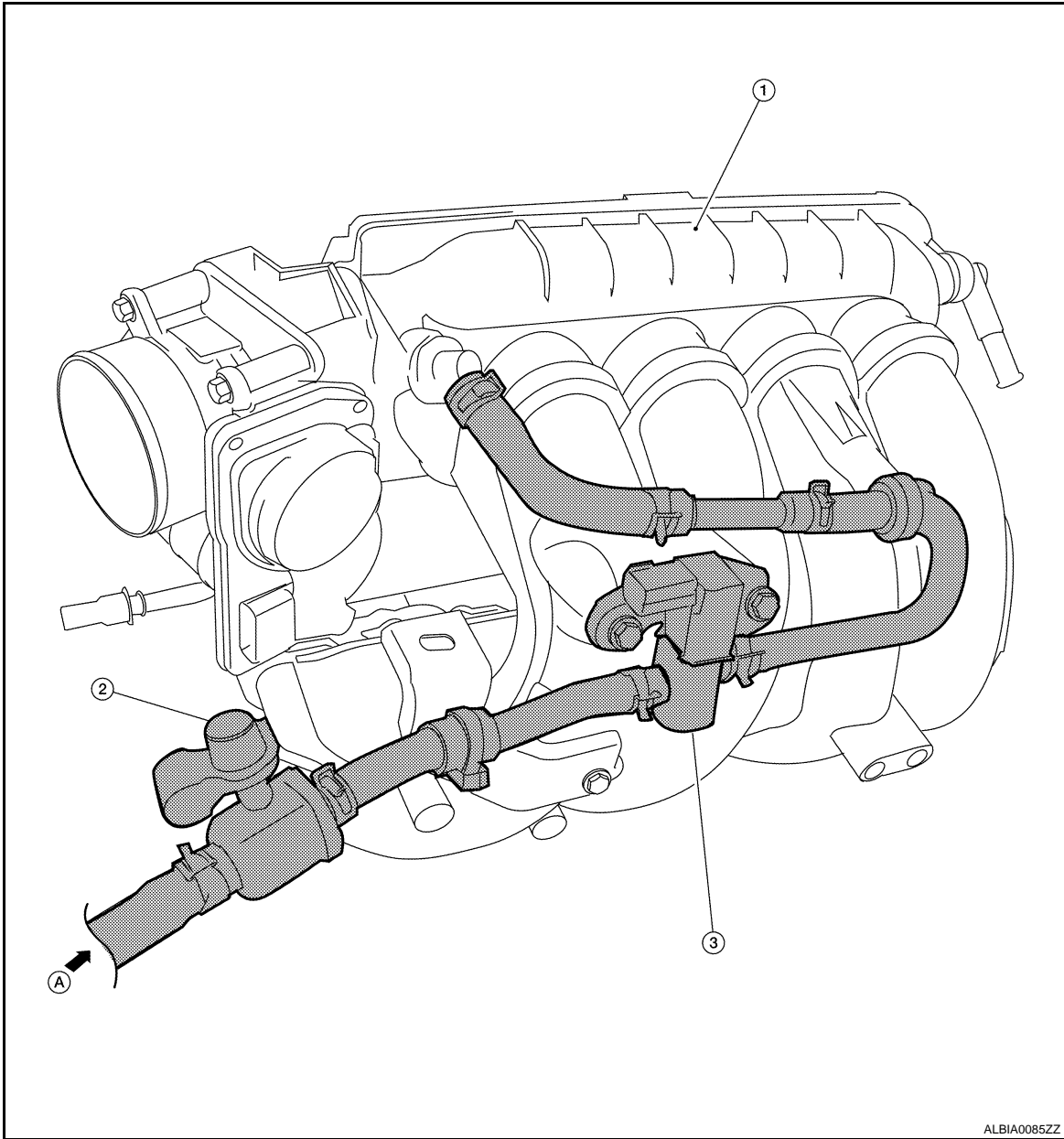
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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1. Intake manifold collector

2. EVAP service port

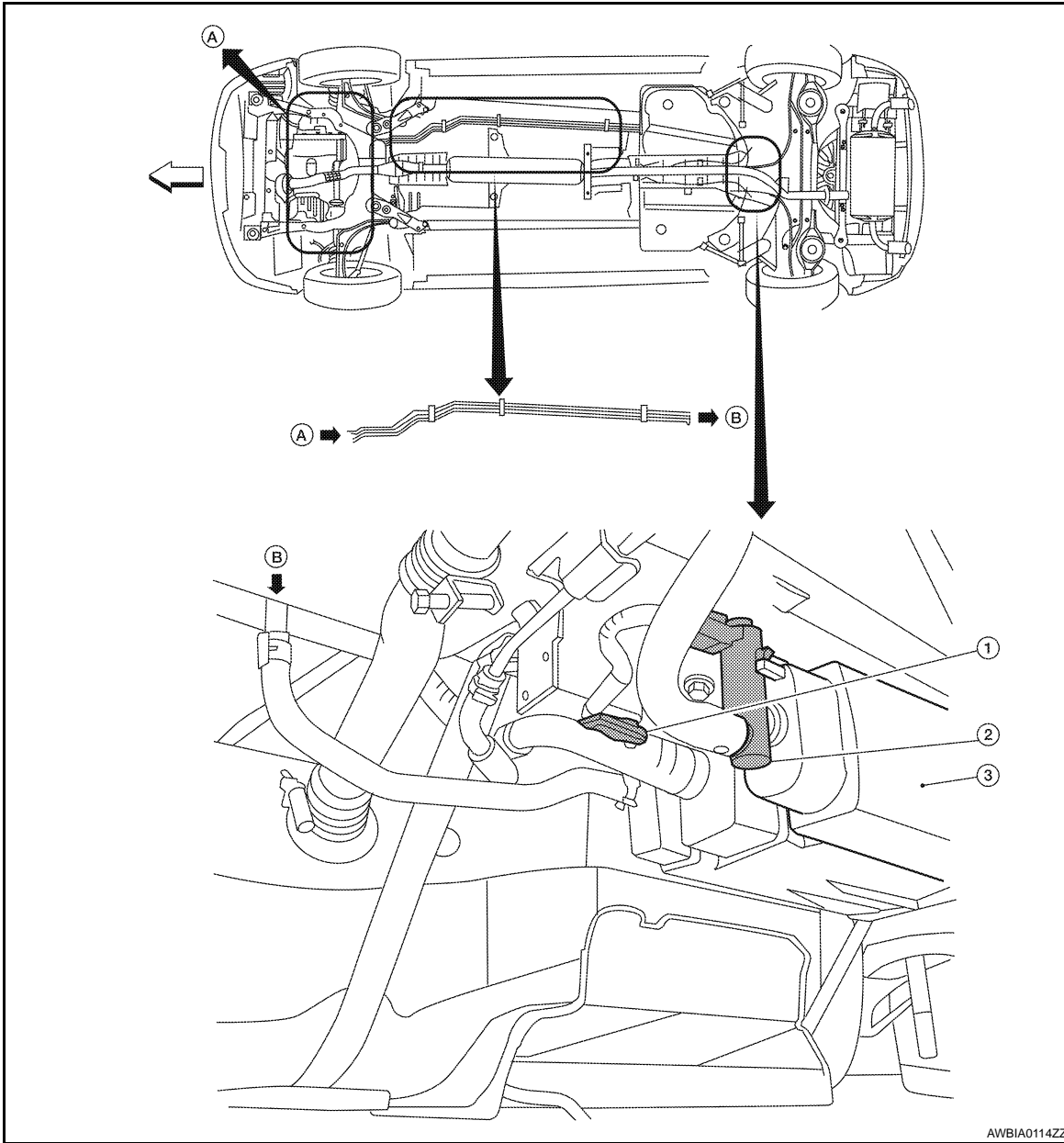
3. EVAP canister purge volume control solenoid valve

A. From next figure

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



- 1. EVAP control system pressure sensor
- 2. EVAP canister vent control valve
- 3. EVAP canister

A. To previous figure

NOTE:

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

System Description

INFOID:000000001344080

INPUT/OUTPUT SIGNAL CHART

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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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

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

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

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.

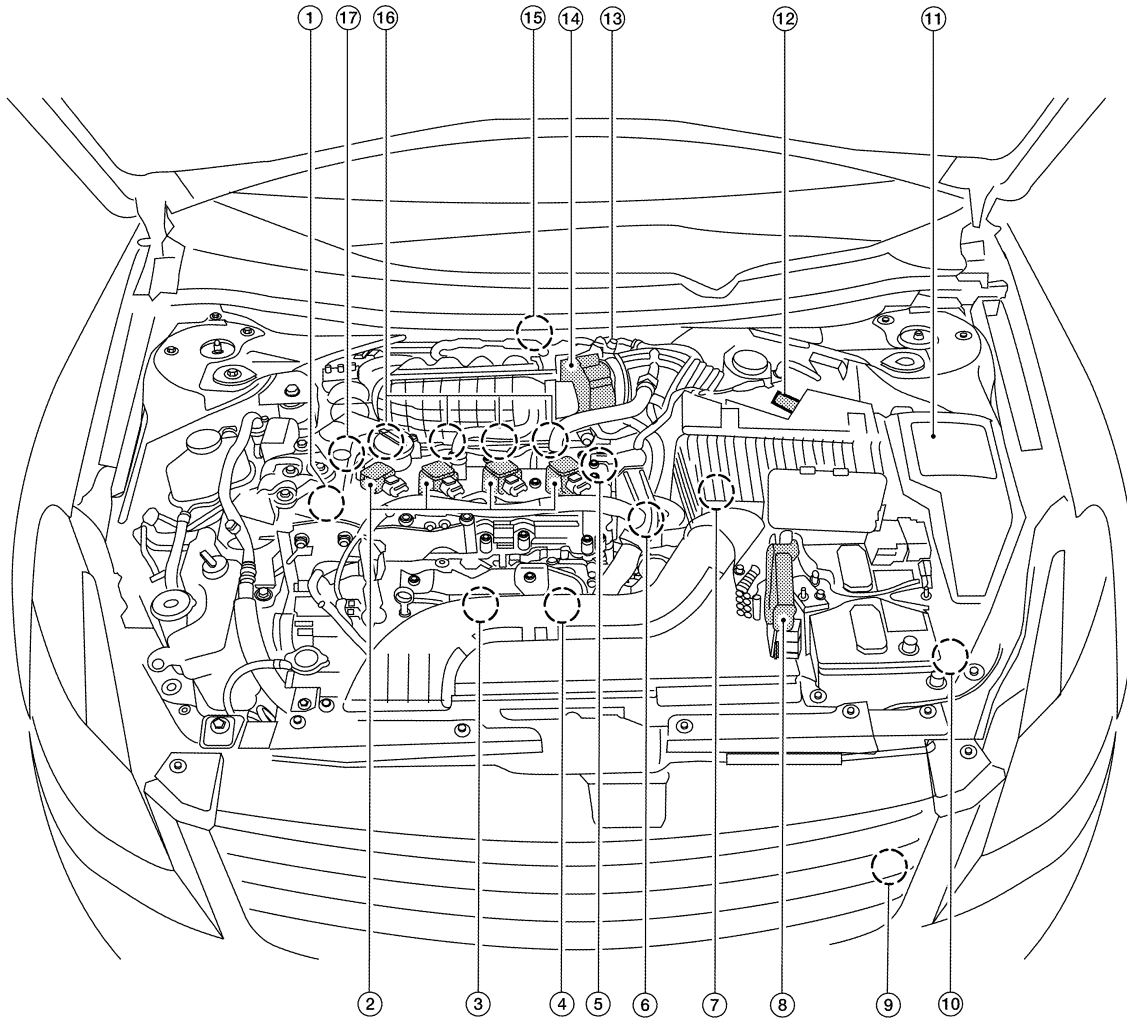
EVAPORATIVE EMISSION SYSTEM

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Component Parts Location

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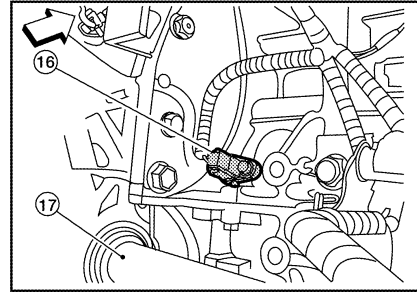
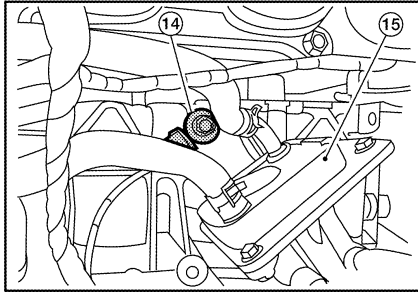
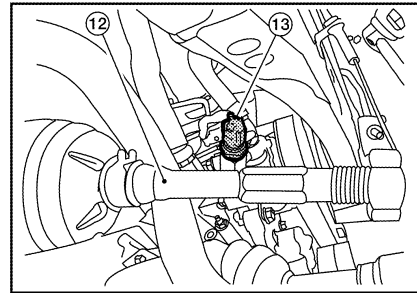
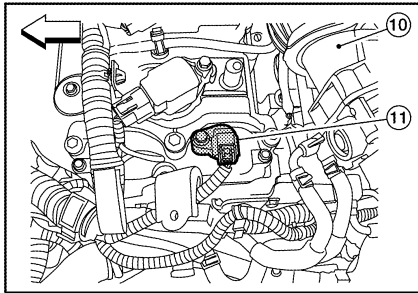
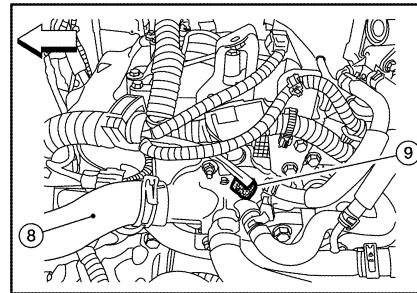
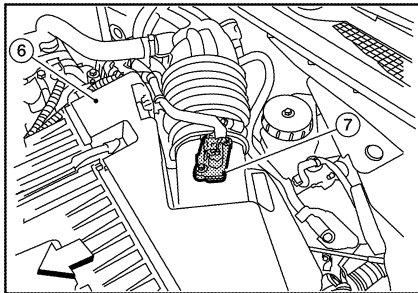
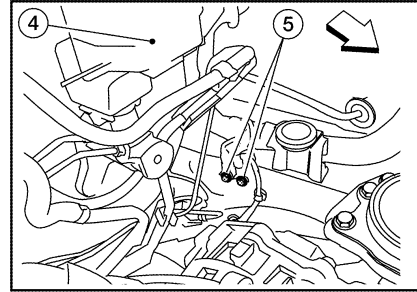
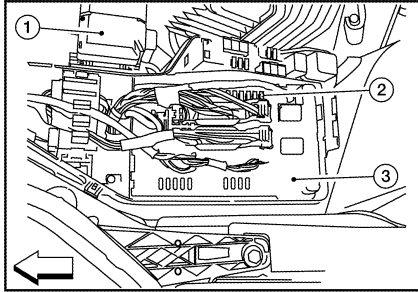
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| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

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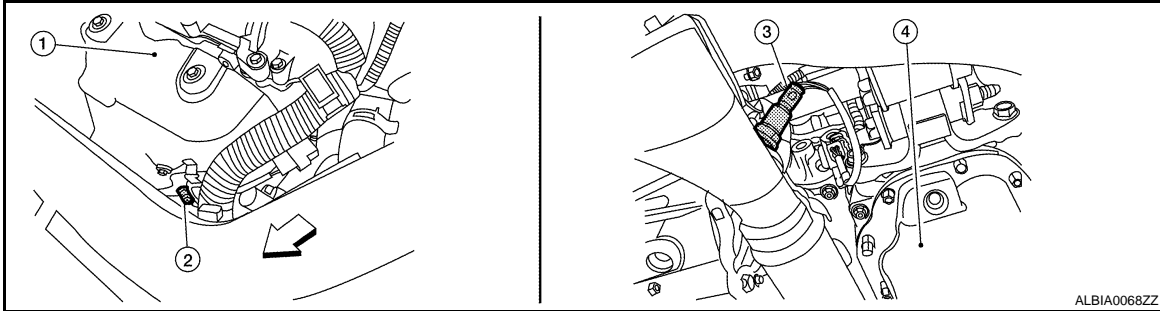
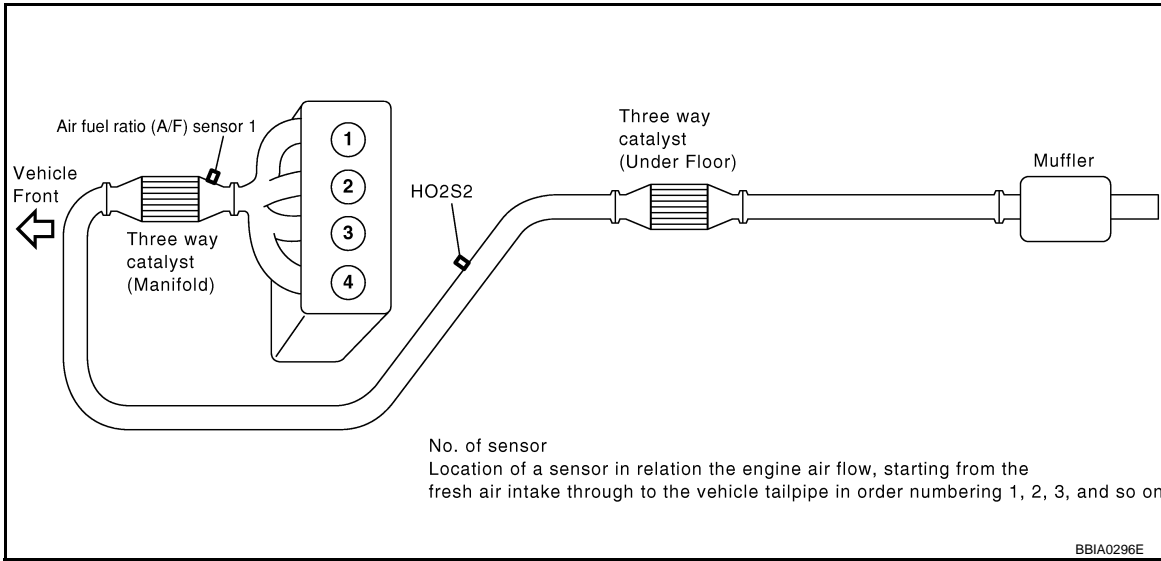
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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

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- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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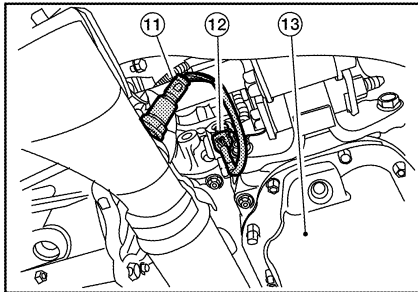
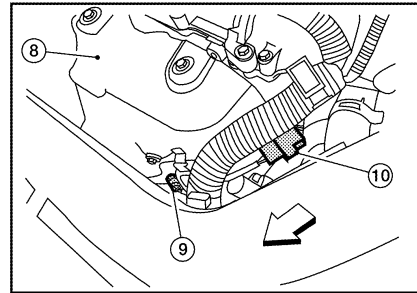
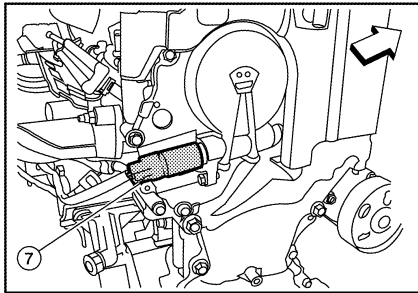
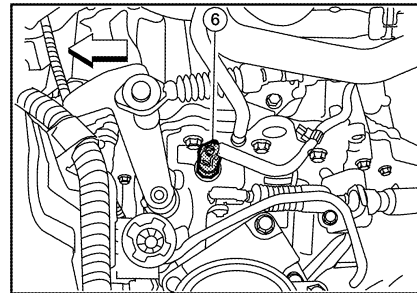
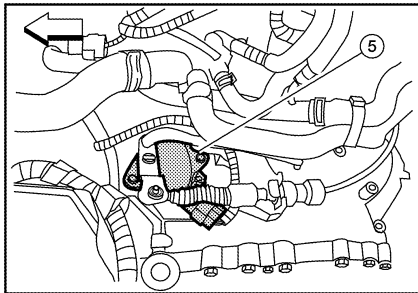
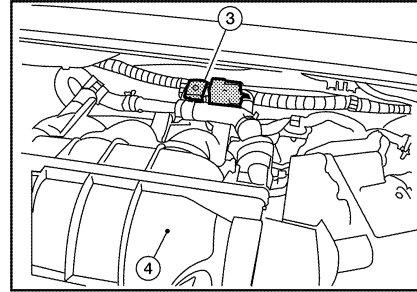
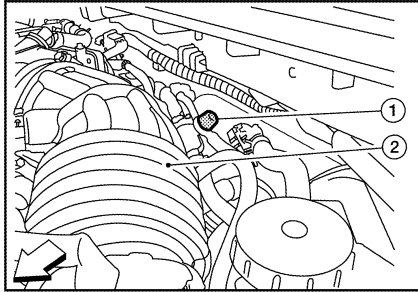
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |

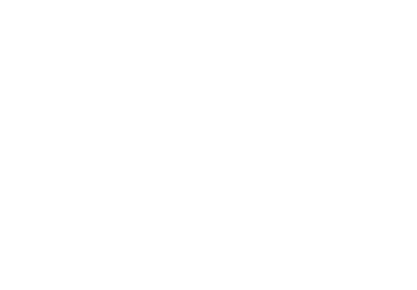
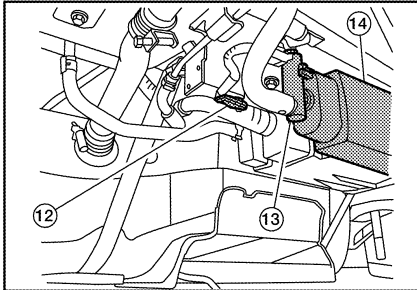
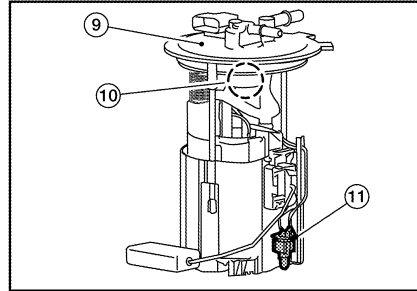
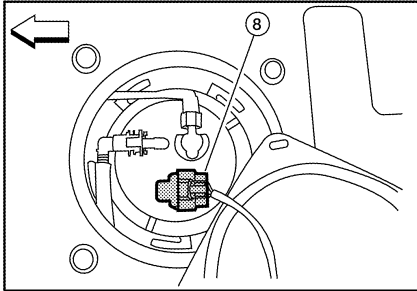
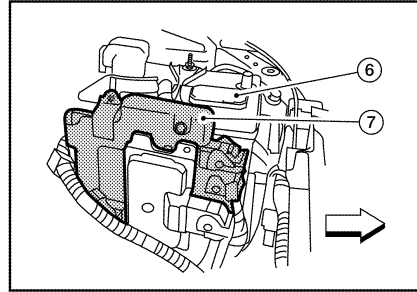
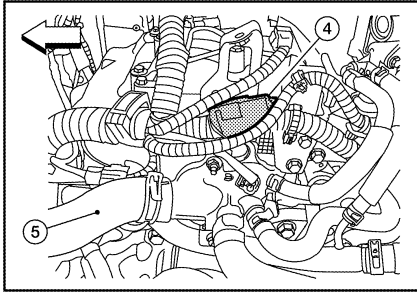
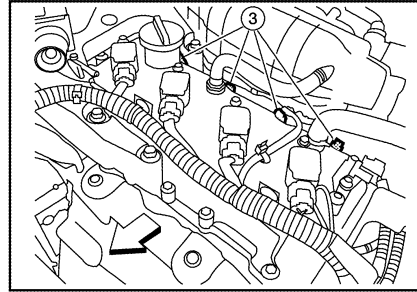
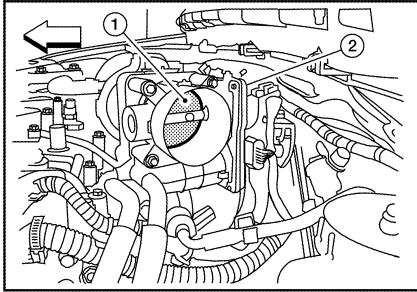
13. Engine oil pan

↶: Vehicle front

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

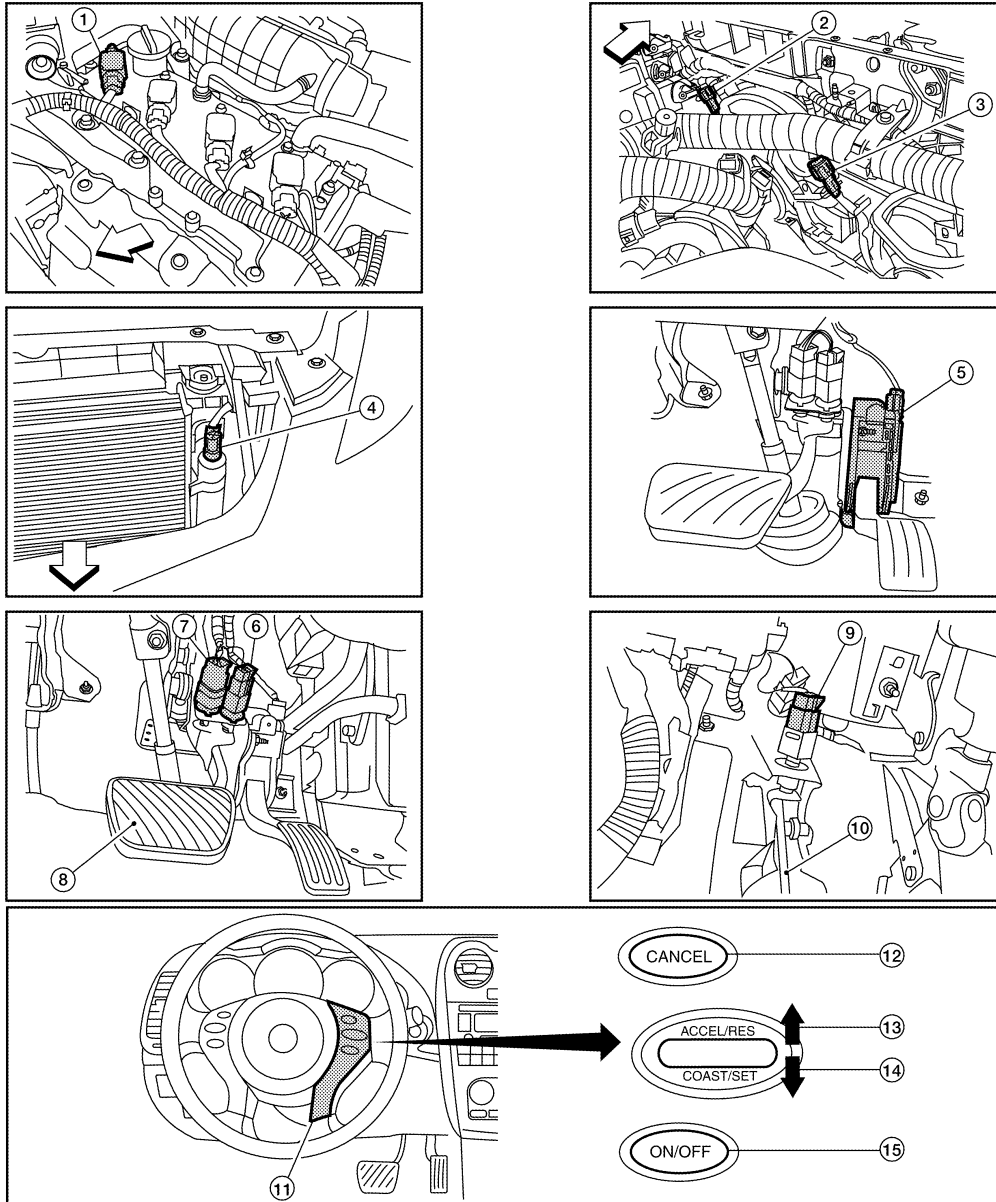
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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|--------------------------------|--|--|
| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344082

| Component | Reference |
|-----------------------------------|---------------------------------------|
| A/F sensor 1 | EC-702. "Description" |
| Accelerator pedal position sensor | EC-899. "Description" |
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Component | Reference | |
|---|---------------------------------------|----|
| Engine coolant temperature sensor | EC-689. "Description" | A |
| EVAP canister purge volume control solenoid valve | EC-784. "Description" | |
| EVAP control system pressure sensor | EC-799. "Description" | EC |
| Fuel tank temperature sensor | EC-744. "Description" | |
| Mass air flow sensor | EC-675. "Description" | |
| Throttle position sensor | EC-692. "Description" | C |
| Vehicle speed sensor | EC-831. "Description" | |

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INTAKE VALVE TIMING CONTROL

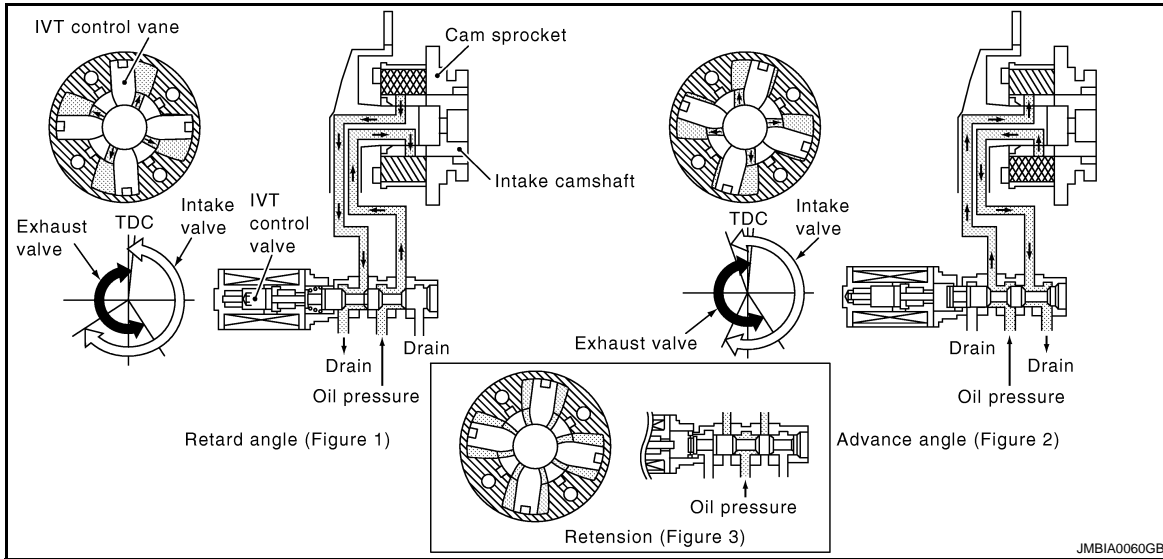
< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

INTAKE VALVE TIMING CONTROL

System Diagram

INFOID:000000001344083



System Description

INFOID:000000001344084

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|-----------------------------------|----------------------------------|-----------------------------|--|
| Crankshaft position sensor (POS) | Engine speed and piston position | Intake valve timing control | Intake valve timing control solenoid valve |
| Camshaft position sensor (PHASE) | | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Wheel sensor* | Vehicle speed | | |

*: This signal is sent to the ECM through 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.

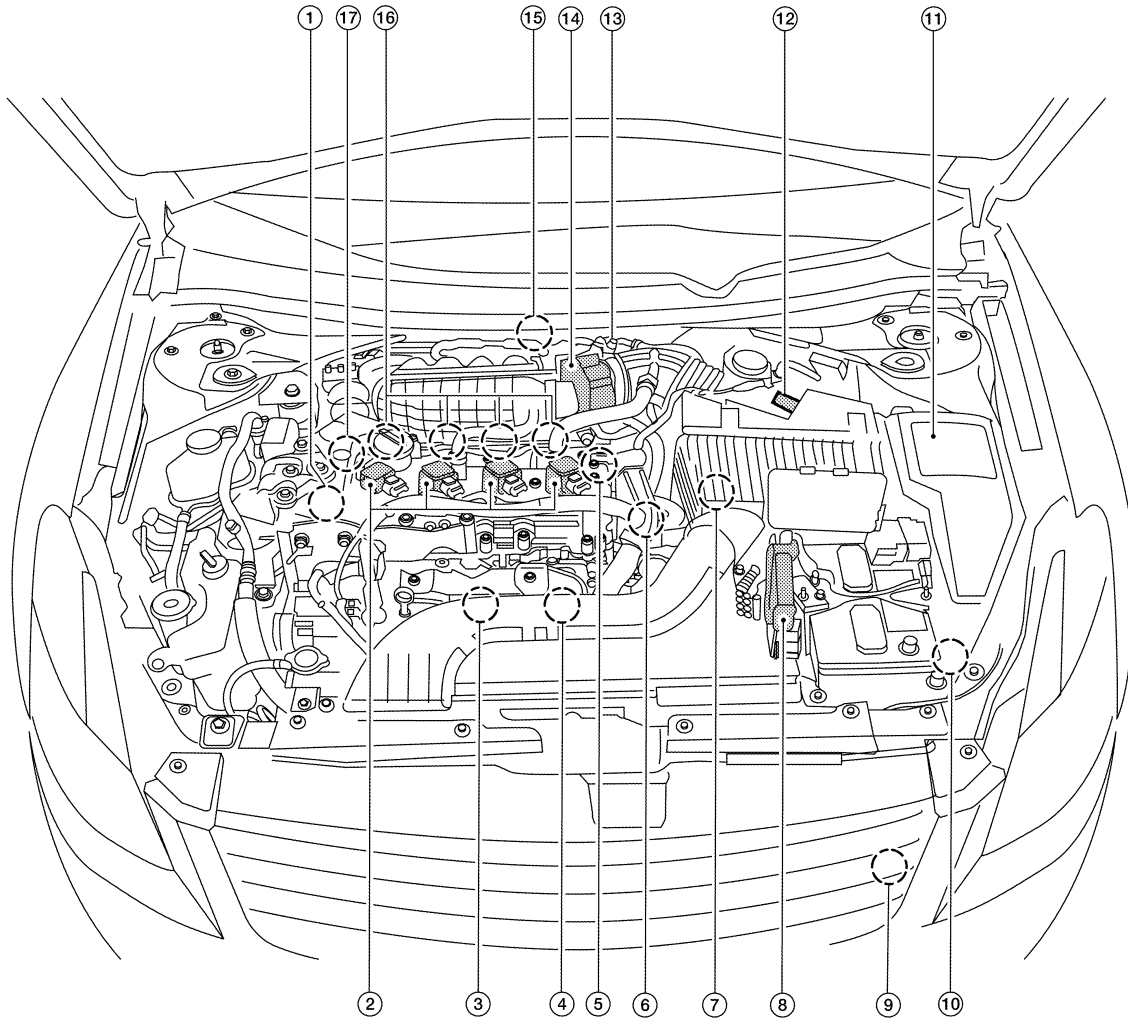
INTAKE VALVE TIMING CONTROL

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Component Parts Location

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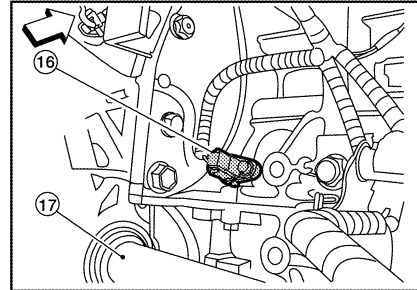
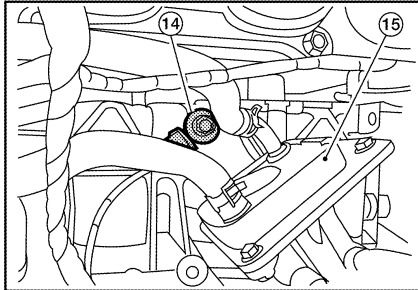
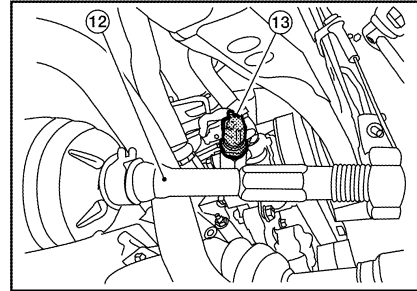
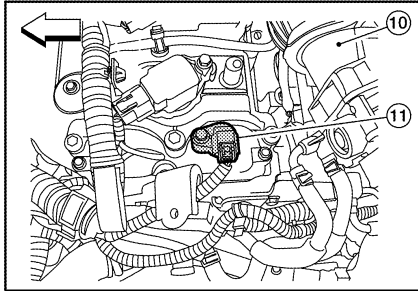
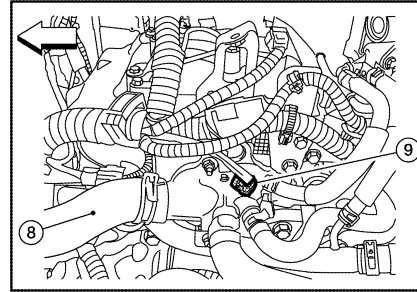
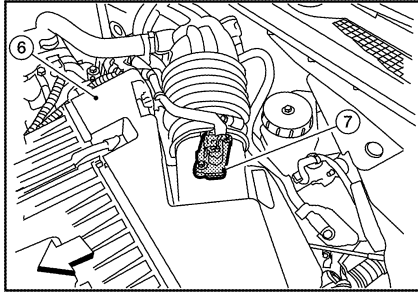
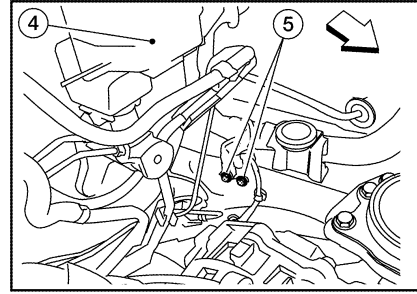
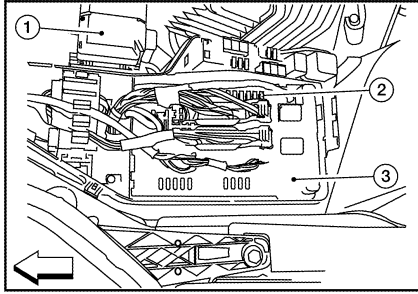
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|---|--|---|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug | 3. Knock sensor, Crankshaft position sensor (POS) |
| 4. Air fuel ratio (A/F) sensor 1 | 5. Camshaft position sensor (PHASE) | 6. Engine coolant temperature sensor |
| 7. Park/neutral position (PNP) switch | 8. ECM | 9. Refrigerant pressure sensor |
| 10. Battery current sensor | 11. IPDM E/R | 12. Mass air flow sensor (with intake temperature sensor) |
| 13. EVAP service port | 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 15. EVAP canister purge volume control solenoid valve |
| 16. Fuel injector | 17. Power steering pressure sensor | |

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



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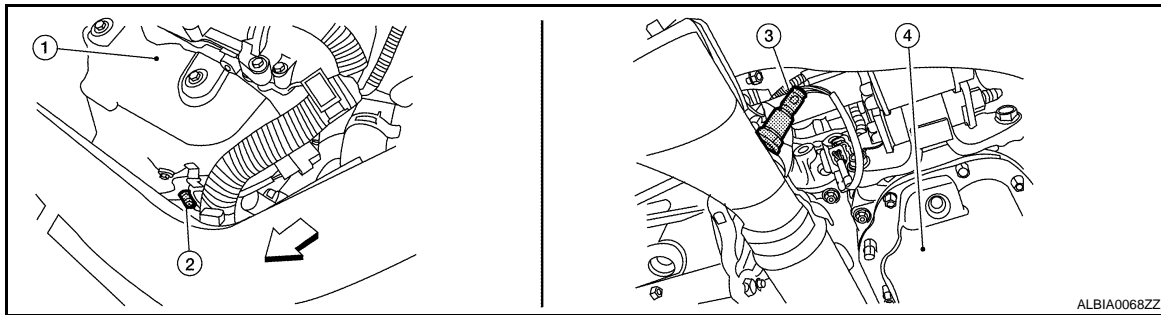
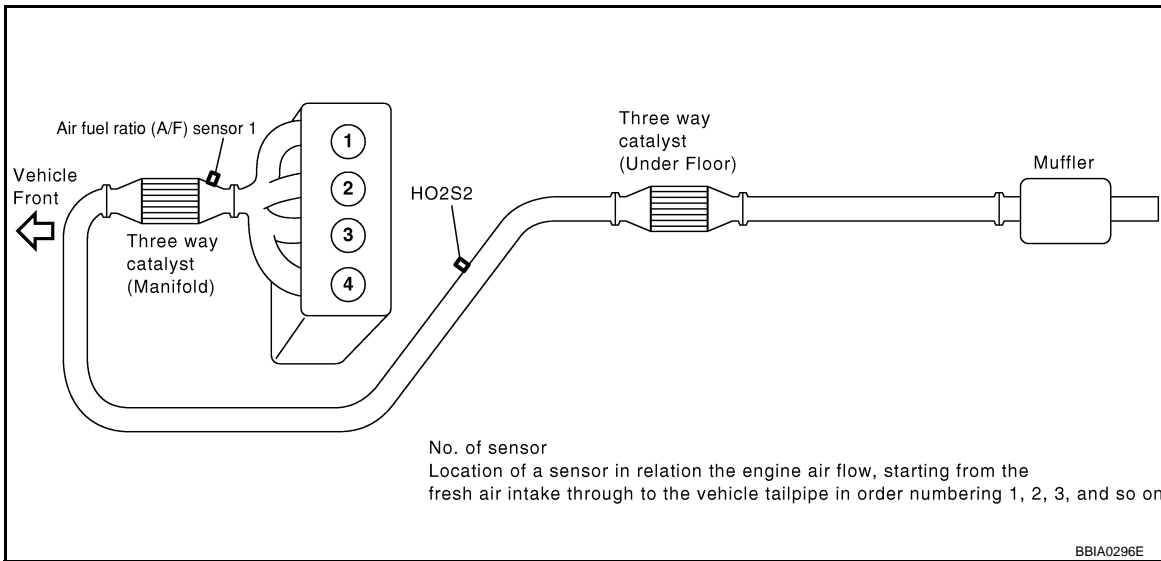
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|--|--------------------------------------|--------------------------------------|
| 1. Battery | 2. Fuel pump fuse (15A) | 3. IPDM E/R |
| 4. Brake master cylinder | 5. Engine ground | 6. Air cleaner assembly |
| 7. Mass air flow sensor (with intake air temperature sensor) | 8. Radiator hose (upper) | 9. Engine coolant temperature sensor |
| 10. Intake air duct | 11. Camshaft position sensor (PHASE) | 12. Tie rod (RH) |
| 13. Power steering pressure sensor | 14. Knock sensor | 15. Engine oil cooler |
| 16. Crankshaft position sensor (POS) | 17. Drive shaft (RH) | |

↙: Vehicle front

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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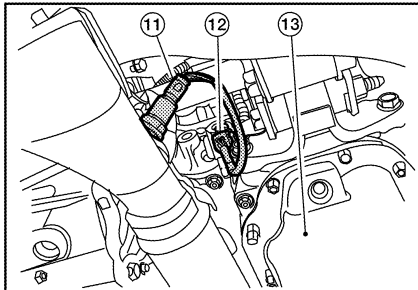
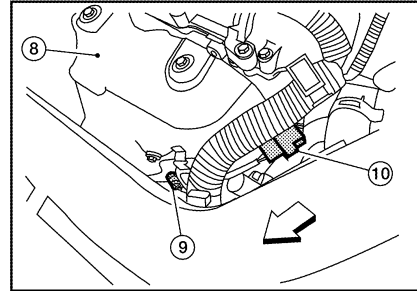
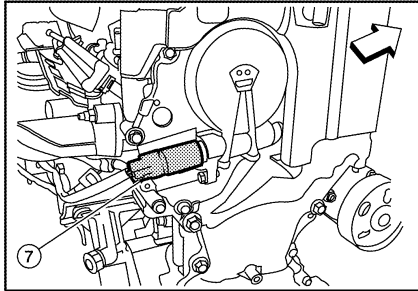
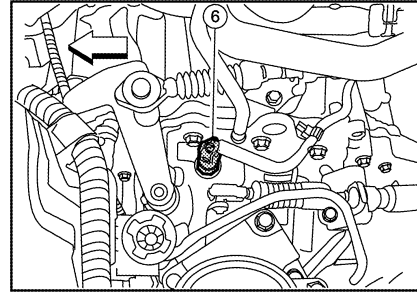
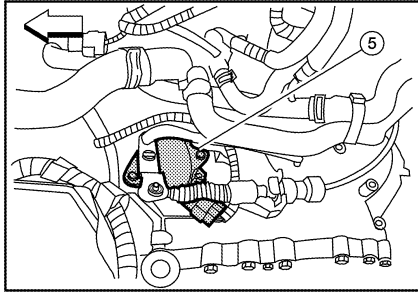
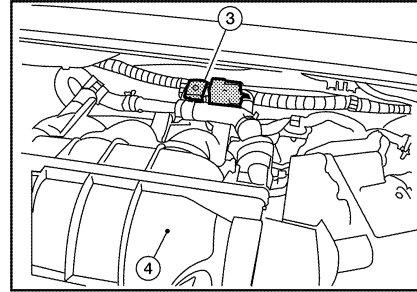
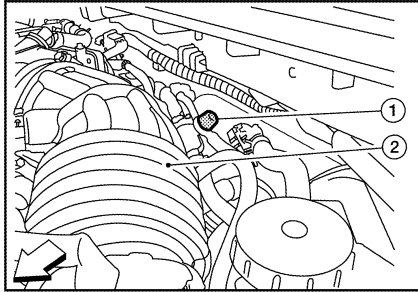
- 1. Exhaust manifold cover
 - 2. Air fuel ratio (A/F) sensor 1
 - 3. Heated oxygen sensor 2
(This illustration is a view from under vehicle.)
 - 4. Engine oil pan
- ⇐: Vehicle front

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INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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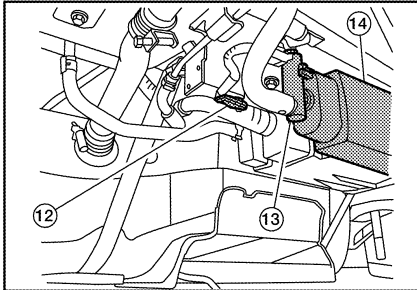
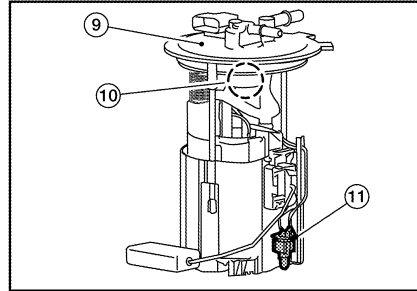
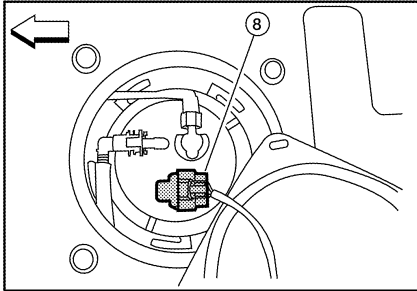
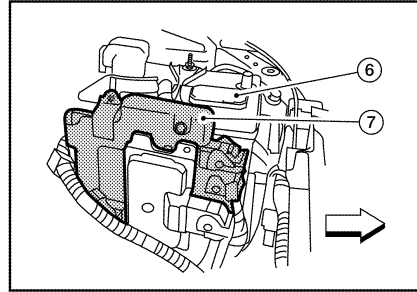
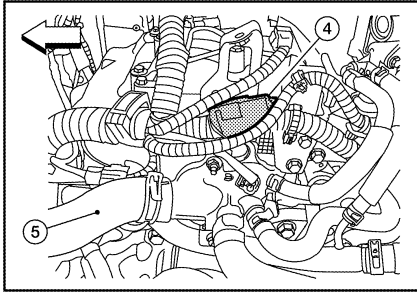
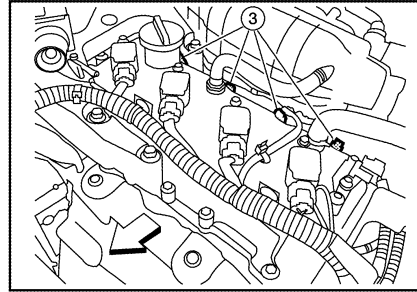
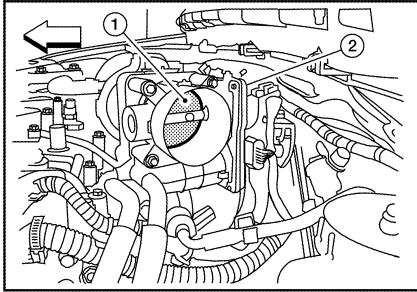
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|---|---|---|
| 1. EVAP service port | 2. Intake air duct | 3. EVAP canister purge volume control solenoid valve |
| 4. Intake manifold collector | 5. Park/neutral position (PNP) switch (CVT) (This illustration is view with air cleaner assembly removed.) | 6. Park/neutral position (PNP) switch (M/T) (This illustration is view with air cleaner assembly removed.) |
| 7. Intake valve timing control solenoid valve (This illustration is view with engine removed.) | 8. Exhaust manifold cover | 9. Air fuel ratio (A/F) sensor 1 |
| 10. Air fuel ratio (A/F) sensor 1 harness connector | 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.) | 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.) |
| 13. Engine oil pan | | |

↶: Vehicle front

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



1. Throttle valve
(This illustration is view with intake air duct removed.)

2. Electric throttle control actuator

3. Fuel injector harness connector

4. Condenser-2

5. Radiator hose (upper)

6. Battery

7. ECM

8. Fuel level sensor unit and fuel pump harness connector
(This illustration is view with rear seat cushion and inspection hole cover removed.)

9. Fuel level sensor unit and fuel pump assembly

10. Fuel pressure regulator

11. Fuel tank temperature sensor

12. EVAP control system pressure sensor
(This illustration is view with rear suspension member removed.)

13. EVAP canister vent control valve
(This illustration is view with rear suspension member removed.)

14. EVAP canister
(This illustration is view with rear suspension member removed.)

← : Vehicle front

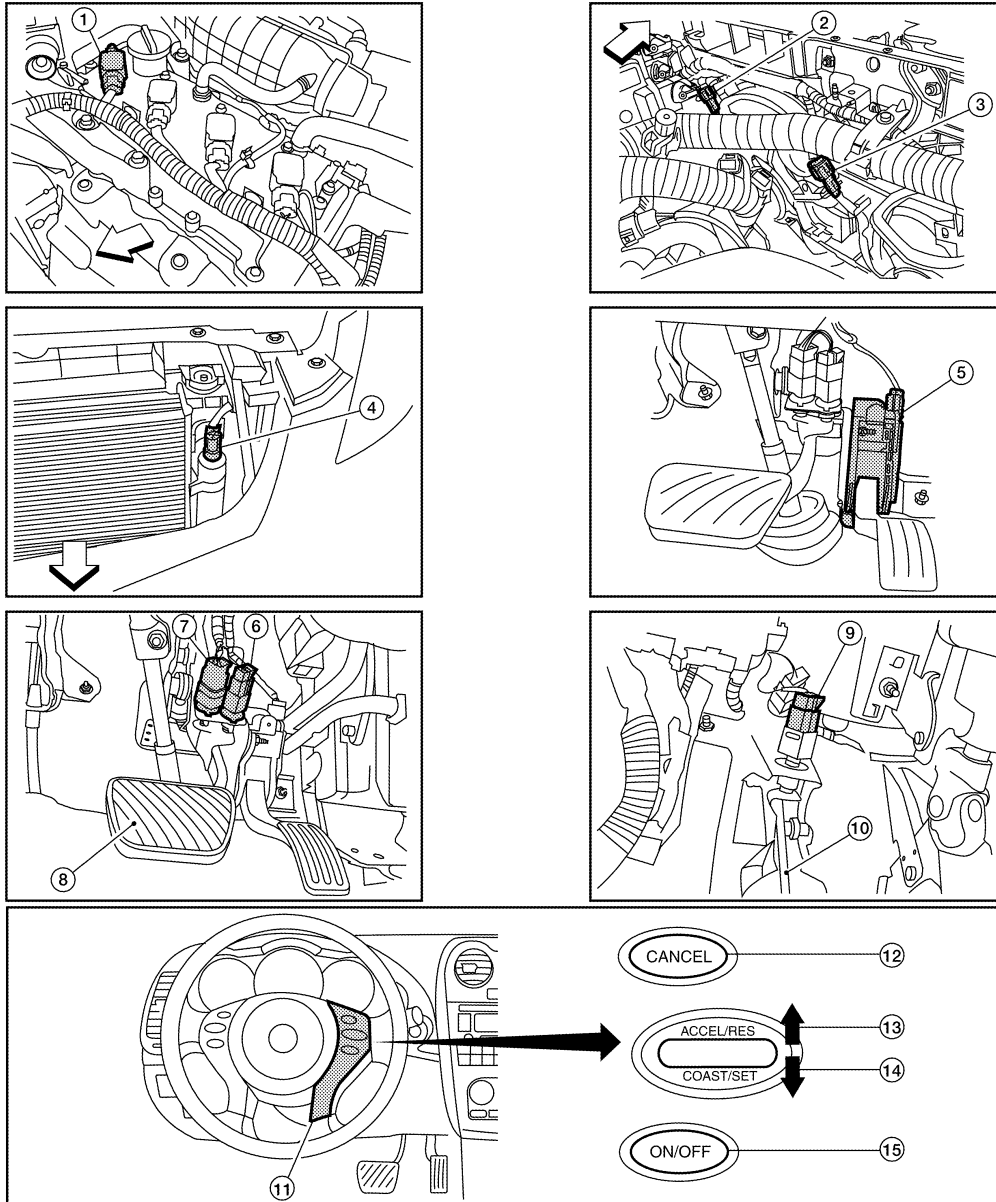
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INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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| 1. No.1 ignition coil | 2. Cooling fan motor-1 harness connector | 3. Cooling fan motor-2 harness connector |
| 4. Refrigerant pressure sensor | 5. Accelerator pedal position sensor | 6. ASCD brake switch |
| 7. Stop lamp switch | 8. Brake pedal | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. ASCD steering switch | 12. CANSEC switch |
| 13. RESUME/ACCELERATE switch | 14. SET/COAST switch | 15. MAIN switch |

↙: Vehicle front

Component Description

INFOID:000000001344086

| Component | Reference |
|-----------------------------------|---------------------------------------|
| Camshaft position sensor (PHASE) | EC-764. "Description" |
| Crankshaft position sensor (POS) | EC-760. "Description" |
| Engine coolant temperature sensor | EC-689. "Description" |

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

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| Component | Reference |
|--|--|
| Intake valve timing control solenoid valve | EC-618, "System Description" |
| Vehicle speed sensor | EC-831, "Description" |

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:000000001344087

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.

x: Applicable —: Not applicable

| | DTC | 1st trip DTC | Freeze Frame data | 1st trip Freeze Frame data | SRT code | SRT status | Test value |
|-------------|-----|--------------|-------------------|----------------------------|----------|------------|------------|
| CONSULT-III | x | x | x | x | x | x | — |
| GST | x | x | x | — | x | x | x |
| ECM | x | x* | — | — | — | x | — |

*: 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 lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-984, "Fail Safe"](#).)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up 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 lights up. The MIL lights up 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 light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

x: Applicable —: Not applicable

| Items | MIL | | | | DTC | | 1st trip DTC | |
|---|----------|-------------|----------|-------------|---------------------|---------------------|---------------------|---------------------|
| | 1st trip | | 2nd trip | | 1st trip displaying | 2nd trip displaying | 1st trip displaying | 2nd trip displaying |
| | Blinking | Lighting up | Blinking | Lighting up | | | | |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | x | — | — | — | — | — | x | — |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | — | — | x | — | — | x | — | — |
| One trip detection diagnoses (Refer to EC-987, "DTC Index" .) | — | x | — | — | x | — | — | — |
| Except above | — | — | — | x | — | x | x | — |

DTC AND FREEZE FRAME DATA

DTC and 1st Trip DTC

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< FUNCTION DIAGNOSIS >

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 reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (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 lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored 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 light up 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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 lighting up 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 [EC-539, "Work Flow"](#). 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. The ECM has the following priorities to update the data.

| Priority | Items | |
|----------|----------------------------|--|
| 1 | Freeze frame data | Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172 |
| 2 | | Except the above items (Includes CVT related items) |
| 3 | 1st trip freeze frame data | |

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored 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 can be stored in the ECM). If freeze frame data is stored in the ECM memory and 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

How to Read DTC and 1st Trip DTC

 **With CONSULT-III**

 **With GST**

CONSULT-III or GST (Generic Scan Tool) Examples: P0340, P0850, P1148, etc.
These DTCs are prescribed by SAE J2012.

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

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 or 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.**

DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-III. 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].

How to Erase DTC and 1st Trip DTC

With CONSULT-III

The emission related diagnostic information in the ECM can be erased by selecting “All Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

With GST

The emission related diagnostic information in the ECM can be erased by selecting Service \$04 with GST.

NOTE:

If the DTC is not for CVT related items (see [EC-987, "DTC Index"](#)), skip step 2.

1. 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.
2. Perform [TM-291, "Diagnosis Description"](#). (The DTC in TCM will be erased)
3. Select Service \$04 with GST (Generic Scan Tool).

No Tools

NOTE:

If the DTC is not for CVT related items (see [EC-987, "DTC Index"](#)), skip step 2.

1. 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.
 2. Perform [TM-291, "Diagnosis Description"](#). (The DTC in the TCM will be erased.)
 3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal.
- **If the battery is disconnected, the emission-related diagnostic information will be lost 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.

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.

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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 (CONSULT-III indication) | Performance Priority* | Required self-diagnostic items to set the SRT to "CMPLT" | Corresponding DTC No. |
|--------------------------------------|--------------------------|--|--------------------------|
| CATALYST | 2 | Three way catalyst function | P0420 |
| 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 |
| | | Heated oxygen sensor 2 | P0137 |
| | | Heated oxygen sensor 2 | P0138 |
| | | Heated oxygen sensor 2 | P0139 |

*: 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 | Ignition cycle | | | | |
| | | | ← ON → | OFF | ← ON → | OFF | |
| 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 (Consecutive NG) | |
| | | (1st trip) DTC | 1st trip DTC | — | 1st trip DTC | DTC (= MIL ON) | |
| | | SRT of EGR | "INCMP" | "INCMP" | "INCMP" | "CMPLT" | |

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

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

—: Self-diagnosis is not carried out.

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

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When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above
If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or 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:

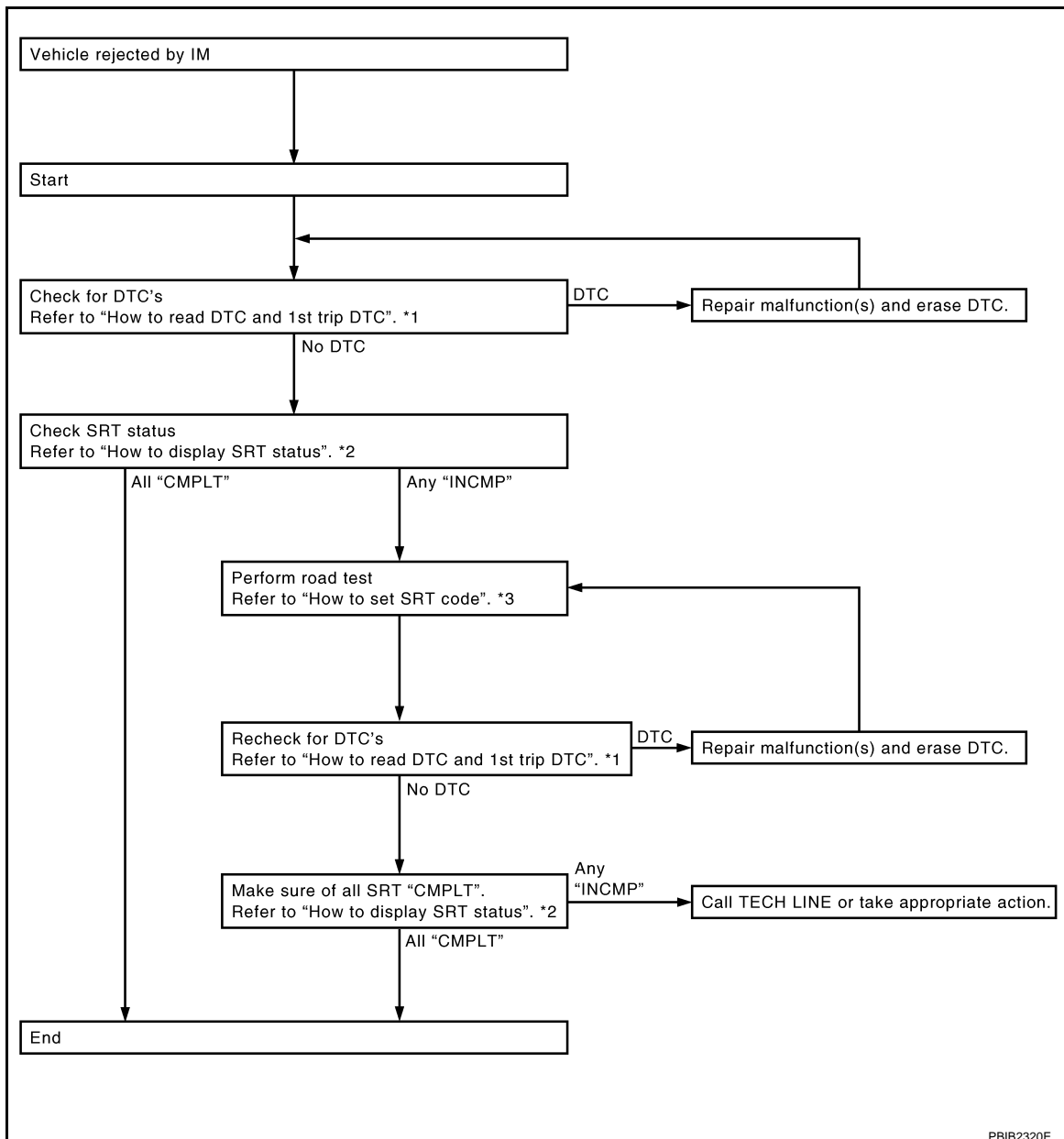
- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from 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.



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*1 "How to Read DTC and 1st Trip DTC" *2 "How to Display SRT Status"

*3 "How to Set SRT Code"

How to Display SRT Status

WITH CONSULT-III

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-III.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.

NOTE:

Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.

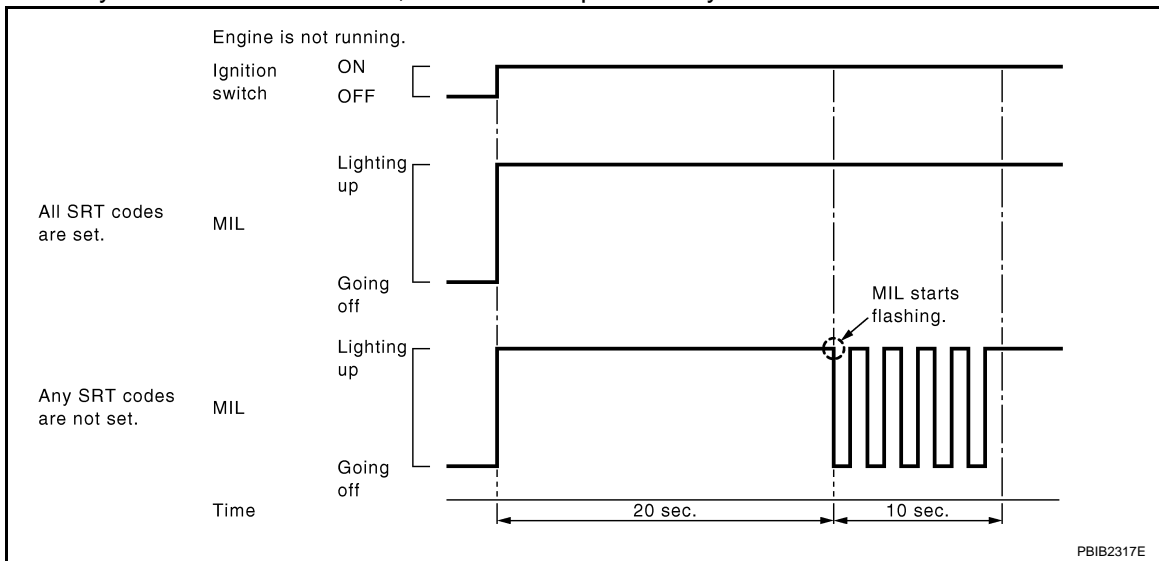
WITH GST

Selecting Service \$01 with GST (Generic Scan Tool)

NO TOOLS

A SRT code itself can not be displayed while only SRT status can be.

1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL lights up continuously.
 - When any SRT codes are not set, MIL will flash periodically for 10 seconds.

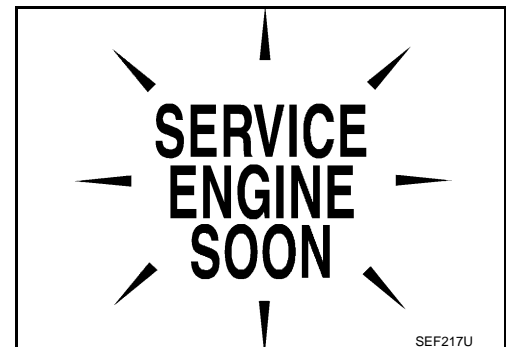


MALFUNCTION INDICATOR LAMP (MIL)

Description

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check. If the MIL does not light up, refer to [MWI-28. "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).
2. When the engine is started, the MIL should go 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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| Diagnostic Test Mode | KEY and ENG. Status | Function | Explanation of Function |
|----------------------|---|-------------------------|---|
| Mode I | Ignition switch in ON position  Engine stopped  | BULB CHECK | This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit. |
| | Engine running  | MALFUNCTION WARNING | This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses |
| Mode II | Ignition switch in ON position  Engine stopped  | SELF-DIAGNOSTIC RESULTS | This function allows DTCs and 1st trip DTCs to be read. |

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [MWI-28. "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).

Diagnostic Test Mode I — Malfunction Warning

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

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

Diagnostic Test Mode II — Self-diagnostic Results

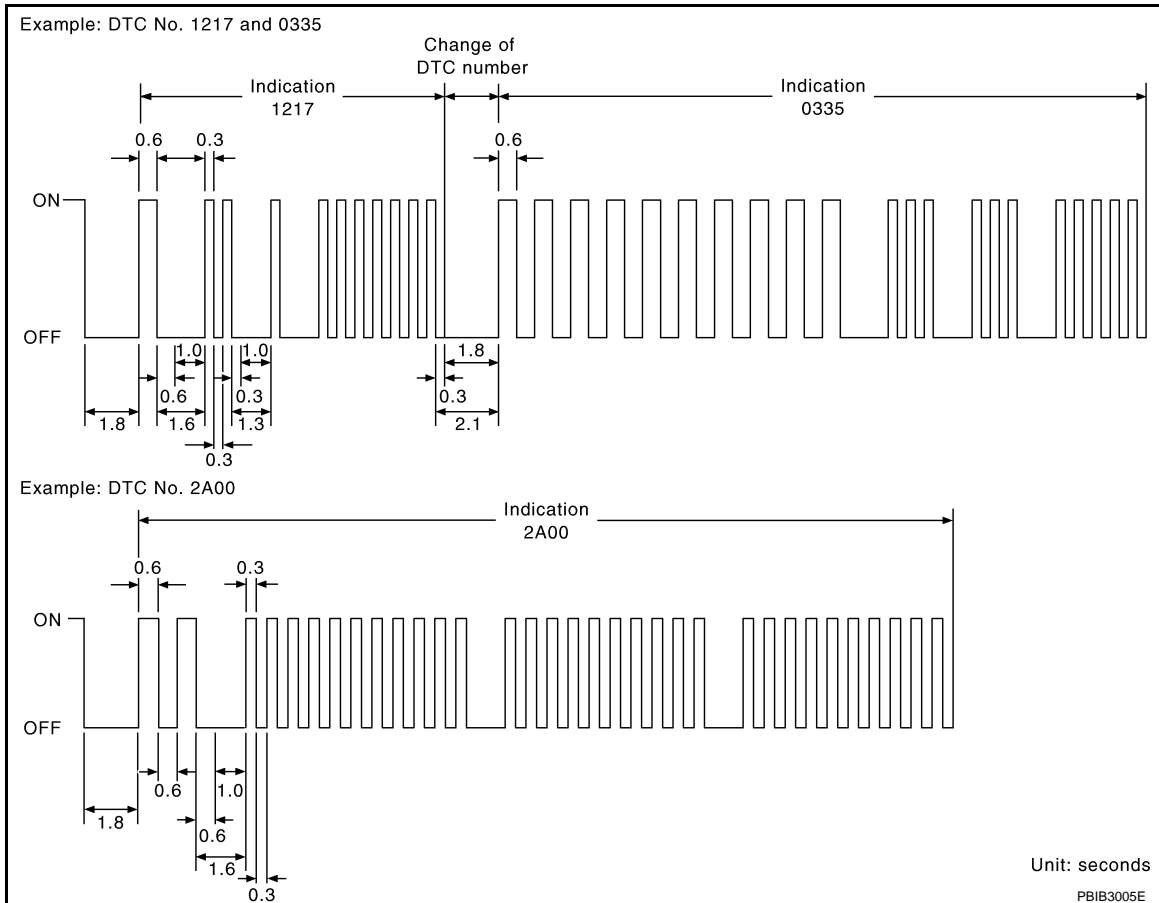
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed 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 flashes as follows.

| Number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---------|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Flashes | 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-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-987, "DTC Index"](#))

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.
- Always ECM returns to Diagnostic Test Mode I after 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 five 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 for approx. 10 seconds until the MIL starts blinking.

NOTE:

Do not release the accelerator pedal for 10 seconds if MIL may start blinking on the halfway of this 10 seconds. This blinking is displaying SRT status and is continued for another 10 seconds.

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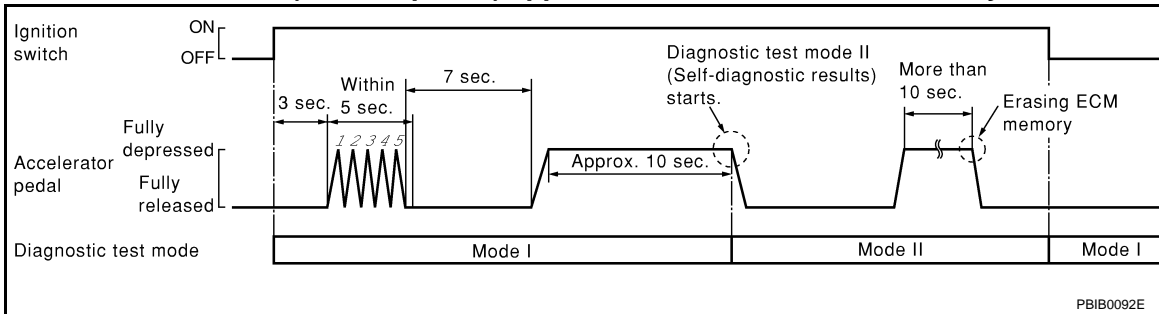
< FUNCTION DIAGNOSIS >

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- Fully release the accelerator pedal.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).

NOTE:

Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



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)”.
- Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
- Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “How to Erase Diagnostic Test Mode II (Self-diagnostic Results)”.

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Be careful not to 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 first 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 go off after the vehicle is driven 3 times (driving pattern B) with no malfunction. The 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 CONSULT-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 (goes 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 (clear) | *1, *2 | *1, *2 | 1 (pattern B) |

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.

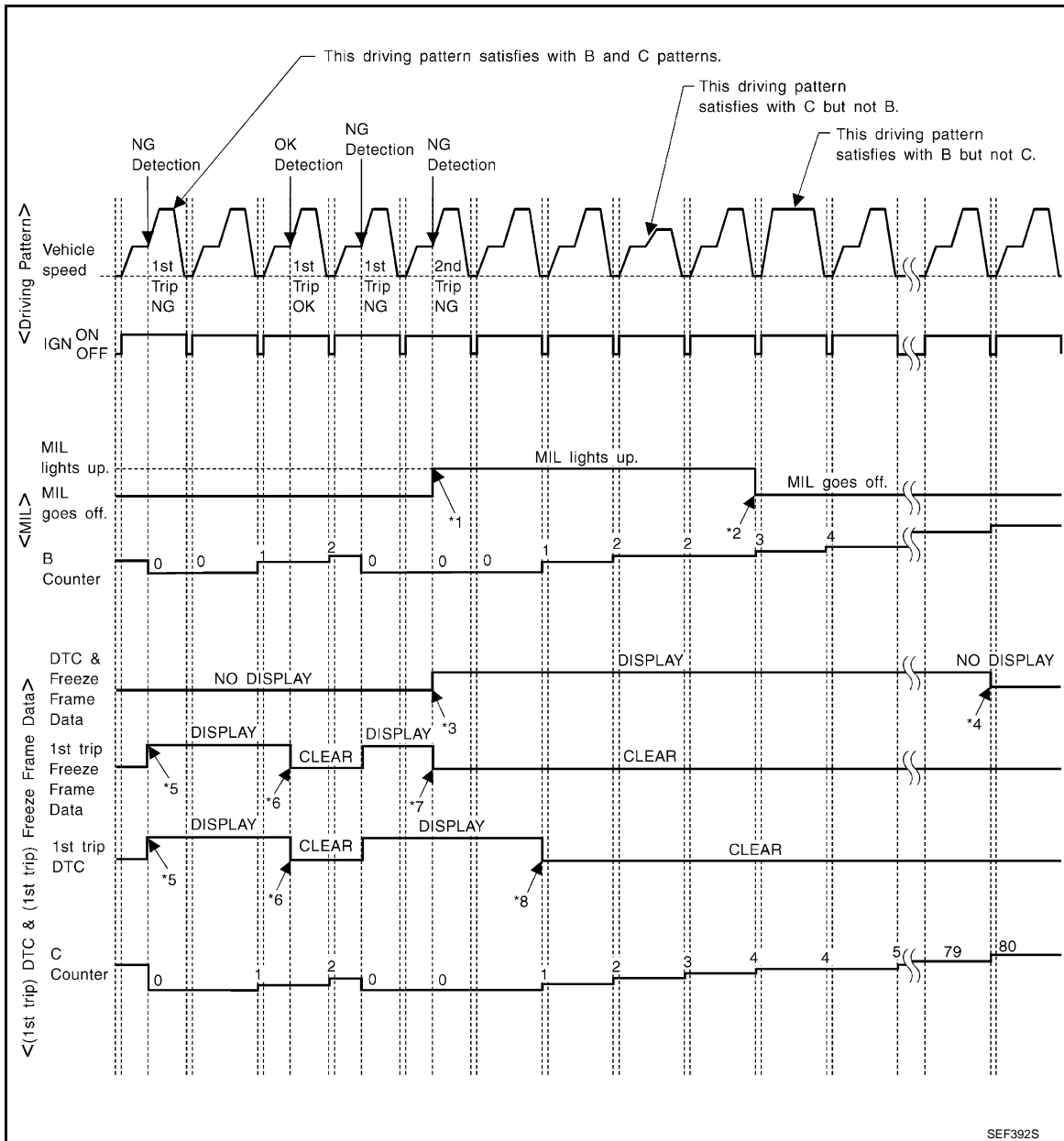
Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns for “Misfire <Exhaust Quality Deterioration>”,

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"Fuel Injection System"



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip 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.

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

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

<Driving Pattern B>
Driving pattern B means the vehicle operation as follows:

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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 malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the 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), T should be lower than 70°C (158°F).
- 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).

Example:

If the stored freeze frame data is as follows:

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:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

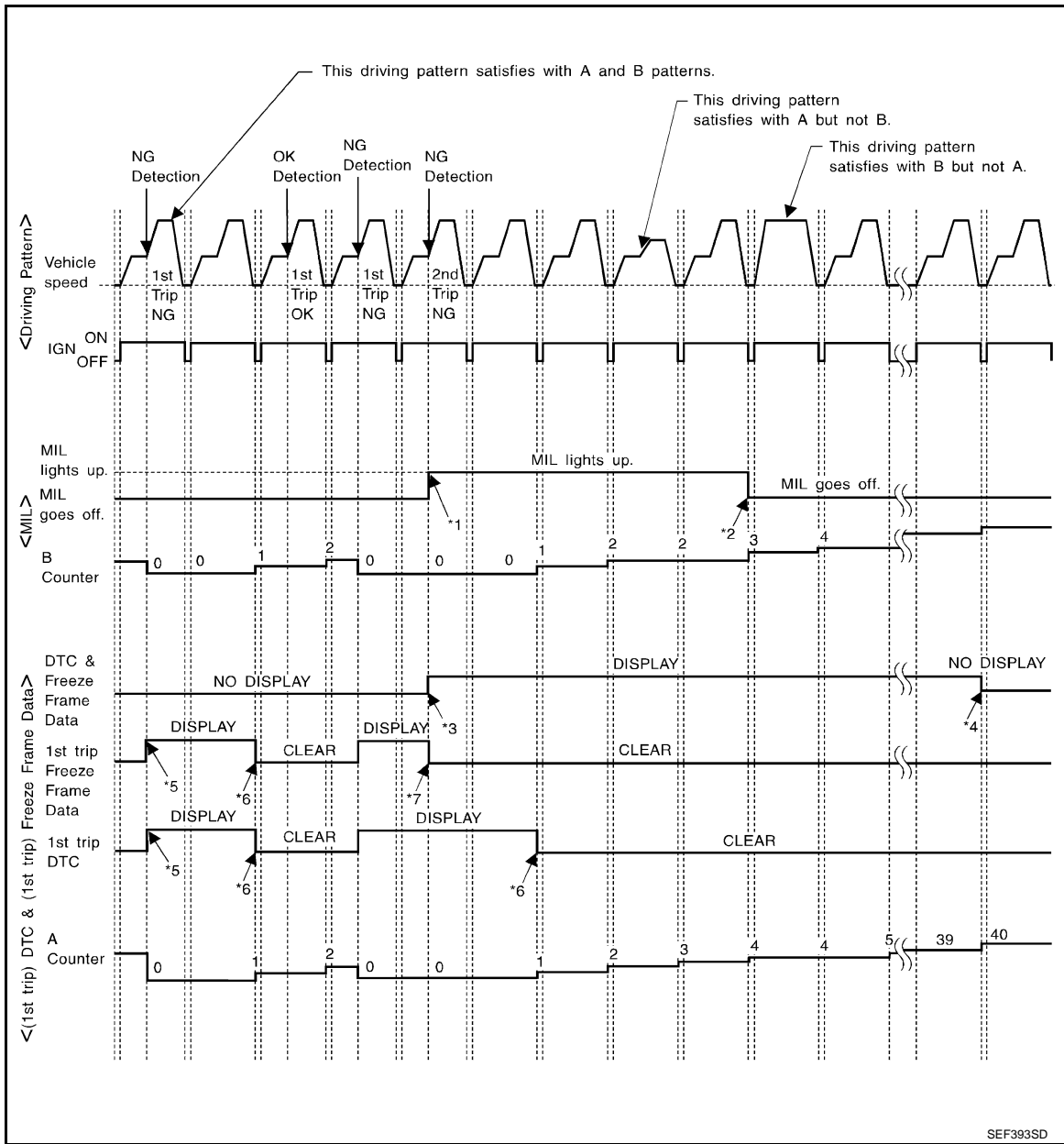
- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

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

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< FUNCTION DIAGNOSIS >

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*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first 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.

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

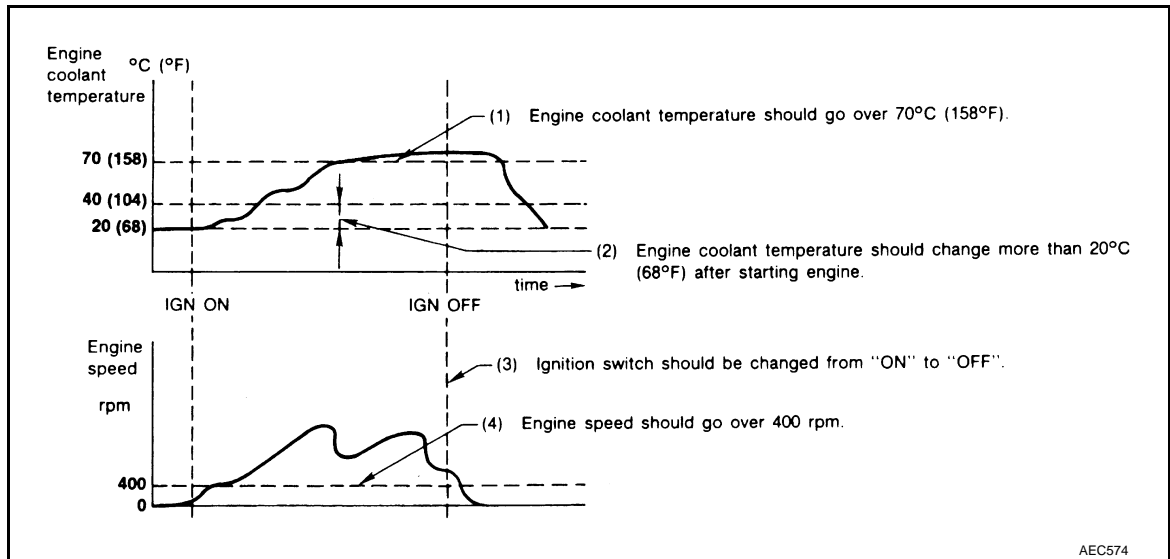
Explanation for Driving Patterns Except for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System"

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<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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 go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

CONSULT-III Function

INFOID:000000001344088

FUNCTION

| Diagnostic test mode | Function |
|-------------------------|---|
| Work support | This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit. |
| Self-diagnostic results | 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 ECMs and also shifts some parameters in a specified range. |
| DTC & SRT confirmation | The status of system monitoring tests and the self-diagnosis status/result can be confirmed. |
| Function test | This mode is used to inform customers when their vehicle condition 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
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

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| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|--------------------------------|--|----------------------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS | INPUT | Crankshaft position sensor (POS) | × | × | × | | | |
| | Camshaft position sensor (PHASE) | × | × | × | | | | |
| | Mass air flow sensor | × | | × | | | | |
| | Engine coolant temperature sensor | × | × | × | × | | | |
| | Air fuel ratio (A/F) sensor 1 | × | | × | | × | × | |
| | Heated oxygen sensor 2 | × | | × | | × | × | |
| | Vehicle speed sensor | × | × | × | | | | |
| | Accelerator pedal position sensor | × | | × | | | | |
| | Throttle position sensor | × | × | × | | | | |
| | Fuel tank temperature sensor | × | | × | × | | | |
| | EVAP control system pressure sensor | × | | × | | | | |
| | Intake air temperature sensor | × | × | × | | | | |
| | Knock sensor | × | | | | | | |
| | Refrigerant pressure sensor | | | | × | | | |
| | Closed throttle position switch (accelerator pedal position sensor signal) | | | | × | | | |
| | Air conditioner switch | | | | × | | | |
| | Park/neutral position (PNP) switch | × | | | × | | | |
| | 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 | × | | | × | | | | |

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|--|---|----------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS OUTPUT | Fuel injector | | | | × | × | | |
| | Power transistor (Ignition timing) | | | | × | × | | |
| | Throttle control motor relay | | × | | × | | | |
| | Throttle control motor | | × | | | | | |
| | EVAP canister purge volume control solenoid valve | | × | | × | × | | × |
| | Air conditioner relay | | | | × | | | |
| | Fuel pump relay | × | | | × | × | | |
| | Cooling fan relay | | × | | × | × | | |
| | Air fuel ratio (A/F) sensor 1 heater | | × | | × | | ×*3 | |
| | Heated oxygen sensor 2 heater | | × | | × | | ×*3 | |
| | EVAP canister vent control valve | × | × | | × | × | | |
| | Intake valve timing control solenoid valve | | × | | × | × | | |
| | Alternator | | | | × | × | | |
| | Calculated load value | | | × | × | | | |

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-626, "Diagnosis Description"](#).

*3: Always "CMPLT" is displayed.

WORK SUPPORT MODE

Work Item

| WORK ITEM | CONDITION | USAGE |
|-----------------------|---|---|
| FUEL PRESSURE RELEASE | <ul style="list-style-type: none"> FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. | When releasing fuel pressure from fuel line |
| IDLE AIR VOL LEARN | <ul style="list-style-type: none"> THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. | When learning the idle air volume |
| SELF-LEARNING CONT | <ul style="list-style-type: none"> THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. | When clearing mixture ratio self-learning value |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| WORK ITEM | CONDITION | USAGE |
|----------------------|---|---|
| EVAP SYSTEM CLOSE | <p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> • IGN SW ON • ENGINE NOT RUNNING • AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). • NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM • FUEL TANK TEMP. IS MORE THAN 0°C (32°F). • WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" • WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-III MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p> | When detecting EVAP vapor leak point of EVAP system |
| VIN REGISTRATION | <ul style="list-style-type: none"> • IN THIS MODE, VIN IS REGISTERED IN ECM. | When registering VIN in ECM |
| TARGET IDLE RPM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When setting target idle speed |
| TARGET IGN TIM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When adjusting target ignition timing |

*: 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-987, "DTC Index".](#))

Freeze Frame Data and 1st Trip Freeze Frame Data

| Freeze frame data item* | Description |
|------------------------------|---|
| DIAG TROUBLE CODE [PXXXX] | <ul style="list-style-type: none"> • The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-987, "DTC Index".) |
| FUEL SYS-B1 | <ul style="list-style-type: none"> • "Fuel injection system status" at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop |
| CAL/LD VALUE [%] | <ul style="list-style-type: none"> • The calculated load value at the moment a malfunction is detected is displayed. |
| COOLANT TEMP [°C] or [°F] | <ul style="list-style-type: none"> • The engine coolant temperature at the moment a malfunction is detected is displayed. |
| L-FUEL TRM-B1 [%] | <ul style="list-style-type: none"> • "Long-term fuel trim" at the moment a malfunction is detected is displayed. • 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 [%] | <ul style="list-style-type: none"> • "Short-term fuel trim" at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule. |
| ENGINE SPEED [rpm] | <ul style="list-style-type: none"> • The engine speed at the moment a malfunction is detected is displayed. |
| VEHICL SPEED [km/h] or [mph] | <ul style="list-style-type: none"> • The vehicle speed at the moment a malfunction is detected is displayed. |
| ABSOL TH-P/S [%] | <ul style="list-style-type: none"> • The throttle valve opening angle at the moment a malfunction is detected is displayed. |
| B/FUEL SCHDL [msec] | <ul style="list-style-type: none"> • The base fuel schedule at the moment a malfunction is detected is displayed. |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Freeze frame data item* | Description |
|----------------------------|---|
| INT/A TEMP SE [°C] or [°F] | <ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed. |
| FUEL SYS-B2 | <ul style="list-style-type: none"> Always a certain value is displayed. These items are not efficient for L32 models. |
| L-FUEL TRM-B2 [%] | |
| S-FUEL TRM-B2 [%] | |
| INT MANI PRES [kPa] | |
| FTFMCH1 | |

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

DATA MONITOR MODE

Monitored Item

×: Applicable

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|---|--|
| ENG SPEED | rpm | <ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). | <ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated. |
| MAS A/F SE-B1 | V | <ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". |
| B/FUEL SCHDL | msec | <ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. | <ul style="list-style-type: none"> When engine is running specification range is indicated in "SPEC". |
| A/F ALPHA-B1 | % | <ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". This data also includes the data for the air-fuel ratio learning control. |
| COOLAN TEMP/S | °C or °F | <ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. | <ul style="list-style-type: none"> 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) | V | <ul style="list-style-type: none"> The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed. | |
| HO2S2 (B1) | V | <ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. | |
| HO2S3 (B1) | V | <ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 3 is displayed. | |
| HO2S2 MNTR(B1) | RICH/LEAN | <ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| BATTERY VOLT | V | <ul style="list-style-type: none"> The power supply voltage of ECM is displayed. | |
| ACCEL SEN 1 | V | <ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. | <ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| ACCEL SEN 2 | | | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|----------|---|---|
| TP SEN 1-B1 | V | <ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. | <ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| TP SEN 2-B1 | | | |
| FUEL T/TMP SE | °C or °F | <ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. | |
| INT/A TEMP SE | °C or °F | <ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. | |
| EVAP SYS PRES | V | <ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. | |
| FUEL LEVEL SE | V | <ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. | |
| START SIGNAL | ON/OFF | <ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. | <ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. |
| CLSD THL POS | ON/OFF | <ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. | |
| AIR COND SIG | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. | |
| P/N POSI SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. | |
| PW/ST SIGNAL | ON/OFF | <ul style="list-style-type: none"> [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 style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. | |
| IGNITION SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch signal. | |
| HEATER FAN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. | |
| BRAKE SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. | |
| INJ PULSE-B1 | msec | <ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. |
| IGN TIMING | BTDC | <ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| CAL/LD VALUE | % | <ul style="list-style-type: none"> "Calculated load value" indicates the value of the current air flow divided by peak air flow. | |
| MASS AIRFLOW | g-m/s | <ul style="list-style-type: none"> Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor. | |
| PURG VOL C/V | % | <ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. | |
| INT/V TIM (B1) | °CA | <ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advance angle. | |

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|--|---------|
| INT/V SOL-B1 | % | <ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. The advance angle becomes larger as the value increases. | |
| AIR COND RLY | ON/OFF | <ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. | |
| FUEL PUMP RLY | ON/OFF | <ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. | |
| VENT CONT/V | ON/OFF | <ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open | |
| THRTL RELAY | ON/OFF | <ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. | |
| COOLING FAN | HI/LOW/OFF | <ul style="list-style-type: none"> Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop | |
| HO2S3 HTR (B1) | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 3 heater determined by ECM according to the input signals. | |
| VEHICLE SPEED | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. | |
| IDL A/V LEARN | YET/CMPLT | <ul style="list-style-type: none"> Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been performed yet. CMPLT: Idle air volume learning has already been performed successfully. | |
| TRVL AFTER MIL | km or mile | <ul style="list-style-type: none"> Distance traveled while MIL is activated. | |
| A/F S1 HTR(B1) | % | <ul style="list-style-type: none"> Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. | |
| AC PRESS SEN | V | <ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. | |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| MAIN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. | |
| CANCEL SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. | |
| RESUME/ACC SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. | |
| SET SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. | |
| BRAKE SW1 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. | |
| BRAKE SW2 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Monitored item | Unit | Description | Remarks |
|----------------|---------------|--|---|
| VHCL SPD CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. | |
| LO SPEED CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off. | |
| AT OD MONITOR | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| AT OD CANCEL | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel request signal. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| CRUISE LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. | |
| SET LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. | |
| BAT CUR SEN | mV | <ul style="list-style-type: none"> The signal voltage of battery current sensor is displayed. | |
| ALT DUTY SIG | ON/OFF | <ul style="list-style-type: none"> The control condition of the power generation voltage variable control (determined by ECM according to the input signals) is indicated. ON: Power generation voltage variable control is active. OFF: Power generation voltage variable control is inactive. | |
| A/F ADJ-B1 | — | <ul style="list-style-type: none"> Indicates the correction of factor stored in ECM. The factor is calculated from the difference between the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 signal. | |
| ALT DUTY | % | <ul style="list-style-type: none"> Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal. | |
| Voltage | V | <ul style="list-style-type: none"> Voltage, frequency, duty cycle or pulse width measured by the probe. | <ul style="list-style-type: none"> Only "#" is displayed if item is unable to be measured. Figures with "#"s are temporary ones. They are the same figures as an actual piece of data which was just previously measured. |
| Frequency | msec, Hz or % | | |
| DUTY-HI | — | | |
| DUTY-LOW | | | |
| PLS WIDTH-HI | | | |
| PLS WIDTH-LOW | | | |

NOTE:

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

ACTIVE TEST MODE

Test Item

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| TEST ITEM | CONDITION | JUDGEMENT | CHECK ITEM (REMEDY) |
|------------------|--|--|---|
| FUEL INJECTION | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1 |
| IGNITION TIMING | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Perform Idle Air Volume Learning. |
| POWER BALANCE | <ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Shift lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. | Engine runs rough or dies. | <ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil |
| COOLING FAN* | <ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "LOW", "HI" and "OFF" CONSULT-III. | Cooling fan moves and stops. | <ul style="list-style-type: none"> Harness and connectors IPDM E/R (Cooling fan relay) Cooling fan motor |
| ENG COOLANT TEMP | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector |
| FUEL PUMP RELAY | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. | Fuel pump relay makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Fuel pump relay |
| PURG VOL CONT/V | <ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. | Engine speed changes according to the opening percent. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| FUEL/T TEMP SEN | <ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-III. | | |
| VENT CONTROL/V | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. | Solenoid valve makes an operating sound. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| V/T ASSIGN ANGLE | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve |
| ALTERNATOR DUTY | <ul style="list-style-type: none"> Engine: Idle Change duty ratio using CONSULT-III. | Battery voltage changes. | <ul style="list-style-type: none"> Harness and connectors IPDM E/R Alternator |

*: 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 [EC-626, "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

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Test mode | Test item | Corresponding DTC No. | Reference page |
|--------------------|---------------------------|-----------------------|------------------------|
| EVAPORATIVE SYSTEM | EVP SML LEAK P0442/P1442* | P0442 | EC-778 |
| | | P0455 | EC-812 |
| | EVP V/S LEAK P0456/P1456* | P0456 | EC-818 |

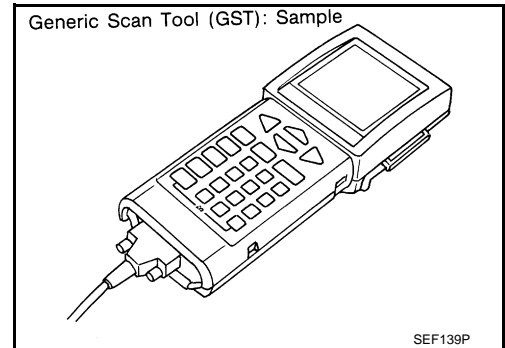
*: DTC P1442 and P1456 does not apply to L32 models but appears in DTC Work Support Mode screens.

Diagnosis Tool Function

INFOID:000000001344089

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



FUNCTION

| Diagnostic Service | | Function |
|--------------------|------------------|--|
| Service \$01 | READINESS TESTS | This diagnostic service gains access to current emission-related data values, including analog 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 which were stored by ECM during the freeze frame. For details, refer to EC-987, "DTC Index" . |
| 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 | This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07) |
| 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-related powertrain components/systems that are continuously monitored during normal driving conditions. |
| Service \$08 | — | 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. In the following conditions, this diagnostic service cannot function. <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system |
| Service \$09 | (CALIBRATION ID) | This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs. |

INSPECTION PROCEDURE

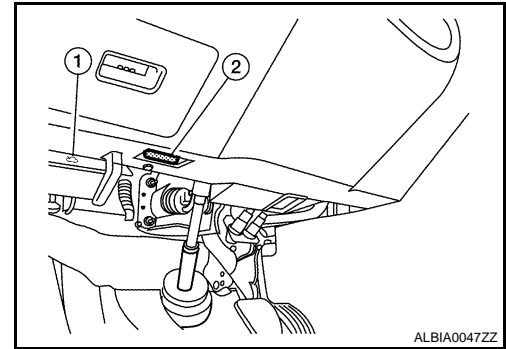
1. Turn ignition switch OFF.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

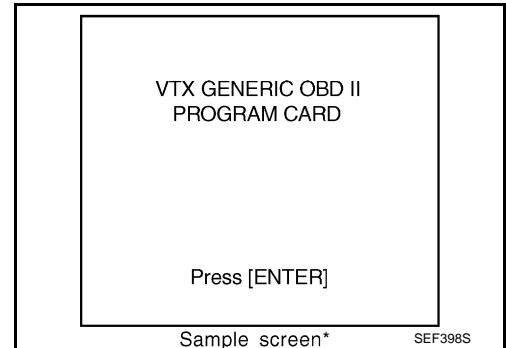
[QR25DE EXCEPT FOR CALIFORNIA]

< FUNCTION DIAGNOSIS >

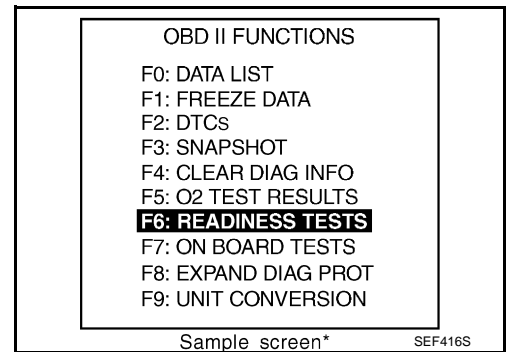
2. Connect "GST" to data link connector (2), which is located under LH dash panel near the hood opener handle (1).



3. Turn ignition switch ON.
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.



TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000001344090

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode of CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" of "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" of "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 light 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 (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

INFOID:000000001344091

1. START

Make sure 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/cm², 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
 - CVT models: 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).
 - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
 - Electrical load: Not applied*
 - Engine speed: Idle
- *: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> GO TO 2.

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

With CONSULT-III

NOTE:

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

1. Perform [EC-543. "BASIC INSPECTION : Special Repair Requirement"](#).
2. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT-III.
3. Make sure that monitor items are within the SP value.

Is the inspection result normal?

YES >> END

NO >> Go to [EC-650. "Diagnosis Procedure"](#).

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

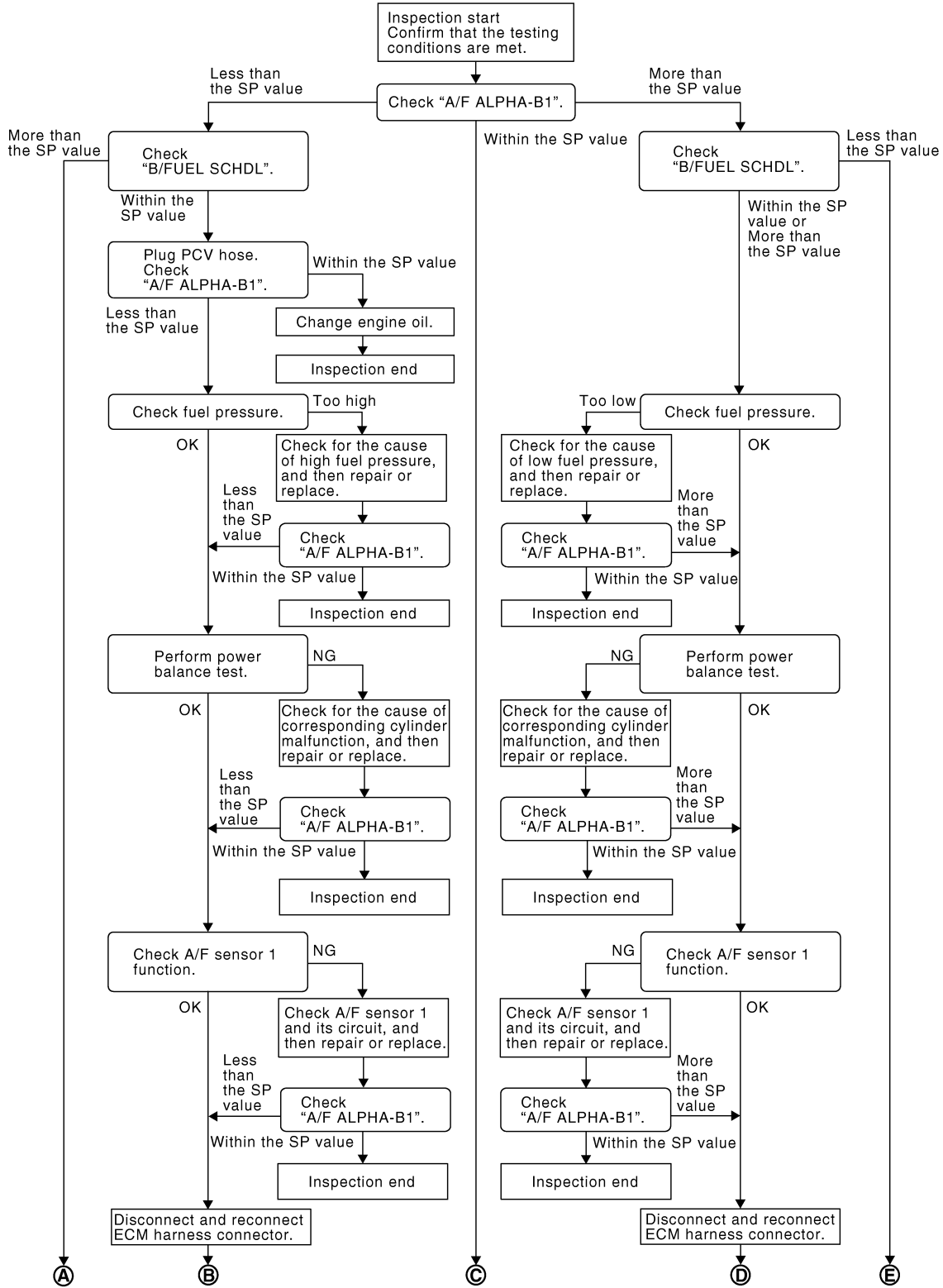
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Diagnosis Procedure

INFOID:000000001344092

OVERALL SEQUENCE

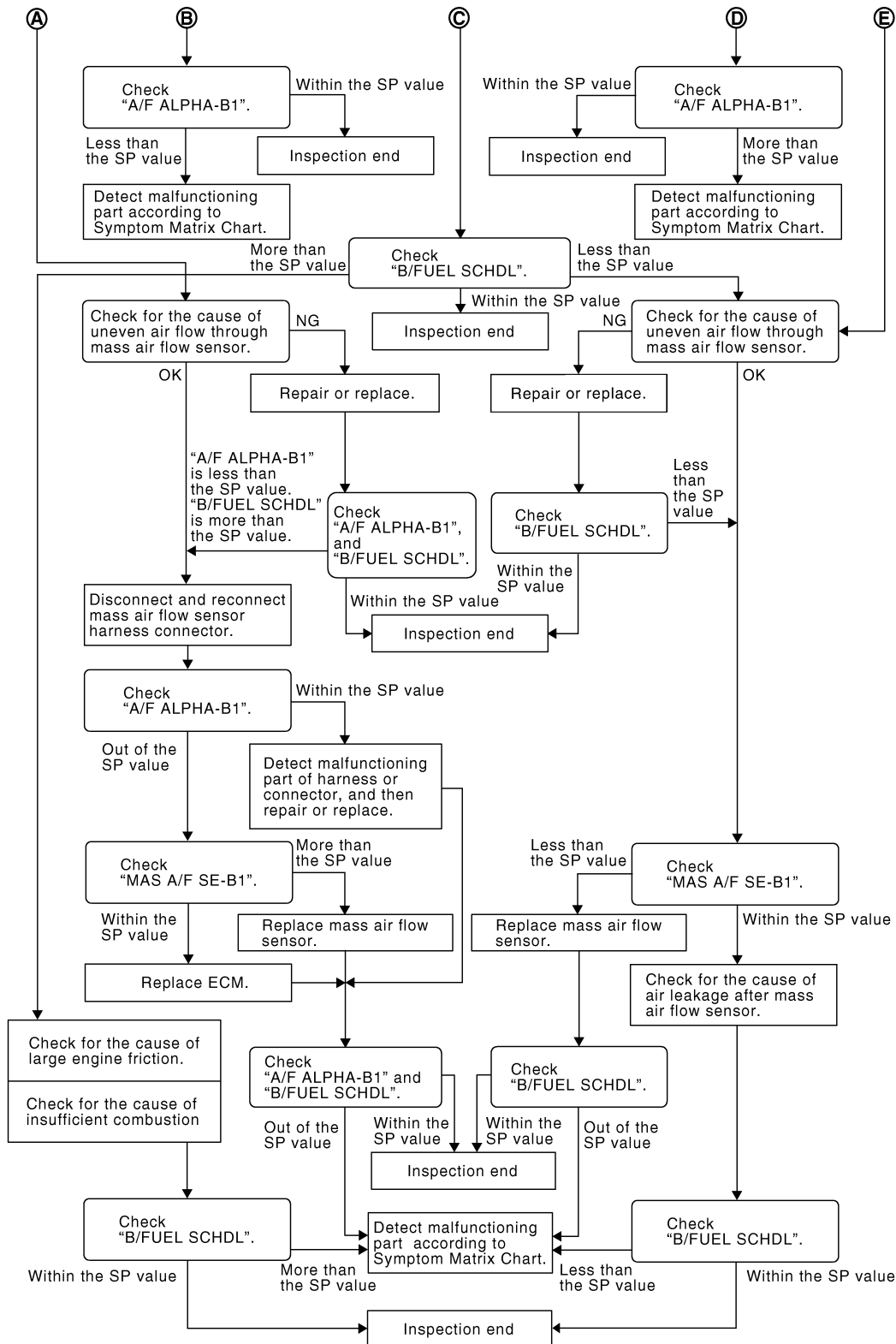


PBIB2318E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]



FBI83213E

DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

④ With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-649, "Component Function Check"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the each indication is within the SP value.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NOTE:

Check "A/F ALPHA-B1" 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 make sure 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 make sure 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"

-
1. Stop the engine.
 2. Disconnect PCV hose, and then plug it.
 3. Start engine.
 4. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the 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 condition.

>> **INSPECTION END**

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-1006, "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.

7.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 and then GO TO 8.

8.CHECK "A/F ALPHA-B1"

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> GO TO 12.
NO >> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the following.

1. Ignition coil and its circuit (Refer to [EC-937, "Component Function Check".](#))
2. Fuel injector and its circuit (Refer to [EC-930, "Component Function Check".](#))
3. Intake air leakage
4. Low compression pressure (Refer to [EM-23, "Compression pressure".](#))

Is the inspection result normal?

- YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 12.

12.CHECK A/F SENSOR 1 FUNCTION

Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.

- For DTC P0130, refer to [EC-702, "DTC Logic".](#)
- For DTC P0131, refer to [EC-706, "DTC Logic".](#)
- For DTC P0132, refer to [EC-709, "DTC Logic".](#)
- For DTC P0133, refer to [EC-712, "DTC Logic".](#)
- For DTC P2A00, refer to [EC-913, "DTC Logic".](#)

Is any DTC detected?

- YES >> GO TO 15.
NO >> GO TO 13.

13.CHECK A/F SENSOR 1 CIRCUIT

Perform DIAGNOSTIC PROCEDURE according to corresponding DTC.

>> GO TO 14.

14.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 15.

15.DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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"

1. Start engine.
2. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure 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 [EC-995, "Symptom Table"](#).

17.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure 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", AND "B/FUEL SCHDL"

Select "A/F ALPHA-B1" and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure that the 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" is 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.

>> GO TO 22.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

22.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-675, "DTC Logic"](#). Then GO TO 29.

NO >> GO TO 23.

23.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.

NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24.REPLACE ECM

1. Replace ECM.
2. Go to [EC-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 29.

25.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 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 make sure that the indication is within the SP value.

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 make sure that the indication is within the SP value.

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

Check for the cause of air leak after the mass air flow sensor. Refer to the following.

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

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

Select "A/F ALPHA-B1" and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure 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 [EC-995. "Symptom Table"](#).

30.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then make sure 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 [EC-995. "Symptom Table"](#).

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000001344093

1. INSPECTION START

Start engine.

Is engine running?

YES >> GO TO 8.

NO >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 93 | Ground | Battery voltage |

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 E18
- 10A fuse (No. 35)
- Harness for open or short between ECM and fuse

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

4. CHECK GROUND CONNECTION-I

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace ground connection.

5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connectors.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

A

EC

C

D

E

F

G

H

I

J

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L

M

N

O

P

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E11
- Harness for open or short between ECM and ground

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

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connectors.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F10 | 53 | Ground | Battery voltage |

Is the inspection result normal?

YES >> Go to [EC-937, "Diagnosis Procedure"](#).

NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|--|
| Connector | Terminal | | |
| E10 | 105 | Ground | After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V. |

Is the inspection result normal?

YES >> GO TO 14.

NO-1 >> Battery voltage does not exist: GO TO 9.

NO-2 >> Battery voltage exists for more than a few seconds: GO TO 12.

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 and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 24 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 12.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E18.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 105 | E18 | 10 | Existed |

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

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Junction block connectors E44, E45
- Harness for open or short between ECM and IPDM E/R

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

12. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 24 | F10 | 69 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Repair open circuit or short to ground or short power in harness or connectors.

13. CHECK 15A FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.
2. Check 15A fuse.

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> Replace 15A fuse.

14. CHECK GROUND CONNECTION-II

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 17.

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 16.

16.DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors F2, E11
- Harness for open or short between ECM and ground

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

17.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

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

U1000, U1001 CAN COMM CIRCUIT

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

U1000, U1001 CAN COMM CIRCUIT

Description

INFOID:000000001344094

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:000000001344095

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|---|
| U1000 | CAN communication line | When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) for 2 seconds or more. | • Harness or connectors (CAN communication line is open or shorted) |
| U1001 | | When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related 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-661, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344096

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

U1010 CONTROL UNIT (CAN)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

U1010 CONTROL UNIT (CAN)

Description

INFOID:000000001665734

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:000000001344098

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|----------------|
| U1010 | CAN communication bus | When detecting error during the initial diagnosis 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 [EC-662, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344099

1. INSPECTION START

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-662, "DTC Logic"](#).
5. Check DTC.

With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-662, "DTC Logic"](#).
4. Check DTC.

Is the DTC U1010 displayed again?

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

2. REPLACE ECM

1. Replace ECM.
2. Go to [EC-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0011 IVT CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0011 IVT CONTROL

DTC Logic

INFOID:000000001344100

DTC DETECTION LOGIC

NOTE:

If DTC P0011 is displayed with DTC P0075, first perform the trouble diagnosis for [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | Detecting condition | Possible cause |
|---------|---|--|---|
| P0011 | Intake valve timing control performance | There is a gap between angle of target and phase-control angle degree. | <ul style="list-style-type: none"> • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

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. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

| | |
|---------------|--|
| VHCL SPEED SE | 100 - 120 km/h (63 - 75 mph) |
| ENG SPEED | 1,700 - 2,000 rpm |
| COOLAN TEMP/S | More than 60°C (140°F) |
| B/FUEL SCHDL | More than 3.5 msec (CVT) More than 4.2 msec (M/T) |
| Shift lever | D position (CVT) 5th position (M/T) |

CAUTION:

Always drive at a safe speed.

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-664, "Diagnosis Procedure"](#)
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT-III

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

P0011 IVT CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| | |
|-------------------------|---|
| ENG SPEED | 1,200 - 3,175 rpm (A constant rotation is maintained.) |
| COOLAN TEMP/S | More than 70°C (221°F) |
| Shift lever | 1st or 2nd position |
| Driving location uphill | Driving vehicle uphill (Increased engine load will help maintain the driving conditions required 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 [EC-664, "Diagnosis Procedure"](#)
NO >> INSPECTION END

Diagnosis Procedure

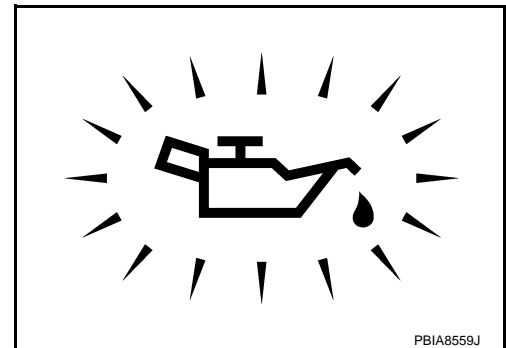
INFOID:000000001344101

1. CHECK OIL PRESSURE WARNING LAMP

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

Is oil pressure warning lamp illuminated?

- YES >> Go to [LU-9, "Inspection"](#).
NO >> GO TO 2.



PBIA8559J

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-665, "Component Inspection"](#).

Is the inspection result normal?

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

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-763, "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-766, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

P0011 IVT CONTROL

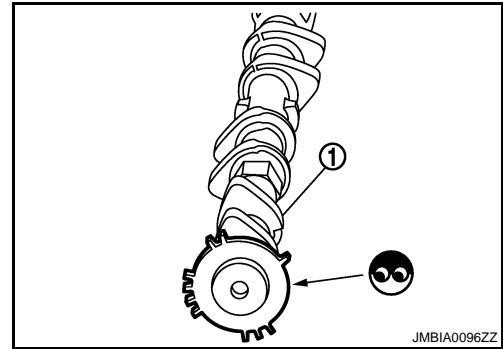
[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Accumulation of debris to the signal plate of camshaft (1) 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 misaligned.

Are there any service records that may cause timing chain misaligned?

- YES >> Check timing chain installation. Refer to [EM-52. "Removal and Installation"](#).
NO >> GO TO 7.

7.CHECK LUBRICATION CIRCUIT

Refer to [EM-48. "Inspection After Installation"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Clean lubrication line.

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344102

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (Continuity should not exist) |

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

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

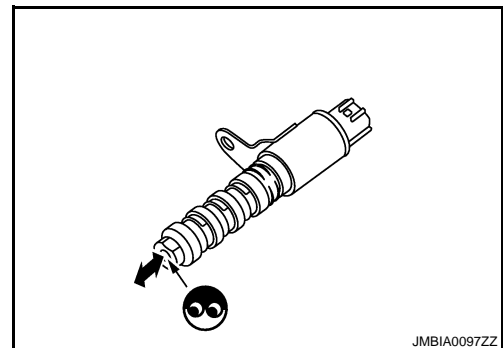
CAUTION:

Do not apply 12V 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?



P0011 IVT CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve.

P0031, P0032 A/F SENSOR 1 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0031, P0032 A/F SENSOR 1 HEATER

Description

INFOID:000000001344103

SYSTEM DESCRIPTION

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

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 at the specified range.

DTC Logic

INFOID:000000001344104

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P0031 | Air fuel ratio (A/F) sensor 1 heater control circuit low | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)• A/F sensor 1 heater |
| P0032 | Air fuel ratio (A/F) sensor 1 heater control circuit high | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 heater circuit is shorted.)• A/F sensor 1 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than between 11V 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-667, "Diagnosis Procedure"](#).

NG >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344105

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 air fuel ratio (A/F) sensor 1 harness connector.
2. Turn ignition switch ON.

P0031, P0032 A/F SENSOR 1 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Check the voltage between A/F sensor 1 harness connector and ground.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- 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 the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 3 | F14 | 4 | 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 or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-668, "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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

>> Repair or replace.

Component Inspection

INFOID:000000001344106

1. CHECK AIR FUEL RATIO (A/F) SENSOR 1

1. Turn ignition switch OFF.

P0031, P0032 A/F SENSOR 1 HEATER

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Disconnect A/F sensor 1 harness connector.
3. Check resistance between A/F sensor 1 terminals as follows.

| Terminals | Resistance |
|------------|--|
| 3 and 4 | 1.8 - 2.44 Ω [at 25°C (77°F)] |
| 3 and 1, 2 | $\infty \Omega$ (Continuity should not exist) |
| 4 and 1, 2 | |

Is the inspection result normal?

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

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

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

CAUTION:

- Discard any 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 sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

A

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P0037, P0038 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0037, P0038 HO2S2 HEATER

Description

INFOID:000000001344107

SYSTEM DESCRIPTION

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|----------------------------|--|-------------------------------|
| Camshaft position sensor (PHASE) Crankshaft position sensor (POS) | Engine speed | Heated oxygen sensor 2 heater control | Heated oxygen sensor 2 heater |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| 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 rpm | Heated oxygen sensor 2 heater |
|---|-------------------------------|
| Above 3,600 | OFF |
| Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none">• Engine: After warming up• Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | ON |

DTC Logic

INFOID:000000001344108

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0037 | Heated oxygen sensor 2 heater control circuit low | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)• Heated oxygen sensor 2 heater |
| P0038 | Heated oxygen sensor 2 heater control circuit high | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)• Heated oxygen sensor 2 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. 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. 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. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

P0037, P0038 HO2S2 HEATER

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is 1st tip DTC detected?

- YES >> Go to [EC-671, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344109

A
EC

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

| HO2S2 | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F42 | 2 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector F10
- 15A fuse (No. 37)
- Harness for open or short between heated oxygen sensor 2 and fuse

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

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 3 | F14 | 13 | 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 or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-672, "Component Inspection"](#).

Is the inspection result normal?

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

6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2.

CAUTION:

P0037, P0038 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344110

1. CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check resistance between HO2S2 terminals as follows.

| Terminals | Resistance |
|---------------|-------------------------------------|
| 2 and 3 | 3.3 - 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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0075 IVT CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0075 IVT CONTROL SOLENOID VALVE

Description

INFOID:000000001344111

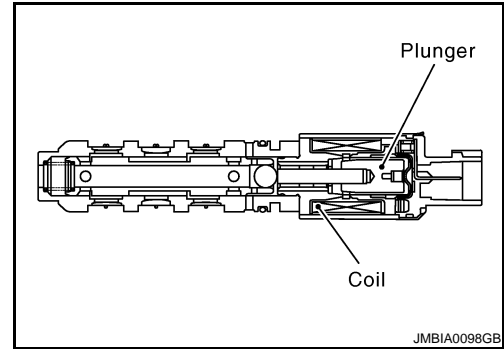
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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 angle.

The shorter pulse width retards valve angle.

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.



JMBIA0098GB

DTC Logic

INFOID:000000001344112

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P0075 | Intake valve timing control solenoid valve circuit | An improper voltage is sent to the ECM through intake valve timing control solenoid valve. | <ul style="list-style-type: none"> • Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Go to [EC-673, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344113

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

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

| IVT control solenoid valve | | Ground | Voltage |
|----------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F59 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

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

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

P0075 IVT CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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.

| IVT control solenoid valve | | ECM | | Continuity |
|----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F59 | 2 | F13 | 78 | 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 or short to ground or short to power in harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-674, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace intake valve timing control solenoid valve.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665735

1.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Check resistance between intake valve timing control solenoid valve terminals as follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (Continuity should not exist) |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

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

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

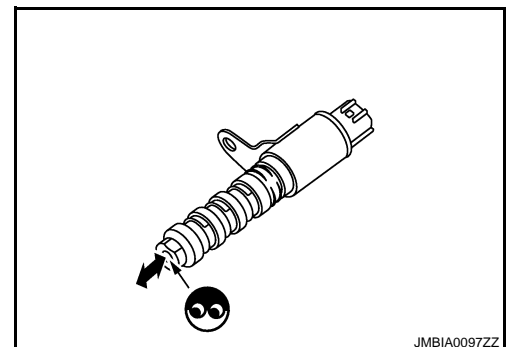
NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve.



JMBIA009ZZ

P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

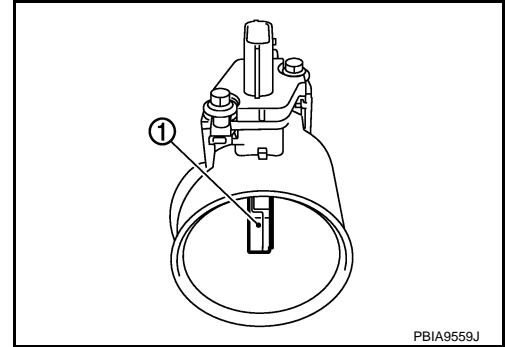
P0101 MAF SENSOR

Description

INFOID:000000001344115

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 more air, 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

INFOID:000000001344116

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|--|-------------------------|---|--|
| P0101 | Mass air flow sensor circuit range/performance | A) | A high voltage from the sensor is sent to ECM under light load driving condition. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Mass air flow sensor• EVAP control system pressure sensor |
| | | B) | A low voltage from the sensor is sent to ECM under heavy load driving condition. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Intake air leaks• Mass air flow sensor• EVAP control system pressure sensor• Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch ON) instead of running engine at idle speed.

>> 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-677, "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.
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-677, "Diagnosis Procedure"](#).

P0101 MAF SENSOR

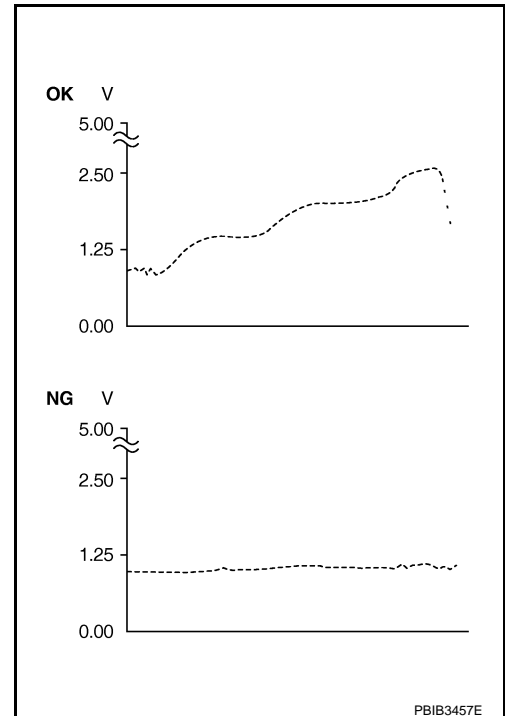
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
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-677, "Diagnosis Procedure"](#).



4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

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

| | |
|------------------|--|
| ENG SPEED | More than 2,000 rpm |
| THRTL SEN 1-B1 | More than 3V |
| THRTL SEN 2-B1 | More than 3V |
| Shift lever | Suitable position |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

CAUTION:

Always drive vehicle at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-677, "Diagnosis Procedure"](#).
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to [EC-676, "Component Function Check"](#).

NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-677, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344117

1. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.

P0101 MAF SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check the mass air flow sensor signal with Service \$01.
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-677, "Diagnosis Procedure"](#).

| | |
|--------------|-------------------|
| CALC LOAD | 20% |
| COOLANT TEMP | 95°C |
| SHORT FT #1 | 2% |
| LONG FT #1 | 0% |
| SHORT FT #2 | 4% |
| LONG FT #2 | 0% |
| ENGINE SPD | 2637RPM |
| VEHICLE SPD | 0MPH |
| IGN ADVANCE | 41.0° |
| INTAKE AIR | 41°C |
| MAF | 14.1gm/sec |
| THROTTLE POS | 3% |

SEF534P

Diagnosis Procedure

INFOID:000000001344118

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-675, "DTC Logic"](#).

Which malfunction is detected?

- A >> GO TO 3.
B >> GO TO 2.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 5 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44
- Harness connector E11,F2
- 15A fuse (No.42)
- 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 or short to ground or short to power in harness or connectors.

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P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8. CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor.

Refer to [EC-687, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-801, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-678, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

11. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344119

1. CHECK MASS AIR FLOW SENSOR-I

 With CONSULT-III

1. Turn ignition switch OFF.

P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Reconnect all harness connectors disconnected.
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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

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

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

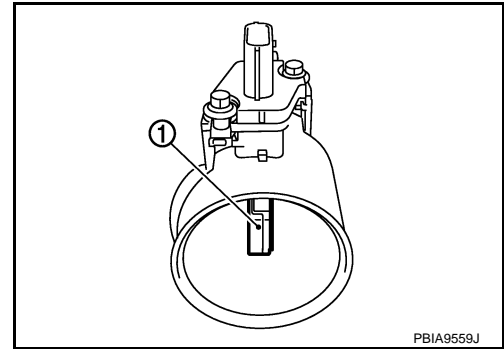
P0102, P0103 MAF SENSOR

Description

INFOID:000000001665736

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 more air, 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.



DTC Logic

INFOID:000000001344121

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0102 | Mass air flow sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Intake air leaks• Mass air flow sensor |
| P0103 | Mass air flow sensor circuit high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Mass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

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-682, "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-682, "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.

Is DTC detected?

YES >> Go to [EC-682, "Diagnosis Procedure"](#).

P0102, P0103 MAF SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344122

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.

NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 5 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44
- Harness connector E11,F2
- 15A fuse (No,42)
- 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 56 | Existed |

P0102, P0103 MAF SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-683, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:0000000016665737

1. CHECK MASS AIR FLOW SENSOR-I

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Without CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the voltage between ECM harness connector and ground.

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- 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.

| Monitor item | Condition | MAS A/F SE-B1 |
|---------------|--|-----------------------------|
| MAS A/F SE-B1 | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|---------------------------|--------|--|-----------------------------|
| Connector | Terminal | | | |
| F13 | 58 (MAF sensor signal) | Ground | Ignition switch ON (Engine stopped.) | Approx. 0.4V |
| | | | Idle (Engine is warmed-up to normal operating temperature.) | 0.9 - 1.1V |
| | | | 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.4 - 1.7V |
| | | | Idle to about 4,000 rpm | 0.9 - 1.1V to Approx. 2.4V* |

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

Is the inspection result normal?

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

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

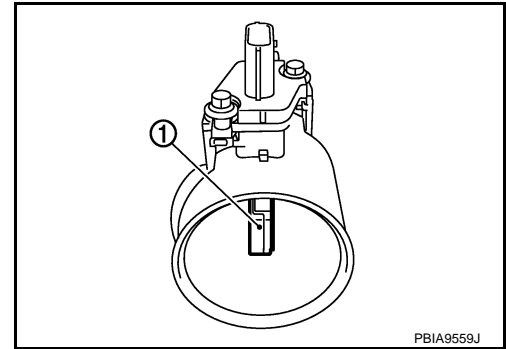
P0112, P0113 IAT SENSOR

Description

INFOID:000000001344124

The intake air temperature sensor is built-into 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 temperature rise.



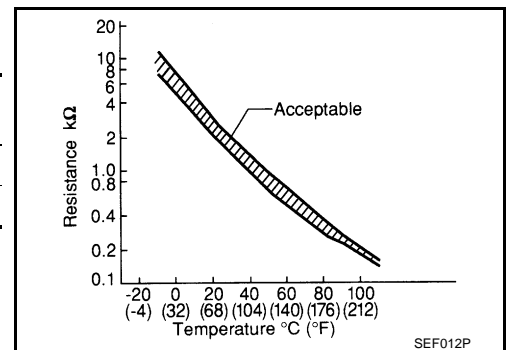
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000001344125

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0112 | Intake air temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor |
| P0113 | Intake air temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-687, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Diagnosis Procedure

INFOID:000000001344126

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "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 | Terminal | | |
| F31 | 2 | Ground | Approx. 5V |

Is the inspection result normal?

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

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| MAF sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 1 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-687. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344127

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 follows.

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Terminals | Condition | | Resistance kΩ |
|-----------|--------------------------------|---------|---------------|
| 1 and 2 | Intake air 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).

P0117, P0118 ECT SENSOR

< COMPONENT DIAGNOSIS >

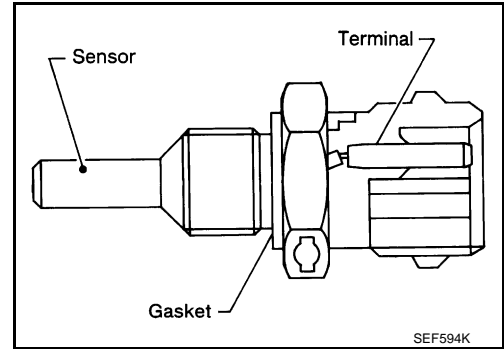
[QR25DE EXCEPT FOR CALIFORNIA]

P0117, P0118 ECT SENSOR

Description

INFOID:000000001344128

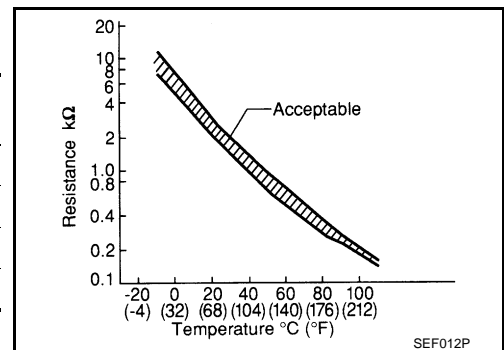
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

| Engine coolant temperature °C (°F) | Voltage* V | Resistance kΩ |
|---------------------------------------|------------|---------------|
| -10 (14) | 4.4 | 7.0 - 11.4 |
| 20 (68) | 3.5 | 2.37 - 2.63 |
| 50 (122) | 2.2 | 0.68 - 1.00 |
| 90 (194) | 0.9 | 0.236 - 0.260 |

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



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001344129

DTC DETECTION LOGIC

| DTC No. | Trouble Diagnosis Name | DTC Detecting Condition | Possible Cause |
|---------|--|---|---|
| P0117 | Engine coolant temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor |
| P0118 | Engine coolant temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-690. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

P0117, P0118 ECT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Diagnosis Procedure

INFOID:000000001344130

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

| ECT sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| F11 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| ECT sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F11 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-690. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344131

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

P0117, P0118 ECT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

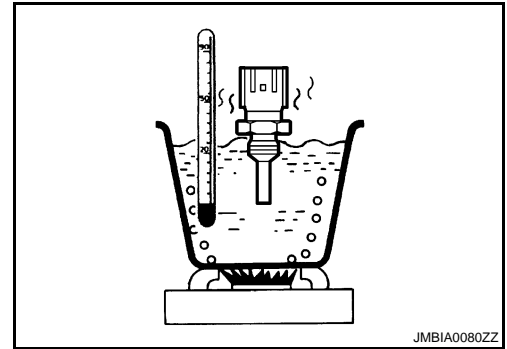
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition | | Resistance |
|-----------|---------------------|----------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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P0122, P0123 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

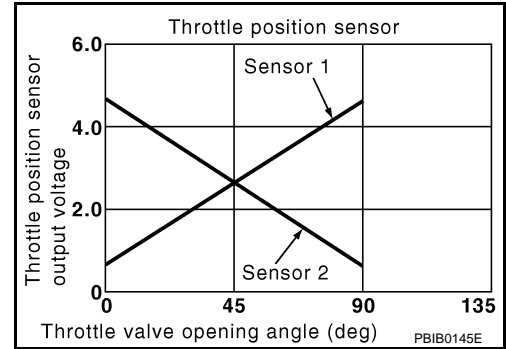
P0122, P0123 TP SENSOR

Description

INFOID:000000001344132

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 signal 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.



DTC Logic

INFOID:000000001344133

DTC DETECTION LOGIC

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0122 | Throttle position sensor 2 circuit low input | An excessively low voltage from the TP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> 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 style="list-style-type: none"> Electric throttle control actuator (TP sensor 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-692, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344134

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

P0122, P0123 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator | | Ground | Voltage |
|------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-694, "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. Go to [EC-694, "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0122, P0123 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection

INFOID:000000001344135

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-694, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344136

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P0125 ECT SENSOR

< COMPONENT DIAGNOSIS >

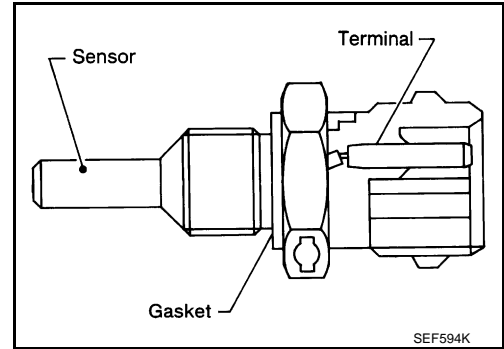
[QR25DE EXCEPT FOR CALIFORNIA]

P0125 ECT SENSOR

Description

INFOID:000000001665738

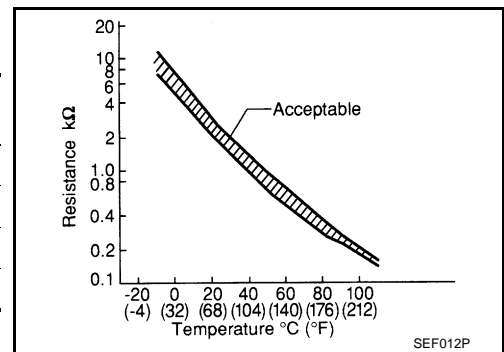
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

| Engine coolant temperature °C (°F) | Voltage* V | Resistance kΩ |
|---------------------------------------|------------|---------------|
| -10 (14) | 4.4 | 7.0 - 11.4 |
| 20 (68) | 3.5 | 2.37 - 2.63 |
| 50 (122) | 2.2 | 0.68 - 1.00 |
| 90 (194) | 0.9 | 0.236 - 0.260 |

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



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001344138

DTC DETECTION LOGIC

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-689, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0125 | Insufficient engine coolant temperature for closed loop fuel control | <ul style="list-style-type: none"> Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. Engine coolant temperature is insufficient for closed loop fuel control. | <ul style="list-style-type: none"> Harness or connectors (High resistance in the circuit) Engine coolant temperature sensor Thermostat |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

Ⓜ With CONSULT-III

- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Check that "COOLAN TEMP/S" is above 10°C (50°F).

P0125 ECT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

With GST

Follow the procedure "With CONSULT-III" above.

Is it above 10°C (50°F)?

- YES >> INSPECTION END
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Start engine and run it for 65 minutes at idle speed.
2. Check 1st trip DTC.

If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.

CAUTION:

Be careful not to overheat engine.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> [EC-696, "Diagnosis Procedure"](#)
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344139

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-690, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace engine coolant temperature sensor.

3.CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace thermostat. Refer to [CO-20, "Removal and Installation"](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665740

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

P0125 ECT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

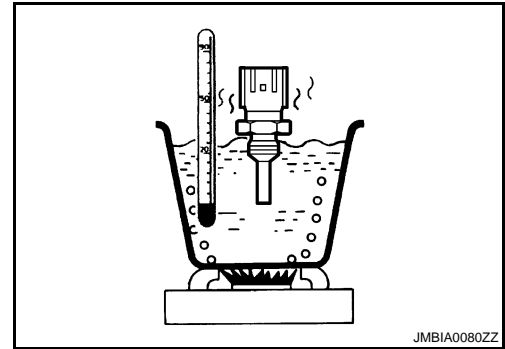
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

| Terminals | Condition | | Resistance |
|-----------|---------------------|----------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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P0127 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

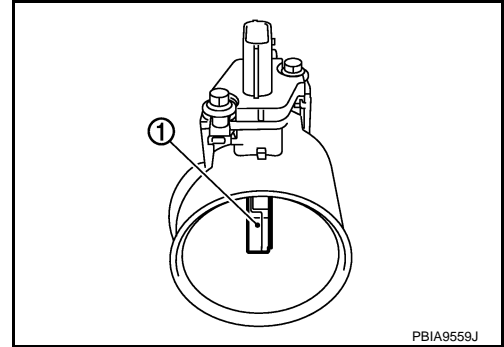
P0127 IAT SENSOR

Description

INFOID:000000001665741

The intake air temperature sensor is built-into 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 temperature rise.



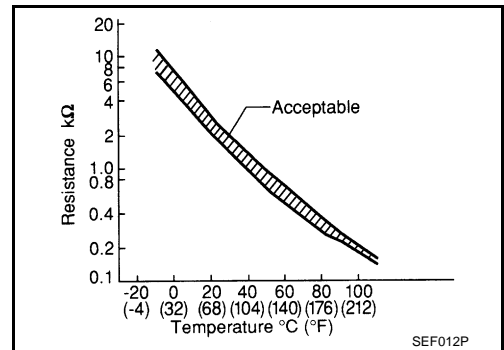
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000001344142

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------|---|--|
| P0127 | Intake air temperature too high | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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.
 - If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.

P0127 IAT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NOTE:

- Perform the following steps before engine coolant temperature is above 90°C (194°F).
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Start engine.
- Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

- Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-699, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344143

1.CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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-699, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665742

1.CHECK INTAKE AIR TEMPERATURE SENSOR

- Turn ignition switch OFF.
- Disconnect mass air flow sensor harness connector.
- Check resistance between mass air flow sensor terminals as follows.

| Terminals | Condition | Resistance kΩ |
|-----------|--|---------------|
| 1 and 2 | Intake air 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 >

[QR25DE EXCEPT FOR CALIFORNIA]

P0128 THERMOSTAT FUNCTION

DTC Logic

INFOID:000000001344145

DTC DETECTION LOGIC

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P0128 | Thermostat function | The engine coolant temperature does not reach to specified temperature even though the engine has run long enough. | <ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

- 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 71°C (160°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Replace thermostat with new one. Refer to [CO-20, "Removal and Installation"](#). Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch ON.
3. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
4. Check the indication of "COOLAN TEMP/S"
If it is below 71°C (160°F), go to following step.
If it is above 71°C (160°F), cool down the engine to less than 71°C (160°F). Then go to next steps.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

| | |
|---------------|-----------------------------|
| VHCL SPEED SE | 80 - 120 km/h (50 - 75 mph) |
|---------------|-----------------------------|

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-700, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344146

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-701, "Component Inspection"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

P0128 THERMOSTAT FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection

INFOID:000000001665744

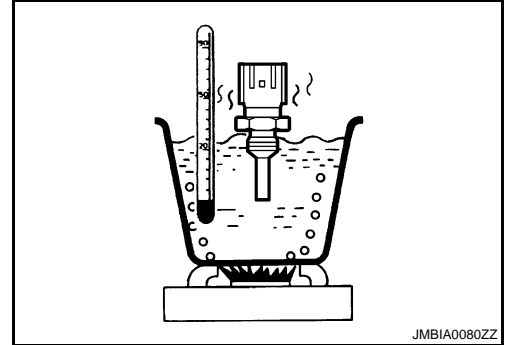
1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

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 by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance | |
|-----------|---------------------|------------|------------------|
| 1 and 2 | Temperature °C (°F) | 20 (68) | 2.37 - 2.63 kΩ |
| | | 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 coolant temperature sensor.



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P0130 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0130 A/F SENSOR 1

Description

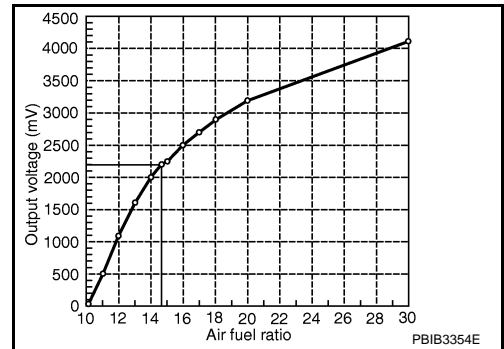
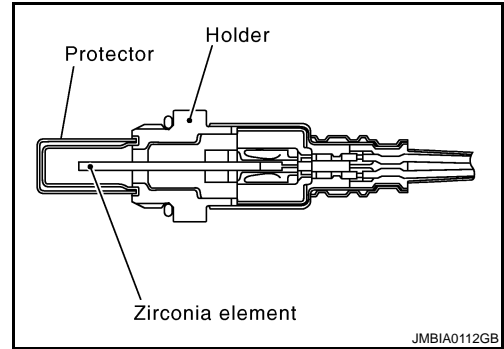
INFOID:000000001344148

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001344149

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 fluctuates according to fuel feedback control.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible Cause |
|---------|---------------------------------------|-------------------------|---|--|
| P0130 | Air fuel ratio (A/F) sensor 1 circuit | A) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2V. | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1 |
| | | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2V. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Let it idle for 2 minutes.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-704, "Diagnosis Procedure"](#).

NO-1 >> With CONSULT-III: GO TO 3.

P0130 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO-2 >> Without CONSULT-III: GO TO 7.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

1. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
2. Check "A/F SEN1 (B1)" indication.

Does the indication fluctuates around 2.2V?

YES >> GO TO 4.

NO >> Go to [EC-704, "Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-I

1. Select "A/F SEN1 (B1) P1276" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
2. Touch "START".
3. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen.

| | |
|---------------|--|
| ENG SPEED | 1,750 - 2,600 rpm |
| VHCL SPEED SE | More than 64 km/h (40 mph) |
| B/FUEL SCHDL | 1.0 - 8.0 msec |
| Shift lever | D position (CVT) 5th position (M/T) |

If "TESTING" is not displayed after 20 seconds, retry from step 2.

CAUTION:

Always drive vehicle at a safe speed.

Is "TESTING" displayed on CONSULT-III screen?

YES >> GO TO 5.

NO >> Check A/F sensor 1 function again. GO TO 3.

5. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-II

Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

Which does "TESTING" change to?

COMPLETED>>GO TO 6.

OUT OF CONDITION>>Retry DTC CONFIRMATION PROCEDURE. GO TO 4.

6. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-III

Touch "SELF-DIAG RESULT"

Which is displayed on CONSULT-III screen?

YES >> INSPECTION END

NO >> Go to [EC-704, "Diagnosis Procedure"](#).

7. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform Component Function Check. Refer to [EC-703, "Component Function Check"](#).

NOTE:

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

NO >> Go to [EC-704, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344150

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.

P0130 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Set D (CVT) or 1st (M/T) position, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-704, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344151

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

P0130 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

A

EC

C

D

E

F

G

H

I

J

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L

M

N

O

P

P0131 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0131 A/F SENSOR 1

Description

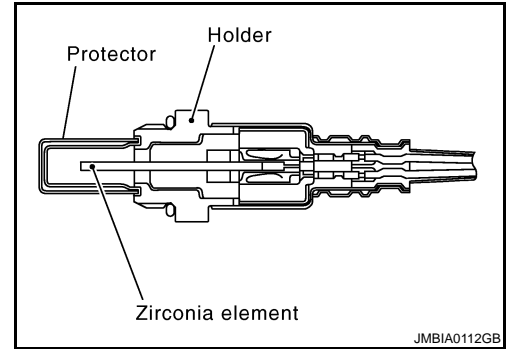
INFOID:000000001665754

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.

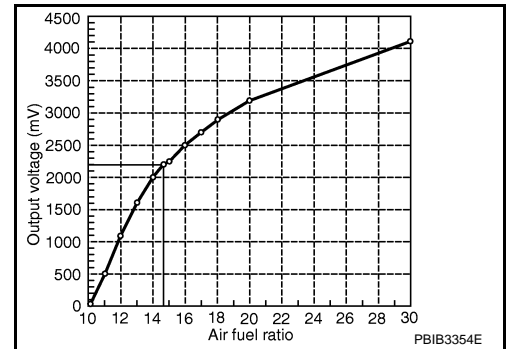
The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range.

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 about 800°C (1,472°F).



JMBIA0112GB



PBIB3354E

DTC Logic

INFOID:000000001344153

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 circuit low voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR FUNCTION

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 0V?

YES >> Go to [EC-707. "Diagnosis Procedure"](#).

P0131 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|---------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Shift lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-707, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344154

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0131 A/F SENSOR 1

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

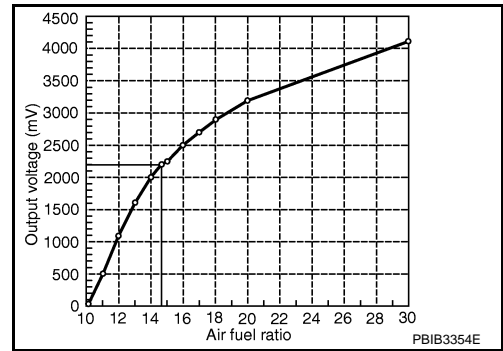
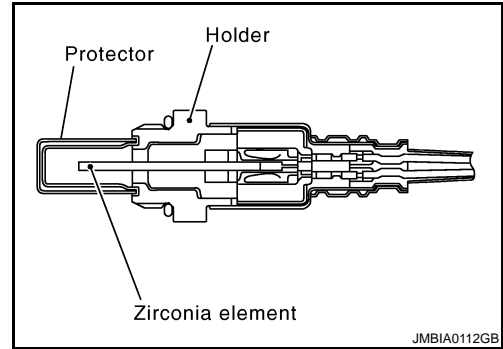
>> INSPECTION END

P0132 A/F SENSOR 1

Description

INFOID:000000001665756

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001344156

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 circuit high voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR FUNCTION

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 5V?

YES >> Go to [EC-710. "Diagnosis Procedure"](#).

P0132 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|---------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Shift lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC is detected?

- YES >> Go to [EC-710, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344157

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0132 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0133 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0133 A/F SENSOR 1

Description

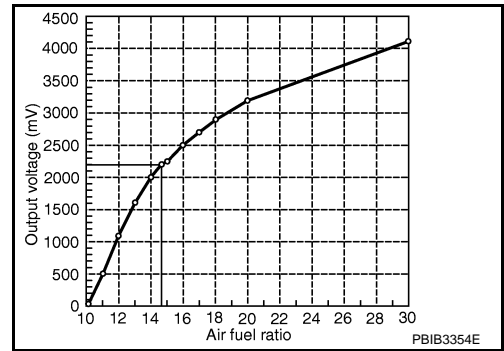
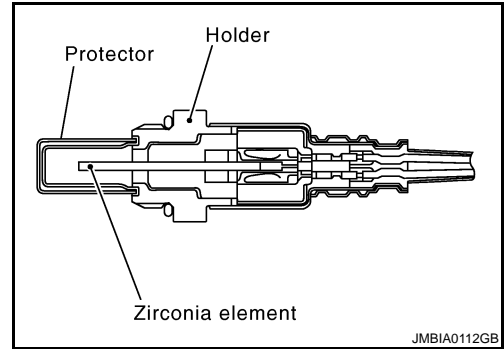
INFOID:000000001665757

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001344159

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 circuit slow response | <ul style="list-style-type: none"> The response of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks Exhaust gas leaks PCV Mass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

P0133 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. 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. 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. Select "A/F SEN1(B1) P1278/P1279" of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
6. Touch "START".

Is "COMPLETED" displayed on COUSULT-III?

- YES >> GO TO 3
NO >> GO TO 4.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
NG >> Go to [EC-714, "Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE

1. After perform the following procedure, "TESTING" will be displayed on the CONSULT-III screen.
 - Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
 - Fully release accelerator pedal and then let engine idle for about 10 seconds.**If "TESTING" is not displayed after 10 seconds, refer to [EC-649, "Component Function Check"](#).**
2. Wait for about 20 seconds at idle at under the condition that "TESTING" is displayed on the CONSULT-III screen.
3. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-649, "Component Function Check"](#).
4. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
NG >> Go to [EC-714, "Diagnosis Procedure"](#).

5. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.
3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.

Is the total percentage within $\pm 15\%$?

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

6. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

7. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

P0133 A/F SENSOR 1

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Let engine idle for 1 minute.
4. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
5. Fully release accelerator pedal and then let engine idle for about 1 minute.
6. Check 1st trip DTC detected?.

Is 1st trip DTC detected?

- YES >> Go to [EC-714, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344160

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. RETIGHTEN A/F SENSOR 1

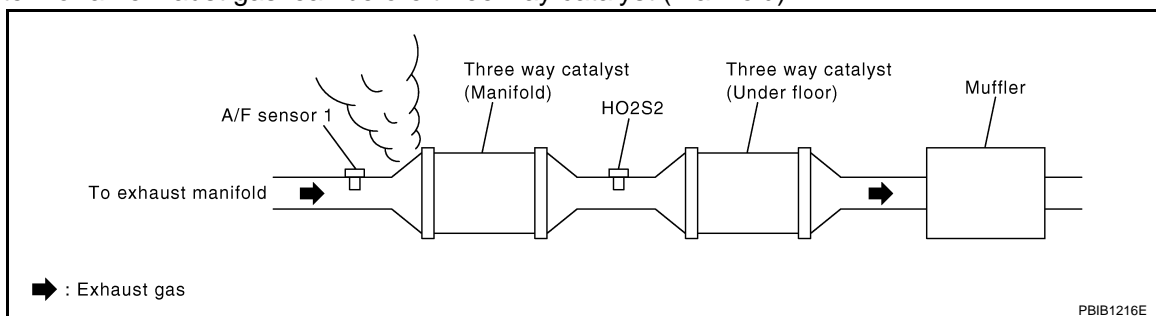
Loosen and retighten the A/F sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> Repair or replace.
NO >> GO TO 4.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
NO >> GO TO 5.

5. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-736, "DTC Logic"](#) or [EC-740, "DTC Logic"](#).
NO >> GO TO 6.

P0133 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

6. 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.

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-668. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor.

Refer to [EC-678. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

P0133 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

11.CHECK PCV VALVE

Refer to [EC-948. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve.

12.CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

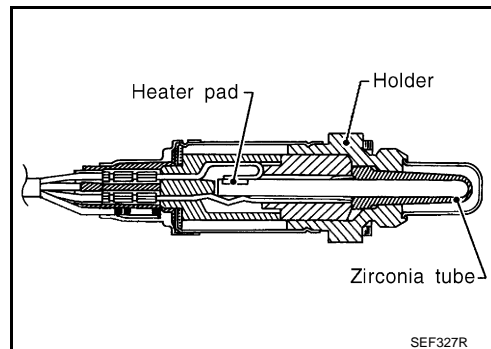
>> INSPECTION END

P0137 HO2S2

Description

INFOID:000000001344161

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

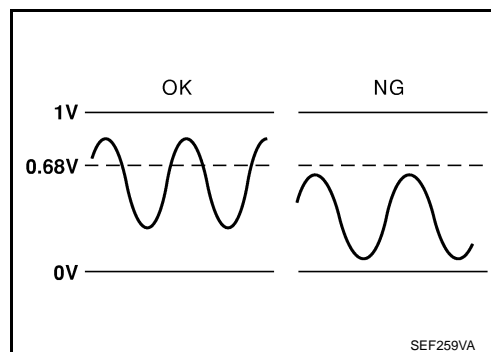


DTC Logic

INFOID:000000001344162

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 maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0137 | Heated oxygen sensor 2 circuit low voltage | The maximum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

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

TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

< COMPONENT DIAGNOSIS >

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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-719. "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-718. "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-719. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344163

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. 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. |

A
EC

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 3.

C

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

D

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. |

E
F

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-719. "Diagnosis Procedure"](#).

G

Diagnosis Procedure

INFOID:000000001344164

1.CHECK GROUND CONNECTION

H

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

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

I
J

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-551. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

K

Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171. Refer to [EC-736. "DTC Logic"](#).
- NO >> GO TO 3.

L

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

M

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check the continuity between HO2S2 harness connector and ECM harness connector.

N

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | Existed |

O

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

P

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair open circuit or 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.

< COMPONENT DIAGNOSIS >

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-720, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344165

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

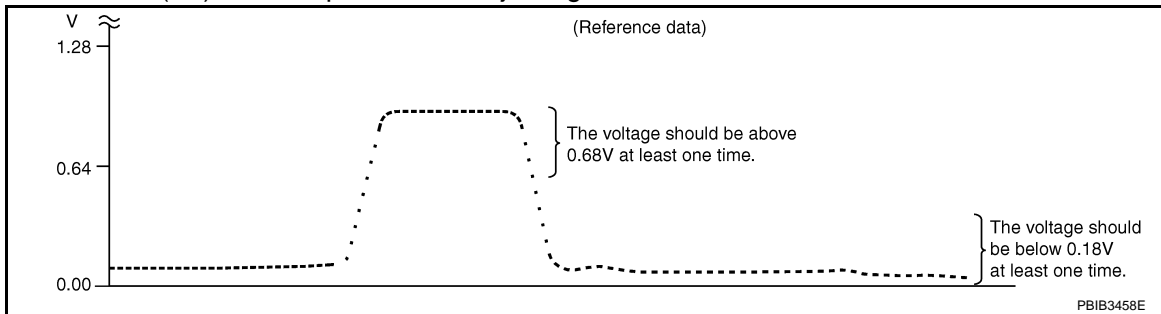
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.

P0137 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

P0137 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

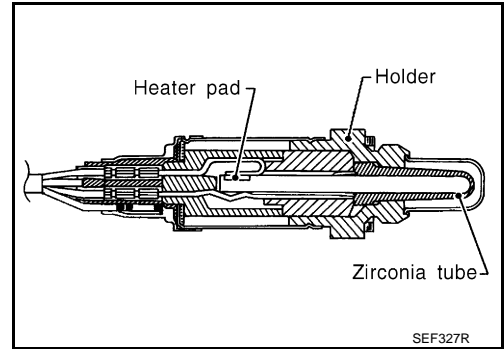
>> INSPECTION END

P0138 HO2S2

Description

INFOID:000000001665759

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



DTC Logic

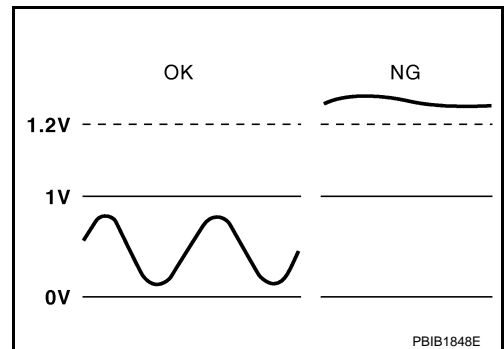
INFOID:000000001344167

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.

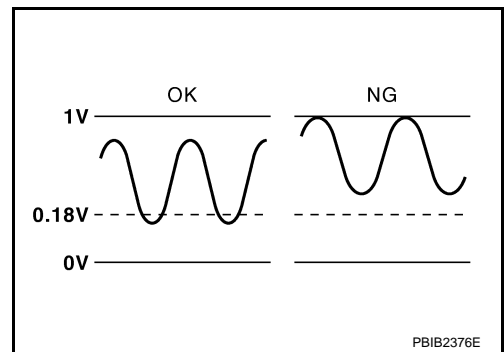
MALFUNCTION A

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition 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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|---|-------------------------|--|---|
| P0138 | Heated oxygen sensor 2 circuit high voltage | A) | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 |
| | | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-725. "Diagnosis Procedure"](#).

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. 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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

OK >> INSPECTION END

NG >> Go to [EC-725. "Diagnosis Procedure"](#).

CAN NOT BE DIAGNOSED >> GO TO 4.

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

Perform component function check. Refer to [EC-725. "Diagnosis Procedure"](#).

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-725. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344168

1. PERFORM COMPONENT FUNCTION CHECK-I**⊗ Without CONSULT-III**

1. Start engine and warm it up to the normal operating temperature.

P0138 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- Turn ignition switch OFF and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- Let engine idle for 1 minute.
- Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revvng up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.18V at least once during this procedure. |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-725, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344169

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-723, "DTC Logic"](#).

Which malfunction is detected?

A >> GO TO 2.

B >> GO TO 9.

2.CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- Disconnect heated oxygen sensor 2 harness connector.
- Disconnect ECM harness connector.
- Check the continuity between HO2S2 harness connector and ECM harness connector.

< COMPONENT DIAGNOSIS >

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | 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 or 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.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness or connectors.

6.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-728, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7.REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

< COMPONENT DIAGNOSIS >

9. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.
 NO >> Repair or replace ground connection.

10. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0172. Refer to [EC-740, "DTC Logic"](#).
 NO >> GO TO 11.

11. 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 HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 12.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not existed |

3. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 13.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-728, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
 NO >> GO TO 14.

14. REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

15.CHECK INTERMITTENT INCIDENTRefer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665760

1.INSPECTION START

Do you have CONSULT-III?

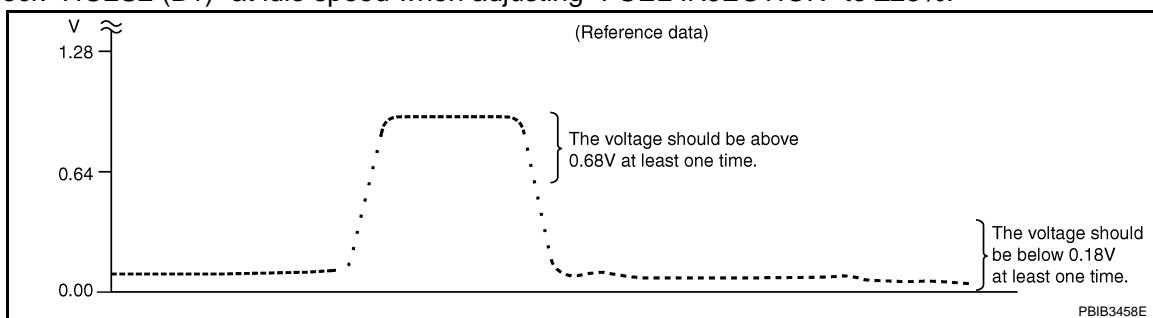
Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2**① 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)" as the monitor item with CONSULT-III.
7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

**"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.****"HO2S2 (B1)" should be below 0.18V 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**② 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 and ground under the following condition.

P0138 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

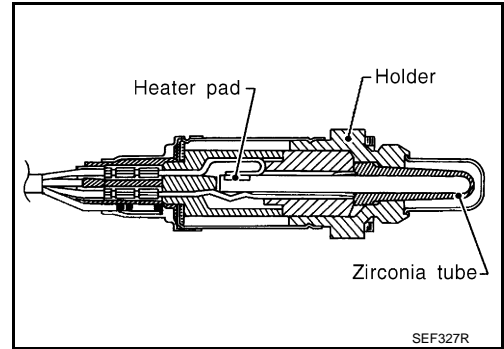
>> INSPECTION END

P0139 HO2S2

Description

INFOID:000000001665761

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

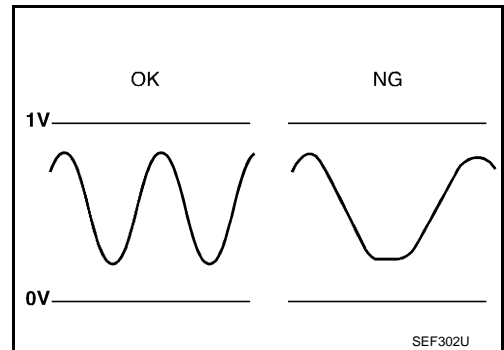


DTC Logic

INFOID:000000001344172

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 (mamifold) 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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0139 | Heated oxygen sensor 2 circuit slow response | It takes more time for the sensor to respond between rich and lean than the specified time. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

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.

P0139 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Start engine and warm it up to the normal operating temperature.
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. Open engine hood.
7. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
8. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

9. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
- NG >> GO TO 4.
- CAN NOT BE DIAGNOSED>>GO TO 4.

4.PERFORM THE RESULT OF DTC CONFIRMATION PROCEDURE

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-731. "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-732. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344173

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. 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Reving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.30V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.30V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END

< COMPONENT DIAGNOSIS >

NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.30V at least once during this procedure. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-732, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344174

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-736, "DTC Logic"](#) or [EC-740, "DTC Logic"](#).
- 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 HO2S2 harness connector and ECM harness connector.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 1 | F13 | 35 | 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 or 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.

| HO2S2 | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F42 | 4 | F13 | 33 | Existed |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| HO2S2 | | ECM | | Ground | Continuity |
|-----------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F42 | 4 | F13 | 33 | Ground | Not 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 ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-733. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665762

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

Ⓜ With CONSULT-III

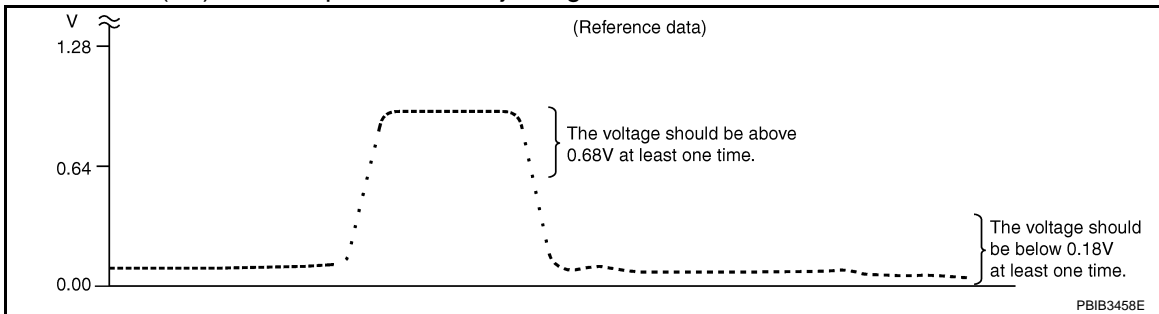
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.

P0139 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V 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 and ground under the following condition.

P0139 HO2S2

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |

A

EC

Is the inspection result normal?

C

YES >> INSPECTION END
NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

D

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

E

F

>> INSPECTION END

G

H

I

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K

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O

P

P0171 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0171 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000001344176

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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 | <ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) | <ul style="list-style-type: none">Intake air leaksA/F sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureLack of fuelMass air flow sensorIncorrect PCV hose connection |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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.
Crank engine while depressing accelerator pedal.

Does engine start?

- YES >> Go to [EC-737, "Diagnosis Procedure"](#).
NO >> Check exhaust and intake air leak visually.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

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

Is 1st trip DTC detected?

- YES >> Go to [EC-737, "Diagnosis Procedure"](#).
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE-III

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

P0171 FUEL INJECTION SYSTEM FUNCTION

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

- Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-737. "Diagnosis Procedure"](#).

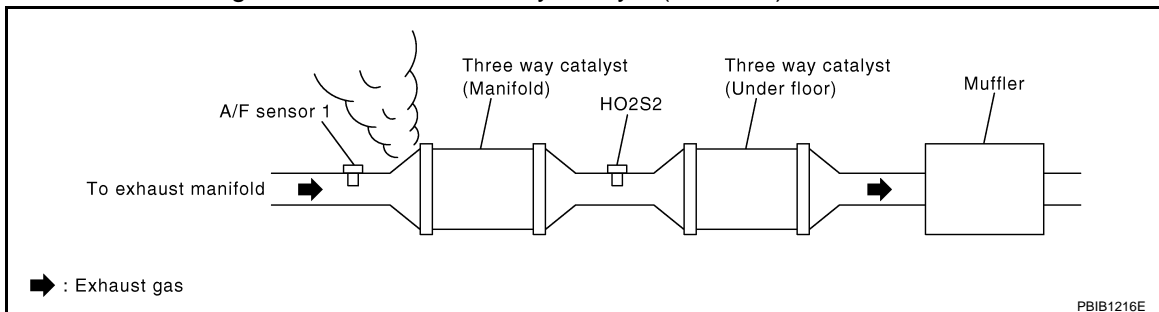
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344177

1.CHECK EXHAUST GAS LEAK

- Start engine and run it at idle.
- Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 2.

2.CHECK FOR INTAKE AIR LEAK

- Listen for an intake air leak after the mass air flow sensor.
- Check PCV hose connection.

Intake air leak detected?

YES >> Repair or replace.

NO >> GO TO 3.

3.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect corresponding A/F sensor 1 harness connector.
- Disconnect ECM harness connector.
- Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F14 | 45 | Existed |
| | 2 | | 49 | |

- Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

P0171 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F14 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1006, "Inspection"](#).

2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1006, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

YES >> GO TO 6.

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

6. 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.

3. For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

 **With GST**

1. Install all removed parts.

2. Check mass air flow sensor signal in Service \$01 with GST.

3. For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

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 grounds. Refer to [EC-675, "DTC Logic"](#).

7. CHECK FUNCTION OF FUEL INJECTOR

 **With CONSULT-III**

1. Start engine.

2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.

3. Make sure that each circuit produces a momentary engine speed drop.

 **Without CONSULT-III**

1. Let engine idle.

P0171 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

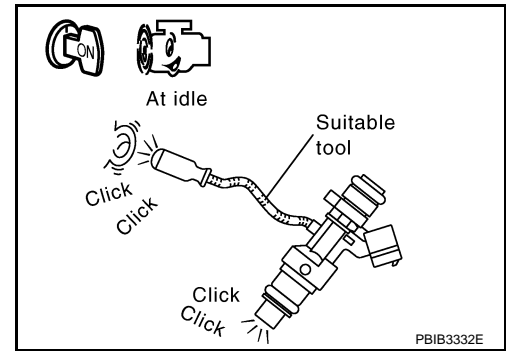
- Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-930. "Component Function Check"](#).



8. CHECK FUEL INJECTOR

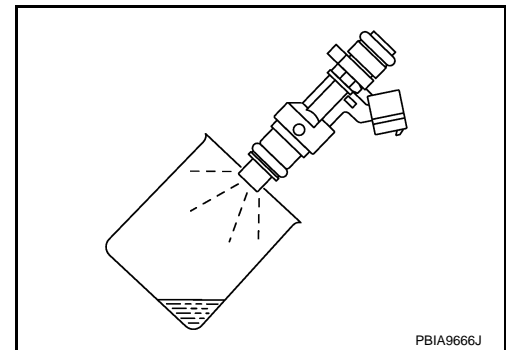
- Turn ignition switch OFF.
- Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- Disconnect all fuel injector harness connectors.
- Remove fuel tube assembly. Refer to [EM-36. "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
- Disconnect all ignition coil harness connectors.
- Prepare pans or saucers under each fuel injector.
- Crank engine for about 3 seconds.

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-42. "Intermittent Incident"](#).

>> INSPECTION END

P0172 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0172 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000001344178

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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 | <ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) | <ul style="list-style-type: none">A/F sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureMass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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.
Crank engine while depressing accelerator pedal.

Does engine start?

- YES >> Go to [EC-741, "Diagnosis Procedure"](#).
NO >> Remove spark plugs and check for fouling, etc.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Start engine and let it idle for at least 10 minutes.

Is 1st trip DTC detected?

- YES >> Go to [EC-741, "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 the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

P0172 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| | |
|--|--|
| 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

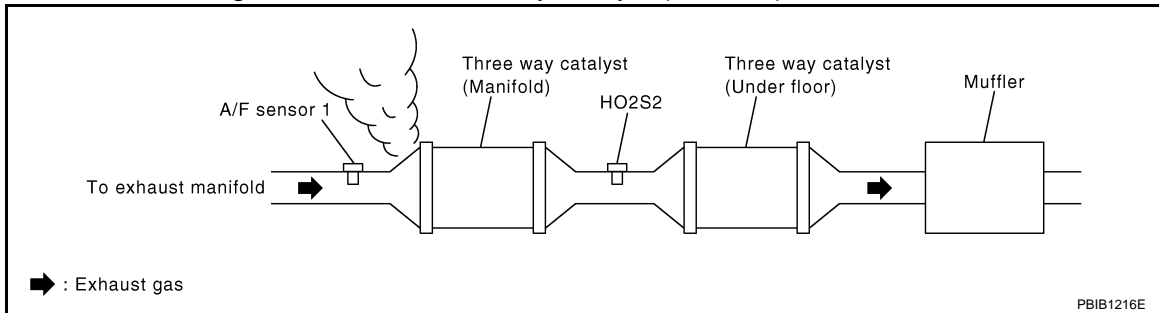
- YES >> Go to [EC-741, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344179

1.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

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

2.CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
 NO >> GO TO 3.

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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F14 | 45 | Existed |
| | 2 | | 49 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F14 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

P0172 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

YES >> GO TO 4.

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

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1006, "Inspection"](#).

2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1006, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

YES >> GO TO 6.

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

6. 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.

3. For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

 **With GST**

1. Install all removed parts.

2. Check mass air flow sensor signal in "Service \$01" with GST.

3. For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

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 grounds. Refer to [EC-675, "DTC Logic"](#).

7. CHECK FUNCTION OF FUEL INJECTOR

 **With CONSULT-III**

1. Start engine.

2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.

3. Make sure that each circuit produces a momentary engine speed drop.

 **Without CONSULT-III**

1. Let engine idle.

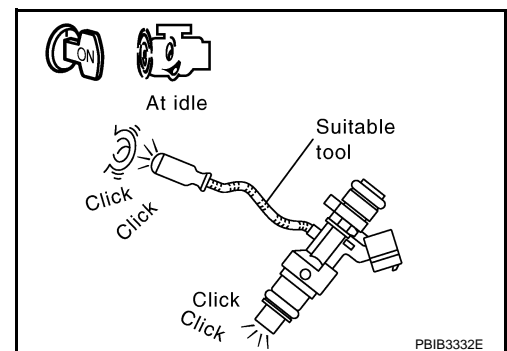
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-930, "Component Function Check"](#).



8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-36, "Removal and Installation"](#).

Keep fuel hose and all fuel injectors connected to fuel tube.

2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.

P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Disconnect all fuel injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from fuel injector.

A

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.

EC

C

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

D

>> INSPECTION END

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P0181 FTT SENSOR

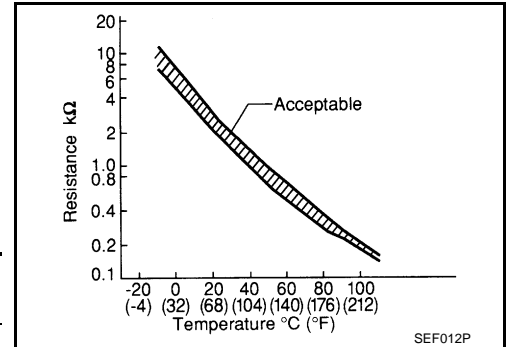
Description

INFOID:000000001344180

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001344181

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0181 | Fuel tank temperature sensor circuit range/performance | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Fuel tank temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Turn ignition switch and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-745. "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3. CHECK ENGINE COOLANT TEMPERATURE

With CONSULT-III

1. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
2. Check "COOLAN TEMP/S" value.

With GST

Follow the procedure "With CONSULT-III" above.

"COOLAN TEMP/S" less than 60°C (140°F)?

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

4. PERFORM DTC CONFIRMATION PROCEDURE-II

P0181 FTT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

With CONSULT-III

1. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
2. Wait at least 10 seconds.
3. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-745. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344182

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. 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 | |
| B42 | 5 | E10 | 104 | Existed |

3. 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 B1, M6

P0181 FTT SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Harness connectors E30, M1
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

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

6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-746, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344183

1.CHECK FUEL TANK TEMPERATURE SENSOR

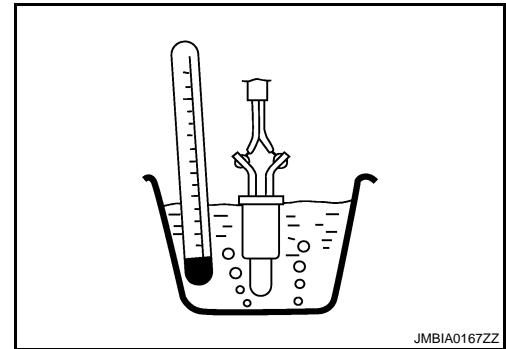
1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Remove fuel level sensor unit.
4. Check resistance between “fuel level sensor unit and fuel pump” terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance |
|-----------|---------------------|-------------------------|
| 4 and 5 | Temperature °C (°F) | 20 (68) 2.3 - 2.7 kΩ |
| | | 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

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0182, P0183 FTT SENSOR

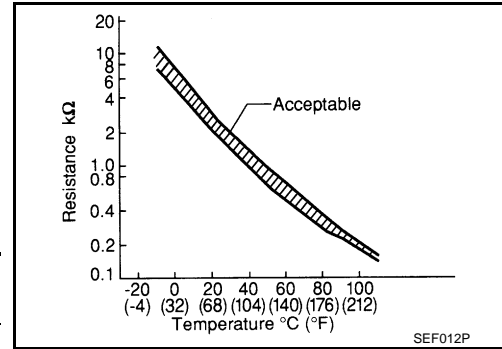
Description

INFOID:000000001665765

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000001344185

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P0182 | Fuel tank temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Fuel tank temperature sensor |
| P0183 | Fuel tank temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-747, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665766

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

P0182, P0183 FTT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

1. Turn ignition switch OFF.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4.CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. 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 | |
| B42 | 5 | E10 | 104 | Existed |

3. 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 B1, M6
- Harness connectors E30, M1
- Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

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

6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-748, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665767

1.CHECK FUEL TANK TEMPERATURE SENSOR

1. Turn ignition switch OFF.

P0182, P0183 FTT SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

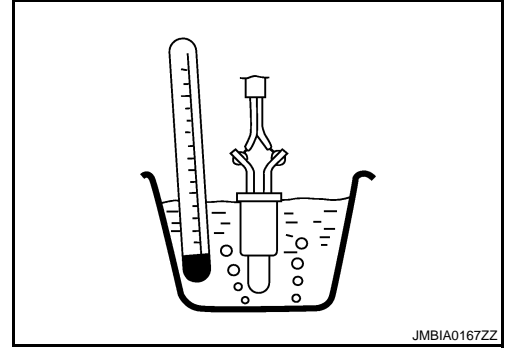
2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
3. Remove fuel level sensor unit.
4. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance | |
|-----------|---------------------|------------|----------------|
| 4 and 5 | Temperature °C (°F) | 20 (68) | 2.3 - 2.7 kΩ |
| | | 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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P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

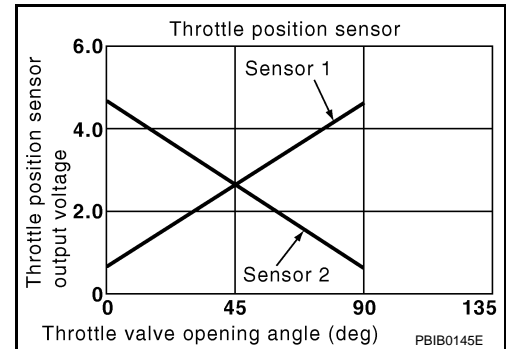
P0222, P0223 TP SENSOR

Description

INFOID:000000001665745

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 signal 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.



DTC Logic

INFOID:000000001344189

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0222 | Throttle position sensor 1 circuit low input | An excessively low voltage from the TP sensor 1 is sent to ECM. | <ul style="list-style-type: none">Harness or connectors (TP sensor 1 circuit is open or shorted.)Electric throttle control actuator (TP sensor 1) |
| P0223 | Throttle position sensor 1 circuit high input | An excessively high voltage from the TP sensor 1 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-750, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344190

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

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

P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Electric throttle control actuator | | Ground | Voltage |
|------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 2 | F13 | 37 | 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 or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-752, "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. Go to [EC-752, "Special Repair Requirement"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection

INFOID:000000001665746

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-752, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665747

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P0300, P0301, P0302, P0303, P0304 MISFIRE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0300, P0301, P0302, P0303, P0304 MISFIRE

DTC Logic

INFOID:000000001344193

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 |
|----------------------------------|---------------------|-------------------------------|
| Crankshaft position sensor (POS) | Engine speed | On board diagnosis of misfire |

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**
On the 1st trip that 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 light 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 on any one cylinder or on multiple cylinders.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|----------------------------|---|
| P0300 | Multiple cylinder misfire detected | Multiple cylinder misfire. | <ul style="list-style-type: none">• Improper spark plug• Insufficient compression• Incorrect fuel pressure• The fuel injector circuit is open or shorted• Fuel injector• Intake air leak• The ignition signal circuit is open or shorted• Lack of fuel• Signal plate• A/F sensor 1• Incorrect PCV hose connection |
| P0301 | No.1 cylinder misfire detected | No. 1 cylinder misfires. | |
| P0302 | No. 2 cylinder misfire detected | No. 2 cylinder misfires. | |
| P0303 | No. 3 cylinder misfire detected | No. 3 cylinder misfires. | |
| P0304 | No. 4 cylinder misfire detected | No. 4 cylinder misfires. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-754, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

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

P0300, P0301, P0302, P0303, P0304 MISFIRE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Start engine and drive the vehicle under the 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.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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 \pm 400 rpm |
| Vehicle speed | Vehicle speed in the freeze frame data \pm 10 km/h (6 MPH) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

The time to driving 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 |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-754, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344194

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

Is intake air leak detected?

- YES >> Discover air leak 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 it.

3. PERFORM POWER BALANCE TEST

Ⓟ With CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> GO TO 4.

4. CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let engine idle.

P0300, P0301, P0302, P0303, P0304 MISFIRE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

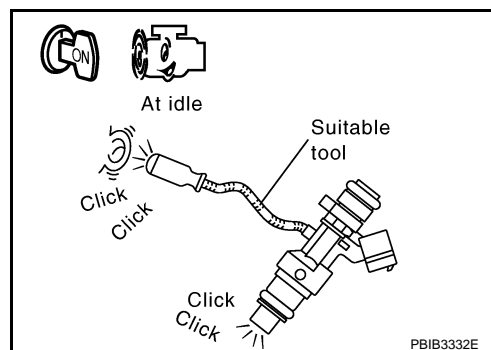
- Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-931. "Component Inspection"](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

- Turn ignition switch OFF.
- 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.

- Start engine.
- After engine stalls, crank it two or three times to release all fuel pressure.
- Turn ignition switch OFF.
- Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- Remove ignition coil and spark plug of the cylinder to be checked.
- Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- Connect spark plug and harness connector to ignition coil.
- 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.
- Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

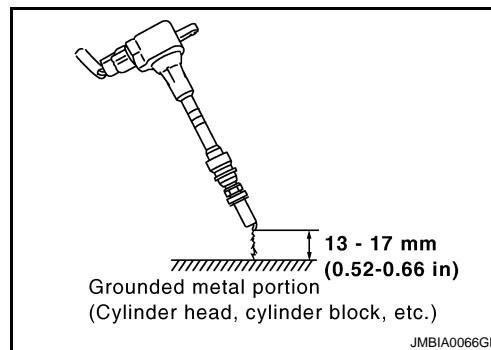
- Turn ignition switch OFF.
- Disconnect spark plug and connect a known-good spark plug.
- Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

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-937. "Component Function Check"](#).



P0300, P0301, P0302, P0303, P0304 MISFIRE

< COMPONENT DIAGNOSIS >

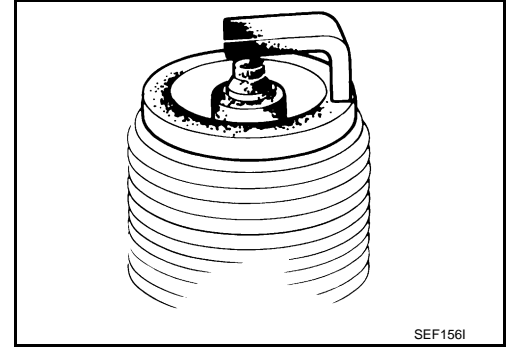
[QR25DE EXCEPT FOR CALIFORNIA]

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 [MA-20. "SPARK PLUG : Removal and Installation"](#).
- NO >> Repair or clean spark plug. Then GO TO 8.



8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 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 [MA-20. "SPARK PLUG : Removal and Installation"](#).

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-23. "Compression pressure"](#).

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

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-1006. "Inspection"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1006. "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 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.

12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-543. "BASIC INSPECTION : Special Repair Requirement"](#). For specification, refer to [EC-1011. "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Follow the [EC-543. "BASIC INSPECTION : Special Repair Requirement"](#).

13. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect corresponding A/F sensor 1 harness connector.

P0300, P0301, P0302, P0303, P0304 MISFIRE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Disconnect ECM harness connector.
4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

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

14.CHECK A/F SENSOR 1 HEATER

Refer to [EC-668, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace A/F sensor 1.

15.CHECK MASS AIR FLOW SENSOR

With CONSULT-III

Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

With GST

Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to [EC-1011, "Mass Air Flow Sensor"](#).

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 [EC-675, "DTC Logic"](#).

16.CHECK SYMPTOM TABLE

Check items on the rough idle symptom in [EC-995, "Symptom Table"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace.

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 [EC-626, "Diagnosis Description"](#).

>> GO TO 18.

18.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0327, P0328 KS

Description

INFOID:000000001344195

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:000000001344196

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detected condition | Possible cause |
|---------|---------------------------------|---|--|
| P0327 | Knock sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor |
| P0328 | Knock sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-758, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344197

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

| Knock sensor | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F45 | 2 | F13 | 67 | Existed |

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

Is the inspection result normal?

YES >> GO TO 3.

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

< COMPONENT DIAGNOSIS >

3.CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Knock sensor | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F45 | 1 | F13 | 61 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK KNOCK SENSOR

Refer to [EC-759, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace knock sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344198

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as follows.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

| Terminals | Resistance |
|-----------|---------------------------------------|
| 1 and 2 | Approx. 532 - 588 kΩ [at 20°C (68°F)] |

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace knock sensor.

P0335 CKP SENSOR (POS)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

P0335 CKP SENSOR (POS)

Description

INFOID:000000001344199

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.

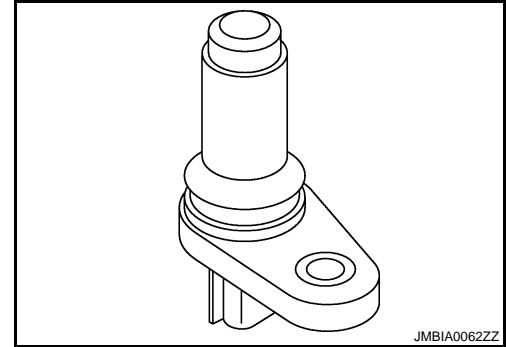
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

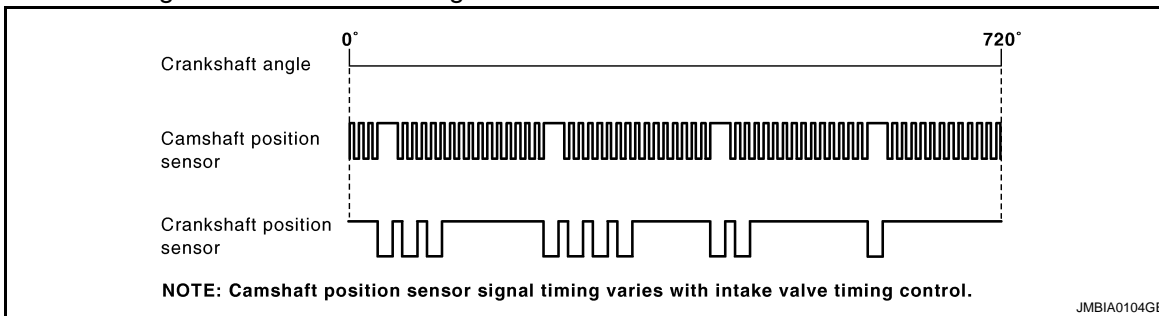
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



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JMBIA0104GB

DTC Logic

INFOID:000000001344200

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0335 | Crankshaft position sensor (POS) circuit | <ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) Crankshaft position sensor (POS) Refrigerant pressure sensor Accelerator pedal position sensor EVAP control system pressure sensor Signal plate |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

P0335 CKP SENSOR (POS)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

1. Start engine and let it idle for at least 5 seconds.
If engine does not start, crank engine for at least 2 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-761, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344201

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

| CKP sensor (POS) | | Ground | Voltage |
|------------------|----------|--------|------------|
| Connector | Terminal | | |
| F30 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch ON.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 1 | F13 | 76 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

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

P0335 CKP SENSOR (POS)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

5. CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)
- EVAP control system pressure sensor (Refer to [EC-801, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

6. CHECK APP SENSOR

Refer to [EC-901, "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. Go to [EC-901, "Special Repair Requirement"](#).

>> INSPECTION END

8. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 2 | F13 | 60 | Existed |

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

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 3 | F13 | 65 | Existed |

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

Is the inspection result normal?

YES >> GO TO 10.

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

10. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-763, "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?

P0335 CKP SENSOR (POS)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 12.
- NO >> Replace the signal plate.

12.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

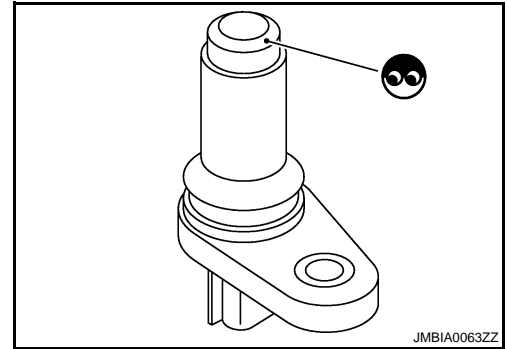
INFOID:000000001344202

1.CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Turn ignition switch OFF.
2. Loosen the fixing bolt of the sensor.
3. Disconnect crankshaft position sensor (POS) harness connector.
4. Remove the sensor.
5. Visually check the sensor for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS).



2.CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

| Terminals (Polarity) | Resistance Ω [at 25°C (77°F)] |
|----------------------|--------------------------------------|
| 1 (+) - 2 (-) | Except 0 or ∞ |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace crankshaft position sensor (POS).

P0340 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0340 CMP SENSOR (PHASE)

Description

INFOID:000000001344203

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

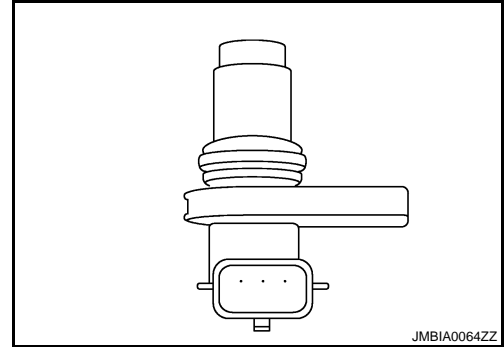
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

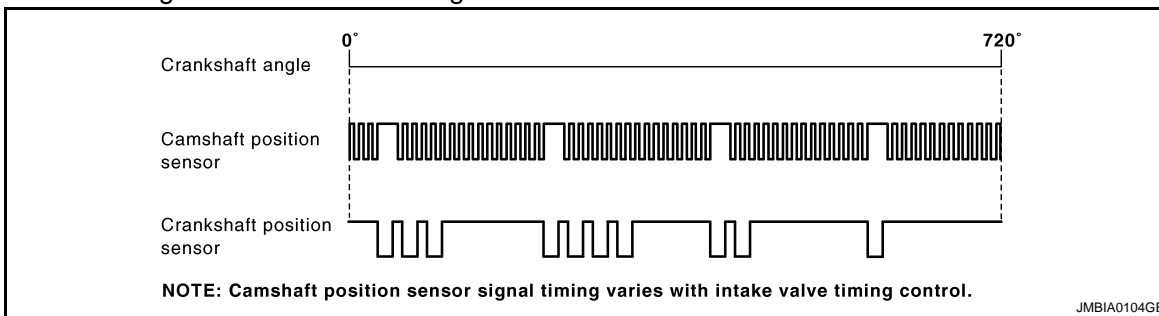
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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.



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DTC Logic

INFOID:000000001344204

DTC DETECTION LOGIC

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P0340 | Camshaft position sensor (PHASE) circuit | <ul style="list-style-type: none"> The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not sent to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to STR-6, "System Diagram".) Starting system circuit (Refer to STR-6, "System Diagram".) Dead (Weak) battery |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.

P0340 CMP SENSOR (PHASE)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

If engine does not start, crank engine for at least 2 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-765, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-765, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344205

1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

YES >> GO TO 2.

NO >> Check starting system.

2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

3.CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.

2. Turn ignition switch ON.

3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

| CMP sensor (PHASE) | | Ground | Voltage |
|--------------------|----------|--------|------------|
| Connector | Terminal | | |
| F55 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

| CMP sensor (PHASE) | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F55 | 2 | F13 | 64 | 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 ground or short to power in harness or connectors.

5.CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

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P0340 CMP SENSOR (PHASE)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

| CMP sensor (PHASE) | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F55 | 3 | F13 | 69 | 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 or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-766, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

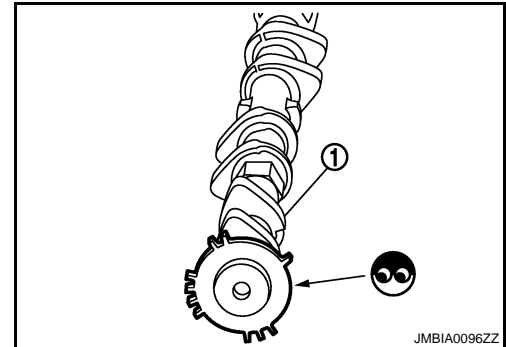
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) 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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344206

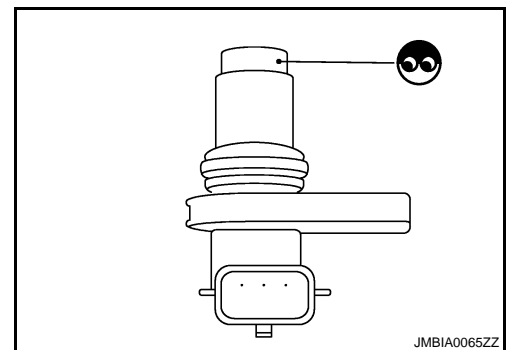
1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

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 camshaft position sensor (PHASE).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

P0340 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Terminals (Polarity) | Resistance |
|----------------------|--|
| 1 (+) - 2 (-) | Except 0 or ∞ Ω [at 25°C (77°F)] |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

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EC

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace camshaft position sensor (PHASE).

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P0420 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0420 THREE WAY CATALYST FUNCTION

DTC Logic

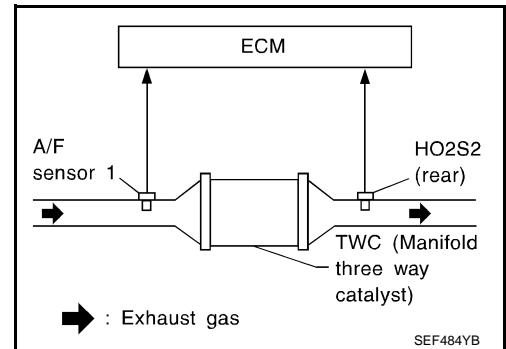
INFOID:000000001344207

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 efficiency below threshold | <ul style="list-style-type: none"> Three way catalyst (manifold) does not operate properly. Three way catalyst (manifold) does not have enough oxygen storage capacity. | <ul style="list-style-type: none"> Three way catalyst (manifold) Exhaust tube Intake air leaks Fuel injector Fuel injector leaks Spark plug Improper ignition timing |

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 7.

2. PRECONDITIONING

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

TESTING CONDITION:

Do not hold 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.
- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- Let engine idle for 1 minute.
- Make sure 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 to 70°C (158°F).
- Open engine hood.
- Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
- Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
- Check the indication of "CATALYST".

Which is displayed on CONSULT-III screen?

P0420 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

CMPLT >> GO TO 6.
INCMP >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.
2. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).

Does the indication change to "CMPLT"?

YES >> GO TO 6.
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than 70°C (158°F).
2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

6. PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-769. "Diagnosis Procedure"](#).
NO >> INSPECTION END

7. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-769. "Component Function Check"](#).

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
NO >> Go to [EC-769. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344208

1. PERFORM COMPONENT FUNCTION CHECK

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. Open engine hood.
6. Check the voltage between ECM harness connector and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------|--------|--|--|
| Connector | Terminal | | | |
| F13 | 33 (HO2S2 signal) | Ground | Keeping engine speed at 2,500 rpm constant under no load | The voltage fluctuation cycle takes more than 5 seconds. 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0 |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to [EC-769. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344209

1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

P0420 THREE WAY CATALYST FUNCTION

[QR25DE EXCEPT FOR CALIFORNIA]

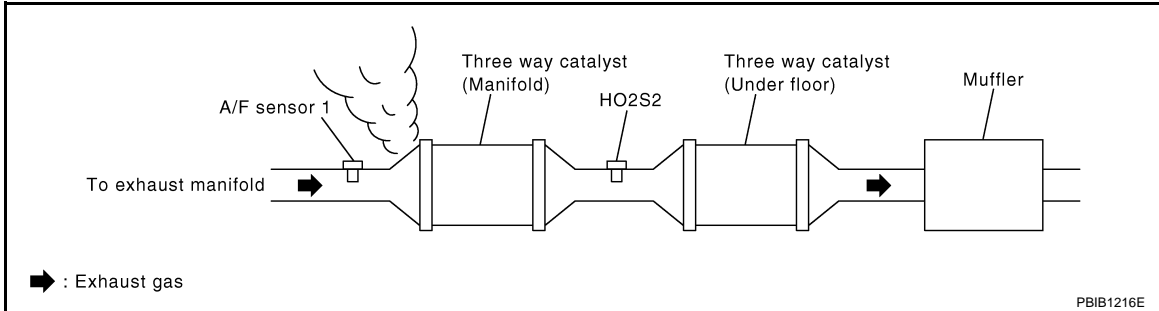
< COMPONENT DIAGNOSIS >

Is the inspection result normal?

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

2.CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> Repair or replace.
- NO >> GO TO 3.

3.CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Repair or replace.
- NO >> GO TO 4.

4.CHECK IGNITION TIMING

For procedure, refer to [EC-547, "IGNITION TIMING : Special Repair Requirement"](#).

For specification, refer to [EC-1011, "Idle Speed"](#) and [EC-1011, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Follow the [EC-543, "BASIC INSPECTION : Special Repair Requirement"](#).

5.CHECK FUEL INJECTOR

1. Stop engine and then turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 29 | Ground | Battery voltage |
| | 30 | | |
| | 31 | | |
| | 32 | | |

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Perform [EC-930, "Diagnosis Procedure"](#).

6.CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. 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.

P0420 THREE WAY CATALYST FUNCTION

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. 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.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 7.

7.CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 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?

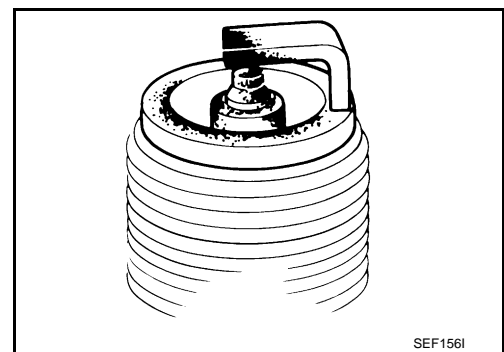
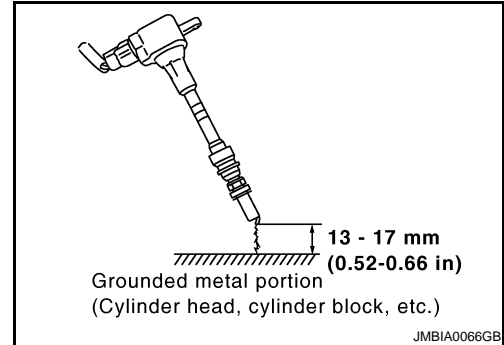
- YES >> GO TO 8.
NO >> Check ignition coil, power transistor and their circuits. Refer to [EC-937. "Diagnosis Procedure"](#).

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 [MA-20. "SPARK PLUG : Removal and Installation"](#).
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 about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

P0420 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [MA-20. "SPARK PLUG : Removal and Installation"](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-36. "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.

Does fuel drip from fuel injector?

YES >> GO TO 11.

NO >> Replace the fuel injector(s) from which fuel is dripping.

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the trouble fixed?

YES >> INSPECTION END

NO >> Replace three way catalyst assembly.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0441 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001344210

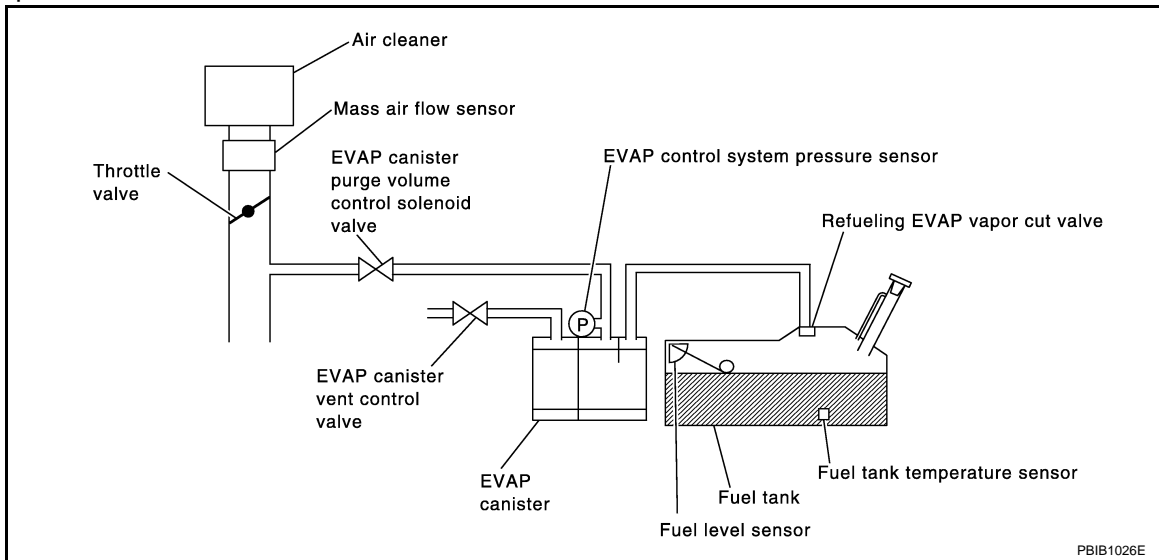
DTC DETECTION LOGIC

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 incorrect purge flow | EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. | <ul style="list-style-type: none"> • EVAP canister purge volume control solenoid valve stuck closed • EVAP control system pressure sensor and the circuit • Loose, disconnected or improper connection of rubber tube • Blocked rubber tube • Cracked EVAP canister • EVAP canister purge volume control solenoid valve circuit • Accelerator pedal position sensor • Blocked purge port • EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 6.

2.PRECONDITIONING

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

TESTING CONDITION:

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. 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 - 3,800 rpm |
| B/FUEL SCHDL | 1.0 - 10.0 msec |
| COOLAN TEMP/S | More than 0°C (32°F) |

CAUTION:

Always drive vehicle at a safe speed.

If "TESTING" is not changed for a long time, retry from step 2.

Is "COMPLETED" displayed on CONSULT-III screen?

YES >> GO TO 5.

NG >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 3.

5. PERFORM DTC CONFIRMATION PROCEDURE-II

Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to [EC-775, "Diagnosis Procedure"](#).

6. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-774, "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-775, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344211

1. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM harness connector and ground.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground |
|-----------|--|--------|
| Connector | Terminal | |
| E10 | 86 (EVAP control system pressure sensor signal) | Ground |

6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

| | |
|-----------------------------|-----------------------------------|
| Air conditioner switch | ON |
| Headlamp switch | ON |
| Rear window defogger switch | ON |
| Engine speed | Approx. 3,000 rpm |
| Shift lever | Any position other than P, N or R |

8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-775. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344212

1.CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

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

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-607. "System Diagram"](#).
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

| PURG VOL CONT/V | Vacuum |
|-----------------|-------------|
| 100% | Existed |
| 0% | Not existed |

Is the inspection result normal?

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

3.CHECK PURGE FLOW

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. 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-607. "System Diagram"](#).

P0441 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- Start engine and let it idle.
Do not depress accelerator pedal even slightly.
- Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

- Revving engine up to 2,000rpm after 100 seconds passed after starting engine.

Vacuum should exist.

Is the inspection result normal?

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

4.CHECK EVAP PURGE LINE

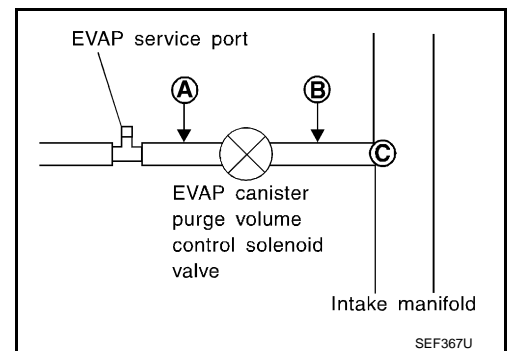
- Turn ignition switch OFF.
- Check EVAP purge line for improper connection or disconnection.
Refer to [EC-607, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair it.

5.CHECK EVAP PURGE HOSE AND PURGE PORT

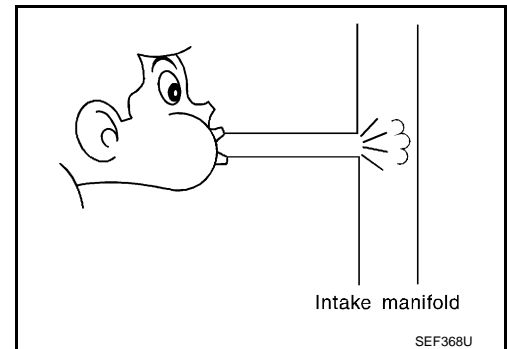
- Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
- Blow air into each hose and EVAP purge port **C**.



- 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

- Start engine.
- Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> GO TO 7.

7.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-787, "Component Inspection"](#).

Is the inspection result normal?

P0441 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 8.
NO >> Replace EVAP canister purge volume control solenoid valve.

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Replace EVAP control system pressure sensor.

9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-802. "DTC Logic"](#) for DTC P0452, [EC-807. "DTC Logic"](#) for DTC P0453.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace EVAP control system pressure sensor.

10.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 11.
NO >> Clean the rubber tube using an air blower.

11.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-793. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Replace EVAP canister vent control valve.

12.CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-607. "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> Replace it.

13.CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

14.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

A

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P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0442 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001344213

DTC DETECTION LOGIC

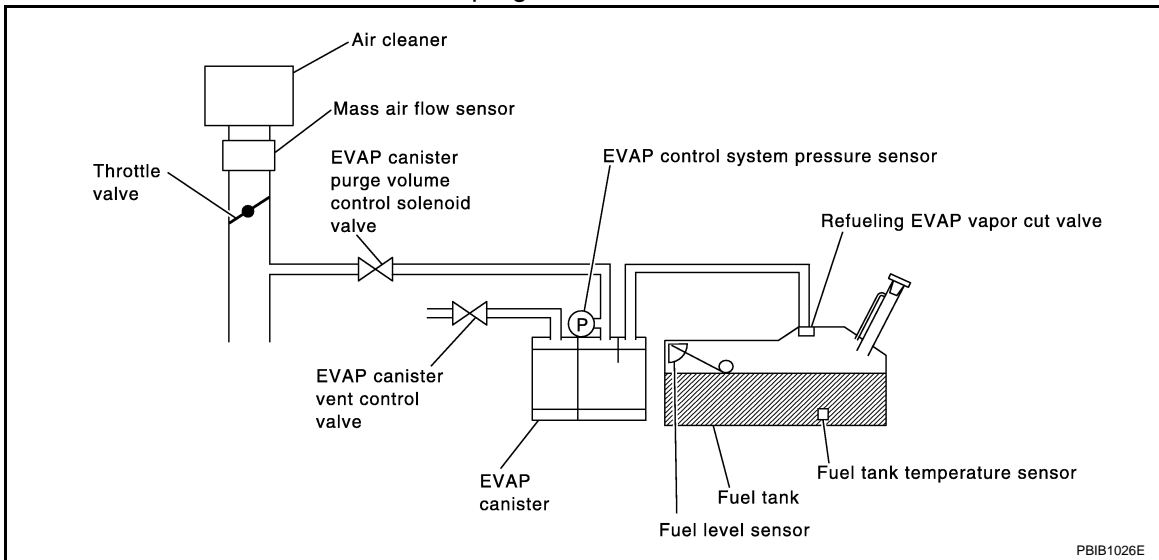
NOTE:

If DTC P0442 is displayed with DTC P0456, first perform the trouble diagnosis for DTC P0456. Refer to [EC-818, "DTC Logic"](#).

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks 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 small leak detected (negative pressure) | EVAP control system has a leak, EVAP control system does not operate properly. | <ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Do you have CONSULT-III?

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

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
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. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-543, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-779, "Diagnosis Procedure"](#).

3. PERFORM COMPONENT FUNCTION CHECK

With GST

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-991, "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Select Service \$07 with GST.

Is 1st trip DTC displayed?

- YES-1 >> P0441: Go to [EC-775, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-779, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344214

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

P0442 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

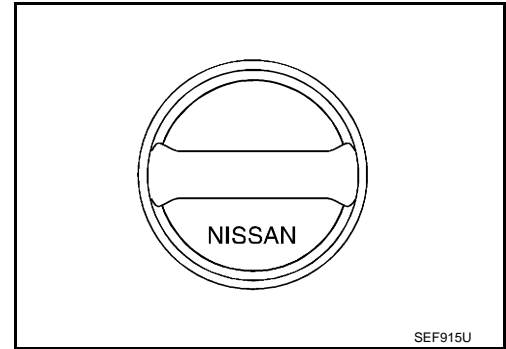
< COMPONENT DIAGNOSIS >

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.



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. Then 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-783. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5.CHECK FOR EVAP LEAK

Refer to [EC-607. "System Diagram"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [EC-1009. "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-793. "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 SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

P0442 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

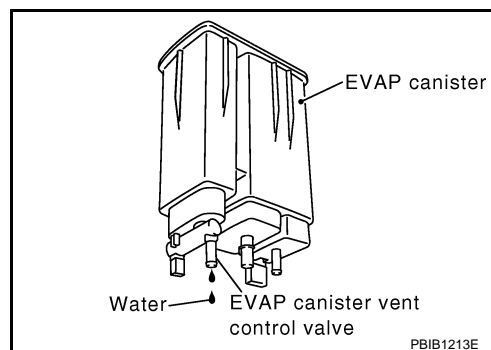
2. Does water drain from the EVAP canister?

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.



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 to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/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

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.

NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-607. "System Diagram"](#).

Is the inspection result normal?

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- YES >> GO TO 13.
NO >> Repair or reconnect the hose.

13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-787, "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-746, "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-799, "DTC Logic"](#).

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 [EC-607, "System Diagram"](#).

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, kink, looseness and improper connection. For location, refer to [EC-943, "Description"](#).

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, kink, 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-946, "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.

P0442 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Replace fuel level sensor unit.

22.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

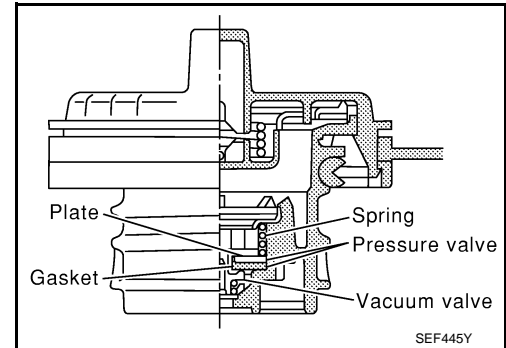
>> INSPECTION END

Component Inspection

INFOID:000000001344215

1.CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



4. Check valve opening pressure and vacuum.

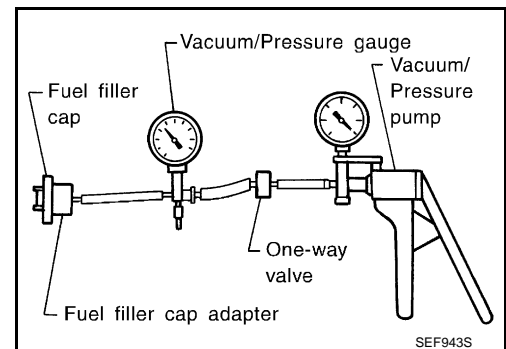
Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -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 come on.

>> INSPECTION END

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

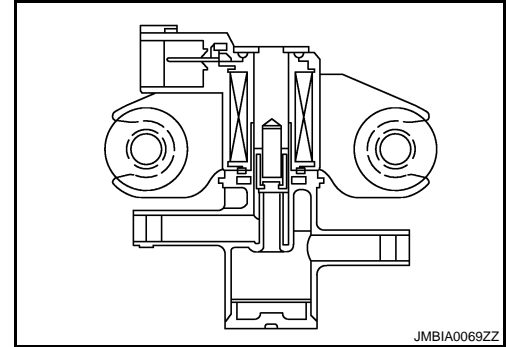
[QR25DE EXCEPT FOR CALIFORNIA]

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:0000000013442.16

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:0000000013442.17

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0443 | EVAP canister purge volume control solenoid 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 style="list-style-type: none">• EVAP control system pressure sensor• EVAP canister purge volume control solenoid valve (The valve is stuck open.)• EVAP canister vent control valve• EVAP canister• Hoses (Hoses are connected incorrectly or clogged.) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

Do you have CONSULT-III

- 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. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. 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.
7. Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III?

- OK >> INSPECTION END
- NG >> Go to [EC-785, "Diagnosis Procedure"](#).

3. PERFORM DTC CONFIRMATION PROCEDURE

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC displayed?

- YES >> Go to [EC-785, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344218

1. 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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

| EVAP canister purge volume control solenoid valve | | Ground | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART

Check the following.

- Junction block E44, E45
- Harness connectors E11, F2
- 15A fuse (No,42)
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 25 | 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 or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Water should not exist.

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-801, "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 CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-787, "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-793, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP canister vent control valve.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

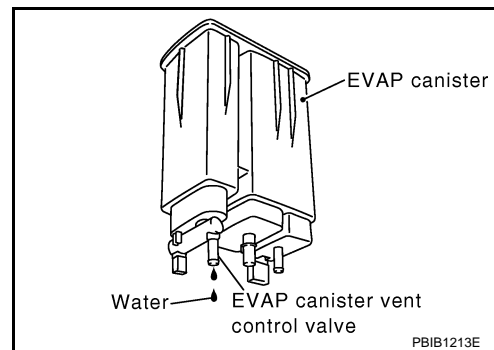
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

2. Check if water will drain from EVAP canister.

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 >

[QR25DE EXCEPT FOR CALIFORNIA]

11. 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 13.

NO >> GO TO 12.

12. 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.

13. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

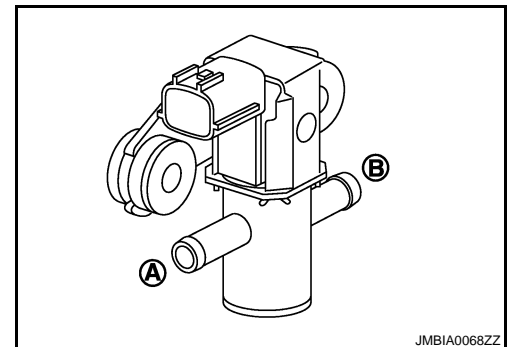
INFOID:000000001344219

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |



JMBIA0068ZZ

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V 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

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

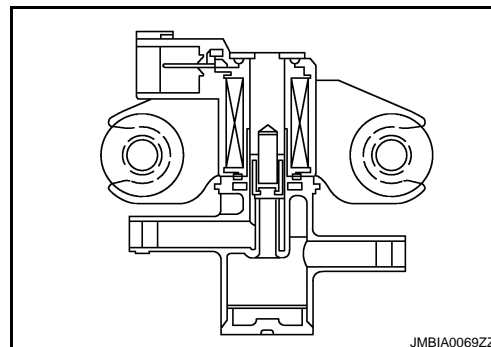
[QR25DE EXCEPT FOR CALIFORNIA]

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000001665811

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:000000001344221

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0444 | EVAP canister purge volume control solenoid valve circuit open | An excessively low voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is open or shorted.)• EVAP canister purge volume control solenoid valve |
| P0445 | EVAP canister purge volume control solenoid valve circuit shorted | An excessively high voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is shorted.)• EVAP canister purge volume control solenoid valve |

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-788. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344222

1.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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| EVAP canister purge volume control solenoid valve | | Ground | Voltage |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Junction block E44, E45
- Harness connectors E11, F2
- 15A fuse (No,42)
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 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 or 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 CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-790, "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-42, "Intermittent Incident"](#).

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

Component Inspection

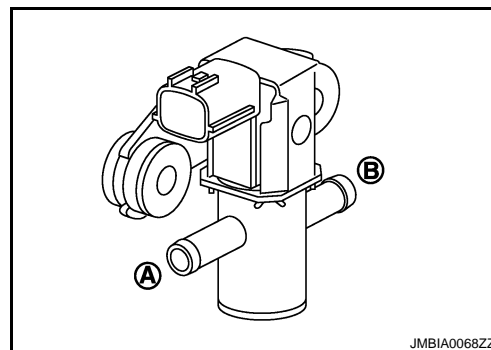
INFOID:000000001665813

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |



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Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V 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

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0447 EVAP CANISTER VENT CONTROL VALVE

Description

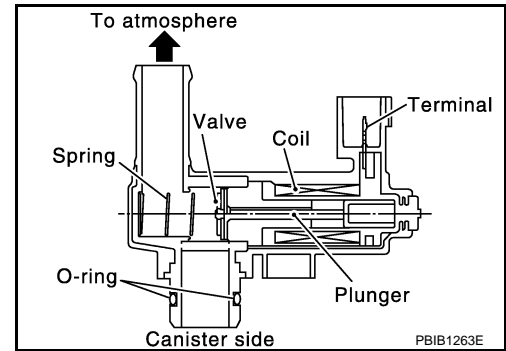
INFOID:000000001344224

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

INFOID:000000001344225

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0447 | EVAP canister vent control valve circuit open | An improper voltage signal is sent to ECM through EVAP canister vent control valve. | <ul style="list-style-type: none">• Harness or connectors (The valve circuit is open or shorted.)• EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-791. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344226

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT-III

1. Turn ignition switch OFF and then turn ON.
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
3. Touch "ON/OFF" on CONSULT-III screen.
4. Check for operating sound of the valve.

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Clicking sound should be heard.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 3.

3.CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

| EVAP canister vent control valve | | Ground | Voltage |
|----------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| B39 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E11, F2
- Harness connectors E29, B10
- 15A fuse (No,42)
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

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

5.CHECK EVAP CANISTER VENT CONTROL 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 vent control valve harness connector and ECM harness connector.

| EVAP canister vent control valve | | ECM | | Continuity |
|----------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| B39 | 2 | E10 | 109 | Existed |

4. 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.

- Junction block connector E44, E45
- Harness connectors E29, B10
- Harness for open or short between EVAP canister vent control valve and ECM

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

7.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 8.

P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Clean the rubber tube using an air blower.

8.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-793. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344227

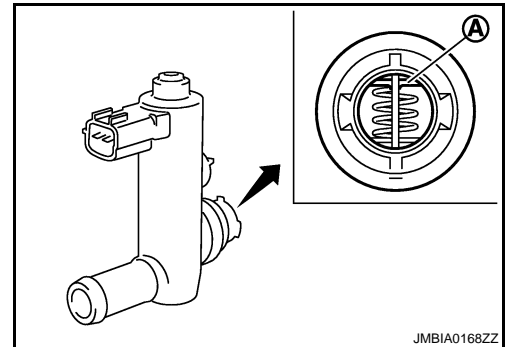
1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (B) of EVAP canister vent control valve for being rusted.

Is it rusted?

YES >> Replace EVAP canister vent control valve

NO >> GO TO 2.



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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.
Make sure 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

Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

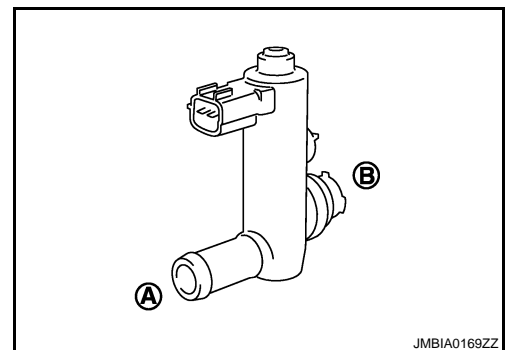
| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve



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P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

④ 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.
Make sure 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

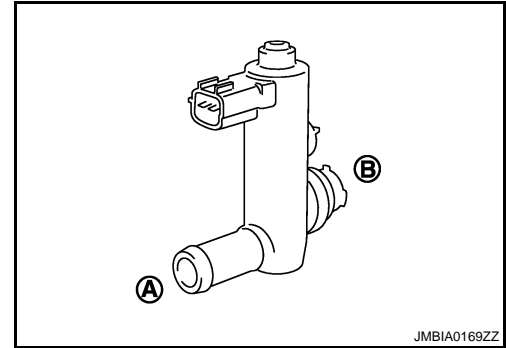
1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace EVAP canister vent control valve



P0448 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0448 EVAP CANISTER VENT CONTROL VALVE

Description

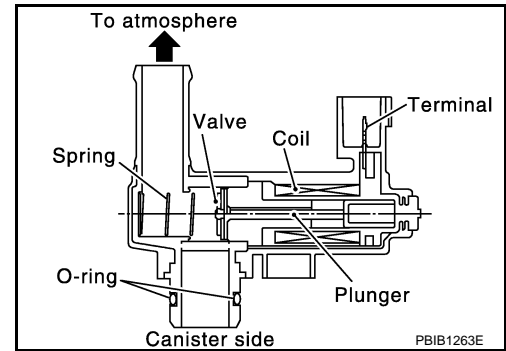
INFOID:000000001665815

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

INFOID:000000001344229

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0448 | EVAP canister vent control valve close | EVAP canister vent control valve remains closed under specified driving conditions. | <ul style="list-style-type: none">• EVAP canister vent control valve• EVAP control system pressure sensor and the circuit• Blocked rubber tube to EVAP canister vent control valve• EVAP canister is saturated with water |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

④ 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 three 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.

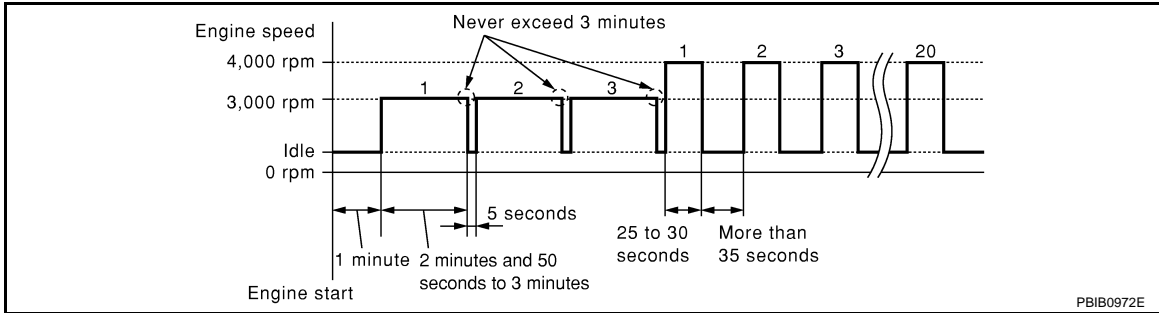
- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
 - Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

P0448 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- Fully released accelerator pedal and keep engine idle for at least 35 seconds.



7. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-796, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344230

1.CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Clean rubber tube using an air blower.

2.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-797, "Component Inspection"](#).

Is the inspection result normal?

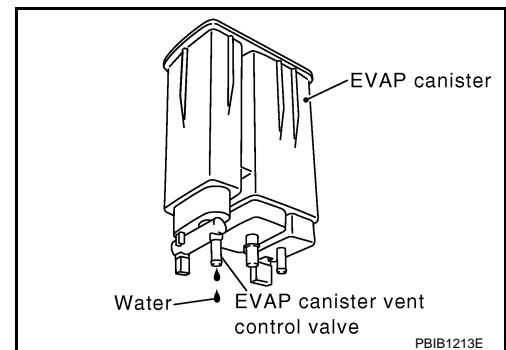
- YES >> GO TO 3.
- NO >> Replace EVAP canister vent control valve.

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 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

P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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.

6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

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-801, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665816

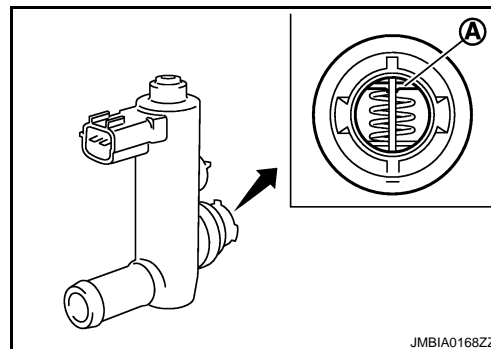
1.CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (B) of EVAP canister vent control valve for being rusted.

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.

P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

4. Check air passage continuity and operation delay time.
Make sure 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

Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

Ⓟ With CONSULT-III

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.
Make sure 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

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

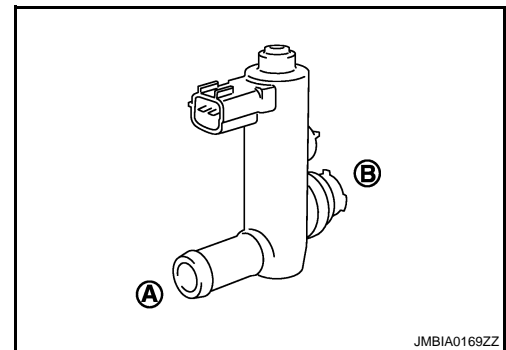
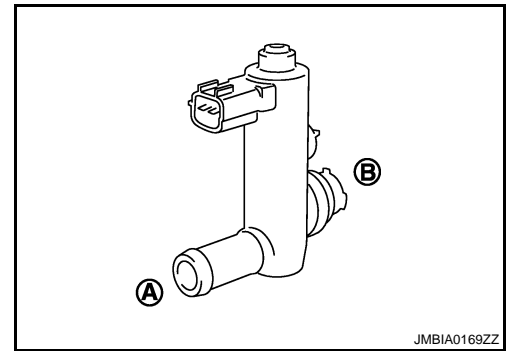
| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve



P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

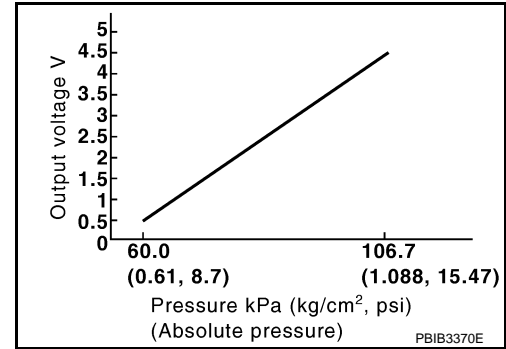
[QR25DE EXCEPT FOR CALIFORNIA]

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001344232

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

INFOID:000000001344233

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0451 | EVAP control system pressure sensor performance | ECM detects a sloshing signal from the EVAP control system pressure sensor | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and wait at least 40 seconds.

NOTE:

Do not depress accelerator pedal even slightly.

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-799, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344234

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 4.

4. CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

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

5. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-763, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace malfunctioning component.

6. CHECK APP SENSOR

Refer to [EC-901, "Component Inspection"](#).

Is the inspection result normal?

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

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly
2. Go to [EC-901, "Special Repair Requirement"](#).

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-801, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344235

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

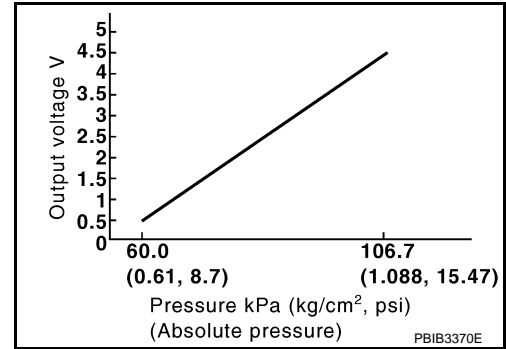
[QR25DE EXCEPT FOR CALIFORNIA]

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001665820

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

INFOID:000000001344237

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0452 | EVAP control system pressure sensor low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. 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 and ground as follows.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-803, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344238

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace harness connector.

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 system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

Is the inspection result normal?

- YES >> GO TO 6.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6. CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 7.

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

7. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-763, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-132, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

8. CHECK APP SENSOR

Refer to [EC-901, "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. Go to [EC-901, "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.
3. 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 | |
| B41 | 1 | E10 | 96 | Existed |

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

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

- YES >> GO TO 12.
- NO >> GO TO 11.

11.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-805. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344239

1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 harness connector and ground under the following conditions.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

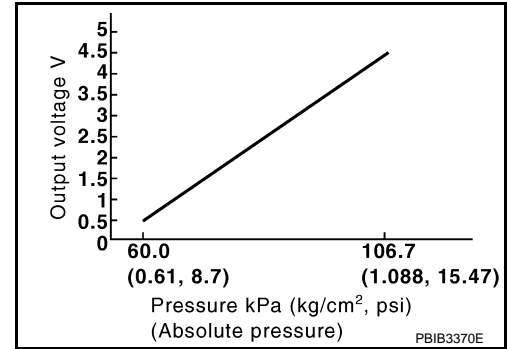
[QR25DE EXCEPT FOR CALIFORNIA]

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000001665821

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

INFOID:000000001344241

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0453 | EVAP control system pressure sensor high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Rubber hose from EVAP canister vent control valve to vehicle frame |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. 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 and ground as follows.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-808, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344242

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage |
|-------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5V |

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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

Is the inspection result normal?

- YES >> GO TO 6.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6. CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 7.

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

7. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-763, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

8. CHECK APP SENSOR

Refer to [EC-901, "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. Go to [EC-901, "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.
3. 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 | |
| B41 | 1 | E10 | 96 | Existed |

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

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

- YES >> GO TO 12.
- NO >> GO TO 11.

11.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14.CHECK RUBBER TUBE

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 15.
- NO >> Clean the rubber tube using an air blower, repair or replace rubber tube.

15.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-793, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 16.
- NO >> Replace EVAP canister vent control valve.

16.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-811, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> Replace EVAP control system pressure sensor.

17.CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

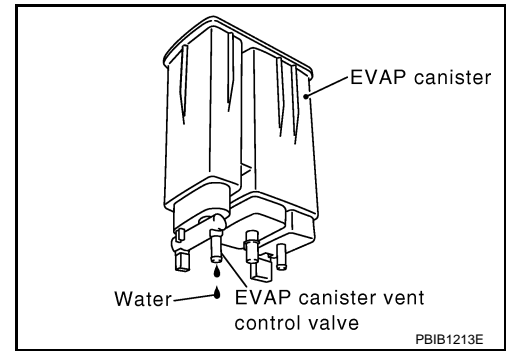
[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

2. Check if water will drain from the EVAP canister.

Does water drain from 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 15.
- NO >> GO TO 14.

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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344243

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|--|---|------------------------------------|
| Connector | Terminal | [Applied vacuum kPa (kg/cm ² , psi)] | |
| E10 | 86 (EVAP control system pressure sensor signal) | Not applied | 1.8 - 4.8V |
| | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

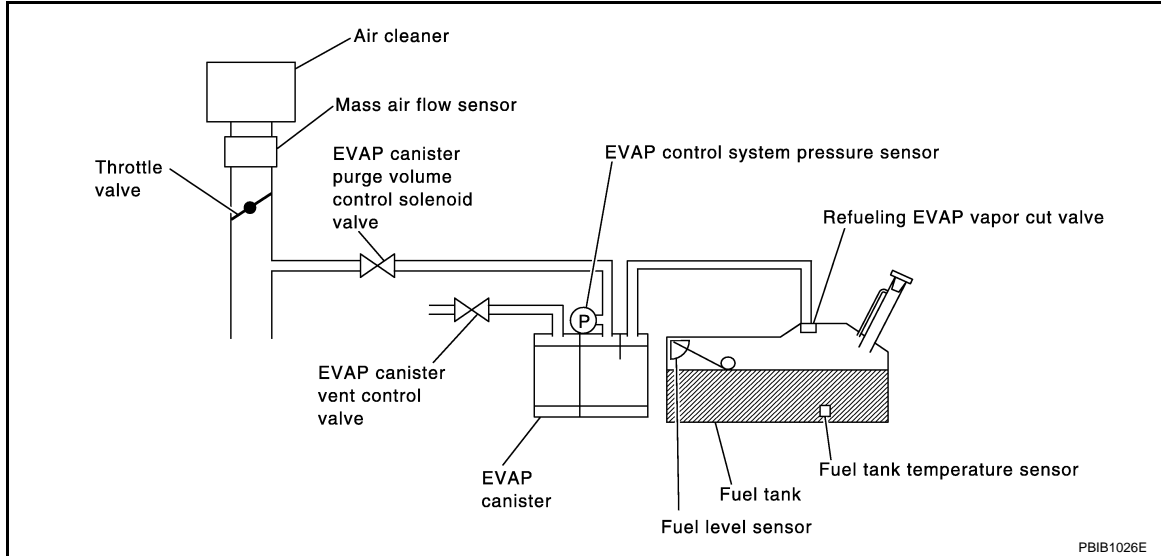
P0455 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001344244

DTC DETECTION LOGIC

This diagnosis detects a very large leak (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 gross leak detected | EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly. | <ul style="list-style-type: none"> Fuel filler cap remains open or fails to close. Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Foreign matter caught in fuel filler cap. Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent. Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

CAUTION:

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< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Never remove fuel filler cap during the DTC CONFIRMATION PROCEDURE.

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

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.

Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-543, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> Go to [EC-813, "Diagnosis Procedure"](#).
- NG >> GO TO 3.

3.CHECK DTC

Check DTC.

Which DTC is detected?

- P0455 >> Go to [EC-813, "Diagnosis Procedure"](#).
- P0442 >> Go to [EC-779, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

 **With GST**

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-991, "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES-1 >> P0455: Go to [EC-813, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-779, "Diagnosis Procedure"](#).
- YES-3 >> P0441: Go to [EC-775, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344245

1.CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

P0455 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

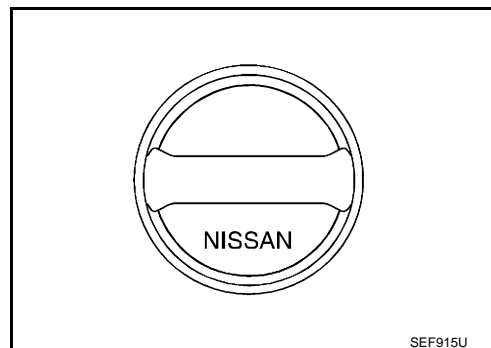
< COMPONENT DIAGNOSIS >

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.



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. Then 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-816. "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-607. "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 [EC-1009. "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-793. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace EVAP canister vent control valve and O-ring.

8. CHECK FOR EVAP LEAK

Refer to [EC-607. "System Diagram"](#).

Is there any leak in EVAP line?

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- YES >> Repair or replace.
- NO-1 >> With CONSULT-III: GO TO 9.
- NO-2 >> Without CONSULT-III: GO TO 10.

9. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

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

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.
- NO >> GO TO 11.

11. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-607, "System Diagram"](#).

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

1. Start engine.
2. Perform "PURG VOL CONT/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 14.
- NO >> GO TO 13.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-787, "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-746, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Replace fuel level sensor unit.

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-801. "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, kink, looseness and improper connection. For location, refer to [EC-943. "Description"](#).

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, kink, 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-946. "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-42. "Intermittent Incident"](#).

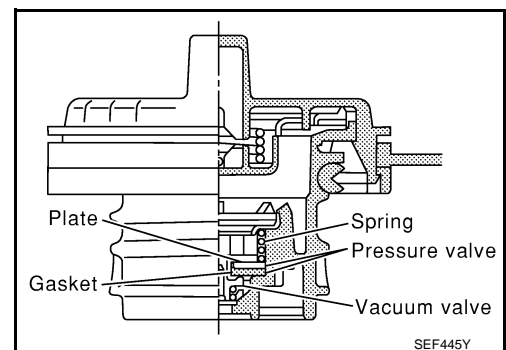
>> INSPECTION END

Component Inspection

INFOID:000000001665784

1. CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

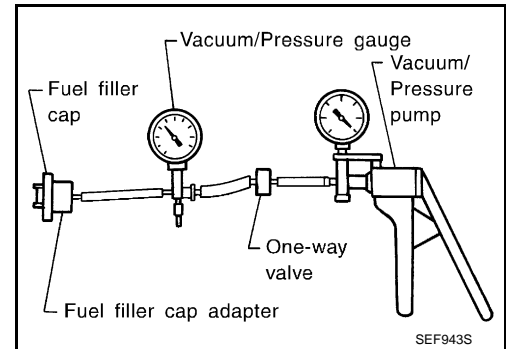
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



A

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C

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P

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0456 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000001344247

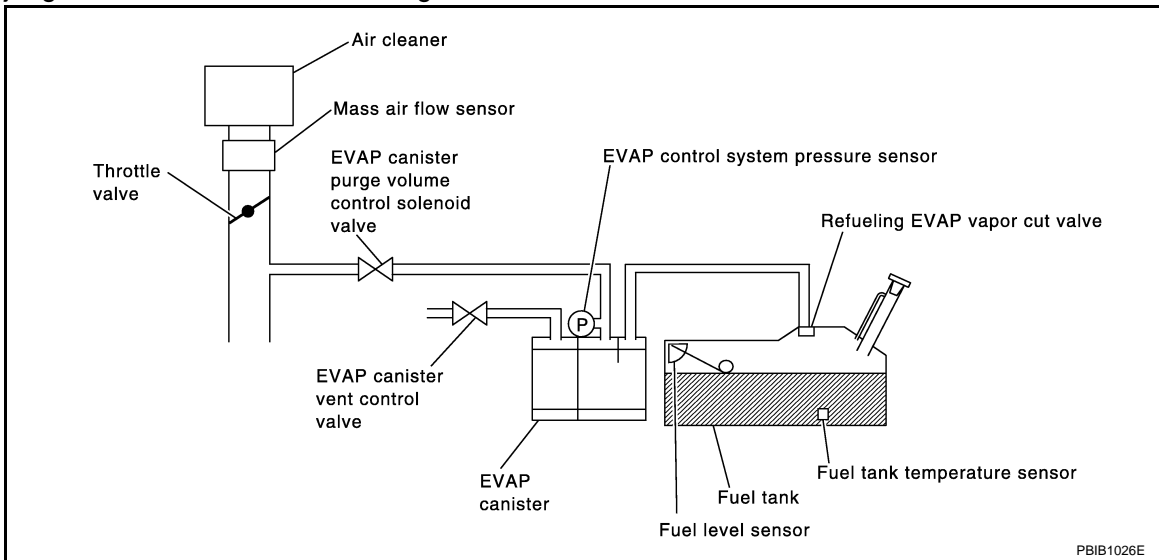
DTC DETECTION LOGIC

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0456 | Evaporative emission control system very small leak (negative pressure check) | <ul style="list-style-type: none"> • EVAP system has a very small leak. • EVAP system does not operate properly. | <ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Refueling EVAP vapor cut valve • ORVR system leaks • Fuel level sensor and the circuit • Foreign matter caught in EVAP canister purge volume control solenoid valve |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 4.

2. PRECONDITIONING

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

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC CONFIRMATION PROCEDURE, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Fuel is refilled or drained.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.4V

COOLAN TEMP/S: 0 - 32°C (32 - 90°F)

FUEL T/TMP SE: 0 - 35°C (32 - 95°F)

INT A/TEMP SE: More than 0°C (32°F)

If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.

Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-543, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III?

OK >> INSPECTION END

NG >> Go to [EC-820, "Diagnosis Procedure"](#).

4. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-820, "Component Function Check"](#).

NOTE:

Use component function check to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-820, "Diagnosis Procedure"](#).

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

INFOID:000000001344248

Component Function Check

1. PERFORM COMPONENT FUNCTION CHECK

 With GST

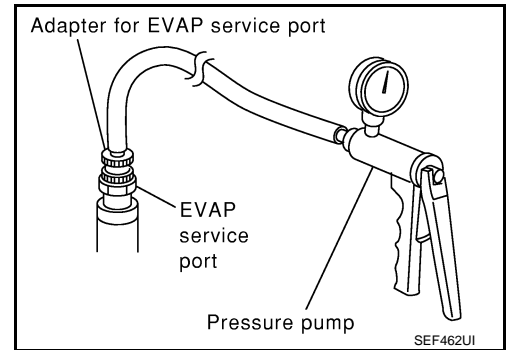
CAUTION:

- Do not use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port adapter 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 kg/cm², 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 kg/cm², 0.06 psi).



Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-820, "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

INFOID:000000001344249

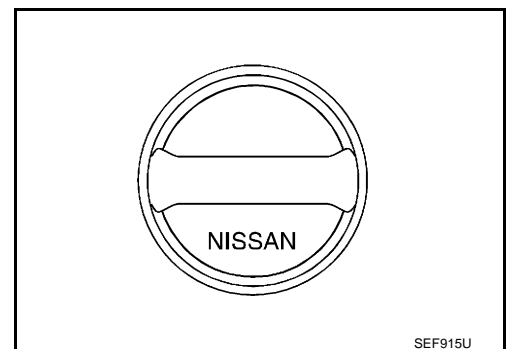
1. CHECK FUEL FILLER CAP DESIGN

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?

P0456 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

YES >> GO TO 3.

NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Then 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-823, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5. CHECK FOR EVAP LEAK

Refer to [EC-607, "System Diagram"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [EC-1009, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-793, "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 SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

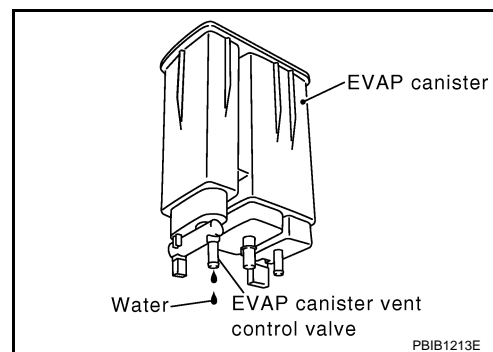
2. Check if water will drain from the EVAP canister.

Does water drain from EVAP canister?

YES >> GO TO 8.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.



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.

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- 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 to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/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

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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-607, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> Repair or reconnect the hose.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-785, "Diagnosis Procedure"](#).

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-746, "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-801, "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.

P0456 EVAP CONTROL SYSTEM

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Refer to [EC-607. "System Diagram"](#).

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, kink, looseness and improper connection. For location, refer to [EC-943. "Description"](#).

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, kink, 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-946. "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.
- NO >> Replace fuel level sensor unit.

22. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

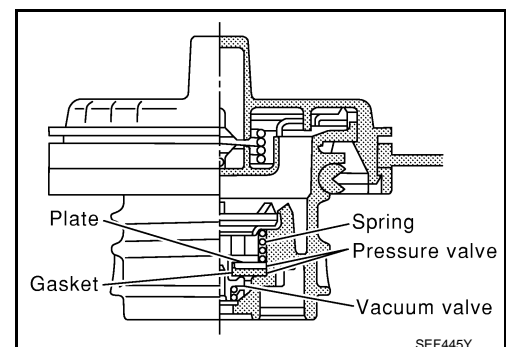
>> INSPECTION END

Component Inspection

INFOID:000000001665810

1. CHECK FUEL TANL VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

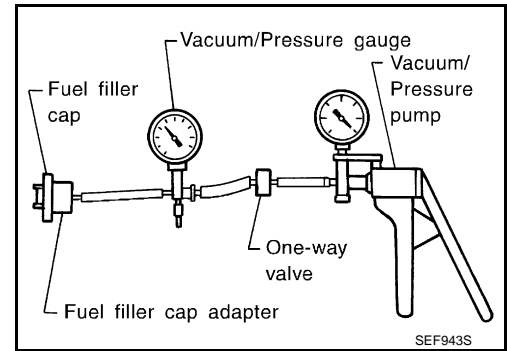
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0460 FUEL LEVEL SENSOR

Description

INFOID:000000001344251

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 through 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:000000001344252

DTC DETECTION LOGIC

NOTE:

- If DTC P0460 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-661, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is 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 |
|---------|---------------------------------|---|---|
| P0460 | Fuel level sensor circuit noise | Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-825, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344253

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

P0461 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0461 FUEL LEVEL SENSOR

Description

INFOID:000000001665822

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 through 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:000000001344255

DTC DETECTION LOGIC

NOTE:

- If DTC P0461 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "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 been driven.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0461 | Fuel level sensor circuit range/performance | The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-827, "Component Function Check"](#).

Use component function check to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-828, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344256

1. PRECONDITIONING

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-10, "Removal and Installation"](#).

TESTING CONDITION:

Before starting component function check, preparation of draining fuel and refilling fuel is required.

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2. PERFORM COMPONENT FUNCTION CHECK

 With CONSULT-III

NOTE:

P0461 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-1006, "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 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 ℓ (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 0.03V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-828, "Diagnosis Procedure"](#).

3.PERFORM COMPONENT FUNCTION CHECK

 Without CONSULT-III

NOTE:

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-1006, "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 ℓ (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-828, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001665823

1.CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0462, P0463 FUEL LEVEL SENSOR

Description

INFOID:000000001665826

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 through 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:000000001344259

DTC DETECTION LOGIC

NOTE:

- If DTC P0462 or P0463 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

This diagnosis indicates the former, to detect open or short circuit malfunction.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|---|---|
| P0462 | Fuel level sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |
| P0463 | Fuel level sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11V and 16V at ignition switch ON.

>> 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-829, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665828

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#)

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

P0500 VSS

Description

INFOID:000000001344261

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:000000001344262

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|--|
| P0500 | Vehicle speed sensor | The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. | <ul style="list-style-type: none"> • Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Vehicle speed sensor • Combination meter • ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

3.CHECK VEHICLE SPEED SENSOR FUNCTION

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.

 With CONSULT-III

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III. The vehicle speed on CONSULT-III should exceed 10 km/h (6 mph) when rotating wheels with suitable gear position.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Go to [EC-832, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.

< COMPONENT DIAGNOSIS >

3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

| | |
|---------------|---|
| ENG SPEED | CVT: 1,350 - 6,000 rpm M/T: 1,650 - 6,000 rpm |
| COOLAN TEMP/S | More than 70°C (158°F) |
| B/FUEL SCHDL | CVT: 5.5 - 31.8 msec M/T: 4.8 - 31.8 msec |
| Shift lever | Except P or N position (CVT) Except Neutral position (M/T) |
| PW/ST SIGNAL | OFF |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-832, "Diagnosis Procedure"](#).

NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-832, "Component Function Check"](#).

Use component function check to check the overall function of the vehicle speed 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-832, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344263

1. PERFORM COMPONENT FUNCTION CHECK

 **With GST**

1. Lift up drive wheels.

2. Start engine.

3. Read vehicle speed sensor signal in Service \$01 with GST.

The vehicle speed sensor 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-832, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344264

1. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to [BRC-12, "CONSULT-III Function \(ABS\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

2. CHECK COMBINATION METER

Refer to [MWI-38, "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

P0506 ISC SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0506 ISC SYSTEM

Description

INFOID:000000001344265

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:000000001344266

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 system RPM lower than expected | The idle speed is less than the target idle speed by 100 rpm or more. | <ul style="list-style-type: none"> Electric throttle control actuator Intake air leak |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#), before conducting DTC Confirmation Procedure.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C(14°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-833, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344267

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Discover air leak location and repair.
 NO >> GO TO 2.

2. REPLACE ECM

1. Stop engine.

P0506 ISC SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Replace ECM.
3. Go to [EC-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0507 ISC SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0507 ISC SYSTEM

Description

INFOID:000000001665831

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:000000001344269

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 system RPM higher than expected | The idle speed is more than the target idle speed by 200 rpm or more. | <ul style="list-style-type: none">• Electric throttle control actuator• Intake air leak• PCV system |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#), before conducting DTC Confirmation Procedure.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above $-10^{\circ}\text{C}(14^{\circ}\text{F})$.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-835, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344270

1. CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

Is the inspection result normal?

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

2. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

P0507 ISC SYSTEM

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is intake air leak detected?

YES >> Discover air leak location and repair.

NO >> GO TO 3.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Go to [EC-546. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0550 PSP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0550 PSP SENSOR

Description

INFOID:000000001344271

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

INFOID:000000001344272

DTC DETECTION LOGIC

NOTE:

If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P0550 | Power steering pressure sensor circuit | An excessively low or high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted)• Power steering pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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-837, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344273

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

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 | | |
| F40 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

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

P0550 PSP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| PSP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 3 | F13 | 48 | 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 or 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 sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

5. CHECK PSP SENSOR

Refer to [EC-838, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace PSP sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344274

1. CHECK POWER STEERING PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and let it idle.
4. Check the voltage between ECM harness connector and ground under the following conditions.

| ECM | | Condition | Voltage |
|-----------|---|----------------|------------------------------|
| Connector | Terminal | | |
| F13 | 41 (Power steering pressure sensor signal) | Steering wheel | Being turned. 0.5 - 4.5V |
| | | | Not being turned. 0.4 - 0.8V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace power steering pressure sensor.

P0603 ECM POWER SUPPLY

< COMPONENT DIAGNOSIS >

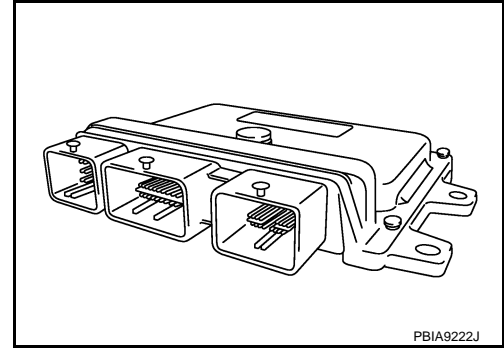
[QR25DE EXCEPT FOR CALIFORNIA]

P0603 ECM POWER SUPPLY

Description

INFOID:000000001344275

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

INFOID:000000001344276

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------|--|---|
| P0603 | ECM power supply circuit | ECM back-up RAM system does not function properly. | <ul style="list-style-type: none"> Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 1 second.
- Start engine and let it idle for 1 second.
- Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- Repeat steps 2 and 3 for four times.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-839. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344277

1. CHECK ECM POWER SUPPLY

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F13 | 77 | Ground | Battery voltage |

Is the inspection result normal?

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

P0603 ECM POWER SUPPLY

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse (No. 42)
- IPDM E/R harness connector F10
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-839, "DTC Logic"](#).

 **With GST**

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-839, "DTC Logic"](#).

Is the 1st trip DTC P0603 displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

5. REPLACE ECM

1. Replace ECM.
2. Go to [EC-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

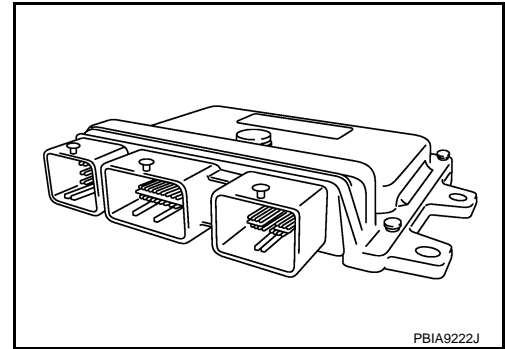
>> INSPECTION END

P0605 ECM

Description

INFOID:000000001344278

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



DTC Logic

INFOID:000000001344279

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|---|----------------|
| P0605 | Engine control module | A) | ECM calculation function is malfunctioning. | • ECM |
| | | B) | ECM EEPROM system is malfunctioning. | |
| | | C) | ECM self shut-off function is malfunctioning. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> 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-842, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

1. wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-842, "Diagnosis Procedure"](#).
- NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-842, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344280

1.INSPECTION START

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-841, "DTC Logic"](#).

 **With GST**

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-841, "DTC Logic"](#).

Is the 1st trip DTC P0605 displayed again?

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

2.REPLACE ECM

1. Replace ECM.
2. Go to [EC-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0607 ECM

Description

INFOID:000000003159703

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:000000003159704

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|----------------|
| P0607 | CAN communication bus | When detecting error during the initial diagnosis 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 [EC-843, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003159705

1.INSPECTION START

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-843, "DTC Logic"](#).
5. Check DTC.

 With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-843, "DTC Logic"](#).
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-546, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0643 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000001344281

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|-----------------------------------|--|--|
| P0643 | Sensor power supply circuit short | ECM detects a voltage of power source for sensor is excessively low or high. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) (Battery current sensor circuit is shorted.) (PSP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] • Accelerator pedal position sensor • Throttle position sensor • Battery current sensor • Power steering pressure sensor • Camshaft position sensor (PHASE) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-844, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344282

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 7.

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

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

| ECM | | Sensor | | |
|-----------|----------|------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 47 | Electric throttle control actuator | F57 | 1 |
| | 51 | Battery current sensor | F5 | 1 |
| | 55 | PSP sensor | F40 | 1 |
| | 59 | CMP sensor (PHASE) | F55 | 1 |
| E10 | 83 | APP sensor | E40 | 5 |

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.

- Battery current sensor (Refer to [EC-861, "Component Inspection".](#))
- Power steering pressure sensor (Refer to [EC-838, "Component Inspection".](#))
- Camshaft position sensor (PHASE) (Refer to [EC-766, "Component Inspection".](#))

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

5.CHECK TP SENSOR

Refer to [EC-694, "Component Inspection".](#)

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".](#)

>> INSPECTION END

7.CHECK APP SENSOR

Refer to [EC-901, "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-901, "Special Repair Requirement".](#)

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident".](#)

>> INSPECTION END

P0850 PNP SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P0850 PNP SWITCH

Description

INFOID:000000001344283

When the shift lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) switch is ON. ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:000000001344284

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) switch is not changed in the process of engine starting and driving. | <ul style="list-style-type: none">• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]• Park/neutral position (PNP) switch |

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2. PRECONDITIONING

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

>> GO TO 3.

3. CHECK PNP SWITCH FUNCTION

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 (Shift lever) | Known-good signal |
|---|-------------------|
| N or P position (CVT) Neutral position (M/T) | ON |
| Except above position | OFF |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-847. "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 | CVT: 1,300 - 6,375 rpm M/T: 1,500 - 6,375 rpm |
| COOLAN TEMP/S | More than 70°C (158°F) |

P0850 PNP SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| | |
|---------------|--|
| B/FUEL SCHDL | CVT: 3.0 - 31.8 msec M/T: 2.1 - 31.8 msec |
| VHCL SPEED SE | More than 64 km/h (40 mph) |
| Shift lever | Suitable position |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-847. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-847. "Component Function Check"](#).

NOTE:

Use component function check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-847. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344285

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-------------------------------|-----------------|
| Connector | Terminal | | | |
| E10 | 102 (PNP switch signal) | Ground | P or N (CVT) Neutral (M/T) | Approx. 0V |
| | | | Except above | BATTERY VOLTAGE |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-847. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344286

1.CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect Park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

| PNP switch | | Ground | Voltage |
|------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F25 (CVT) F32 (M/T) | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

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

P0850 PNP SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| PNP switch | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F25 (CVT) F32 (M/T) | 2 | E10 | 102 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

NO-1 >> Repair open circuit or short to ground or short to power in harness or connectors.

NO-2 >> CVT: GO TO 3.

3.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Check the continuity between PNP switch harness connector and ECM harness connector.

| PNP switch | | IPDM E/R | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F25 | 2 | F10 | 72 | Existed |

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

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 102 | E18 | 30 | Existed |

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK PNP SWITCH

Refer to [TM-303. "Component Inspection \(Park/Neutral Position Switch\)"](#) (CVT) or [TM-20. "Inspection"](#) (M/T).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace PNP switch.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

P1148 CLOSED LOOP CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1148 CLOSED LOOP CONTROL

DTC Logic

INFOID:000000001344287

DTC DETECTION LOGIC

NOTE:

**DTC P1148 is displayed with another DTC for A/F sensor 1.
Perform the trouble diagnosis for the corresponding DTC.**

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------|---|---|
| P1148 | Closed loop control function | The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition. | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)• A/F sensor 1• A/F sensor 1 heater |
| | | The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition. | |

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P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:000000001344288

DTC DETECTION LOGIC

NOTE:

- If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

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 |
|---------|------------------------------------|--|---|
| P1217 | Engine over temperature (Overheat) | <ul style="list-style-type: none">• Cooling fan does not operate properly (Overheat).• Cooling fan system does not operate properly (Overheat).• Engine coolant was not added to the system using the proper filling method.• Engine coolant is not within the specified range. | <ul style="list-style-type: none">• Harness or connectors (The cooling fan circuit is open or shorted.)• IPDM E/R (Cooling fan relay-1)• Cooling fan relays-2 and -3• Cooling fan motor• Radiator hose• Radiator• Radiator cap• Reservoir tank• Water pump• Thermostat• Water control valve |

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-12, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-10, "Changing Engine Oil"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-12, "Engine Oil Recommendation"](#).
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-850, "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-851, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344289

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.

P1217 ENGINE OVER TEMPERATURE

[QR25DE EXCEPT FOR CALIFORNIA]

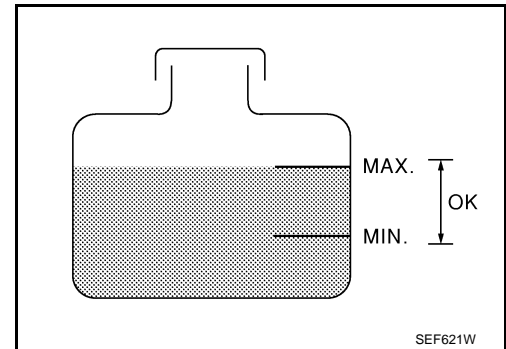
< COMPONENT DIAGNOSIS >

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 [EC-851, "Diagnosis Procedure"](#).
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-851, "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. Make sure that cooling fan motors-1 and -2 operate at each speed (LOW/HI).

Without CONSULT-III

Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-851, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344290

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. Make sure that cooling fan motors-1 and -2 operate at each speed (LOW/HI).

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).
2. Make sure that cooling fan motors-1 and -2 operate at each speed (Low/High).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [EC-922, "Diagnosis Procedure"](#).

2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to [CO-11, "System Inspection"](#).

Is leakage detected?

- YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak. Refer to [CO-11, "System Inspection"](#).

- Hose
- Radiator
- Water pump

P1217 ENGINE OVER TEMPERATURE

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

>> Repair or replace malfunctioning part.

4.CHECK RADIATOR CAP

Check radiator cap. Refer to [CO-15, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap.

5.CHECK THERMOSTAT

Check thermostat. Refer to [CO-20, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat.

6.CHECK WATER CONTROL VALVE

Check water control valve. Refer to [CO-22, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace water control valve

7.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-690, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace engine coolant temperature sensor.

8.CHECK MAIN 13 CAUSES

If the cause cannot be isolated, check the following.

| Engine | Step | Inspection item | Equipment | Standard | Reference page |
|--------|------|--|--|--|--|
| OFF | 1 | <ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper | <ul style="list-style-type: none"> Visual | No blocking | — |
| | 2 | <ul style="list-style-type: none"> Coolant mixture | <ul style="list-style-type: none"> Coolant tester | 50 - 50% coolant mixture | MA-12, "Engine Oil Recommendation" |
| | 3 | <ul style="list-style-type: none"> Coolant level | <ul style="list-style-type: none"> Visual | Coolant up to MAX level in reservoir tank and radiator filler neck | CO-12, "Changing Engine Coolant" |
| | 4 | <ul style="list-style-type: none"> Radiator cap | <ul style="list-style-type: none"> Pressure tester | 59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit) | CO-15, "Removal and Installation" |
| ON*2 | 5 | <ul style="list-style-type: none"> Coolant leaks | <ul style="list-style-type: none"> Visual | No leaks | CO-11, "System Inspection" |
| ON*2 | 6 | <ul style="list-style-type: none"> Thermostat | <ul style="list-style-type: none"> Touch the upper and lower radiator hoses | Both hoses should be hot | CO-20, "Removal and Installation" |
| ON*1 | 7 | <ul style="list-style-type: none"> Cooling fan motor | <ul style="list-style-type: none"> CONSULT-III | Operating | EC-922, "Component Function Check" |
| OFF | 8 | <ul style="list-style-type: none"> Combustion gas leak | <ul style="list-style-type: none"> Color checker chemical tester 4 Gas analyzer | Negative | — |
| ON*3 | 9 | <ul style="list-style-type: none"> Coolant temperature gauge | <ul style="list-style-type: none"> Visual | Gauge less than 3/4 when driving | — |
| | | <ul style="list-style-type: none"> Coolant overflow to reservoir tank | <ul style="list-style-type: none"> Visual | No overflow during driving and idling | CO-11, "System Inspection" |
| OFF*4 | 10 | <ul style="list-style-type: none"> Coolant return from reservoir tank to radiator | <ul style="list-style-type: none"> Visual | Should be initial level in reservoir tank | CO-11, "System Inspection" |

P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Engine | Step | Inspection item | Equipment | Standard | Reference page |
|--------|------|--|--|--|---|
| OFF | 11 | <ul style="list-style-type: none">Water control valve | <ul style="list-style-type: none">Remove and inspect the valve | Within the specified value | CO-22, "Removal and Installation" |
| OFF | 12 | <ul style="list-style-type: none">Cylinder head | <ul style="list-style-type: none">Straight gauge feeler gauge | 0.1 mm (0.004 in) Maximum distortion (warping) | EM-64, "On-Vehicle Service" |
| | 13 | <ul style="list-style-type: none">Cylinder block and pistons | <ul style="list-style-type: none">Visual | No scuffing on cylinder walls or piston | EM-82, "Inspection After Disassembly" |

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 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-9, "Troubleshooting Chart"](#).

>> INSPECTION END

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P1225 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

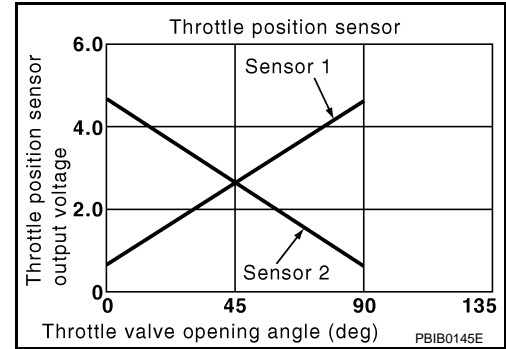
P1225 TP SENSOR

Description

INFOID:000000001665748

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 signal 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.



DTC Logic

INFOID:000000001344292

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P1225 | Closed throttle position learning performance | Closed throttle position learning value is excessively low. | • Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-854, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344293

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1225 TP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

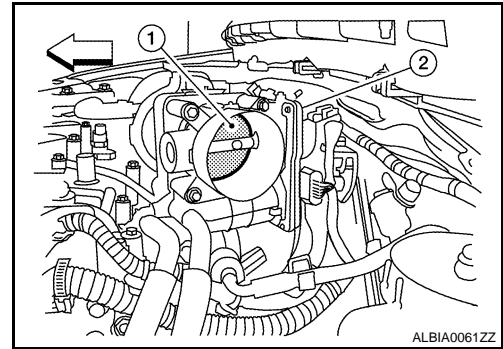
2. Electric throttle control actuator

← : 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-898. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665749

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

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P1226 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

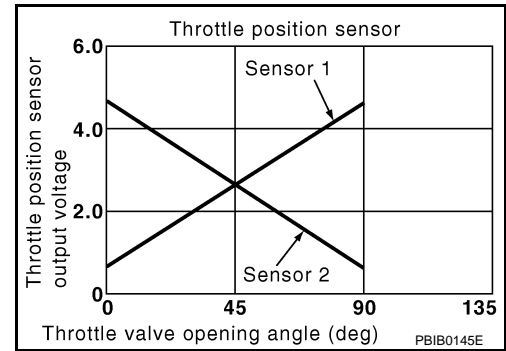
P1226 TP SENSOR

Description

INFOID:000000001665750

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 signal 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.



DTC Logic

INFOID:000000001344296

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P1226 | Closed throttle position learning performance | Closed throttle position learning is not performed successfully, repeatedly. | • Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-856, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665832

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1226 TP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

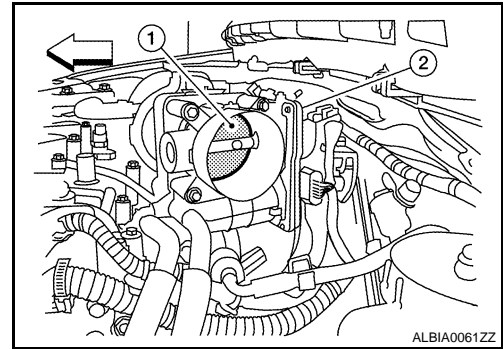
2. Electric throttle control actuator

← : 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. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-898, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665751

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P1421 COLD START CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1421 COLD START CONTROL

Description

INFOID:000000001344299

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

DTC Logic

INFOID:000000001344300

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 idle speed properly when engine is started with prewarming up condition. | <ul style="list-style-type: none">• Lack of intake air volume• Fuel injection system• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check that the "COOLAN TEMP/S" indication is between 4°C (39°F) and 36°C (97°F).
If "COOLAN TEMP/S" indication is within the specified value, go to the following step.
If "COOLANT TEMP/S" indication is out of the specified value, cool engine down or warm engine up and go to step 1.
5. Start engine and let it idle for 5 minutes.
6. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-858, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344301

1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 2.
NO >> Follow the instruction of Idle Air Volume Learning.

2. CHECK INTAKE SYSTEM

Check for the cause of intake air volume lacking. Refer to the following.

- Crushed intake air passage
- Intake air passage clogging

P1421 COLD START CONTROL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part

3. CHECK FUEL INJECTION SYSTEM FUNCTION

Perform DTC CONFIRMATION PROCEDURE for DTC P0171. Refer to [EC-736. "DTC Logic"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-737. "Diagnosis Procedure"](#) for DTC P0171.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-858. "DTC Logic"](#).

With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-858. "DTC Logic"](#).

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-546. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

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P1550 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1550 BATTERY CURRENT SENSOR

Description

INFOID:000000001344302

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001344303

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P1550 | Battery current sensor circuit range/performance | The output voltage of the battery current sensor remains within the specified range while engine is running. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-860, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344304

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1550 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-861](#). "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42](#). "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:000000001344305

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1550 BATTERY CURRENT SENSOR

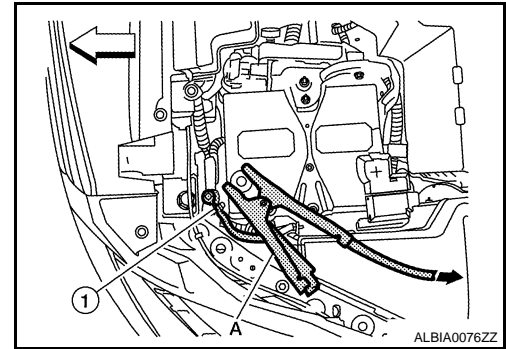
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1551, P1552 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1551, P1552 BATTERY CURRENT SENSOR

Description

INFOID:000000001665836

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001344307

DTC DETECTION LOGIC

NOTE:

If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P1551 | Battery current 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.) • Battery current sensor |
| P1552 | Battery current sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V with ignition switch ON

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-863, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665844

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

P1551, P1552 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-864, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665845

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1551, P1552 BATTERY CURRENT SENSOR

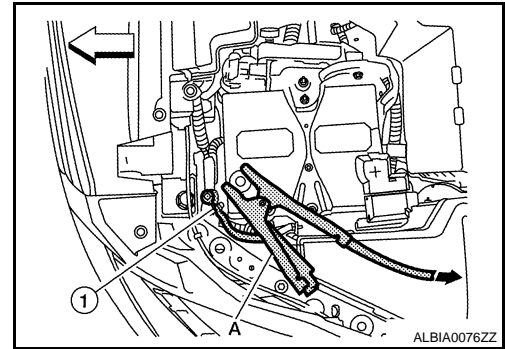
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

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P1553 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1553 BATTERY CURRENT SENSOR

Description

INFOID:000000001665846

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001344311

DTC DETECTION LOGIC

NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1553 | Battery current sensor performance | The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-866, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665847

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1553 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or sort to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-867, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665848

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.

P1553 BATTERY CURRENT SENSOR

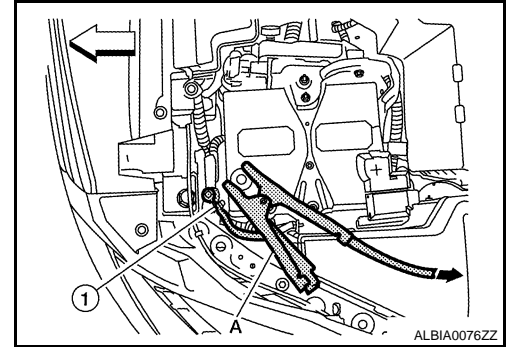
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1554 BATTERY CURRENT SENSOR

Description

INFOID:000000001665850

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 [CHG-6, "System Description"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000001344315

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1554 | Battery current sensor performance | The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-869, "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 [EC-870, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000001344316

1.PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8V 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

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.

P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Above 2.3V at least once |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-870. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001665851

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage |
|------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or sort 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 42 | Existed |

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

Is the inspection result normal?

P1554 BATTERY CURRENT SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-871. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

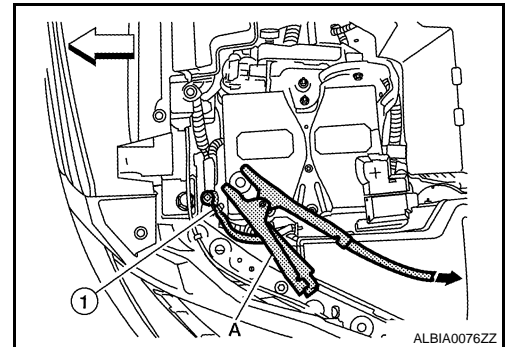
INFOID:000000001665852

1.CHECK BATTERY CURRENT SENSOR

1. Reconnect harness connectors disconnected.
2. Disconnect battery negative cable (1).

←: To body ground

3. Install jumper cable (A) between battery negative terminal and body ground.
4. Turn ignition switch ON.
5. Check the voltage between ECM harness connector and ground.



| ECM | | Ground | Voltage |
|-----------|---------------------------------------|--------|--------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5V |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1564 ASCD STEERING SWITCH

Description

INFOID:000000001344319

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 [EC-588, "System Description"](#) for the ASCD function.

DTC Logic

INFOID:000000001344320

DTC DETECTION LOGIC

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-841, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P1564 | ASCD steering switch | <ul style="list-style-type: none">An excessively high voltage signal from the ASCD steering switch is sent to ECM.ECM detects that input signal from the ASCD steering switch is out of the specified range.ECM detects that the ASCD steering switch is stuck ON. | <ul style="list-style-type: none">Harness or connectors (The switch circuit is open or shorted.)ASCD steering switchECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON.
- Wait at least 10 seconds.
- Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 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.
- Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Go to [EC-872, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344321

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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

- Turn ignition switch ON.

P1564 ASCD STEERING SWITCH

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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 |
| | | Released | OFF |
| CANCEL SW | CANCEL switch | Pressed | ON |
| | | Released | OFF |
| RESUME/ACC SW | RESUME/ACCELERATE 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 and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|--------------------------------------|--------|--------------------------------------|------------|
| Connector | Terminal | | | |
| E10 | 110 (ASCD steering switch signal) | Ground | MAIN switch: Pressed | Approx. 0V |
| | | | CANSEL switch: Pressed | Approx. 1V |
| | | | SET/COAST switch: Pressed | Approx. 2V |
| | | | RESUME/ACCELERATE switch: Pressed | Approx. 3V |
| | | | All ASCD steering switches: Released | Approx. 4V |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

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 M88.
4. Check the continuity between combination switch and ECM harness connector.

| Combination switch | ECM | | Continuity |
|--------------------|-----------|----------|------------|
| | Connector | Terminal | |
| Terminal 16 | E10 | 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

1. Check the continuity between ECM harness connector and combination switch.

| Combination switch Terminal | ECM | | Continuity |
|--------------------------------|-----------|----------|------------|
| | Connector | Terminal | |
| 13 | E10 | 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

7. CHECK ASCD STEERING SWITCH

Refer to [EC-874, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344322

1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M303.
2. Check the continuity between combination switch harness connector terminals under following conditions.

| Combination meter | | Condition | Resistance |
|-------------------|-----------|--------------------------------------|-----------------|
| Connector | Terminals | | |
| M88 | 13 and 16 | MAIN switch: Pressed | Approx. 0 Ω |
| | | CANCEL switch: Pressed | Approx. 250 Ω |
| | | SET/COAST switch: Pressed | Approx. 660 Ω |
| | | RESUME/ACCELERATE switch: Pressed | Approx. 1,480 Ω |
| | | All ASCD steering switches: Released | Approx. 4,000 Ω |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1572 ASCD BRAKE SWITCH

Description

INFOID:000000001344323

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 this input of two kinds (ON/OFF signal). Refer to [EC-588, "System Description"](#) for the ASCD function.

DTC Logic

INFOID:000000001344324

DTC DETECTION LOGIC

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-841, "DTC Logic"](#).
- 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 OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|--|--|
| P1572 | ASCD brake switch | 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 style="list-style-type: none">• Harness or connectors (The stop lamp switch circuit is shorted.)• Harness or connectors (The ASCD brake switch circuit is shorted.)• Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T)• Stop lamp switch• ASCD brake switch• ASCD clutch switch (M/T)• Incorrect stop lamp switch installation• Incorrect ASCD brake switch installation• Incorrect ASCD clutch switch installation (M/T)• ECM |
| | | B) | ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
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.

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| | |
|---------------|----------------------------|
| VHCL SPEED SE | More than 30 km/h (19 mph) |
| Shift lever | Suitable position |

5. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-876. "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

 **With CONSULT-III**

1. 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 |
| Driving location | Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed. |

2. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-876. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344325

1.CHECK OVERALL FUNCTION-I

 **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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

 **Without CONSULT-III**

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage | |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

P1572 ASCD BRAKE SWITCH

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- NO-1 >> CVT models: GO TO 3.
- NO-1 >> M/T models: GO TO 7.

2.CHECK OVERALL FUNCTION-II

With CONSULT-III

Select "BRAKE SW2" and check indication in "DATA MONITOR" mode.

| Monitor item | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW2 | Brake pedal (CVT) | Slightly depressed | ON |
| | Brake pedal and clutch pedal (M/T) | Fully released | OFF |

Without CONSULT-III

Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | | Voltage |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | Brake pedal (CVT) | Slightly depressed | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 19.
- NO >> GO TO 14.

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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 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 E6
- Junction block connector E44, E46
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or 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 ASCD harness connector.
3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

| ASCD brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | Existed |

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

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

YES >> GO TO 6.

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

6. CHECK ASCD BRAKE SWITCH

Refer to [EC-880. "Component Inspection \(ASCD Brake Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD brake switch.

7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | Voltage (V) | |
|--------------------|----------|--------|----------------|--------------------|-----------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | Fully released | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 8.

8. 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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

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

10. 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 ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

P1572 ASCD BRAKE SWITCH

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 11.

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

11.CHECK ASCD BRAKE SWITCH

Refer to [EC-880, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD brake switch.

12.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 ECM harness connector and ASCD clutch switch harness connector.

| ECM | | ASCD clutch switch | | Continuity |
|-----------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 110 | E37 | 2 | Existed |

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

Is the inspection result normal?

YES >> GO TO 13.

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

13.CHECK ASCD CLUTCH SWITCH

Refer to [EC-881, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD clutch switch.

14.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect stop lamp switch harness connector.

3. Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 15.

15.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.7)
- Harness for open or short between stop lamp switch and battery

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

16.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | ASCD clutch switch | | Continuity |
|-----------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 106 | E38 | 2 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 18.
- NG >> GO TO 17.

17. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Harness for open or short between ECM and stop lamp switch

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

18. CHECK STOP LAMP SWITCH

Refer to [EC-881, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 19.
- NO >> Replace stop lamp switch.

19. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:000000001344326

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 |
| | | 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 [BR-12, "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 |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace ASCD brake switch.

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection (ASCD Clutch Switch)

INFOID:000000001344327

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to [CL-5, "Inspection and Adjustment"](#).
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:000000001344328

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

P1574 ASCD VEHICLE SPEED SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:000000001344329

The ECM receives two vehicle speed sensor 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 [EC-588, "System Description"](#) for ASCD functions.

DTC Logic

INFOID:000000001344330

DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-831, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-841, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------|---|--|
| P1574 | ASCD vehicle speed sensor | ECM detects a difference between two vehicle speed signals is out of the specified range. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.)• Combination meter• ABS actuator and electric unit (control unit)• Wheel sensor• TCM (CVT models)• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
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 [EC-882, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344331

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-291, "Diagnosis Description"](#).

P1574 ASCD VEHICLE SPEED SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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-12. "CONSULT-III Function \(ABS\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.

Refer to [MWI-38. "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

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P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

Description

INFOID:000000001344332

ECM receives primary speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

DTC Logic

INFOID:000000001344333

DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-662, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to [EC-760, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0340, first perform the trouble diagnosis for DTC P0340. Refer to [EC-764, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-841, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-843, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P1715 | Input speed sensor (Primary speed sensor) (TCM output) | Primary speed sensor signal is different from the theoretical value calculated by ECM from secondary speed sensor signal and engine rpm signal. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (Primary speed sensor circuit is open or shorted)• TCM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and drive the vehicle at more than 50 km/h (31 MPH) for at least 5 seconds.

CAUTION:

Always drive vehicle at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-884, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344334

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-291, "Diagnosis Description"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

2. REPLACE TCM

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Replace TCM.

>> INSPECTION END

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P1805 BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P1805 BRAKE SWITCH

Description

INFOID:000000001344335

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 driving.

DTC Logic

INFOID:000000001344336

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 extremely long time while the vehicle is driving. | <ul style="list-style-type: none">• Harness or connectors (Stop lamp switch circuit is open or shorted.)• Stop lamp switch |

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-886, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344337

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

| Brake pedal | Stop lamp |
|--------------------|-----------------|
| Fully released | Not illuminated |
| Slightly depressed | Illuminated |

Is 1st trip DTC detected?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E6

P1805 BRAKE SWITCH

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

- 10A fuse (No. 7)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or 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 ECM harness connector.
2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

| ECM | | Stop lamp switch | | Continuity |
|-----------|----------|------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 106 | E38 | 2 | Existed |

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

Is the inspection result normal?

- YES >> GO TO 6.
- NG >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E44, E45
- Harness for open or short between ECM and stop lamp switch

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

6.CHECK STOP LAMP SWITCH

Refer to [EC-920, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace stop lamp switch.

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:000000001665858

1.CHECK STOP LAMP SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the continuity between stop lamp switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

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

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

P1805 BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:000000001344339

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled 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:000000001344340

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P2100 | Throttle control motor relay circuit open | ECM detects a voltage of power source for throttle control motor is excessively low. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay |
| P2103 | Throttle control motor relay circuit short | ECM detect the throttle control motor relay is stuck ON. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

With DTC is detected?

P2100 >> GO TO 2.

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-889. "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-889. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344341

1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector F10.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 15 | F10 | 70 | 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 or short to ground or short to power in harness or connectors.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

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

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 2 | F10 | 54 | Existed |

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.

2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15A fuse.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000001344342

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000001344343

DTC DETECTION LOGIC

NOTE:

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-889, "DTC Logic"](#) or [EC-897, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|--|
| P2101 | Electric throttle control performance | Electric throttle control function does not operate properly. | <ul style="list-style-type: none">Harness or connectors (Throttle control motor circuit is open or shorted)Electric throttle control actuator |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 2 seconds.
- Start engine and let it idle for 5 seconds.
- Check DTC.

Is DTC detected?

YES >> Go to [EC-891, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344344

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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

- Check the voltage between ECM harness connector and ground.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Ground | Condition | Voltage |
|-----------|----------|--------|---------------------|-----------------|
| Connector | Terminal | | | |
| F14 | 2 | Ground | Ignition switch OFF | Approx. 0V |
| | | | Ignition switch ON | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 70 | F14 | 15 | 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 or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

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

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 54 | F14 | 2 | 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 or short to ground or short to power in harness or connectors.

5. CHECK FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace 15A fuse.

6. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

7. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

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

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|-------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 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.

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.

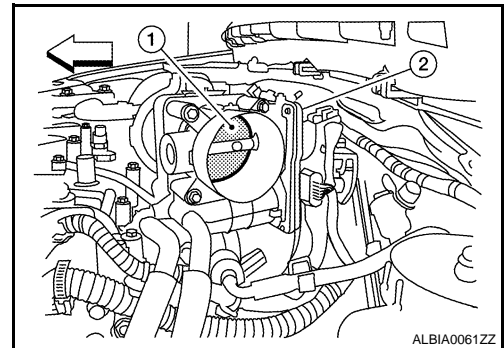
2. Electric throttle control actuator

← : Vehicle front

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-893. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "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 malfunction electric throttle control actuator.
2. Go to [EC-894. "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344345

1. CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between electric throttle control actuator terminals as follows.

| Terminals | Resistance |
|-----------|------------------------------------|
| 5 and 6 | Approx. 1 - 15 Ω [at 25 °C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-894. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344346

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2118 THROTTLE CONTROL MOTOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2118 THROTTLE CONTROL MOTOR

Description

INFOID:000000001344347

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000001344348

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|--|---|
| P2118 | Throttle control motor circuit short | ECM detects short in both circuits between ECM and throttle control motor. | <ul style="list-style-type: none"> Harness or connectors (Throttle control motor circuit is shorted.) Electric throttle control actuator (Throttle control motor) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 2 seconds.
- Start engine and let it idle for 5 seconds.
- Check DTC.

Is DTC detected?

- YES >> Go to [EC-895, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344349

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Disconnect electric throttle control actuator harness connector.
- 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 | |
| F57 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 5 | Existed |
| | | | 6 | Not existed |

P2118 THROTTLE CONTROL MOTOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-896, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.

2. Go to [EC-896, "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344350

1.CHECK THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.

2. Check resistance between electric throttle control actuator terminals as follows.

| Terminals | Resistance |
|-----------|---|
| 5 and 6 | Approx. 1 - 15 Ω [at 25 °C (77°F)] |

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-896, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344351

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:000000001344352

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 feeds 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.

DTC Logic

INFOID:000000001344353

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------------------|-------------------------|---|--------------------------------------|
| P2119 | Electric throttle control actuator | A) | Electric throttle control actuator does not function properly due to the return spring malfunction. | • Electric throttle control actuator |
| | | B) | Throttle valve opening angle in fail-safe mode is not in specified range. | |
| | | C) | ECM detect the throttle valve is stuck open. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to P (CVT) or Neutral (M/T) position.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set shift lever to P (CVT) or Neutral (M/T) position.
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to [EC-897, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set shift lever to N, P (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to [EC-897, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001665833

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

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.

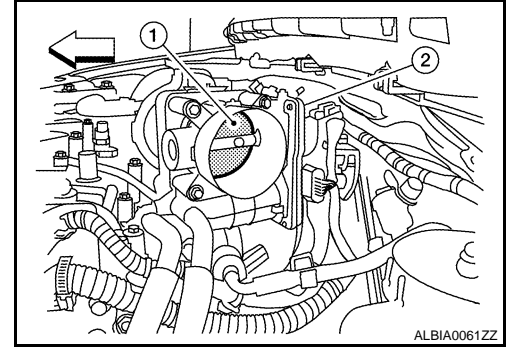
2. Electric throttle control actuator

← : 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-898. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344355

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2122, P2123 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2122, P2123 APP SENSOR

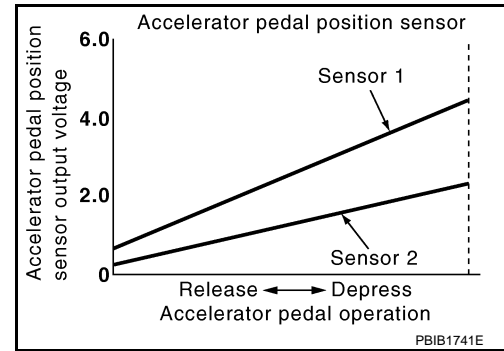
Description

INFOID:000000001344356

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001344357

DTC DETECTION LOGIC

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P2122 | Accelerator pedal position sensor 1 circuit low input | An excessively low voltage from the APP sensor 1 is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (APP sensor 1 circuit is open or shorted.) Accelerator pedal position sensor (APP sensor 1) |
| P2123 | Accelerator pedal position sensor 1 circuit high input | An excessively high voltage from the APP sensor 1 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-899, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344358

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.

P2122, P2123 APP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

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

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 4 | E10 | 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 3 | E10 | 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 or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-901, "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. Go to [EC-901, "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P2122, P2123 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection

INFOID:000000001344359

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

| ECM | | Ground | Condition | Voltage |
|-----------|-----------------------------|--------|-----------------|-------------|
| Connector | Terminal | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Fully released | 0.5 - 1.0V |
| | | | Fully depressed | 4.2 - 4.8V |
| | 82 (APP sensor 2 signal) | | Fully released | 0.25 - 0.5V |
| | | | Fully depressed | 2.0 - 2.5V |

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-901. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344360

1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-548. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

P2127, P2128 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

P2127, P2128 APP SENSOR

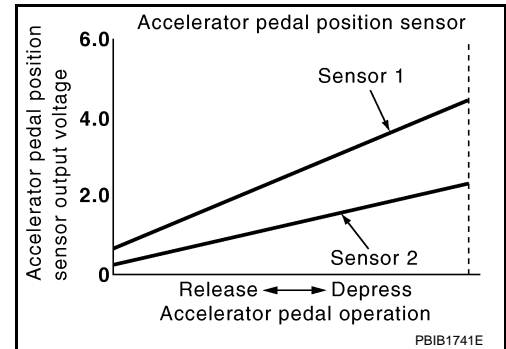
Description

INFOID:000000001665859

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001344362

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P2127 | Accelerator pedal position sensor 2 circuit low input | An excessively low voltage from the APP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor |
| P2128 | Accelerator pedal position sensor 2 circuit high input | An excessively high voltage from the APP sensor 2 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-902, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344363

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

P2127, P2128 APP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

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

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

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

| APP sensor | | Ground | Voltage |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 6 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 3 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

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

5.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-763, "Component Inspection".](#))
- EVAP control system pressure sensor (Refer to [EC-801, "Component Inspection".](#))
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure".](#))

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace malfunctioning component.

6.CHECK APP SENSOR 2 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.

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P2127, P2128 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 2 | E10 | 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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 1 | E10 | 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 or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-904. "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. Go to [EC-905. "Special Repair Requirement"](#).

>> INSPECTION END

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665860

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

| ECM | | Ground | Condition | Voltage | |
|-----------|-----------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.5 - 1.0V |
| | 82 (APP sensor 2 signal) | | | Fully depressed | 4.2 - 4.8V |
| | | | | Fully released | 0.25 - 0.5V |
| | Fully depressed | | | 2.0 - 2.5V | |

Is the inspection result normal?

YES >> INSPECTION END

P2127, P2128 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 2.

2. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-905. "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665861

1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-548. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

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P2135 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

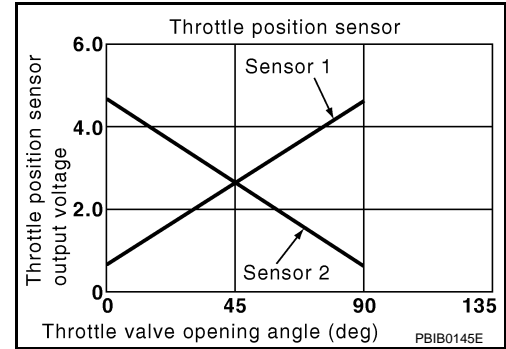
P2135 TP SENSOR

Description

INFOID:000000001344366

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 signal 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.



DTC Logic

INFOID:000000001344367

DTC DETECTION LOGIC

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P2135 | Throttle position sensor circuit range/performance | Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2. | <ul style="list-style-type: none">• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.)• Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-906, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344368

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

P2135 TP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

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

| Electric throttle control actuator | | Ground | Voltage |
|------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F57 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 1 | F13 | 47 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 4 | F13 | 36 | Existed |

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

Is the inspection result normal?

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

5.CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F57 | 2 | F13 | 37 | Existed |
| | 3 | | 38 | |

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

Is the inspection result normal?

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

6.CHECK THROTTLE POSITION SENSOR

Refer to [EC-908, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 7.

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P2135 TP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. [EC-908, "Special Repair Requirement"](#)

>> INSPECTION END

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001344369

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-908, "Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set shift lever to D (CVT) or 1st (M/T) position.
6. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-908, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001344370

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2138 APP SENSOR

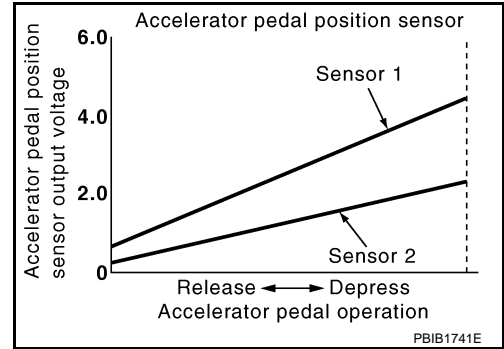
Description

INFOID:000000001665880

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000001344372

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-844, "DTC Logic"](#).

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-910, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

P2138 APP SENSOR

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000001344373

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "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 |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 5 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair open circuit or short to ground or shot 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 |
|------------|----------|--------|------------|
| Connector | Terminal | | |
| E40 | 6 | Ground | Approx. 5V |

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

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

5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

| ECM | | Sensor | | |
|-----------|----------|-----------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |

P2138 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 6.

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

6. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-763, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-801, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 2 | F10 | 84 | Existed |
| | 4 | | 100 | |

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

Is the inspection result normal?

YES >> GO TO 8.

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

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

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

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 1 | F10 | 82 | Existed |
| | 3 | | 81 | |

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

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK APP SENSOR

Refer to [EC-912, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-912, "Special Repair Requirement"](#).

P2138 APP SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000001665881

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

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

| ECM | | Ground | Condition | Voltage |
|-----------|-----------------------------|--------|-----------------|-------------|
| Connector | Terminal | | | |
| E40 | 81 (APP sensor 1 signal) | Ground | Fully released | 0.5 - 1.0V |
| | | | Fully depressed | 4.2 - 4.8V |
| | 82 (APP sensor 2 signal) | | Fully released | 0.25 - 0.5V |
| | | | Fully depressed | 2.0 - 2.5V |

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-912, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000001665882

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-548, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-548, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-549, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

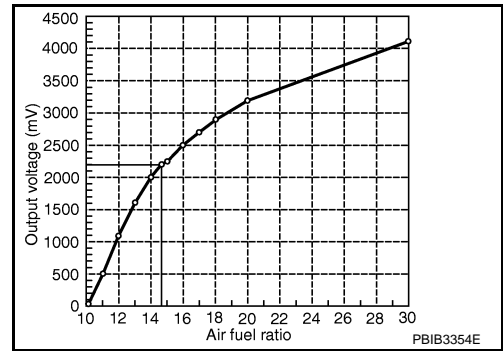
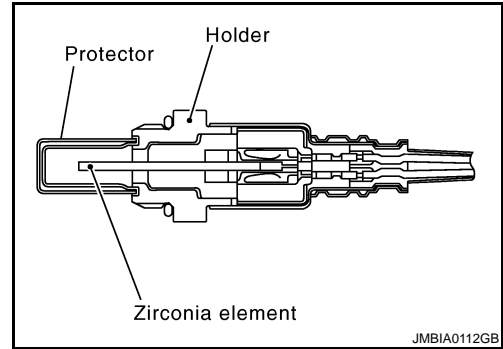
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P2A00 A/F SENSOR 1

Description

INFOID:000000001665758

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000001344377

DTC DETECTION LOGIC

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible Cause |
|---------|---|--|---|
| P2A00 | Air fuel ratio (A/F) sensor 1 circuit range/performance | <ul style="list-style-type: none"> The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period. | <ul style="list-style-type: none"> A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear the mixture ratio self-learning value. Refer to [EC-551. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 1 minute under no load.
4. Let engine idle for 1 minute.
5. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
6. Check 1st trip DTC\$.

P2A00 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is 1st trip DTC detected?

- YES >> Go to [EC-914, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344378

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2.RETIGHTEN A/F SENSOR 1

1. Loosen and retighten the A/F sensor 1.

Tightening torque: 50 N-m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

3.CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle.
2. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> GO TO 4.
- NO >> Repair or replace.

4.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

- YES >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-736, "DTC Logic"](#) or [EC-740, "DTC Logic"](#).
- 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.

6.CHECK A/F SENSOR 1 POWER SUPPLY CIRCUIT

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

| A/F sensor 1 | | Ground | Voltage |
|--------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F44 | 4 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 8.

P2A00 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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.

| A/F sensor 1 | | ECM | | Continuity |
|--------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F44 | 1 | F13 | 45 | Existed |
| | 2 | | 49 | |

4. Check the continuity between ECM harness connector or A/F sensor 1 harness connector and ground.

| A/F sensor 1 | | ECM | | Ground | Continuity |
|--------------|----------|-----------|----------|--------|-------------|
| Connector | Terminal | Connector | Terminal | | |
| F44 | 1 | F13 | 45 | Ground | Not existed |
| | 2 | | 49 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK A/F SENSOR 1 HEATER

Refer to [EC-668, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace.

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

Replace 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

Do you have CONSULT-III?

YES >> GO TO 12.

NO >> GO TO 13.

12. CONFIRM A/F ADJUSTMENT DATA

 With CONSULT-III

P2A00 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

Is "0.000" displayed?

- YES >> INSPECTION END
NO >> GO TO 13.

13. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

Clear the mixture ratio self-learning value. Refer to [EC-551, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).

Do you have CONSULT-III?

- YES >> GO TO 14.
NO >> INSPECTION END

14. CONFIRM A/F ADJUSTMENT DATA

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

>> INSPECTION END

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

ASCD BRAKE SWITCH

Description

INFOID:000000001665853

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 this input of two kinds (ON/OFF signal). Refer to [EC-588, "System Description"](#) for the ASCD function.

Component Function Check

INFOID:000000001344380

1. CHECK FOR 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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | | Voltage |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0V |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> INSPECTION END.
 NO >> Refer to [EC-917, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344381

1. CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

Is the inspection result normal?

- CVT >> GO TO 2.
 M/T >> GO TO 6.

2. 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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No. 3)
- Harness for open or short between ASCD brake switch and fuse

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

4. 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 brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | 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 or short to ground or short to power in harness or connectors.

5. CHECK ASCD BRAKE SWITCH

Refer to [EC-920, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch.

6. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the continuity between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | Voltage (V) | |
|--------------------|----------|--------|-------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | | Fully released | Battery voltage |

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 7.

7. 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 brake switch | | Ground | Voltage |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

8. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10A fuse (No. 3)
- Harness for open or short between ASCD brake switch and fuse

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

9. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

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

Is the inspection result normal?

YES >> GO TO 10.

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

10. CHECK ASCD BRAKE SWITCH

Refer to [EC-920, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch.

11. 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 clutch switch harness connector and ECM harness connector.

| ASCD clutch switch | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E39 | 2 | E10 | 110 | Existed |

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

Is the inspection result normal?

YES >> GO TO 12.

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

12. CHECK ASCD CLUTCH SWITCH

Refer to [EC-920, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD clutch switch.

13. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection (ASCD Brake Switch)

INFOID:000000001665854

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 |
| | | 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 [BR-12, "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 |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:000000001665855

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to [CL-5, "Inspection and Adjustment"](#).
2. Check the continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch.

ASCD INDICATOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

ASCD INDICATOR

Description

INFOID:000000001344384

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET lamp illuminates when following conditions are met.

- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.

Refer to [EC-588, "System Description"](#) for the ASCD function.

Component Function Check

INFOID:000000001344385

1. ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

| ASCD INDICATOR | CONDITION | | SPECIFICATION |
|----------------|--|--|---------------|
| CRUISE LAMP | <ul style="list-style-type: none">• Ignition switch: ON | <ul style="list-style-type: none">• MAIN switch: Pressed at the 1st time → at the 2nd time | ON → OFF |
| SET LAMP | <ul style="list-style-type: none">• MAIN switch: ON• When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH) | <ul style="list-style-type: none">• ASCD: Operating | ON |
| | | <ul style="list-style-type: none">• ASCD: Not operating | OFF |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-921, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344386

1. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-661, "DTC Logic"](#).

2. CHECK COMBINATION METER OPERATION

Refer to [MWI-38, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check combination meter circuit. Refer to [MWI-5, "METER SYSTEM : System Diagram"](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

COOLING FAN

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

COOLING FAN

Description

INFOID:000000001344387

Cooling fan operates at each speed when the current flows in the cooling fan motor as follows. Refer to [EC-598. "System Diagram"](#) for cooling fan operation.

| Cooling fan Speed | Cooling fan motor terminals | |
|-------------------|-----------------------------|---------|
| | (+) | (-) |
| Low (LO) | 1 | 4 |
| | 2 | 3 |
| High (HI) | 1 and 2 | 3 and 4 |

Component Function Check

INFOID:000000001344388

1. CHECK COOLING FAN LOW SPEED FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III and touch "LOW" on the CONSULT-III screen.
3. Make sure that cooling fans operates at low speed.

Without CONSULT-III

1. Start engine and let it idle.
2. Turn air conditioner switch and blower fan switch ON.
3. Make sure that cooling fan operates at low speed.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Check cooling fan low speed control circuit.

2. CHECK COOLING FAN HIGH SPEED FUNCTION

With CONSULT-III

1. Touch "HI" on the CONSULT-III screen.
2. Make sure that cooling fans operates at higher speed than low speed.

Without CONSULT-III

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Check cooling fan high speed control circuit.

Diagnosis Procedure

INFOID:000000001344389

PROCEDURE A

1. CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E16.
3. Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E16 | 1 | Ground | Battery voltage |

COOLING FAN

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan motor-1 harness connector.
2. Check the voltage between cooling fan motor-1 harness connector and ground.

| Cooling fan motor-1 | | Ground | Voltage |
|---------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E220 | 1 | Ground | Battery voltage |

3. Also check harness for short to ground or short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible link (letter M)
- Harness for open or short between cooling fan motor-1 and battery

>> Repair or replace malfunctioning part.

4.CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.
3. Check the continuity between cooling fan motor-1, 2 harness connectors and IPDM E/R harness connector.

| Cooling fan motor | | | IPDM E/R | | Continuity |
|-------------------|-----------|----------|-----------|----------|------------|
| Motor | Connector | Terminal | Connector | Terminal | |
| 1 | E220 | 4 | E18 | 35 | Existed |
| 2 | E221 | 1 | E18 | 38 | |

4. Check the continuity between cooling fan motor-2 harness connector or IPDM E/R harness connector and ground.

| Cooling fan motor-2 | | IPDM E/R | | Ground | Continuity |
|---------------------|----------|-----------|----------|--------|------------|
| Connector | Terminal | Connector | Terminal | | |
| E221 | 4 | E17 | 41 | Ground | Existed |
| | | E18 | 12 | | |

5. 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 E12, E203
- Harness for open or short between cooling fan motor-1, -2 and IPDM E/R
- Harness for open or short between cooling fan motor-2 and ground
- Harness for open or short between IPDM E/R and ground

>> Repair or replace malfunctioning part.

COOLING FAN

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6. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
NO >> Repair or replace ground connection.

7. CHECK COOLING FAN RELAYS

Refer to [EC-926, "Component Inspection \(Cooling Fan Relay\)"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Replace malfunctioning cooling fan relay.

8. CHECK COOLING FAN MOTORS

Refer to [EC-926, "Component Inspection \(Cooling Fan Motor\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Replace malfunctioning cooling fan motor.

9. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

PROCEDURE B

1. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 harness connector.
3. Check the voltage between cooling fan motor-1 harness connector and ground.

| Cooling fan motor-1 | | Ground | Voltage |
|---------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E220 | 2 | Ground | Battery voltage |

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

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT-II

1. Disconnect cooling fan relay-2 and -3.
2. Check the voltage between cooling fan relays terminals and ground.

| Cooling fan relay | | | Ground | Voltage |
|-------------------|-----------|----------|--------|-----------------|
| Relay | Connector | Terminal | | |
| 2 | E42 | 5 | Ground | Battery voltage |
| 3 | E42 | 5 | | |

3. Also check harness for short to ground or short to power.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

COOLING FAN

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Check the following.

- 40A fusible link (letter K)
- Harness for open or short between cooling fan relay-2, -3 and battery

>> Repair or replace malfunctioning part.

4. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.
3. Check the continuity between cooling fan relay-1, -2 terminals and cooling fan motor-1, -2 harness connector.

| Cooling fan relay | | | Cooling fan motor | | | Continuity |
|-------------------|-----------|----------|-------------------|-----------|----------|------------|
| Relay | Connector | Terminal | motor | Connector | Terminal | |
| 2 | E42 | 7 | 1 | E220 | 3 | Existed |
| 3 | E43 | | | | 4 | |
| 2 | E42 | 3 | 2 | E221 | 2 | |
| 3 | E43 | | | | 1 | |

4. Check the continuity between cooling fan relay-1, -2 terminals and IPDM E/R harness connector.

| Cooling fan relay | | | IPDM E/R | | Continuity |
|-------------------|-----------|----------|-----------|----------|------------|
| Relay | Connector | Terminal | Connector | Terminal | |
| 2 | E42 | 1 | E17 | 42 | Existed |
| | | 2 | E18 | 15 | |
| 3 | E43 | 1 | E18 | 34 | |
| | | 2 | | 15 | |

5. Check the continuity between cooling fan relay-2, 3 or IPDM E/R harness connector or cooling fan motor-1, -2 harness connector ground.

| Cooling fan relay | | | IPDM E/R | | Cooling fan motor-2 | | Ground | Continuity |
|-------------------|-----------|----------|-----------|----------|---------------------|----------|--------|------------|
| Relay | Connector | Terminal | Connector | Terminal | Connector | Terminal | | |
| 2 | E42 | 6 | E17 | 41 | E221 | 3 | Ground | Existed |
| 3 | E43 | | E18 | 12 | | 4 | | |

6. 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 E12, E203
- Harness for open or short between cooling fan motor-1 and cooling fan relay-2, -3
- Harness for open or short between cooling fan relay-2, -3 and IPDM E/R
- Harness for open or short between cooling fan relay-2, -3 and ground
- Harness for open or short between cooling fan motor-2 and cooling fan relay-2, -3
- Harness for open or short between cooling fan motor-2 and ground
- Harness for open or short between IPDM E/R and ground

>> Repair or replace malfunctioning part.

6. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

COOLING FAN

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< COMPONENT DIAGNOSIS >

2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair or replace ground connection.

7. CHECK COOLING FAN RELAYS

Refer to [EC-926. "Component Inspection \(Cooling Fan Relay\)"](#).

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace malfunctioning cooling fan relay.

8. CHECK COOLING FAN MOTORS

Refer to [EC-926. "Component Inspection \(Cooling Fan Motor\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace malfunctioning cooling fan motor.

9. CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
- NO >> Repair or replace harness or connector.

Component Inspection (Cooling Fan Motor)

INFOID:000000001344390

1. CHECK COOLING FAN MOTORS

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 and -2 harness connectors E220, E221.
3. Supply cooling fan motor terminals with battery voltage and check operation.

| Speed | Terminals | | Operation |
|-------|-----------|---------|--------------------------------------|
| | (+) | (-) | |
| Low | 1 | 4 | Cooling fans operates at low speed. |
| | 2 | 3 | |
| High | 1 and 2 | 3 and 4 | Cooling fans operates at high speed. |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace cooling fan motor.

Component Inspection (Cooling Fan Relay)

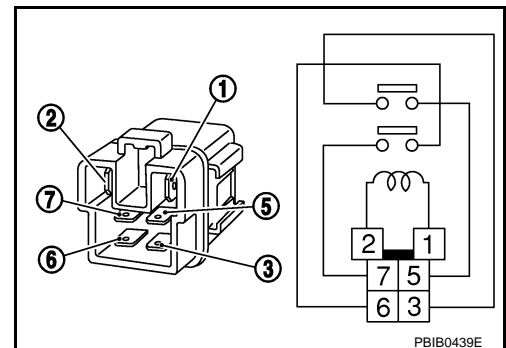
INFOID:000000001344391

1. CHECK COOLING FAN RELAYS

1. Turn ignition switch OFF.
2. Remove cooling fan relay.
3. Check the continuity between cooling fan relay terminals under the following conditions.

| Terminals | Conditions | Continuity |
|-----------|---|-------------|
| 3 and 5 | 12V direct current supply between terminals 1 and 2 | Existed |
| | No current supply | Not existed |
| 6 and 7 | 12V direct current supply between terminals 1 and 2 | Existed |
| | No current supply | Not existed |

Is the inspection result normal?



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COOLING FAN

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YES >> INSPECTION END
NO >> Replace cooling fan relay.

A

EC

C

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P

ELECTRICAL LOAD SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

ELECTRICAL LOAD SIGNAL

Description

INFOID:000000001344392

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:000000001344393

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 |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-928, "Diagnosis Procedure"](#).

2. CHECK LIGHTING SWITCH FUNCTION

Check "LOAD SIGNAL" indication under the following conditions.

| Monitor item | Condition | Indication | |
|--------------|-----------------|--------------------|-----|
| LOAD SIGNAL | Lighting switch | ON at 2nd position | ON |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Go to [EC-928, "Diagnosis Procedure"](#).

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-928, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344394

1. INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to [EC-928, "Component Function Check"](#).

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-6, "System Diagram"](#).

ELECTRICAL LOAD SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to [EXL-7, "System Diagram"](#) (XENON TYPE) or [EXL-9, "System Diagram"](#) (HALOGEN TYPE).

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to [EC-922, "Diagnosis Procedure"](#).

>> INSPECTION END

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FUEL INJECTOR

< COMPONENT DIAGNOSIS >

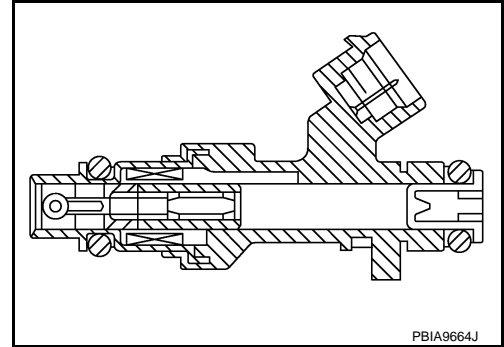
[QR25DE EXCEPT FOR CALIFORNIA]

FUEL INJECTOR

Description

INFOID:000000001344395

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:000000001344396

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to [EC-930, "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. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

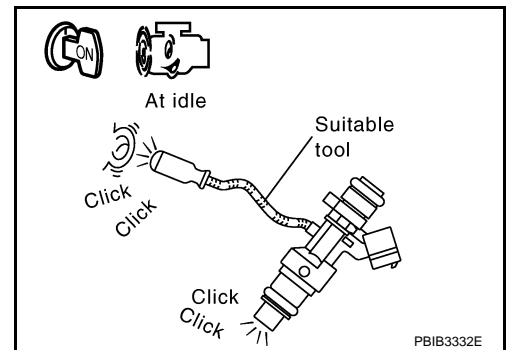
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-930, "Diagnosis Procedure"](#).



Diagnosis Procedure

INFOID:000000001344397

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

FUEL INJECTOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Fuel injector | | | Ground | Voltage |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F17 | 1 | Ground | Battery voltage |
| 2 | F18 | 1 | | |
| 3 | F19 | 1 | | |
| 4 | F20 | 1 | | |

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 10A fuse (No. 35)
- Harness for open or short between fuel injector and fuse

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

3.CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

| Fuel injector | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F17 | 2 | F14 | 32 | Existed |
| 2 | F18 | 2 | | 31 | |
| 3 | F19 | 2 | | 30 | |
| 4 | F20 | 2 | | 29 | |

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 or short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to [EC-931, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace malfunctioning fuel injector.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:000000001344398

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

FUEL INJECTOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Terminals | Resistance |
|-----------|---|
| 1 and 2 | 10.4 - 15.3Ω [at 10 -60°C (50 - 140°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector.

FUEL PUMP

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

FUEL PUMP

Description

INFOID:000000001344399

| Sensor | Input signal to ECM | ECM Function | Actuator |
|--|---------------------|-------------------|-----------------------------------|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* | Fuel pump control | Fuel pump relay ↓ Fuel pump |
| Battery | Battery voltage* | | |

*: 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 startability. 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 |
|----------------------------------|------------------------|
| Ignition switch is turned to ON. | Operates for 1 second. |
| Engine running and cranking | Operates. |
| When engine is stopped | Stops in 1.5 seconds. |
| Except as shown above | Stops. |

Component Function Check

INFOID:000000001344400

1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose (2) with two fingers.

1 : Air cleaner assembly

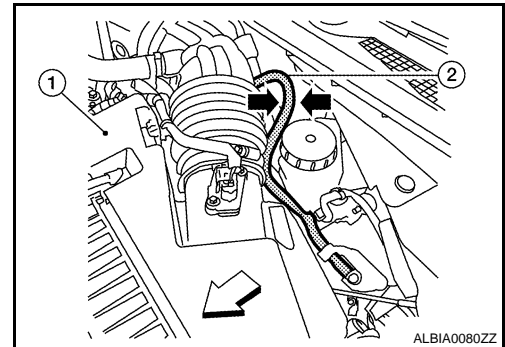
↶ : Vehicle front

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-933. "Diagnosis Procedure".](#)



ALBIA0080ZZ

Diagnosis Procedure

INFOID:000000001344401

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 and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 14 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

FUEL PUMP

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 14 | F10 | 77 | Existed |

Is the inspection result normal?

YES >> GO TO 3.

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

3. CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-I

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

| Condenser-1 | | Ground | Voltage |
|-------------|----------|--------|---|
| Connector | Terminal | | |
| B17 | 1 | Ground | Battery voltage should exist for 1 second after ignition switch is turned ON. |

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15A fuse (No. 32) from IPDM E/R.
3. Check 15A fuse.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuse.

5. CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector E18.
2. Check the continuity between IPDM E/R harness connector and condenser-1 harness connector.

| IPDM E/R | | Condenser-I | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F18 | 13 | B17 | 1 | Existed |

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

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 7.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- IPDM E/R connector F10
- Harness for open or short between IPDM E/R and condenser-I

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

FUEL PUMP

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

7. CHECK CONDENSER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector.
3. Check the continuity between condenser-I harness connector and ground.

| Condenser-I | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| B17 | 2 | Ground | Existed |

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

Is the inspection result normal?

YES >> GO TO 8.

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

8. CHECK CONDENSER-1

Refer to [EC-936. "Component Inspection \(Condenser-1\)".](#)

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace condenser-1.

9. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Check the continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" and ground.

| IPDM E/R | | Fuel level sensor unit and fuel pump | | Continuity |
|-----------|----------|--------------------------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E18 | 13 | B42 | 1 | Existed |

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E29, B10
- Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R
- 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.

11. CHECK FUEL PUMP GROUND CIRCUIT

1. Check the continuity between "fuel level sensor unit and fuel pump" and ground.

| Fuel level sensor unit and fuel pump | | Ground | Continuity |
|--------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B42 | 3 | Ground | Existed |

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 12.

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

12. CHECK FUEL PUMP

FUEL PUMP

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Refer to [EC-936. "Component Inspection \(Fuel Pump\)".](#)

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace fuel pump.

13.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident".](#)

Is the inspection result normal?

- YES >> Replace IPDM E/R.
- NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:000000001344402

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 follows.

| Terminals | Resistance |
|-----------|-----------------------------|
| 1 and 3 | 0.2 - 5.0Ω [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)

INFOID:000000001344403

1.CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser-1 harness connector.
3. Check resistance between condenser-1 terminals as follows.

| Terminal | Resistance |
|----------|----------------------------|
| 1 and 2 | Above 1MΩ [at 25°C (77°F)] |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace condenser-1.

IGNITION SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

IGNITION SIGNAL

Description

INFOID:000000001344404

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:000000001344405

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.

YES-2 >> Without CONSULT-III: GO TO 3.

NO >> Go to [EC-937, "Diagnosis Procedure"](#).

2.IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

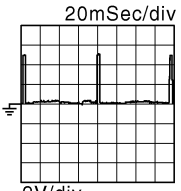
YES >> INSPECTION END

NO >> Go to [EC-937, "Diagnosis Procedure"](#).

3.IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector and ground.

| ECM | | Ground | Voltage signal |
|-----------|----------|--------|---|
| Connector | Terminal | | |
| F14 | 9 | Ground |  |
| | 10 | | |
| | 11 | | |
| | 21 | | |

NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-937, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344406

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 105 | Ground | Battery voltage |

IGNITION SIGNAL

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-657, "Diagnosis Procedure"](#).

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser-2 harness connector and ground.

| Condenser | | Ground | Voltage |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F26 | 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 F10.
3. Check the continuity between IPDM E/R harness connector and condenser-2 harness connector.

| IPDM E/R | | Condenser-2 | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 53 | F24 | 1 | Existed |

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

Is the inspection result normal?

YES >> Go to [EC-657, "Diagnosis Procedure"](#).

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

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser-2 harness connector and ground.

| Condenser-2 | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| F24 | 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 ground or short to power in harness or connectors.

5.CHECK CONDENSER

Refer to [EC-940, "Component Inspection \(Condenser-2\)"](#)

Is the inspection result normal?

YES >> GO TO 6.

NG >> Replace condenser.

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 SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Ignition coil | | | Ground | Voltage |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F34 | 3 | Ground | Battery voltage |
| 2 | F35 | 3 | | |
| 3 | F36 | 3 | | |
| 4 | F37 | 3 | | |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit or short to ground or short to power in 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 | | |
| 1 | F34 | 2 | Ground | Existed |
| 2 | F35 | 2 | | |
| 3 | F36 | 2 | | |
| 4 | F37 | 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 ground 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 ECM harness connector and ignition coil harness connector.

| Ignition coil | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F34 | 1 | F14 | 11 | Existed |
| 2 | F35 | 1 | | 10 | |
| 3 | F36 | 1 | | 9 | |
| 4 | F37 | 1 | | 21 | |

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

Is the inspection result normal?

YES >> GO TO 9.

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

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-940. "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-42. "Intermittent Incident".](#)

>> INSPECTION END

IGNITION SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000001344407

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 follows.

| Terminals | Resistance Ω [at 25°C (77°F)] |
|-----------|--------------------------------------|
| 1 and 2 | Except 0 or ∞ |
| 1 and 3 | Except 0 |
| 2 and 3 | |

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:

Do the following procedure in the place where ventilation is good without the combustible.

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 two or three 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 about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.

- It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> INSPECTION END

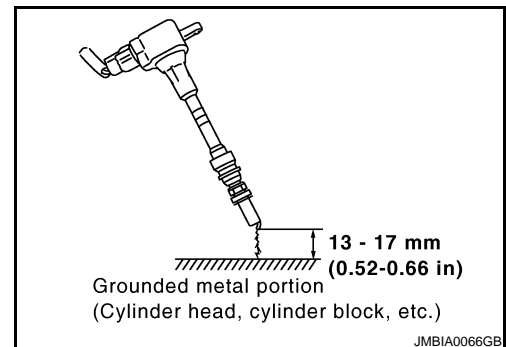
NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser-2)

INFOID:000000001344408

1. CHECK CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.



IGNITION SIGNAL

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. Check resistance between condenser-2 terminals as follows.

| Terminals | Resistance |
|-----------|-------------------------------------|
| 1 and 2 | Above 1 M Ω [at 25°C (77°F)] |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace condenser-2.

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MALFUNCTION INDICATOR LAMP

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

MALFUNCTION INDICATOR LAMP

Description

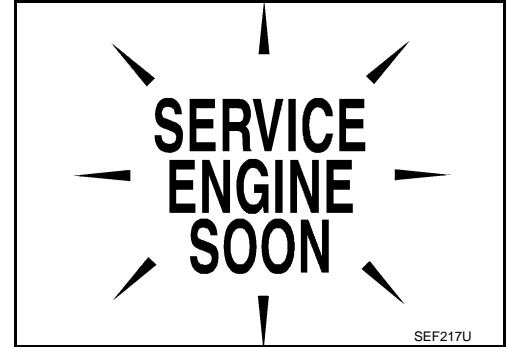
INFOID:000000001344409

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to [EC-942. "Diagnosis Procedure"](#).



Component Function Check

INFOID:000000001344410

1. CHECK MIL FUNCTION

1. Turn ignition switch ON.
2. Make sure that MIL lights up.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-942. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344411

1. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-661. "Diagnosis Procedure"](#).

2. CHECK DTC WITH METER

Refer to [MWI-38. "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace.

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace combination meter.
- NO >> Repair or replace.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

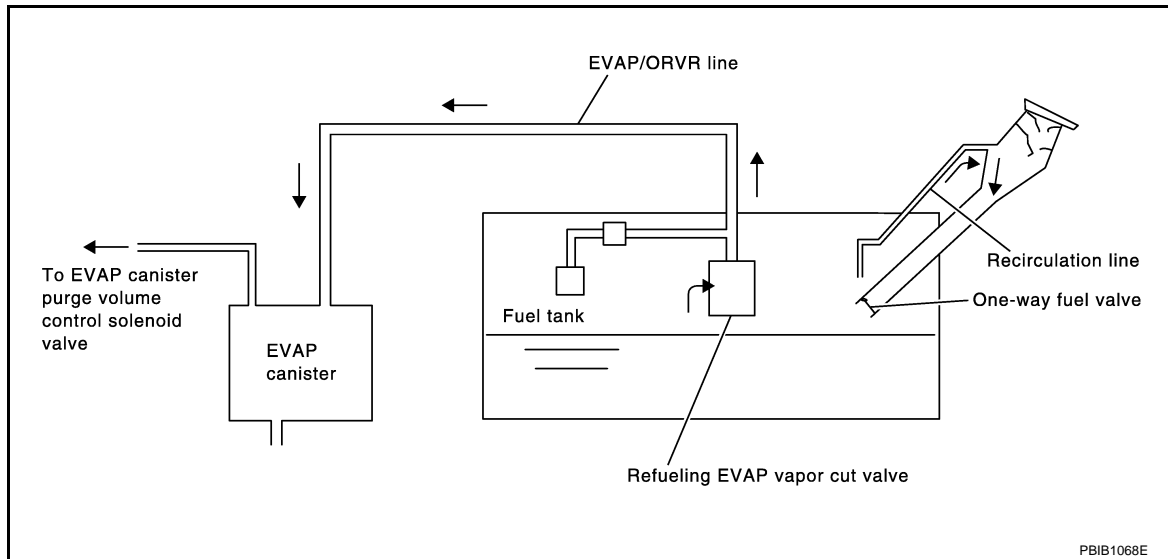
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

Description

INFOID:000000001344412



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is 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 refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - Put drained fuel in an explosion-proof container and put lid on securely.
 - Release fuel pressure from fuel line. Refer to [EC-1006, "Inspection"](#).
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Component Function Check

INFOID:000000001344413

1. CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Is any symptom present?

- YES >> Go to [EC-943, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001344414

1. INSPECTION START

Check whether the following symptoms are present.

- A: Fuel odor from EVAP canister is strong.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Which symptom is present?

- 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?

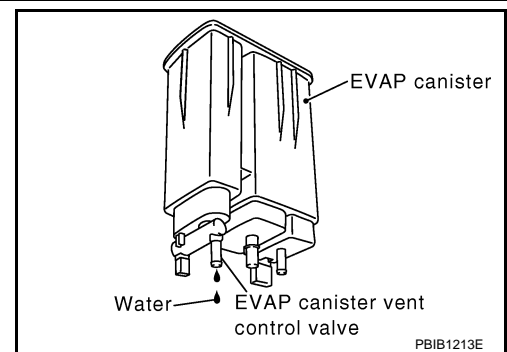
- YES >> GO TO 3.
- NO >> GO TO 4.

3.CHECK IF EVAP CANISTER 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-946, "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.
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 8.
- NO >> GO TO 9.

8.CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

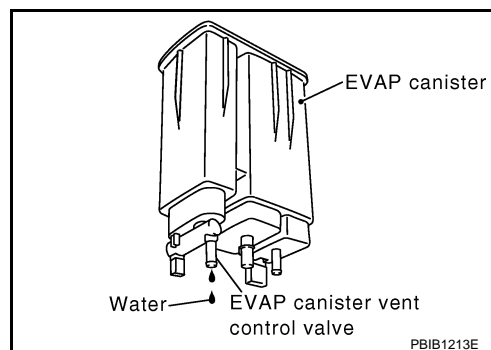
[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 9.
- NO >> GO TO 11.



9.REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

11.CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

Is the inspection result normal?

- YES >> GO TO 12.
- NO >> Repair or replace hoses and tubes.

12.CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace filler neck tube.

13.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-946. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.
- NO >> Replace refueling EVAP vapor cut valve with fuel tank.

14.CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Replace fuel filler tube.

15.CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

- YES >> GO TO 16.
- NO >> Repair or replace one-way fuel valve with fuel tank.

16.CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE EXCEPT FOR CALIFORNIA]

< COMPONENT DIAGNOSIS >

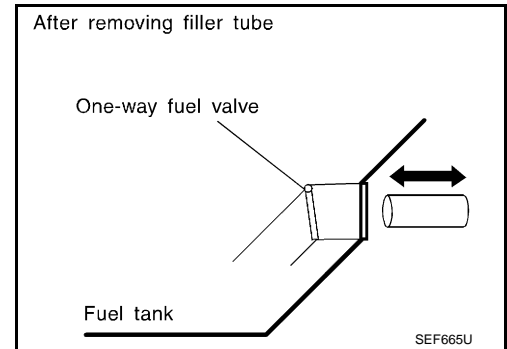
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

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.



INFOID:000000001344415

Component Inspection

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

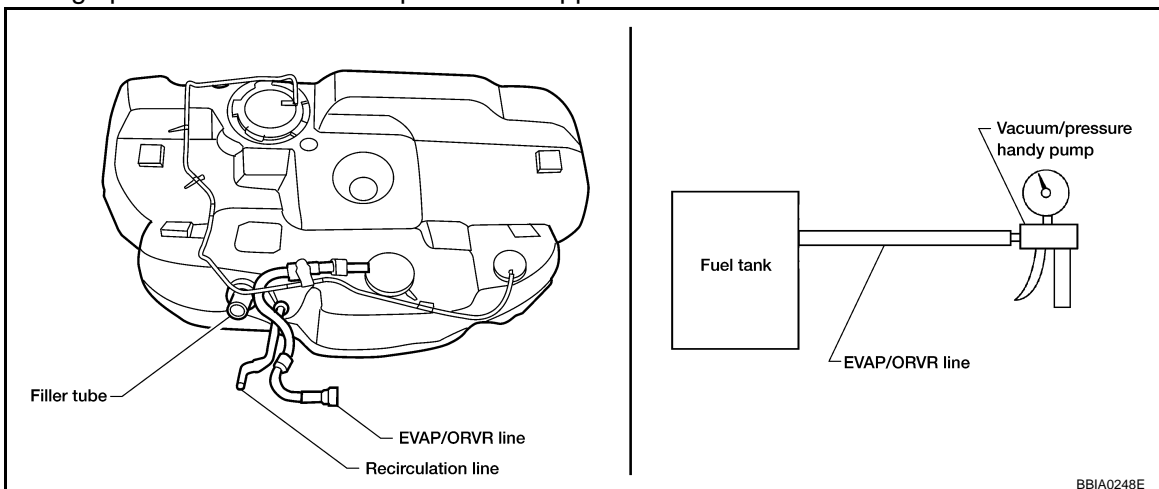
2.CHECK REFUELING EVAP VAPOR CUT VALVE

 **With CONSULT-III**

1. Remove fuel tank. Refer to [FL-6, "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
 - 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.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
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.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.

Always replace O-ring with new one.

 - Put fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -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.

3.CHECK REFUELING EVAP VAPOR CUT VALVE

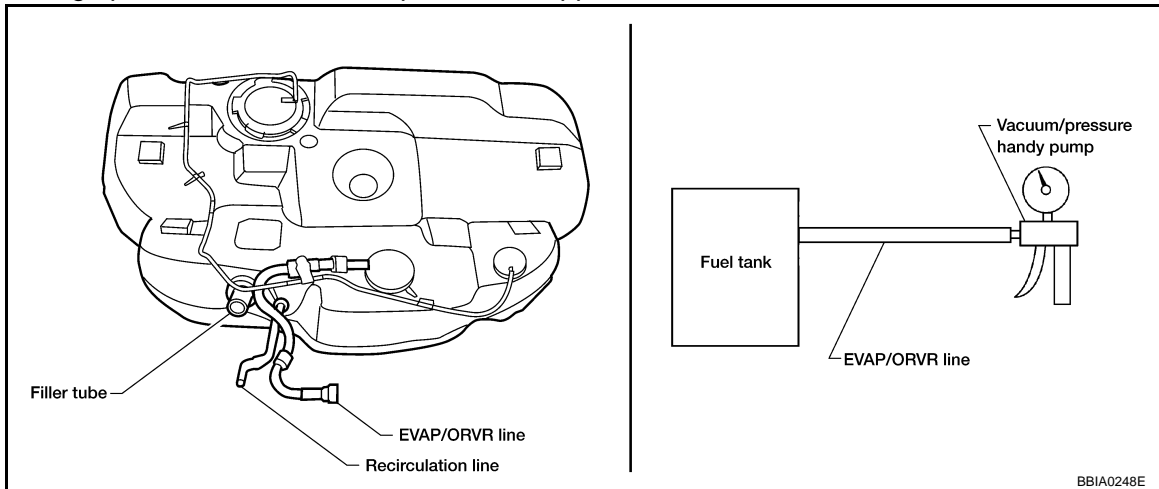
ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

⊗ Without CONSULT-III

1. Remove fuel tank. Refer to [FL-6. "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
 - Remove fuel gauge retainer.
 - Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
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.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.**Always replace O-ring with new one.**
 - Put fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -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.

POSITIVE CRANKCASE VENTILATION

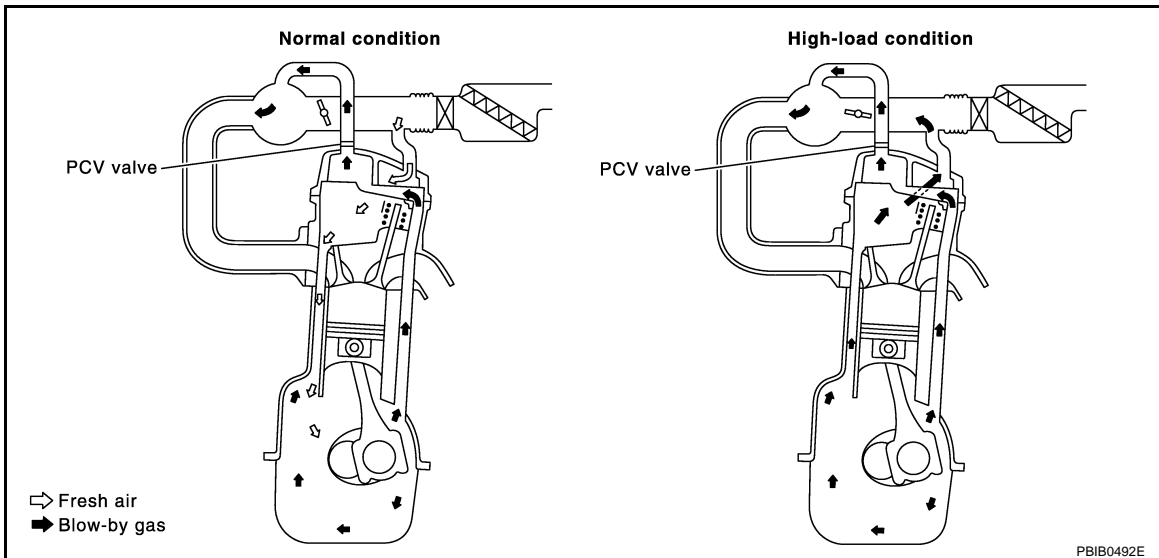
< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000001344416



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.

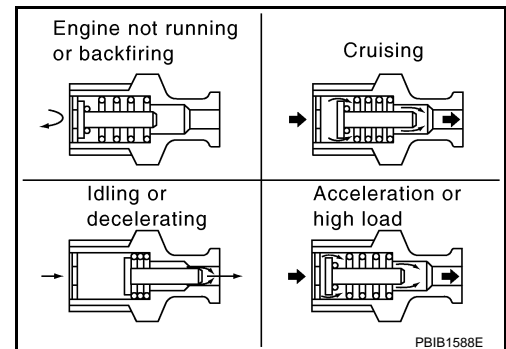
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then 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.



Component Inspection

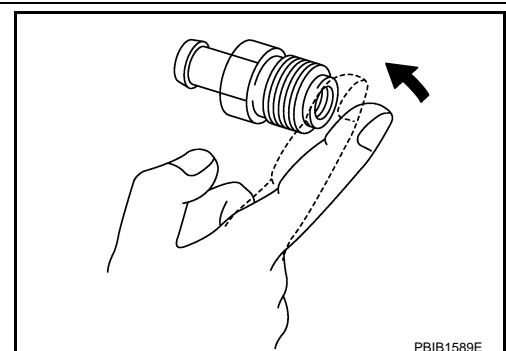
INFOID:000000001344417

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.



REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

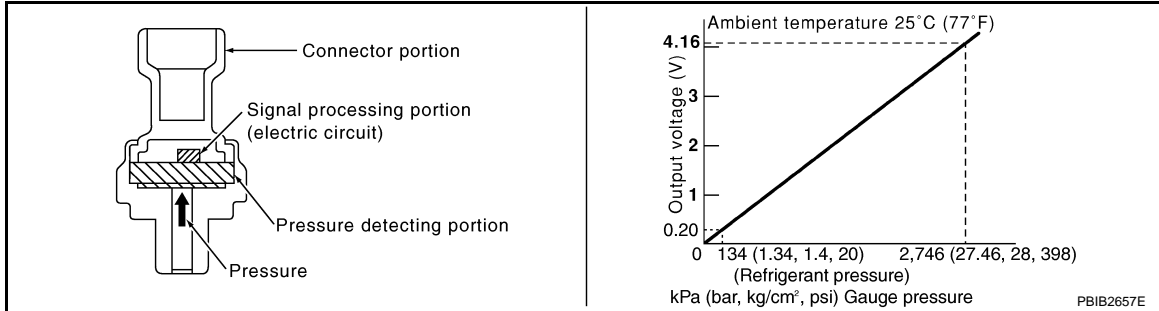
[QR25DE EXCEPT FOR CALIFORNIA]

REFRIGERANT PRESSURE SENSOR

Description

INFOID:000000001344418

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

INFOID:000000001344419

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL 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 and ground.

| ECM | | Ground | Voltage |
|-----------|--|--------|------------|
| Connector | Terminal | | |
| E219 | 39 (Refrigerant pressure sensor signal) | Ground | 1.0 - 4.0V |

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-949, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000001344420

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

| Refrigerant pressure sensor | | Ground | Voltage |
|-----------------------------|----------|--------|------------|
| Connector | Terminal | | |
| E219 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or 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.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 3 | F13 | 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 F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

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

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 2 | F13 | 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 F1, E3
- Harness for open or short between ECM and refrigerant pressure sensor

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

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace refrigerant pressure sensor.
NO >> Repair or replace.

< ECU DIAGNOSIS >

ECU DIAGNOSIS

ECM

Reference Value

INFOID:000000001344421

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 TIMING 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 | Condition | | Values/Status |
|-----------------|--|---------------------------------------|---|
| ENG SPEED | • Run engine and compare CONSULT-III value with the tachometer indication. | | Almost the same speed as the tachometer indication. |
| MAS A/F SE-B1 | See EC-650, "Diagnosis Procedure" . | | |
| B/FUEL SCHDL | See EC-650, "Diagnosis Procedure" . | | |
| A/F ALPHA-B1 | See EC-650, "Diagnosis Procedure" . | | |
| 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 |
| HO2S2 (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S3 (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ↔ RICH |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as speedometer indication |
| BATTERY VOLT | • Ignition switch: ON (Engine stopped) | | 11 - 14V |
| ACCEL SEN 1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| ACCEL SEN 2*1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| THRL SEN 1-B1 | <ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |
| THRL SEN 2-B1*1 | <ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |
| FUEL T/TMP SE | • Ignition switch: ON | | Indicates fuel tank temperature |
| INT/A TEMP SE | • Ignition switch: ON | | Indicates intake air temperature |
| EVAP SYS PRES | • Ignition switch: ON | | Approx. 1.8 - 4.8V |

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Monitor Item | Condition | Values/Status | |
|----------------|--|---|--------------------|
| FUEL LEVEL SE | <ul style="list-style-type: none"> Ignition switch: ON | Depending on fuel level of fuel tank | |
| START SIGNAL | <ul style="list-style-type: none"> Ignition switch: ON → START → ON | OFF → ON → OFF | |
| CLSD THL POS | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND SIG | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates.) | ON |
| P/N POSI SW | <ul style="list-style-type: none"> Ignition switch: ON | Shift lever: P or N (CVT), Neutral (M/T) | ON |
| | | Selector lever: Except above | OFF |
| PW/ST SIGNAL | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Steering wheel: Not being turned | OFF |
| | | Steering wheel: Being turned | ON |
| LOAD SIGNAL | <ul style="list-style-type: none"> Ignition switch: ON | Rear window defogger switch: ON and/or Lighting switch: 2nd position | ON |
| | | Rear window defogger switch and lighting switch: OFF | OFF |
| IGNITION SW | <ul style="list-style-type: none"> Ignition switch: ON → OFF → ON | ON → OFF → ON | |
| HEATER FAN SW | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Heater fan switch: ON | ON |
| | | Heater fan switch: OFF | OFF |
| BRAKE SW | <ul style="list-style-type: none"> Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| INJ PULSE-B1 | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| IGN TIMING | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 10° - 20° BTDC |
| | | 2,000 rpm | 25° - 45° BTDC |
| CAL/LD VALUE | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 10% - 35% |
| | | 2,500 rpm | 10% - 35% |
| MASS AIRFLOW | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 1.0 - 4.0 g·m/s |
| | | 2,500 rpm | 4.0 - 10.0 g·m/s |
| PURG VOL C/V | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle (Accelerator pedal: Not depressed even slightly, after engine starting.) | 0% |
| | | 2,000 rpm | 20% - 90% |
| INT/V TIM (B1) | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | -5° - 5°CA |
| | | 2,000 rpm | Approx. 0° - 20°CA |

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Monitor Item | Condition | | Values/Status |
|-------------------------------|--|--|---|
| INT/V SOL (B1) | <ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load | Idle | 0% |
| | | 2,000 rpm | Approx. 0% - 60% |
| AIR COND RLY | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates) | ON |
| FUEL PUMP RLY | <ul style="list-style-type: none"> For 1 seconds after turning ignition switch: ON Engine running or cranking | | ON |
| | | <ul style="list-style-type: none"> Except above | OFF |
| VENT CONT/V | <ul style="list-style-type: none"> Ignition switch: ON | | OFF |
| THRTL RELAY | <ul style="list-style-type: none"> Ignition switch: ON | | ON |
| HO2S2 HTR (B1) | <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load Engine speed: Above 3,600 rpm | | ON |
| | | | OFF |
| I/P PULLY SPD | <ul style="list-style-type: none"> Vehicle speed: More than 20 km/h (12 MPH) | | Almost the same speed as the tachometer indication |
| VEHICLE SPEED | <ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| IDL A/V LEARN | <ul style="list-style-type: none"> Engine: running | Idle air volume learning has not been performed yet. | YET |
| | | Idle air volume learning has already been performed successfully. | CMPLT |
| TRVL AFTER MIL | <ul style="list-style-type: none"> Ignition switch: ON | Vehicle has traveled after MIL has turned ON. | 0 - 65,535 km (0 - 40,723 miles) |
| A/F S1 HTR (B1) | <ul style="list-style-type: none"> Engine: After warming up, idle the engine (More than 140 seconds after starting engine.) | | 4 - 100% |
| AC PRESS SEN | <ul style="list-style-type: none"> Engine: Idle Both A/C switch and blower fan switch: ON (Compressor operates) | | 1.0 - 4.0V |
| VHCL SPEED SE | <ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| SET VHCL SPD | <ul style="list-style-type: none"> Engine: Running | ASCD: Operating | The preset vehicle speed is displayed |
| MAIN SW | <ul style="list-style-type: none"> Ignition switch: ON | MAIN switch: Pressed | ON |
| | | MAIN switch: Released | OFF |
| CANCEL SW | <ul style="list-style-type: none"> Ignition switch: ON | CANCEL switch: Pressed | ON |
| | | CANCEL switch: Released | OFF |
| RESUME/ACC SW | <ul style="list-style-type: none"> Ignition switch: ON | RESUME/ACCELERATE switch: Pressed | ON |
| | | RESUME/ACCELERATE switch: Released | OFF |
| SET SW | <ul style="list-style-type: none"> Ignition switch: ON | SET/COAST switch: Pressed | ON |
| | | SET/COAST switch: Released | OFF |
| BRAKE SW1 (ASCD brake switch) | <ul style="list-style-type: none"> Ignition switch: ON | <ul style="list-style-type: none"> Brake pedal: Fully released (CVT) Brake pedal and clutch pedal: Fully released (M/T) | ON |
| | | <ul style="list-style-type: none"> Brake pedal: Slightly depressed (CVT) Brake pedal and/or clutch pedal: Slightly depressed (M/T) | OFF |

ECM

< ECU DIAGNOSIS >

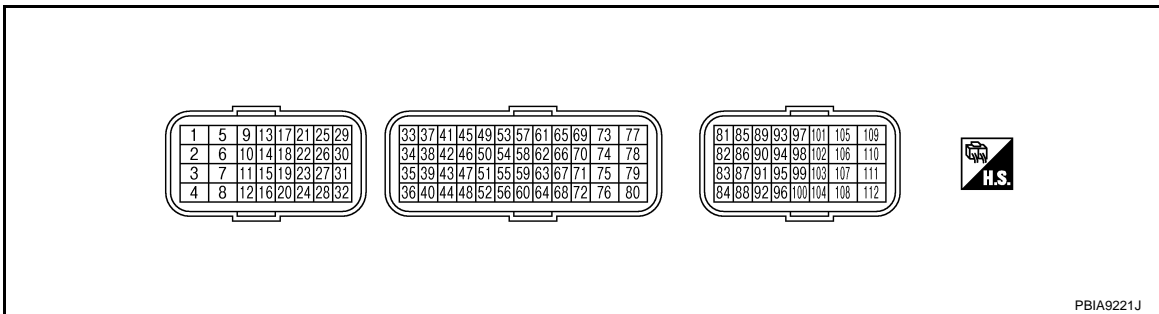
[QR25DE EXCEPT FOR CALIFORNIA]

| Monitor Item | Condition | | Values/Status |
|---------------------------------|--|---|-------------------------|
| BRAKE SW2 (Stop lamp switch) | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | 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 → at the 2nd time | ON → OFF |
| SET LAMP | • MAIN switch: ON • When vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH) | ASCD: Operating | ON |
| | | ASCD: Not operating | OFF |
| ALT DUTY | • Engine: Idle | | 0 - 80% |
| BAT CUR SEN | <ul style="list-style-type: none"> • Engine speed: Idle • Battery: Fully charged*2 • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load | | Approx. 2,600 - 3,500mV |
| ALT DUTY SIG | • Power generation voltage variable control: Operating | | ON |
| | • Power generation voltage variable control: Not operating | | OFF |
| A/F ADJ B1 | • Engine: running | | -0.330 - 0.330 |

*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-68. "How to Handle Battery"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

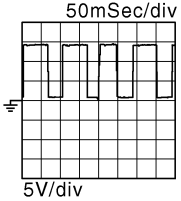
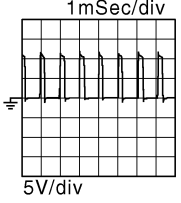
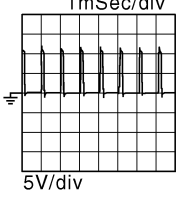
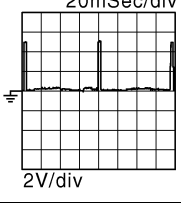
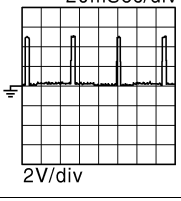
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

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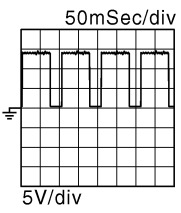
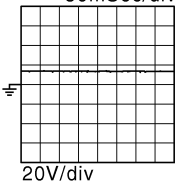
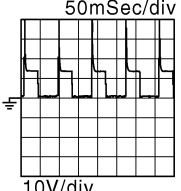
| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|---------------------|--------|--------------------------|--|--------------|--|---|
| + | — | | Signal name | Input/Output | | |
| 2 | Ground | G/W | Throttle control motor relay power supply | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| 4 | Ground | BR/Y | A/F sensor 1 heater | Output | [Engine is running] • Warm-up condition • Idle speed | 2.9 - 8.8V★  50mSec/div 5V/div JMBIA0082GB |
| 5 | Ground | L | Throttle control motor (Open) | Output | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | 0 - 14V★  1mSec/div 5V/div JMBIA0083GB |
| 6 | Ground | P | Throttle control motor (Close) | Output | [Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | 0 - 14V★  1mSec/div 5V/div JMBIA0084GB |
| 9 10 11 21 | Ground | L/B G/R Y/R G/Y | Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1 Ignition signal No. 4 | Output | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 0 - 0.1V★  20mSec/div 2V/div JMBIA0085GB |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 0 - 0.2V★  20mSec/div 2V/div JMBIA0086GB |
| 12 16 | Ground | B | ECM ground | — | [Engine is running] • Idle speed | Body ground |

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| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
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| + | — | | Signal name | Input/Output | | |
| 13 | Ground | R | Heated oxygen sensor 2 heater | Output | [Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10V★  |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14V) |
| 14 | Ground | B/R | Fuel pump relay | Output | [Ignition switch: ON] <ul style="list-style-type: none"> • For 1 second after turning ignition switch ON [Engine is running] | 0 - 1.0V |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • More than 1 second after turning ignition switch ON | BATTERY VOLTAGE (11 - 14V) |
| 15 | Ground | O | Throttle control motor relay | Output | [Ignition switch: ON → OFF] | 0 - 1.0V ↓ BATTERY VOLTAGE (11 - 14V) ↓ 0V |
| | | | | | [Ignition switch: ON] | 0 - 1.0V |
| 24 | Ground | W/B | ECM relay (Self shut-off) | Output | [Engine is running] <ul style="list-style-type: none"> • A few seconds after turning ignition switch OFF | 0 - 1.0V |
| | | | | | [Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF | BATTERY VOLTAGE (11 - 14V) |
| 25 | Ground | P/L | EVAP canister purge volume control solenoid valve | Output | [Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting | BATTERY VOLTAGE (11 - 14V)★  |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.) | BATTERY VOLTAGE (11 - 14V)★  |

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[QR25DE EXCEPT FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
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| + | — | | Signal name | Input/Output | | |
| 29 30 31 32 | Ground | LG/R R/Y R/W R/B | Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1 | Output | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | BATTERY VOLTAGE (11 - 14V)★ |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm | BATTERY VOLTAGE (11 - 14V)★ |
| 33 | Ground | LG | Heated oxygen sensor 2 | Input | [Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0V |
| 35 | Ground | B/Y | Sensor ground (Heated oxygen sensor 2) | — | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed | 0V |
| 36 | Ground | B | Sensor ground (Throttle position sensor) | — | [Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed | 0V |
| 37 | Ground | W | Throttle position sensor 1 | Input | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | More than 0.36V |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | Less than 4.75V |
| 38 | Ground | R | Throttle position sensor 2 | Input | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | Less than 4.75V |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | More than 0.36V |

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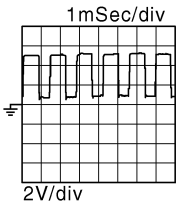
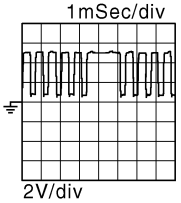
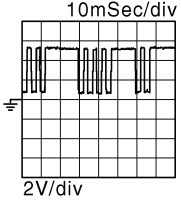
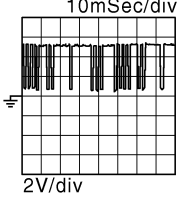
[QR25DE EXCEPT FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|---------------|---|--|
| + | — | | Signal name | Input/ Output | | |
| 39 | Ground | R | Refrigerant pressure sensor | Input | [Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates) | 1.0 - 4.0V |
| 40 | Ground | G | Sensor ground (Refrigerant pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 41 | Ground | O/B | Power steering pressure sensor | Output | [Engine is running] • Steering wheel: Being turned | 0.5 - 4.0V |
| | | | | | [Engine is running] • Steering wheel: Not being turned | 0.4 - 0.8V |
| 42 | Ground | G/R | Battery current sensor | Input | [Engine is running] • Battery: Fully charged* • Idle speed | 2.6 - 3.5V |
| 44 | Ground | R/B | Sensor ground (Battery current sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 45 | Ground | B/W | A/F sensor 1 (bank 1) | Input | [Ignition switch: ON] | 2.2V |
| 46 | Ground | Y | Engine coolant temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with engine coolant temperature. |
| 47 | Ground | G | Sensor power supply (Throttle position sensor) | — | [Ignition switch: ON] | 5V |
| 48 | Ground | B/P | Sensor ground (Power steering pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 49 | Ground | L | A/F sensor 1 | Input | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 1.8V Output voltage varies with air fuel ratio. |
| 50 | Ground | L/Y | Intake air temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with intake air temperature. |
| 51 | Ground | O/L | Sensor power supply | — | [Ignition switch: ON] | 5V |
| 52 | Ground | LG | Sensor ground (Engine coolant temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 55 | Ground | R/L | Sensor power supply (Power steering pressure sensor) | — | [Ignition switch: ON] | 5V |
| 56 | Ground | G/B | Sensor ground (Mass air flow sensor, Intake air temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 58 | Ground | O | Mass air flow sensor | Input | [Engine is running] • Warm-up condition • Idle speed | 0.9 - 1.1V |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,500 rpm | 1.4 - 1.7V |
| 59 | Ground | G/W | Sensor power supply [Camshaft position sensor (PHASE)] | — | [Ignition switch: ON] | 5V |

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[QR25DE EXCEPT FOR CALIFORNIA]

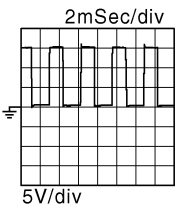
| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--|
| + | — | | Signal name | Input/Output | | |
| 60 | Ground | Y/B | Sensor ground [Crankshaft position sensor (POS)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 61 | Ground | W | Knock sensor | Input | [Engine is running] • Idle speed | 2.5V |
| 64 | Ground | B/R | Sensor ground [Camshaft position sensor (PHASE)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 65 | Ground | W | Crankshaft position sensor (POS) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 3.0V★  JMBIA0091GB |
| | | | | | [Engine is running] • Engine speed: 2,000 rpm | 3.0V★  JMBIA0092GB |
| 67 | Ground | — | Sensor ground (Knock sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 69 | Ground | W/R | Camshaft position sensor (PHASE) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 1.0 - 4.0★  JMBIA0093GB |
| | | | | | [Engine is running] • Engine speed is 2,000 rpm | 1.0 - 4.0★  JMBIA0094GB |
| 76 | Ground | R/G | Sensor power supply [Crankshaft position sensor (POS)] | — | [Ignition switch: ON] | 5V |
| 77 | Ground | W/L | Power supply for ECM (Back-up) | Input | [Ignition switch: OFF] | BATTERY VOLTAGE (11 - 14V) |

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| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|---|--|
| + | — | | Signal name | Input/Output | | |
| 78 | Ground | R/L | Intake valve timing control solenoid valve | Output | [Engine is running] • Warm-up condition • Idle speed | 0V |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000rpm | 7 - 10V★  JMBIA0095GB |
| 81 | Ground | W | Accelerator pedal position sensor 1 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| 82 | Ground | G/B | Accelerator pedal position sensor 2 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.25 - 0.5V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 2.0 - 2.5V |
| 83 | Ground | R/W | Sensor power supply (Accelerator pedal position sensor 1) | — | [Ignition switch: ON] | 5V |
| 84 | Ground | B | Sensor ground (Accelerator pedal position sensor 1) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 85 | Ground | G/Y | ASCDC steering switch | Input | [Ignition switch: ON] • ASCDC steering switch: OFF | 4V |
| | | | | | [Ignition switch: ON] • MAIN switch: Pressed | 0V |
| | | | | | [Ignition switch: ON] • CANCEL switch: Pressed | 1V |
| | | | | | [Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed | 3V |
| | | | | | [Ignition switch: ON] • SET/COAST switch: Pressed | 2V |
| 86 | Ground | LG | EVAP control system pressure sensor | Input | [Ignition switch: ON] | 1.8 - 4.8V |
| 87 | Ground | P/L | Sensor power supply (Accelerator pedal position sensor 2) | — | [Ignition switch: ON] | 5V |
| 88 | Ground | O | Data link connector | Input/Output | [Ignition switch: ON] • CONSULT-III or GST: Disconnected | BATTERY VOLTAGE (11 - 14V) |

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[QR25DE EXCEPT FOR CALIFORNIA]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) | |
|--------------|--------|------------|---|--------------|--|---|----|
| + | — | | Signal name | Input/Output | | | |
| 91 | Ground | BR/L | Sensor power supply (EVAP control system pressure sensor) | — | [Ignition switch: ON] | 5V | EC |
| 92 | Ground | R | Sensor ground (ASCDC steering switch) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | C |
| 93 | Ground | L/Y | Ignition switch | Input | [Ignition switch: OFF] | 0V | D |
| | | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | |
| 95 | Ground | R/Y | Fuel tank temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with fuel tank temperature. | E |
| 96 | Ground | V | Sensor ground (EVAP control system pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | F |
| 97 | Ground | P | CAN communication line | Input/Output | — | — | G |
| 98 | Ground | L | CAN communication line | Input/Output | — | — | |
| 100 | Ground | G | Sensor ground (Accelerator pedal position sensor 2) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | H |
| 102 | Ground | R/B | PNP switch | Input | [Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T) | BATTERY VOLTAGE (11 - 14V) | I |
| | | | | | [Ignition switch: ON] • Shift lever: Except above | 0V | |
| 104 | Ground | B/W | Sensor ground (Fuel tank temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | K |
| 105 | Ground | R/G | Power supply for ECM | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | |
| 106 | Ground | SB | Stop lamp switch | Input | [Ignition switch: OFF] • Brake pedal: Fully released | 0V | L |
| | | | | | [Ignition switch: OFF] • Brake pedal: Slightly depressed | BATTERY VOLTAGE (11 - 14V) | |
| 107 108 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | Body ground | N |
| 109 | Ground | LG | EVAP canister vent control valve | Output | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | |
| 110 | Ground | G/B | ASCDC brake switch | Input | [Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T) | 0V | O |
| | | | | | [Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T) | BATTERY VOLTAGE (11 - 14V) | |
| 111 112 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | Body ground | P |

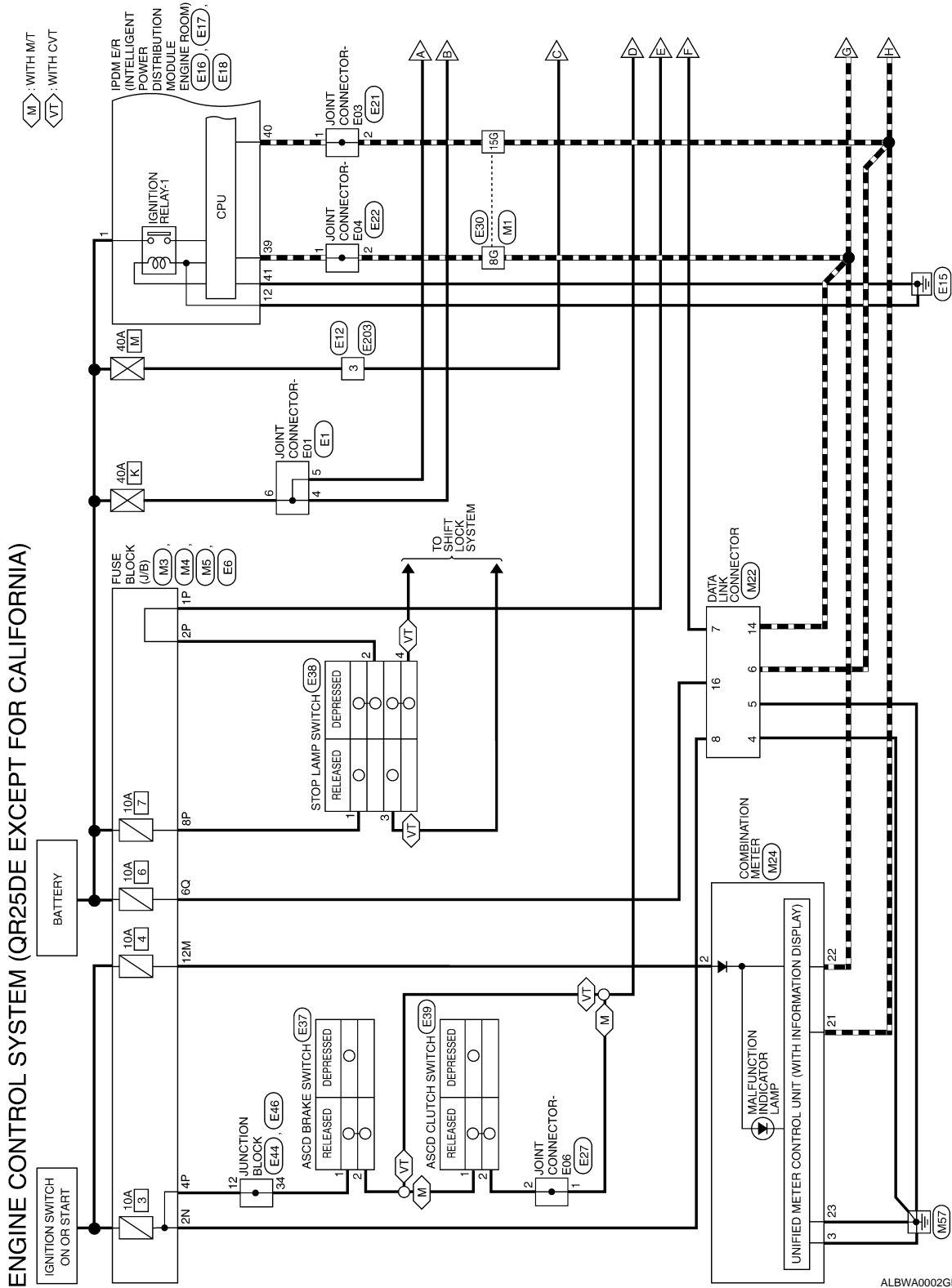
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★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

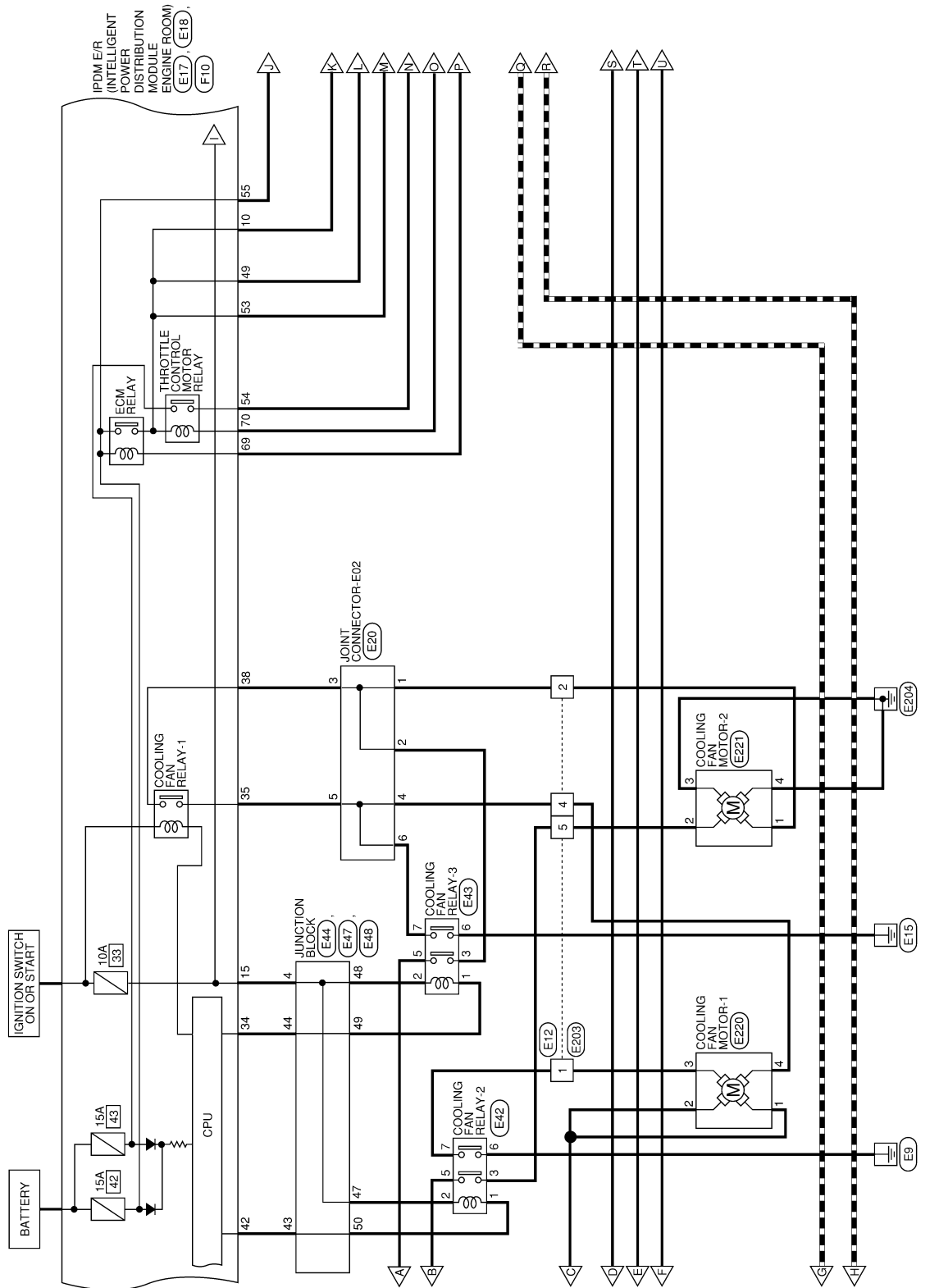
** : Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-68, "How to Handle Battery"](#).

Wiring Diagram — ENGINE CONTROL SYSTEM —

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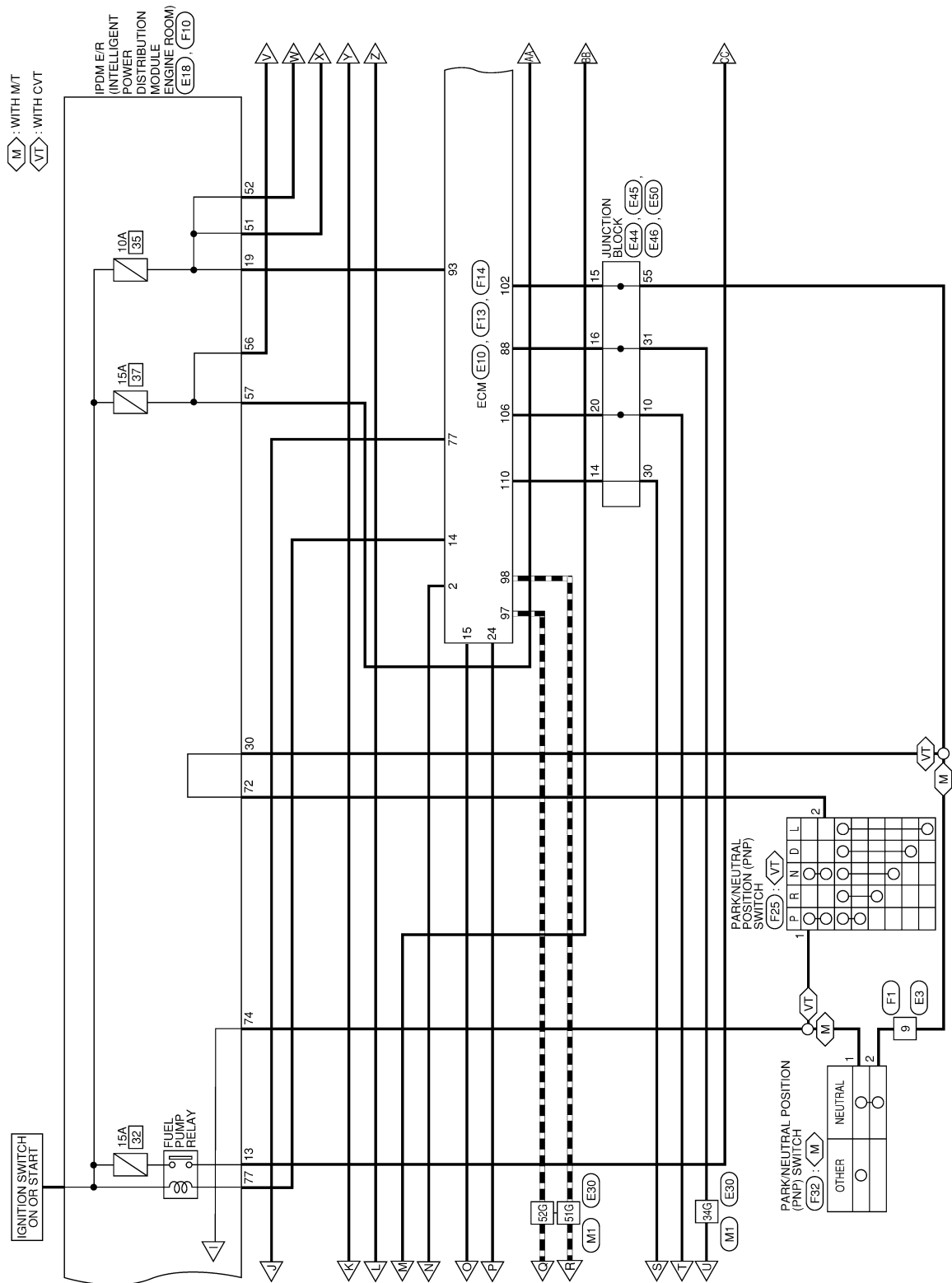
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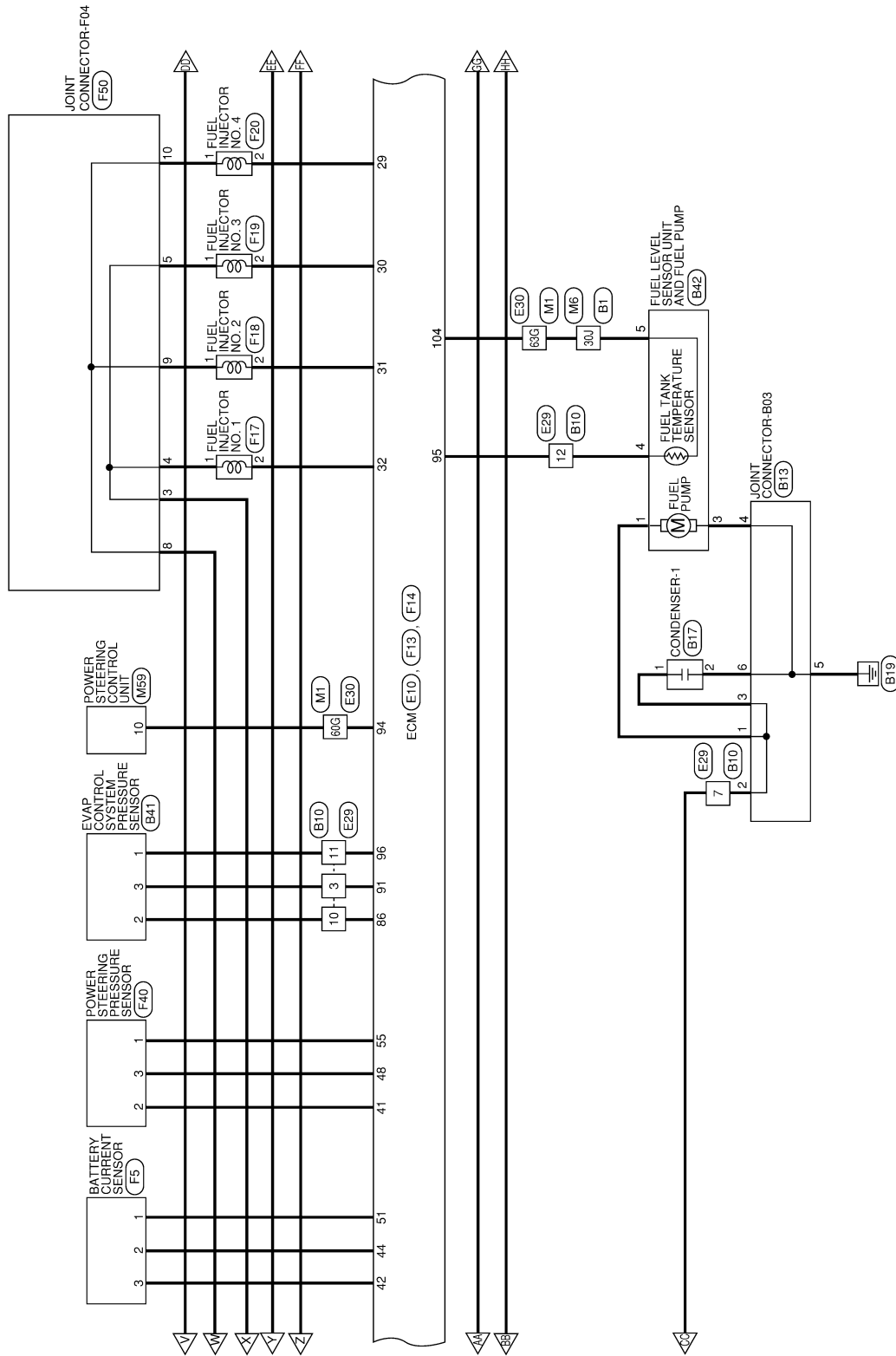
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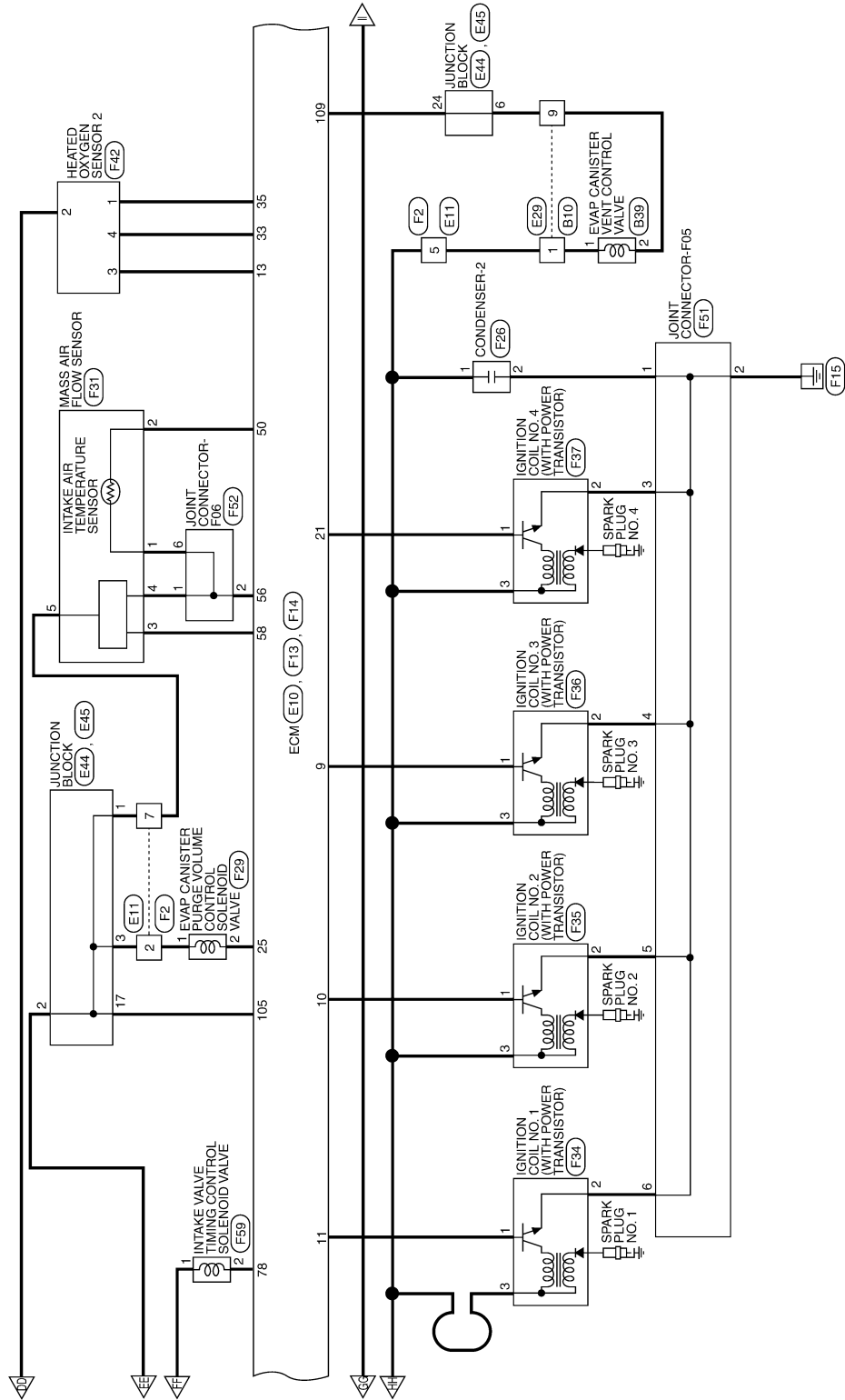


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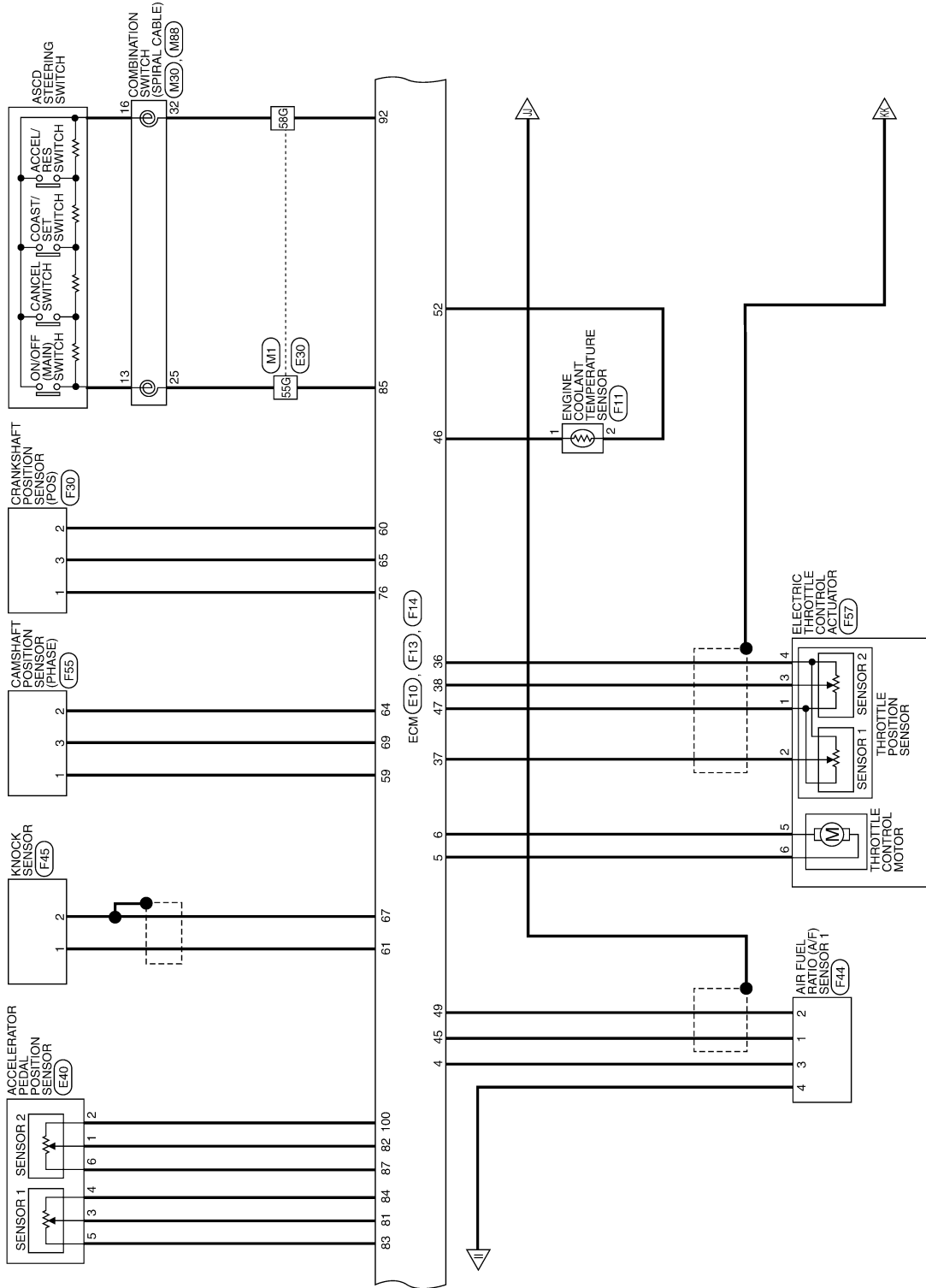


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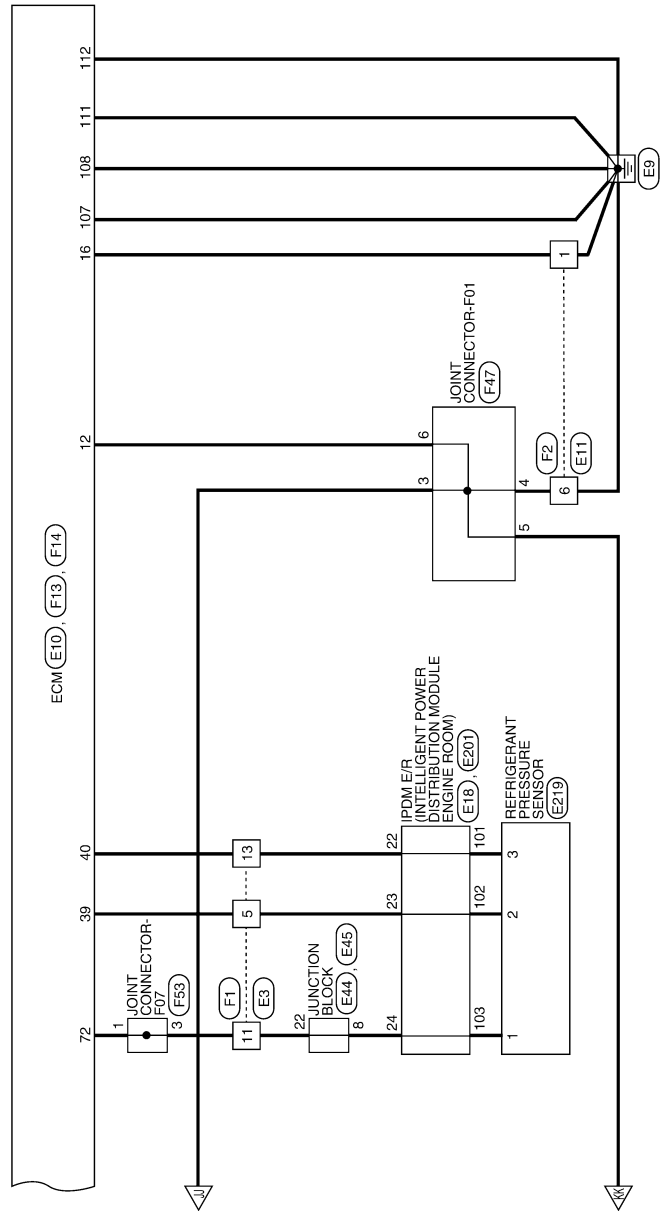


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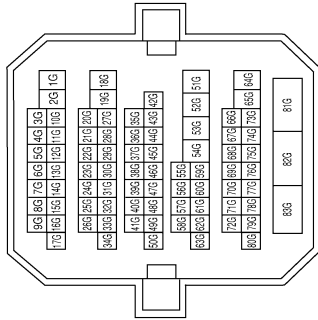
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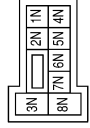
ENGINE CONTROL SYSTEM (QR25DE EXCEPT FOR CALIFORNIA) CONNECTORS

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| Connector No. | M1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



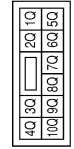
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 8G | P | - |
| 15G | L | - |
| 34G | O | - |
| 51G | L | - |
| 52G | P | - |
| 55G | G/Y | - |
| 58G | R | - |
| 60G | V/W | - |
| 63G | B/W | - |

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| Connector No. | M3 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



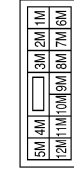
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| Terminal No. | 2N | Color of wire | G | Signal Name | - |
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| Connector No. | M4 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



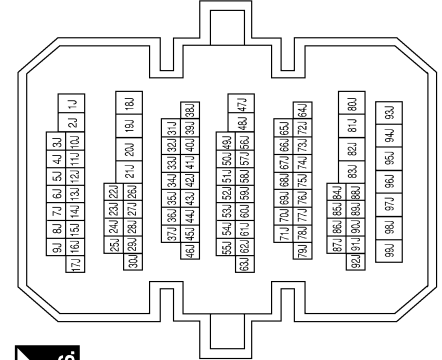
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| Terminal No. | 6Q | Color of wire | Y/R | Signal Name | - |
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| Connector No. | M5 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



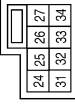
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| Terminal No. | 12M | Color of wire | P | Signal Name | - |
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| Connector No. | M6 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



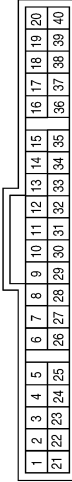
| | | | | | |
|--------------|-----|---------------|-----|-------------|---|
| Terminal No. | 30J | Color of wire | B/W | Signal Name | - |
|--------------|-----|---------------|-----|-------------|---|

| | |
|-----------------|-----------------------------------|
| Connector No. | M30 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



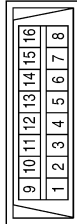
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 25 | G/Y | ASCD_SW |
| 32 | R | ASCD_GND |

| | |
|-----------------|-------------------|
| Connector No. | M24 |
| Connector Name | COMBINATION METER |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2 | O | IGN |
| 3 | B | GND |
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 23 | B | GND |

| | |
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| Connector No. | M22 |
| Connector Name | DATA LINK CONNECTOR |
| Connector Color | WHITE |



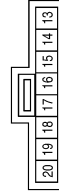
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | B | GND |
| 5 | B | GND |
| 6 | L | CAN-H |
| 7 | O | K-LINE |
| 8 | G | IGN_SW |
| 14 | P | CAN-L |
| 16 | Y/R | BATT |

| | |
|-----------------|---------------------|
| Connector No. | E1 |
| Connector Name | JOINT CONNECTOR-E01 |
| Connector Color | WHITE |



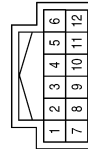
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | W/L | - |
| 5 | W/L | - |
| 6 | W/L | - |

| | |
|-----------------|-----------------------------------|
| Connector No. | M88 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 13 | Y | ASCD_SW |
| 16 | B | ASCD_GND |

| | |
|-----------------|-----------------------------|
| Connector No. | M59 |
| Connector Name | POWER STEERING CONTROL UNIT |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 10 | V/W | ENG_TACHO |

| | |
|-----------------|------------------|
| Connector No. | E6 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



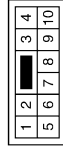
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1P | SB | - |
| 2P | R/G | - |
| 4P | G/R | - |
| 8P | Y/R | - |

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|-----------------|--------------|
| Connector No. | E3 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5 | B/R | - |
| 9 | R/B | - |
| 11 | BR/W | - |
| 13 | W/R | - |

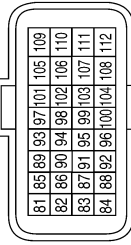
| | |
|-----------------|--------------|
| Connector No. | E11 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|---------------|
| 92 | R | GND-ASCDSW |
| 93 | L/Y | IGNSW |
| 94 | V/W | TACHO (CABIN) |
| 95 | R/Y | TF |
| 96 | V | GND-FTPRES |
| 97 | P | CAN-L |
| 98 | L | CAN-H |
| 100 | G | GND-APS2 |
| 102 | R/B | NEUT-H |
| 104 | B/W | GND-TF |
| 105 | R/G | VBR |
| 106 | SB | BRAKE |
| 107 | B | GND |
| 108 | B | GND |
| 109 | LG | CDCV |
| 110 | G/B | BNC SW |
| 111 | B | GND |
| 112 | B | GND |

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| Connector No. | E10 |
| Connector Name | ECM |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 81 | W | APS1 |
| 82 | G/B | APS2 |
| 83 | R/W | AVCC1-APS1 |
| 84 | B | GND-APS1 |
| 85 | G/Y | ASCDSW |
| 86 | LG | FTPRES |
| 87 | P/L | AVCC2-APS2 |
| 88 | O | KLINE |
| 91 | BR/L | AVCC2-FTPRES |

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|-----------------|--------------|
| Connector No. | E12 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

| | |
|-----------------|--|
| Connector No. | E16 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | BLACK |



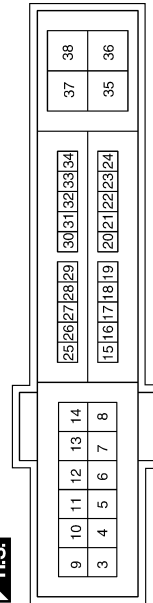
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | F/L_MAIN |

| | |
|-----------------|--|
| Connector No. | E17 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------------|
| 39 | P | CAN-L |
| 40 | L | CAN-H |
| 41 | B | S-GND |
| 42 | SB | MOTOR_FAN_RLY_MID |

| | |
|-----------------|--|
| Connector No. | E18 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



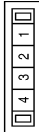
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|------------------|
| 10 | R/B | ECM_VB |
| 12 | B | P-GND |
| 13 | W | FUEL_PUMP |
| 15 | G/W | START_IG-E/R |
| 19 | L/Y | BCM_IGNSW |
| 22 | W/R | PD_SENS_GND-E/R |
| 23 | B/R | PD_SENS_SIG-E/R |
| 24 | BR/W | PD_SENSPWRE/R |
| 30 | R/B | CLUTCH_I/L_SW |
| 34 | O/L | MOTOR_FAN_RLY_HI |
| 35 | L/B | MOTOR_FAN_LO |
| 38 | R/W | F/L_MOTOR_FAN |

| | |
|-----------------|---------------------|
| Connector No. | E20 |
| Connector Name | JOINT CONNECTOR-E02 |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | - |
| 2 | R/W | - |
| 3 | R/W | - |
| 4 | L/B | - |
| 5 | L/B | - |
| 6 | L/B | - |

| | |
|-----------------|---------------------|
| Connector No. | E21 |
| Connector Name | JOINT CONNECTOR-E03 |
| Connector Color | WHITE |



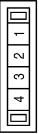
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L | - |
| 2 | L | - |

| | |
|-----------------|---------------------|
| Connector No. | E22 |
| Connector Name | JOINT CONNECTOR-E04 |
| Connector Color | WHITE |



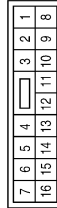
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | - |
| 2 | P | - |

| | |
|-----------------|---------------------|
| Connector No. | E27 |
| Connector Name | JOINT CONNECTOR-E06 |
| Connector Color | WHITE |



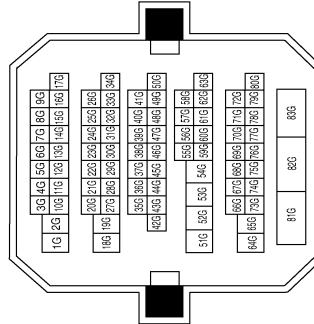
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |

| | |
|-----------------|--------------|
| Connector No. | E29 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/B | - |
| 3 | BR/L | - |
| 7 | W | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

| | |
|-----------------|--------------|
| Connector No. | E30 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 8G | P | - |
| 15G | L | - |
| 34G | O | - |
| 51G | L | - |
| 52G | P | - |
| 55G | G/Y | - |
| 58G | R | - |
| 60G | V/W | - |
| 63G | B/W | - |

| | |
|-----------------|-------------------|
| Connector No. | E37 |
| Connector Name | ASCD BRAKE SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | - |
| 2 | G/B | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH CVT) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |
| 3 | G/R | - |
| 4 | R/W | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH M/T) |
| Connector Color | BLACK |



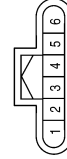
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |

| | |
|-----------------|--------------------|
| Connector No. | E39 |
| Connector Name | ASCD CLUTCH SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | BR | - |
| 2 | G/B | - |

| | |
|-----------------|-----------------------------------|
| Connector No. | E40 |
| Connector Name | ACCELERATOR PEDAL POSITION SENSOR |
| Connector Color | BLACK |



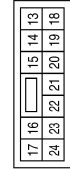
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | APS2 |
| 2 | G | GND-A2 |
| 3 | W | APS1 |
| 4 | B | GND-A1 |
| 5 | R/W | AVCC1 |
| 6 | P/L | AVCC2 |

| | |
|-----------------|---------------------|
| Connector No. | E42 |
| Connector Name | COOLING FAN RELAY-2 |
| Connector Color | BROWN |



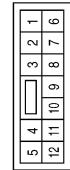
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | G/W | - |
| 3 | L | - |
| 5 | W/L | - |
| 6 | B | - |
| 7 | R | - |

| | |
|-----------------|----------------|
| Connector No. | E45 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 14 | G/B | - |
| 15 | R/B | - |
| 16 | O | - |
| 17 | R/G | - |
| 20 | SB | - |
| 22 | BR/W | - |
| 24 | LG | - |

| | |
|-----------------|----------------|
| Connector No. | E44 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | BROWN |



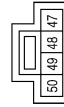
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | - |
| 2 | R/B | - |
| 3 | R/W | - |
| 4 | G/W | - |
| 6 | LG/W | - |
| 8 | BR/W | - |
| 10 | SB | - |
| 12 | G/R | - |

| | |
|-----------------|---------------------|
| Connector No. | E43 |
| Connector Name | COOLING FAN RELAY-3 |
| Connector Color | BROWN |



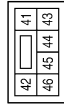
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O/L | - |
| 2 | Y | - |
| 3 | R/W | - |
| 5 | W/L | - |
| 6 | B | - |
| 7 | L/B | - |

| | |
|-----------------|----------------|
| Connector No. | E48 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



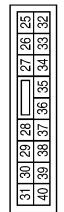
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 47 | G/W | - |
| 48 | Y | - |
| 49 | O/L | - |
| 50 | SB | - |

| | |
|-----------------|----------------|
| Connector No. | E47 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 43 | SB | - |
| 44 | O/L | - |

| | |
|-----------------|----------------|
| Connector No. | E46 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 30 | G/B | - |
| 31 | O | - |
| 34 | G/R | - |

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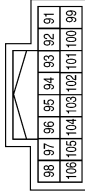
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| Connector No. | E50 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 55 | R/B | - |

| | |
|-----------------|--|
| Connector No. | E201 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 101 | O/L | PD_SENS_GND |
| 102 | R/B | PD_SENS_SIG |
| 103 | P | PD_SEND_PWR |

| | |
|-----------------|--------------|
| Connector No. | E203 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E219 |
| Connector Name | REFRIGERANT PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | AVCC2 |
| 2 | R | SIGNAL |
| 3 | W | GND |

| | |
|-----------------|---------------------|
| Connector No. | E220 |
| Connector Name | COOLING FAN MOTOR-1 |
| Connector Color | GRAY |



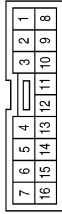
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/Y | LO + |
| 2 | R/Y | HI + |
| 3 | R | HI - |
| 4 | L/B | LO - |

| | |
|-----------------|---------------------|
| Connector No. | E221 |
| Connector Name | COOLING FAN MOTOR-2 |
| Connector Color | GRAY |



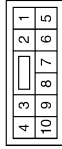
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | LO + |
| 2 | L | HI + |
| 3 | B | HI - |
| 4 | B | LO - |

| | |
|-----------------|--------------|
| Connector No. | F1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 5 | R | - |
| 9 | R/B | - |
| 11 | LG/B | - |
| 13 | G | - |

| | |
|-----------------|--------------|
| Connector No. | F2 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



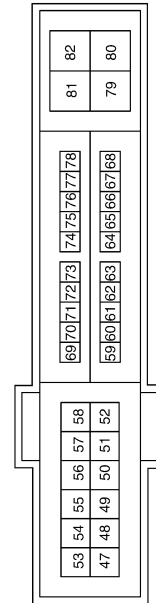
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

| | |
|-----------------|------------------------|
| Connector No. | F5 |
| Connector Name | BATTERY CURRENT SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O/L | AVCC1 |
| 2 | R/B | GND |
| 3 | G/R | SIGNAL |

| | |
|-----------------|--|
| Connector No. | F10 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|--------------|
| 49 | B/R | ENG_SOL |
| 51 | LG | INJECTOR_#1 |
| 52 | Y/G | INJECTOR_#2 |
| 53 | R/B | IGN_COIL |
| 54 | G/W | ETC |
| 55 | W/L | ECM_BAT |
| 56 | R/Y | O2_SENS_#1 |
| 57 | O | O2_SENS_#2 |
| 69 | W/B | SSOFF |
| 70 | O | MOTRLY |
| 72 | R/B | NPSW |
| 74 | Y | START_IG_EGI |
| 77 | B/R | FPR |

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| Connector No. | F11 |
| Connector Name | ENGINE COOLANT TEMPERATURE SENSOR |
| Connector Color | GRAY |

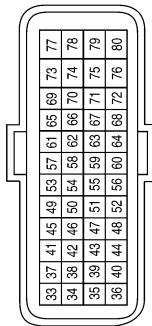


| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | TW |
| 2 | B/G | GND |

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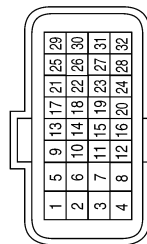
| | |
|-----------------|-------|
| Connector No. | F13 |
| Connector Name | ECM |
| Connector Color | BROWN |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|--------------|
| 33 | LG | OSR1 |
| 35 | B/Y | GND-02SR2 |
| 36 | B | GND-TPS-B1 |
| 37 | W | TPS1-B1 |
| 38 | R | TPS2-B1 |
| 39 | R | PDPRES |
| 40 | G | GND-PDRS |
| 41 | O/B | PSPRES |
| 42 | G/R | CURSEN |
| 44 | R/B | GND-CURSEN |
| 45 | B/W | AF+1 |
| 46 | Y | TW |
| 47 | G | AVCC1-TPS-B1 |
| 48 | B/P | GND-PSPRES |
| 49 | L | AF-1 |
| 50 | L/Y | TA1 |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|---------------|
| 51 | O/L | AVCC1-CURSEN |
| 52 | LG | GND-TW |
| 55 | R/L | AVCV1-PSPRES |
| 56 | G/B | GND-TA1 |
| 58 | O | QA1+ |
| 59 | G/W | AVCC1-PHASE#1 |
| 60 | Y/B | GND-POS |
| 61 | W | KNK1 |
| 64 | B/R | GND-PHASE#1 |
| 65 | W | POS |
| 67 | - | GND-KNK 1 |
| 69 | W/R | PHASE#1 |
| 72 | LG/B | AVCC2-PDPRES |
| 76 | R/G | AVCC2-POS |
| 77 | W/L | BATT |
| 78 | R/L | CVTC#1 |

| | |
|-----------------|------|
| Connector No. | F14 |
| Connector Name | ECM |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 2 | G/W | VMOT-B1 |
| 4 | BR/Y | AFH1 |
| 5 | L | MOTOR1-B1 |
| 6 | P | MOTOR2-B1 |
| 9 | L/B | IGN #3 |
| 10 | G/R | IGN #2 |
| 11 | Y/R | IGN #1 |
| 12 | B | GND |
| 13 | R | 02HR1 |
| 14 | B/R | FPR |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 15 | O | MOTRLY-B1 |
| 16 | B | GND |
| 21 | G/Y | IGN #4 |
| 24 | W/B | SSOF |
| 25 | P/L | EVAP |
| 29 | LG/R | INJ #4 |
| 30 | R/Y | INJ #3 |
| 31 | R/W | INJ #2 |
| 32 | R/B | INJ #1 |

| | |
|-----------------|---------------------|
| Connector No. | F17 |
| Connector Name | FUEL INJECTOR NO. 1 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/B | C/U |

| | |
|-----------------|---------------------|
| Connector No. | F18 |
| Connector Name | FUEL INJECTOR NO. 2 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | R/W | C/U |

| | |
|-----------------|---------------------|
| Connector No. | F19 |
| Connector Name | FUEL INJECTOR NO. 3 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/Y | C/U |

| | |
|-----------------|---------------------|
| Connector No. | F20 |
| Connector Name | FUEL INJECTOR NO. 4 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | LG/R | C/U |

| | |
|-----------------|------------------------------------|
| Connector No. | F25 |
| Connector Name | PARK/NEUTRAL POSITION (PNP) SWITCH |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | R/B | - |

| | |
|-----------------|-------------|
| Connector No. | F26 |
| Connector Name | CONDENSER-2 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | VBR |
| 2 | B | GND |

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| | |
|-----------------|----------------------|
| Connector No. | F31 |
| Connector Name | MASS AIR FLOW SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | TA- |
| 2 | L/Y | TA+ |
| 3 | O | QA+ |
| 4 | G/B | GND |
| 5 | R/G | VB |

| | |
|-----------------|----------------------------------|
| Connector No. | F30 |
| Connector Name | CRANKSHAFT POSITION SENSOR (POS) |
| Connector Color | BLACK |



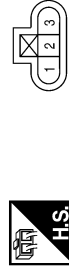
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | AVCC2 |
| 2 | Y/B | GND |
| 3 | W | POS |

| | |
|-----------------|---|
| Connector No. | F29 |
| Connector Name | EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | P/L | C/U |

| | |
|-----------------|--|
| Connector No. | F35 |
| Connector Name | IGNITION COIL NO.2 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|--|
| Connector No. | F34 |
| Connector Name | IGNITION COIL NO.1 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|------------------------------------|
| Connector No. | F32 |
| Connector Name | PARK/NEUTRAL POSITION (PNP) SWITCH |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | R/B | - |

| | |
|-----------------|--------------------------------|
| Connector No. | F40 |
| Connector Name | POWER STEERING PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/L | AVCC1 |
| 2 | O/B | OUTPUT |
| 3 | B/P | GND |

| | |
|-----------------|---|
| Connector No. | F37 |
| Connector Name | IGNITION COIL NO. 4 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/Y | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F36 |
| Connector Name | IGNITION COIL NO. 3 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/B | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|--------------|
| Connector No. | F45 |
| Connector Name | KNOCK SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | KNK |
| 2 | - | GND |

| | |
|-----------------|-------------------------------|
| Connector No. | F44 |
| Connector Name | AIR FUEL RATIO (A/F) SENSOR 1 |
| Connector Color | DARK GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/W | AF(+) |
| 2 | L | AF(-) |
| 3 | BR/Y | HEATER(-) |
| 4 | O | HEATER(+) |

| | |
|-----------------|------------------------|
| Connector No. | F42 |
| Connector Name | HEATED OXYGEN SENSOR 2 |
| Connector Color | BLACK |

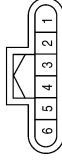


| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/Y | SENSOR(-) |
| 2 | R/Y | HEATER(+) |
| 3 | R | HEATER(-) |
| 4 | LG | SENSOR(+) |

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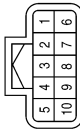
A
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| | |
|-----------------|---------------------|
| Connector No. | F51 |
| Connector Name | JOINT CONNECTOR-F05 |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | B | - |
| 3 | B | - |
| 4 | B | - |
| 5 | B | - |
| 6 | B | - |

| | |
|-----------------|---------------------|
| Connector No. | F50 |
| Connector Name | JOINT CONNECTOR-F04 |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 3 | LG | - |
| 4 | LG | - |
| 5 | LG | - |
| 8 | Y/G | - |
| 9 | Y/G | - |
| 10 | Y/G | - |

| | |
|-----------------|---------------------|
| Connector No. | F47 |
| Connector Name | JOINT CONNECTOR-F01 |
| Connector Color | BLACK |



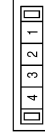
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 3 | - | - |
| 4 | B | - |
| 5 | - | - |
| 6 | B | - |

| | |
|-----------------|----------------------------------|
| Connector No. | F55 |
| Connector Name | CAMSHAFT POSITION SENSOR (PHASE) |
| Connector Color | BLACK |



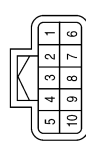
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/W | AVCC1 |
| 2 | B/R | GND |
| 3 | W/R | PHASE |

| | |
|-----------------|---------------------|
| Connector No. | F53 |
| Connector Name | JOINT CONNECTOR-F07 |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG/B | - |
| 3 | LG/B | - |

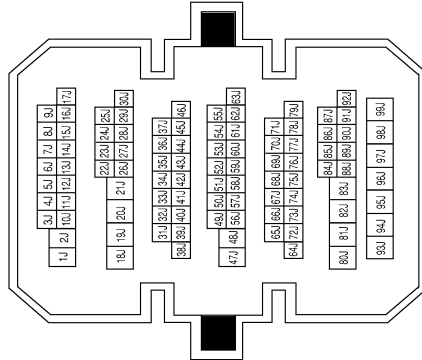
| | |
|-----------------|---------------------|
| Connector No. | F52 |
| Connector Name | JOINT CONNECTOR-F06 |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |
| 6 | G/B | - |

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| | |
|-----------------|--------------|
| Connector No. | B1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



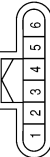
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 30J | B/W | - |

| | |
|-----------------|--|
| Connector No. | F59 |
| Connector Name | INTAKE VALVE TIMING CONTROL SOLENOID VALVE |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/R | VB |
| 2 | R/L | C/U |

| | |
|-----------------|------------------------------------|
| Connector No. | F57 |
| Connector Name | ELECTRIC THROTTLE CONTROL ACTUATOR |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G | INPUT |
| 2 | W | OUTPUT1 |
| 3 | R | OUTPUT2 |
| 4 | B | GND |
| 5 | P | MOTOR2 |
| 6 | L | MOTOR1 |

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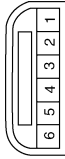
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| | |
|-----------------|-------------|
| Connector No. | B17 |
| Connector Name | CONDENSER-1 |
| Connector Color | WHITE |



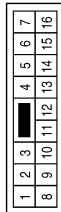
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | (+) |
| 2 | B/Y | (-) |

| | |
|-----------------|---------------------|
| Connector No. | B13 |
| Connector Name | JOINT CONNECTOR-B03 |
| Connector Color | WHITE |



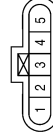
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | SB | - |
| 3 | W | - |
| 4 | B/Y | - |
| 5 | B/Y | - |
| 6 | B/Y | - |

| | |
|-----------------|--------------|
| Connector No. | B10 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 3 | BR/L | - |
| 7 | W | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

| | |
|-----------------|--------------------------------------|
| Connector No. | B42 |
| Connector Name | FUEL LEVEL SENSOR UNIT AND FUEL PUMP |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | S/B | IGN |
| 3 | B/Y | GND |
| 4 | R/Y | TEMP SENS |
| 5 | B/W | SENSOR - |

| | |
|-----------------|-------------------------------------|
| Connector No. | B41 |
| Connector Name | EVAP CONTROL SYSTEM PRESSURE SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | V | GND |
| 2 | LG | SIGNAL |
| 3 | BR/L | AVCC2 |

| | |
|-----------------|----------------------------------|
| Connector No. | B39 |
| Connector Name | EVAP CANISTER VENT CONTROL VALVE |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | BATT |
| 2 | R | C/U |

Fail Safe

NON DTC RELATED ITEM

ALBIA0197GB

INFOID:000000001344423

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Engine operating condition in fail-safe mode | Detected items | Remarks | Reference page |
|--|------------------------------------|--|------------------------|
| Engine speed will not rise more than 2,500 rpm due to the fuel cut | Malfunction indicator lamp circuit | When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up MIL when there is malfunction on engine control system. 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 fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction. | EC-942 |

DTC RELATED ITEM

| DTC No. | Detected items | Engine operating condition in fail-safe mode | |
|---|---|--|--|
| P0011 | Intake valve timing control | The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function. | |
| P0102 P0103 | Mass air flow sensor circuit | Engine speed will not rise more than 2,400 rpm due to the fuel cut. | |
| P0117 P0118 | Engine coolant temperature sensor circuit | Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-III displays the engine coolant temperature decided by ECM. | |
| | | Condition | Engine coolant temperature decided (CONSULT-III display) |
| | | Just as ignition switch is turned ON or START | 40°C (104°F) |
| | | More than approx. 4 minutes after ignition ON or START | 80°C (176°F) |
| | | Except as shown above | 40 - 80°C (104 - 176°F) (Depends on the time) |
| | | When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running. | |
| P0122 P0123 P0222 P0223 P2132 P2133 P2135 | Throttle 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. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor. | |
| P0500 | Vehicle speed sensor | When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running. | |
| P0643 | Sensor power supply | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | |
| P0605 | ECM | (When ECM calculation function is malfunctioning.) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation. | |
| P1805 | Brake switch | ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor. | |
| | | Vehicle condition | Driving condition |
| | | When engine is idling | Normal |
| | | When accelerating | Poor acceleration |
| P2100 P2103 | Throttle control motor relay | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | |
| P2101 | Electric throttle control function | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | |

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| DTC No. | Detected items | Engine operating condition in fail-safe mode |
|---|------------------------------------|---|
| 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. |
| P2119 | Electric throttle control actuator | <p>(When electric throttle control actuator does not function properly due to the return spring malfunction:) 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.</p> <p>(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.</p> <p>(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</p> |
| P2122 P2123 P2127 P2128 P2138 | Accelerator pedal position sensor | <p>The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.</p> <p>The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.</p> |

DTC Inspection Priority Chart

INFOID:000000001344424

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

| Priority | Detected items (DTC) | |
|----------|--|-----------------------------|
| 1 | <ul style="list-style-type: none"> • U1000 U1001 CAN communication line • U1010 CAN communication • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0643 Sensor power supply • P0605 P0607 ECM • P0705 P0850 Park/neutral position (PNP) switch • P1550 P1551 P1552 P1553 P1554 Battery current sensor • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor | A EC C D E F |
| 2 | <ul style="list-style-type: none"> • P0031 P0032 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 Heated oxygen sensor 2 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P0133 P2A00 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0550 Power steering pressure sensor • P0603 ECM power supply • P0710 P0715 P0720 P0740 P0744 P0745 P0776 P0778 P0840 P0845 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P2101 Electric throttle control function • P2118 Throttle control motor • P2100 P2103 Throttle control motor relay | G H I J K |
| 3 | <ul style="list-style-type: none"> • P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P1148 Closed loop control • P1421 Cold start control • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Primary speed sensor • P2119 Electric throttle control actuator | L M N O |

DTC Index

INFOID:000000001344425

×:Applicable —: Not applicable

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|-------------------------------------|----------------------|--------|----------|---|--------------------|--------|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| CAN COMM CIRCUIT | U1000 | 1000*4 | — | — | 1 (CVT) 2 (M/T) | × — | EC-661 |
| CAN COMM CIRCUIT | U1001 | 1001*4 | — | — | 2 | — | EC-661 |

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|---|----------------------|-------------|----------|---|--------------------|-------------------|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| CONTROL UNIT(CAN) | U1010 | 1010 | — | — | 1 (CVT) 2 (M/T) | × — | EC-662 |
| NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED. | P0000 | 0000 | — | — | — | Flashing*7 | — |
| INT/V TIM CONT-B1 | P0011 | 0011 | — | — | 2 | × | EC-663 |
| A/F SEN1 HTR (B1) | P0031 | 0031 | — | × | 2 | × | EC-667 |
| A/F SEN1 HTR (B1) | P0032 | 0032 | — | × | 2 | × | EC-667 |
| HO2S2 HTR (B1) | P0037 | 0037 | — | × | 2 | × | EC-670 |
| HO2S2 HTR (B1) | P0038 | 0038 | — | × | 2 | × | EC-670 |
| INT/V TIM V/CIR-B1 | P0075 | 0075 | — | — | 2 | × | EC-673 |
| MAF SEN/CIRCUIT-B1 | P0101 | 0101 | — | — | 2 | × | EC-675 |
| MAF SEN/CIRCUIT-B1 | P0102 | 0102 | — | — | 1 | × | EC-681 |
| MAF SEN/CIRCUIT-B1 | P0103 | 0103 | — | — | 1 | × | EC-681 |
| IAT SEN/CIRCUIT-B1 | P0112 | 0112 | — | — | 2 | × | EC-686 |
| IAT SEN/CIRCUIT-B1 | P0113 | 0113 | — | — | 2 | × | EC-686 |
| ECT SEN/CIRC | P0117 | 0117 | — | — | 1 | × | EC-689 |
| ECT SEN/CIRC | P0118 | 0118 | — | — | 1 | × | EC-689 |
| TP SEN 2/CIRC-B1 | P0122 | 0122 | — | — | 1 | × | EC-692 |
| TP SEN 2/CIRC-B1 | P0123 | 0123 | — | — | 1 | × | EC-692 |
| ECT SENSOR | P0125 | 0125 | — | — | 2 | × | EC-695 |
| IAT SENSOR-B1 | P0127 | 0127 | — | — | 2 | × | EC-698 |
| THERMSTAT FNCTN | P0128 | 0128 | — | — | 2 | × | EC-700 |
| A/F SENSOR1 (B1) | P0130 | 0130 | — | × | 2 | × | EC-702 |
| A/F SENSOR1 (B1) | P0131 | 0131 | — | × | 2 | × | EC-706 |
| A/F SENSOR1 (B1) | P0132 | 0132 | — | × | 2 | × | EC-709 |
| A/F SENSOR1 (B1) | P0133 | 0133 | × | × | 2 | × | EC-712 |
| HO2S2 (B1) | P0137 | 0137 | × | × | 2 | × | EC-717 |
| HO2S2 (B1) | P0138 | 0138 | × | × | 2 | × | EC-723 |
| HO2S2 (B1) | P0139 | 0139 | × | × | 2 | × | EC-730 |
| FUEL SYS-LEAN-B1 | P0171 | 0171 | — | — | 2 | × | EC-736 |
| FUEL SYS-RICH-B1 | P0172 | 0172 | — | — | 2 | × | EC-740 |
| FTT SENSOR | P0181 | 0181 | — | — | 2 | × | EC-744 |
| FTT SEN/CIRCUIT | P0182 | 0182 | — | — | 2 | × | EC-747 |
| FTT SEN/CIRCUIT | P0183 | 0183 | — | — | 2 | × | EC-747 |
| TP SEN 1/CIRC-B1 | P0222 | 0222 | — | — | 1 | × | EC-750 |
| TP SEN 1/CIRC-B1 | P0223 | 0223 | — | — | 1 | × | EC-750 |
| MULTI CYL MISFIRE | P0300 | 0300 | — | — | 2 | × | EC-753 |
| CYL 1 MISFIRE | P0301 | 0301 | — | — | 2 | × | EC-753 |
| CYL 2 MISFIRE | P0302 | 0302 | — | — | 2 | × | EC-753 |
| CYL 3 MISFIRE | P0303 | 0303 | — | — | 2 | × | EC-753 |
| CYL 4 MISFIRE | P0304 | 0304 | — | — | 2 | × | EC-753 |
| KNOCK SEN/CIRC-B1 | P0327 | 0327 | — | — | 2 | — | EC-758 |

ECM

< ECU DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|--|----------------------|-------|----------|---|--------------------|--------|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| KNOCK SEN/CIRC-B1 | P0328 | 0328 | — | — | 2 | — | EC-758 |
| CKP SEN/CIRCUIT | P0335 | 0335 | — | — | 2 | × | EC-760 |
| CMP SEN/CIRC-B1 | P0340 | 0340 | — | — | 2 | × | EC-764 |
| TW CATALYST SYS-B1 | P0420 | 0420 | × | × | 2 | × | EC-768 |
| EVAP PURG FLOW/MON | P0441 | 0441 | × | × | 2 | × | EC-773 |
| EVAP SMALL LEAK | P0442 | 0442 | × | × | 2 | × | EC-778 |
| PURG VOLUME CONT/V | P0443 | 0443 | — | — | 2 | × | EC-784 |
| PURG VOLUME CONT/V | P0444 | 0444 | — | — | 2 | × | EC-788 |
| PURG VOLUME CONT/V | P0445 | 0445 | — | — | 2 | × | EC-788 |
| VENT CONTROL VALVE | P0447 | 0447 | — | — | 2 | × | EC-791 |
| VENT CONTROL VALVE | P0448 | 0448 | — | — | 2 | × | EC-795 |
| EVAP SYS PRES SEN | P0451 | 0451 | — | — | 2 | × | EC-799 |
| EVAP SYS PRES SEN | P0452 | 0452 | — | — | 2 | × | EC-802 |
| EVAP SYS PRES SEN | P0453 | 0453 | — | — | 2 | × | EC-807 |
| EVAP GROSS LEAK | P0455 | 0455 | — | — | 2 | × | EC-812 |
| EVAP VERY SML LEAK | P0456 | 0456 | ×*6 | × | 2 | × | EC-818 |
| FUEL LEV SEN SLOSH | P0460 | 0460 | — | — | 2 | × | EC-825 |
| FUEL LEVEL SENSOR | P0461 | 0461 | — | — | 2 | × | EC-827 |
| FUEL LEVL SEN/CIRC | P0462 | 0462 | — | — | 2 | × | EC-829 |
| FUEL LEVL SEN/CIRC | P0463 | 0463 | — | — | 2 | × | EC-829 |
| VEH SPEED SEN/CIRC*5 | P0500 | 0500 | — | — | 2 | × | EC-831 |
| ISC SYSTEM | P0506 | 0506 | — | — | 2 | × | EC-833 |
| ISC SYSTEM | P0507 | 0507 | — | — | 2 | × | EC-835 |
| PW ST P SEN/CIRC | P0550 | 0550 | — | — | 2 | — | EC-837 |
| ECM BACK UP/CIRCUIT | P0603 | 0603 | — | — | 2 | × | EC-839 |
| ECM | P0605 | 0605 | — | — | 1 or 2 | × or — | EC-841 |
| ECM | U1010 | 1010 | — | — | 1 (CVT) 2 (M/T) | × | EC-843 |
| SENSOR POWER/CIRC | P0643 | 0643 | — | — | 1 | × | EC-844 |
| PNP SW/CIRC | P0705 | 0705 | — | — | 2 | × | TM-302 |
| ATF TEMP SEN/CIRC | P0710 | 0710 | — | — | 1 | × | TM-305 |
| INPUT SPD SEN/CIRC | P0715 | 0715 | — | — | 2 | × | TM-307 |
| VEH SPD SEN/CIR AT*5 | P0720 | 0720 | — | — | 2 | × | TM-312 |
| TCC SOLENOID/CIRC | P0740 | 0740 | — | — | 2 | × | TM-318 |
| A/T TCC S/V FNCTN | P0744 | 0744 | — | — | 2 | × | TM-320 |
| L/PRESS SOL/CIRC | P0745 | 0745 | — | — | 2 | × | TM-322 |
| PRS CNT SOL/A FCTN | P0746 | 0746 | — | — | 1 | × | TM-324 |
| PRS CNT SOL/B FCTN | P0776 | 0776 | — | — | 2 | × | TM-326 |
| PRS CNT SOL/B CIRC | P0778 | 0778 | — | — | 2 | × | TM-329 |
| TR PRS SENS/A CIRC | P0840 | 0840 | — | — | 2 | × | TM-334 |
| TR PRS SENS/B CIRC | P0845 | 0845 | — | — | 2 | × | TM-340 |
| P-N POS SW/CIRCUIT | P0850 | 0850 | — | — | 2 | × | EC-846 |

ECM

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| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Test value/ Test limit (GST only) | Trip | MIL | Reference page |
|--|----------------------|-------|----------|---|------|-----|------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | | |
| CLOSED LOOP-B1 | P1148 | 1148 | — | — | 1 | × | EC-849 |
| ENG OVER TEMP | P1217 | 1217 | — | — | 1 | × | EC-850 |
| CTP LEARNING-B1 | P1225 | 1225 | — | — | 2 | — | EC-854 |
| CTP LEARNING-B1 | P1226 | 1226 | — | — | 2 | — | EC-856 |
| COLD START CONTROL | P1421 | 1421 | — | — | 2 | × | EC-858 |
| BAT CURRENT SENSOR | P1550 | 1550 | — | — | 2 | — | EC-860 |
| BAT CURRENT SENSOR | P1551 | 1551 | — | — | 2 | — | EC-863 |
| BAT CURRENT SENSOR | P1552 | 1552 | — | — | 2 | — | EC-863 |
| BAT CURRENT SENSOR | P1553 | 1553 | — | — | 2 | — | EC-866 |
| BAT CURRENT SENSOR | P1554 | 1554 | — | — | 2 | — | EC-869 |
| ASCD SW | P1564 | 1564 | — | — | 1 | — | EC-872 |
| ASCD BRAKE SW | P1572 | 1572 | — | — | 1 | — | EC-875 |
| ASCD VHL SPD SEN | P1574 | 1574 | — | — | 1 | — | EC-882 |
| LOCK MODE | P1610 | 1610 | — | — | 2 | — | SEC-34 |
| ID DISCARD IMM-ECM | P1611 | 1611 | — | — | 2 | — | SEC-39 |
| CHAIN OF ECM-IMMU | P1612 | 1612 | — | — | 2 | — | SEC-40 |
| DIFFERENCE OF KEY | P1615 | 1615 | — | — | 2 | — | SEC-38 |
| IN PULY SPEED | P1715 | 1715 | — | — | 2 | — | EC-884 |
| LU-SLCT SOL/CIRC | P1740 | 1740 | — | — | 2 | × | TM-355 |
| STEP MOTOR CIRC | P1777 | 1777 | — | — | 1 | × | TM-358 |
| STEP MOTOR FNCT | P1778 | 1778 | — | — | 2 | × | TM-361 |
| BRAKE SW/CIRCUIT | P1805 | 1805 | — | — | 2 | — | EC-886 |
| ETC MOT PWR-B1 | P2100 | 2100 | — | — | 1 | × | EC-889 |
| ETC FNCTN/CIRC-B1 | P2101 | 2101 | — | — | 1 | × | EC-891 |
| ETC MOT PWR | P2103 | 2103 | — | — | 1 | × | EC-889 |
| ETC MOT-B1 | P2118 | 2118 | — | — | 1 | × | EC-895 |
| ETC ACTR-B1 | P2119 | 2119 | — | — | 1 | × | EC-897 |
| APP SEN 1/CIRC | P2122 | 2122 | — | — | 1 | × | EC-899 |
| APP SEN 1/CIRC | P2123 | 2123 | — | — | 1 | × | EC-899 |
| APP SEN 2/CIRC | P2127 | 2127 | — | — | 1 | × | EC-902 |
| APP SEN 2/CIRC | P2128 | 2128 | — | — | 1 | × | EC-902 |
| TP SENSOR-B1 | P2135 | 2135 | — | — | 1 | × | EC-906 |
| APP SENSOR | P2138 | 2138 | — | — | 1 | × | EC-909 |
| A/F SENSOR1 (B1) | P2A00 | 2A00 | — | × | 2 | × | EC-913 |

*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 of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

How to Set SRT Code

INFOID:000000001344426

A

To set all SRT codes, self-diagnosis 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.

WITH CONSULT-III

Perform corresponding DTC CONFIRMATION PROCEDURE one by one based on Performance Priority in the table on "SRT Item".

EC

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.

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M

N

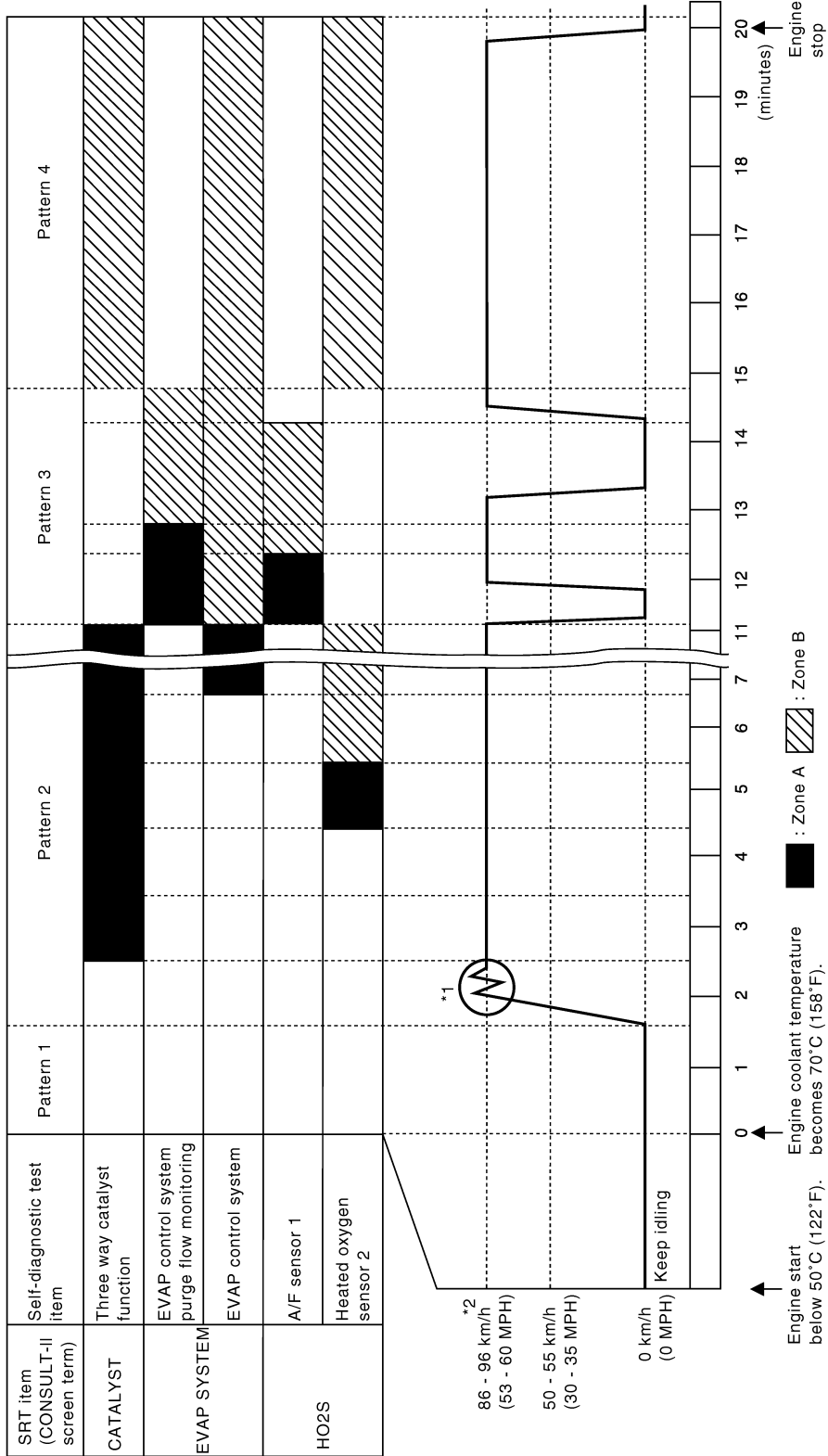
O

P

DRIVING PATTERN

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.

Driving pattern



PBIB2906E

- 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:

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- 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:

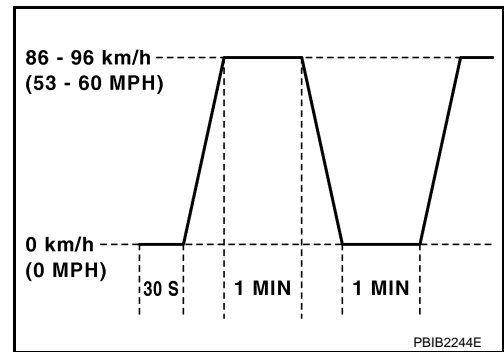
- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 46 and ground is lower than 1.4V).**
- **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 4.1V).**

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 decelerating 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 steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*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.

Suggested Upshift Speeds for M/T Models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

| Gear change | For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft): | | For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft): |
|-------------|---|-------------------------------|---|
| | ACCEL shift position km/h (MPH) | CRUISE shift point km/h (MPH) | km/h (MPH) |
| 1st to 2nd | 24 (15) | 13 (8) | 13 (8) |
| 2nd to 3rd | 40 (25) | 27 (17) | 27 (17) |
| 3rd to 4th | 53 (33) | 40 (25) | 40 (25) |
| 4th to 5th | 71 (44) | 58 (36) | 58 (36) |
| 5th to 6th | 82 (51) | 82 (51) | 82 (51) |

Test Value and Test Limit

INFOID:000000001344427

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 Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

ECM

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[QR25DE EXCEPT FOR CALIFORNIA]

| Item | Self-diagnostic test item | DTC | Test value (GST display) | | Test limit | Conversion |
|----------------|---|-------|-----------------------------|-----|------------|-----------------------|
| | | | TID | CID | | |
| CATALYST | Three way catalyst function | P0420 | 01H | 81H | Min. | 1/128 |
| | | P0420 | 02H | 81H | Min. | 1 |
| EVAP SYSTEM | EVAP control system (Small leak) | P0442 | 05H | 03H | Max. | 1/128 mm ² |
| | EVAP control system purge flow monitoring | P0441 | 06H | 83H | Min. | 20 mV |
| | EVAP control system (Very small leak) | P0456 | 07H | 03H | Max. | 1/128 mm ² |
| HO2S | Air fuel ratio (A/F) sensor 1 | P0131 | 41H | 8EH | Min. | 5mV |
| | | P0132 | 42H | 0EH | Max. | 5mV |
| | | P2A00 | 43H | 0EH | Max. | 0.002 |
| | | P2A00 | 44H | 8EH | Min. | 0.002 |
| | | P0130 | 46H | 0EH | Max. | 5mV |
| | | P0130 | 47H | 8EH | Min. | 5mV |
| | | P0133 | 45H | 8EH | Min. | 0.004 |
| | | P0133 | 48H | 8EH | Min. | 0.004 |
| | Heated oxygen sensor 2 | P0139 | 19H | 86H | Min. | 10mV/500 ms |
| | | P0137 | 1AH | 86H | Min. | 10 mV |
| | | P0138 | 1BH | 06H | Max. | 10 mV |
| | | P0138 | 1CH | 06H | Max. | 10mV |
| HO2S HEATER | A/F sensor 1 heater | P0032 | 57H | 10H | Max. | 5 mV |
| | | P0031 | 58H | 90H | Min. | 5 mV |
| | Heated oxygen sensor 2 heater | P0038 | 2DH | 0AH | Max. | 20 mV |
| | | P0037 | 2EH | 8AH | Min. | 20 mV |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

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SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:000000001344428

SYSTEM — BASIC ENGINE CONTROL SYSTEM

| | | SYMPTOM | | | | | | | | | | | | Reference page | |
|---|---------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-------------------|--|
| | | 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) |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Fuel | Fuel pump circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 3 | | 2 | EC-933 |
| | Fuel pressure regulator system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | | | EC-1006 |
| | Fuel injector circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-930 |
| | Evaporative emission system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | EC-607 |
| Air | Positive crankcase ventilation system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | | EC-948 |
| | Incorrect idle speed adjustment | | | | | | 1 | 1 | 1 | 1 | | 1 | | | EC-547 |
| | Electric throttle control actuator | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | | 2 | | 2 | EC-891, EC-897 |
| Ignition | Incorrect ignition timing adjustment | 3 | 3 | 1 | 1 | 1 | | 1 | 1 | | | 1 | | | EC-547 |
| | Ignition circuit | 1 | 1 | 2 | 2 | 2 | | 2 | 2 | | | 2 | | | EC-937 |
| Main power supply and ground circuit | | 2 | 2 | 3 | 3 | 3 | | 3 | 3 | | 2 | 3 | | | EC-657 |
| Mass air flow sensor circuit | | 1 | | | 2 | | | | | | | | | | EC-675, EC-675 |
| Engine coolant temperature sensor circuit | | | | | | | 3 | | | 3 | | | | | EC-689, EC-695 |
| Air fuel ratio (A/F) sensor 1 circuit | | | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-702, EC-706, EC-709, EC-712, EC-913 |
| Throttle position sensor circuit | | | | | | | 2 | | | 2 | | | | | EC-692, EC-750, EC-854, EC-856, EC-906 |
| Accelerator pedal position sensor circuit | | | | 3 | 2 | 1 | | | | | | | | | EC-899, EC-902, EC-909 |
| Knock sensor circuit | | | | 2 | | | | | | | | 3 | | | EC-758 |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

| | SYMPTOM | | | | | | | | | | | | | Reference page |
|--|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|--|
| | 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) | |
| Warranty symptom code | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Crankshaft position sensor (POS) circuit | 2 | 2 | | | | | | | | | | | | EC-760 |
| Camshaft position sensor (PHASE) circuit | 3 | 2 | | | | | | | | | | | | EC-764 |
| Vehicle speed signal circuit | | 2 | 3 | | 3 | | | | | | 3 | | | EC-831 |
| Power steering pressure sensor circuit | | 2 | | | | | 3 | 3 | | | | | | EC-837 |
| ECM | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | EC-839 , EC-841 |
| Intake valve timing control solenoid valve circuit | | 3 | 2 | | 1 | 3 | 2 | 2 | 3 | | 3 | | | EC-673 |
| PNP switch circuit | | | 3 | | 3 | | 3 | 3 | | | 3 | | | EC-846 |
| Refrigerant pressure sensor circuit | | 2 | | | | 3 | | | 3 | | 4 | | | EC-949 |
| Electrical load signal circuit | | | | | | | 3 | | | | | | | EC-928 |
| Air conditioner circuit | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | 2 | HAC-83 |
| ABS actuator and electric unit (control unit) | | | 4 | | | | | | | | | | | BRC-53 |

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

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| | | SYMPTOM | | | | | | | | | | | | | Reference page | | |
|-----------------------|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|---------------------------------|----------------------------|---------------------------|-----------------------------|--|---|--|
| | | 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 | OVERHEATSWATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) | | | |
| Warranty symptom code | | A A | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | | | |
| Fuel | Fuel tank | 5 | 5 | | | | | | | | | | | | FL-10 | | |
| | Fuel piping | | | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-36 | | |
| | Vapor lock | | | | | | | | | | | | | | | — | |
| | Valve deposit | | | | | | | | | | | | | | | — | |
| | Poor fuel (Heavy weight gasoline, Low octane) | 5 | | | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | — | |
| Air | Air duct | | | | | | | | | | | | | | EM-26 | | |
| | Air cleaner | | | | | | | | | | | | | | EM-25 | | |
| | Air leakage from air duct (Mass air flow sensor — electric throttle control actuator) | 5 | 5 | 5 | | 5 | 5 | 5 | | | | 5 | | | EM-26 | | |
| | Electric throttle control actuator | | | 5 | | 5 | | | 5 | | | | | | EM-26 | | |
| | Air leakage from intake manifold/Collector/Gasket | | | | | | | | | | | | | | EM-26 | | |
| Cranking | Battery | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | | 1 | PG-132 | | |
| | Generator circuit | | | | | | | | | | | | | | CHG-5 | | |
| | Starter circuit | 3 | | | | | | | | | | 1 | | | STR-6 | | |
| | Signal plate | 6 | | | | | | | | | | | | | EM-72 | | |
| | PNP switch | 4 | | | | | | | | | | | | | TM-302 or TM-20 | | |
| Engine | Cylinder head | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-64 | | |
| | Cylinder head gasket | | | | | | | | | | | | 4 | | 5 | 3 | |
| | Cylinder block | | | | | | | | | | | | | | | | |
| | Piston | | | | | | | | | | | | 4 | | | | |
| | Piston ring | 6 | 6 | 6 | 6 | 6 | | 6 | 6 | | | 6 | | | EM-75 | | |
| | Connecting rod | | | | | | | | | | | | | 6 | | | |
| | Bearing | | | | | | | | | | | | | | | | |
| Crankshaft | | | | | | | | | | | | | | | | | |

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

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| | | SYMPTOM | | | | | | | | | | | | | Reference page |
|--|--|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|--|
| | | 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) | |
| Warranty symptom code | | A A | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Valve mecha- nism | Timing chain | | | | | | | | | | | | | | EM-52 |
| | Camshaft | | | | | | | | | | | | | | EM-41 |
| | Intake valve timing control | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-52 |
| | Intake valve | | | | | | | | | | | | | 3 | EM-52 |
| | Exhaust valve | | | | | | | | | | | | | | |
| Exhaust | Exhaust manifold/Tube/Muffler/ Gasket | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-30, EX-6 |
| | Three way catalyst | | | | | | | | | | | | | | |
| Lubrica- tion | Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-32, LU-12, LU-11, LU-15 |
| | Oil level (Low)/Filthy oil | | | | | | | | | | | | | | LU-9 |
| Cooling | Radiator/Hose/Radiator filler cap | | | | | | | | | | | | | | CO-15 |
| | Thermostat | | | | | | | | | 5 | | | | | CO-20 |
| | Water pump | | | | | | | | | | | | | | CO-18 |
| | Water gallery | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | 4 | 5 | | | CO-7 |
| | Cooling fan | | | | | | | | | | | | | | CO-17 |
| | Coolant level (Low)/Contaminat- ed coolant | | | | | | | | | | 5 | | | | CO-11 |
| NVIS (NISSAN Vehicle Immobilizer System — NATS) | | 1 | 1 | | | | | | | | | | | | SEC-8 |

1 - 6: The numbers refer to the order of inspection.

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[QR25DE EXCEPT FOR CALIFORNIA]

NORMAL OPERATING CONDITION

Description

INFOID:000000001344429

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 1,800 rpm under no load (for example, the selector lever position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-562](#), "[System Description](#)".

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PRECAUTIONS

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[QR25DE EXCEPT FOR CALIFORNIA]

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000001344430

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 SRC and SB section of this Service Manual.

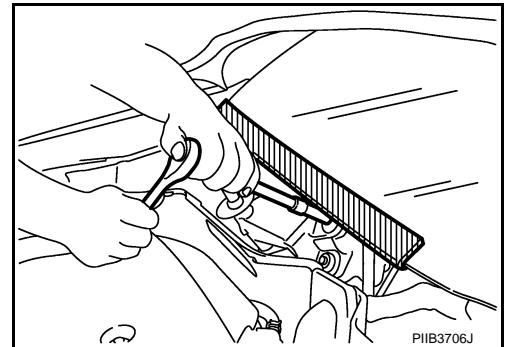
WARNING:

- 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 SRC 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.

Precaution for Procedure without Cowl Top Cover

INFOID:000000001344431

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions For Xenon Headlamp Service

INFOID:000000001344432

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.).

PRECAUTIONS

< PRECAUTION >

[QR25DE EXCEPT FOR CALIFORNIA]

On Board Diagnostic (OBD) System of Engine and CVT

INFOID:000000001344433

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

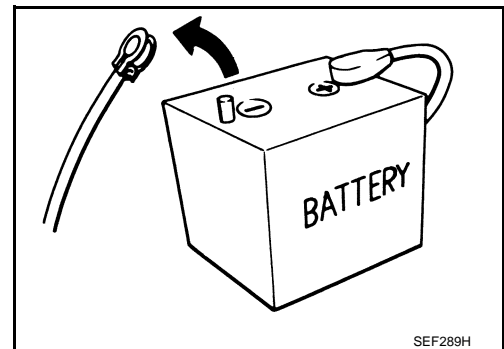
CAUTION:

- Be sure 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 light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up 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-locking type harness connector. For description and how to disconnect, refer to [PG-124, "Description"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

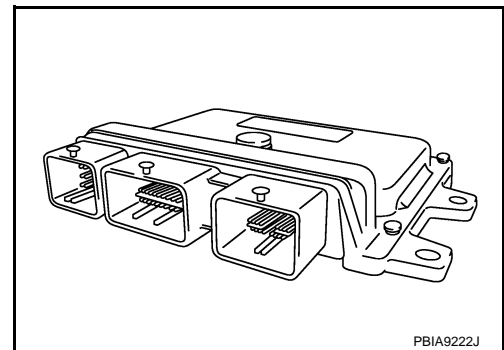
General Precautions

INFOID:000000001344434

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- 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.



- Do not 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. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not 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



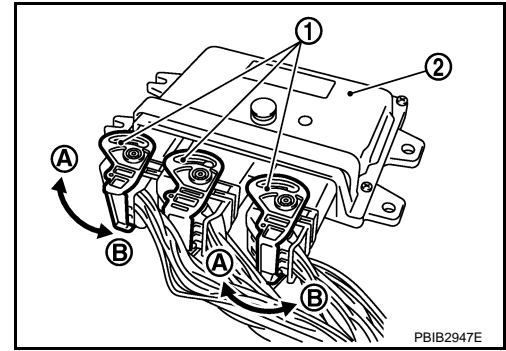
PRECAUTIONS

[QR25DE EXCEPT FOR CALIFORNIA]

< PRECAUTION >

- When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.

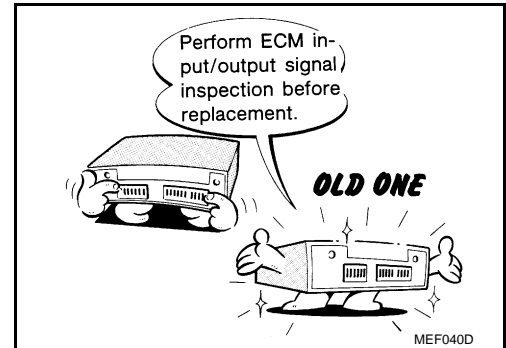
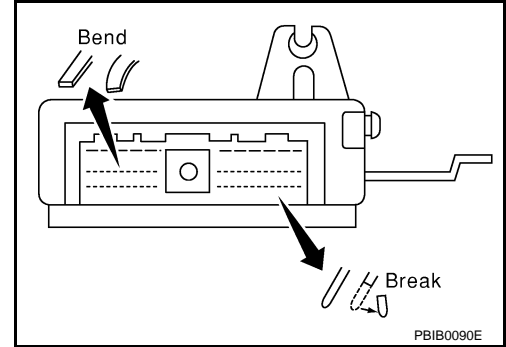
- 2. ECM
- A. Loosen



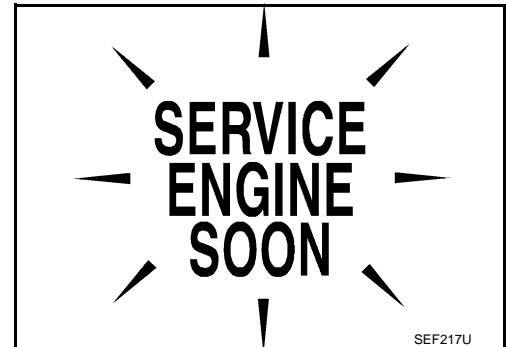
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).

Make sure 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 make sure ECM functions properly. Refer to [EC-951, "Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not 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.

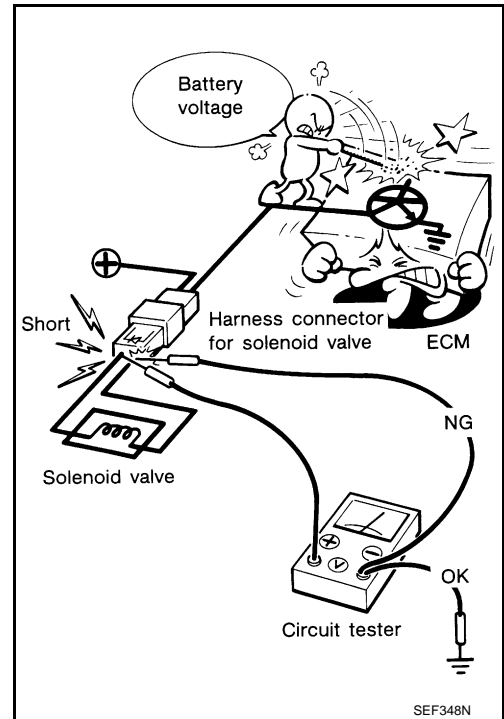


PRECAUTIONS

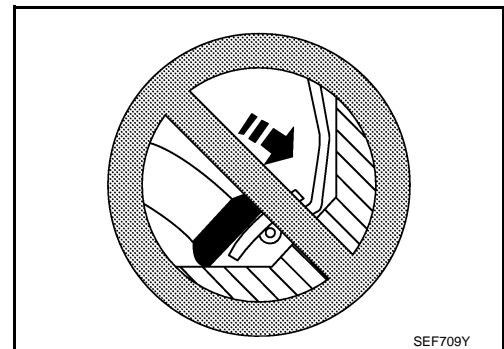
[QR25DE EXCEPT FOR CALIFORNIA]

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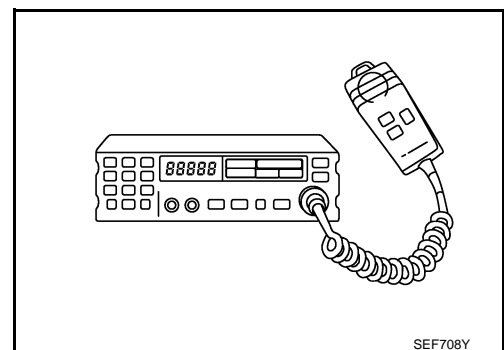
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.
- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



- 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. Do not 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.



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PREPARATION

< PREPARATION >

[QR25DE EXCEPT FOR CALIFORNIA]

PREPARATION

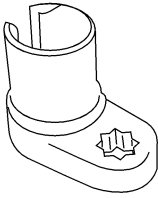
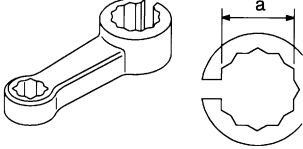
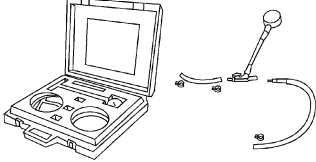
PREPARATION

Special Service Tools

INFOID:000000001344435

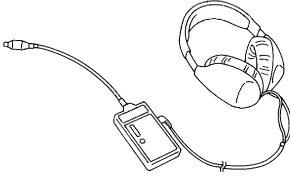
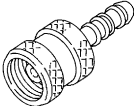
NOTE:

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | Description |
|---|---|
| (J-44626) Air fuel ratio (A/F) sensor wrench  LEM054 | Loosening tightening air fuel ratio (A/F) sensor 1 |
| KV10114400 (J-38365) Heated oxygen sensor wrench  S-NT636 | Loosening or tightening heated oxygen sensor 2 a: 22 mm (0.87 in) |
| (J-44321) Fuel pressure gauge kit  LEC642 | Checking fuel pressure |

Commercial Service Tools


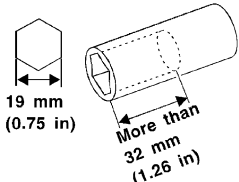
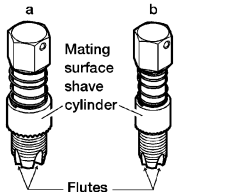

INFOID:000000001344436

| Tool name (Kent-Moore No.) | Description |
|---|--|
| Leak detector i.e.: (J-41416)  S-NT703 | Locating the EVAP leak |
| EVAP service port adapter i.e.: (J-41413-OBD)  S-NT704 | Applying positive pressure through EVAP service port |

PREPARATION

< PREPARATION >

[QR25DE EXCEPT FOR CALIFORNIA]

| Tool name (Kent-Moore No.) | Description | A |
|---|--|-------------|
| Fuel filler cap adapter i.e.: (MLR-8382) <div style="text-align: center;">  <p>S-NT815</p> </div> | Checking fuel tank vacuum relief valve opening pressure | EC C |
| Socket wrench <div style="text-align: center;">  <p>S-NT705</p> </div> | Removing and installing engine coolant temperature sensor | D E |
| Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;">  <p>AEM488</p> </div> | Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor | F G H |
| Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) <div style="text-align: center;">  <p>S-NT779</p> </div> | Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads. | I J K |

ON-VEHICLE MAINTENANCE

FUEL PRESSURE

Inspection

INFOID:000000001344437

FUEL PRESSURE RELEASE

④ 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 two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

⊗ With CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three 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 L32 models do not have fuel return system.
- Use Fuel Pressure Gauge Kit (J-44321) to check fuel pressure.

1. Release fuel pressure to zero.
2. Connect fuel tube (B) adapter to quick connector.

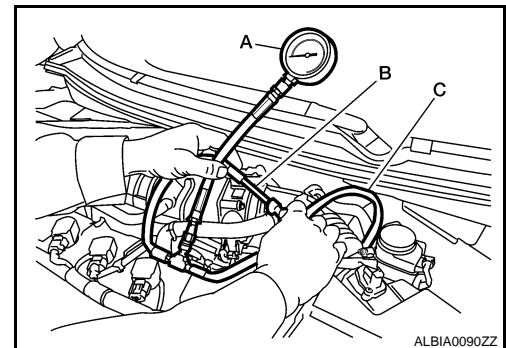
A : Fuel pressure gauge

C : Fuel feed hose

3. Turn ignition switch ON and check for fuel leakage.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idling : Approximately 350 kPa (3.57 kg/cm², 51 psi)

6. If result is unsatisfactory, check fuel hoses and fuel tubes for clogging.
If OK, Replace "fuel filter and fuel pump assembly".
If NG, Repair or replace.



EVAP LEAK CHECK

< ON-VEHICLE MAINTENANCE >

[QR25DE EXCEPT FOR CALIFORNIA]

EVAP LEAK CHECK

Inspection

INFOID:000000001344438

CAUTION:

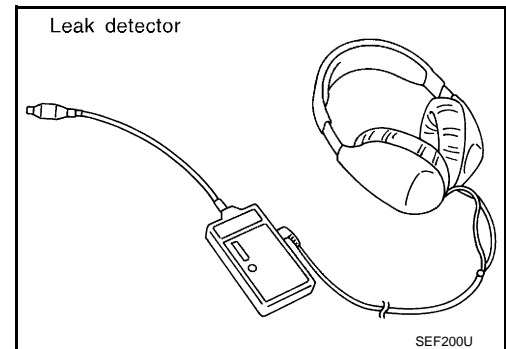
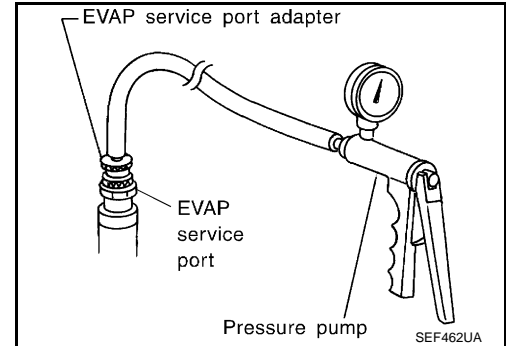
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

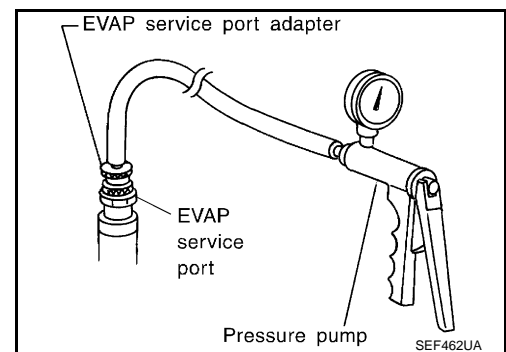
Ⓟ WITH CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port.
2. Turn ignition switch ON.
3. 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.
6. Remove EVAP service port adapter and hose with pressure pump.
7. Locate the leak using a leak detector. Refer to [EC-607, "System Diagram"](#).



ⓧ WITHOUT CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter 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.
3. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
4. Remove EVAP service port adapter and hose with pressure pump.



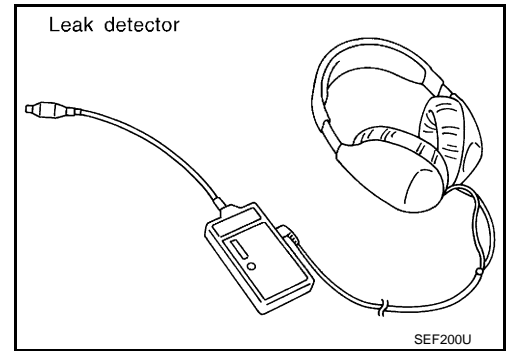
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EVAP LEAK CHECK

< ON-VEHICLE MAINTENANCE >

[QR25DE EXCEPT FOR CALIFORNIA]

5. Locate the leak using a leak detector. Refer to [EC-607. "System Diagram"](#).

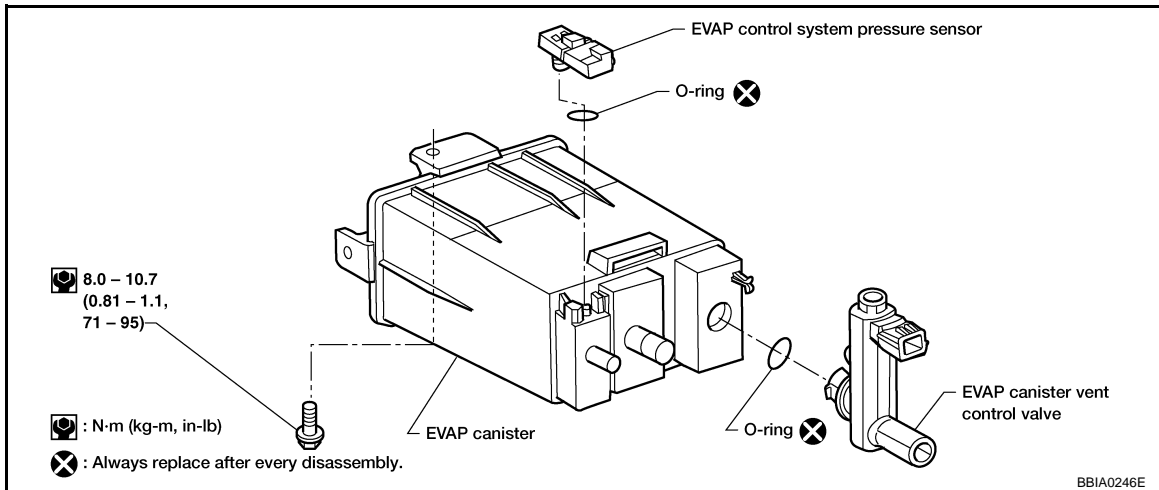


ON-VEHICLE REPAIR

EVAP CANISTER

Exploded View

INFOID:000000001344439



Removal and Installation

INFOID:000000001344440

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:

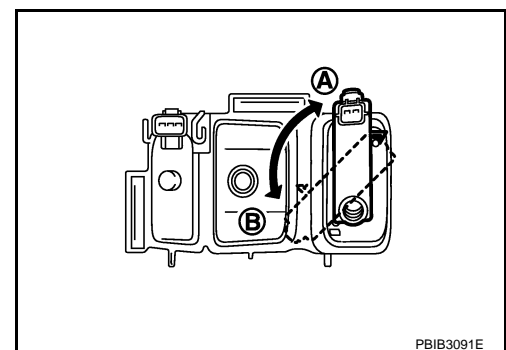
Tighten EVAP canister fixing bolt to the specified torque.

DISASSEMBLY

1. Turn EVAP canister vent control valve counterclockwise.

- A : Lock
- B : Unlock

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.

EVAP CANISTER

< ON-VEHICLE REPAIR >

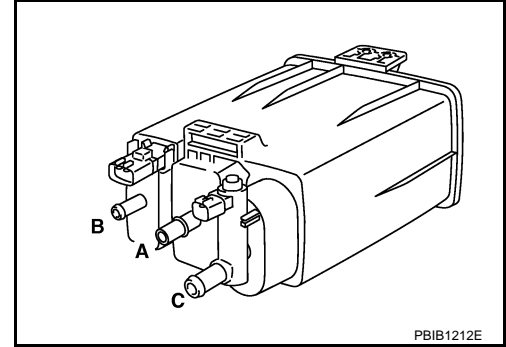
[QR25DE EXCEPT FOR CALIFORNIA]

Inspection

INFOID:000000001344441

Check EVAP canister as follows:

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.



PBIB1212E

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE EXCEPT FOR CALIFORNIA]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:0000000001686164

| Transmission | Condition | Specification |
|--------------|--------------------------------|---------------|
| CVT | No load* (in P or N position) | 650 ± 50 rpm |
| M/T | No load* (in Neutral position) | 650 ± 50 rpm |

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Timing

INFOID:0000000001686165

| Transmission | Condition | Specification |
|--------------|--------------------------------|---------------|
| CVT | No load* (in P or N position) | 15 ± 5° BTDC |
| M/T | No load* (in Neutral position) | 15 ± 5° BTDC |

*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:0000000001686166

| Condition | Specification (Using CONSULT-III or GST) |
|--------------|--|
| At idle | 10 – 35 % |
| At 2,500 rpm | 10 – 35 % |

Mass Air Flow Sensor

INFOID:0000000001686167

| | |
|--|--|
| Supply voltage | Battery voltage (11 – 14 V) |
| Output voltage at idle | 0.8 – 1.2V* |
| Mass air flow (Using CONSULT-III or GST) | 1.0 – 4.0 g-m/sec at idle* 4.0 – 10.0 g-m/sec at 2,500 rpm* |

*: Engine is warmed up to normal operating temperature and running under no load.

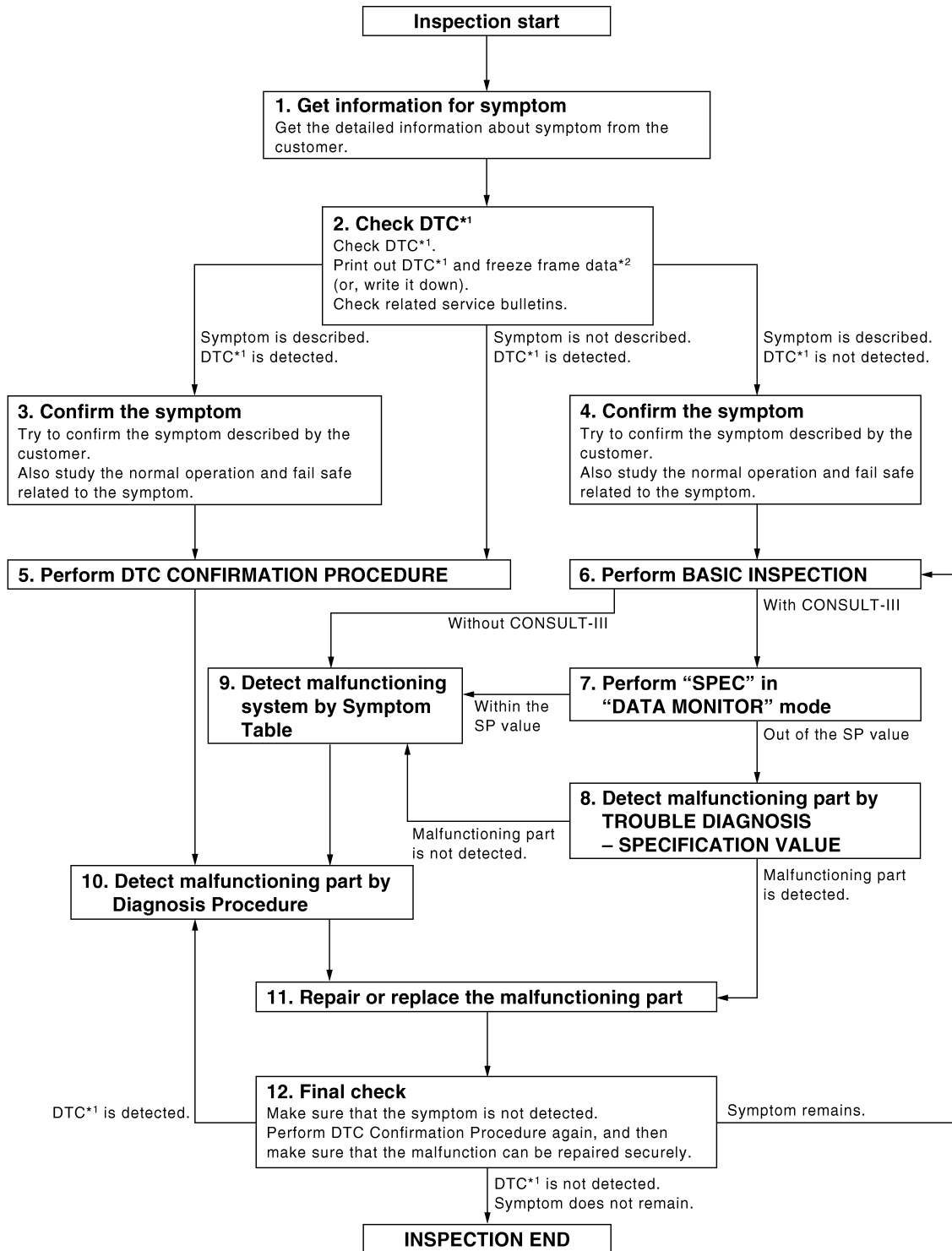
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001343152

OVERALL SEQUENCE



*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< 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 [EC-1015, "Diagnostic Work Sheet"](#).)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-1110, "Diagnosis Description"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-1513, "Symptom Table"](#).)
3. Check related service bulletins for information.

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.

Symptom is not described, DTC is displayed>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON).

Also study the normal operation and fail safe related to the symptom. Refer to [EC-1517, "Description"](#) and [EC-1498, "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-1517, "Description"](#) and [EC-1498, "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 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-1500, "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [GI-11, "Description"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-1016, "BASIC INSPECTION : Special Repair Requirement"](#).

Do you have CONSULT-III?

DIAGNOSIS AND REPAIR WORKFLOW

[VQ35DE]

< BASIC INSPECTION >

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

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

④ With CONSULT-III

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL", and "A/F ALPHA-B1", "A/F ALPHA-B2" are within the SP value using CONSULT-III in "SPEC" of "DATA MONITOR" mode. Refer to [EC-1135, "Component Function Check"](#).

Are they within the SP value?

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

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-1136, "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 [EC-1513, "Symptom Table"](#) 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 [GI-11, "Description"](#).

Is malfunctioning part detected?

YES >> GO TO 11.
NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT-III. Refer to [EC-1458, "Reference Value"](#).

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 [EC-1110, "Diagnosis Description"](#).

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Overall Function Check again, and then make sure that the malfunction have been repaired securely.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure 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, make sure to erase unnecessary DTC in ECM and TCM (Transmission Control Module). (Refer to [EC-1110, "Diagnosis Description"](#).) If the completion of SRT is needed, drive vehicle under the specific DRIVING PATTERN in [EC-1505, "How to Set SRT Code"](#).

INSPECTION AND ADJUSTMENT

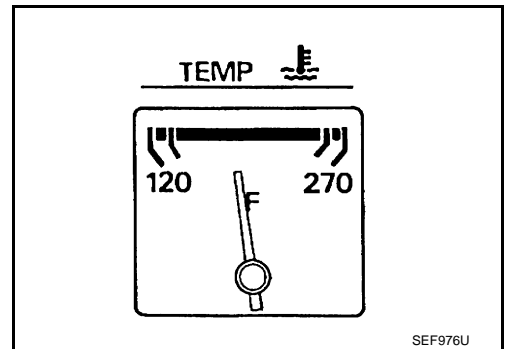
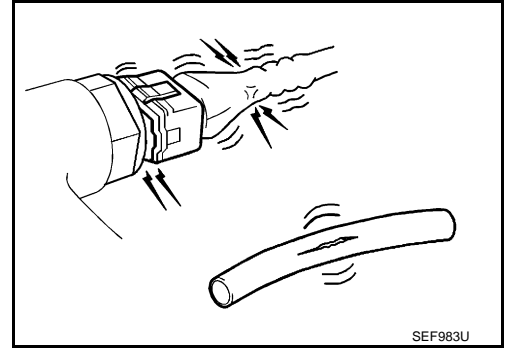
BASIC INSPECTION

BASIC INSPECTION : Special Repair Requirement

INFOID:000000001343154

1.INSPECTION START

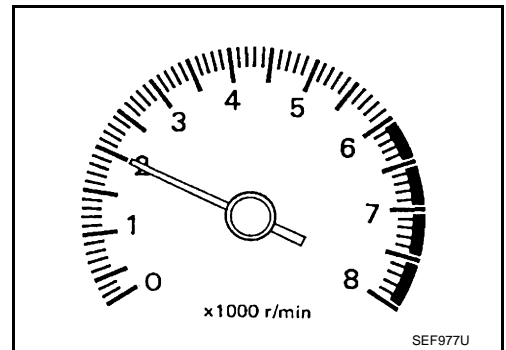
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses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



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

Is any DTC 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

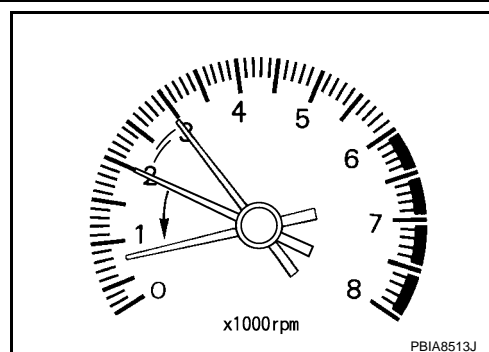
1. Run engine at about 2,000 rpm for about 2 minutes under no load.

INSPECTION AND ADJUSTMENT

[VQ35DE]

< BASIC INSPECTION >

- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed.
For procedure, refer to [EC-1020, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-1531, "Idle Speed"](#).



Is the inspection result normal?

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

4.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

5.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 6.

6.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 7.
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

7.CHECK TARGET IDLE SPEED AGAIN

- Start engine and warm it up to normal operating temperature.
- Check idle speed.
For procedure, refer to [EC-1020, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-1531, "Idle Speed"](#).

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART

Check the Following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1255, "Diagnosis Procedure"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1251, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 9.
NO >> 1. Repair or replace.
2. GO TO 4.

9.CHECK ECM FUNCTION

- Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 4.

10.CHECK IGNITION TIMING

- Run engine at idle.

INSPECTION AND ADJUSTMENT

[VQ35DE]

< BASIC INSPECTION >

2. Check ignition timing with a timing light.
For procedure, refer to [EC-1020, "IGNITION TIMING : Special Repair Requirement"](#).
For specification, refer to [EC-1531, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 19.
NO >> GO TO 11.

11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 12.

12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 13.

13.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-1022, "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 TARGET IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
For procedure, refer to [EC-1020, "IDLE SPEED : Special Repair Requirement"](#).
For specification, refer to [EC-1531, "Idle Speed"](#).

Is the inspection result normal?

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

15.CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
For procedure, refer to [EC-1020, "IGNITION TIMING : Special Repair Requirement"](#).
For specification, refer to [EC-1531, "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-163, "Installation"](#).

Is the inspection result normal?

- YES >> GO TO 17.
NO >> 1. Repair the timing chain installation.
2. GO TO 4.

17.DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1255, "Diagnosis Procedure"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1251, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 18.
NO >> 1. Repair or replace.

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VQ35DE]

2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

19. INSPECTION END

Did you replace ECM, referring this Basic Inspection procedure?

Yes or No

Yes >> Go to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

No >> **INSPECTION END**

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000001343155

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:000000001343156

1. PERFORM INITIALIZATION OF NVIS (NATS) SYSTEM AND REGISTRATION OF ALL NVIS (NATS) IGNITION KEY IDS

Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM VIN REGISTRATION

Refer to [SEC-11, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 4.

4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

5. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

IDLE SPEED

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VQ35DE]

IDLE SPEED : Description

INFOID:000000001343157

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

IDLE SPEED : Special Repair Requirement

INFOID:000000001343158

1.CHECK IDLE SPEED

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

INFOID:000000001343159

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

IGNITION TIMING : Special Repair Requirement

INFOID:000000001343160

1.CHECK IGNITION TIMING

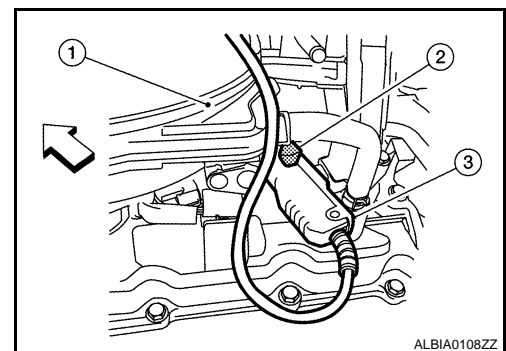
1. Slide the harness protector of ignition coil No.1 (2) to clear the wires.

1 : Intake manifold collector

3 : Timing light pick-up lead

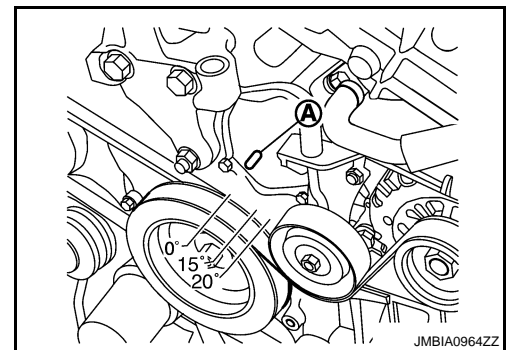
← : Vehicle front

2. Attach timing light to the ignition coil No.1 wires as shown in the figure.



3. Check ignition timing.
A: Timing indicator

>> INSPECTION END



VIN REGISTRATION

VIN REGISTRATION : Description

INFOID:000000001343161

VIN Registration is an operation to registering 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).

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VQ35DE]

VIN REGISTRATION : Special Repair Requirement

INFOID:000000001343162

1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-22, "Identification Number - Sedan"](#) or [GI-23, "Identification Number - Coupe"](#).

>> GO TO 2.

2.PERFORM VIN REGISTRATION

With CONSULT-III

1. Turn ignition switch ON and engine stopped.
2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
3. Follow the instruction of CONSULT-III display.

>> END

ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOID:000000001343163

Accelerator Pedal Released Position Learning is an operation 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 harness connector of accelerator pedal position sensor or ECM is disconnected.

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement INFOID:000000001343164

1.START

1. Make sure 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 INFOID:000000001343165

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

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement INFOID:000000001343166

1.START

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

>> END

IDLE AIR VOLUME LEARNING

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VQ35DE]

IDLE AIR VOLUME LEARNING : Description

INFOID:000000001343167

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 any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

IDLE AIR VOLUME LEARNING : Special Repair Requirement

INFOID:000000001343168

1. PRECONDITIONING

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)
On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - CVT models
- With CONSULT-III: Drive vehicle until "ATF TEMP SE" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT-III?

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

2. PERFORM IDLE AIR VOLUME LEARNING

With CONSULT-III

1. Perform [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform [EC-1021, "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:

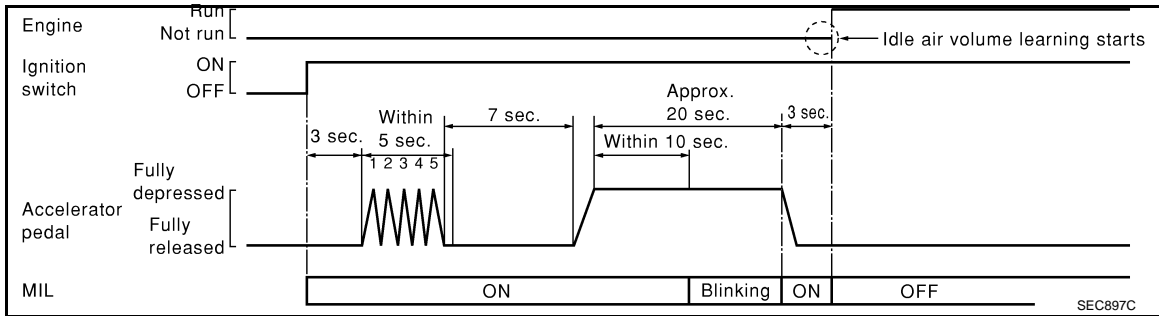
- It is better to count the time accurately with a clock.
 - It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
1. Perform [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
 2. Perform [EC-1021, "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 five times within 5 seconds.
 - Fully depress the accelerator pedal.
 - Fully release the accelerator pedal.

INSPECTION AND ADJUSTMENT

[VQ35DE]

< BASIC INSPECTION >

7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
8. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
9. Start engine and let it idle.
10. Wait 20 seconds.



>> GO TO 4.

4. CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

For procedure, refer to [EC-1020, "IDLE SPEED : Special Repair Requirement"](#) and [EC-1020, "IGNITION TIMING : Special Repair Requirement"](#).

For specification, refer to [EC-1531, "Idle Speed"](#) and [EC-1531, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART-I

Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace malfunctioning part.

6. DETECT MALFUNCTIONING PART-II

When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to [EC-1135, "Description"](#).

If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:

- Engine stalls.
- Erroneous idle.

>> INSPECTION END

MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000001343169

This describes how to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in "Diagnosis Procedure".

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000001343170

1. START

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[VQ35DE]

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear mixture ratio self-learning value by touching "CLEAR".

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
7. Select Service \$04 with GST to erase the DTC P0102.

>> END

FUNCTION DIAGNOSIS

ENGINE CONTROL SYSTEM

System Diagram

INFOID:000000001343171

A

EC

C

D

E

F

G

H

I

J

K

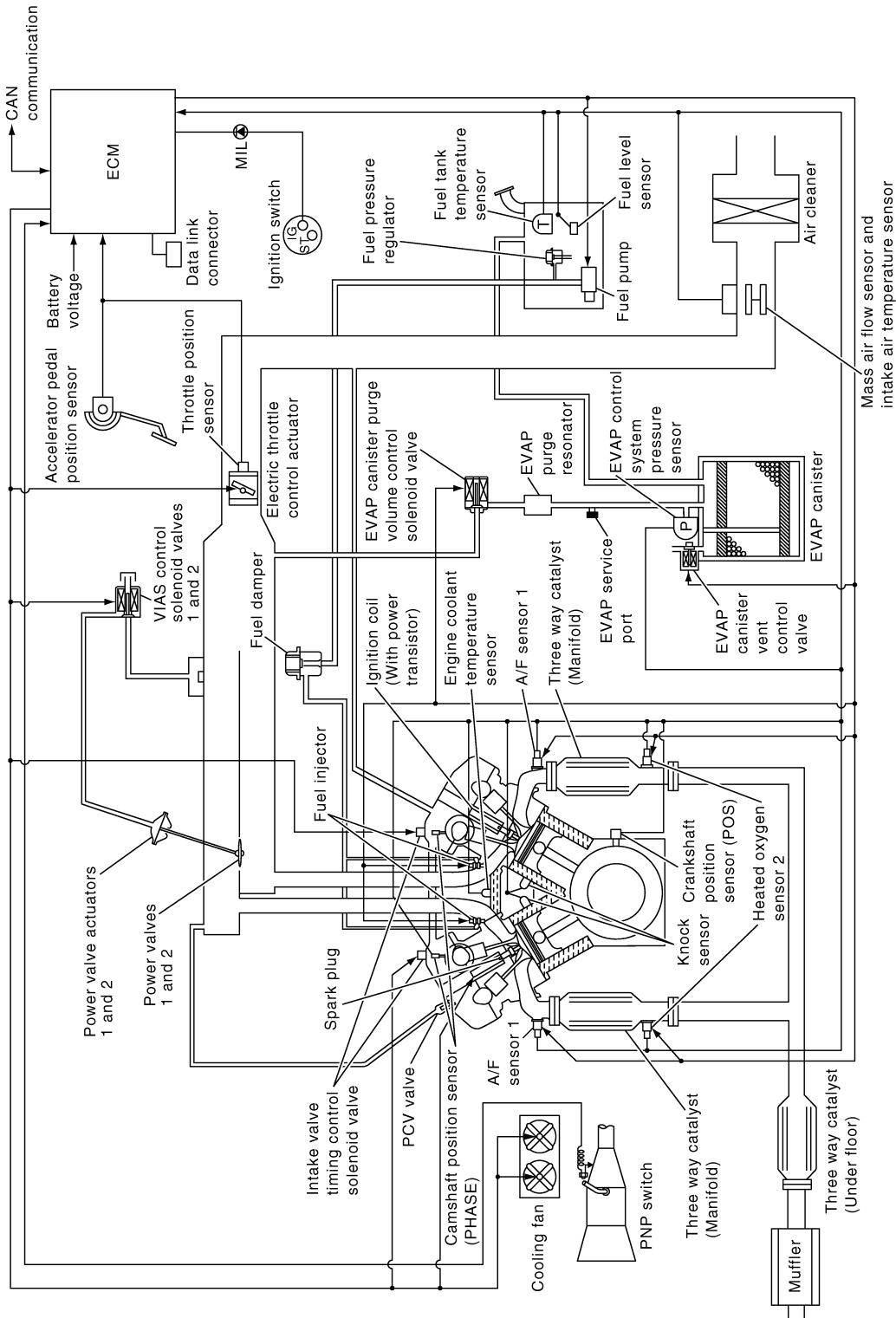
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ENGINE CONTROL SYSTEM

[VQ35DE]

< FUNCTION DIAGNOSIS >

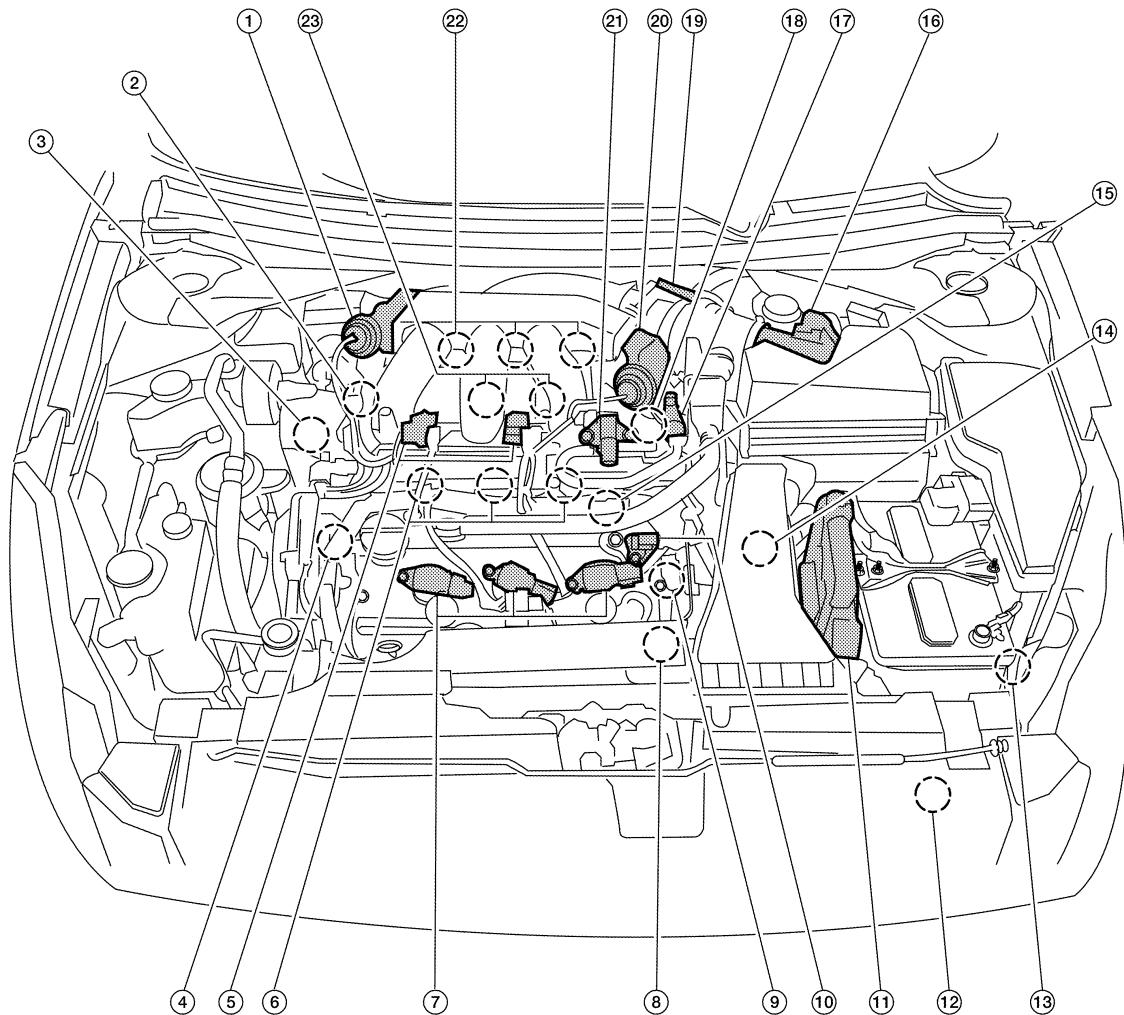
System Description

INFOID:000000001343172

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

Component Parts Location

INFOID:000000001343173



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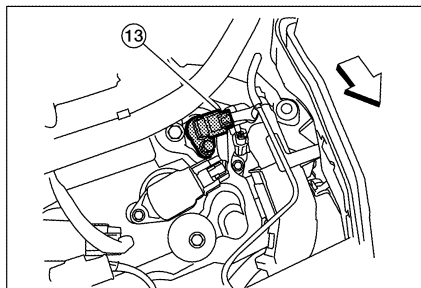
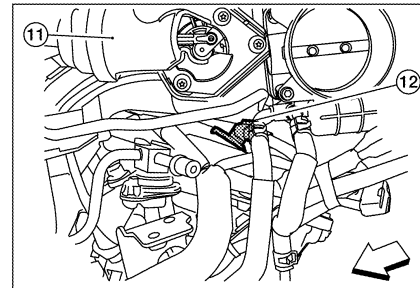
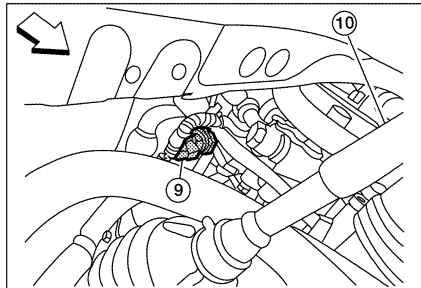
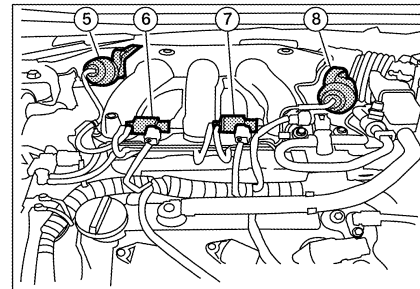
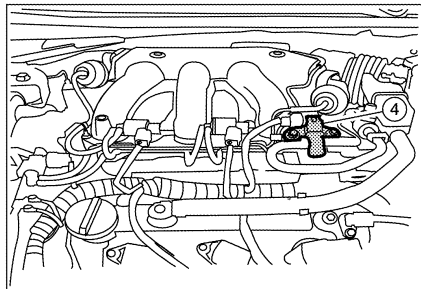
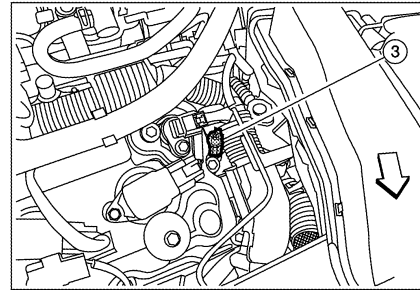
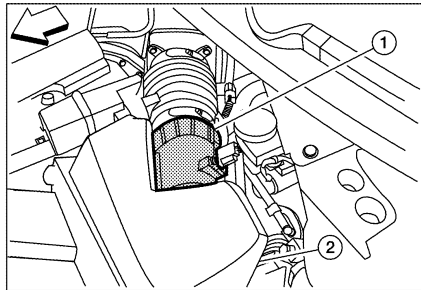
- | | | |
|--|---|--|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid | 3. Power steering pressure sensor valve (bank 1) |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |

ENGINE CONTROL SYSTEM

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< FUNCTION DIAGNOSIS >

- | | | |
|---|----------------------------|---|
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |



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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

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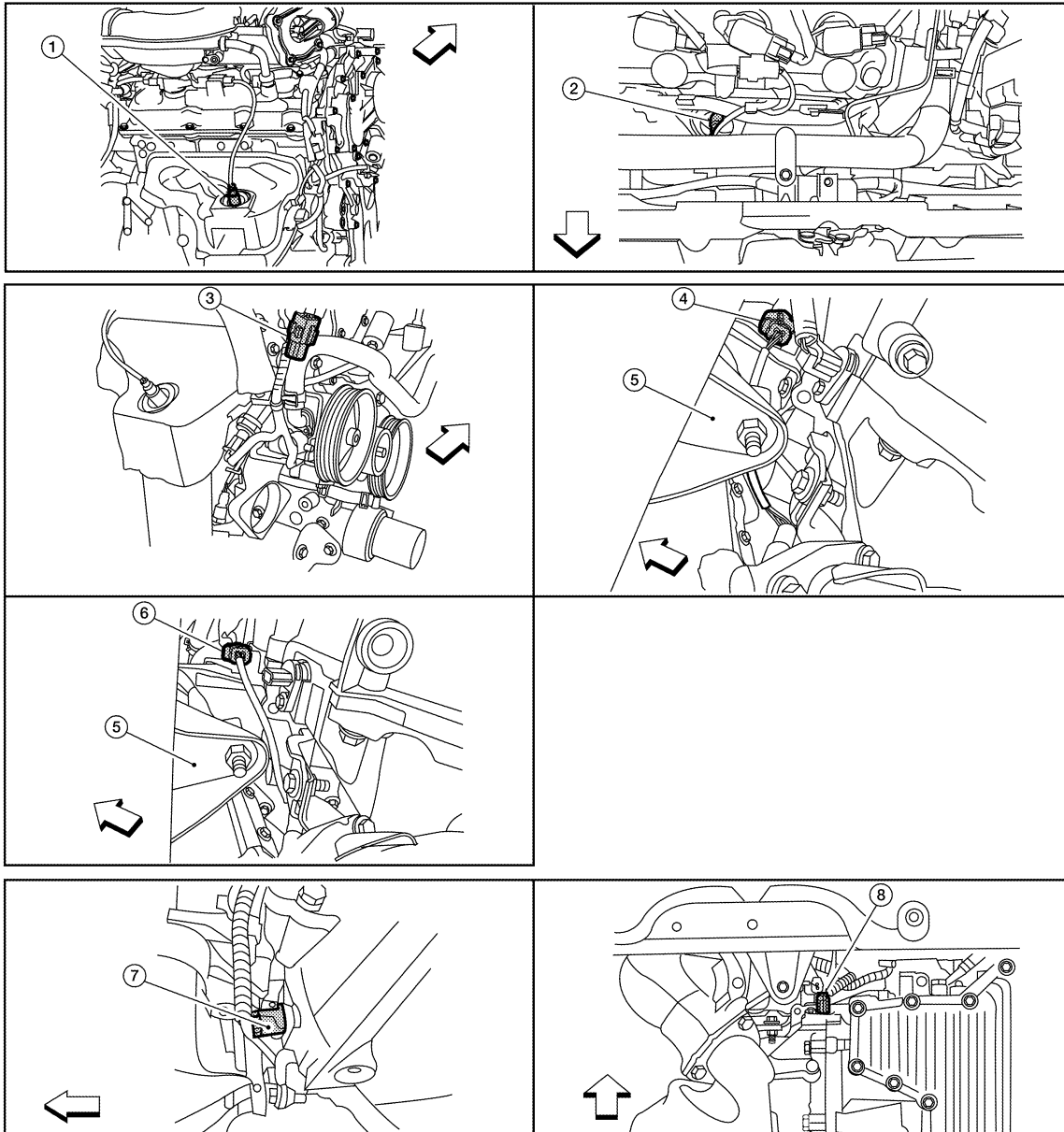
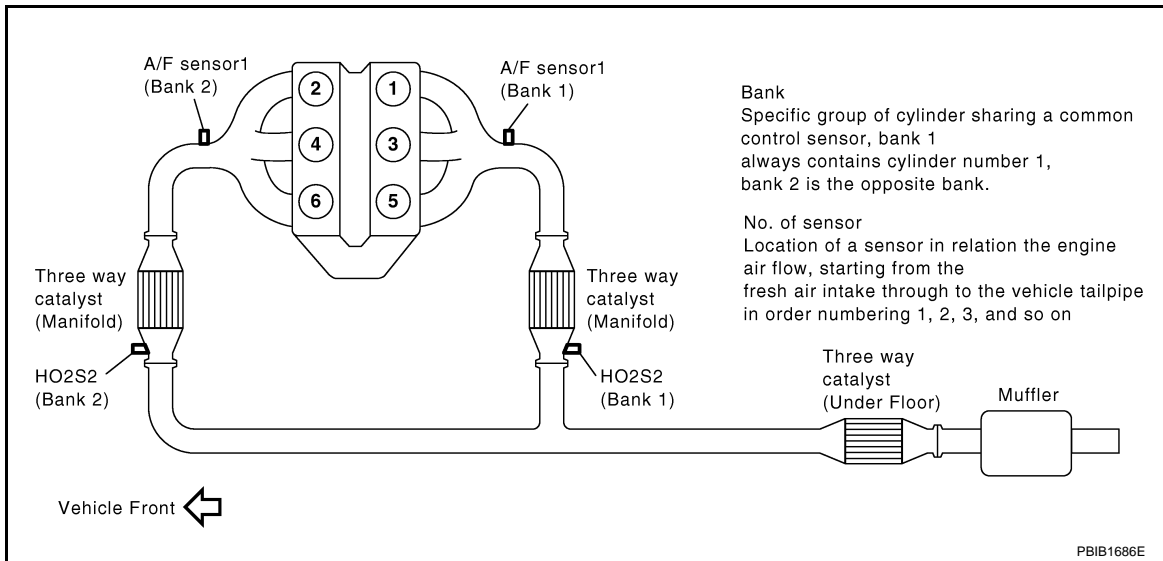
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ENGINE CONTROL SYSTEM

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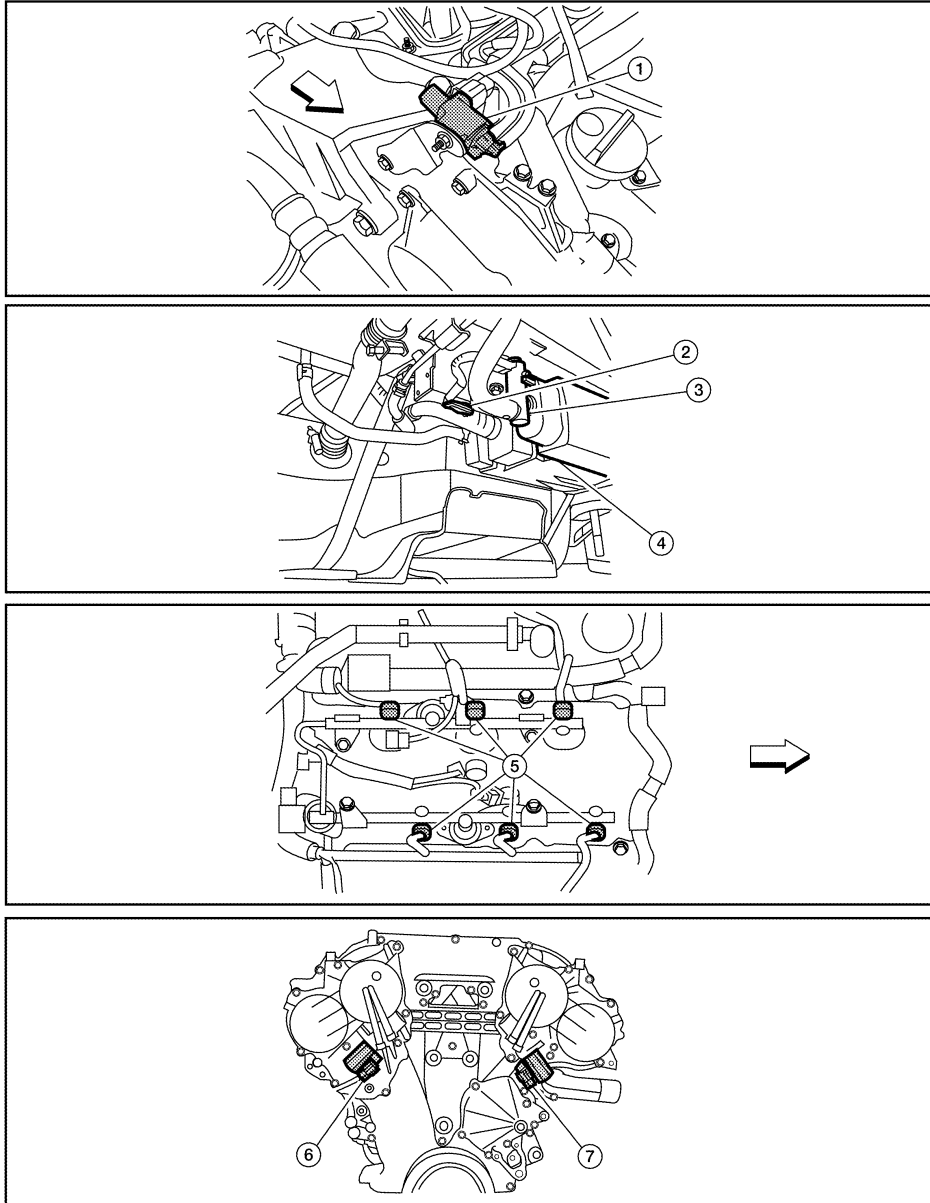
ENGINE CONTROL SYSTEM

[VQ35DE]

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

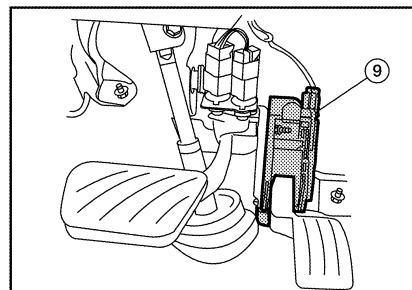
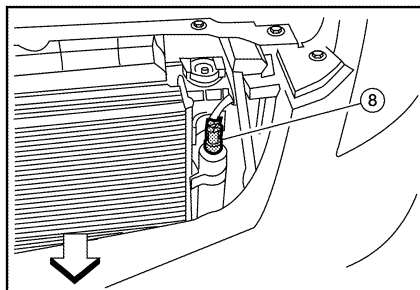
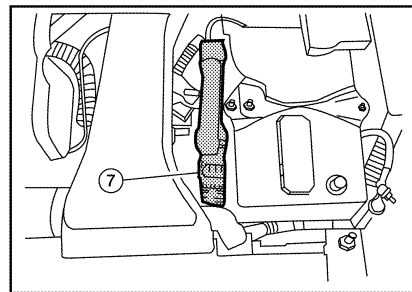
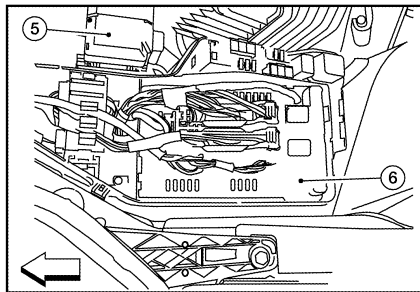
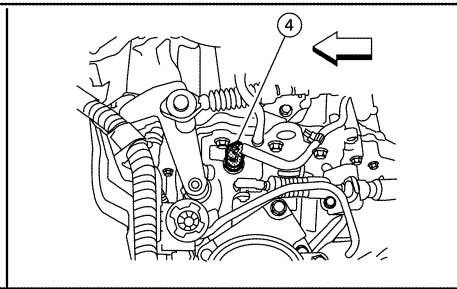
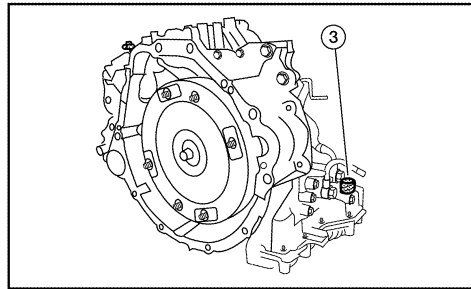
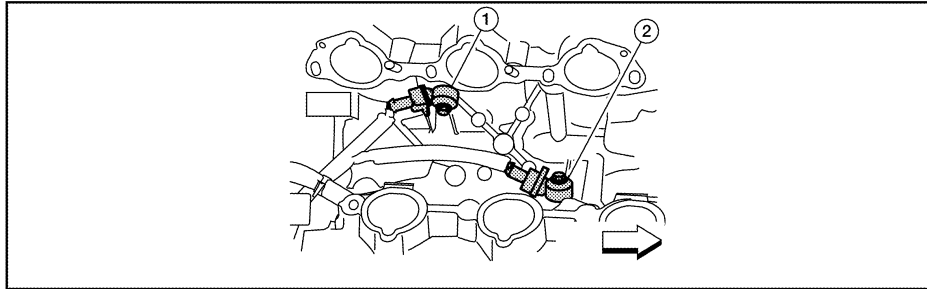
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ENGINE CONTROL SYSTEM

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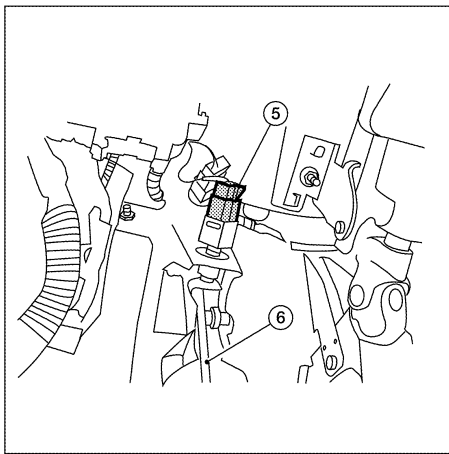
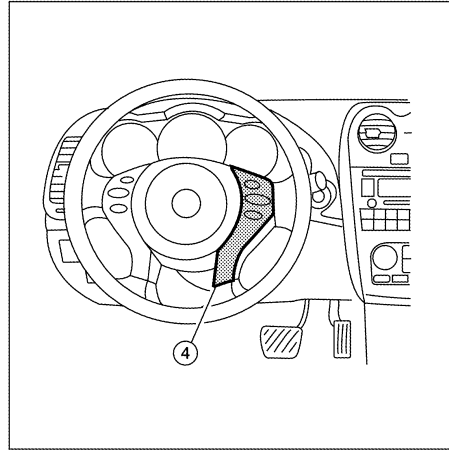
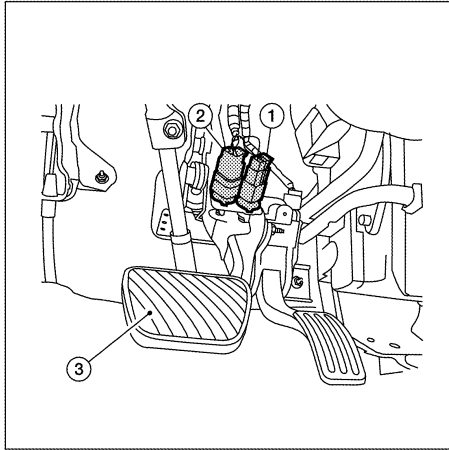
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| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

← : Vehicle front



- 1. ASCD brake switch
- 2. Stop lamp switch
- 3. Brake pedal
- 4. ASCD steering switch
- 5. ASCD clutch switch (M/T models)
- 6. Clutch pedal

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Component Description

INFOID:000000001343174

| Component | Reference |
|-----------------------------------|--|
| A/F sensor 1 | EC-1189, "Description" |
| A/F sensor 1 heater | EC-1153, "Description" |
| Accelerator pedal position sensor | EC-1409, "Description" |
| ASCD brake switch | EC-1367, "Description" |
| ASCD steering switch | EC-1364, "Description" |
| ASCD vehicle speed sensor | EC-1374, "Description" |
| Battery current sensor | EC-1352, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |

ENGINE CONTROL SYSTEM

[VQ35DE]

< FUNCTION DIAGNOSIS >

| Component | Reference |
|---|--|
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Cooling fan motor | EC-1422, "Description" |
| Electric throttle control actuator | EC-1397, "Description" |
| Electronic controlled engine mount | EC-1428, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| EVAP canister purge volume control solenoid valve | EC-1278, "Description" |
| EVAP canister vent control valve | EC-1281, "Description" |
| EVAP control system pressure sensor | EC-1289, "Description" |
| Fuel injector | EC-1431, "Description" |
| Fuel level sensor | EC-1315, "Description" |
| Fuel pump | EC-1434, "Description" |
| Fuel tank temperature sensor | EC-1232, "Description" |
| Heated oxygen sensor 2 | EC-1204, "Description" |
| Heated oxygen sensor 2 heater | EC-1156, "Description" |
| Ignition signal | EC-1438, "Description" |
| Intake air temperature sensor | EC-1173, "Description" |
| Intake valve timing control solenoid valve | EC-1159, "Description" |
| Knock sensor | EC-1247, "Description" |
| Mass air flow sensor | EC-1162, "Description" |
| Park/neutral position switch | EC-1336, "Description" |
| PCV valve | EC-1449, "Description" |
| Power steering pressure sensor | EC-1327, "Description" |
| Power valves 1 and 2 | EC-1453, "Description" |
| Refrigerant pressure sensor | EC-1450, "Description" |
| Stop lamp switch | EC-1386, "Description" |
| Throttle control motor | EC-1395, "Description" |
| Throttle control motor relay | EC-1389, "Description" |
| Throttle position sensor | EC-1406, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |
| VIAS control solenoid valve 1 | EC-1381, "Description" |
| VIAS control solenoid valve 2 | EC-1383, "Description" |

MULTIPOINT FUEL INJECTION SYSTEM

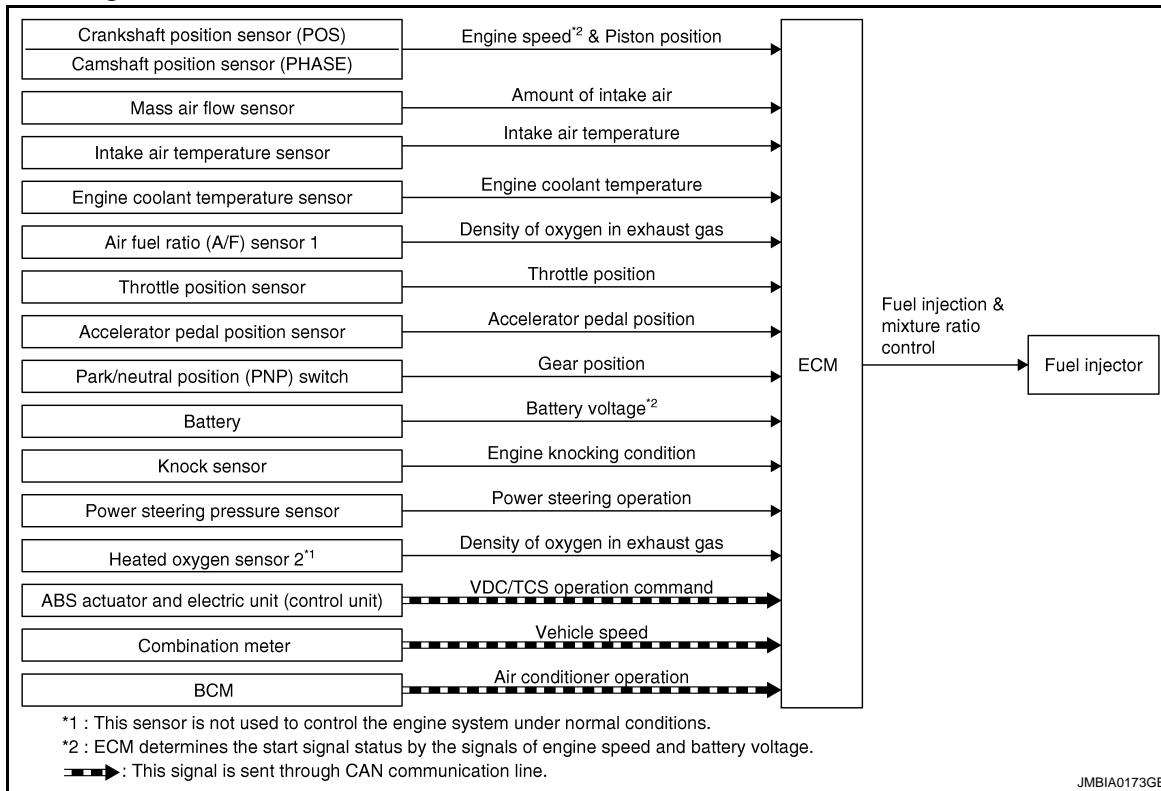
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[VQ35DE]

MULTIPOINT FUEL INJECTION SYSTEM

System Diagram

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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 Piston position | Fuel injection & mixture ratio control | Fuel injector |
| 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 | | |
| Park/neutral position (PNP) switch | Gear position | | |
| 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 | | |
| BCM | Air conditioner operation*2 | | |
| Combination meter | Vehicle speed*2 | | |

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

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

MULTIPOINT FUEL INJECTION SYSTEM

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*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.

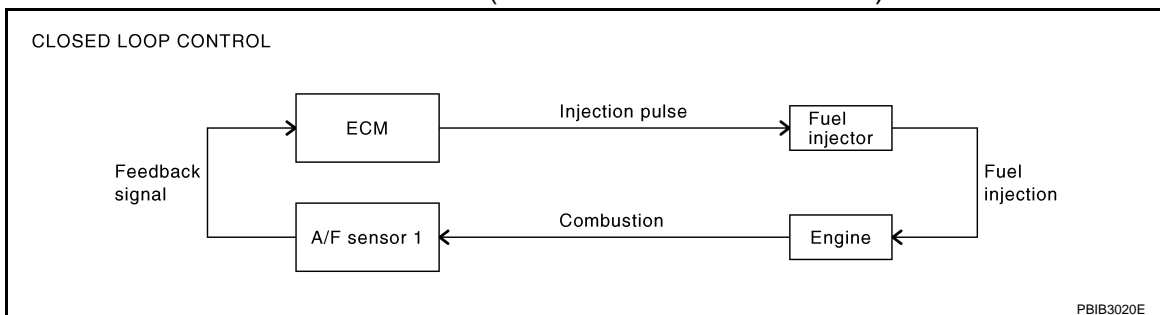
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- 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 driveability and emission control. The three way catalyst (manifold) can then 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 [EC-1189, "Description"](#). 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 control 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 (CVT models)
- 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

MULTIPOINT FUEL INJECTION SYSTEM

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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.

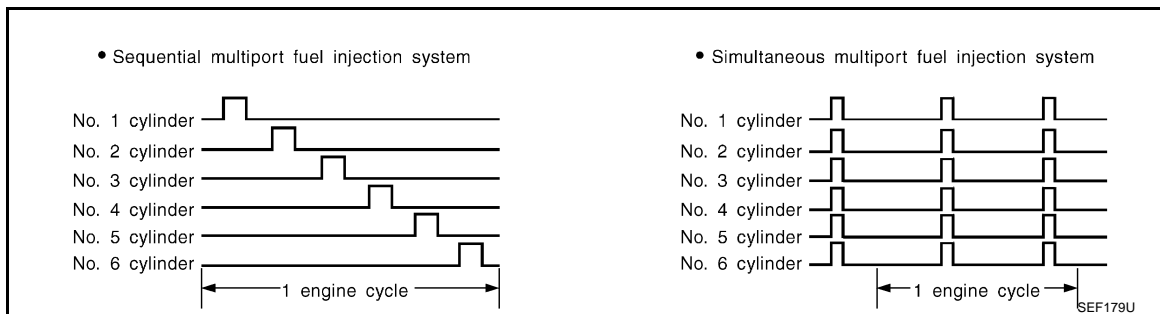
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing 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 fuel injectors will then receive the signals two 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.

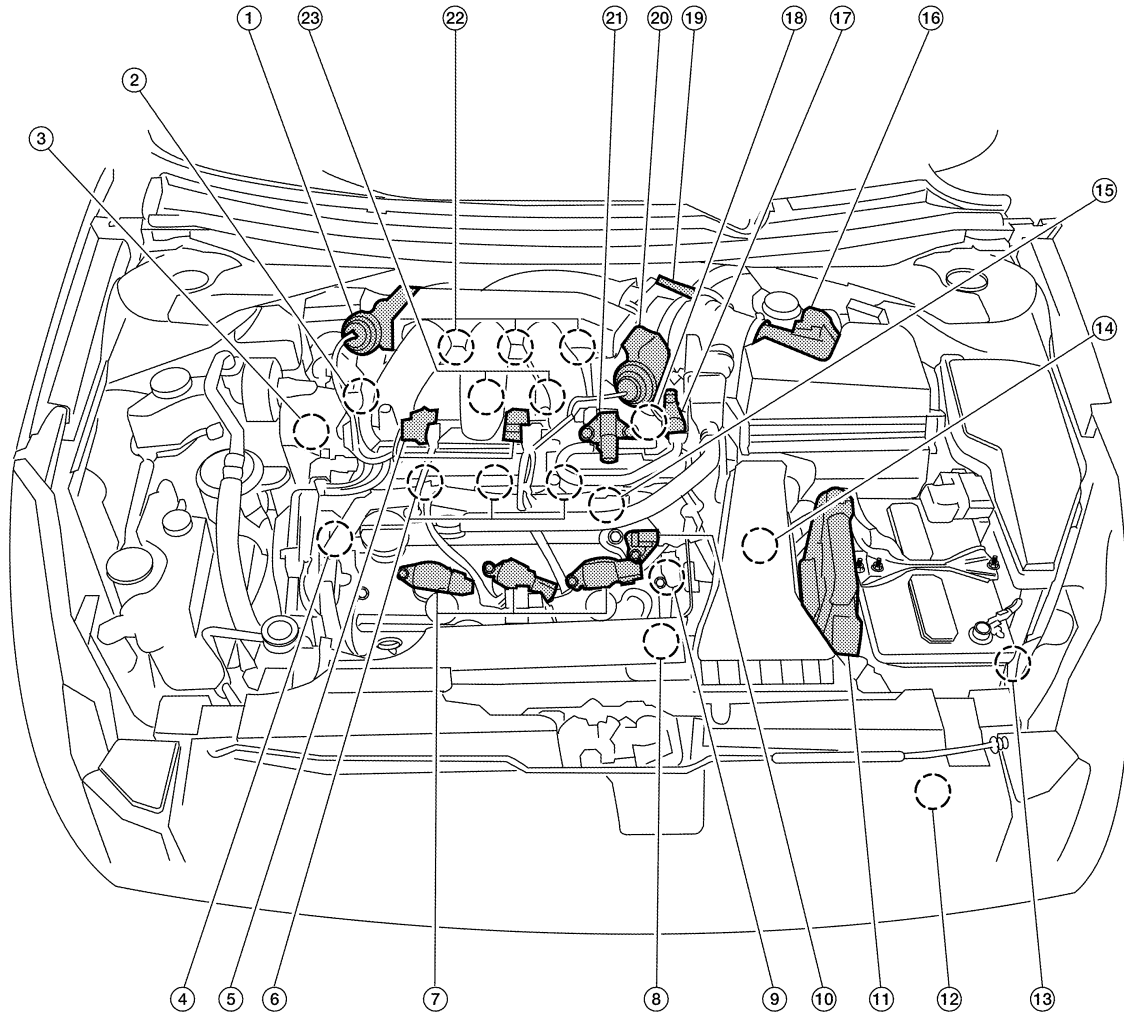
MULTIPOINT FUEL INJECTION SYSTEM

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Component Parts Location

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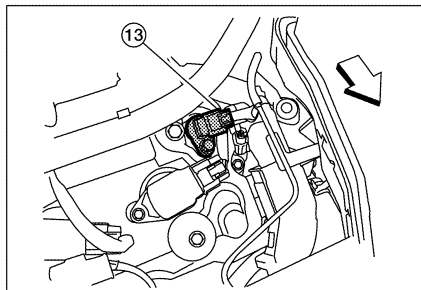
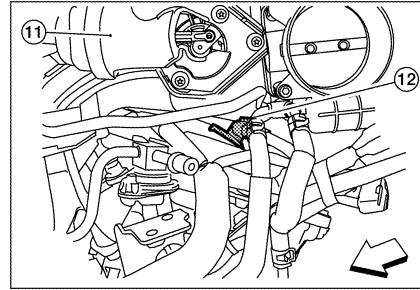
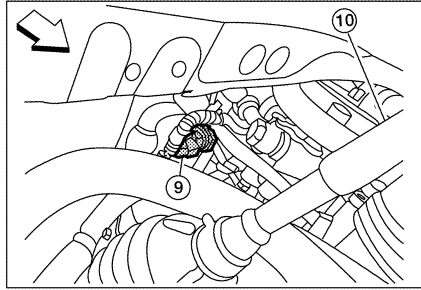
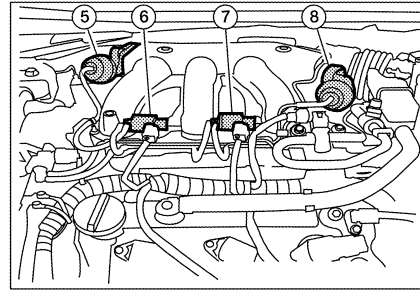
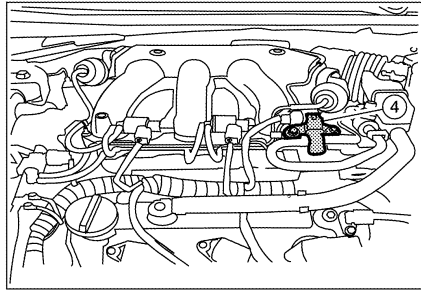
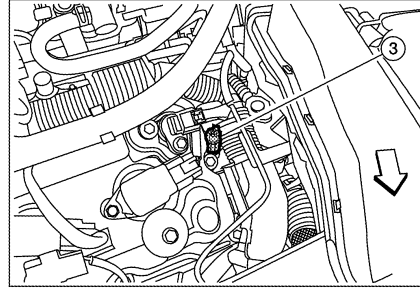
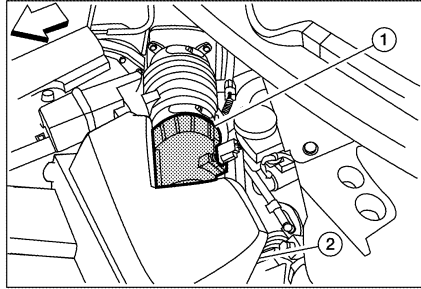
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|---|--|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

MULTIPOINT FUEL INJECTION SYSTEM

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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |
- ↙ : Vehicle front

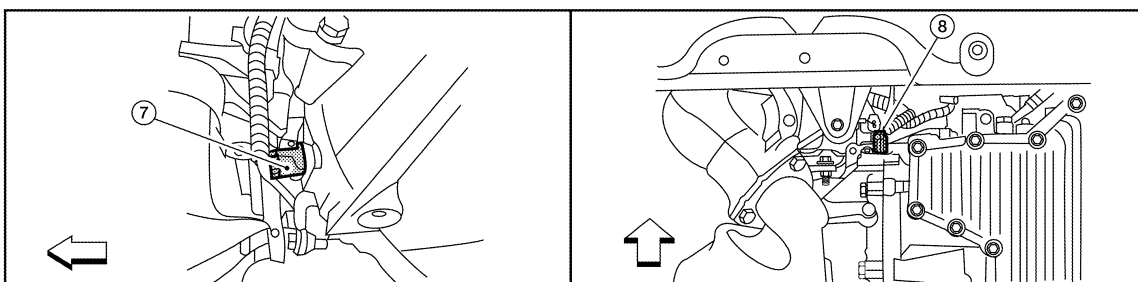
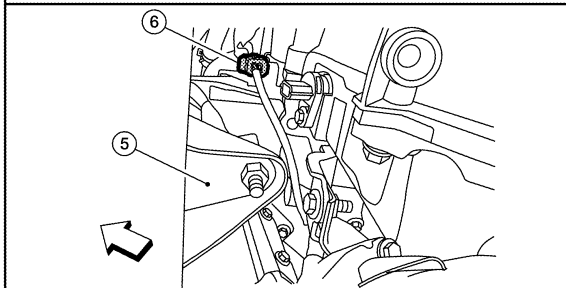
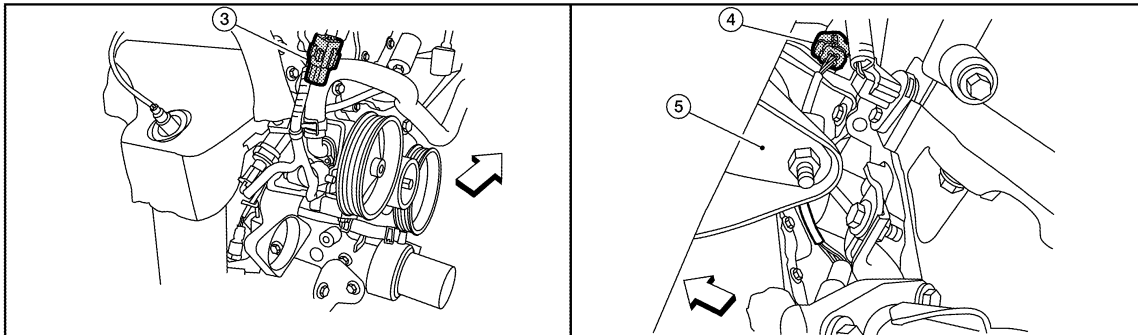
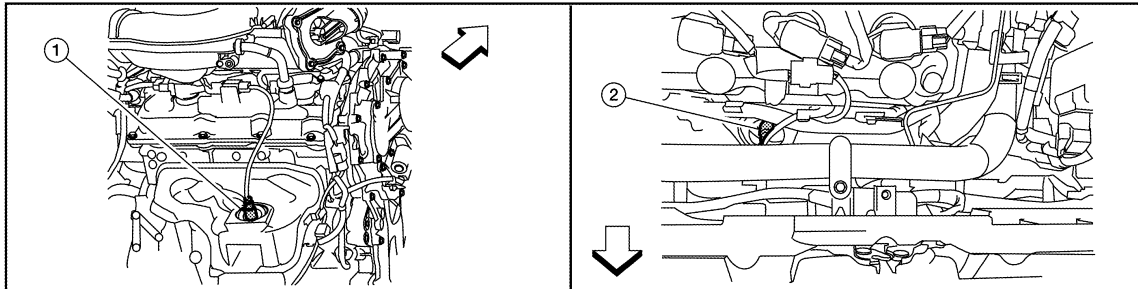
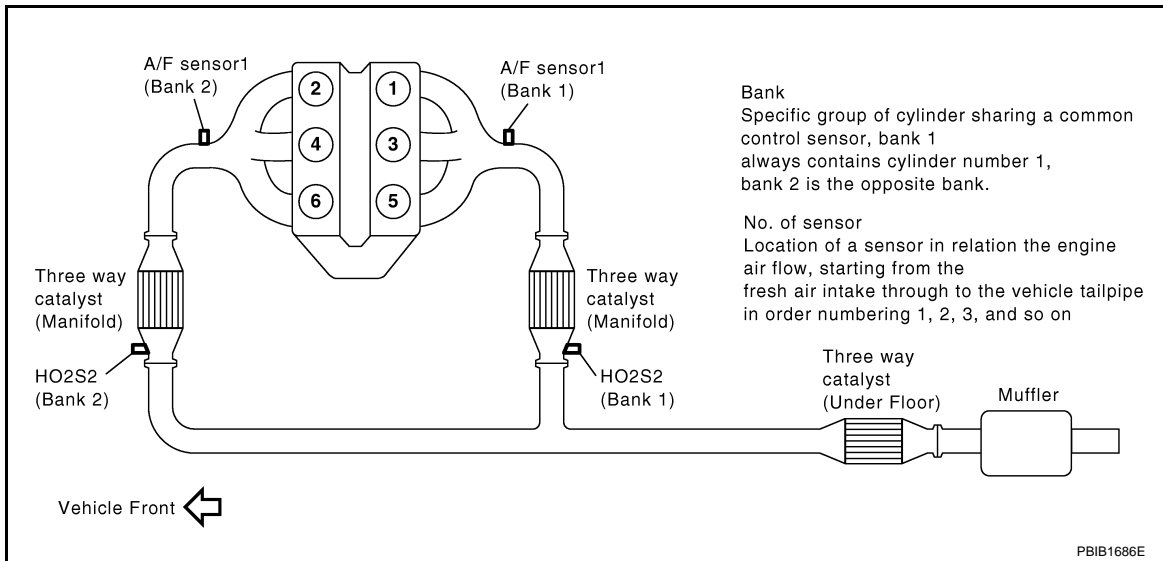
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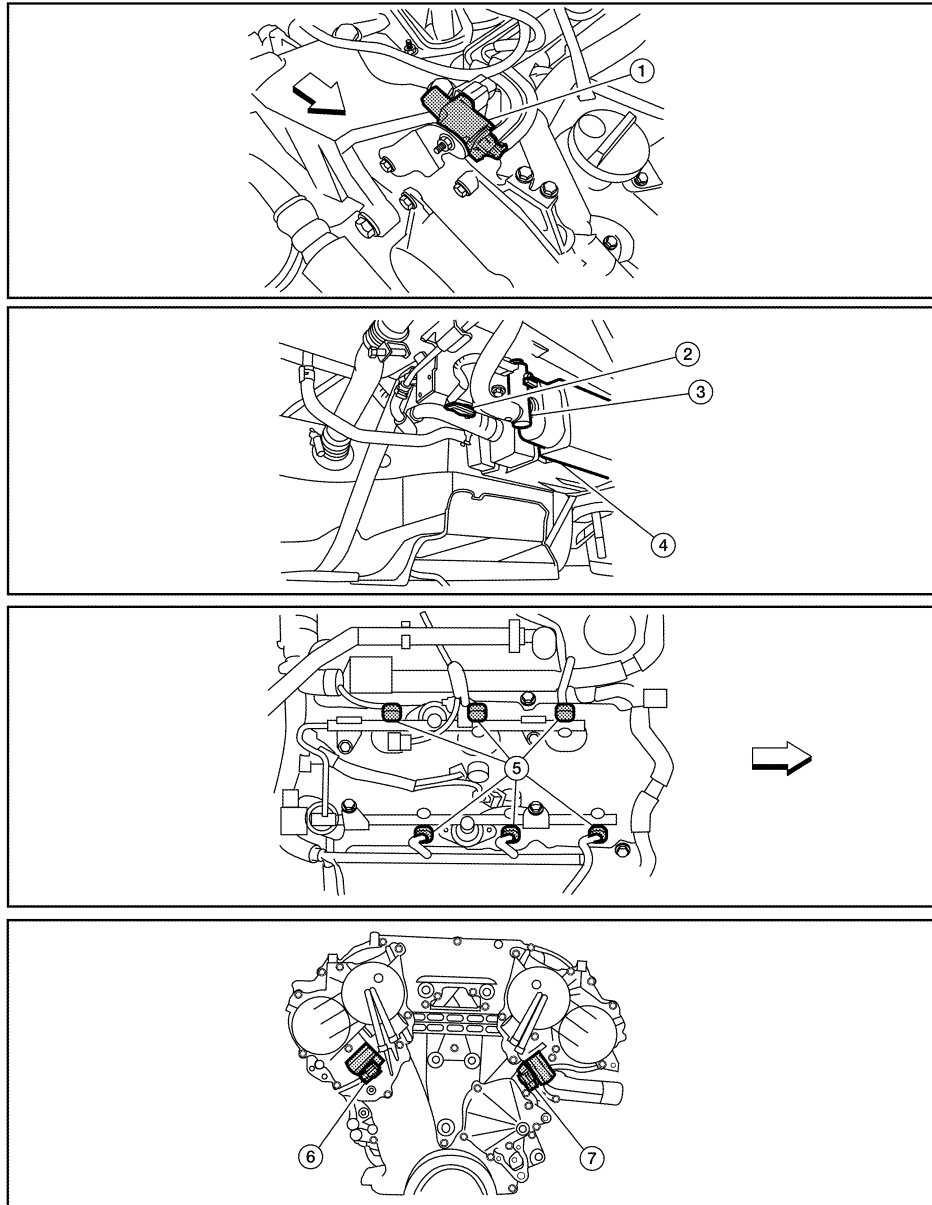
MULTIPOINT FUEL INJECTION SYSTEM

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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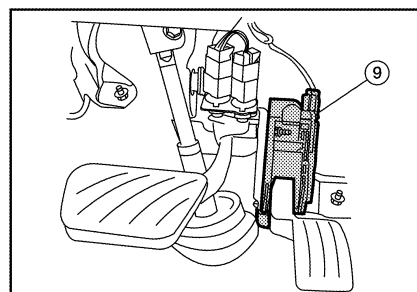
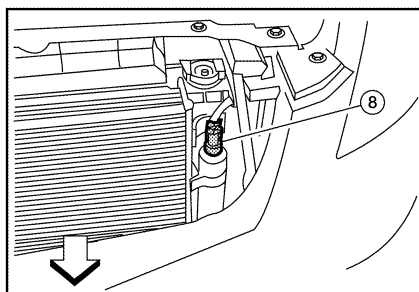
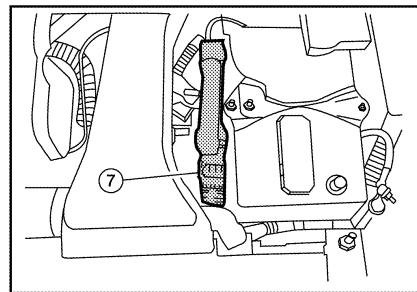
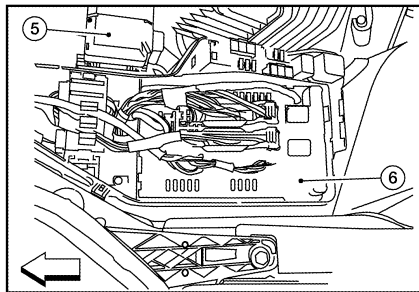
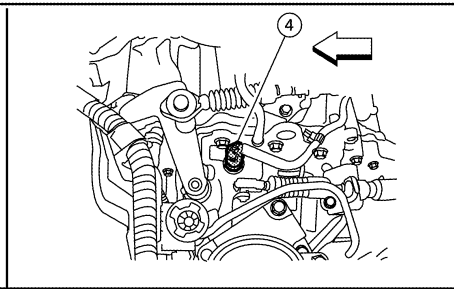
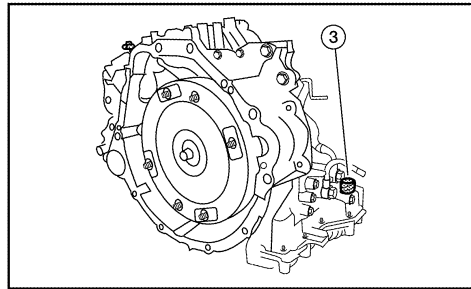
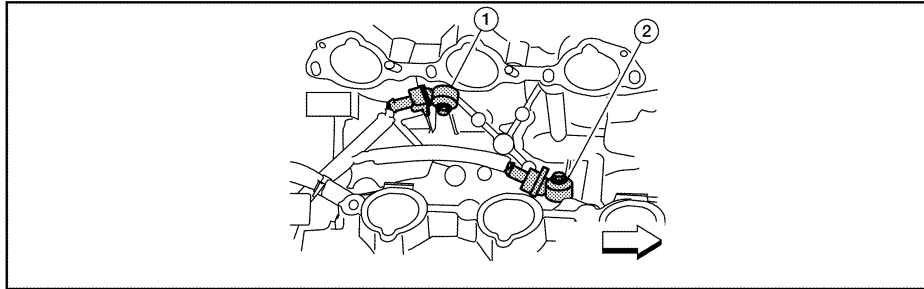
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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

MULTIPOINT FUEL INJECTION SYSTEM

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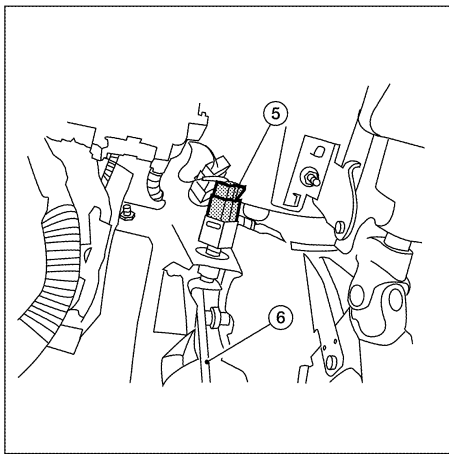
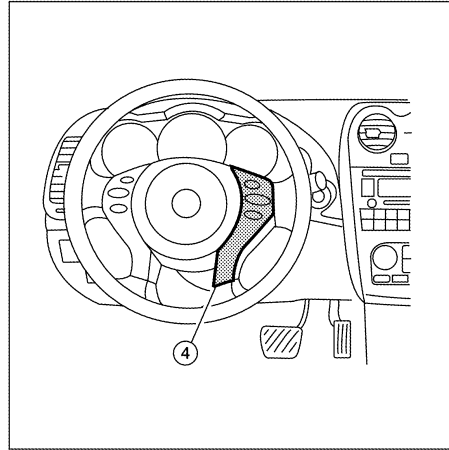
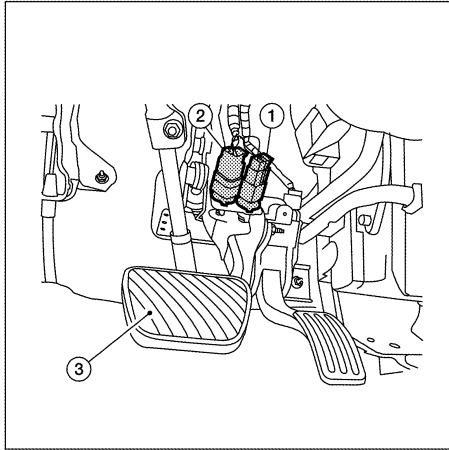
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|----------------------------|--|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

← : Vehicle front

MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

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|-------------------------|------------------------------------|-----------------|
| 1. ASCD brake switch | 2. Stop lamp switch | 3. Brake pedal |
| 4. ASCD steering switch | 5. ASCD clutch switch (M/T models) | 6. Clutch pedal |

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Component Description

INFOID:000000001343178

| Component | Reference |
|-----------------------------------|--|
| A/F sensor 1 | EC-1189, "Description" |
| Accelerator pedal position sensor | EC-1153, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| Fuel injector | EC-1431, "Description" |
| Heated oxygen sensor 2 | EC-1204, "Description" |
| Intake air temperature sensor | EC-1173, "Description" |

MULTIPOINT FUEL INJECTION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Component | Reference |
|--------------------------------|--|
| Knock sensor | EC-1247, "Description" |
| Mass air flow sensor | EC-1162, "Description" |
| Park/neutral position switch | EC-1336, "Description" |
| Power steering pressure sensor | EC-1327, "Description" |
| Throttle position sensor | EC-1406, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |

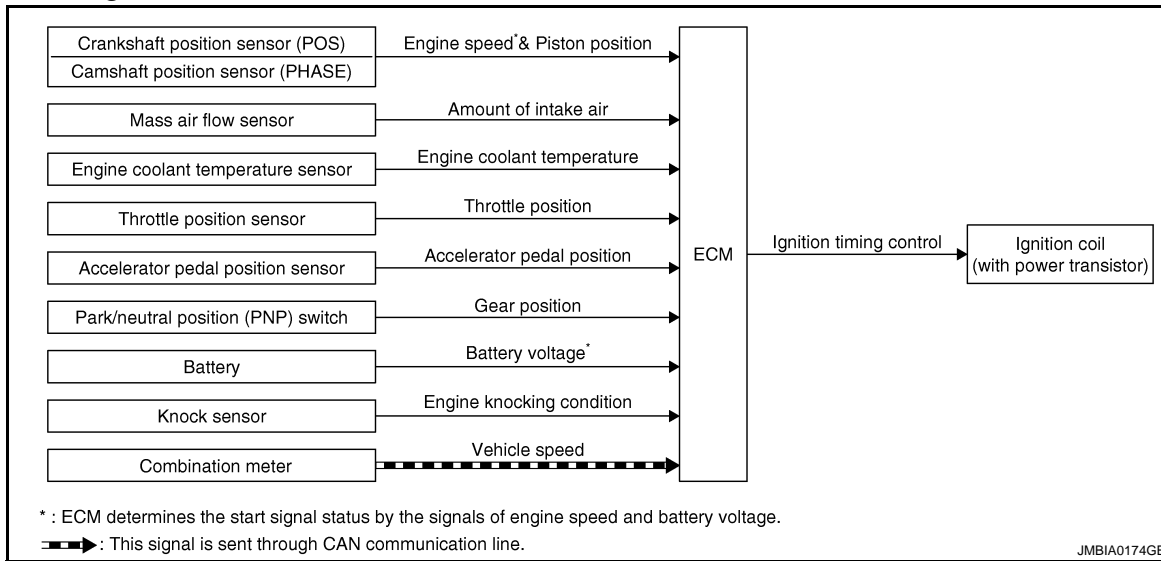
ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

ELECTRIC IGNITION SYSTEM

System Diagram



System Description

INFOID:000000001343180

INPUT/OUTPUT SIGNAL CHART

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

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

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

SYSTEM DESCRIPTION

Firing 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

ELECTRIC IGNITION SYSTEM

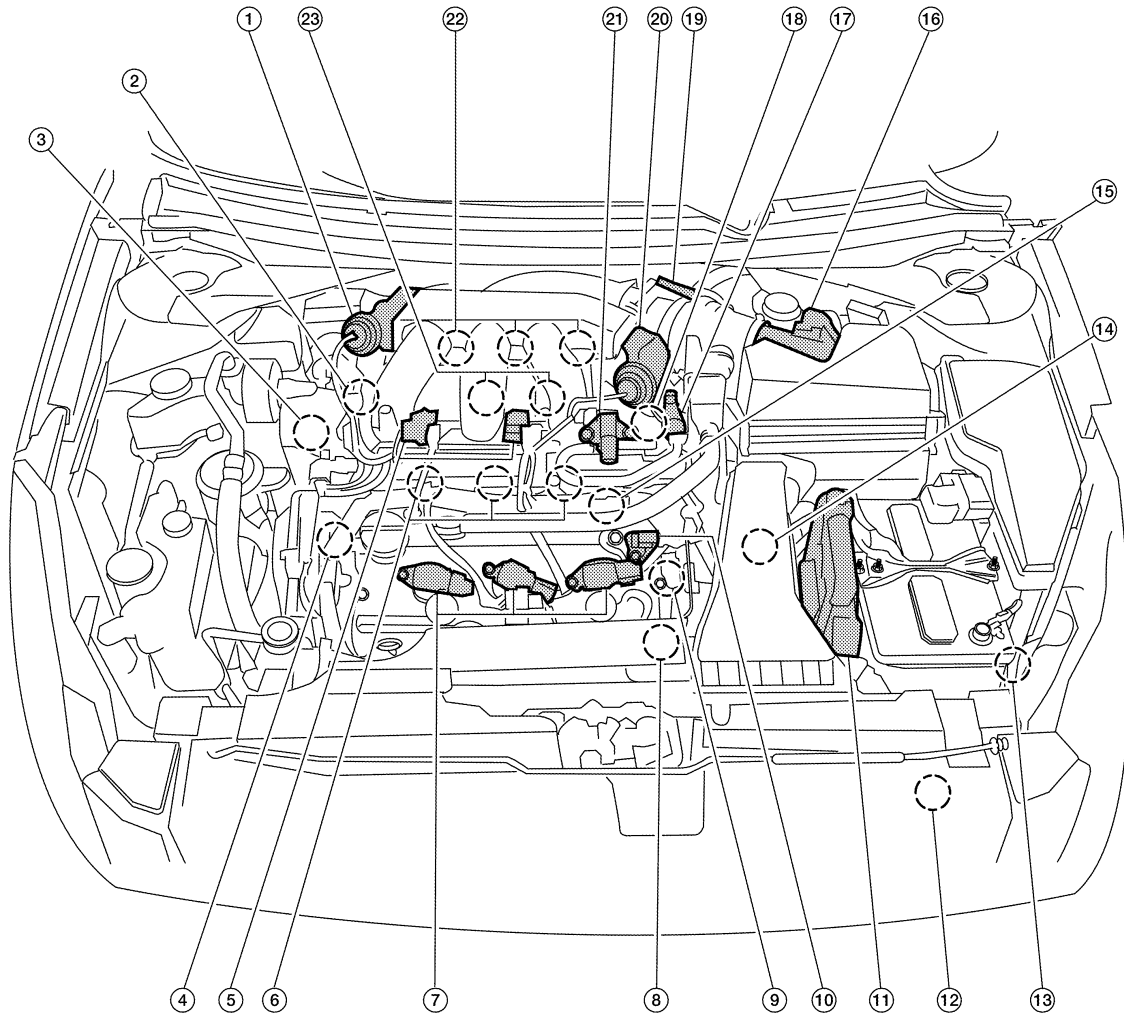
< FUNCTION DIAGNOSIS >

[VQ35DE]

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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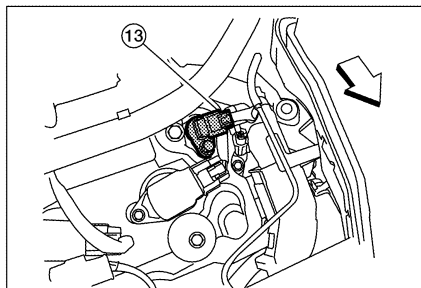
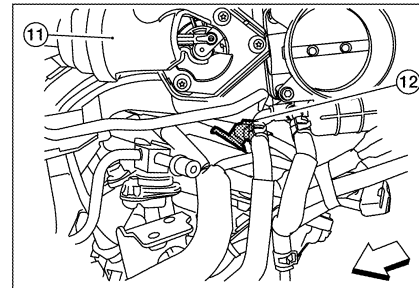
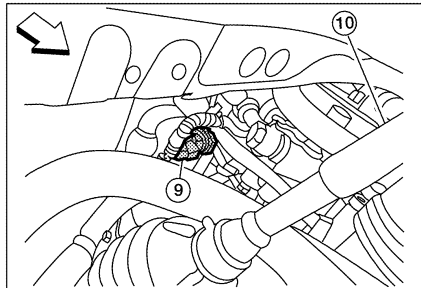
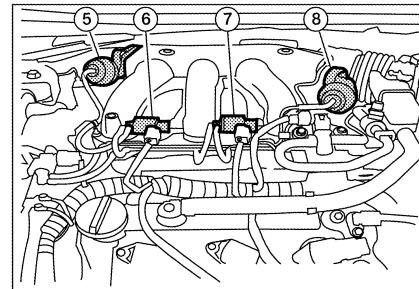
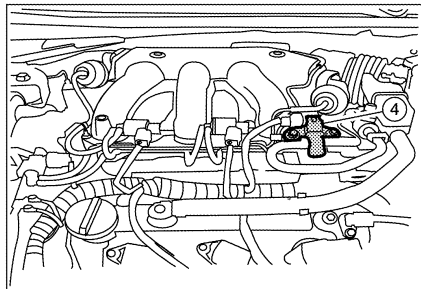
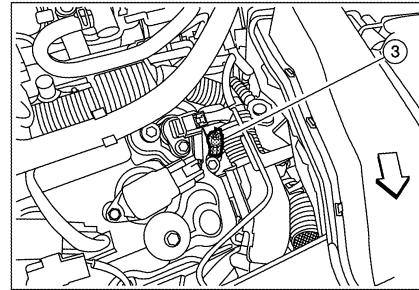
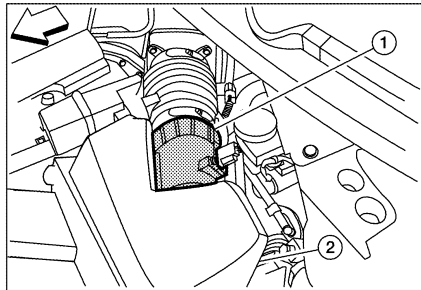
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|--|---|--|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid | 3. Power steering pressure sensor valve (bank 1) |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |

ELECTRIC IGNITION SYSTEM

[VQ35DE]

< FUNCTION DIAGNOSIS >

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|---|----------------------------|---|
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |



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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↶ : Vehicle front

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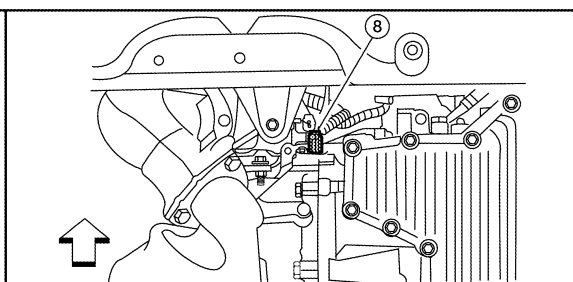
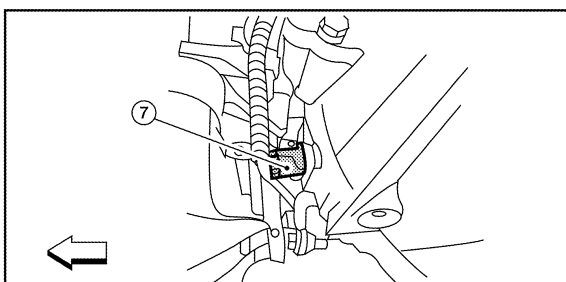
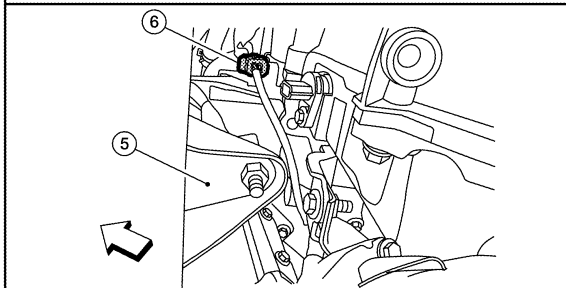
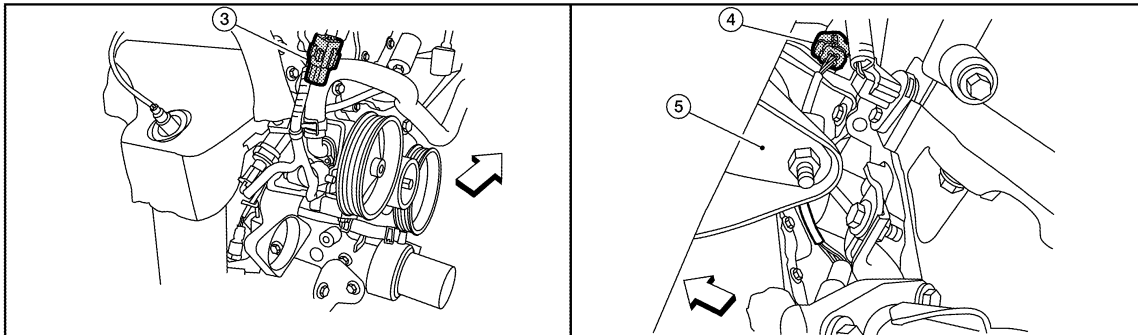
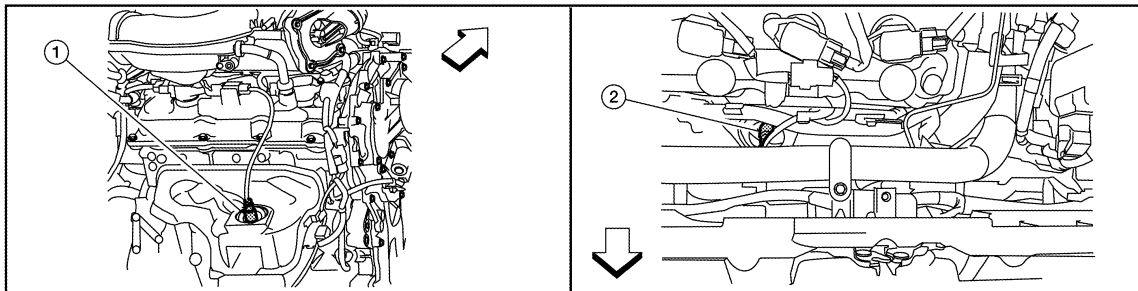
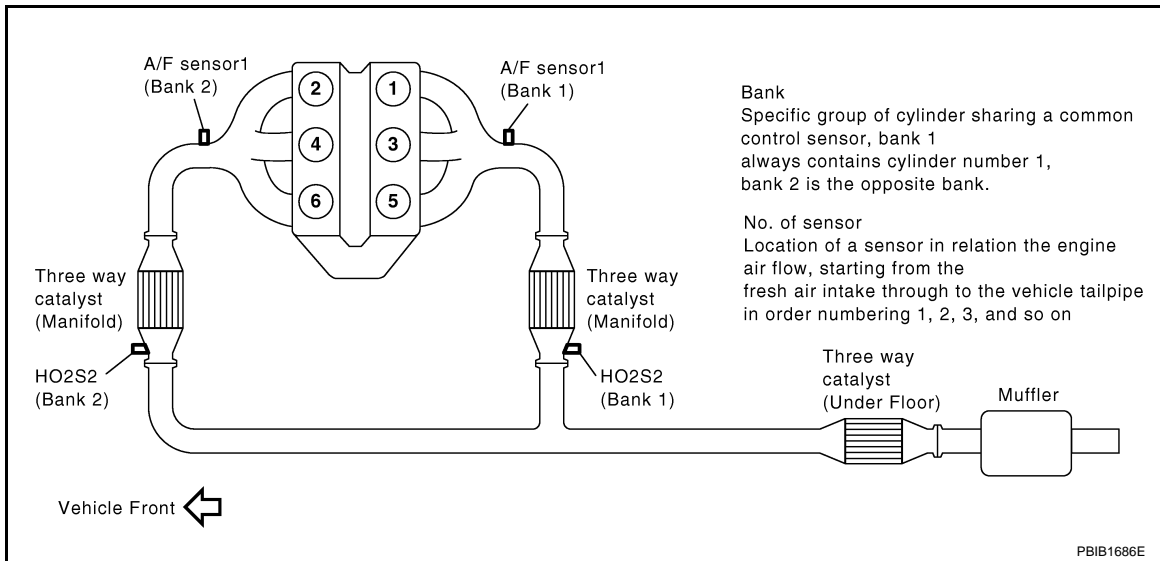
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ELECTRIC IGNITION SYSTEM

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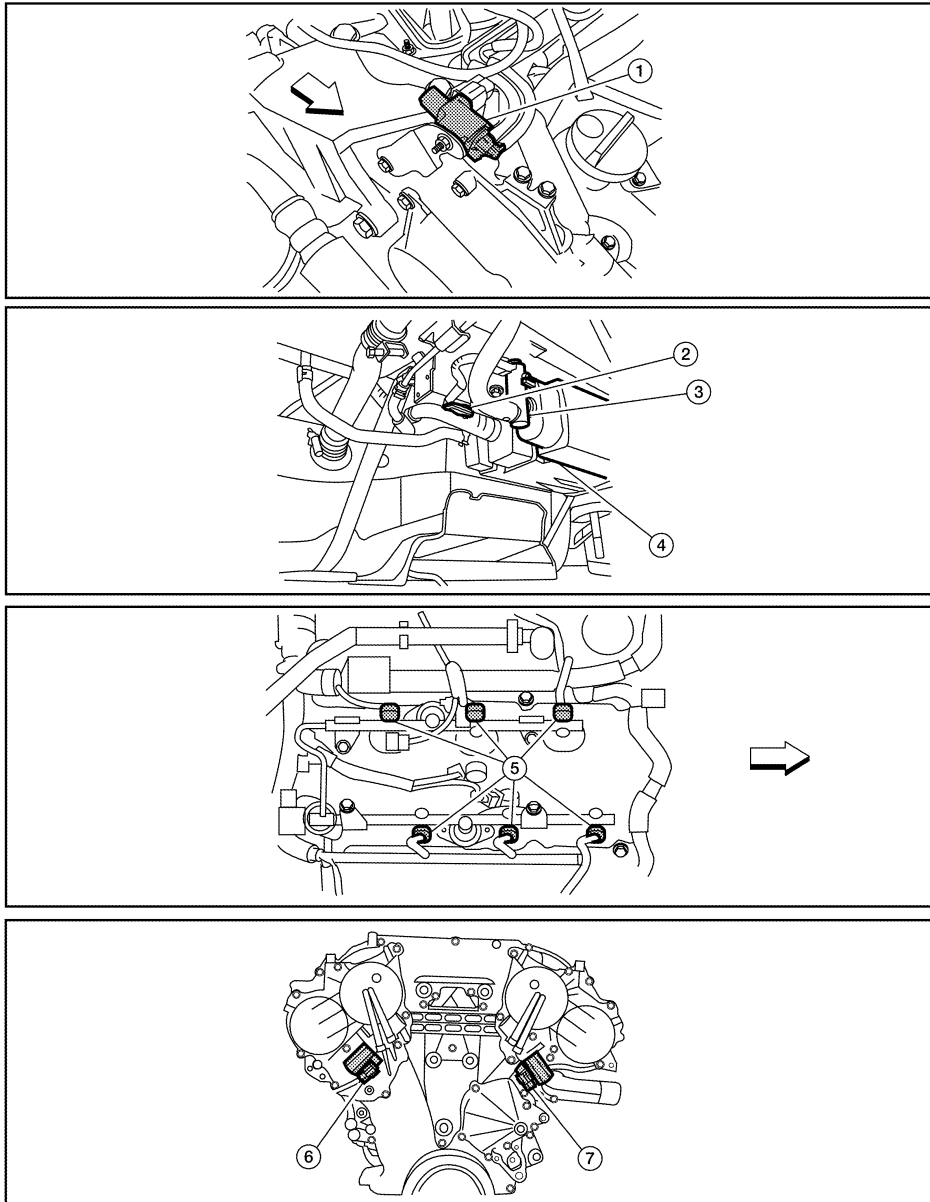
ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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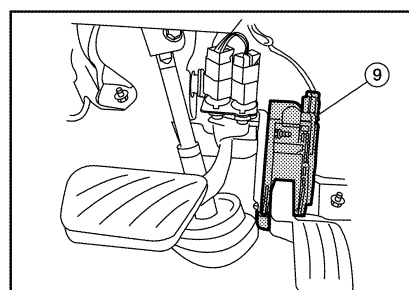
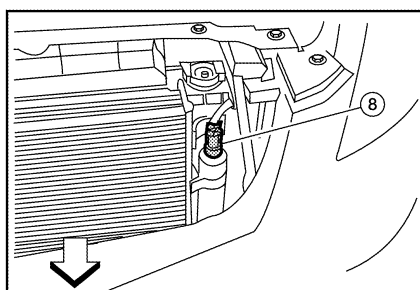
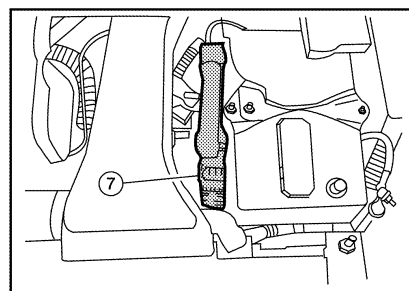
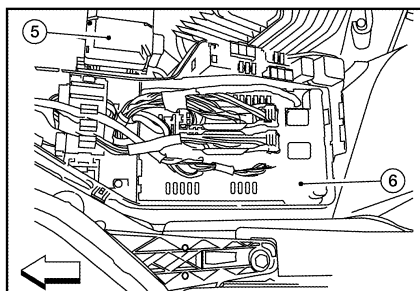
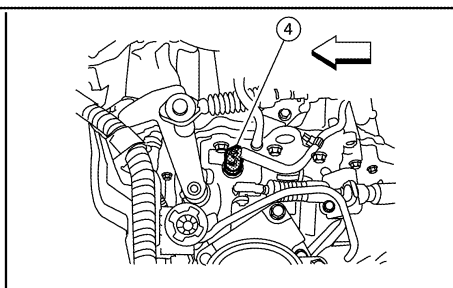
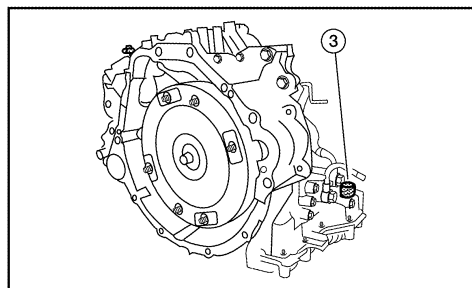
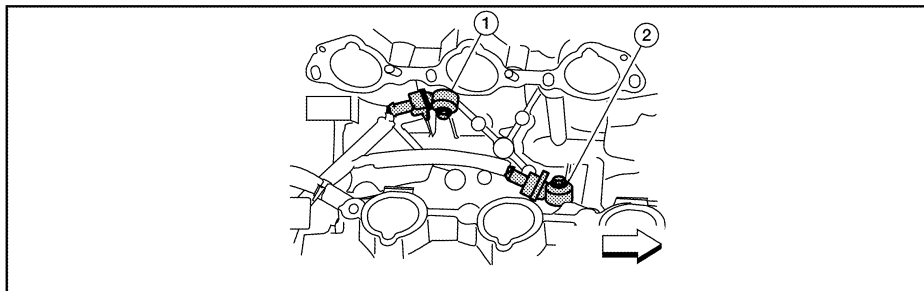
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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

ELECTRIC IGNITION SYSTEM

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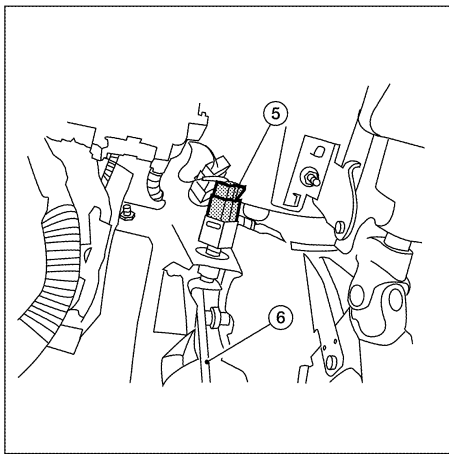
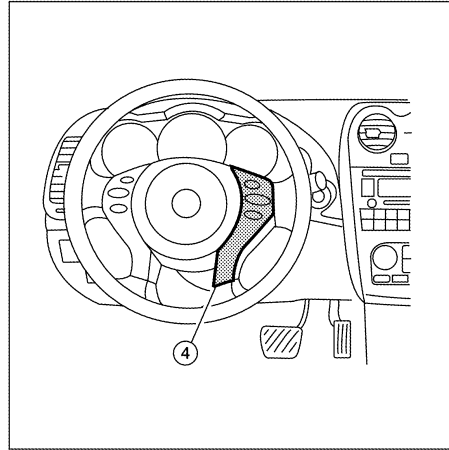
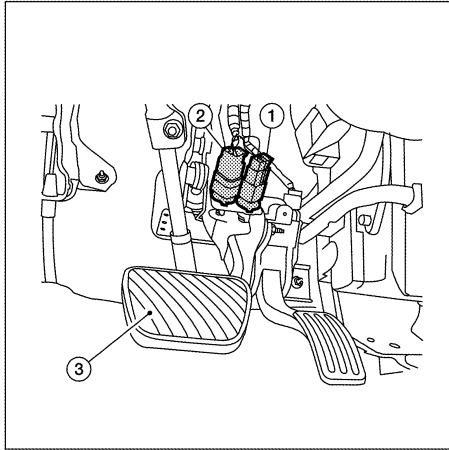
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| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

⇐ : Vehicle front

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|-------------------------|------------------------------------|-----------------|
| 1. ASCD brake switch | 2. Stop lamp switch | 3. Brake pedal |
| 4. ASCD steering switch | 5. ASCD clutch switch (M/T models) | 6. Clutch pedal |

Component Description

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INFOID:000000001343182

| Component | Reference |
|-----------------------------------|--|
| Accelerator pedal position sensor | EC-1409, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| Ignition signal | EC-1438, "Description" |
| Knock sensor | EC-1247, "Description" |
| Mass air flow sensor | EC-1162, "Description" |
| Park/neutral position switch | EC-1336, "Description" |

ELECTRIC IGNITION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Component | Reference |
|--------------------------|--|
| Throttle position sensor | EC-1406, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |

AIR CONDITIONING CUT CONTROL

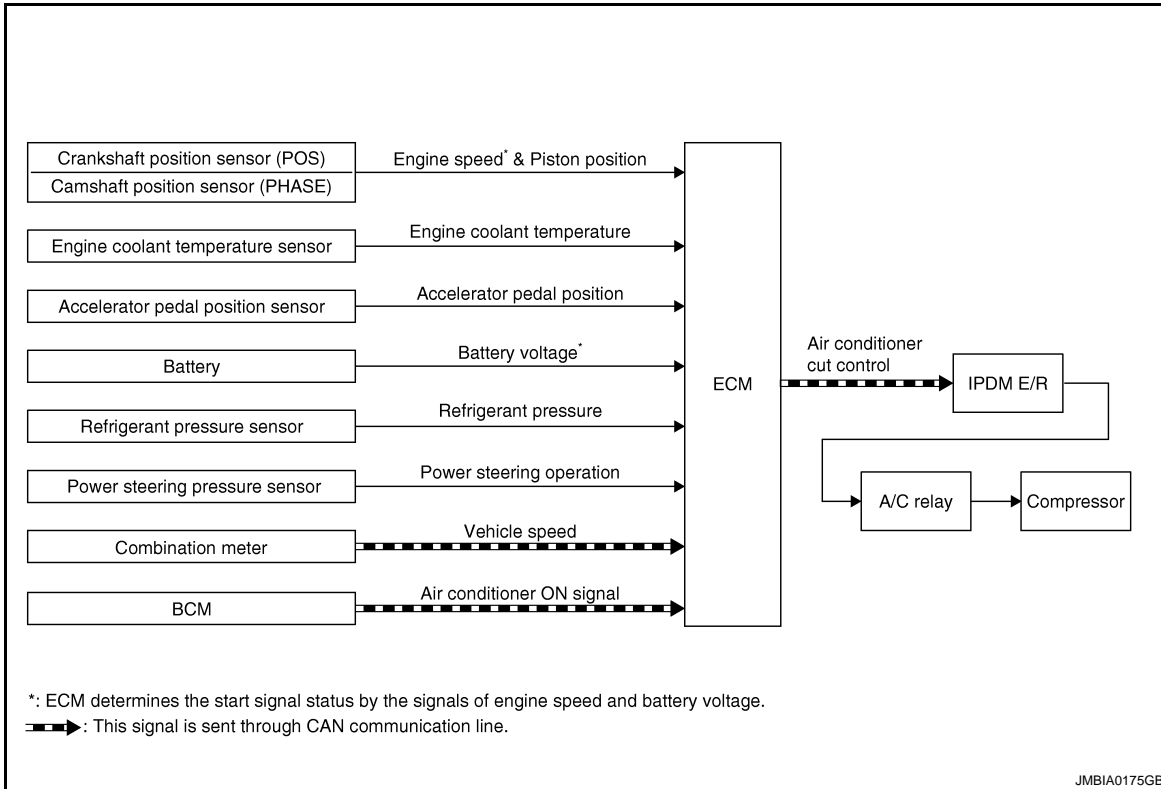
< FUNCTION DIAGNOSIS >

[VQ35DE]

AIR CONDITIONING CUT CONTROL

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Sensor | Input Signal to ECM | ECM function | Actuator |
|--|-----------------------------|-----------------------------|-----------------------|
| BCM | Air conditioner ON signal*1 | Air conditioner cut control | Air conditioner relay |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed*2 | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Battery | Battery voltage*2 | | |
| Refrigerant pressure sensor | Refrigerant pressure | | |
| Power steering pressure sensor | Power steering operation | | |
| Combination meter | Vehicle speed*1 | | |

*1: This signal is sent to the ECM through 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.

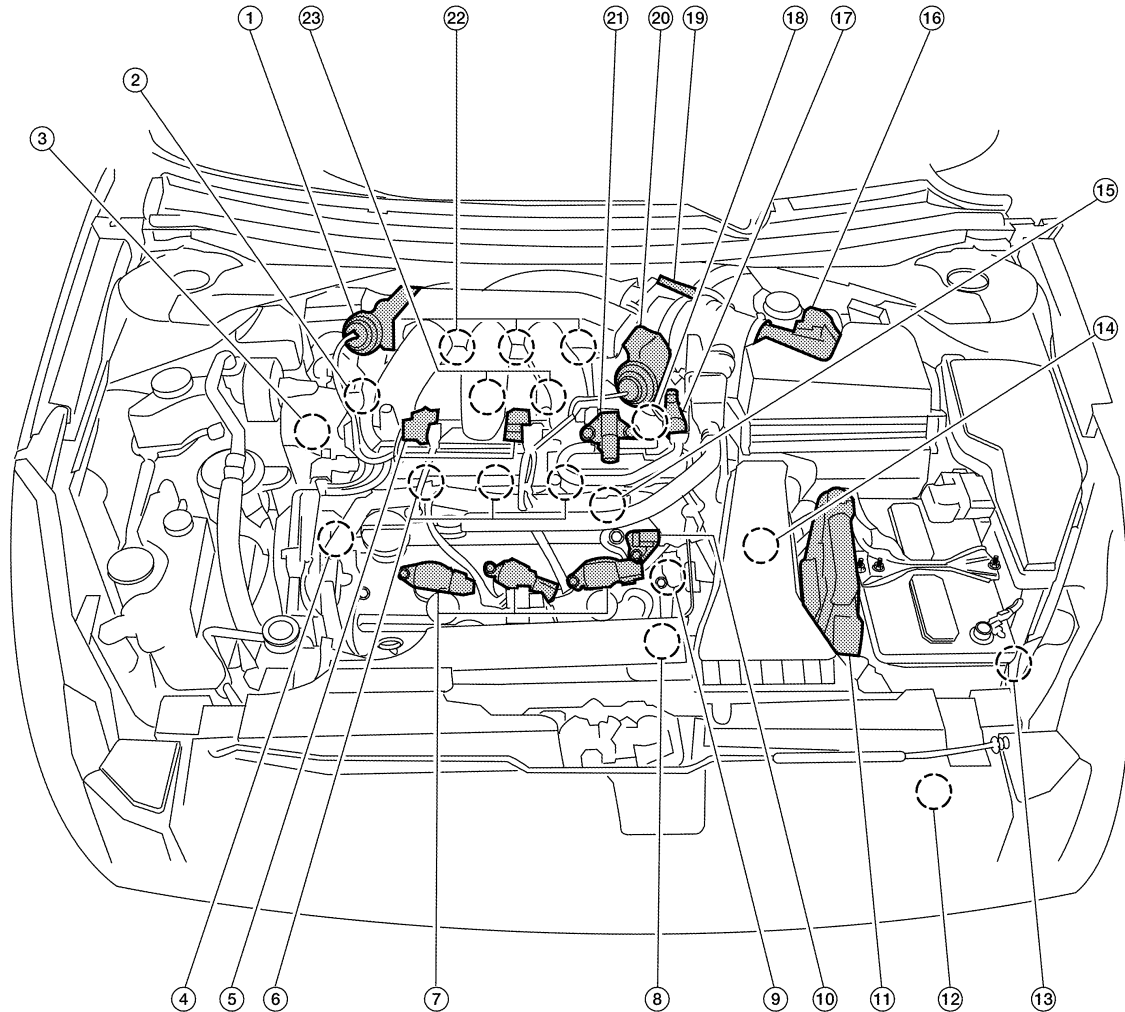
AIR CONDITIONING CUT CONTROL

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[VQ35DE]

Component Parts Location

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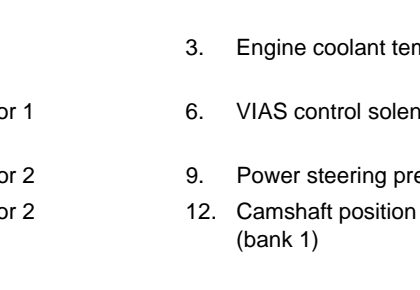
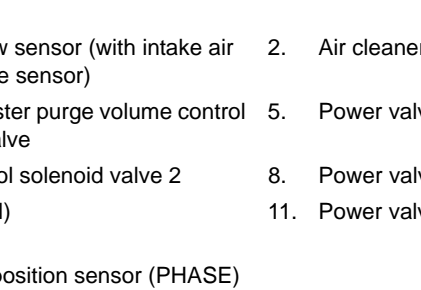
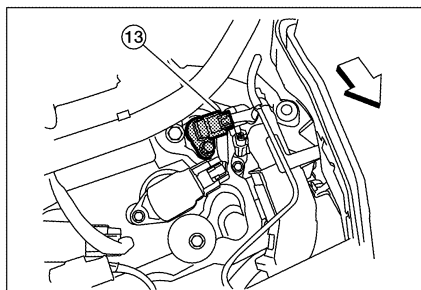
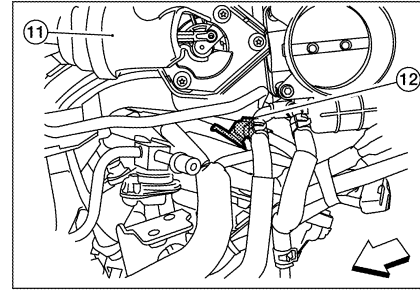
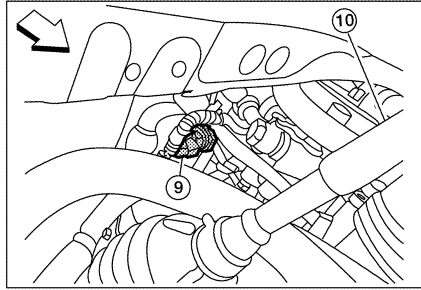
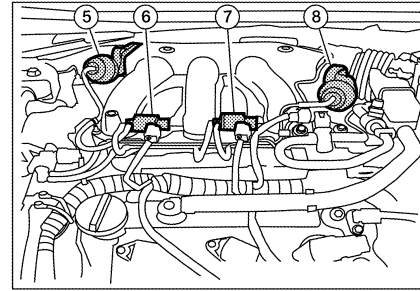
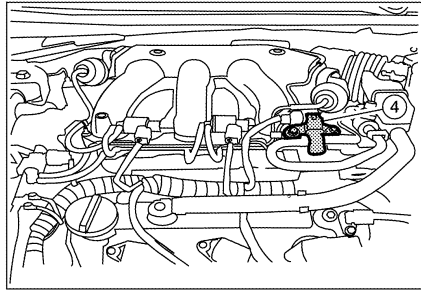
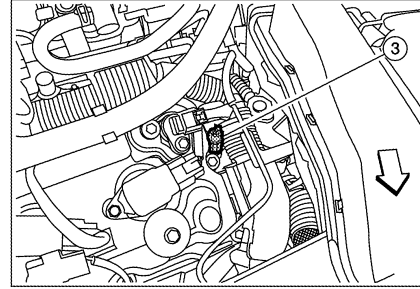
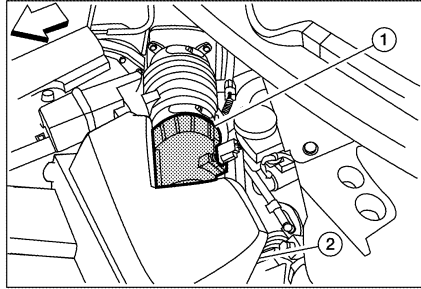
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|---|---|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid | 3. Power steering pressure sensor |
| | valve (bank 1) | |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

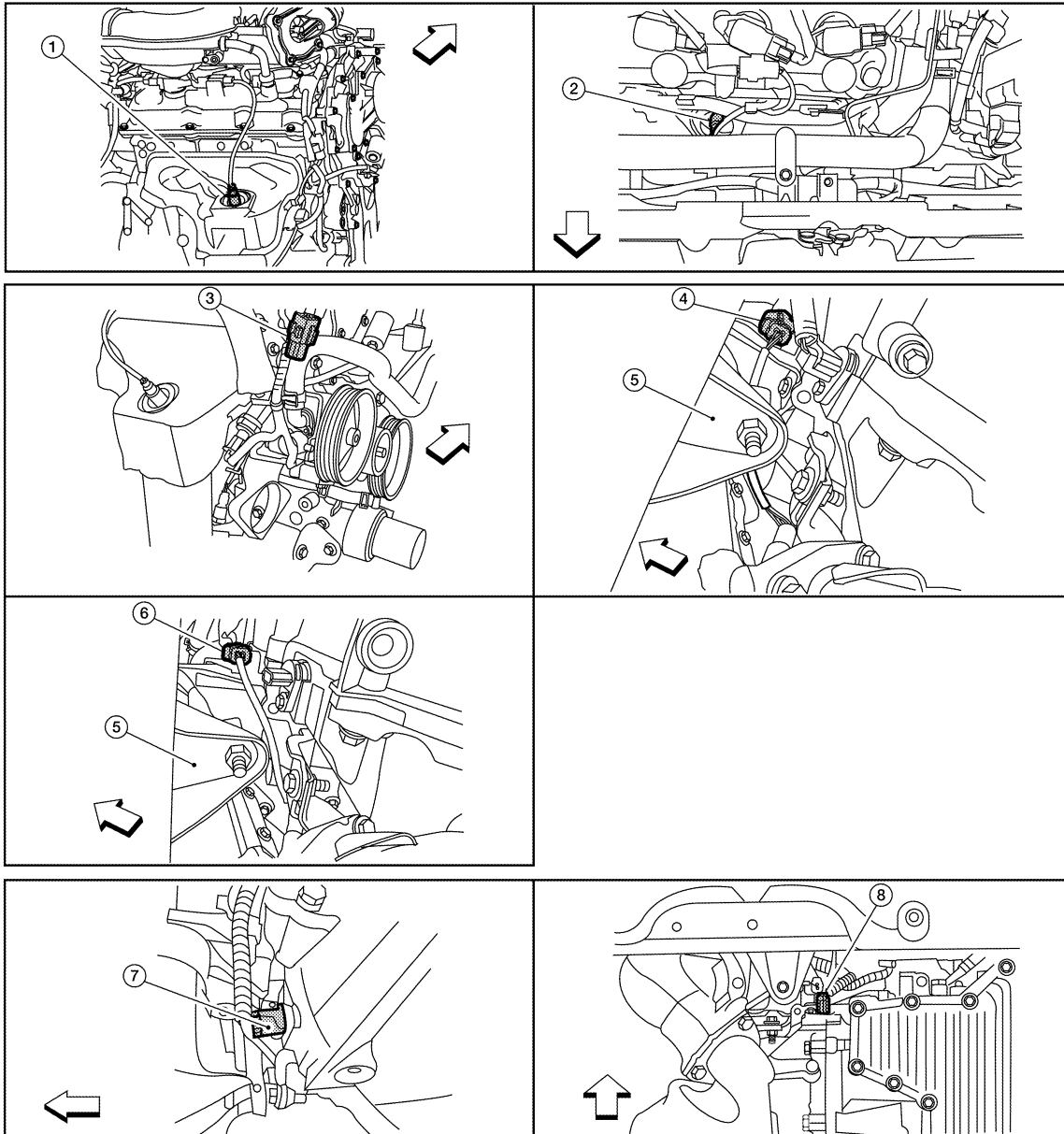
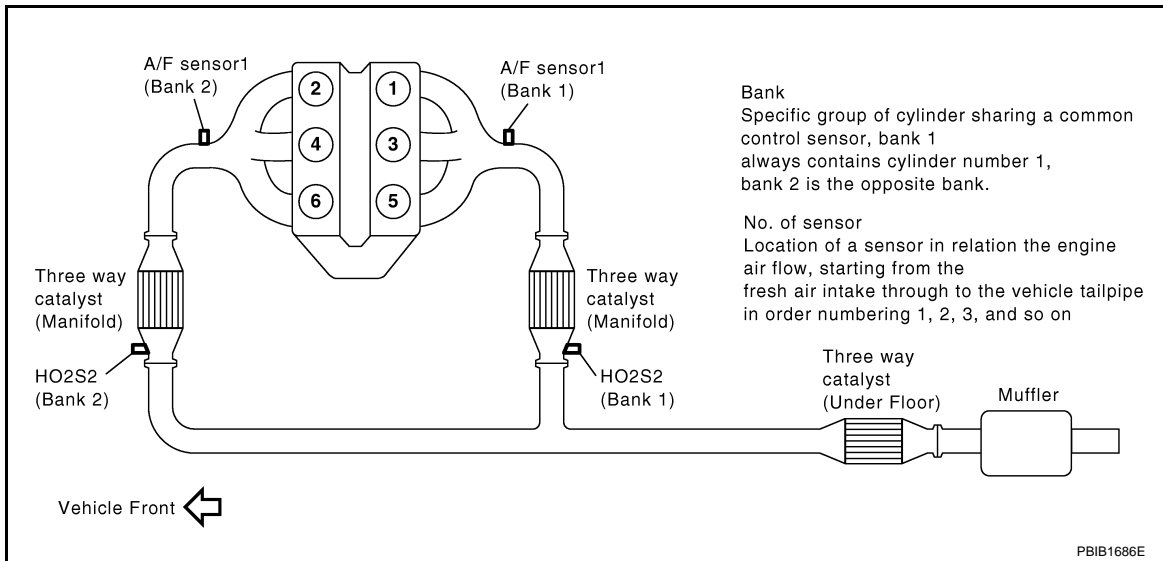
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AIR CONDITIONING CUT CONTROL

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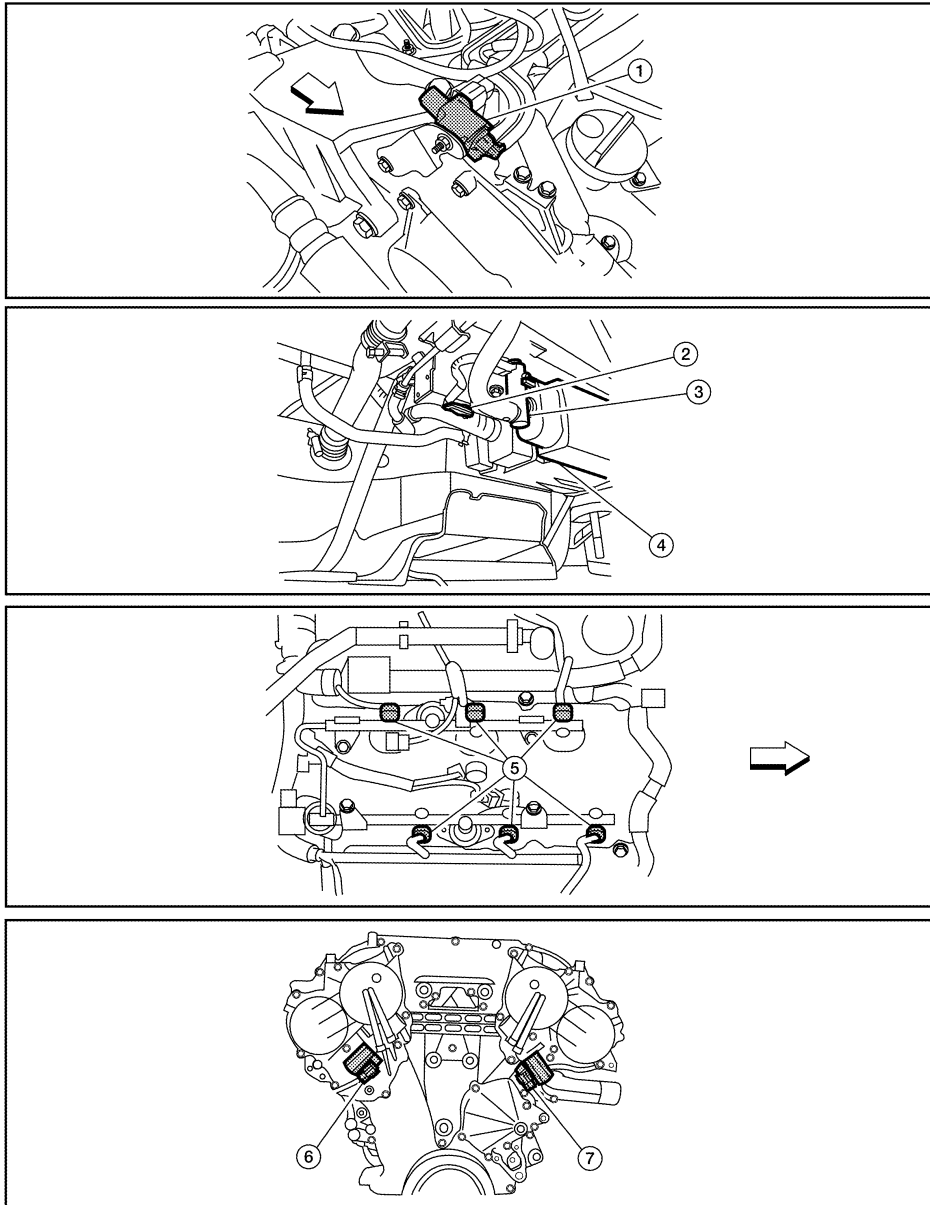
AIR CONDITIONING CUT CONTROL

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

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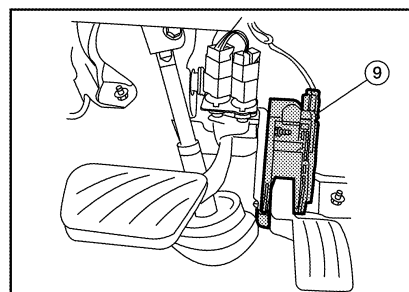
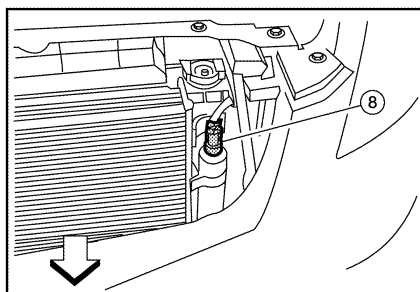
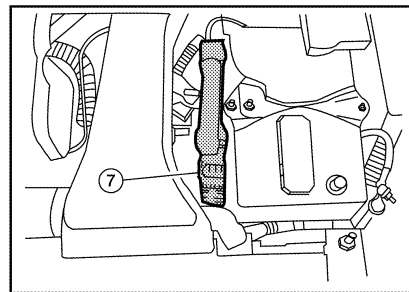
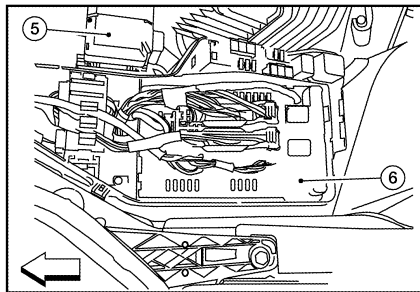
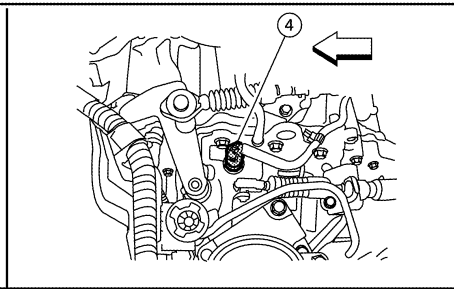
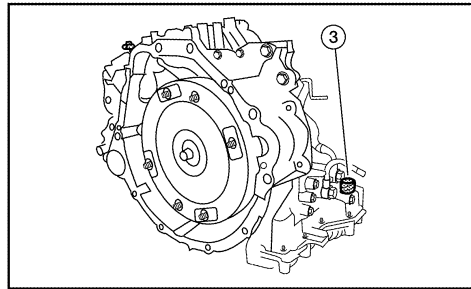
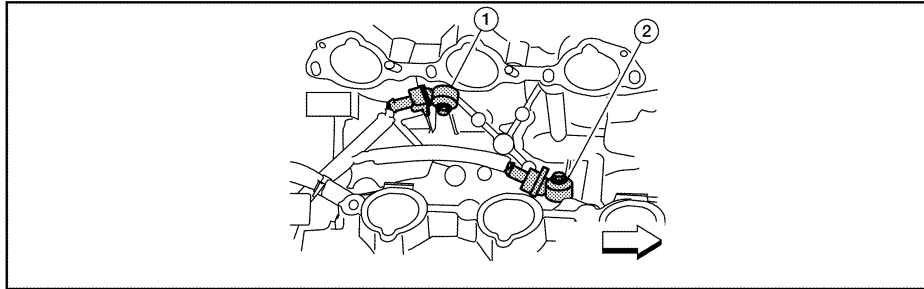
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AIR CONDITIONING CUT CONTROL

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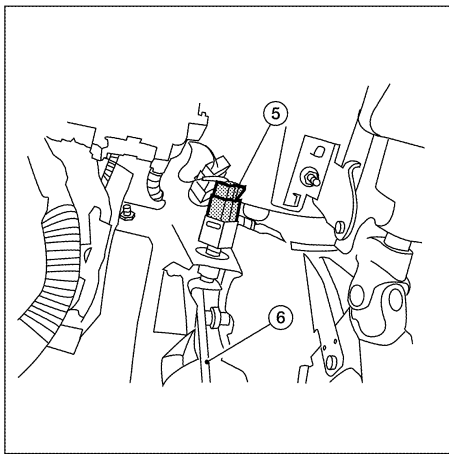
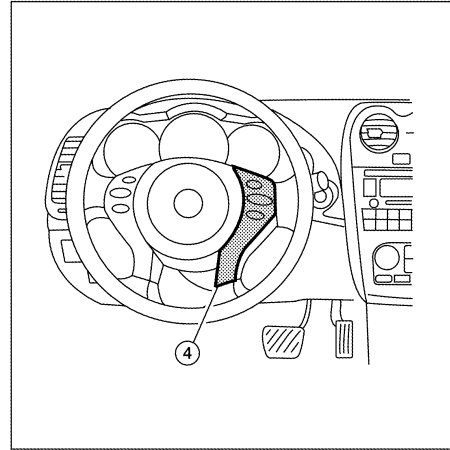
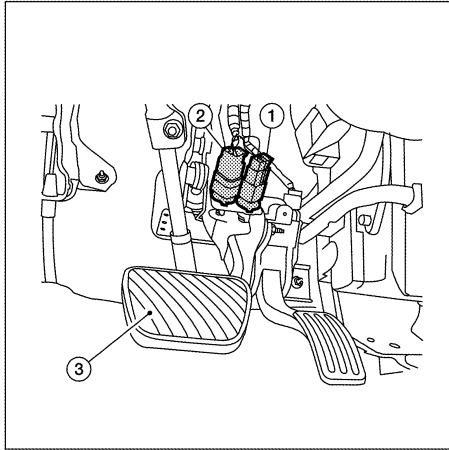
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|----------------------------|--|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

⇐ : Vehicle front

AIR CONDITIONING CUT CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|-------------------------|------------------------------------|-----------------|
| 1. ASCD brake switch | 2. Stop lamp switch | 3. Brake pedal |
| 4. ASCD steering switch | 5. ASCD clutch switch (M/T models) | 6. Clutch pedal |

Component Description

ALBIA0105ZZ

INFOID:000000001343186

| Component | Reference |
|-----------------------------------|--|
| Accelerator pedal position sensor | EC-1409, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| Power steering pressure sensor | EC-1327, "Description" |
| Refrigerant pressure sensor | EC-1450, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

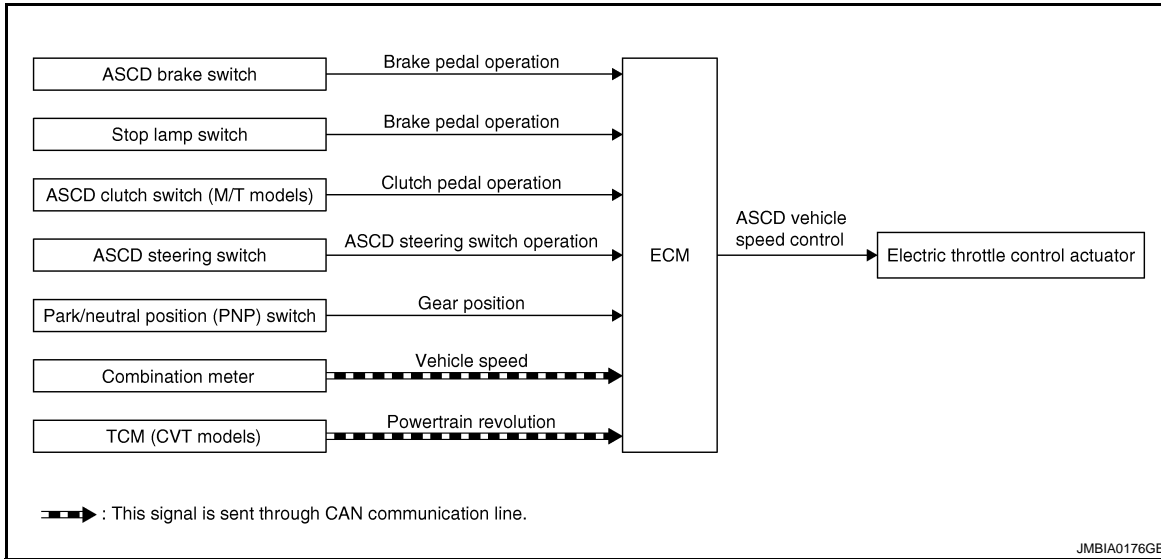
< FUNCTION DIAGNOSIS >

[VQ35DE]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram

INFOID:000000001343187



System Description

INFOID:000000001343188

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to ECM | ECM function | Actuator |
|------------------------------------|--------------------------------|----------------------------|------------------------------------|
| ASCD brake switch | Brake pedal operation | ASCD vehicle speed control | Electric throttle control actuator |
| Stop lamp switch | Brake pedal operation | | |
| ASCD clutch switch (M/T models) | Clutch pedal operation | | |
| ASCD steering switch | ASCD steering switch operation | | |
| Park/neutral position (PNP) switch | Gear position | | |
| Combination meter | Vehicle speed* | | |
| TCM (CVT models) | Powertrain revolution* | | |

*: This signal is sent to the ECM through 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 lamp and SET lamp in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press MAIN switch. (The CRUISE lamp in 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. (Then SET lamp in combination meter illuminates.)

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 keep the new set speed.

CANCEL OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[VQ35DE]

< FUNCTION DIAGNOSIS >

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

- CANCEL switch is pressed
- More than 2 switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to neutral position. (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- 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-1376, "Description"](#).

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

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during 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 keep the new set speed.

RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after cancel operation other than pressing 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
- Clutch pedal is released (M/T models)
- CVT selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

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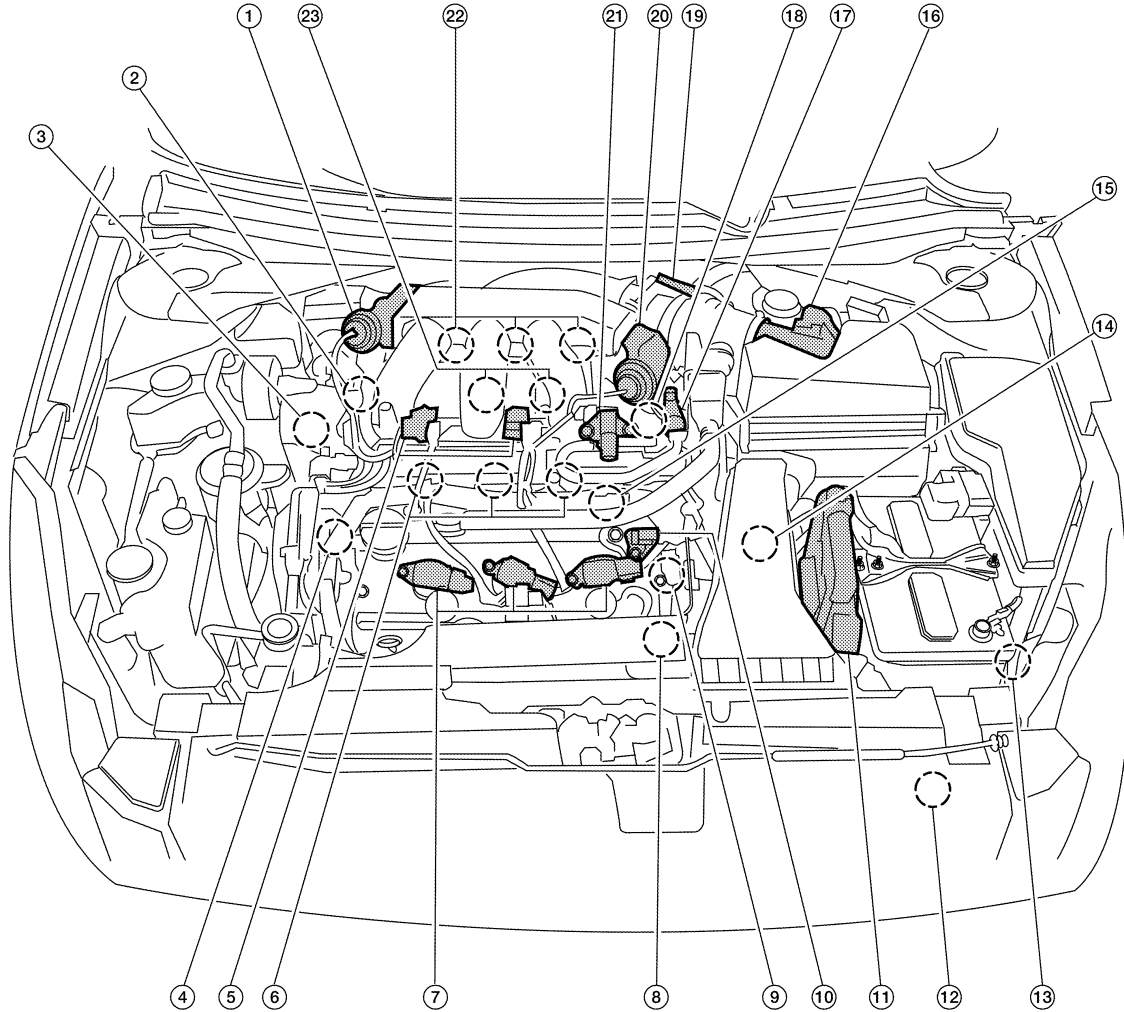
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]

Component Parts Location

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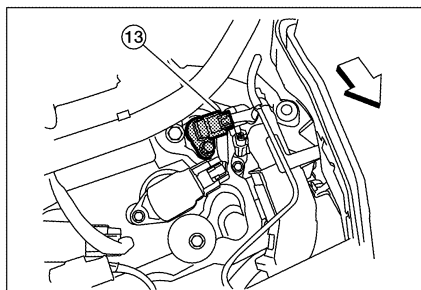
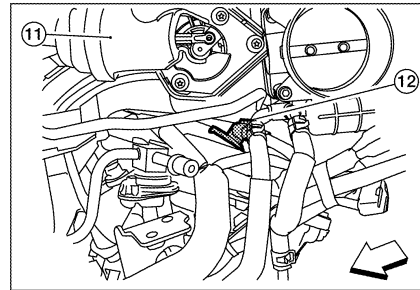
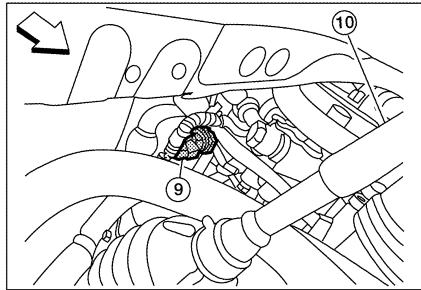
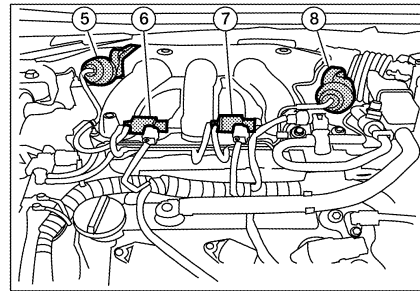
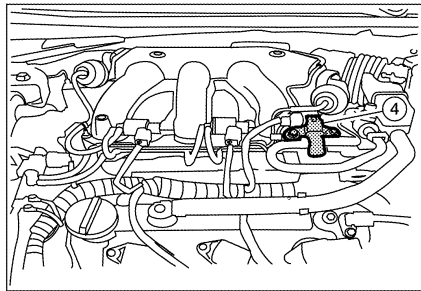
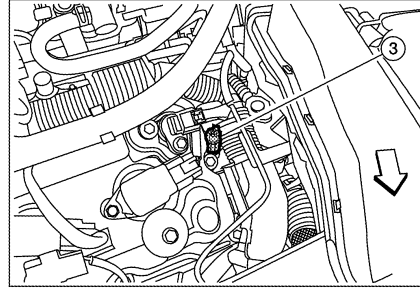
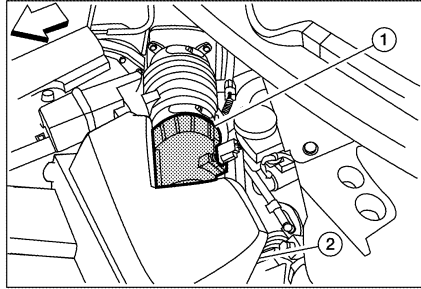
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|---|--|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

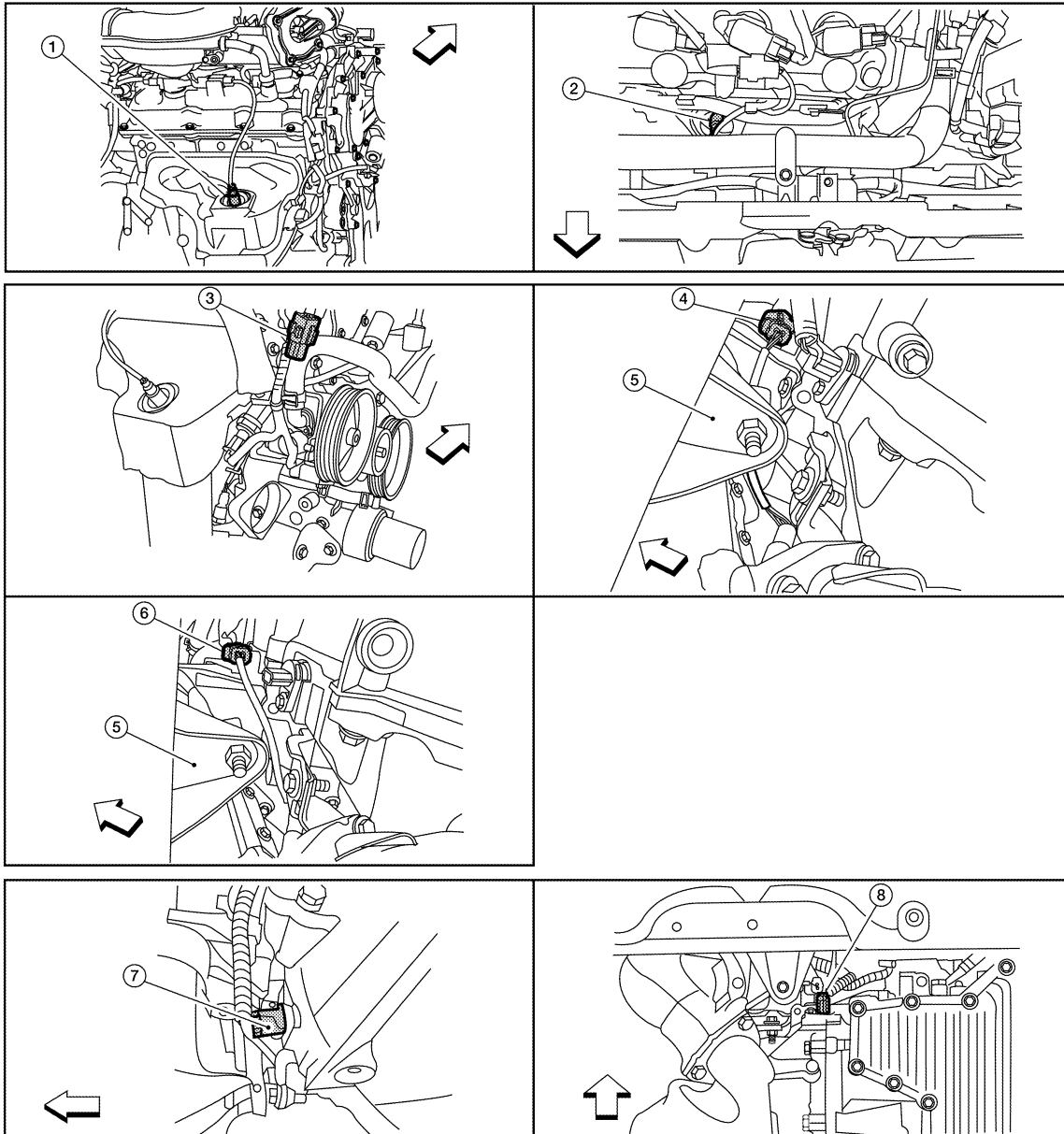
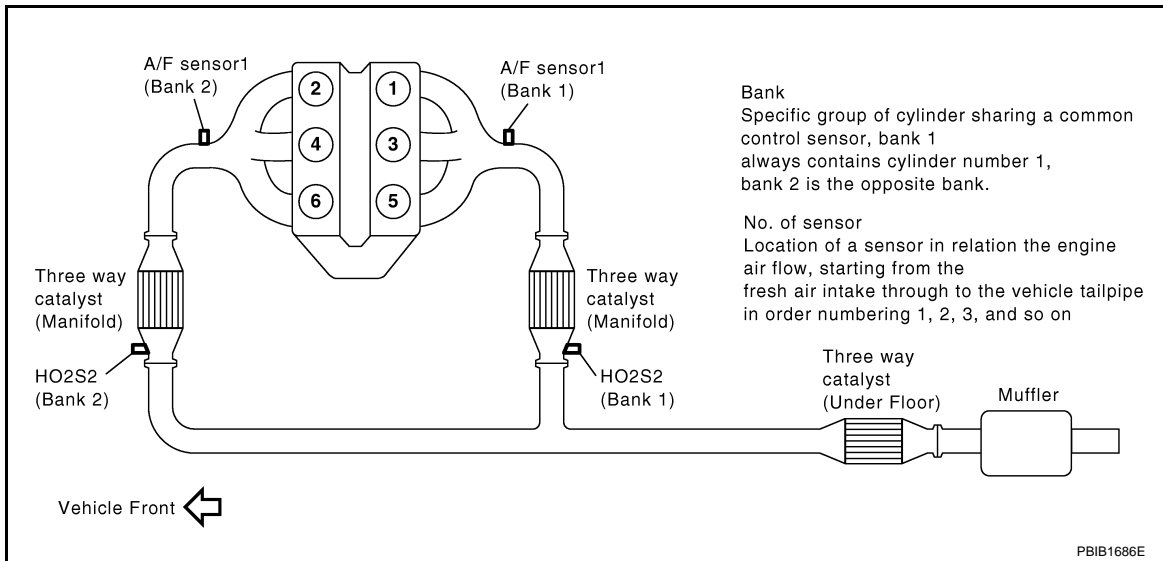
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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]



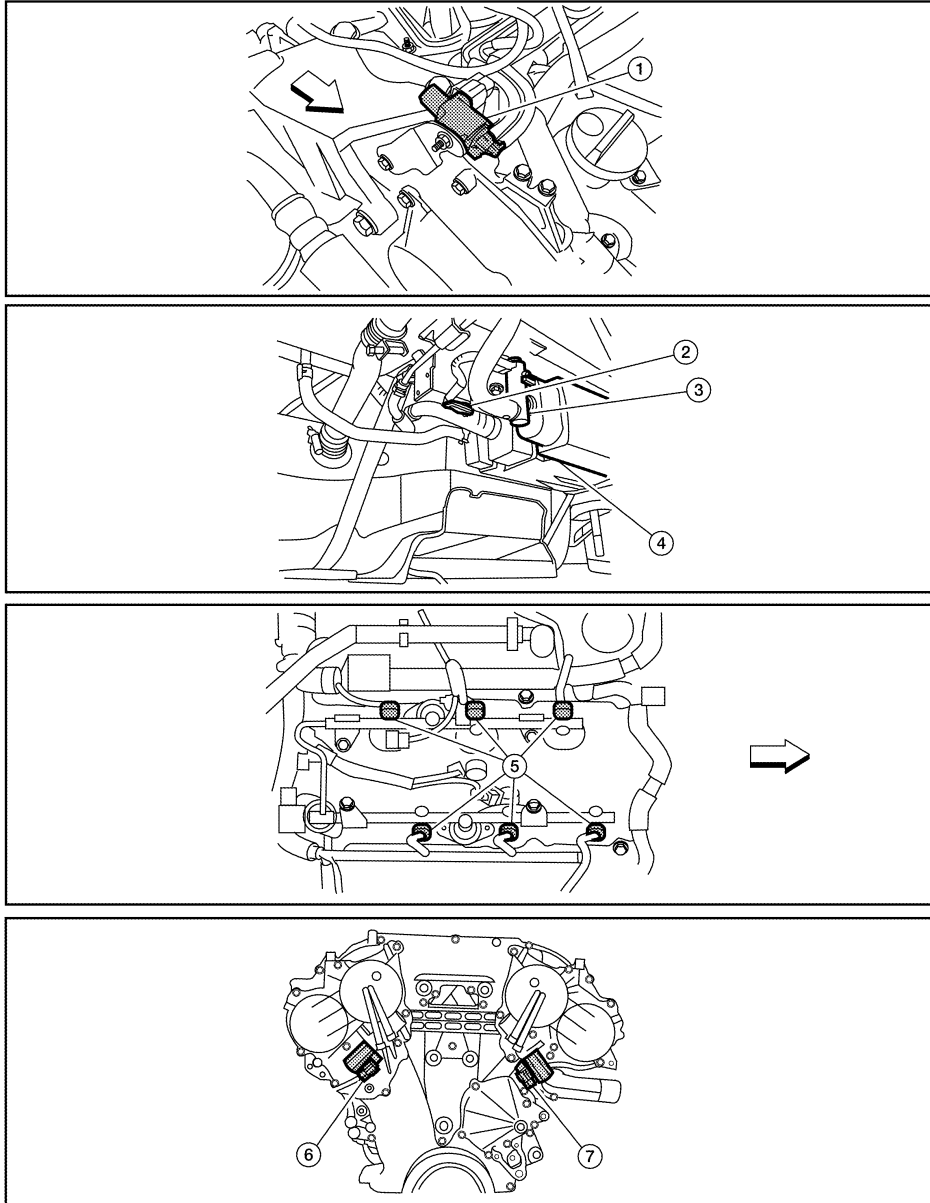
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

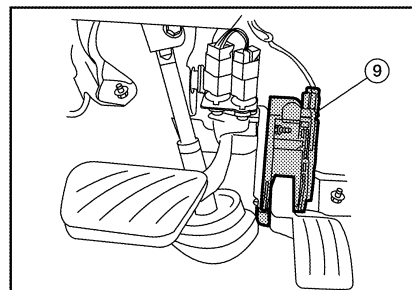
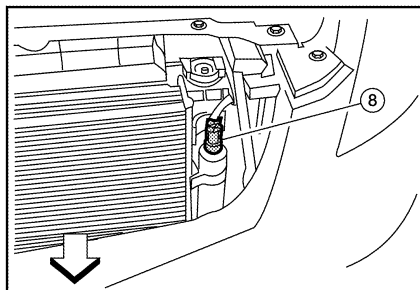
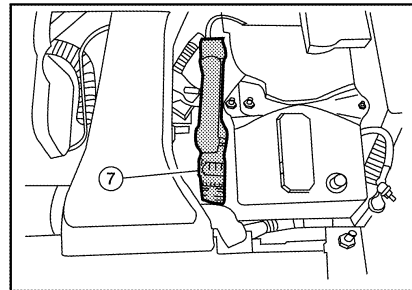
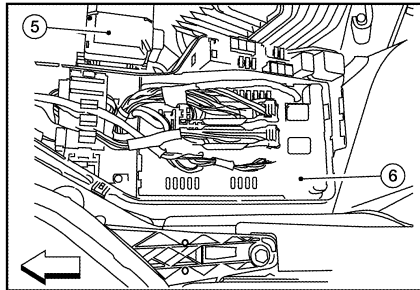
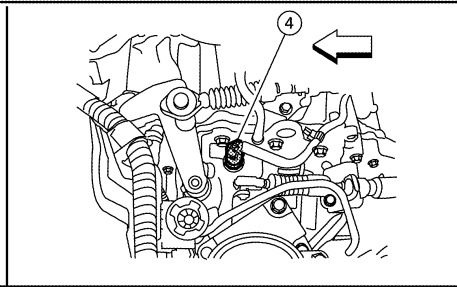
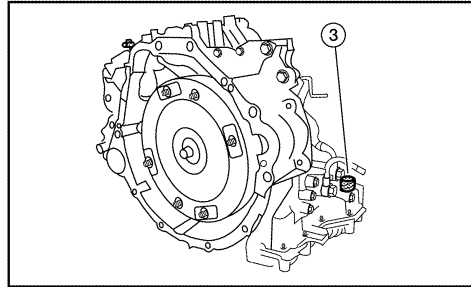
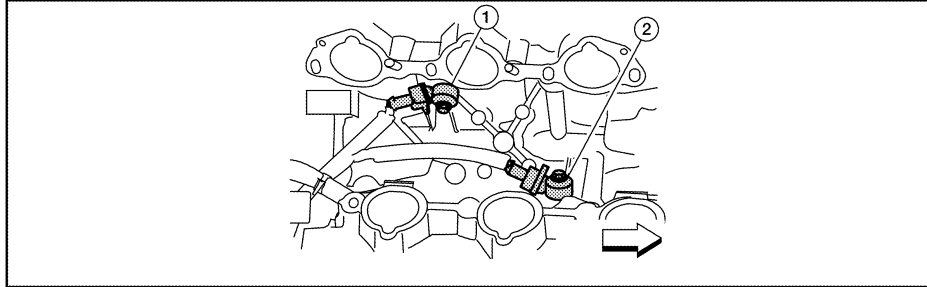
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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]



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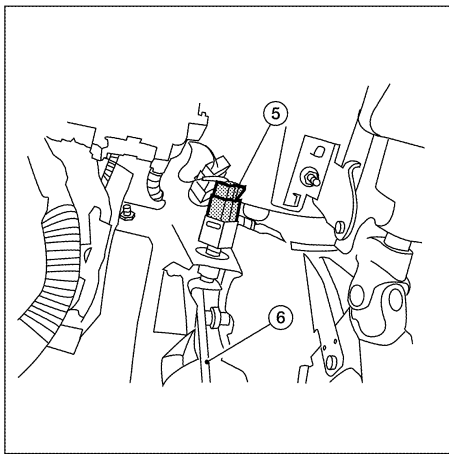
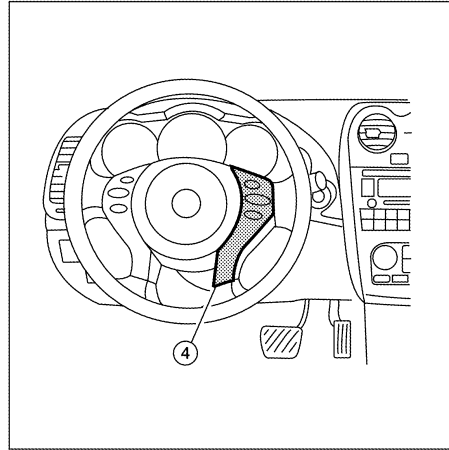
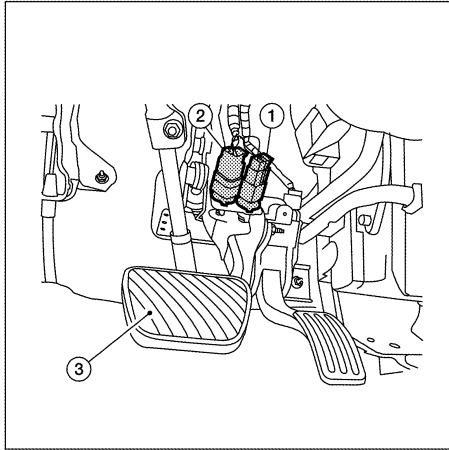
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| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

← : Vehicle front

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< FUNCTION DIAGNOSIS >

[VQ35DE]



- 1. ASCD brake switch
- 2. Stop lamp switch
- 3. Brake pedal
- 4. ASCD steering switch
- 5. ASCD clutch switch (M/T models)
- 6. Clutch pedal

Component Description

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INFOID:000000001343190

| Component | Reference |
|------------------------------------|--|
| ASCD steering switch | EC-1364, "Description" |
| ASCD brake switch | EC-1367, "Description" |
| ASCD clutch switch | EC-1367, "Description" |
| Stop lamp switch | EC-1386, "Description" |
| Electric throttle control actuator | EC-1397, "Description" |
| ASCD indicator | EC-1421, "Description" |

CAN COMMUNICATION

System Description

INFOID:000000001343191

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.

Refer to [LAN-25, "CAN Communication Signal Chart"](#), about CAN communication for detail..

COOLING FAN CONTROL

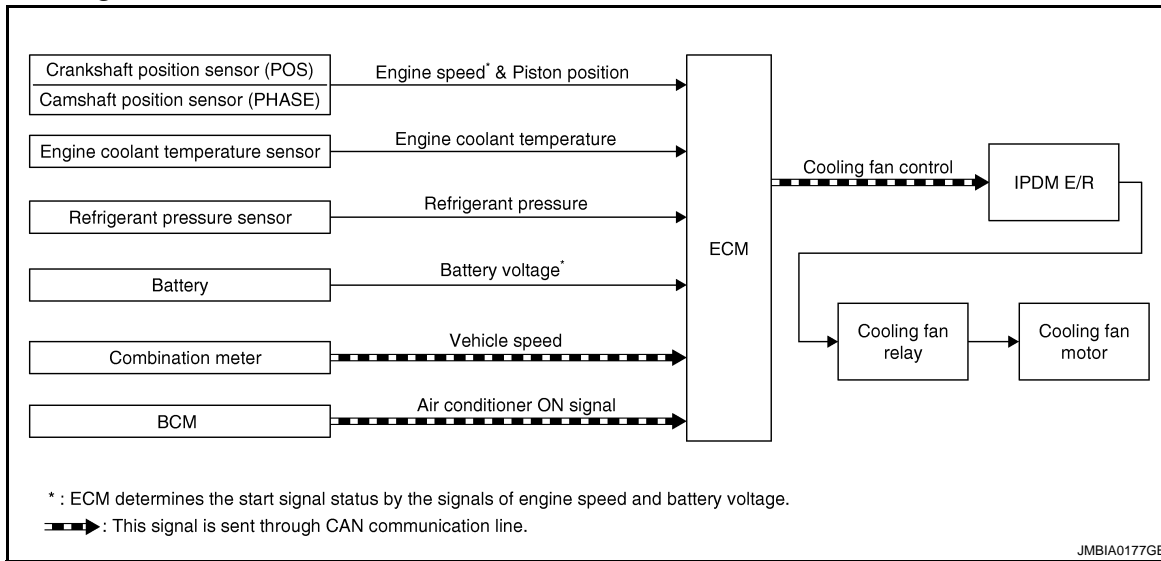
< FUNCTION DIAGNOSIS >

[VQ35DE]

COOLING FAN CONTROL

System Diagram

INFOID:000000001343192



System Description

INFOID:000000001343193

INPUT/OUTPUT SIGNAL CHART

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

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

*2: This signal is sent to ECM through CAN communication line.

SYSTEM DESCRIPTION

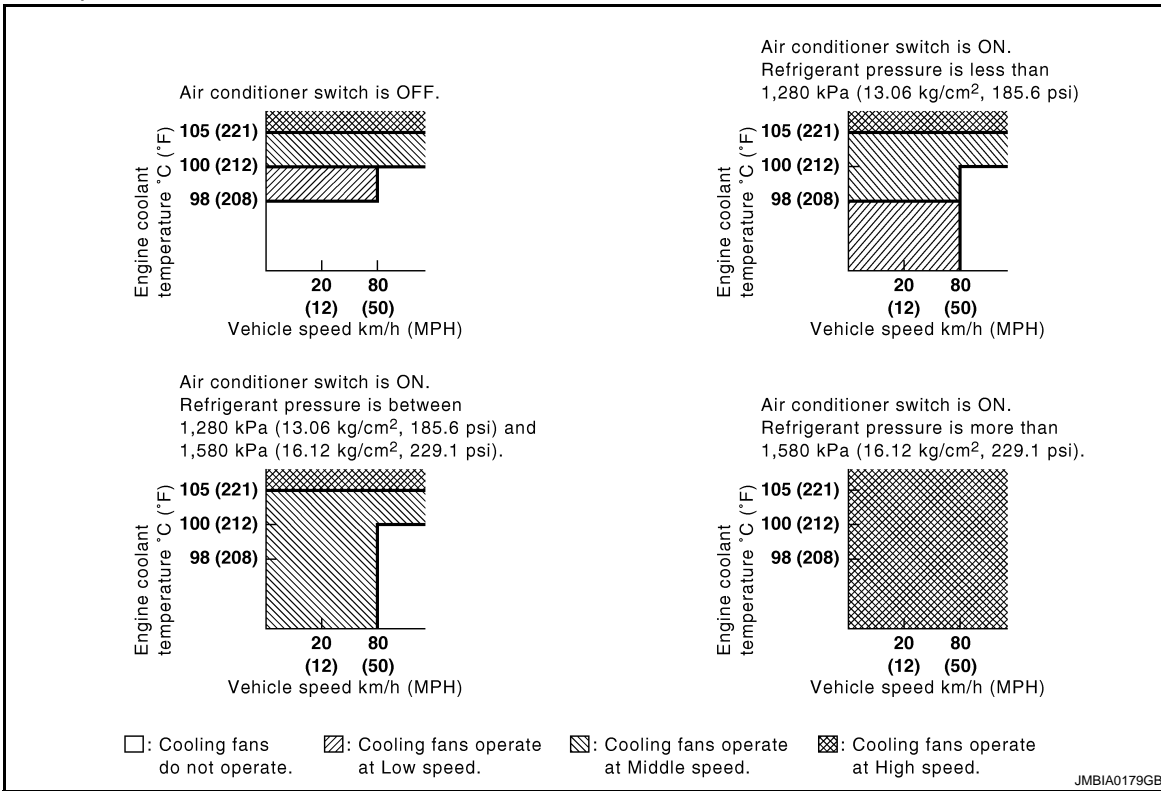
The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]

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) | OFF | ON | OFF |
| Middle (MID) | ON | OFF | OFF |
| High (HI) | OFF | ON | ON |

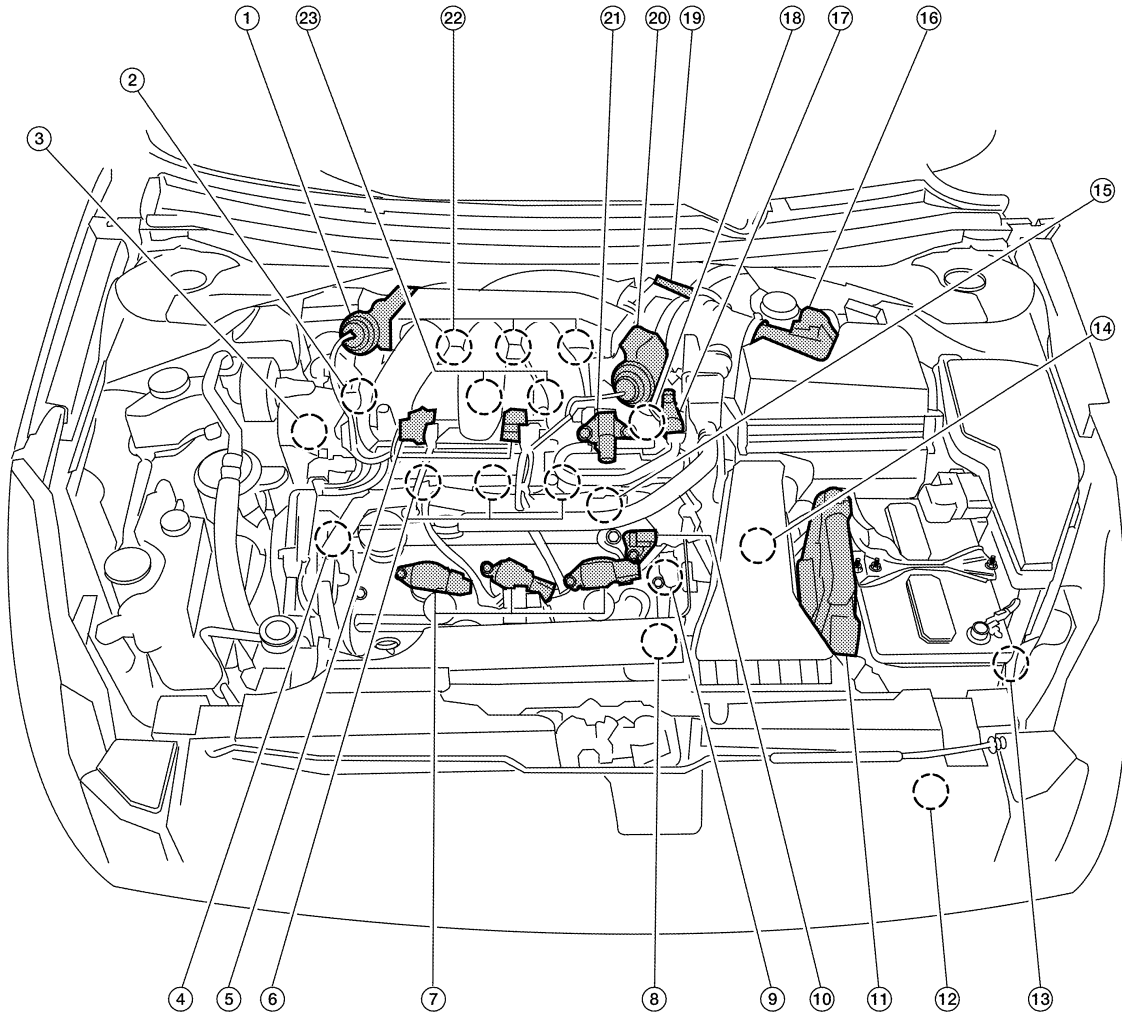
COOLING FAN CONTROL

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[VQ35DE]

Component Parts Location

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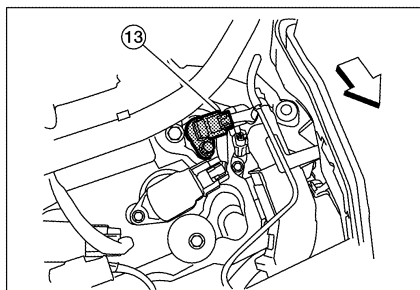
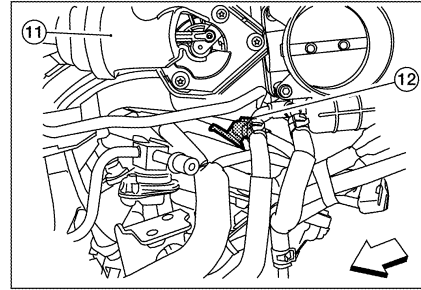
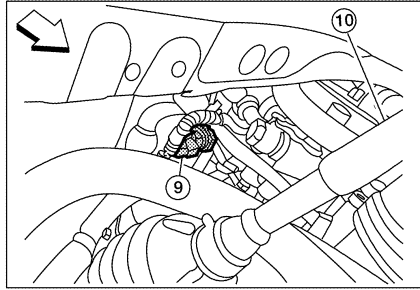
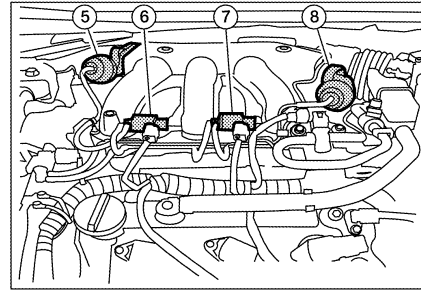
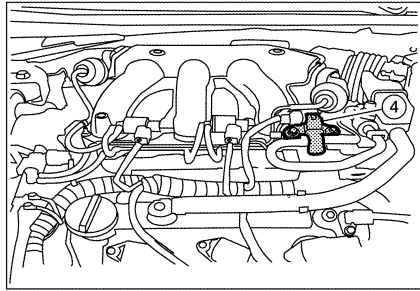
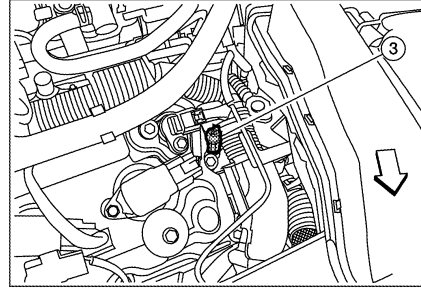
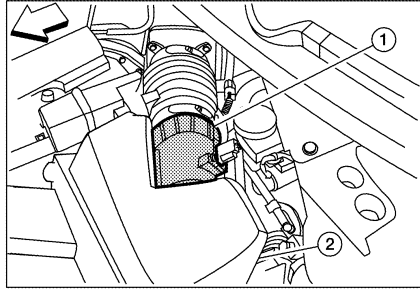
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| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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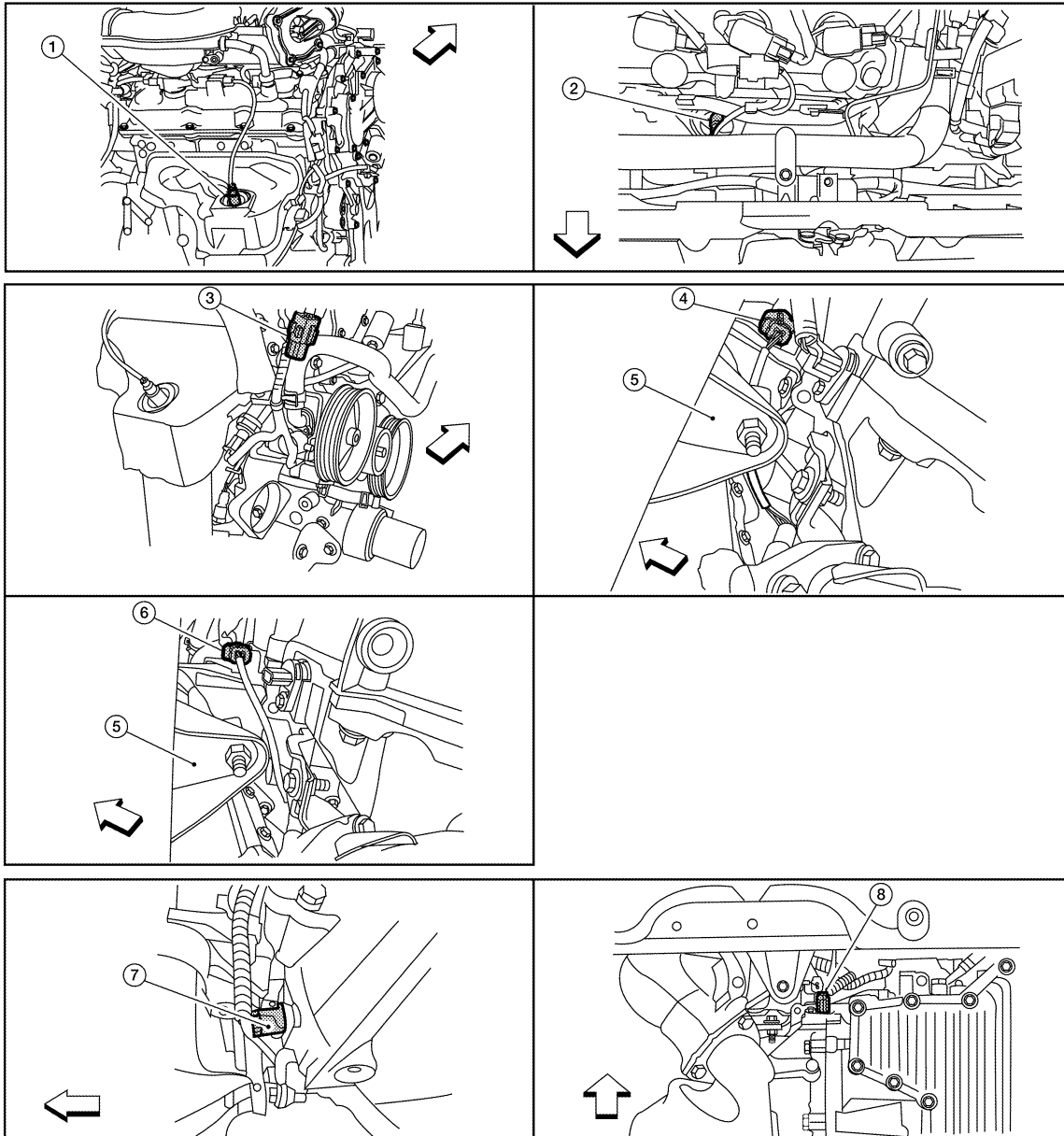
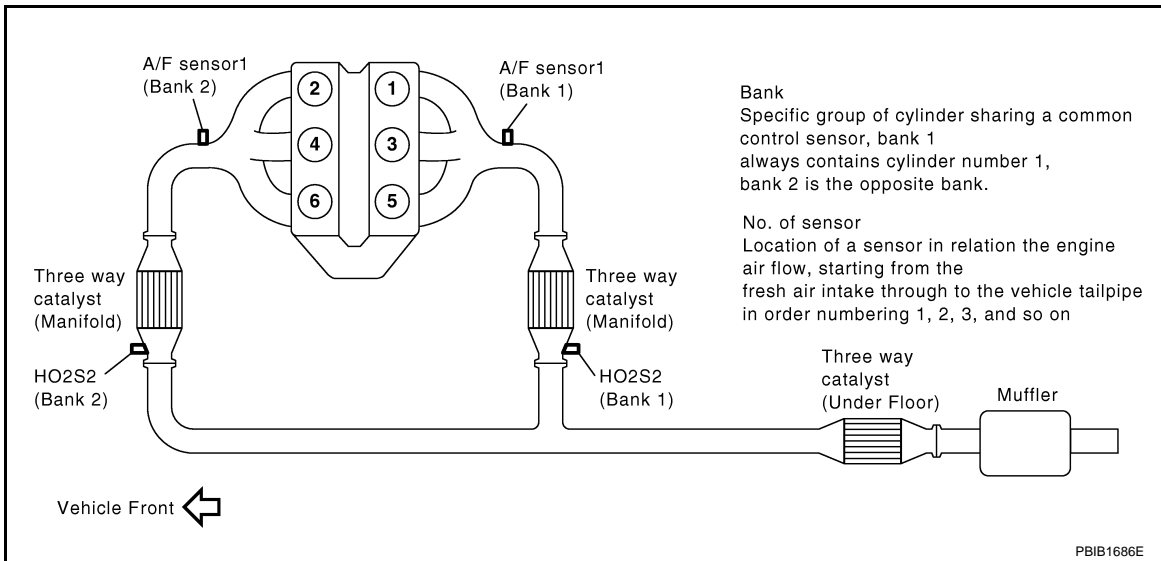
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|---|----------------------------|---|
| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

COOLING FAN CONTROL

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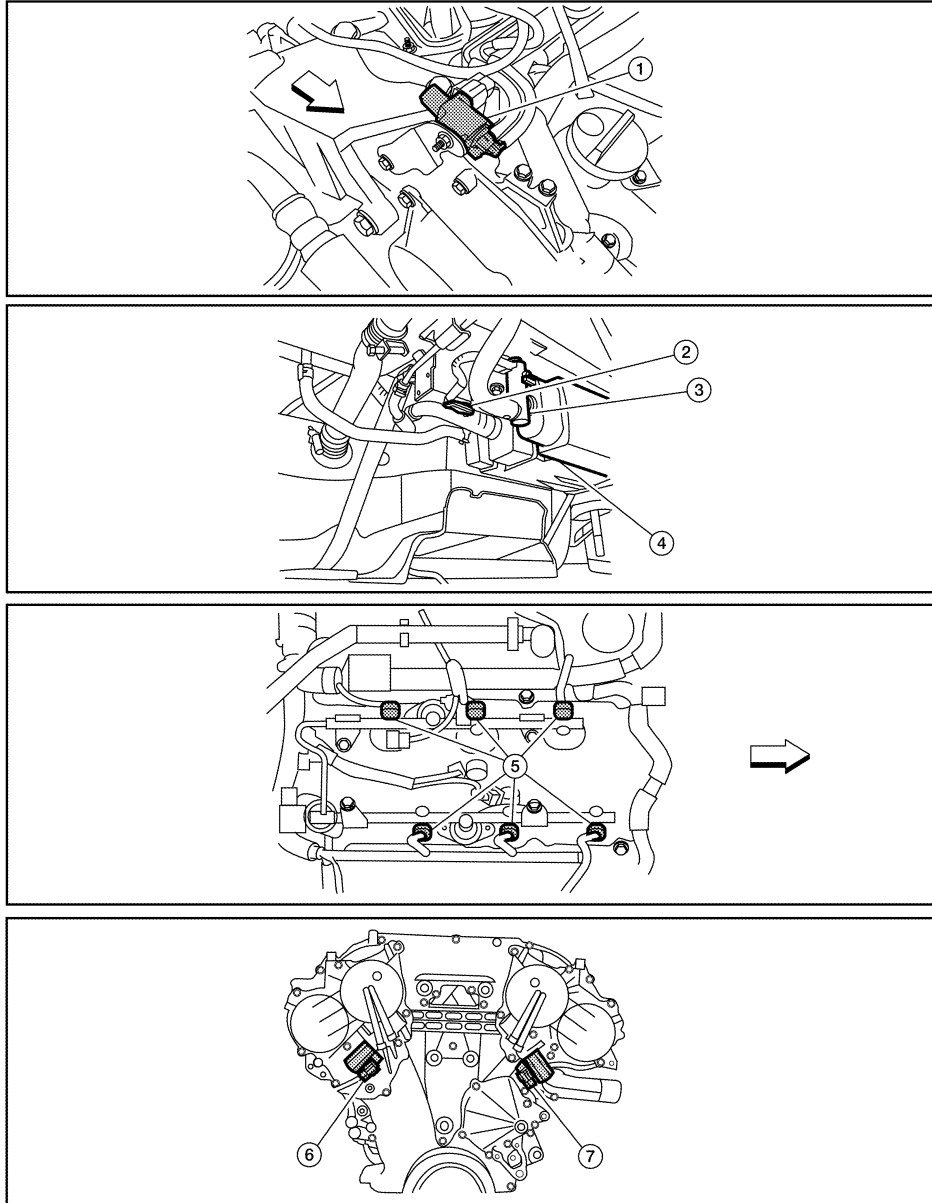
COOLING FAN CONTROL

[VQ35DE]

< FUNCTION DIAGNOSIS >

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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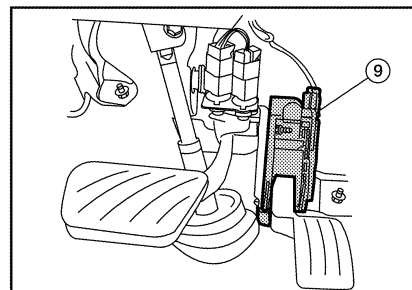
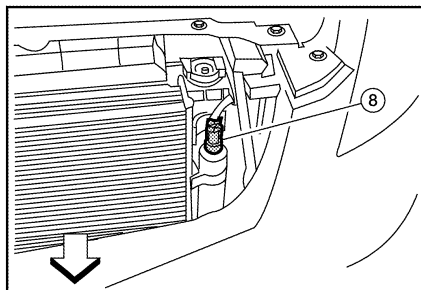
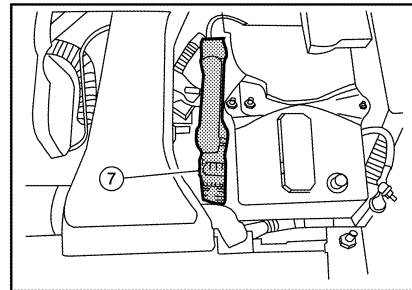
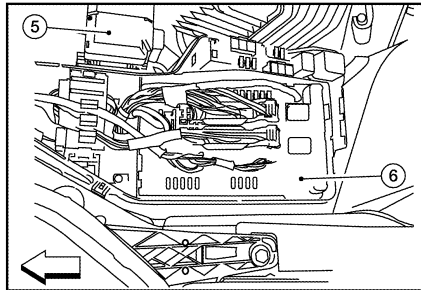
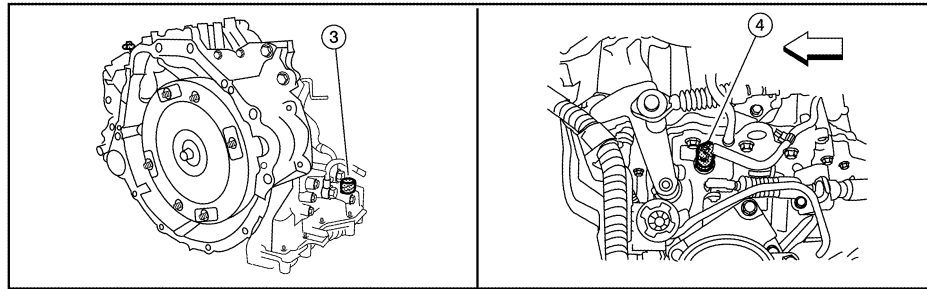
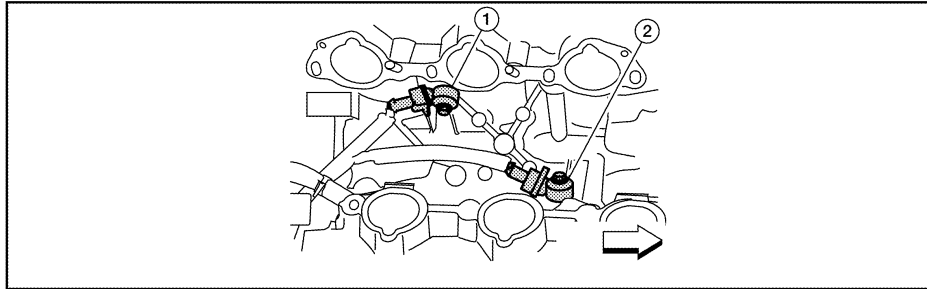
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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|----------------------------|---|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

↔ : Vehicle front

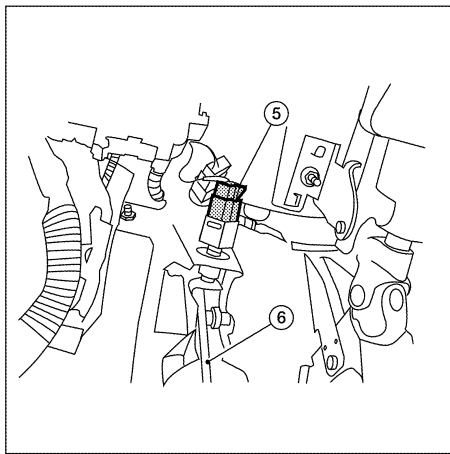
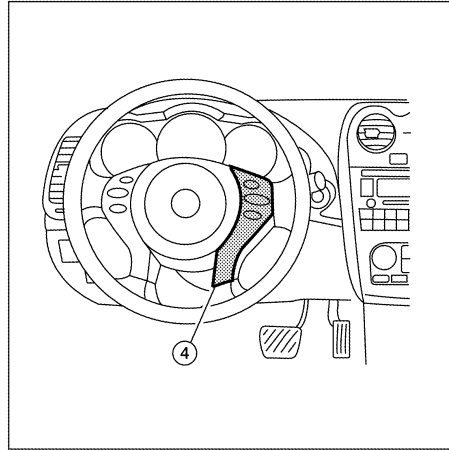
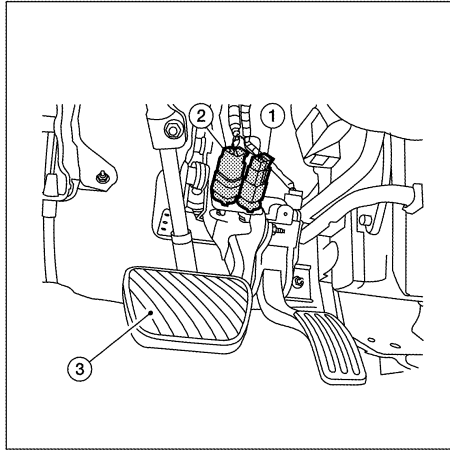
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COOLING FAN CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



- 1. ASCD brake switch
- 2. Stop lamp switch
- 3. Brake pedal
- 4. ASCD steering switch
- 5. ASCD clutch switch (M/T models)
- 6. Clutch pedal

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Component Description

INFOID:000000001343195

| Component | Reference |
|-----------------------------------|--|
| Camshaft position sensor (PHASE) | EC-1254. "Description" |
| Crankshaft position sensor (POS) | EC-1250. "Description" |
| Cooling fan motor | EC-1422. "Description" |
| Engine coolant temperature sensor | EC-1176. "Description" |
| Refrigerant pressure sensor | EC-1450. "Description" |

ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

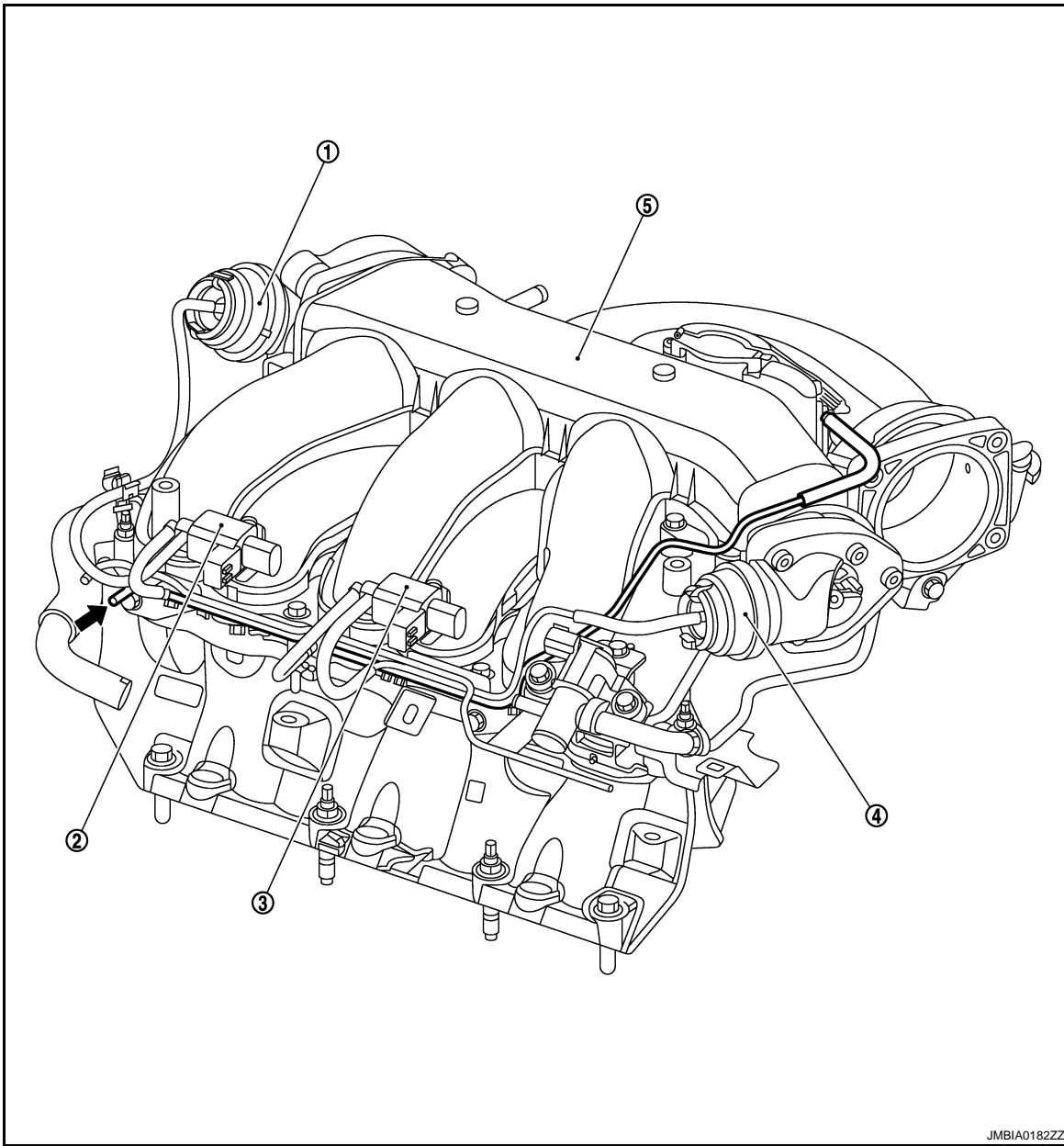
[VQ35DE]

ELECTRONIC CONTROLLED ENGINE MOUNT

System Diagram

INFOID:000000001343196

EVAOPRATIVE EMISSION LINE DRAWING



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

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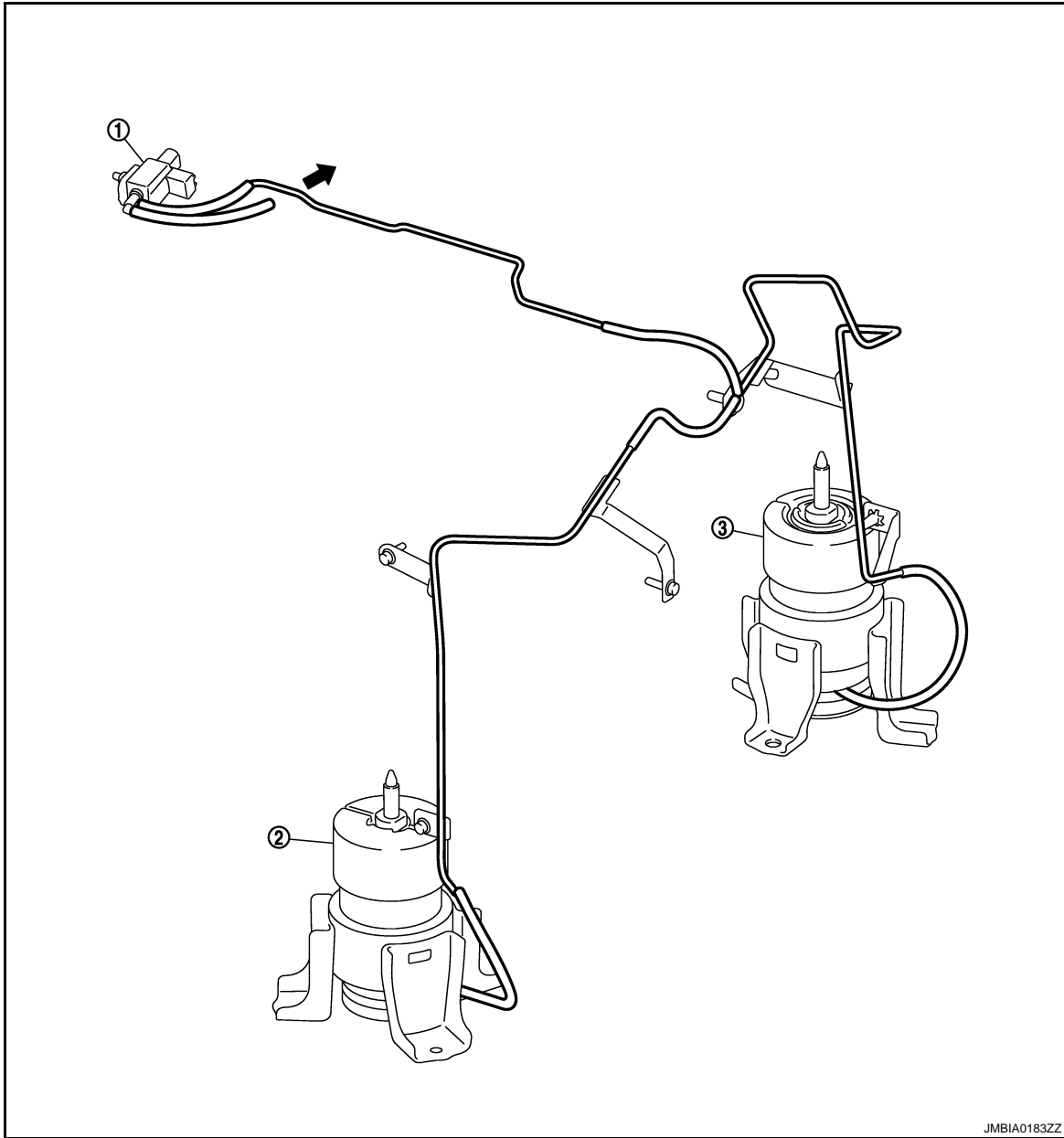
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ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

[VQ35DE]



1. Electronic controlled engine mount control solenoid valve 2. Front electronic controlled engine mount 3. Rear electronic controlled engine mount

← : To previous page

NOTE:

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

System Description

INFOID:000000001343197

INPUT/OUTPUT SIGNAL CHART

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

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

SYSTEM DESCRIPTION

ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

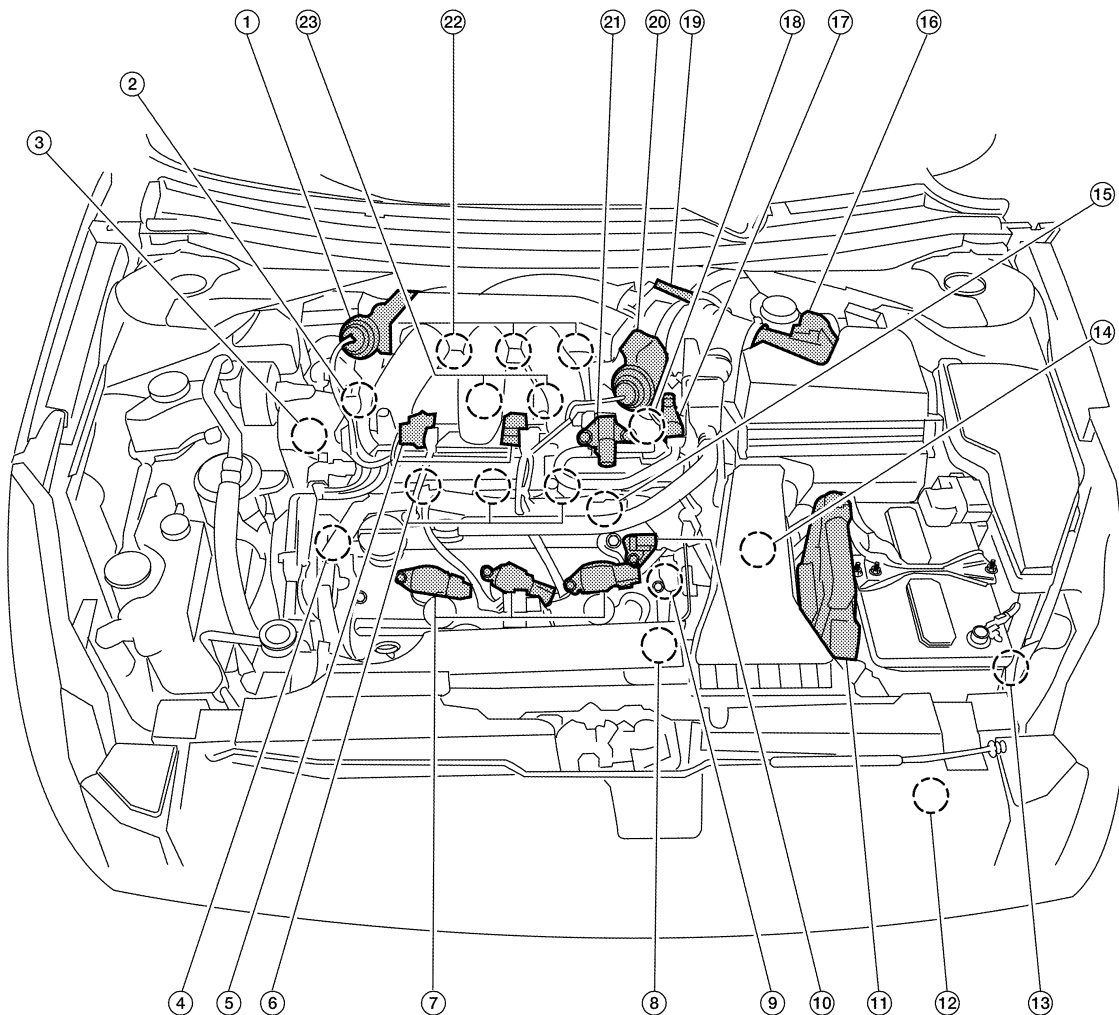
[VQ35DE]

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

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

Component Parts Location

INFOID:000000001690041



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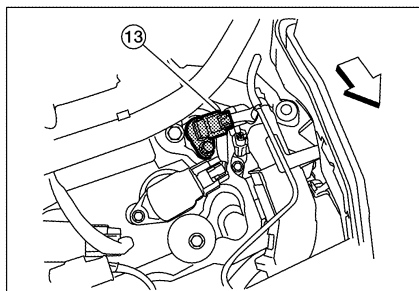
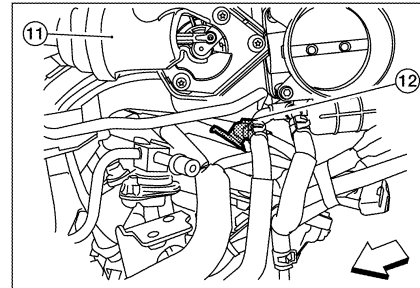
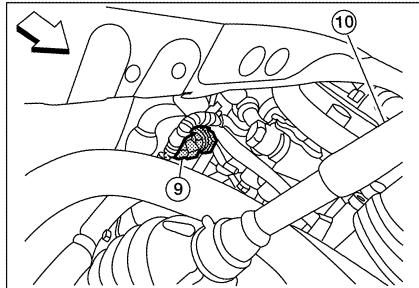
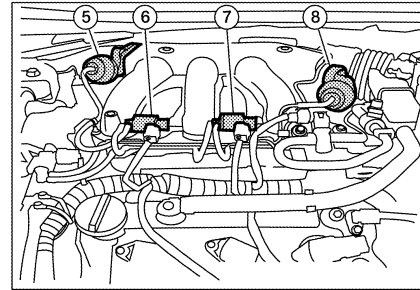
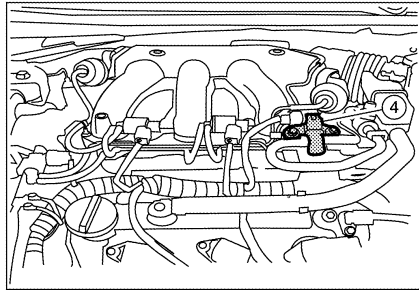
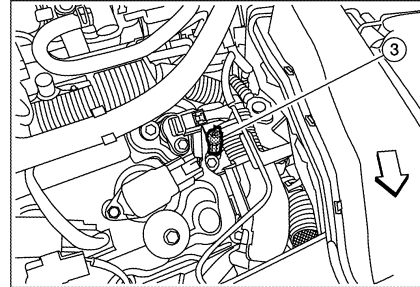
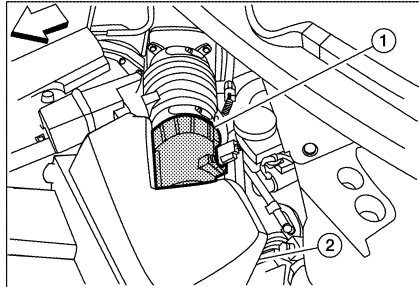
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| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |

ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ35DE]

< FUNCTION DIAGNOSIS >

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|---|----------------------------|---|
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |



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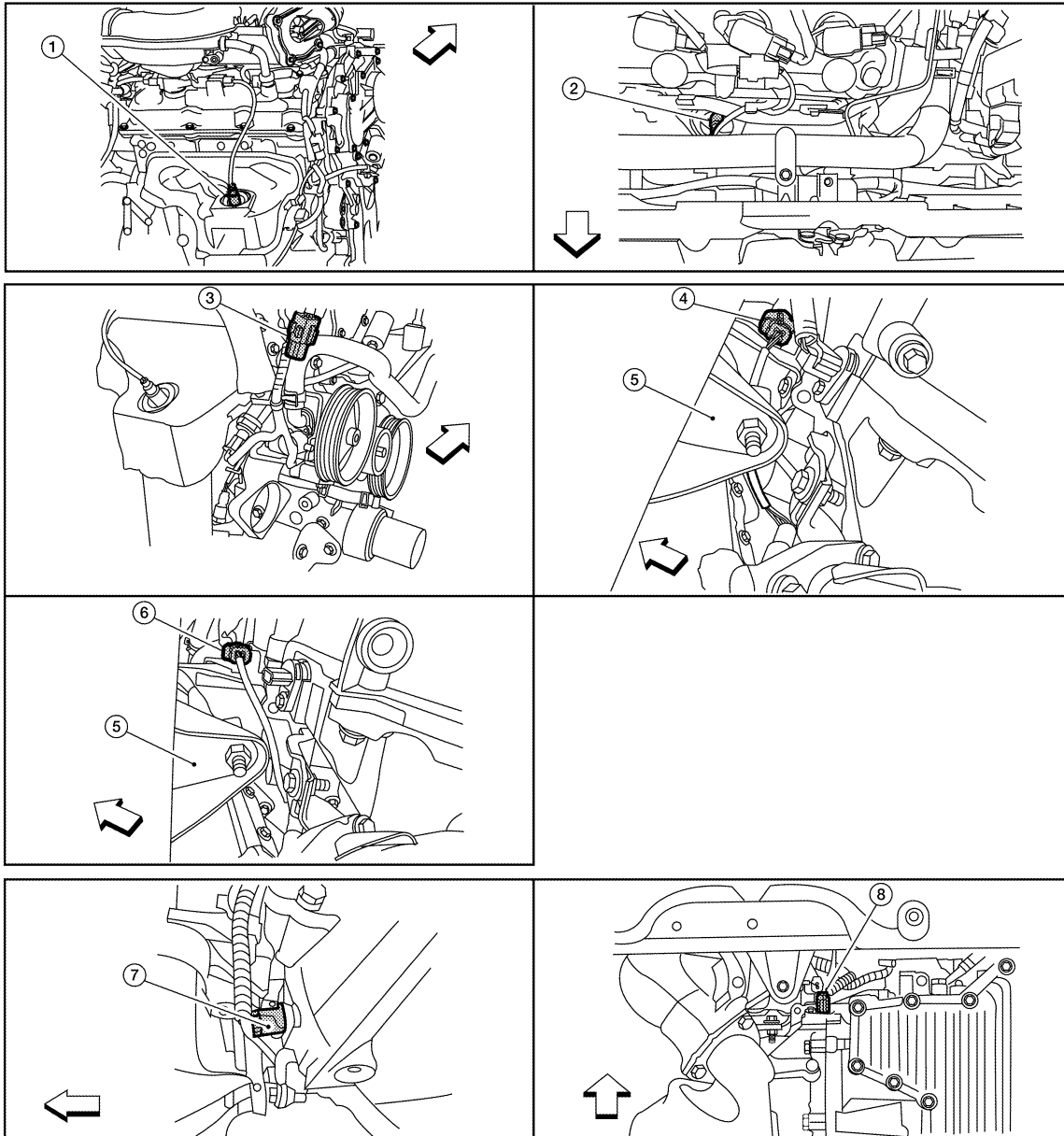
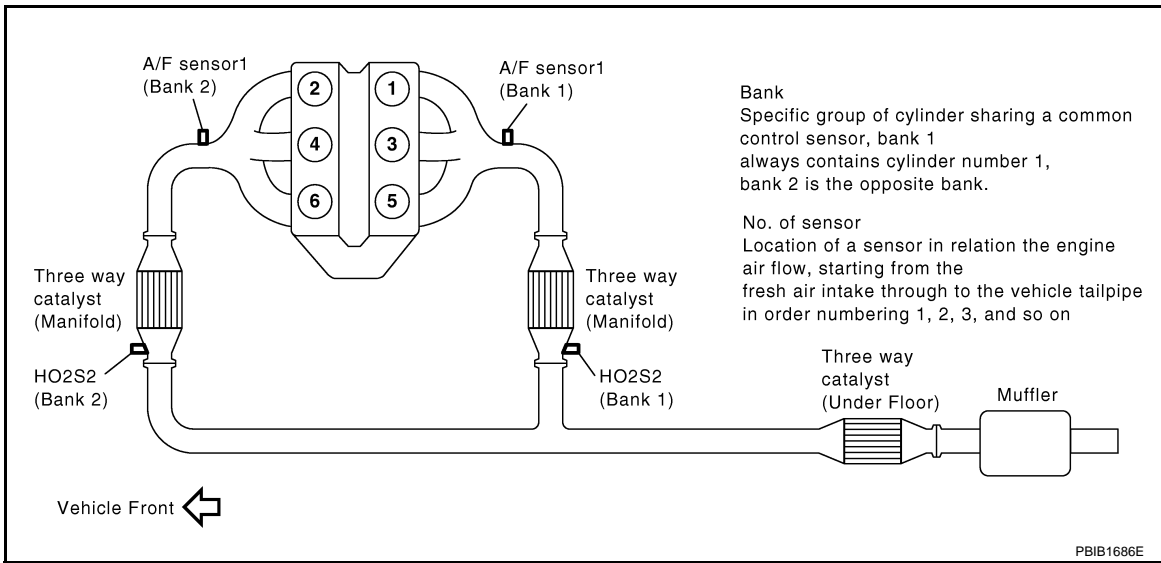
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| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

[VQ35DE]



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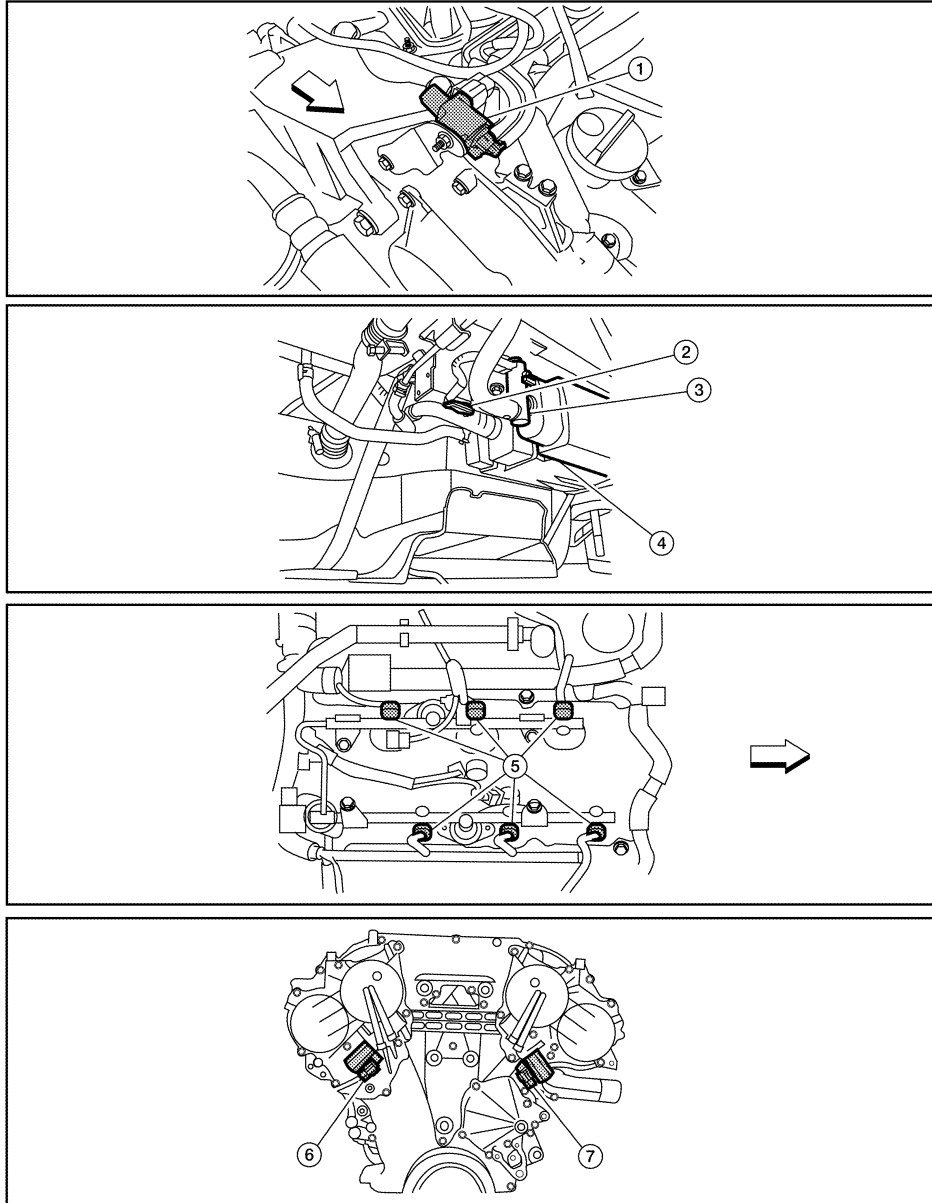
ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ35DE]

< FUNCTION DIAGNOSIS >

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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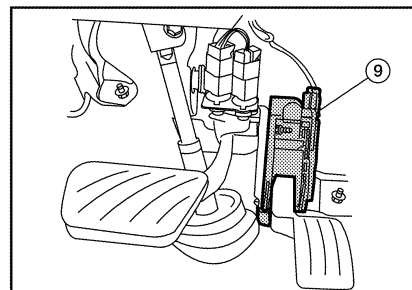
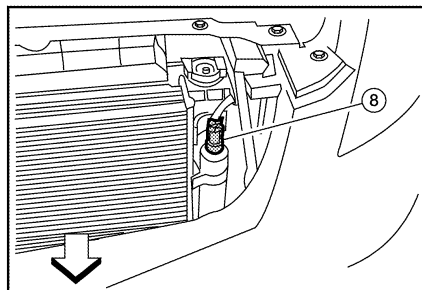
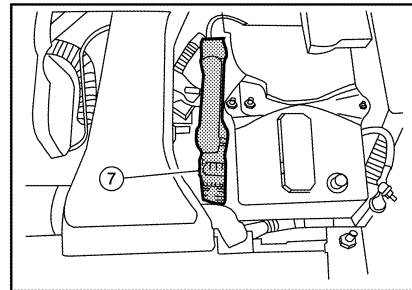
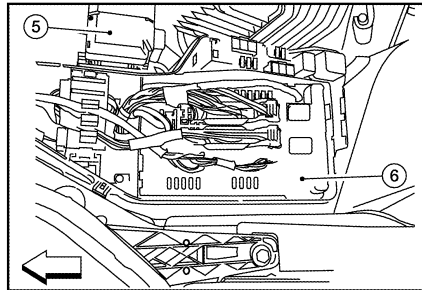
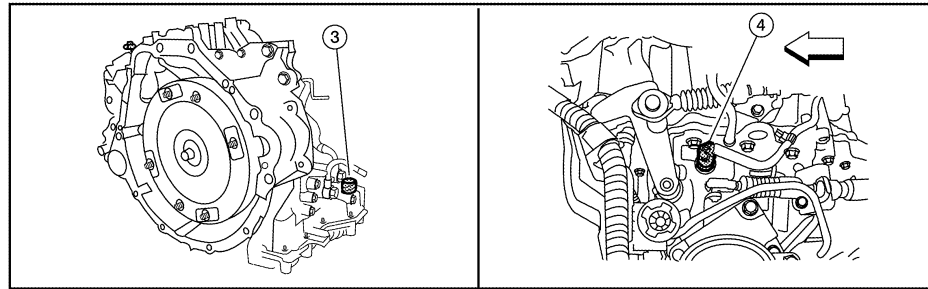
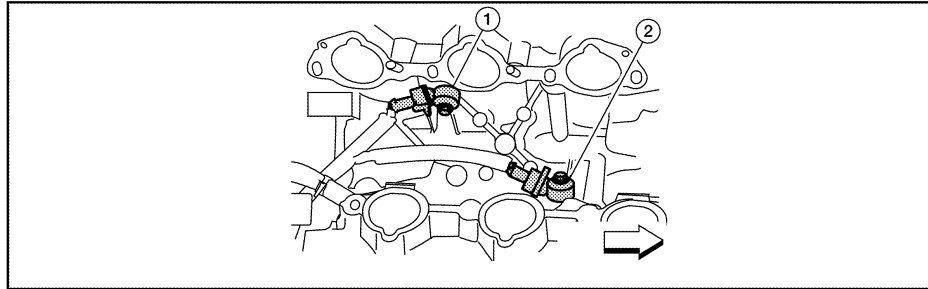
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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|----------------------------|---|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

↶ : Vehicle front

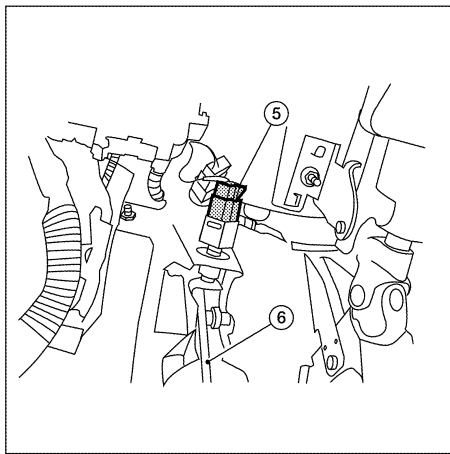
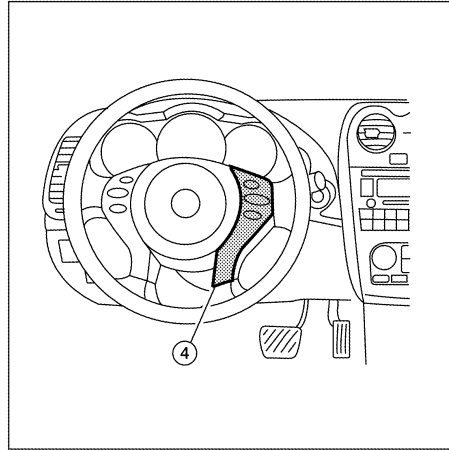
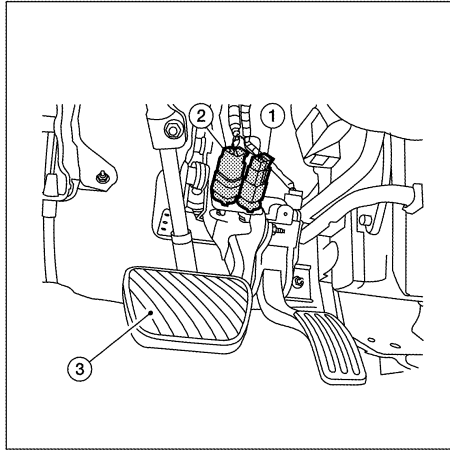
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ELECTRONIC CONTROLLED ENGINE MOUNT

< FUNCTION DIAGNOSIS >

[VQ35DE]



- | | | |
|-------------------------|------------------------------------|-----------------|
| 1. ASCD brake switch | 2. Stop lamp switch | 3. Brake pedal |
| 4. ASCD steering switch | 5. ASCD clutch switch (M/T models) | 6. Clutch pedal |

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Component Description

INFOID:000000001343199

| Component | Reference |
|---|--|
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Electronic controlled engine mount control solenoid valve | EC-1428, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |

EVAPORATIVE EMISSION SYSTEM

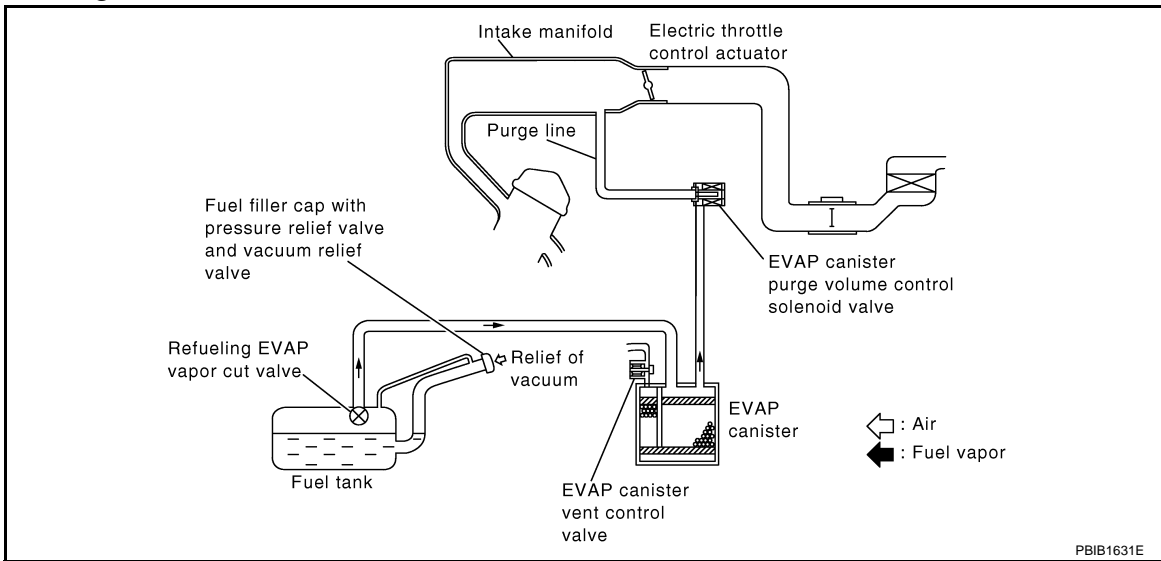
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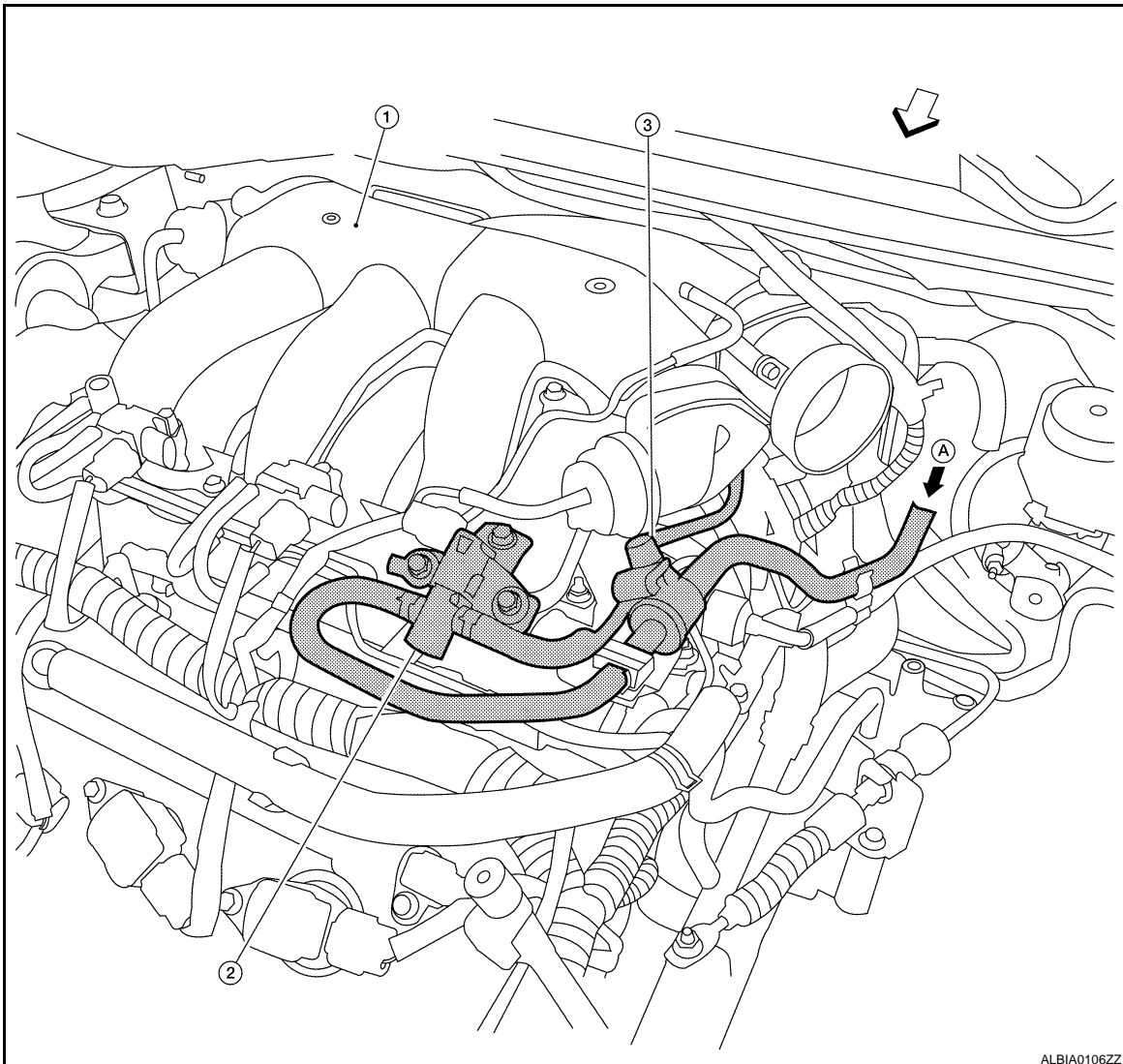
EVAPORATIVE EMISSION SYSTEM

System Diagram

INFOID:000000001343200



EVAOPRATIVE EMISSION LINE DRAWING



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EVAPORATIVE EMISSION SYSTEM

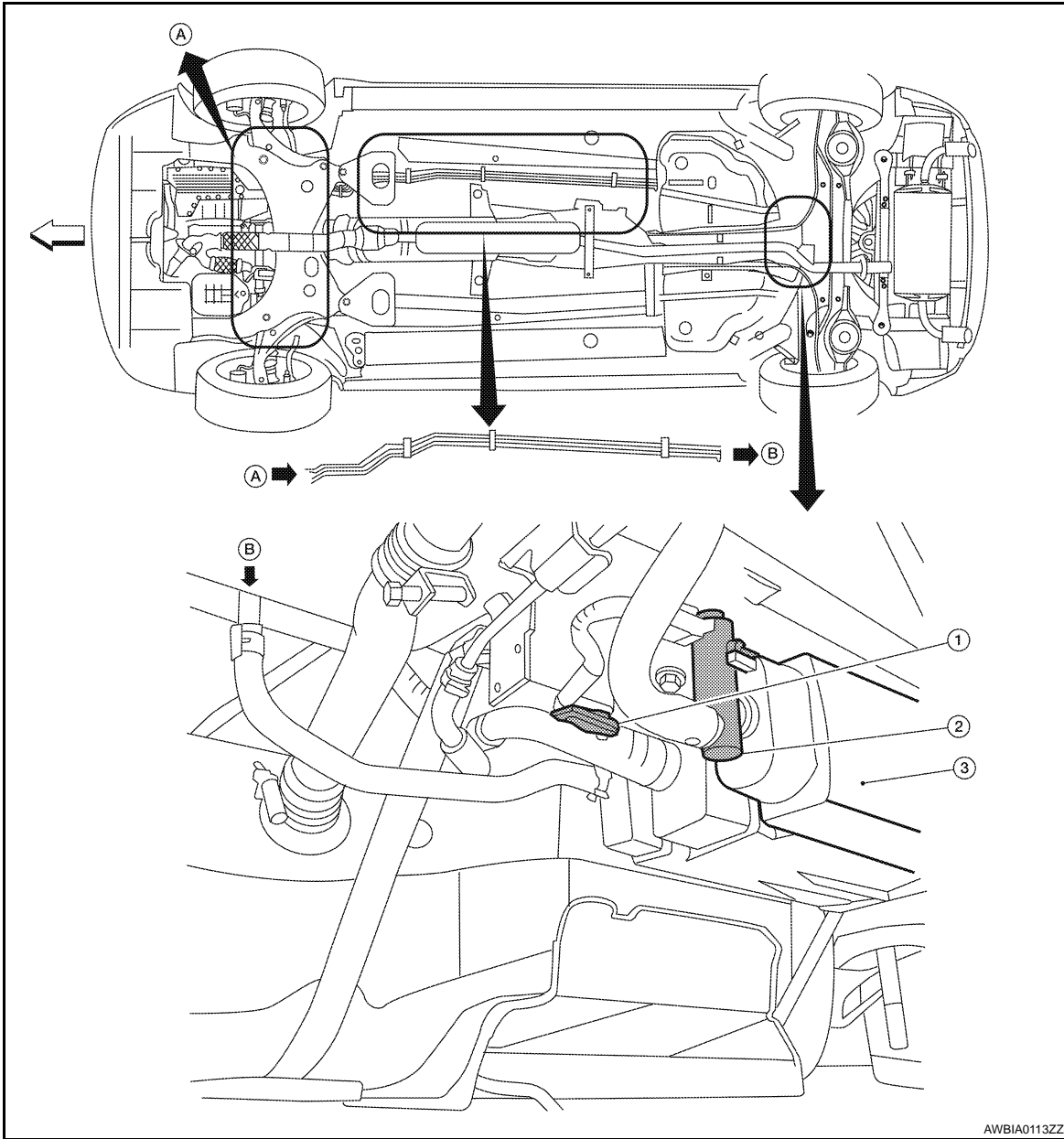
[VQ35DE]

< FUNCTION DIAGNOSIS >

1. Intake manifold collector
2. EVAP canister purge volume control
3. EVAP service port solenoid valve

↶ : Vehicle front

➡ : From next figure



1. EVAP control system pressure sensor
2. EVAP canister vent control valve
3. EVAP canister

↶ : Vehicle front

➡ : To previous figure

NOTE:

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

System Description

INFOID:000000001343201

INPUT/OUTPUT SIGNAL CHART

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|---|-------------------------------------|--|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed*1 | EVAP canister purge flow control | EVAP canister purge vol- ume control solenoid valve |
| Mass air flow sensor | Amount of intake air | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| Battery | Battery voltage*1 | | |
| Throttle position sensor | Throttle position | | |
| Accelerator pedal position sensor | Accelerator pedal position | | |
| Air fuel ratio (A/F) sensor 1 | Density of oxygen in exhaust gas (Mixture ratio feedback signal) | | |
| Fuel tank temperature sensor | Fuel temperature in fuel tank | | |
| EVAP control system pressure sensor | Pressure in purge line | | |
| 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 through CAN communication line.

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.

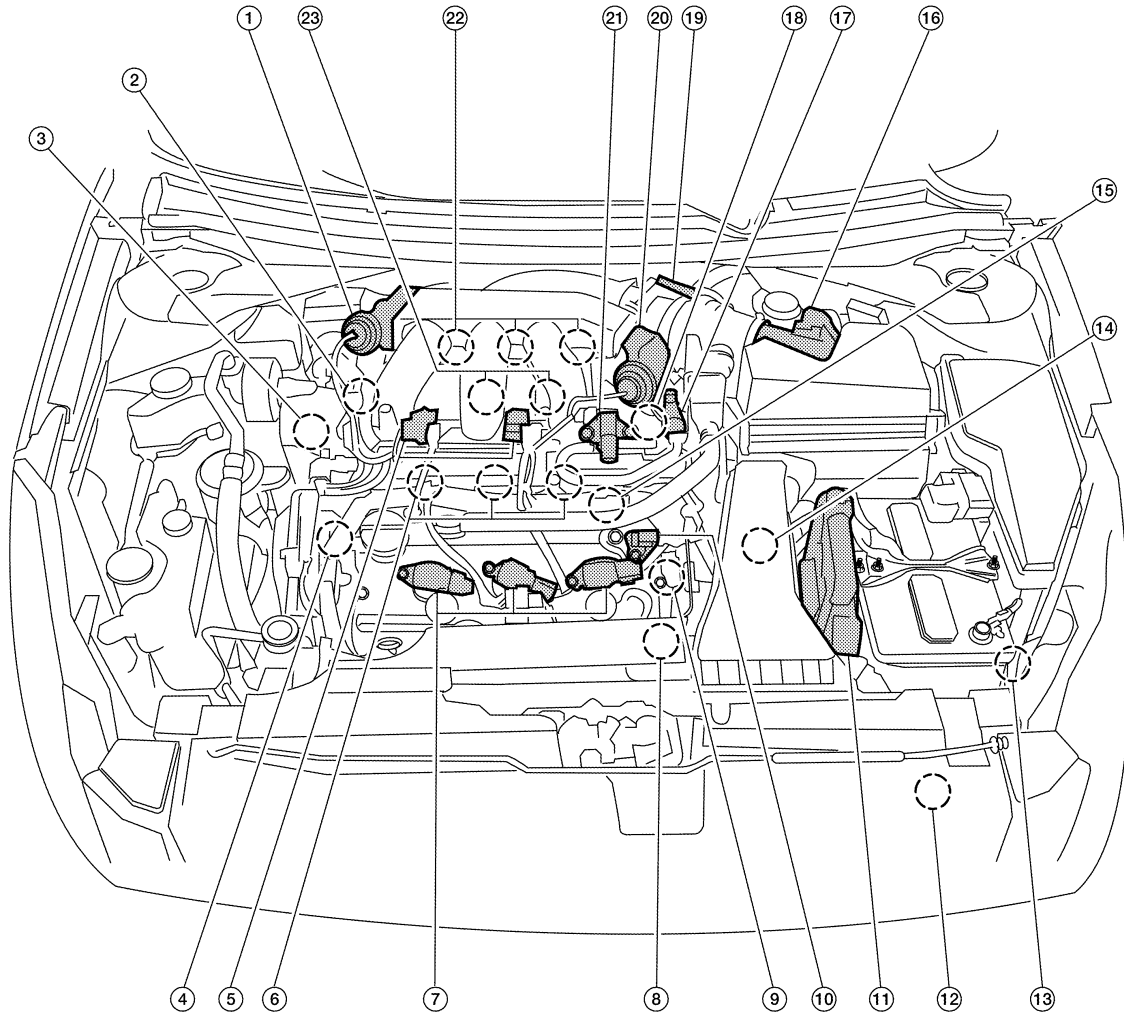
EVAPORATIVE EMISSION SYSTEM

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[VQ35DE]

Component Parts Location

INFOID:000000001690042



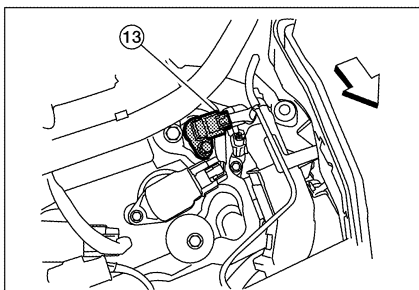
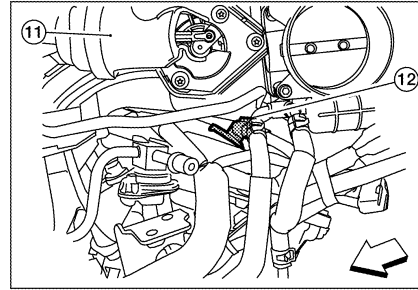
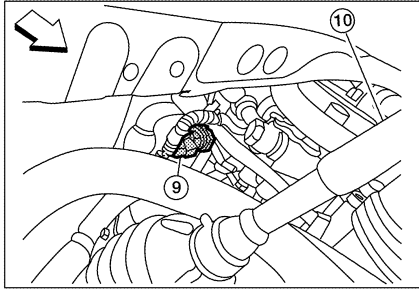
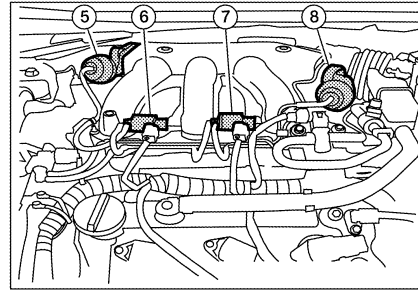
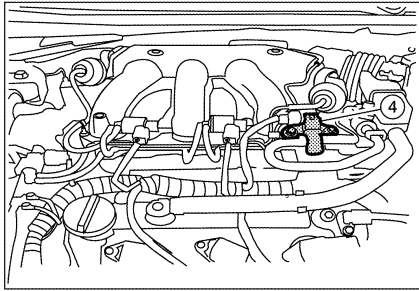
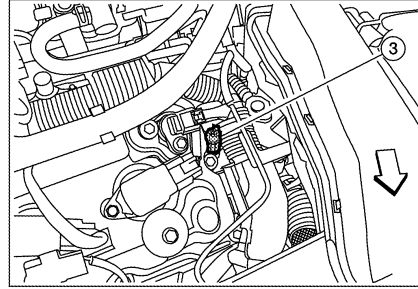
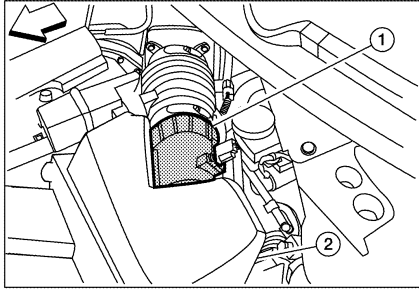
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|---|--|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|---|----------------------------|---|
| 1. Maf air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↖ : Vehicle front

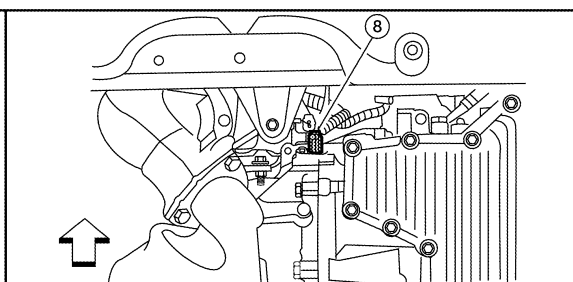
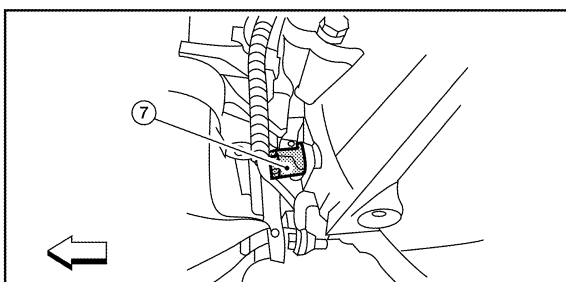
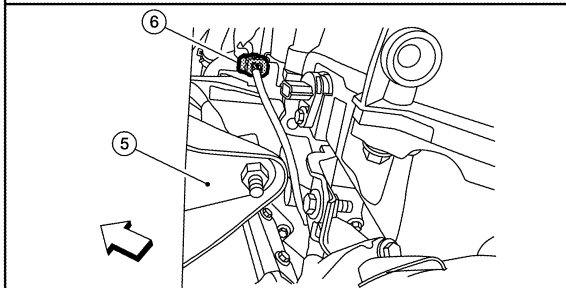
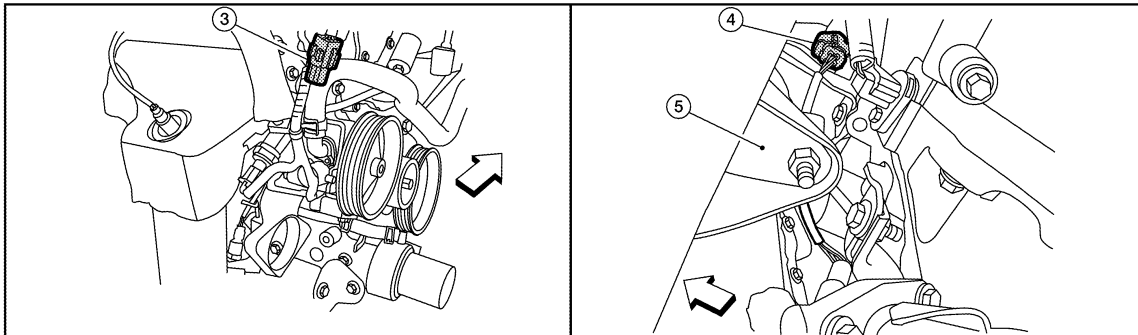
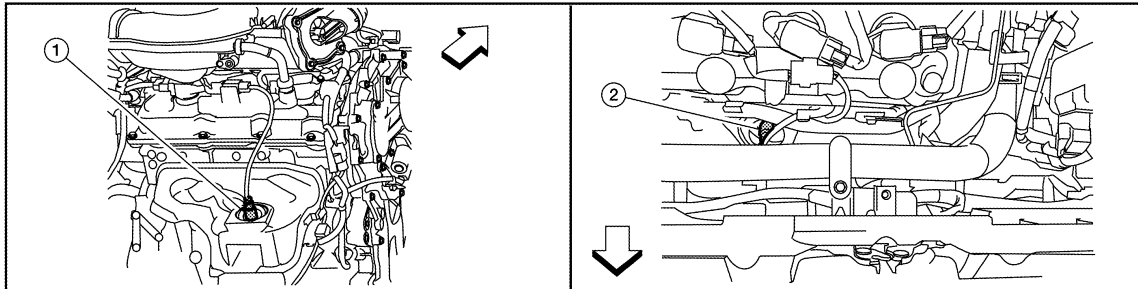
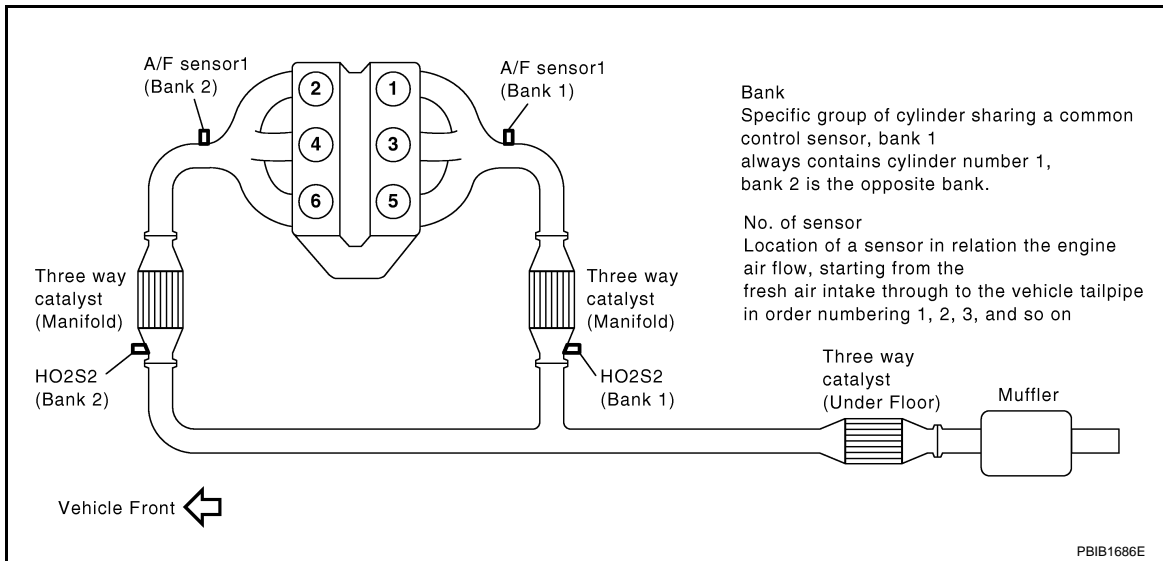
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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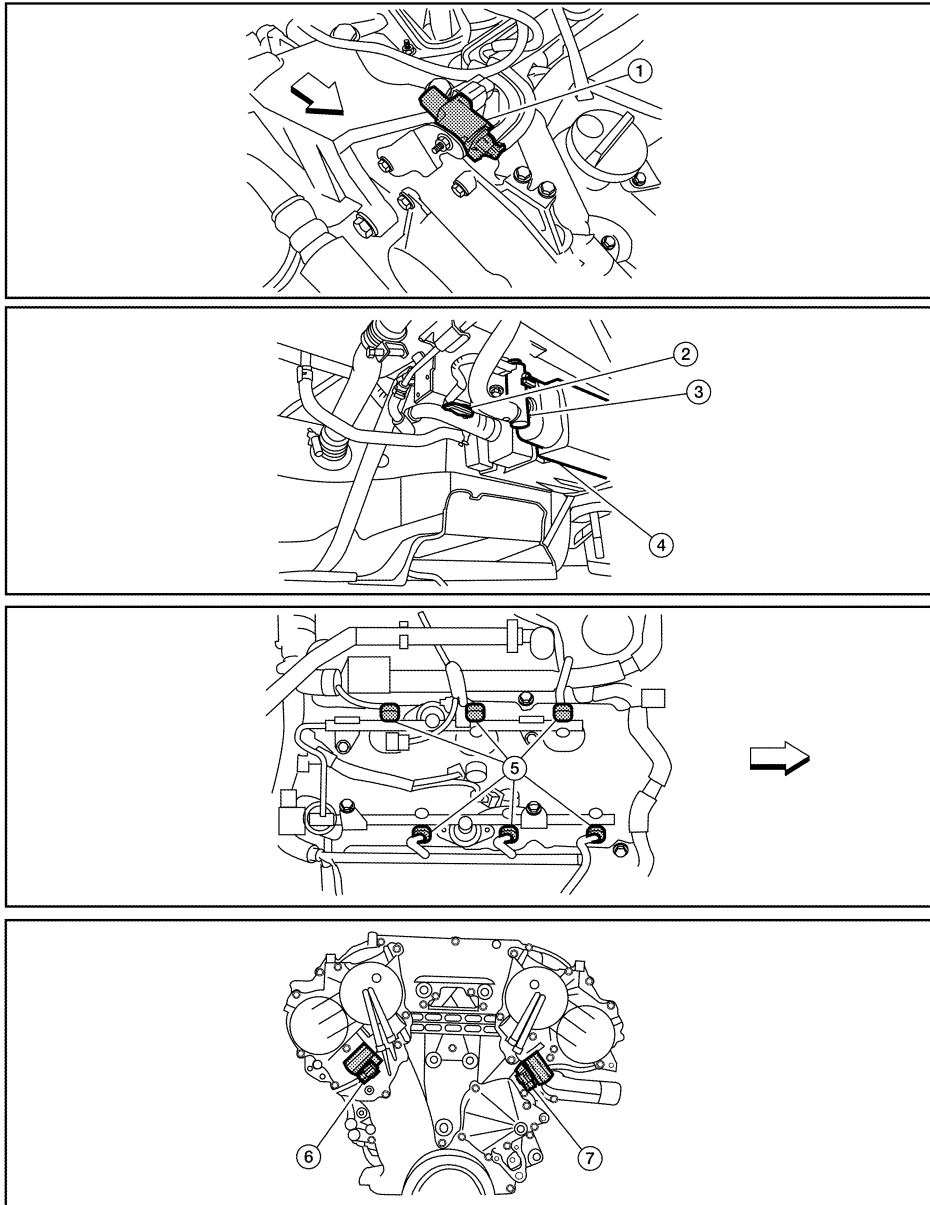
EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

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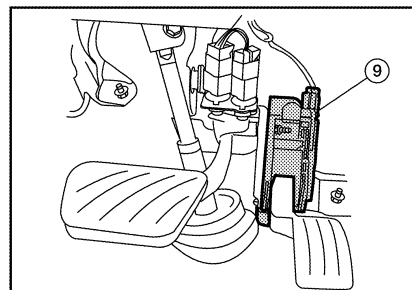
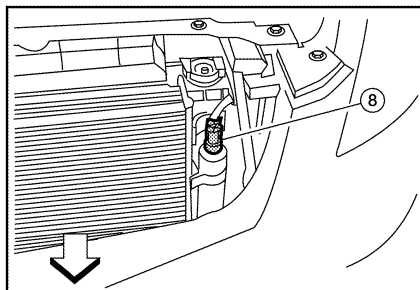
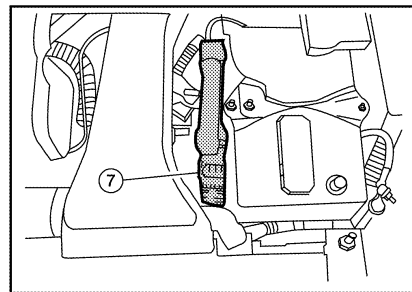
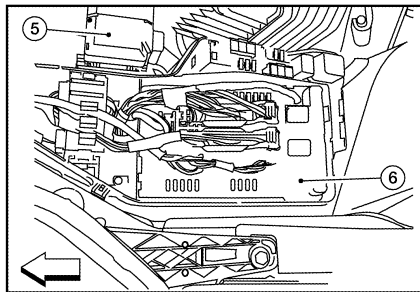
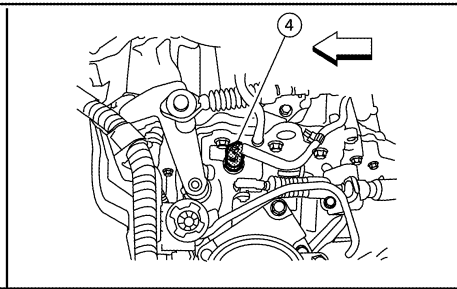
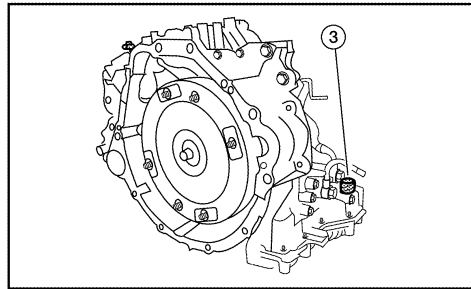
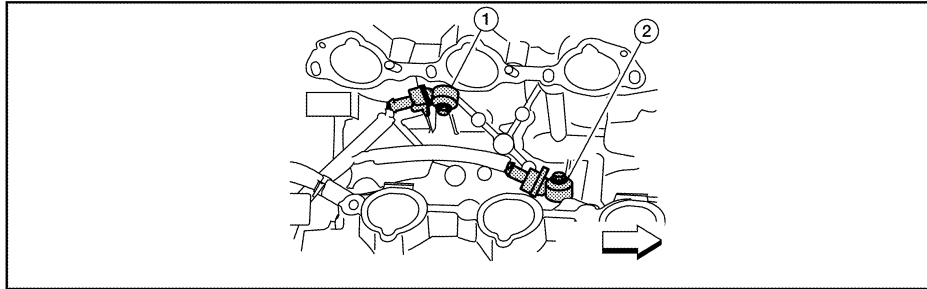
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EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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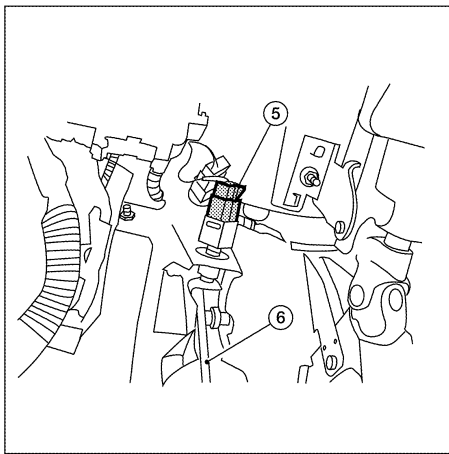
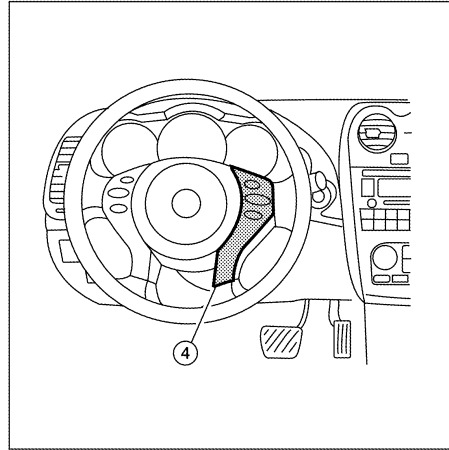
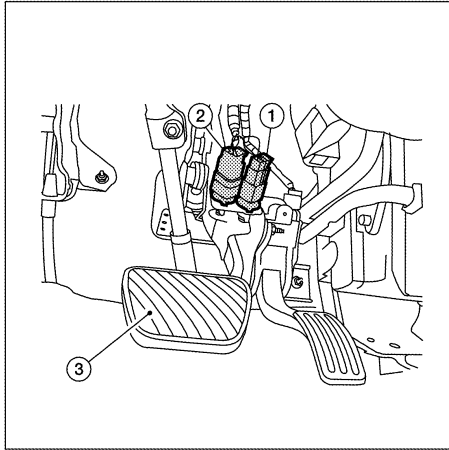
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|----------------------------|--|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

⇐ : Vehicle front

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



- 1. ASCD brake switch
- 2. Stop lamp switch
- 3. Brake pedal
- 4. ASCD steering switch
- 5. ASCD clutch switch (M/T models)
- 6. Clutch pedal

Component Description

ALBIA0105ZZ

INFOID:000000001343203

| Component | Reference |
|---|--|
| A/F sensor 1 | EC-1189, "Description" |
| Accelerator pedal position sensor | EC-1409, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| EVAP canister purge volume control solenoid valve | EC-1278, "Description" |
| EVAP control system pressure sensor | EC-1289, "Description" |
| Fuel tank temperature sensor | EC-1232, "Description" |

EVAPORATIVE EMISSION SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Component | Reference |
|--------------------------|--|
| Mass air flow sensor | EC-1162. "Description" |
| Throttle position sensor | EC-1406. "Description" |
| Vehicle speed sensor | EC-1321. "Description" |

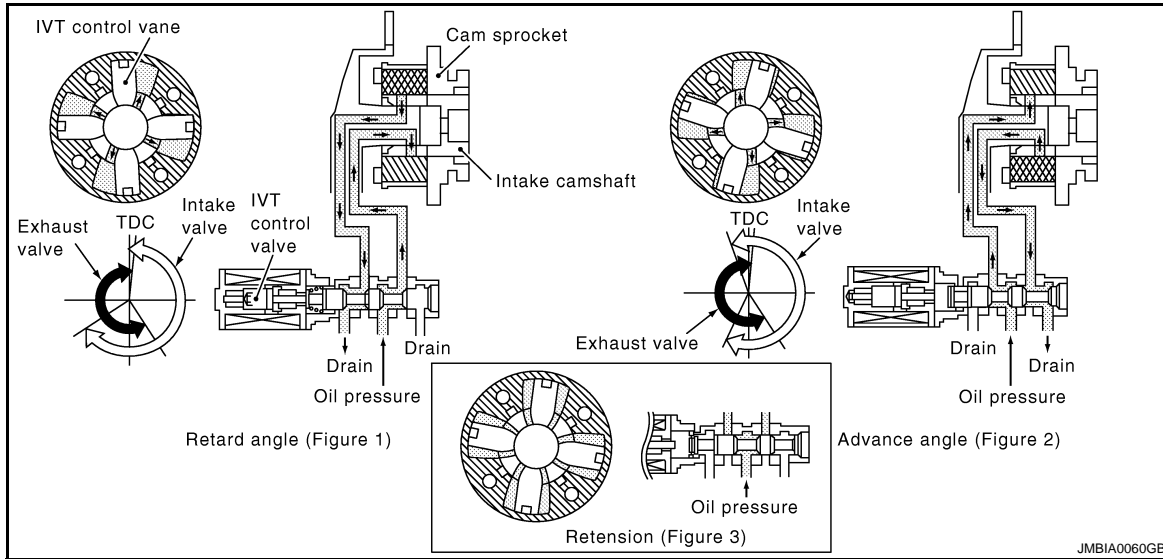
INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]

INTAKE VALVE TIMING CONTROL

System Diagram



System Description

INFOID:000000001343205

INPUT/OUTPUT SIGNAL CHART

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

*: This signal is sent to the ECM through 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.

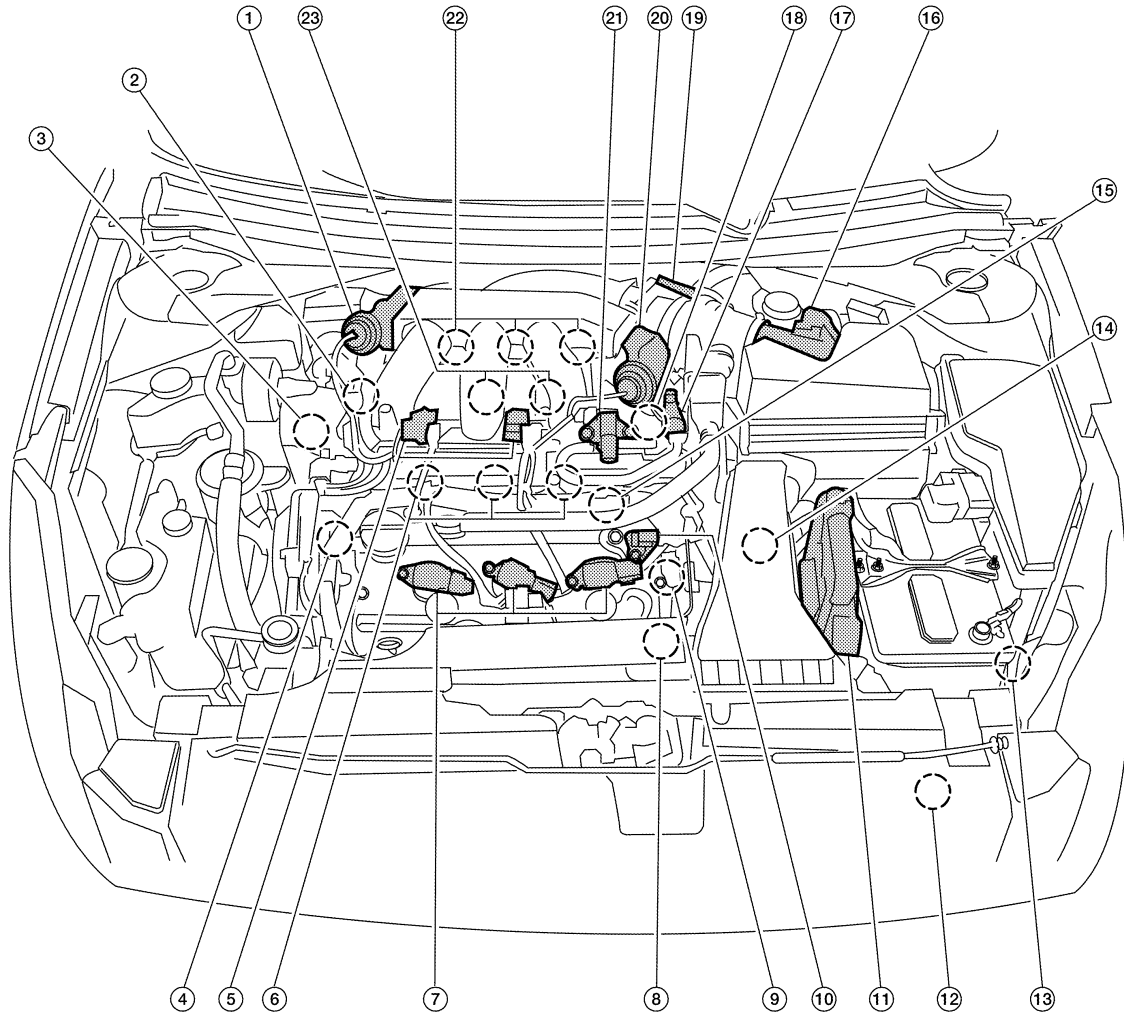
INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]

Component Parts Location

INFOID:000000001690043



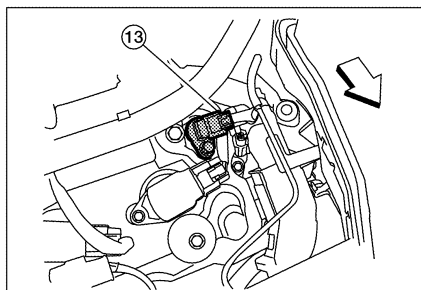
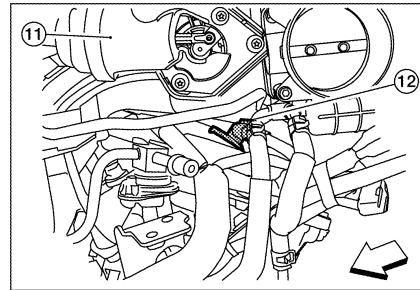
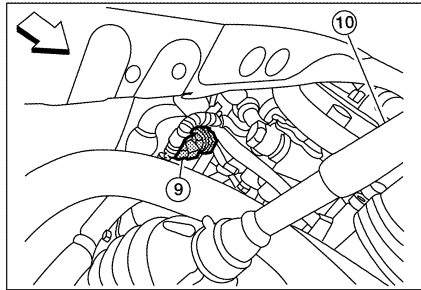
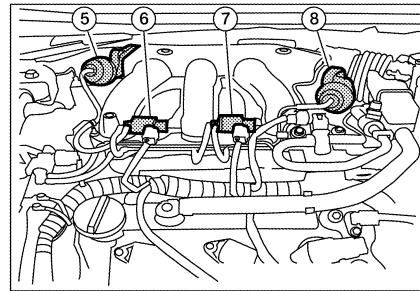
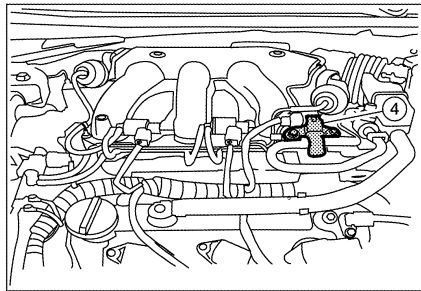
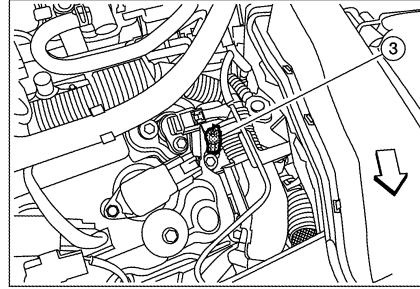
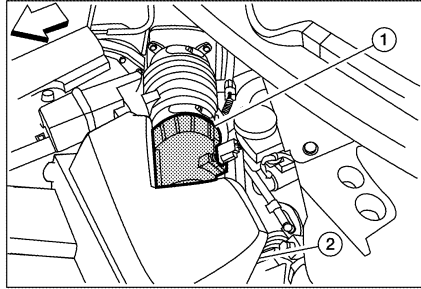
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|---|---|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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| 1. Mas air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

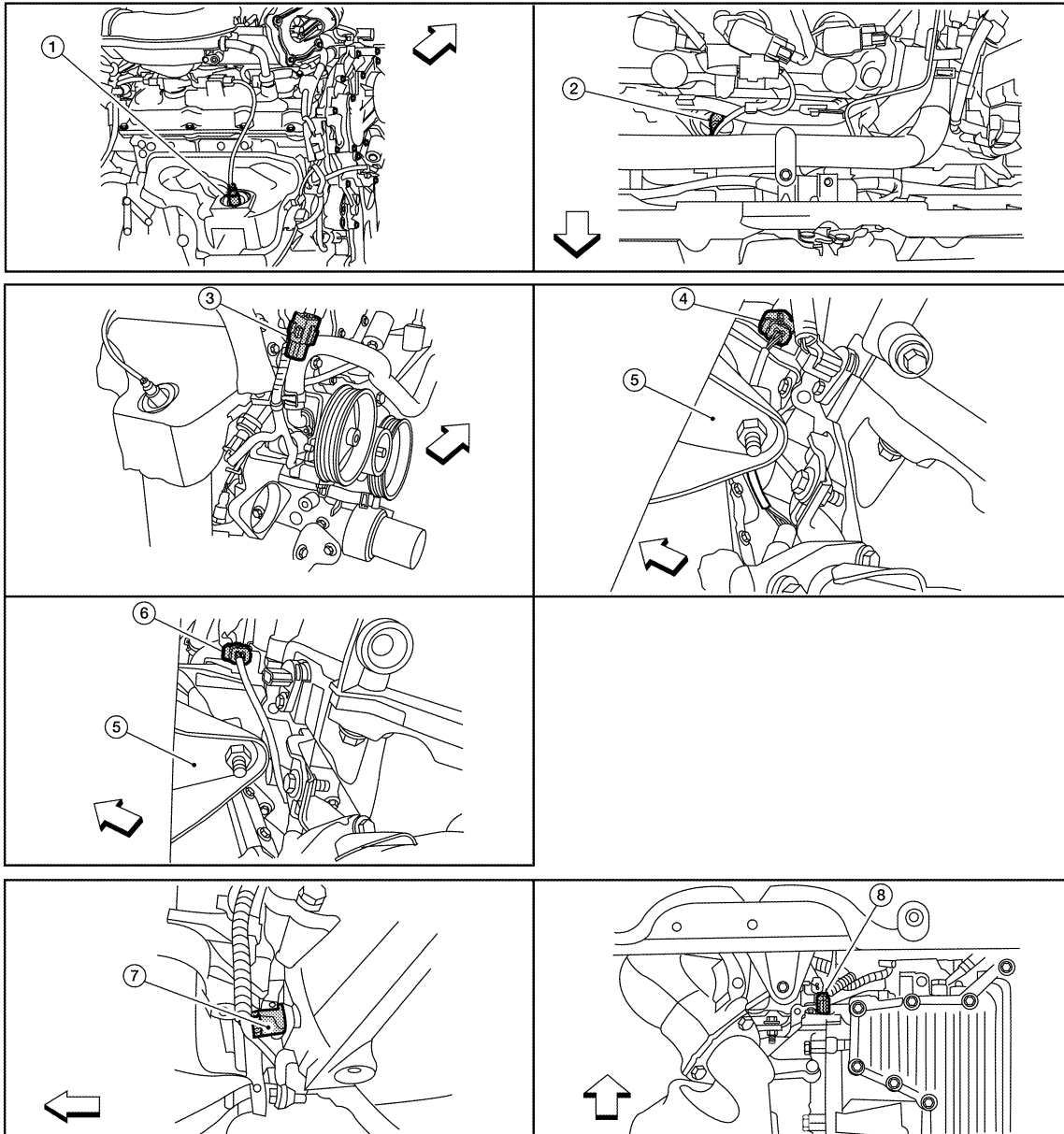
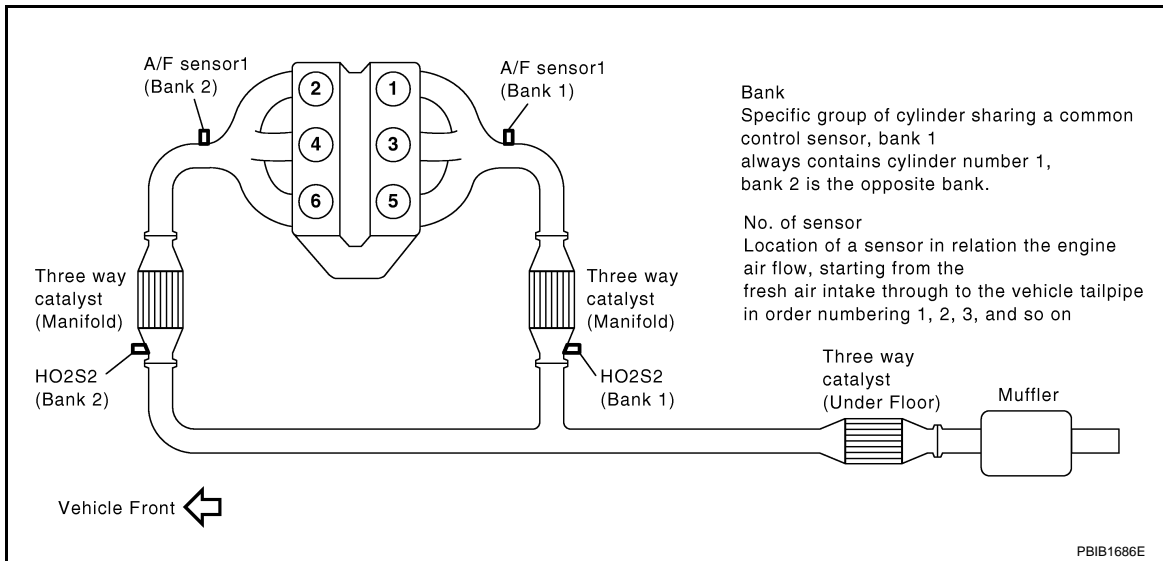
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INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



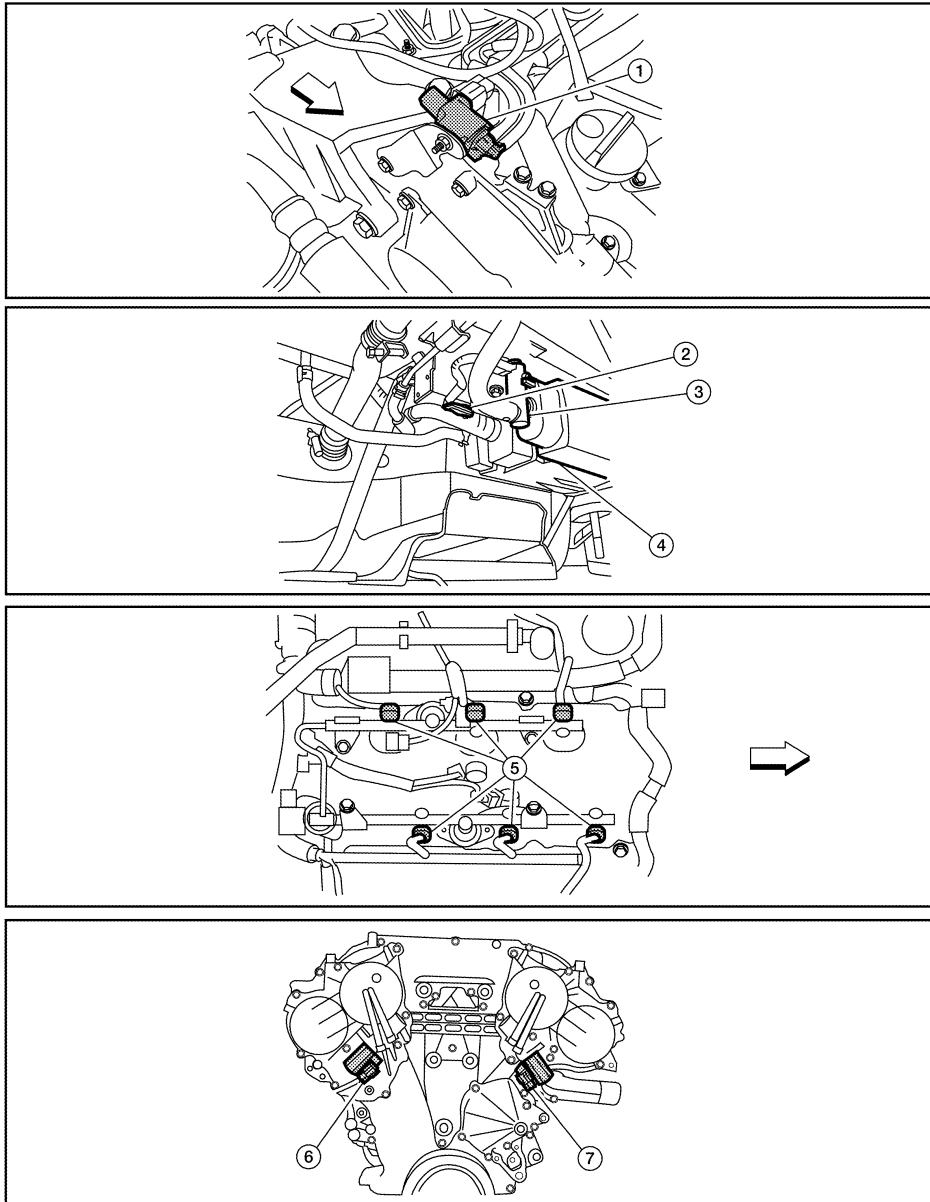
INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

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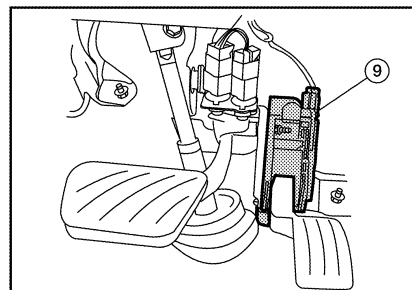
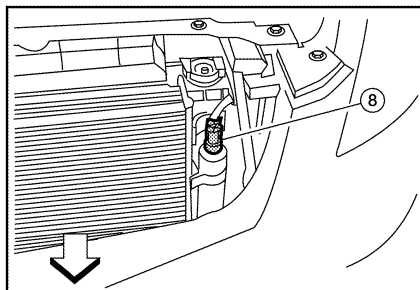
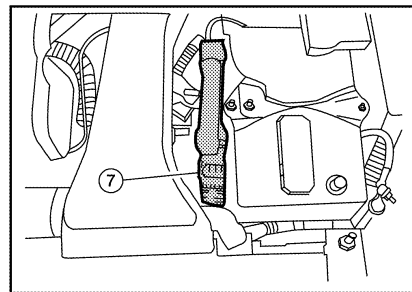
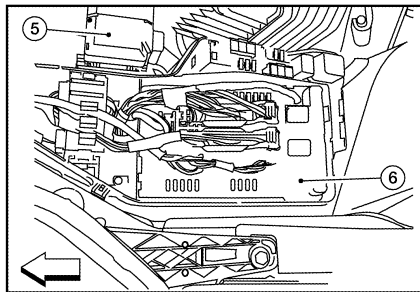
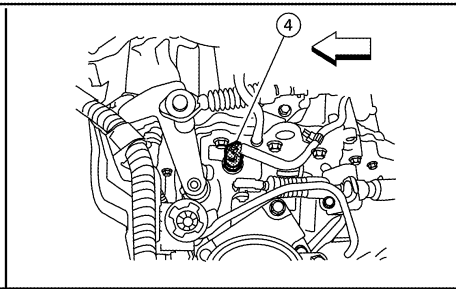
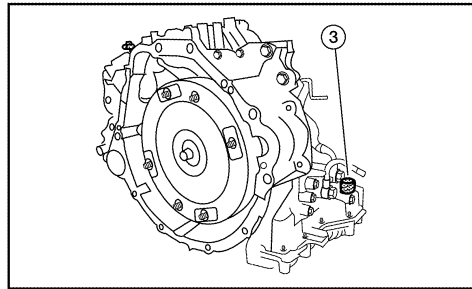
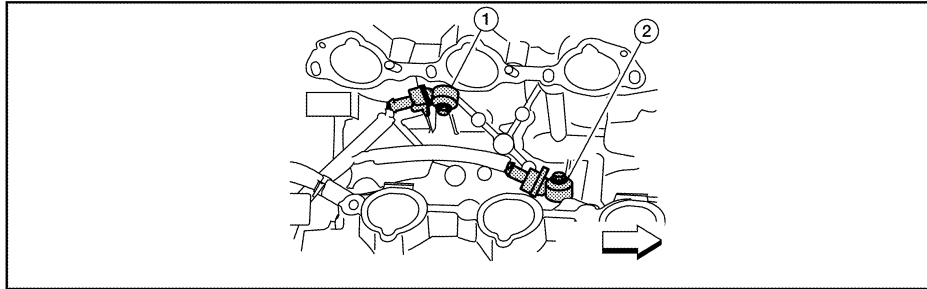
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INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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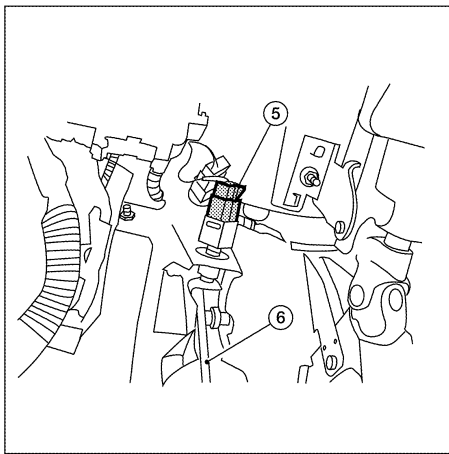
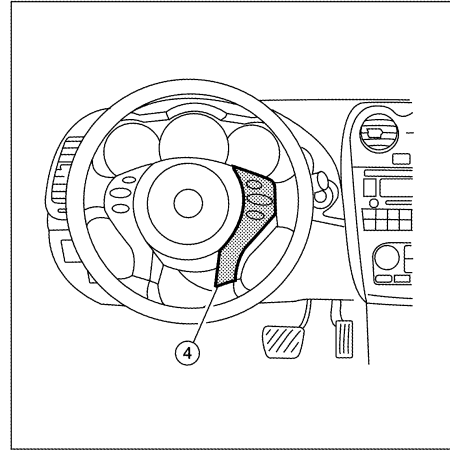
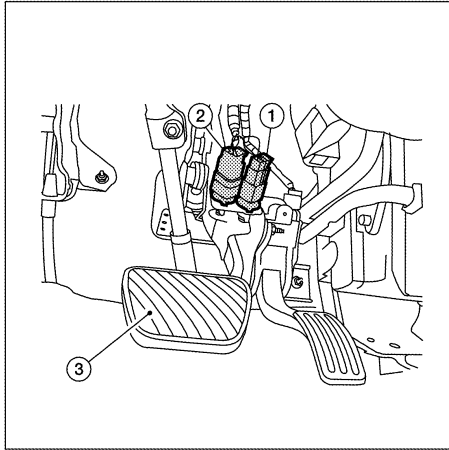
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|----------------------------|--|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

⇐ : Vehicle front

INTAKE VALVE TIMING CONTROL

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|-------------------------|------------------------------------|-----------------|
| 1. ASCD brake switch | 2. Stop lamp switch | 3. Brake pedal |
| 4. ASCD steering switch | 5. ASCD clutch switch (M/T models) | 6. Clutch pedal |

Component Description

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INFOID:000000001343207

| Component | Reference |
|--|--|
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| Intake valve timing control solenoid valve | EC-1159, "Description" |
| Vehicle speed sensor | EC-1321, "Description" |

VARIABLE INDUCTION AIR SYSTEM

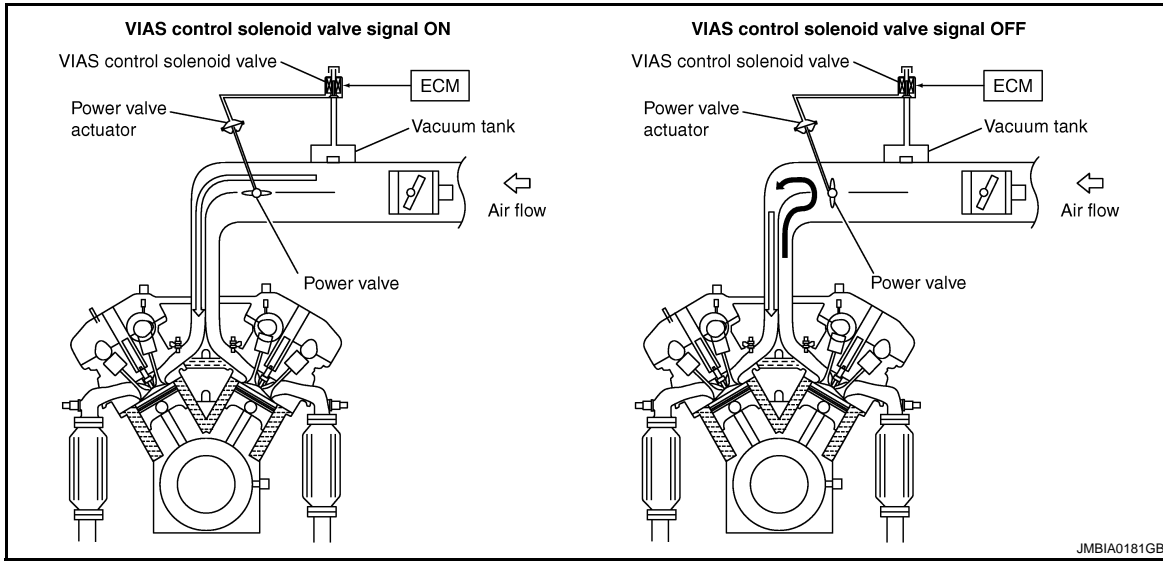
< FUNCTION DIAGNOSIS >

[VQ35DE]

VARIABLE INDUCTION AIR SYSTEM

System Diagram

INFOID:000000001343208

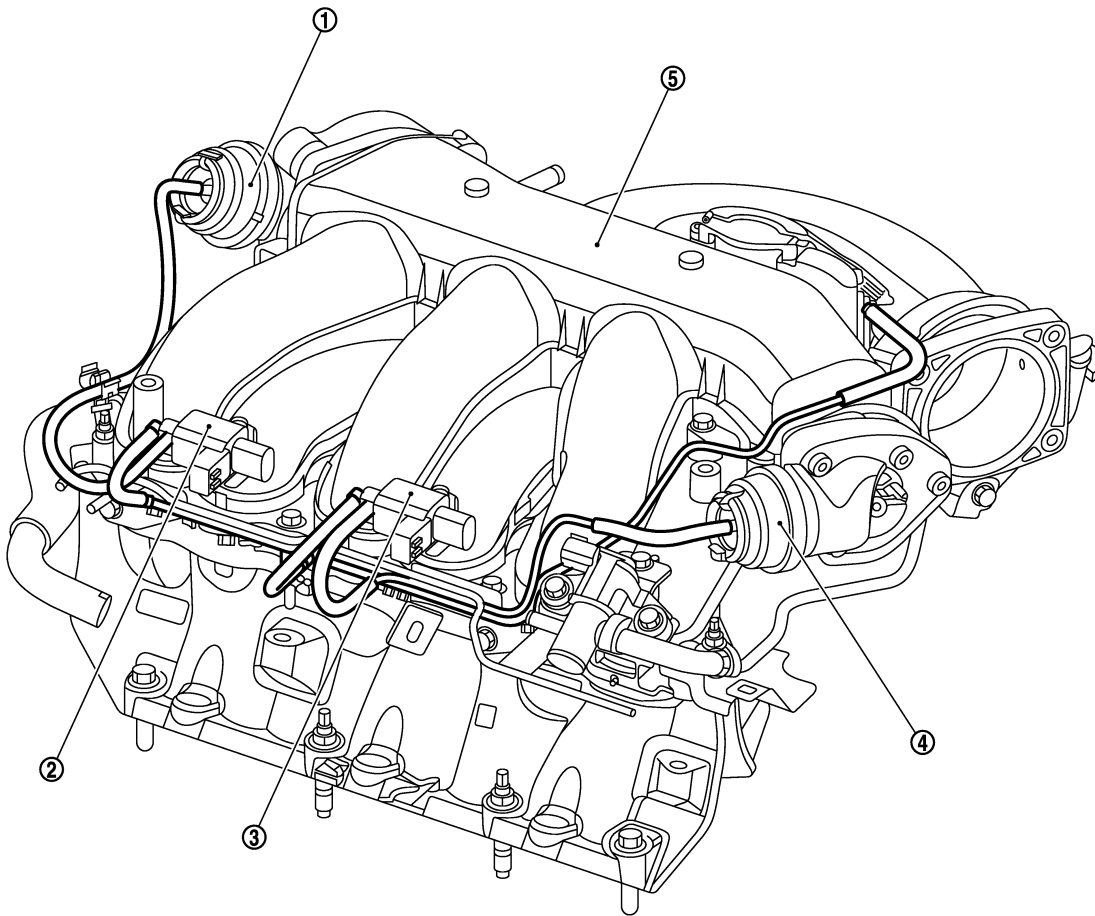


VACUUM HOSE DRAWING

VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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

NOTE:

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

System Description

INFOID:000000001343209

INPUT/OUTPUT SIGNAL CHART

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VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|----------------------------|--------------|--|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* | VIAS control | VIAS control solenoid valve 1 VIAS control solenoid valve 2 |
| Mass air flow sensor | Amount of intake air | | |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| 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 power valves are closed. Under this condition, the pressure waves of exhaust stroke do not disturb those of intake stroke of each opposite bank. Therefore, charging efficiency is increased together with the effect of the long intake passage.

On the other hand, in the high speed range, the power valves are open. 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 controlled to be open or closed in other ranges mentioned above. Thus the maximum charging efficiency is obtained for the various driving conditions.

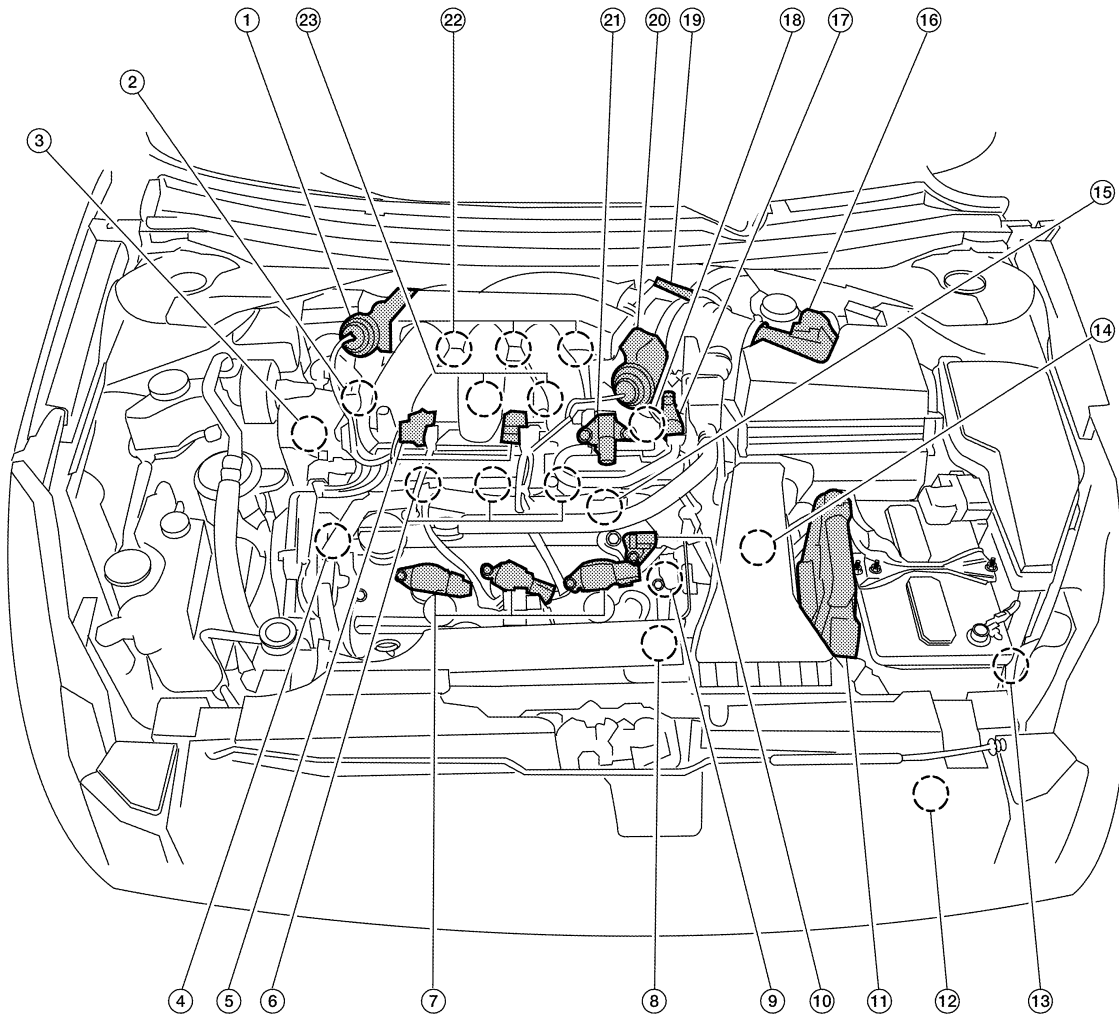
VARIABLE INDUCTION AIR SYSTEM

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[VQ35DE]

Component Parts Location

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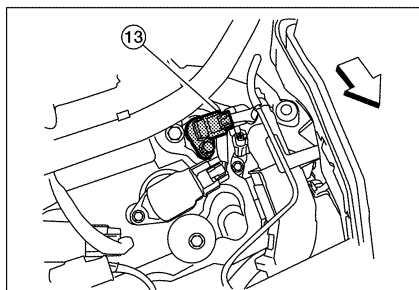
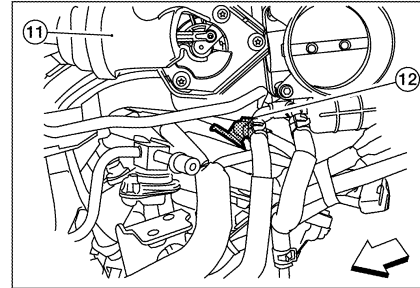
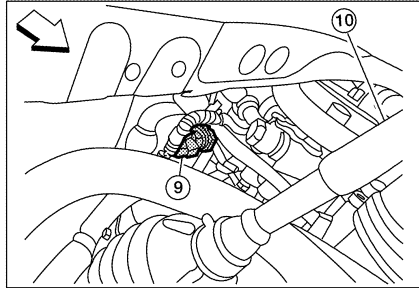
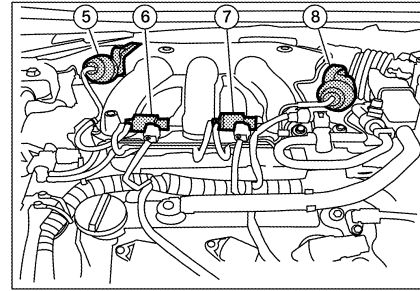
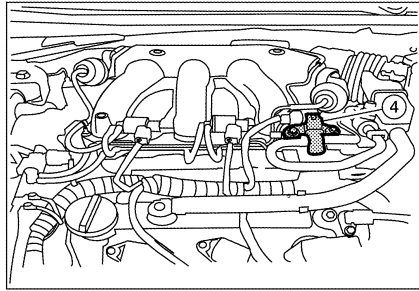
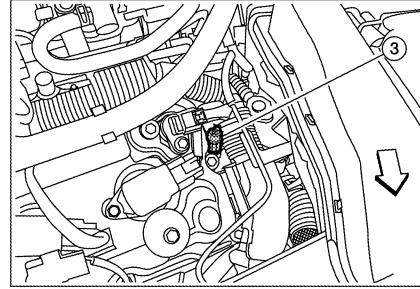
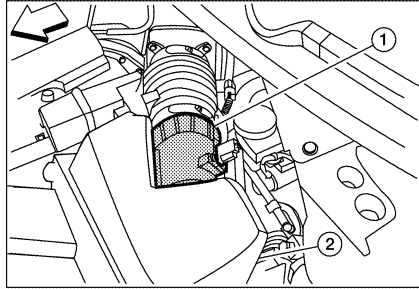
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|---|--|---|
| 1. Power valve actuator 1 | 2. Intake valve timing control solenoid valve (bank 1) | 3. Power steering pressure sensor |
| 4. Intake valve timing control solenoid valve (bank 2) | 5. VIAS control solenoid valves 1 and 2 | 6. Fuel injector (bank 2) |
| 7. Ignition coil (with power transistor) and spark plug (bank 2) | 8. Crankshaft position sensor (POS) | 9. Engine coolant temperature sensor |
| 10. Camshaft position sensor (PHASE) (bank 2) | 11. ECM | 12. Refrigerant pressure sensor |
| 13. Battery current sensor | 14. PNP switch | 15. Condenser-2 |
| 16. Mass air flow sensor (with intake air temperature sensor) | 17. EVAP service port | 18. Camshaft position sensor (PHASE) (bank 1) |
| 19. Electric throttle control actuator | 20. Power valve actuator 2 | 21. EVAP canister purge volume control solenoid valve |
| 22. Ignition coil (with power transistor) and spark plug (bank 1) | 23. Knock sensor | |

VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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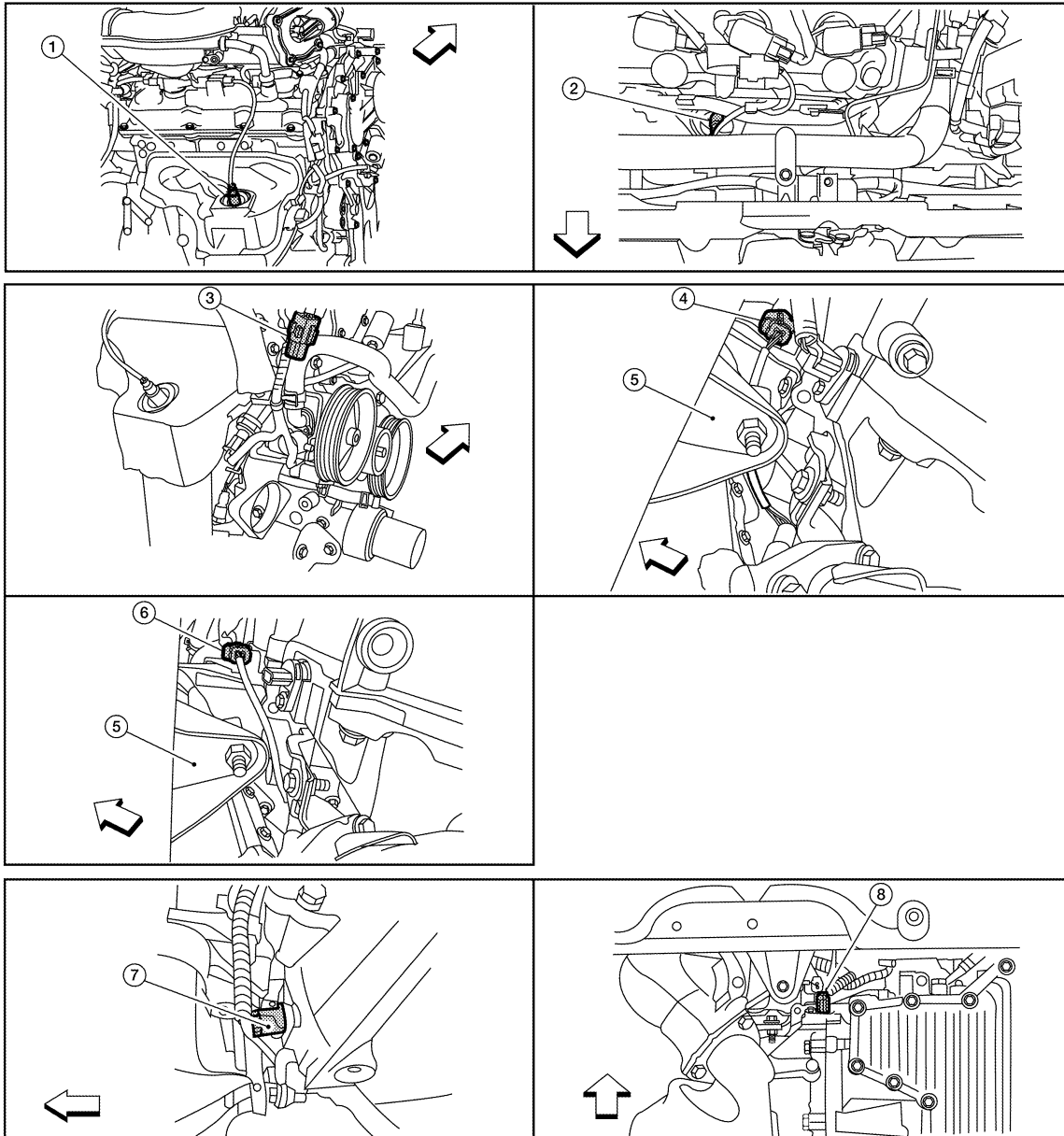
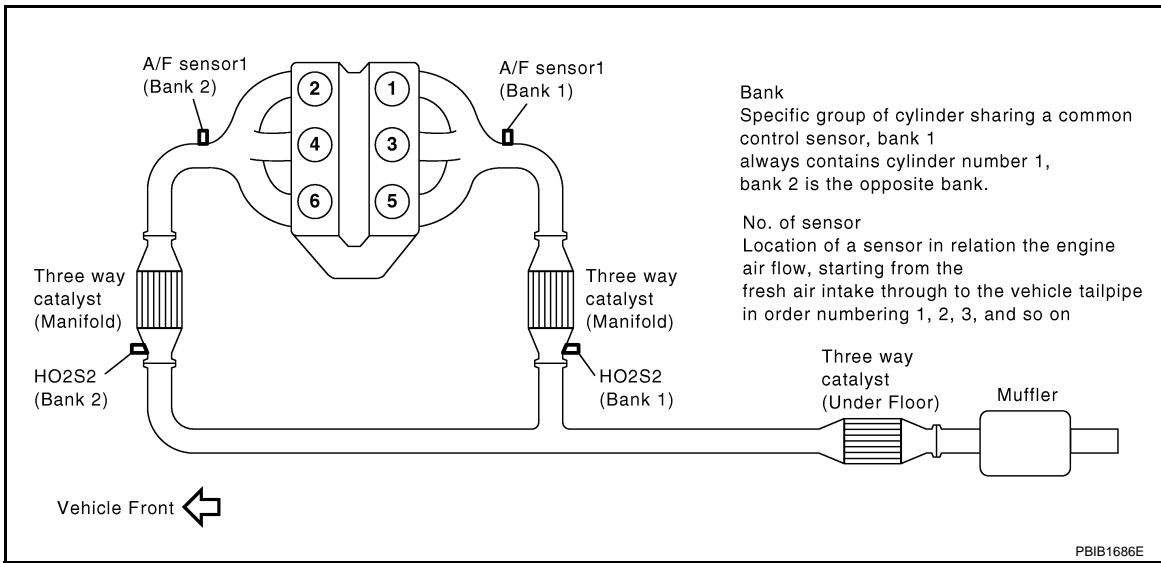
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|---|----------------------------|---|
| 1. Maf air flow sensor (with intake air temperature sensor) | 2. Air cleaner case | 3. Engine coolant temperature sensor |
| 4. EVAP canister purge volume control solenoid valve | 5. Power valve actuator 1 | 6. VIAS control solenoid valve 1 |
| 7. VIAS control solenoid valve 2 | 8. Power valve actuator 2 | 9. Power steering pressure sensor |
| 10. Tie rod (RH) | 11. Power valve actuator 2 | 12. Camshaft position sensor (PHASE) (bank 1) |
| 13. Camshaft position sensor (PHASE) (bank 2) | | |

↙ : Vehicle front

VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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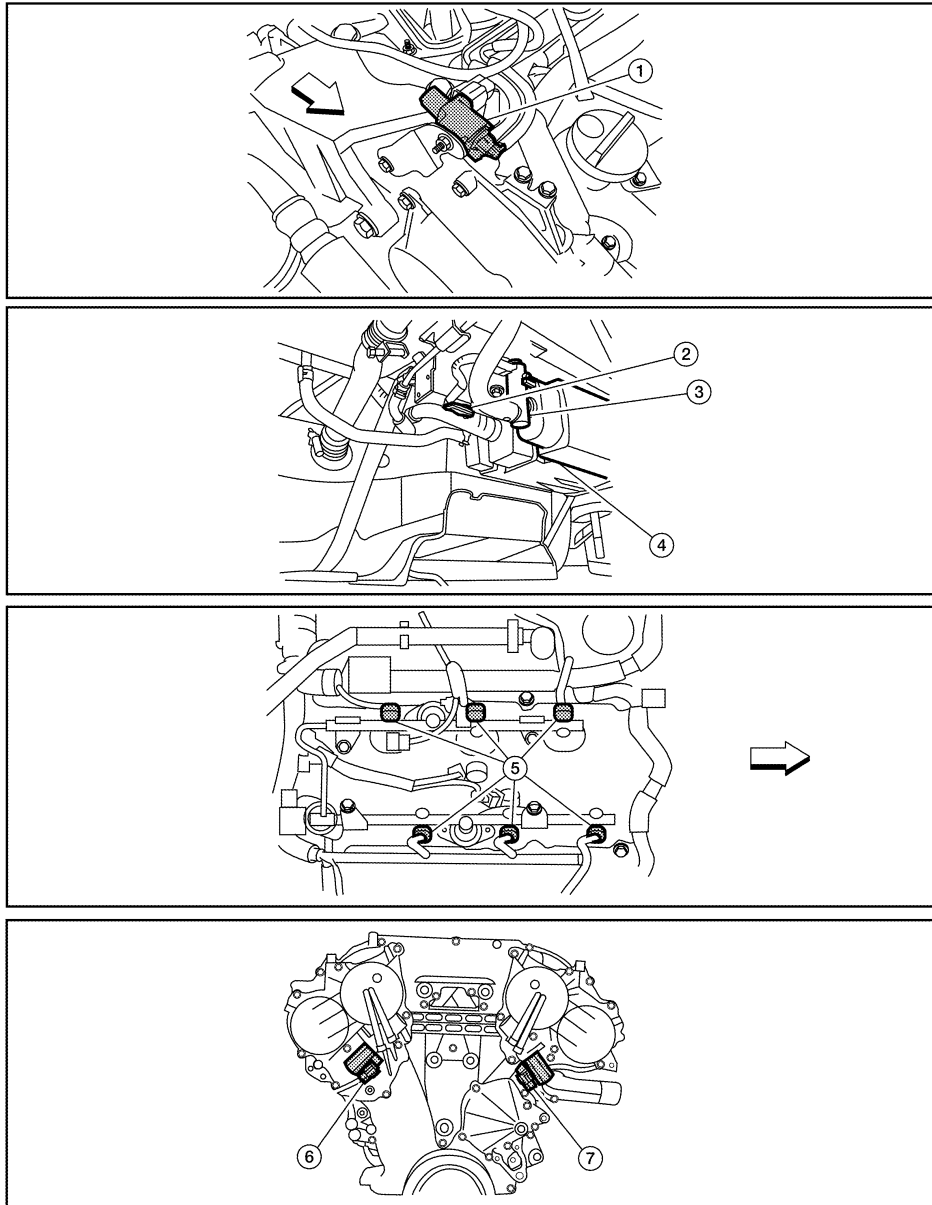
VARIABLE INDUCTION AIR SYSTEM

[VQ35DE]

< FUNCTION DIAGNOSIS >

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| 1. A/F sensor 1 (bank 1) | 2. A/F sensor 1 (bank 2) | 3. HO2S2 (bank 1) harness connector |
| 4. HO2S2 (bank 2) harness connector (CVT models) | 5. Front engine mount | 6. HO2S2 (bank 2) harness connector (M/T models) |
| 7. Crankshaft position sensor (POS) (M/T models) | 8. Crankshaft position sensor (POS) (CVT models) | |

↶ : Vehicle front



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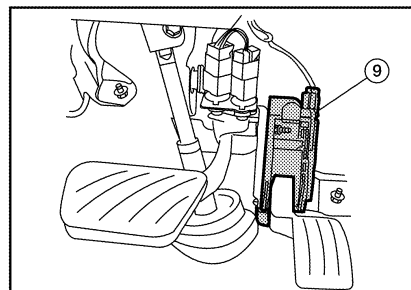
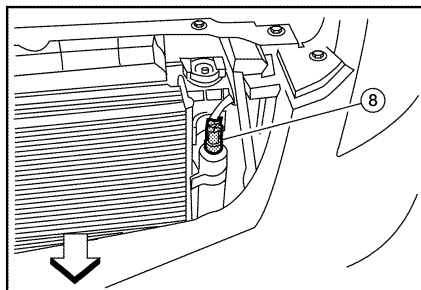
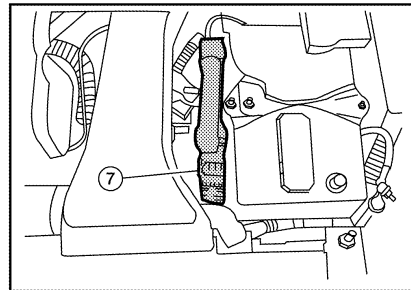
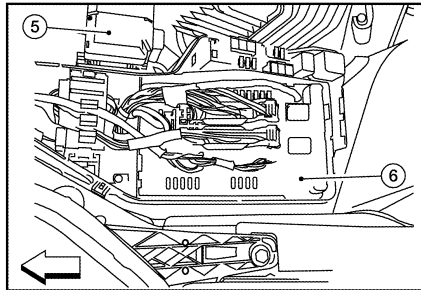
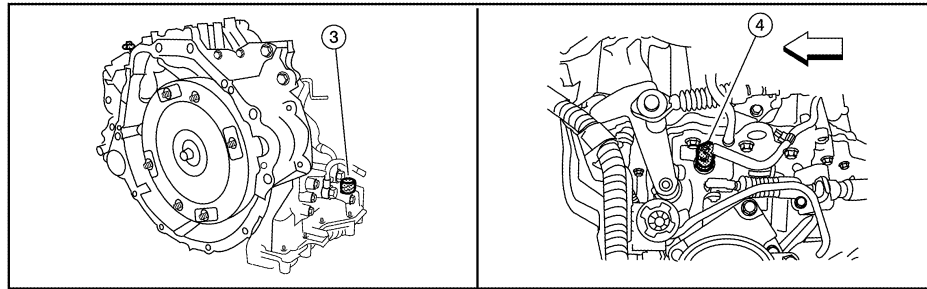
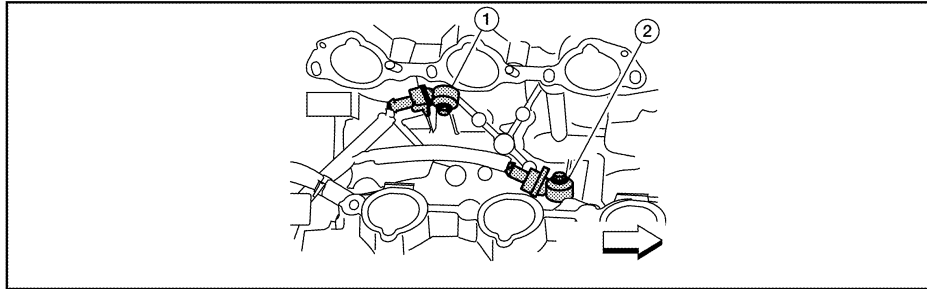
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| 1. Electronic controlled engine mount control solenoid valve | 2. EVAP control system pressure sensor | 3. EVAP canister vent control valve |
| 4. EVAP canister | 5. Fuel injector harness connector | 6. Intake valve timing control solenoid valve (bank 1) |
| 7. Intake valve timing control solenoid valve (bank 2) | | |

↶ : Vehicle front

VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



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|----------------------------|--|----------------------------|
| 1. Knock sensor (bank 2) | 2. Knock sensor (bank 1) | 3. PNP switch (CVT models) |
| 4. PNP switch (M/T models) | 5. Battery | 6. IPDM E/R |
| 7. ECM | 8. Refrigerant pressure sensor (shown with front grill removed) | 9. Accelerator pedal |

↔ : Vehicle front

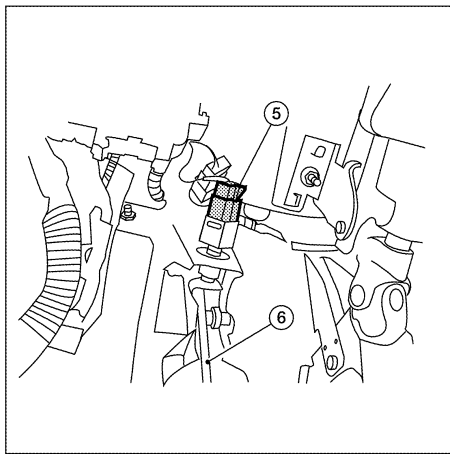
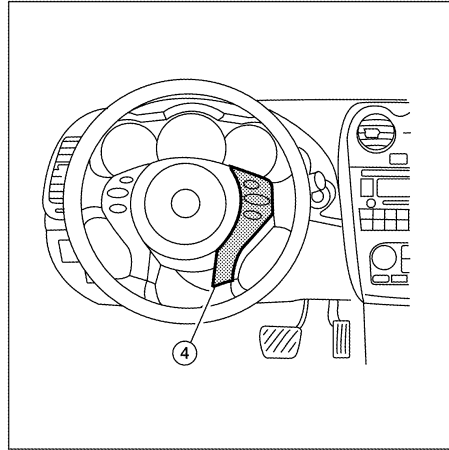
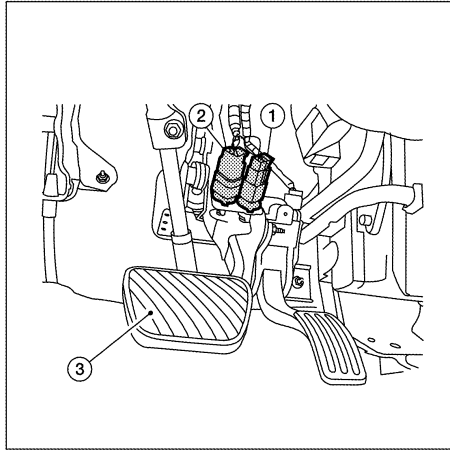
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VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



- 1. ASCD brake switch
- 2. Stop lamp switch
- 3. Brake pedal
- 4. ASCD steering switch
- 5. ASCD clutch switch (M/T models)
- 6. Clutch pedal

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Component Description

INFOID:000000001343211

| Component | Reference |
|-----------------------------------|--|
| Accelerator pedal position sensor | EC-1409, "Description" |
| Camshaft position sensor (PHASE) | EC-1254, "Description" |
| Crankshaft position sensor (POS) | EC-1250, "Description" |
| Engine coolant temperature sensor | EC-1176, "Description" |
| Mass air flow sensor | EC-1162, "Description" |
| Throttle position sensor | EC-1406, "Description" |
| Power valve 1 and 2 | EC-1453, "Description" |

VARIABLE INDUCTION AIR SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Component | Reference |
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| VIAS control solenoid valve 1 | EC-1381, "Description" |
| VIAS control solenoid valve 2 | EC-1383, "Description" |

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000013432.12

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.

x: Applicable —: Not applicable

| | DTC | 1st trip DTC | Freeze Frame data | 1st trip Freeze Frame data | SRT code | SRT status | Test value |
|-------------|-----|--------------|-------------------|----------------------------|----------|------------|------------|
| CONSULT-III | x | x | x | x | x | x | — |
| GST | x | x | x | — | x | x | x |
| ECM | x | x* | — | — | — | x | — |

*: 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 lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-1498, "Fail Safe"](#).)

TWO TRIP DETECTION LOGIC

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up 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 lights up. The MIL lights up 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 light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

x: Applicable —: Not applicable

| Items | MIL | | | | DTC | | 1st trip DTC | |
|---|----------|-------------|----------|-------------|---------------------|---------------------|---------------------|---------------------|
| | 1st trip | | 2nd trip | | 1st trip displaying | 2nd trip displaying | 1st trip displaying | 2nd trip displaying |
| | Blinking | Lighting up | Blinking | Lighting up | | | | |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected | x | — | — | — | — | — | x | — |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0306 is being detected | — | — | x | — | — | x | — | — |
| One trip detection diagnoses (Refer to EC-1502, "DTC Index" .) | — | x | — | — | x | — | — | — |
| Except above | — | — | — | x | — | x | x | — |

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 reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (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 lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored 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 light up 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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 lighting up 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 [EC-1012, "Work Flow"](#). 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. The ECM has the following priorities to update the data.

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

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored 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 can be stored in the ECM). If freeze frame data is stored in the ECM memory and 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 EMISSION-RELATED DIAGNOSTIC INFORMATION".

How to Read DTC and 1st Trip DTC

 **With CONSULT-III**

 **With GST**

CONSULT-III or GST (Generic Scan Tool) Examples: P0340, P0850, P1148, etc.
These DTCs are prescribed by SAE J2012.

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

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 or 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.**

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-III. 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].

How to Erase DTC and 1st Trip DTC

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 [EC-1502, "DTC Index"](#)), skip step 1.
1. Erase DTC in TCM. Refer to [TM-117, "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.
 - If the DTC is not for CVT related items (see [EC-1502, "DTC Index"](#)), skip step 1.
1. Erase DTC in TCM. Refer to [TM-117, "Diagnosis Description"](#).
 2. 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.
 - If the DTC is not for CVT related items (see [EC-1502, "DTC Index"](#)), skip step 1.
1. Erase DTC in TCM. Refer to [TM-117, "Diagnosis Description"](#).
 2. 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 lost 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".

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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.

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 (CONSULT-III indication) | Performance Priority* | Required self-diagnostic items to set the SRT to "CMPLT" | Corresponding 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 | Ignition cycle | | | | | |
| | | | ← ON → | OFF | ← ON → | OFF | ← ON → | OFF |
| 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" | | |

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| | | | | | | |
|-----------|--------|-------------------|--------------|---------|--------------|------------------------|
| NG exists | Case 3 | P0400 | OK | OK | — | — |
| | | P0402 | — | — | — | — |
| | | P1402 | NG | — | NG | NG (Consecutive NG) |
| | | (1st trip) DTC | 1st trip DTC | — | 1st trip DTC | DTC (= MIL ON) |
| | | SRT of EGR | "INCMP" | "INCMP" | "INCMP" | "CMPLT" |

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

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

—: Self-diagnosis is not carried out.

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

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

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

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or 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:

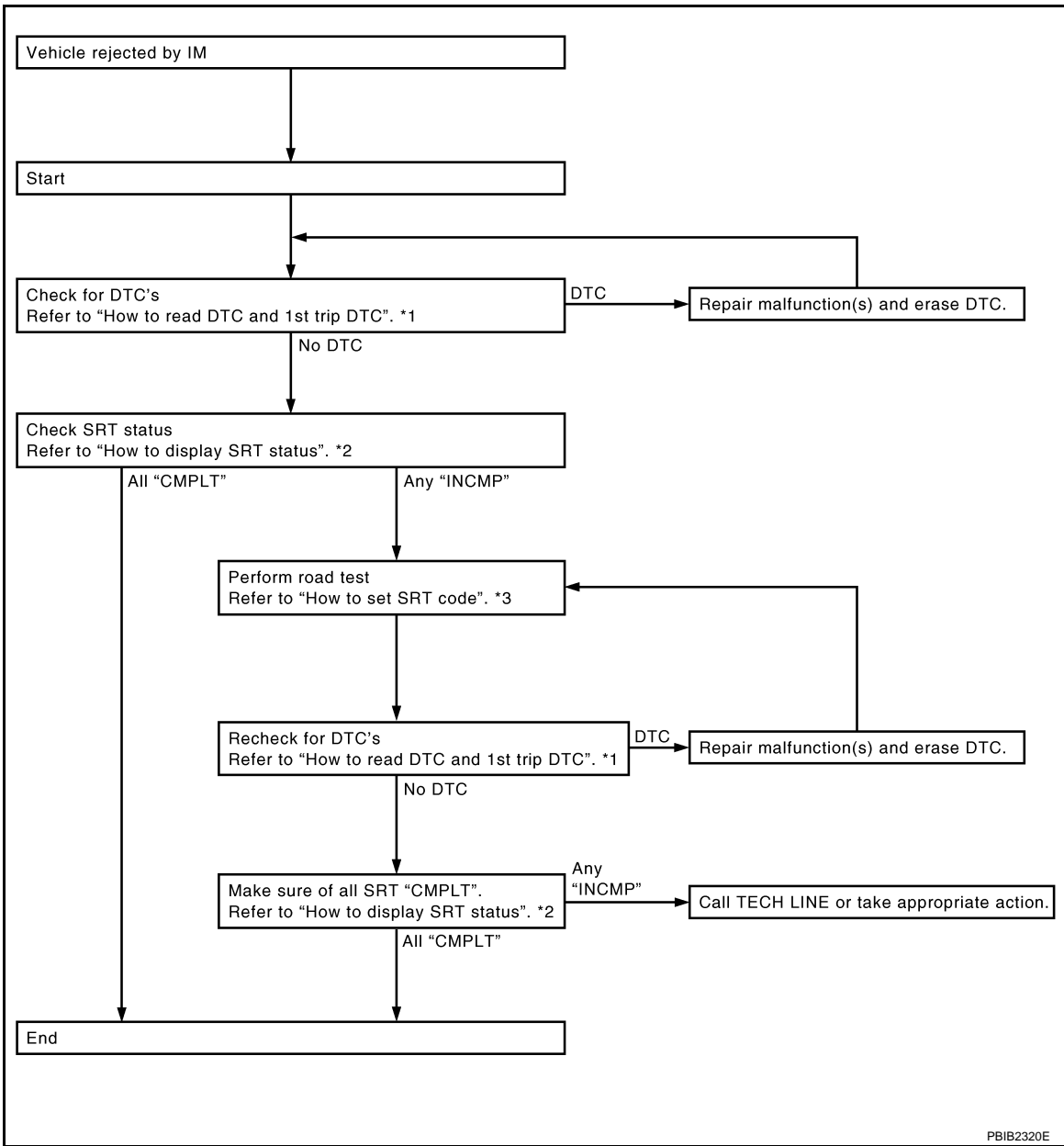
- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from 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.



*1 "How to Read DTC and 1st Trip DTC" *2 "How to Display SRT Status"

*3 "How to Set SRT Code"

How to Display SRT Status

WITH CONSULT-III

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-III.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.

NOTE:

Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.

WITH GST

Selecting Service \$01 with GST (Generic Scan Tool)

NO TOOLS

A SRT code itself can not be displayed while only SRT status can be.

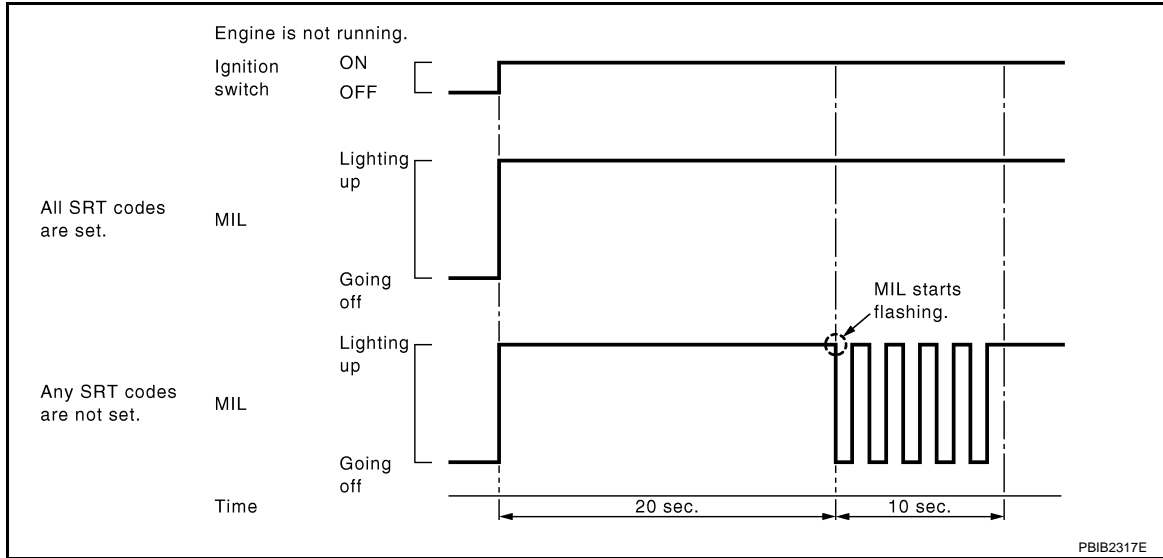
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL lights up continuously.

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- When any SRT codes are not set, MIL will flash periodically for 10 seconds.

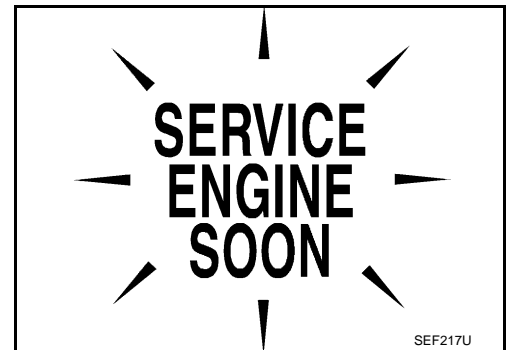


MALFUNCTION INDICATOR LAMP (MIL)

Description

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
If the MIL does not light up, refer to [MWI-28. "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).
2. When the engine is started, the MIL should go 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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| Diagnostic Test Mode | KEY and ENG. Status | Function | Explanation of Function |
|----------------------|---|-------------------------|---|
| Mode I | Ignition switch in ON position  Engine stopped  | BULB CHECK | This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit. |
| | Engine running  | MALFUNCTION WARNING | This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses |
| Mode II | Ignition switch in ON position  Engine stopped  | SELF-DIAGNOSTIC RESULTS | This function allows DTCs and 1st trip DTCs to be read. |

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [MWI-28, "WARNING LAMPS/INDICATOR LAMPS : System Diagram"](#).

Diagnostic Test Mode I — Malfunction Warning

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

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

Diagnostic Test Mode II — Self-diagnostic Results

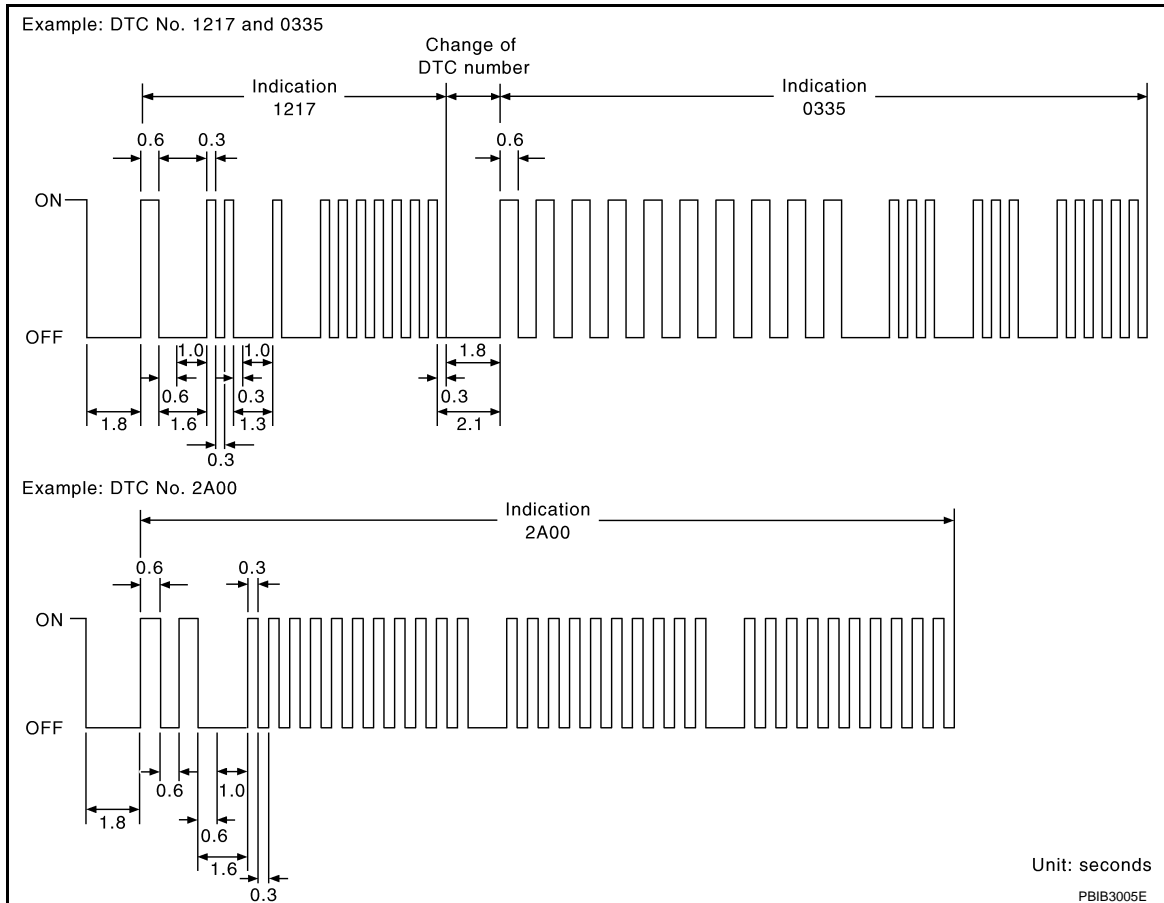
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed 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 flashes as follows.

| Number | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---------|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Flashes | 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-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-1502, "DTC Index"](#))

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.
- Always ECM returns to Diagnostic Test Mode I after 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 five 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 for approx. 10 seconds until the MIL starts blinking.

NOTE:

Do not release the accelerator pedal for 10 seconds if MIL may start blinking on the halfway of this 10 seconds. This blinking is displaying SRT status and is continued for another 10 seconds.

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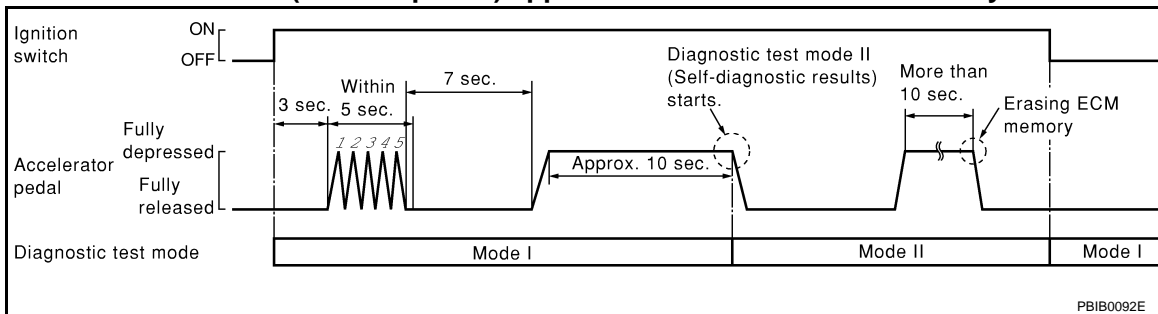
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- Fully release the accelerator pedal.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).

NOTE:

Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



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)”.
- Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
- Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to “How to Erase Diagnostic Test Mode II (Self-diagnostic Results)”

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- Be careful not to 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 first 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 go off after the vehicle is driven 3 times (driving pattern B) with no malfunction. The 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 CONSULT-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 (goes 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 (clear) | *1, *2 | *1, *2 | 1 (pattern B) |

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.

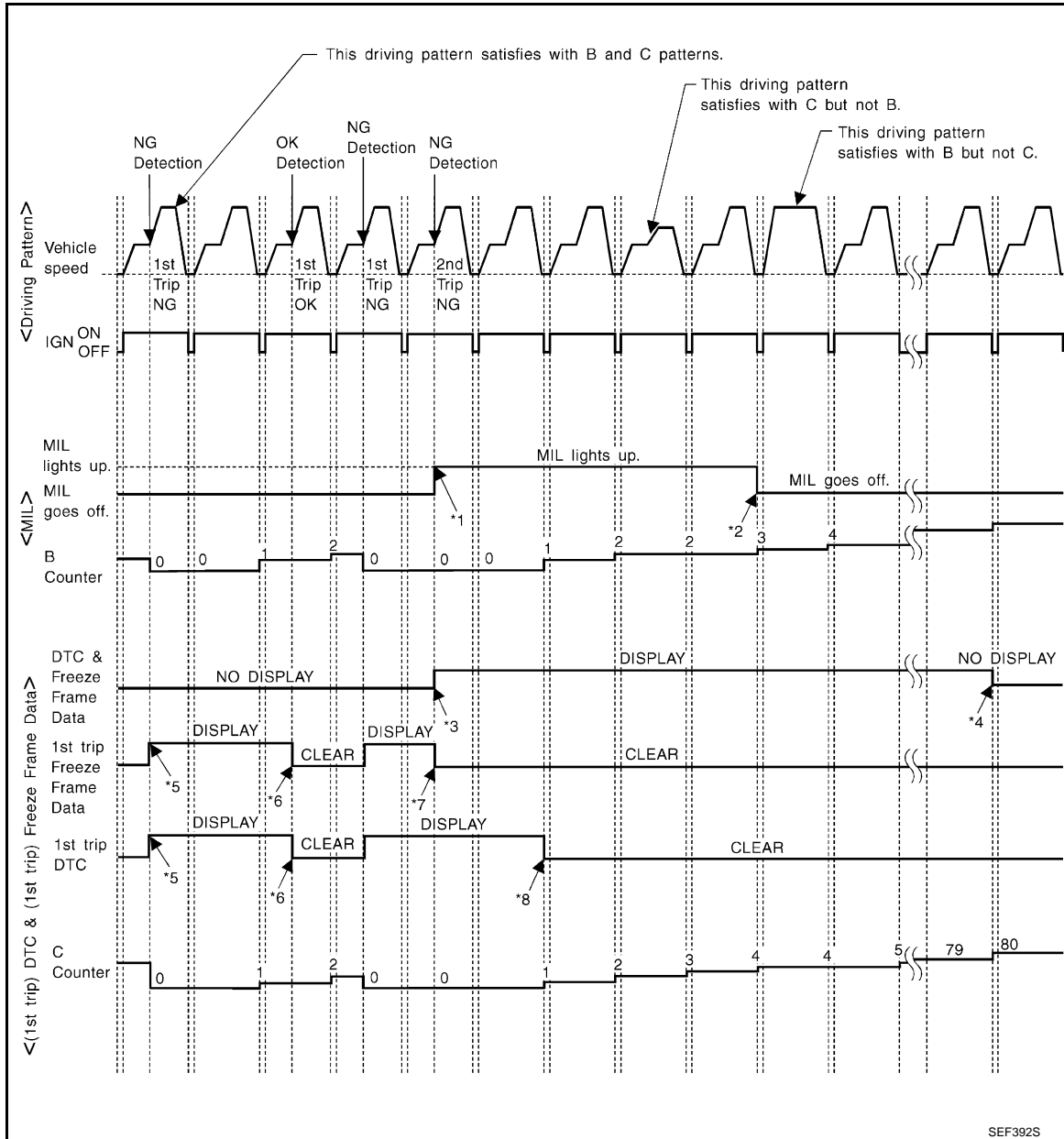
Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns for “Misfire <Exhaust Quality Deterioration>”,

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"Fuel Injection System"



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*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip 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.

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

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

Driving pattern B means the vehicle operation as follows:

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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 malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the 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), T should be lower than 70°C (158°F).
- 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).

Example:

If the stored freeze frame data is as follows:

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:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

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

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

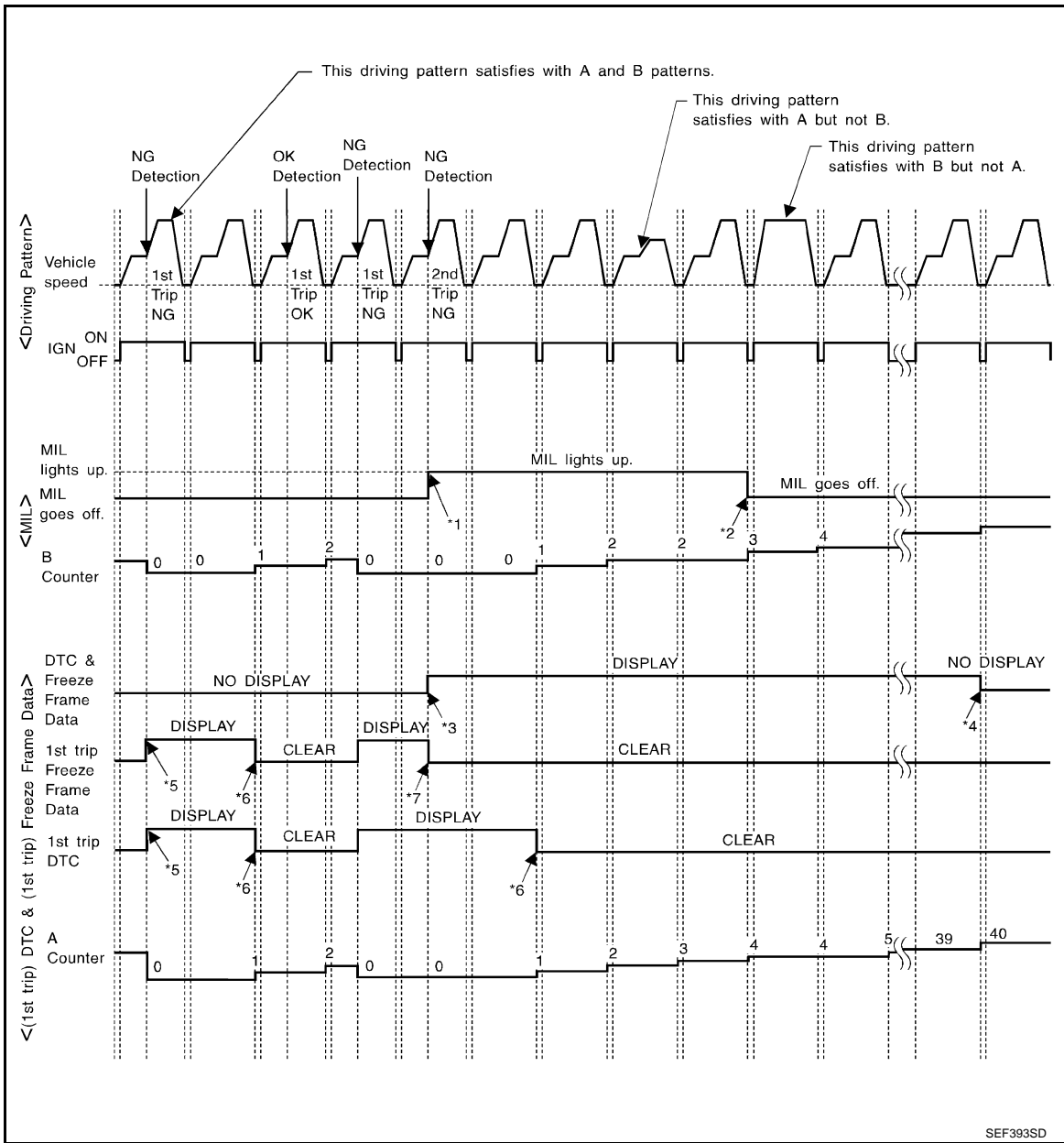
O

P

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*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.)

*5: When a malfunction is detected for the first 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.

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

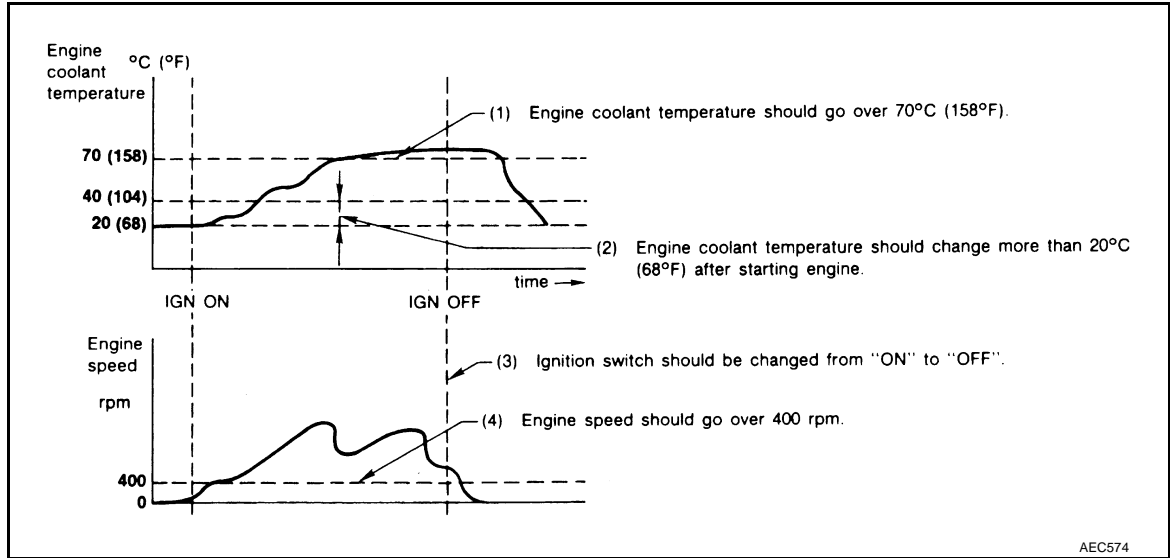
Explanation for Driving Patterns Except for "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System"

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[VQ35DE]

< FUNCTION DIAGNOSIS >

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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 go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

CONSULT-III Function

INFOID:000000001343213

FUNCTION

| Diagnostic test mode | Function |
|-------------------------|---|
| Work support | This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit. |
| Self-diagnostic results | 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 ECMs and also shifts some parameters in a specified range. |
| DTC & SRT confirmation | The status of system monitoring tests and the self-diagnosis status/result can be confirmed. |
| Function test | This mode is used to inform customers when their vehicle condition 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
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|--------------------------------|--|----------------------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS | INPUT | 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 | × | × | × | | | | |
| | Accelerator pedal position sensor | × | | × | | | | |
| | Throttle position sensor | × | × | × | | | | |
| | Fuel tank temperature sensor | × | | × | × | | | |
| | EVAP control system pressure sensor | × | | × | | | | |
| | Intake air temperature sensor | × | × | × | | | | |
| | Knock sensor | × | | | | | | |
| | Refrigerant pressure sensor | | | × | | | | |
| | Closed throttle position switch (accelerator pedal position sensor signal) | | | × | | | | |
| | Air conditioner switch | | | × | | | | |
| | Park/neutral position (PNP) switch | × | | × | | | | |
| | 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 | × | | × | | | | | |
| ASCD clutch switch | × | | × | | | | | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Item | | DIAGNOSTIC TEST MODE | | | | | | |
|--|---|----------------------|-------------------------|---------------------|--------------|-------------|------------------------|------------------|
| | | WORK SUPPORT | SELF-DIAGNOSTIC RESULTS | | DATA MONITOR | ACTIVE TEST | DTC & SRT CONFIRMATION | |
| | | | DTC*1 | FREEZE FRAME DATA*2 | | | SRT STATUS | DTC WORK SUPPORT |
| ENGINE CONTROL COMPONENT PARTS OUTPUT | Fuel injector | | | | × | × | | |
| | Power transistor (Ignition timing) | | | | × | × | | |
| | Throttle control motor relay | | × | | × | | | |
| | Throttle control motor | | × | | | | | |
| | EVAP canister purge volume control solenoid valve | | × | | × | × | | × |
| | Air conditioner relay | | | | × | | | |
| | Fuel pump relay | × | | | × | × | | |
| | Cooling fan relay | | × | | × | × | | |
| | Air fuel ratio (A/F) sensor 1 heater | | × | | × | | ×*3 | |
| | Heated oxygen sensor 2 heater | | × | | × | | ×*3 | |
| | EVAP canister vent control valve | × | × | | × | × | | |
| | Intake valve timing control solenoid valve | | × | | × | × | | |
| | VIAS control solenoid valve 1 | | × | | × | × | | |
| | VIAS control solenoid valve 2 | | × | | × | × | | |
| | Electronic controlled engine mount | | | | × | × | | |
| Alternator | | | | × | × | | | |
| Calculated load value | | | × | × | | | | |

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-1110, "Diagnosis Description"](#).

*3: Always "CMPLT" is displayed.

WORK SUPPORT MODE

Work Item

| WORK ITEM | CONDITION | USAGE |
|-----------------------|---|---|
| FUEL PRESSURE RELEASE | <ul style="list-style-type: none"> FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. | When releasing fuel pressure from fuel line |
| IDLE AIR VOL LEARN | <ul style="list-style-type: none"> THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. | When learning the idle air volume |
| SELF-LEARNING CONT | <ul style="list-style-type: none"> THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. | When clearing mixture ratio self-learning value |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| WORK ITEM | CONDITION | USAGE |
|----------------------|---|---|
| EVAP SYSTEM CLOSE | <p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> • IGN SW ON • ENGINE NOT RUNNING • AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). • NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM • FUEL TANK TEMP. IS MORE THAN 0°C (32°F). • WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" • WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-III WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-III MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p> | When detecting EVAP vapor leak point of EVAP system |
| VIN REGISTRATION | <ul style="list-style-type: none"> • IN THIS MODE, VIN IS REGISTERED IN ECM. | When registering VIN in ECM |
| TARGET IDLE RPM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When setting target idle speed |
| TARGET IGN TIM ADJ* | <ul style="list-style-type: none"> • IDLE CONDITION | When adjusting target ignition timing |

*: 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-1502, "DTC Index".](#))

Freeze Frame Data and 1st Trip Freeze Frame Data

| Freeze frame data item* | Description |
|------------------------------|---|
| DIAG TROUBLE CODE [PXXXX] | <ul style="list-style-type: none"> • The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-1502, "DTC Index".) |
| FUEL SYS-B1 | <ul style="list-style-type: none"> • "Fuel injection system status" at the moment a malfunction is detected is displayed. • One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop |
| FUEL SYS-B2 | |
| CAL/LD VALUE [%] | <ul style="list-style-type: none"> • The calculated load value at the moment a malfunction is detected is displayed. |
| COOLANT TEMP [°C] or [°F] | <ul style="list-style-type: none"> • The engine coolant temperature at the moment a malfunction is detected is displayed. |
| L-FUEL TRM-B1 [%] | <ul style="list-style-type: none"> • "Long-term fuel trim" at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim. |
| L-FUEL TRM-B2 [%] | |
| S-FUEL TRM-B1 [%] | <ul style="list-style-type: none"> • "Short-term fuel trim" at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule. |
| S-FUEL TRM-B2 [%] | |
| ENGINE SPEED [rpm] | <ul style="list-style-type: none"> • The engine speed at the moment a malfunction is detected is displayed. |
| VEHICL SPEED [km/h] or [mph] | <ul style="list-style-type: none"> • The vehicle speed at the moment a malfunction is detected is displayed. |
| ABSOL TH-P/S [%] | <ul style="list-style-type: none"> • The throttle valve opening angle at the moment a malfunction is detected is displayed. |
| B/FUEL SCHDL [msec] | <ul style="list-style-type: none"> • The base fuel schedule at the moment a malfunction is detected is displayed. |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Freeze frame data item* | Description |
|----------------------------|---|
| INT/A TEMP SE [°C] or [°F] | <ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed. |
| INT MANI PRES [kPa] | <ul style="list-style-type: none"> Always a certain value is displayed. These items are not efficient for L32 models. |
| FTFMCH1 | |

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

DATA MONITOR MODE

Monitored Item

x: Applicable

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|---|--|
| ENG SPEED | rpm | <ul style="list-style-type: none"> Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). | <ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated. |
| MAS A/F SE-B1 | V | <ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". |
| B/FUEL SCHDL | msec | <ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. | <ul style="list-style-type: none"> When engine is running specification range is indicated in "SPEC". |
| A/F ALPHA-B1 | % | <ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. This data also includes the data for the air-fuel ratio learning control. When engine is running specification range is indicated in "SPEC". |
| A/F ALPHA-B2 | | | |
| COOLAN TEMP/S | °C or °F | <ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. | <ul style="list-style-type: none"> 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) | V | <ul style="list-style-type: none"> The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed. | |
| A/F SEN1 (B2) | | | |
| HO2S2 (B1) | V | <ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. | |
| HO2S2 (B2) | | | |
| HO2S2 MNTR(B1) | RICH/LEAN | <ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| HO2S2 MNTR(B2) | | | |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| BATTERY VOLT | V | <ul style="list-style-type: none"> The power supply voltage of ECM is displayed. | |
| ACCEL SEN 1 | V | <ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. | <ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| ACCEL SEN 2 | | | |
| TP SEN 1-B1 | V | <ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. | <ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. |
| TP SEN 2-B1 | | | |
| FUEL T/TMP SE | °C or °F | <ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item | Unit | Description | Remarks |
|----------------|----------|---|---|
| INT/A TEMP SE | °C or °F | <ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. | |
| EVAP SYS PRES | V | <ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. | |
| FUEL LEVEL SE | V | <ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. | |
| START SIGNAL | ON/OFF | <ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. | <ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. |
| CLSD THL POS | ON/OFF | <ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. | |
| AIR COND SIG | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. | |
| P/N POSI SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. | |
| PW/ST SIGNAL | ON/OFF | <ul style="list-style-type: none"> [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 style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. | |
| IGNITION SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch signal. | |
| HEATER FAN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. | |
| BRAKE SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. | |
| INJ PULSE-B1 | msec | <ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. |
| INJ PULSE-B2 | | | |
| IGN TIMING | BTDC | <ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. | <ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. |
| CAL/LD VALUE | % | <ul style="list-style-type: none"> "Calculated load value" indicates the value of the current air flow divided by peak air flow. | |
| MASS AIRFLOW | g·m/s | <ul style="list-style-type: none"> Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor. | |
| PURG VOL C/V | % | <ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. | |
| INT/V TIM (B1) | °CA | <ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advance angle. | |
| INT/V TIM (B2) | | | |
| INT/V SOL-B1 | % | <ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. The advance angle becomes larger as the value increases. | |
| INT/V SOL-B2 | | | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item | Unit | Description | Remarks |
|----------------|--------------------|--|---------|
| VIAS S/V-1 | ON/OFF | <ul style="list-style-type: none"> The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the input signals) is indicated. ON: VIAS control solenoid valve 1 is operating. OFF: VIAS control solenoid valve 1 is not operating. | A EC |
| VIAS S/V-2 | ON/OFF | <ul style="list-style-type: none"> The control condition of the VIAS control solenoid valve 2 (determined by ECM according to the input signals) is indicated. ON: VIAS control solenoid valve 2 is operating. OFF: VIAS control solenoid valve 2 is not operating. | C D |
| AIR COND RLY | ON/OFF | <ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. | E |
| ENGINE MOUNT | IDLE/TRVL | <ul style="list-style-type: none"> The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated. IDLE: Engine speed is below 950 rpm TRVL: Engine speed is above 950 rpm | F |
| FUEL PUMP RLY | ON/OFF | <ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. | G |
| VENT CONT/V | ON/OFF | <ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open | H I |
| THRTL RELAY | ON/OFF | <ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. | J |
| COOLING FAN | HI/MID/LOW/ OFF | <ul style="list-style-type: none"> The control condition of the cooling fan (determined by ECM according to the input signals) is indicated. HI: High speed operation MID: Middle speed operation LOW: Low speed operation OFF: Stop | K L |
| HO2S2 HTR (B1) | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. | |
| HO2S2 HTR (B2) | | | |
| I/P PULLY SPD | rpm | <ul style="list-style-type: none"> Indicates the engine speed computed from the turbine revolution sensor signal. | M |
| VEHICLE SPEED | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. | N |
| IDL A/V LEARN | YET/CMPLT | <ul style="list-style-type: none"> Display the condition of idle air volume learning YET: Idle Air Volume Learning has not been performed yet. CMPLT: Idle Air Volume Learning has already been performed successfully. | O |
| ENG OIL TEMP | °C or °F | <ul style="list-style-type: none"> The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed. | P |
| TRVL AFTER MIL | km or mile | <ul style="list-style-type: none"> Distance traveled while MIL is activated. | |
| A/F S1 HTR(B1) | % | <ul style="list-style-type: none"> Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. | |
| A/F S1 HTR(B2) | | | |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

| Monitored item | Unit | Description | Remarks |
|----------------|-------------|--|--|
| AC PRESS SEN | V | <ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. | |
| VHCL SPEED SE | km/h or mph | <ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed. | |
| SET VHCL SPD | km/h or mph | <ul style="list-style-type: none"> The preset vehicle speed is displayed. | |
| MAIN SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. | |
| CANCEL SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. | |
| RESUME/ACC SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. | |
| SET SW | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. | |
| BRAKE SW1 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal or ASCD clutch switch. | |
| BRAKE SW2 | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. | |
| VHCL SPD CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. | |
| LO SPEED CUT | NON/CUT | <ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off. | |
| AT OD MONITOR | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| AT OD CANCEL | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of A/T O/D cancel request signal. | <ul style="list-style-type: none"> For M/T models, always "OFF" is displayed. |
| CRUISE LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. | |
| SET LAMP | ON/OFF | <ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. | |
| BAT CUR SEN | mV | <ul style="list-style-type: none"> The signal voltage of battery current sensor is displayed. | |
| ALT DUTY SIG | ON/OFF | <ul style="list-style-type: none"> The control condition of the power generation voltage variable control (determined by ECM according to the input signals) is indicated. ON: Power generation voltage variable control is active. OFF: Power generation voltage variable control is inactive. | |
| A/F ADJ-B1 | — | <ul style="list-style-type: none"> Indicates the correction of factor stored in ECM. The factor is calculated from the difference between the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 signal. | |
| A/F ADJ-B2 | | | |
| ALT DUTY | % | <ul style="list-style-type: none"> Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal. | |

NOTE:

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

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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 | JUDGEMENT | CHECK ITEM (REMEDY) |
|------------------|---|---|---|
| FUEL INJECTION | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1 |
| IGNITION TIMING | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Perform Idle Air Volume Learning. |
| POWER BALANCE | <ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Selector lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. | Engine runs rough or dies. | <ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil |
| COOLING FAN* | <ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "HI", "MID", "LOW" and "OFF" using CONSULT-III. | Cooling fan moves and stops. | <ul style="list-style-type: none"> Harness and connectors Cooling fan motor IPDM E/R |
| ENG COOLANT TEMP | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector |
| FUEL PUMP RELAY | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. | Fuel pump relay makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Fuel pump relay |
| VIAS S/V-1 | <ul style="list-style-type: none"> Ignition switch: ON Turn solenoid valve "ON" and "OFF" using CONSULT-III and listen to operating sound. | Solenoid valve makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| VIAS S/V-2 | <ul style="list-style-type: none"> Ignition switch: ON Turn solenoid valve "ON" and "OFF" using CONSULT-III and listen to operating sound. | Solenoid valve makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| ENGINE MOUNTING | <ul style="list-style-type: none"> Ignition switch: ON Turn electronic controlled engine mount "IDLE" and "TRVL" with the CONSULT-III. | Electronic controlled engine mount makes the operating sound. | <ul style="list-style-type: none"> Harness and connectors Electronic controlled engine mount |
| PURG VOL CONT/V | <ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. | Engine speed changes according to the opening percent. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |
| FUEL/T TEMP SEN | <ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-III. | | |
| VENT CONTROL/V | <ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. | Solenoid valve makes an operating sound. | <ul style="list-style-type: none"> Harness and connectors Solenoid valve |

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

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| TEST ITEM | CONDITION | JUDGEMENT | CHECK ITEM (REMEDY) |
|------------------|---|--|--|
| V/T ASSIGN ANGLE | <ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-III. | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve |
| ALTERNATOR DUTY | <ul style="list-style-type: none"> Engine: Idle Change duty ratio using CONSULT-III. | Battery voltage changes. | <ul style="list-style-type: none"> Harness and connectors IPDM E/R Alternator |

*: 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 [EC-1110, "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 |
|--------------------|---------------------------|-----------------------|--|
| EVAPORATIVE SYSTEM | EVP SML LEAK P0442/P1442* | P0442 | EC-1268, "DTC Logic" |
| | | P0455 | EC-1302, "DTC Logic" |
| | EVP V/S LEAK P0456/P1456* | P0456 | EC-1308, "DTC Logic" |
| | PURG VOL CN/V P1444 | P0443 | EC-1274, "Description" |
| | PURG FLOW P0441 | P0441 | EC-1263, "DTC Logic" |
| A/F SEN1 | A/F SEN1(B1) P1278/P1279 | P0133 | EC-1199, "DTC Logic" |
| | A/F SEN1(B1) P1276 | P0130 | EC-1189, "DTC Logic" |
| | A/F SEN1(B2) P1288/P1289 | P0153 | EC-1199, "DTC Logic" |
| | A/F SEN1(B2) P1286 | P0150 | EC-1189, "DTC Logic" |
| HO2S2 | HO2S2(B1) P1146 | P0138 | EC-1210, "DTC Logic" |
| | HO2S2(B1) P1147 | P0137 | EC-1204, "DTC Logic" |
| | HO2S2(B1) P0139 | P0139 | EC-1218, "DTC Logic" |
| | HO2S2(B2) P1166 | P0158 | EC-1210, "DTC Logic" |
| | HO2S2(B2) P1167 | P0157 | EC-1204, "DTC Logic" |
| | HO2S2(B2) P0159 | P0159 | EC-1218, "DTC Logic" |

*: DTC P1442 and P1456 does not apply to L32 models but appears in DTC Work Support Mode screens.

Diagnosis Tool Function

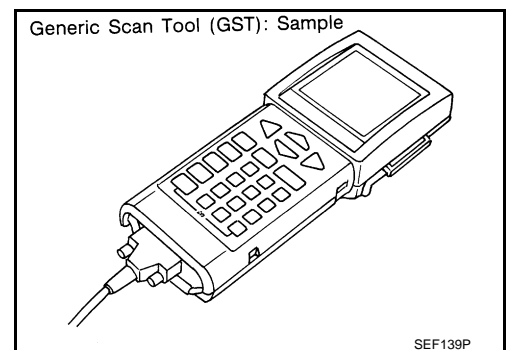
INFOID:000000001343214

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below.

ISO15765-4 is used as the protocol.

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



FUNCTION

ON BOARD DIAGNOSTIC (OBD) SYSTEM

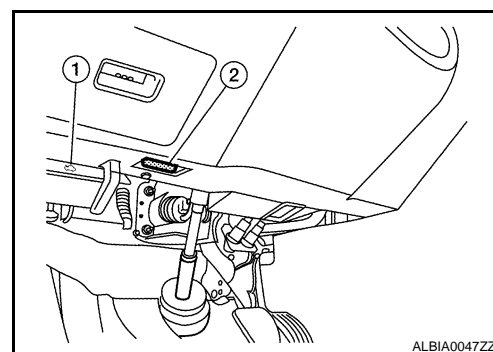
< FUNCTION DIAGNOSIS >

[VQ35DE]

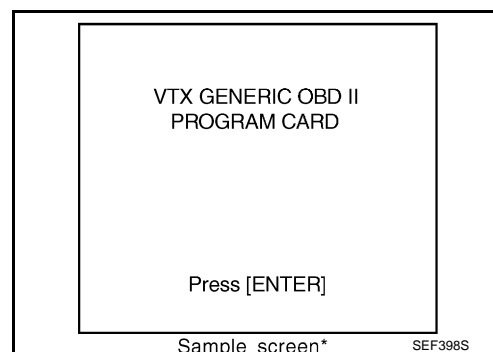
| Diagnostic Service | | Function |
|--------------------|------------------|--|
| Service \$01 | READINESS TESTS | This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information. |
| Service \$02 | (FREEZE DATA) | This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-1502, "DTC Index" . |
| 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 | This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07) |
| 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-related powertrain components/systems that are continuously monitored during normal driving conditions. |
| Service \$08 | — | 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. In the following conditions, this diagnostic service cannot function. <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system |
| Service \$09 | (CALIBRATION ID) | This diagnostic service enables the off-board test device to request specific vehicle information 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 near the hood opener handle (1).



3. Turn ignition switch ON.
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.)

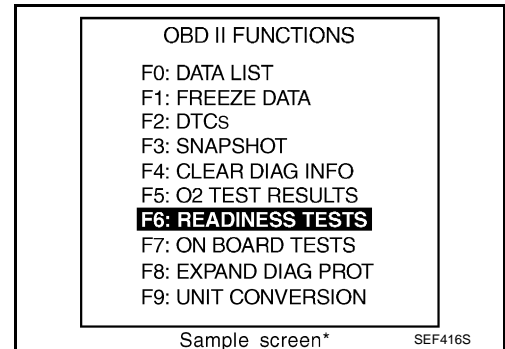


ON BOARD DIAGNOSTIC (OBD) SYSTEM

< FUNCTION DIAGNOSIS >

[VQ35DE]

5. Perform each diagnostic mode according to each service procedure.
For further information, see the GST Operation Manual of the tool maker.



COMPONENT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000003170709

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode of CONSULT-III during normal operation of the Engine Control System. 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 light 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

INFOID:000000003170710

1. START

Make sure 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/cm², 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
 - CVT models: 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).
 - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- 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.

1. Perform "[EC-1016. "BASIC INSPECTION : Special Repair Requirement"](#)".
2. 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.
3. Make sure that monitor items are within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Go to [EC-1136. "Diagnosis Procedure"](#).

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

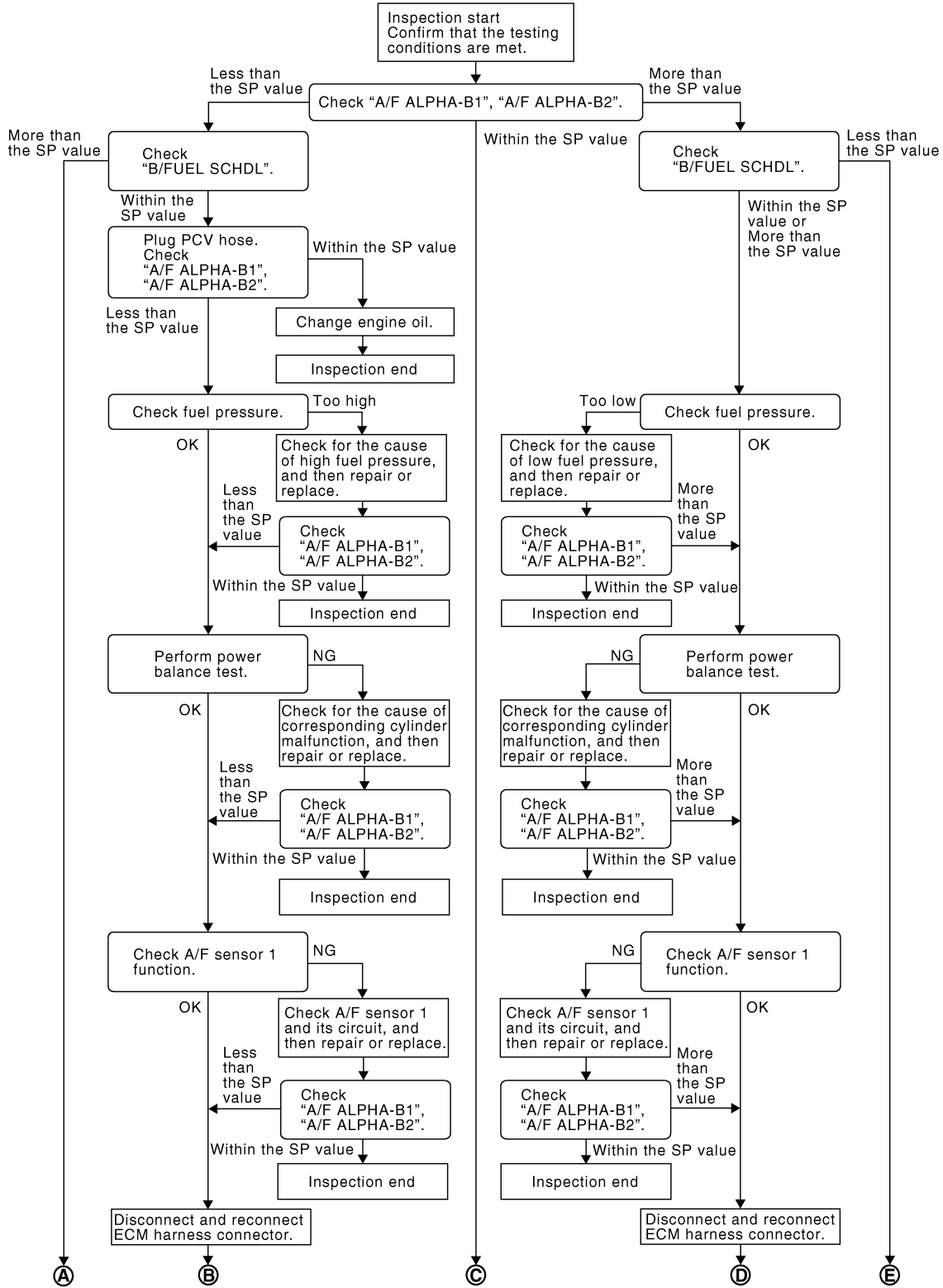
< COMPONENT DIAGNOSIS >

[VQ35DE]

Diagnosis Procedure

INFOID:000000003170711

OVERALL SEQUENCE

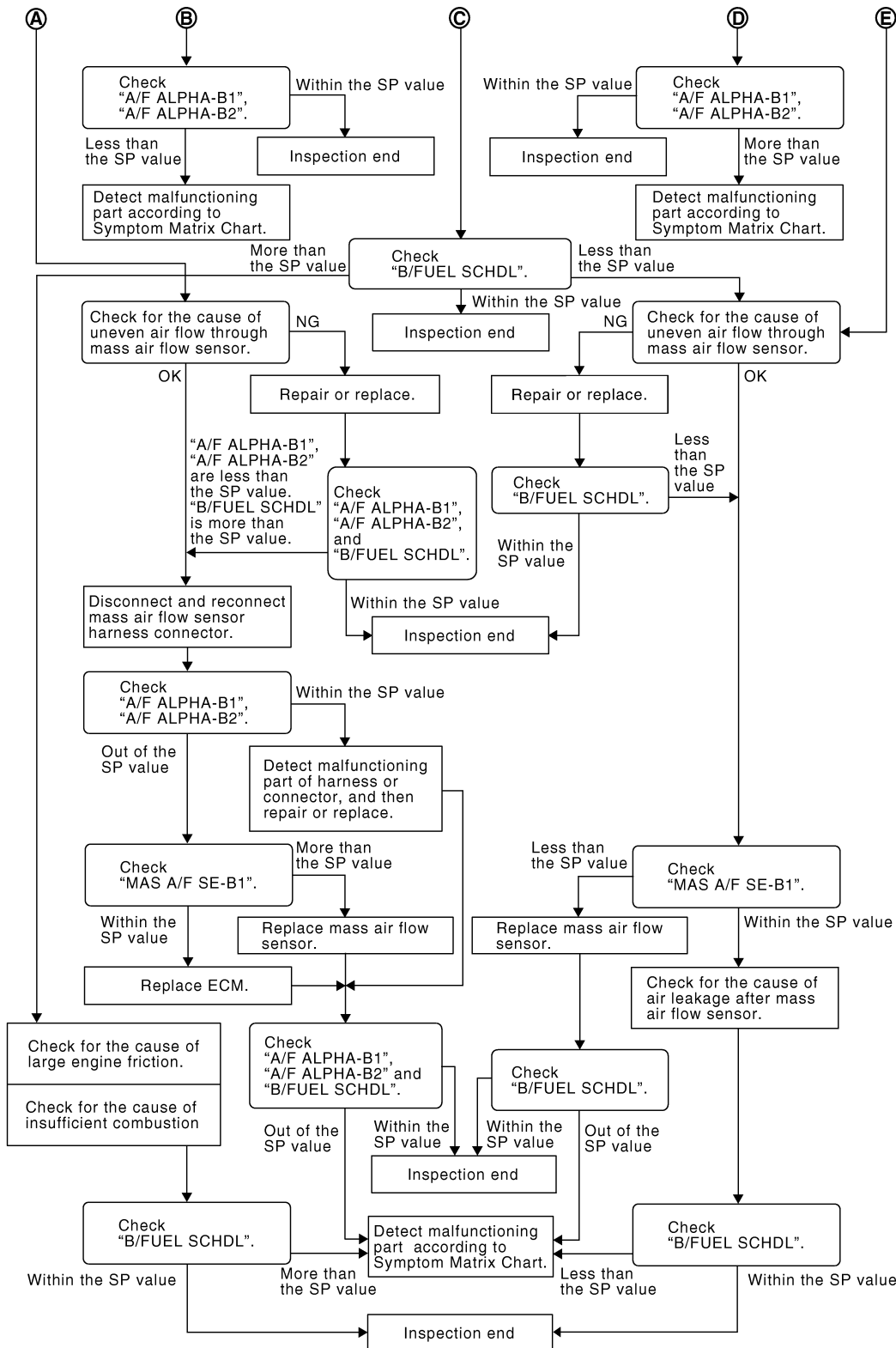


PBIB2268E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[VQ35DE]



FBIIB3214E

DETAILED PROCEDURE

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-1135, "Component Function Check"](#).
3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and make sure that the each indication is within the SP value.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 make sure 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 make sure 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 make sure that the 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. Refer to [LU-23, "Changing 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 condition.

>> INSPECTION END

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-1525, "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.

7.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 and then GO TO 8.

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

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[VQ35DE]

< COMPONENT DIAGNOSIS >

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 9.

9.PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> GO TO 12.
NO >> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the following.

- Ignition coil and its circuit (Refer to [EC-1438, "Component Function Check".](#))
- Fuel injector and its circuit (Refer to [EC-1431, "Component Function Check".](#))
- Intake air leakage
- Low compression pressure (Refer to [EM-128, "On-Vehicle Service".](#))

Is the inspection result normal?

- YES >> Replace fuel injector and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.

11.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 make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 12.

12.CHECK A/F SENSOR 1 FUNCTION

Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.

- For DTC P0130, P0150, refer to [EC-1189, "DTC Logic".](#)
- For DTC P0131, P0151, refer to [EC-1193, "DTC Logic".](#)
- For DTC P0132, P0152, refer to [EC-1196, "DTC Logic".](#)
- For DTC P0133, P0153, refer to [EC-1199, "DTC Logic".](#)
- For DTC P2A00, P2A03, refer to [EC-1413, "DTC Logic".](#)

Is any DTC detected?

- YES >> GO TO 15.
NO >> GO TO 13.

13.CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

14.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 make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
NO >> GO TO 15.

15.DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to [EC-1513, "Symptom Table"](#).

17.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure 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 make sure that the 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.

>> GO TO 22.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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< COMPONENT DIAGNOSIS >

22.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 make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-1169, "Diagnosis Procedure"](#). Then GO TO 29.

NO >> GO TO 23.

23.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 24.

NO >> More than the SP value: Replace mass air flow sensor, and then GO TO 29.

24.REPLACE ECM

1. Replace ECM.
2. Refer to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 29.

25.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 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 make sure that the indication is within the SP value.

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 make sure that the indication is within the SP value.

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

Check for the cause of air leak after the mass air flow sensor. Refer to the following.

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< COMPONENT DIAGNOSIS >

[VQ35DE]

- Malfunctioning seal of 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 make sure that the each indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to [EC-1513. "Symptom Table"](#).

30.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then make sure 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 [EC-1513. "Symptom Table"](#).

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[VQ35DE]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:000000003170712

1.INSPECTION START

Start engine.

Is engine running?

- YES >> GO TO 8.
- NO >> GO TO 2.

2.CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 93 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector E18
- 10A fuse (No. 35)
- Harness for open or short between ECM and fuse

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

4.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace ground connection.

5.CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

is the inspection result normal?

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

POWER SUPPLY AND GROUND CIRCUIT

[VQ35DE]

< COMPONENT DIAGNOSIS >

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E11
- Harness for open or short between ECM and ground

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

7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F10 | 49 | Ground | Battery voltage |

Is the inspection result normal?

YES >> Refer to [EC-1438, "Diagnosis Procedure"](#).

NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|--|
| Connector | Terminal | | |
| E10 | 105 | Ground | After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V. |

Is the inspection result normal?

YES >> GO TO 14.

NO-1 >> Battery voltage does not exist: GO TO 9.

NO-2 >> Battery voltage exists for more than a few seconds: GO TO 11.

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 and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 24 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E18.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 105 | E18 | 10 | Existed |

4. Also check harness for short to ground and short to power.

POWER SUPPLY AND GROUND CIRCUIT

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> GO TO 11.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

Check the following.

- Junction block connectors E44, E45
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F14 | 24 | F10 | 69 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK 20A FUSE

1. Disconnect 15A fuse (No. 42) from IPDM E/R.
2. Check 15A fuse.

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> Replace 15A fuse.

14. CHECK GROUND CONNECTION

Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Repair or replace ground connection.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check the continuity between ECM harness connector and ground.

| ECM | | Ground | Continuity |
|-----------|----------|--------|------------|
| Connector | Terminal | | |
| F14 | 12 | Ground | Existed |
| | 16 | | |
| E10 | 107 | | |
| | 108 | | |
| | 111 | | |
| | 112 | | |

3. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> GO TO 16.

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[VQ35DE]

16.DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors F2, E11
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

17.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair open circuit or short to power in harness or connectors.

U1000, U1001 CAN COMM CIRCUIT

< COMPONENT DIAGNOSIS >

[VQ35DE]

U1000, U1001 CAN COMM CIRCUIT

Description

INFOID:000000003170713

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:000000003170714

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|---|
| U1000 | CAN communication line | When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) for 2 seconds or more. | • Harness or connectors (CAN communication line is open or shorted) |
| U1001 | | When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related 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-1147. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170715

Go to [LAN-25. "CAN System Specification Chart"](#).

U1010 CONTROL UNIT (CAN)

Description

INFOID:000000003170716

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:000000003170717

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|---|
| U1010 | CAN communication bus | When detecting error during the initial diagnosis of CAN controller of ECM. | <ul style="list-style-type: none"> • ECM |

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

- YES >> Go to [EC-1148, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170718

1. INSPECTION START

Ⓟ With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-1148, "DTC Logic"](#).
5. Check DTC.

Ⓢ With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-1148, "DTC Logic"](#).
4. Check DTC.

Is the DTC U1010 displayed again?

- Yes >> GO TO 2.
 No >> INSPECTION END

2. REPLACE ECM

1. Replace ECM.
2. Go to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0011, P0021 IVT CONTROL

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0011, P0021 IVT CONTROL

DTC Logic

INFOID:000000003170719

DTC DETECTION LOGIC

NOTE:

If DTC P0011 or P0021 is displayed with DTC P0075, P0081, first perform the trouble diagnosis for [EC-1159, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | Detecting condition | Possible cause |
|---------|--|--|--|
| P0011 | intake valve timing control performance (bank 1) | There is a gap between angle of target and phase-control angle degree. | <ul style="list-style-type: none">• Crankshaft position sensor (POS)• Camshaft position sensor (PHASE)• Intake valve control solenoid valve• Accumulation of debris to the signal pick-up portion of the camshaft• Timing chain installation• Foreign matter caught in the oil groove for intake valve timing control |
| P0021 | Intake valve timing control performance (bank 2) | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

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. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

| | |
|----------------|--|
| VHCL SPEED SE | 100 - 120 km/h (63 - 75 mph) |
| ENG SPEED | 2,000 - 4,000 rpm |
| COOLAN TEMP/S | More than 60°C (140°F) |
| B/FUEL SCHDL | More than 7.3 msec |
| Selector lever | D position (CVT) 5th position (M/T) |

CAUTION:

Always drive at a safe speed.

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1150, "Diagnosis Procedure"](#)
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT-III

1. Maintain the following conditions for at least 20 consecutive seconds.

P0011, P0021 IVT CONTROL

[VQ35DE]

< COMPONENT DIAGNOSIS >

| | |
|-------------------------|---|
| ENG SPEED | M/T1: 700 - 3,175 rpm (A constant rotation is maintained.) CVT: 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 (Increased engine load will help maintain the driving conditions required 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 [EC-1150, "Diagnosis Procedure"](#)
NO >> INSPECTION END

Diagnosis Procedure

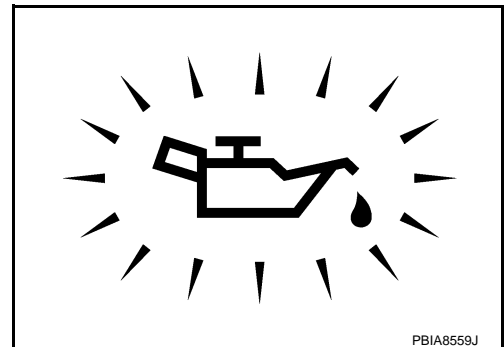
INFOID:000000003170720

1. CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.

Is oil pressure warning lamp illuminated?

- YES >> Go to [MWI-48, "Component Function Check"](#).
NO >> GO TO 2.



2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-1151, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace malfunctioning intake valve timing control solenoid valve.

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1253, "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-1256, "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.

P0011, P0021 IVT CONTROL

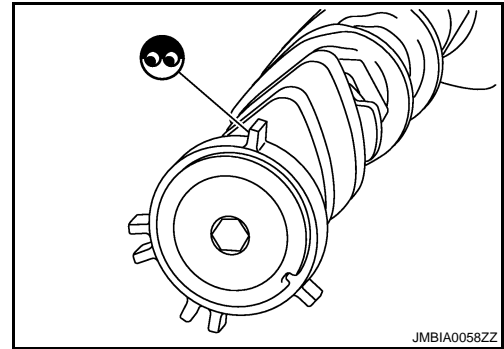
[VQ35DE]

< COMPONENT DIAGNOSIS >

- 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 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 misaligned.

Are there any service records that may cause timing chain misaligned?

- YES >> Check timing chain installation. Refer to [EM-163, "Installation"](#).
NO >> GO TO 7.

7.CHECK LUBRICATION CIRCUIT

Refer to [EM-181, "Inspection after Installation"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Clean lubrication line.

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170721

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 follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (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.
2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

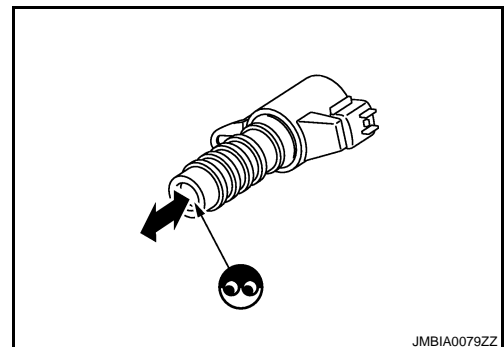
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.

Is the inspection result normal?

- YES >> INSPECTION END



P0011, P0021 IVT CONTROL

< COMPONENT DIAGNOSIS >

[VQ35DE]

NO >> Replace malfunctioning intake valve timing control solenoid valve.

P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

Description

INFOID:000000003170722

SYSTEM DESCRIPTION

| Sensor | Input Signal to ECM | ECM function | Actuator |
|--|----------------------|---|---|
| Camshaft position sensor (PHASE) Crankshaft position sensor (POS) | Engine speed | Air fuel ratio (A/F) sensor 1 heater control | Air fuel ratio (A/F) sensor 1 heater |
| Mass air flow sensor | Amount of intake air | | |

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 at the specified range.

DTC Logic

INFOID:000000003170723

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0031 | Air fuel ratio (A/F) sensor 1 heater (bank 1) control circuit low | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) • A/F sensor 1 heater |
| P0032 | Air fuel ratio (A/F) sensor 1 heater (bank 1) control circuit high | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 heater circuit is shorted.) • A/F sensor 1 heater |
| P0051 | Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit low | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) • A/F sensor 1 heater |
| P0052 | Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit high | The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.) | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 heater circuit is shorted.) • A/F sensor 1 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V 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-1153, "Diagnosis Procedure"](#).
 NG >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170724

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-42, "Intermittent Incident"](#).

P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 (V) |
|--------------|--------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0031, P0032 | 1 | F12 | 4 | Ground | Battery voltage |
| P0051, P0052 | 2 | F61 | 4 | | |

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 F10
- 15A fuse (No. 37)
- 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 | | | ECM | | Bank |
|--------------|--------------|-----------|----------|-----------|----------|---------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0031, P0032 | 1 | F12 | 3 | F14 | 4 | Existed |
| P0051, P0052 | 2 | F61 | 3 | | 8 | |

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 or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-1155, "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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< COMPONENT DIAGNOSIS >

[VQ35DE]

7. CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident"](#).

>> Repair or replace.

Component Inspection

INFOID:000000003170725

1. CHECK AIR FUEL RATIO (A/F) SENSRO 1

Check resistance between A/F sensor terminals as follows.

| Terminal No. | Resistance |
|--------------|------------------------------------|
| 3 and 4 | 1.8 - 2.44 Ω at 25°C (77°F) |
| 3 and 1, 2 | $\infty \Omega$ |
| 4 and 1, 2 | (Continuity should not exist) |

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

2. 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 Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0037, P0038, P0057, P0058 HO2S2 HEATER

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0037, P0038, P0057, P0058 HO2S2 HEATER

Description

INFOID:000000003170726

SYSTEM DESCRIPTION

| Sensor | Input signal to ECM | ECM function | Actuator |
|--|----------------------------|--|-------------------------------|
| Camshaft position sensor (PHASE) Crankshaft position sensor (POS) | Engine speed | Heated oxygen sensor 2 heater control | Heated oxygen sensor 2 heater |
| Engine coolant temperature sensor | Engine coolant temperature | | |
| 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 rpm | Heated oxygen sensor 2 heater |
|---|-------------------------------|
| Above 3,600 | OFF |
| Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none">• Engine: After warming up• Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | ON |

DTC Logic

INFOID:000000003170727

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0037 | Heated oxygen sensor 2 heater (bank 1) control circuit low | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)• Heated oxygen sensor 2 heater |
| P0038 | Heated oxygen sensor 2 heater (bank 1) control circuit high | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)• Heated oxygen sensor 2 heater |
| P0057 | Heated oxygen sensor 2 heater (bank 2) control circuit low | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)• Heated oxygen sensor 2 heater |
| P0058 | Heated oxygen sensor 2 heater (bank 2) control circuit high | The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.) | <ul style="list-style-type: none">• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)• Heated oxygen sensor 2 heater |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11V and 16V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

 With CONSULT-III

P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ35DE]

< COMPONENT DIAGNOSIS >

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. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1157, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170728

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

| DTC | HO2S2 | | | Ground | Voltage (V) |
|--------------|-------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0037, P0038 | 1 | F62 | 2 | Ground | Battery voltage |
| P0057, P0058 | 2 | F56 | 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 F10
- 15A fuse (No. 37)
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|--------------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0037, P0038 | 1 | F62 | 3 | F14 | 13 | Existed |
| P0057, P0058 | 2 | F56 | 3 | | 17 | |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

- YES >> GO TO 5.

P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-1158, "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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170729

1. CHECK HEATED OXYGEN SENSOR 2 HEATER

Check resistance between HO2S2 terminals as follows.

| 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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

P0075, P0081 IVT CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0075, P0081 IVT CONTROL SOLENOID VALVE

Description

INFOID:000000003170730

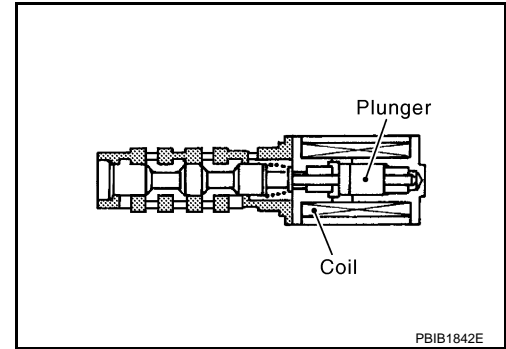
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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 angle.

The shorter pulse width retards valve angle.

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.



DTC Logic

INFOID:000000003170731

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0075 | Intake valve timing control solenoid valve (bank 1) circuit | An improper voltage is sent to the ECM through intake valve timing control solenoid valve. | <ul style="list-style-type: none"> • Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve |
| P0081 | Intake valve timing control solenoid valve (bank 2) circuit | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1159. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170732

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between intake valve timing control solenoid valve harness connector and ground with CONSULT-III or tester.

| DTC | IVT control solenoid valve | | | Ground | Voltage (V) |
|-------|----------------------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0075 | 1 | F67 | 2 | Ground | Battery voltage |
| P0081 | 2 | F66 | 2 | | |

Is the inspection result normal?

- YES >> GO TO 2.

P0075, P0081 IVT CONTROL SOLENOID VALVE

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Repair open circuit or 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 | |
| P0075 | 1 | F67 | 1 | F13 | 78 | Existed |
| P0081 | 2 | F66 | 1 | | 75 | |

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 or short to ground or short to power in harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-1160, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170733

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 follows.

| Terminals | Resistance |
|-------------------|-------------------------------------|
| 1 and 2 | 7.0 - 7.5Ω [at 20°C (68°F)] |
| 1 or 2 and ground | ∞Ω (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

[VQ35DE]

< COMPONENT DIAGNOSIS >

2. Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

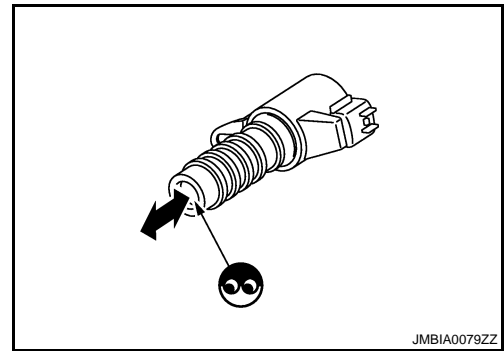
NOTE:

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.



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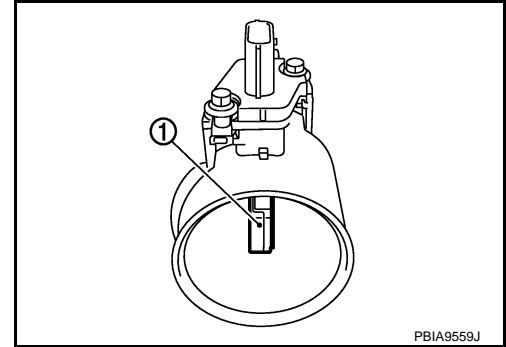
P0101 MAF SENSOR

Description

INFOID:000000003170734

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 more air, 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

INFOID:000000003170735

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|--|-------------------------|---|--|
| P0101 | Mass air flow sensor circuit range/performance | A) | A high voltage from the sensor is sent to ECM under light load driving condition. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor • EVAP control system pressure sensor |
| | | B) | A low voltage from the sensor is sent to ECM under heavy load driving condition. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor • EVAP control system pressure sensor • Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch ON) instead of running engine at idle speed.

>> 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-1164, "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.
2. Start engine and warm it up to normal operating temperature.
If engine cannot be started, go to [EC-1164, "Diagnosis Procedure"](#).

P0101 MAF SENSOR

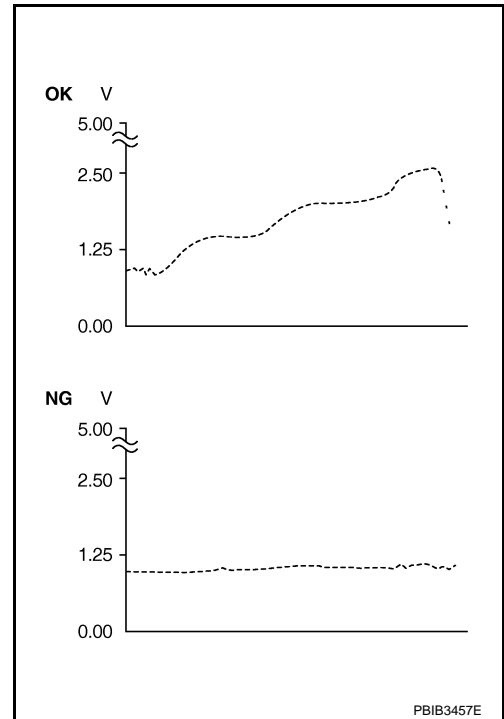
[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
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-1164, "Diagnosis Procedure"](#).



4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION

1. Maintain the following conditions for at least 10 consecutive seconds.

| | |
|------------------|--|
| ENG SPEED | More than 2,000 rpm |
| TP SEN 1-B1 | More than 3V |
| TP SEN 2-B1 | More than 3V |
| Selector lever | Suitable position |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

CAUTION:

Always drive vehicle at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1164, "Diagnosis Procedure"](#).
NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to [EC-1163, "Component Function Check"](#).

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-1164, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170736

1. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.

P0101 MAF SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check the mass air flow sensor signal with Service \$01.
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-1164, "Diagnosis Procedure"](#).

| | |
|--------------|-------------------|
| CALC LOAD | 20% |
| COOLANT TEMP | 95°C |
| SHORT FT #1 | 2% |
| LONG FT #1 | 0% |
| SHORT FT #2 | 4% |
| LONG FT #2 | 0% |
| ENGINE SPD | 2637RPM |
| VEHICLE SPD | 0MPH |
| IGN ADVANCE | 41.0° |
| INTAKE AIR | 41°C |
| MAF | 14.1gm/sec |
| THROTTLE POS | 3% |

SEF534P

Diagnosis Procedure

INFOID:000000003170737

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-1163, "Component Function Check"](#).

Which malfunction is detected?

- A >> GO TO 3.
 B >> GO TO 2.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage (V) |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 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 E11, F2
- 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 or short to ground or short to power in harness or connectors.

6.CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

P0101 MAF SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

7.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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1174, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor (with intake air temperature sensor).

9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1291, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor.

10.CHECK MASS AIR FLOW SENSOR

Refer to [EC-1165, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor.

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170738

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.

P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

- YES >> GO TO 4.
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 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

P0101 MAF SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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.

| 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END

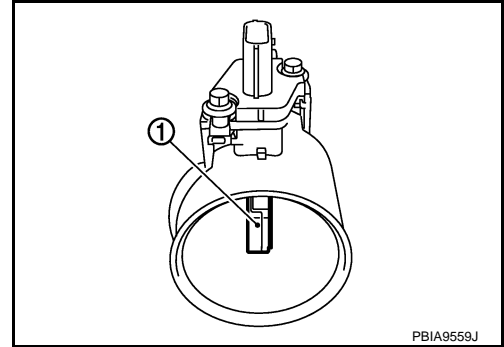
NO >> Clean or replace mass air flow sensor.

P0102, P0103 MAF SENSOR

Description

INFOID:000000003170739

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 more air, 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.



DTC Logic

INFOID:000000003170740

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0102 | Mass air flow sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air leaks • Mass air flow sensor |
| P0103 | Mass air flow sensor circuit high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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-1169, "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-1169, "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.

Is DTC detected?

- YES >> Go to [EC-1169, "Diagnosis Procedure"](#).

P0102, P0103 MAF SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170741

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

- P0102 >> GO TO 2.
- P0103 >> GO TO 3.

2.CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Reconnect the parts.

3.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
3. Check the voltage between MAF sensor harness connector and ground.

| MAF sensor | | Ground | Voltage (V) |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F31 | 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 E11, F2
- 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 4 | F13 | 56 | Existed |

4. Also check harness for short to ground and short to power.

P0102, P0103 MAF SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1170, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170742

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) |
|---------------|--|---------------------------|
| 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> GO TO 4.

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 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

P0102, P0103 MAF SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

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) |
|---------------|--|---------------------------|
| 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 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 and ground.

| ECM | | Ground | Condition | Voltage V |
|-----------|---------------------------|--------|--|---------------------------|
| Connector | Terminal | | | |
| F31 | 58 (MAF sensor signal) | Ground | 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 about 4,000 rpm | 0.9 - 1.2 to Approx. 2.4* |

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Clean or replace mass air flow sensor.

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

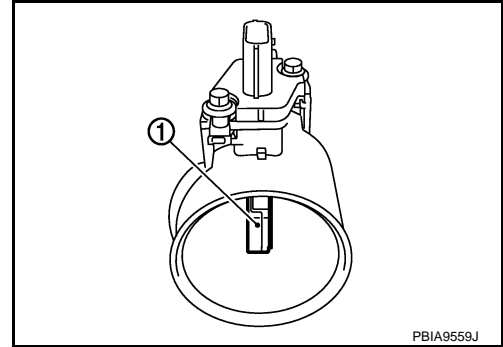
P0112, P0113 IAT SENSOR

Description

INFOID:000000003170743

The intake air temperature sensor is built-into 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 temperature rise.



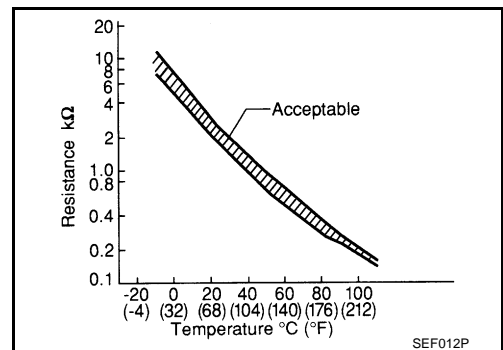
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000003170744

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0112 | Intake air temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor |
| P0113 | Intake air temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-1174, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

P0112, P0113 IAT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000003170745

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 (V) |
|------------|----------|--------|-------------|
| Connector | Terminal | | |
| F31 | 2 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F31 | 1 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1174, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170746

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 follows.

P0112, P0113 IAT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Terminal | Condition | | Resistance kΩ |
|----------|---------------------|---------|---------------|
| 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).

A

EC

C

D

E

F

G

H

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L

M

N

O

P

P0117, P0118 ECT SENSOR

< COMPONENT DIAGNOSIS >

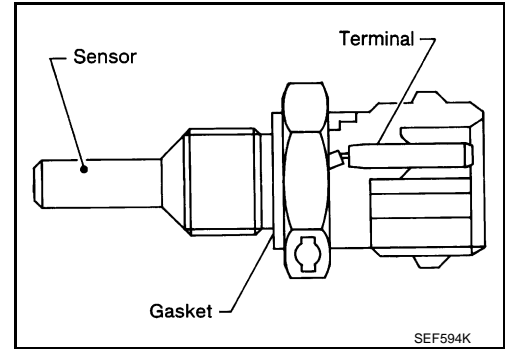
[VQ35DE]

P0117, P0118 ECT SENSOR

Description

INFOID:000000003170747

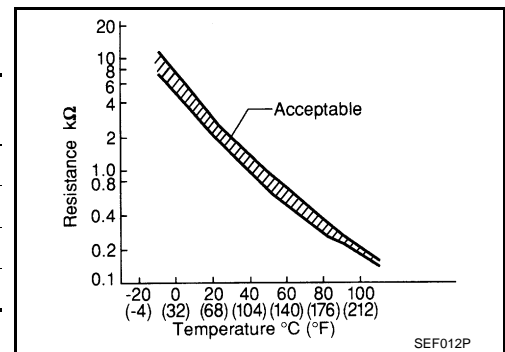
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

| Engine coolant temperature °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 |

*: These data are reference values and are measured between ECM terminal 46 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000003170748

DTC DETECTION LOGIC

| DTC No. | Trouble Diagnosis Name | DTC Detecting Condition | Possible Cause |
|---------|--|---|---|
| P0117 | Engine coolant temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Engine coolant temperature sensor |
| P0118 | Engine coolant temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 5 seconds.
- Check DTC.

Is DTC detected?

- YES >> Go to [EC-1177, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

P0117, P0118 ECT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

Diagnosis Procedure

INFOID:000000003170749

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between ECT sensor harness connector and ground.

| ECT sensor | | Ground | Voltage (V) |
|------------|----------|--------|-------------|
| Connector | Terminal | | |
| F11 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between ECT sensor harness connector and ECM harness connector.

| ECT sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F11 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1177. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170750

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Remove engine coolant temperature sensor.

P0117, P0118 ECT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

4. Check resistance between engine coolant temperature sensor terminals as follows.

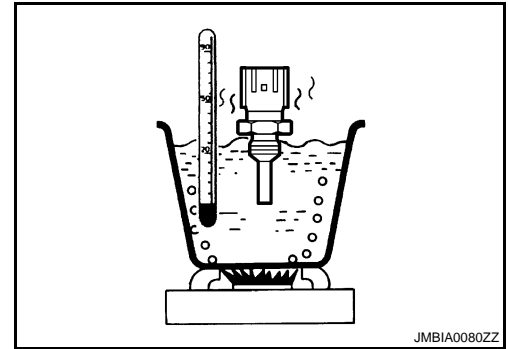
<Reference data>

| Terminals | Condition | Resistance kΩ | |
|-----------|---------------------|---------------|---------------|
| 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.



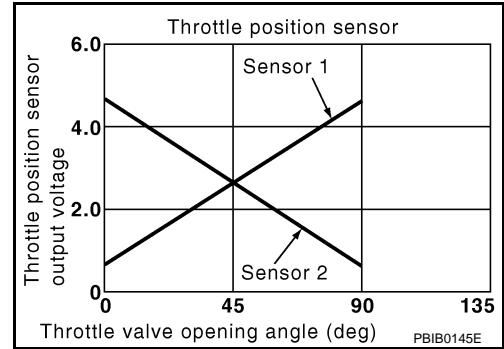
P0122, P0123 TP SENSOR

Description

INFOID:000000003170751

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 signal 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.



DTC Logic

INFOID:000000003170752

DTC DETECTION LOGIC

NOTE:

IF DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-1334, "DTC Logic".

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0122 | Throttle position sensor 2 circuit low input | An excessively low voltage from the TP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (TP sensor 2 circuit is open or shorted.) Electric throttle control actuator (TP sensor 2) |
| P0123 | Throttle position sensor 2 circuit high input | An excessively high voltage from the TP sensor 2 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1179, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170753

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

P0122, P0123 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator | | Ground | Voltage (V) |
|------------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F51 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F51 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F51 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1181, "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-1181, "Special Repair Requirement"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0122, P0123 TP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

Component Inspection

INFOID:000000003170754

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector lever to D position (CVT) or 1st position (M/T).
6. Check the voltage between ECM harness connector and ground

| ECM | | Ground | Condition | Voltage (V) |
|-----------|-------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-1181, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170755

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P0125 ECT SENSOR

< COMPONENT DIAGNOSIS >

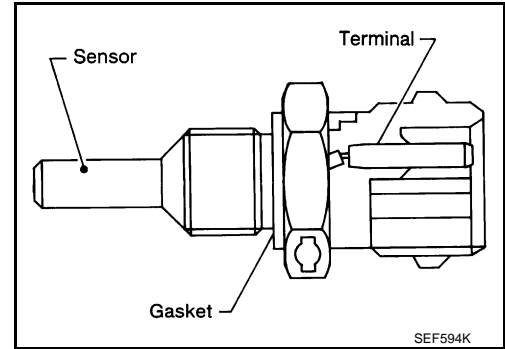
[VQ35DE]

P0125 ECT SENSOR

Description

INFOID:000000003170756

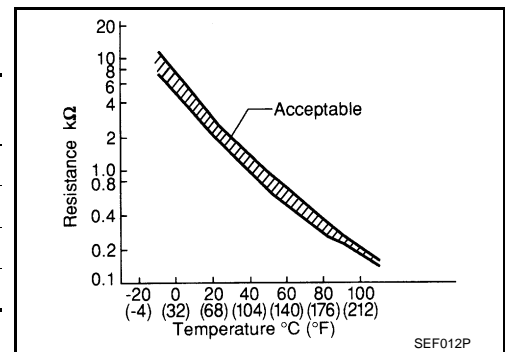
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

| Engine coolant temperature °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 |

*: These data are reference values and are measured between ECM terminal 46 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000003170757

DTC DETECTION LOGIC

NOTE:

- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-1176, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0125 | Insufficient engine coolant temperature for closed loop fuel control | <ul style="list-style-type: none"> • Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control. | <ul style="list-style-type: none"> • Harness or connectors (High resistance in the circuit) • Engine coolant temperature sensor • Thermostat |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

Ⓜ With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).

< COMPONENT DIAGNOSIS >

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is it above 10°C (50°F)?

- YES >> INSPECTION END
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Start engine and run it for 65 minutes at idle speed.

If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.

CAUTION:

Be careful not to overheat engine.

2. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> [EC-1183, "Diagnosis Procedure"](#)
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170758

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1183, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace engine coolant temperature sensor.

3.CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace thermostat. Refer to [CO-44, "Removal and Installation"](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170759

1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect engine coolant temperature sensor harness connector.

3. Remove engine coolant temperature sensor.

P0125 ECT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

4. Check resistance between engine coolant temperature sensor terminals as follows.

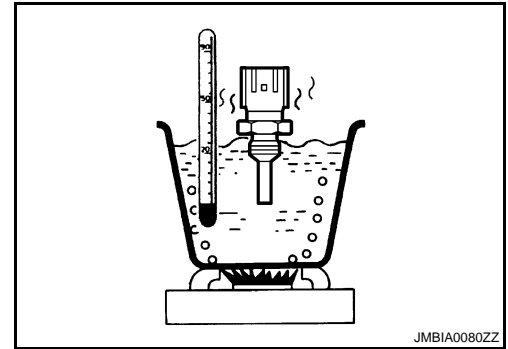
<Reference data>

| Terminals | Condition | Resistance kΩ | |
|-----------|---------------------|---------------|---------------|
| 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

< COMPONENT DIAGNOSIS >

[VQ35DE]

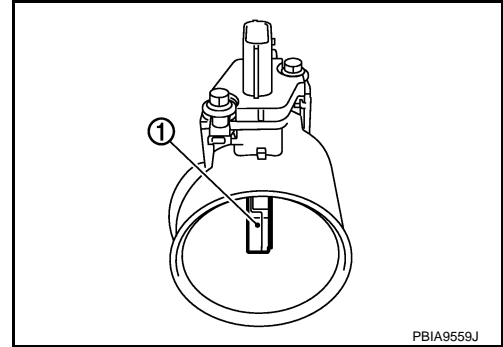
P0127 IAT SENSOR

Description

INFOID:000000003170760

The intake air temperature sensor is built-into 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 temperature rise.



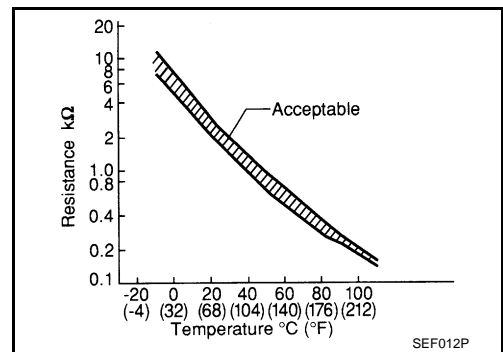
<Reference data>

| Intake air temperature °C (°F) | Voltage* V | Resistance kΩ |
|-----------------------------------|------------|---------------|
| 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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



DTC Logic

INFOID:000000003170761

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------|---|--|
| P0127 | Intake air temperature too high | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Intake air temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

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.
 - If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.

P0127 IAT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

NOTE:

- Perform the following steps before engine coolant temperature is above 90°C (194°F).
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Start engine.
- Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

- Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1186, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170762

1.CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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-1186, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170763

1.CHECK INTAKE AIR TEMPERATURE SENSOR

- Turn ignition switch OFF.
- Disconnect mass air flow sensor harness connector.
- Check resistance between mass air flow sensor terminals as follows.

| Terminal | Condition | Resistance kΩ |
|----------|-----------------------------|---------------|
| 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 >

[VQ35DE]

P0128 THERMOSTAT FUNCTION

DTC Logic

INFOID:000000003170764

DTC DETECTION LOGIC

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P0128 | Thermostat function | The engine coolant temperature does not reach to specified temperature even though the engine has run long enough. | <ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- 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 71°C (160°F).
- Before performing the following procedure, do not fill with the 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 71°C (160°F), go to following step.
If it is above 71°C (160°F), cool down the engine to less than 71°C (160°F). Then go to next steps.
6. Start engine.
7. Wait at idle for at least 30 minutes.
If "COOLAN TEMP/S" increases to more than 71°C (160°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-1187, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170765

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1187, "Component Inspection"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace engine coolant temperature sensor.

Component Inspection

INFOID:000000003170766

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

P0128 THERMOSTAT FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 follows.

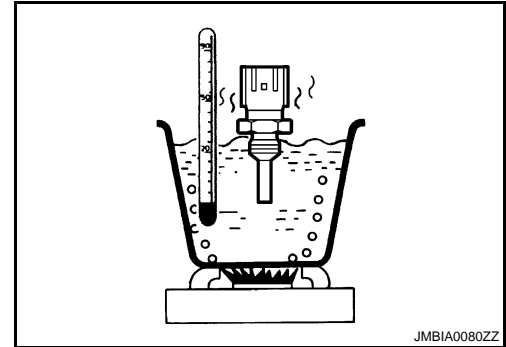
<Reference data>

| Terminals | Condition | Resistance kΩ | |
|-----------|---------------------|---------------|---------------|
| 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.

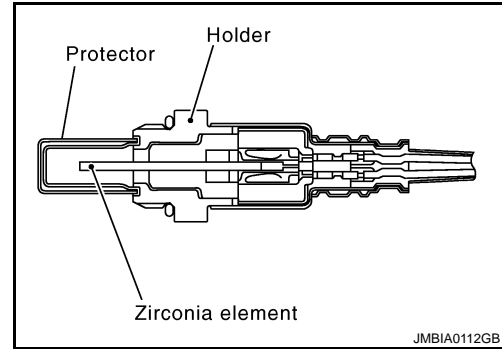


P0130, P0150 A/F SENSOR 1

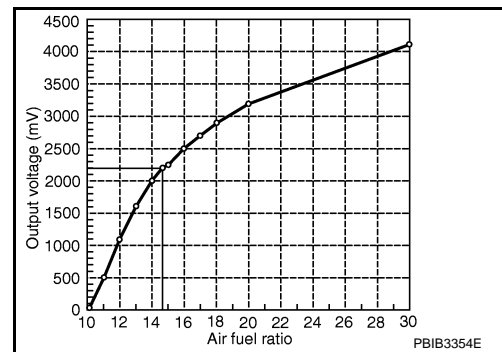
Description

INFOID:000000003170767

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000003170768

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 fluctuates according to fuel feedback control.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible Cause |
|---------|--|-------------------------|---|--|
| P0130 | Air fuel ratio (A/F) sensor 1 (bank 1) circuit | A) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2V. | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1 |
| | | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2V. | |
| P0150 | Air fuel ratio (A/F) sensor 1 (bank 2) circuit | A) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2V. | <ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1 |
| | | B) | The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2V. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

1. Start engine and warm it up to normal operating temperature.

< COMPONENT DIAGNOSIS >

2. Let it idle for 2 minutes.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1191, "Diagnosis Procedure"](#).
- NO-1 >> With CONSULT-III: GO TO 3.
- NO-2 >> Without CONSULT-III: GO TO 7.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

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.

Does the indication fluctuates around 2.2V?

- YES >> GO TO 4.
- NO >> Go to [EC-1191, "Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-I

1. Select "A/F SEN1 (B1) P1276" (for DTC P0130) or "A/F SEN1 (B2) P1286" (for DTC P0150) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
2. Touch "START".
3. When the following conditions 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 (CVT) 5th position (M/T) |

If "TESTING" is not displayed after 20 seconds, retry from step 2.

CAUTION:

Always drive vehicle at a safe speed.

Is "TESTING" displayed on CONSULT-III screen?

- YES >> GO TO 5.
- NO >> Check A/F sensor 1 function again. GO TO 3.

5. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-II

Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

Which does "TESTING" change to?

- COMPLETED>>GO TO 6.
- OUT OF CONDITION>>Retry DTC CONFIRMATION PROCEDURE. GO TO 4.

6. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-III

Touch "SELF-DIAG RESULT".

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-1191, "Diagnosis Procedure"](#).

7. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to [EC-1191, "Component Function Check"](#).

NOTE:

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
- NO >> Go to [EC-1191, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170769

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. Set D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1191, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170770

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 |
|-------|--------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0130 | 1 | F12 | 4 | Ground | Battery voltage |
| P0150 | 2 | F61 | 4 | | |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> 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.

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

P0130, P0150 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

| DTC | A/F sensor 1 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0130 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0150 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0130 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0150 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

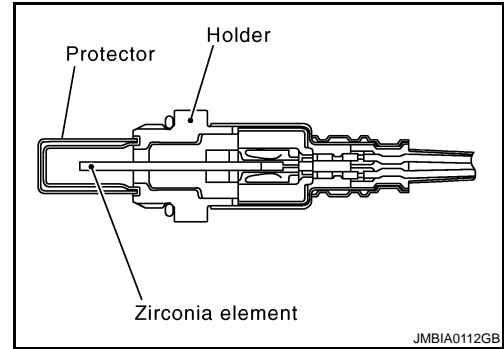
>> INSPECTION END

P0131, P0151 A/F SENSOR 1

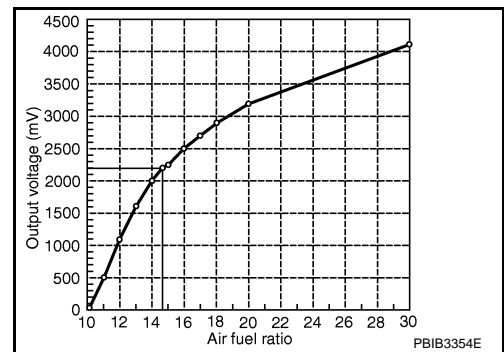
Description

INFOID:000000003170771

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000003170772

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 (bank 1) circuit low voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |
| P0151 | Air fuel ratio (A/F) sensor 1 (bank 2) circuit low voltage | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR 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.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 0V?

P0131, P0151 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> Go to [EC-1194, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|----------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Selector lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1194, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170773

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 |
|-------|--------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0131 | 1 | F12 | 4 | Ground | Battery voltage |
| P0151 | 2 | F61 | 4 | | |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

P0131, P0151 A/F SENSOR 1

< COMPONENT DIAGNOSIS >

[VQ35DE]

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 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0131 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0151 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0131 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0151 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

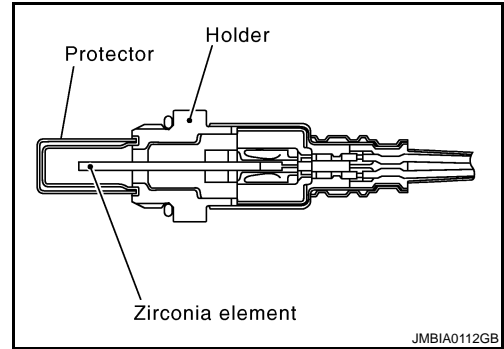
>> INSPECTION END

P0132, P0152 A/F SENSOR 1

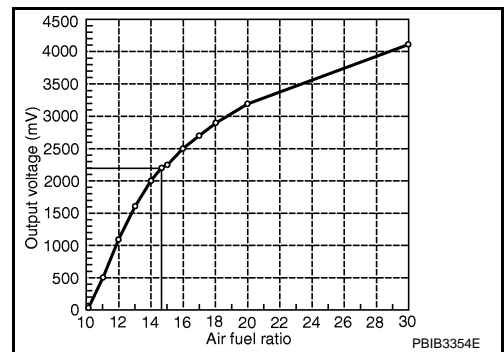
Description

INFOID:000000003170774

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000003170775

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 (bank 1) circuit high voltage | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5V. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 |
| P0152 | Air fuel ratio (A/F) sensor 1 (bank 2) circuit high voltage | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR 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.

With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 5V?

P0132, P0152 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> Go to [EC-1197, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
2. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.

CAUTION:

Always drive vehicle at a safe speed.

3. Maintain the following conditions for about 20 consecutive seconds.

| | |
|----------------|----------------------------|
| ENG SPEED | 1,000 - 3,200 rpm |
| VHCL SPEED SE | More than 40 km/h (25 mph) |
| B/FUEL SCHDL | 1.5 - 9.0 msec |
| Selector lever | Suitable position |

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.

4. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC is detected?

- YES >> Go to [EC-1197, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170776

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 |
|-------|--------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0132 | 1 | F12 | 4 | Ground | Battery voltage |
| P0152 | 2 | F61 | 4 | | |

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 F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

P0132, P0152 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0132 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0152 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0132 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0152 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

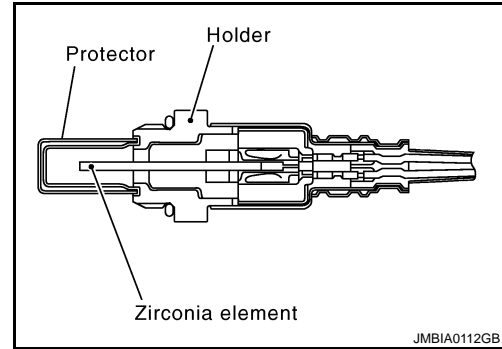
>> INSPECTION END

P0133, P0153 A/F SENSOR 1

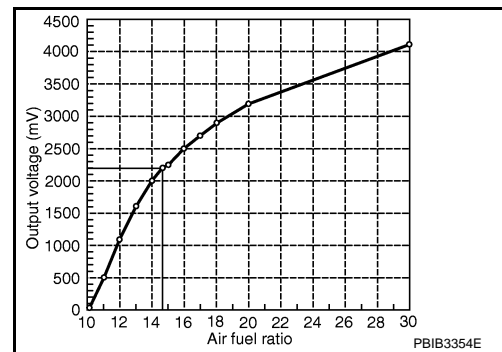
Description

INFOID:000000003170777

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000003170778

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 (bank 1) circuit slow response | <ul style="list-style-type: none"> The response of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time. | <ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 circuit is open or shorted.) A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks Exhaust gas leaks PCV Mass air flow sensor |
| P0153 | Air fuel ratio (A/F) sensor 1 (bank 2) circuit slow response | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

< COMPONENT DIAGNOSIS >

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. 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. 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.
6. Touch "START".

Is COMPLETED displayed?

- YES >> GO TO 3.
NO >> GO TO 4.

3. PERFORM DTC CONFIRMATION PROCEDURE

Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".

Is OK displayed?

- YES >> INSPECTION END
NO >> Go to [EC-1201, "Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE

1. After perform the following procedure, "TESTING" will be displayed on the CONSULT-III screen.
 - Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
 - Fully release accelerator pedal and then let engine idle for about 10 seconds.**If "TESTING" is not displayed after 10 seconds, refer to [EC-1135, "Component Function Check"](#).**
2. Wait for about 20 seconds at idle at under the condition that "TESTING" is displayed on the CONSULT-III screen.
3. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-1135, "Component Function Check"](#).
4. Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".

Is OK displayed?

- YES >> INSPECTION END
NO >> Go to [EC-1201, "Diagnosis Procedure"](#).

5. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

With GST

1. Start engine and warm it up to normal operating temperature.
2. Select Service \$01 with GST.
3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.

Is the total percentage within $\pm 15\%$?

- YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

7. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.

P0133, P0153 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

2. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
3. Let engine idle for 1 minute.
4. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
5. Fully release accelerator pedal and then let engine idle for about 1 minute.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1201, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170779

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

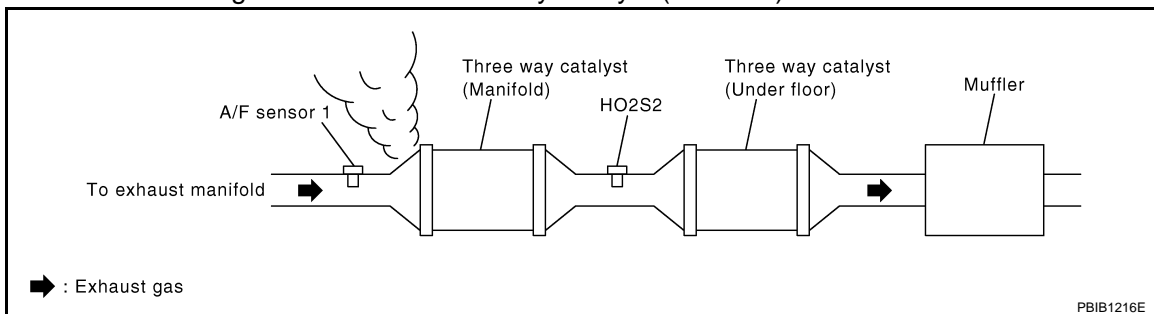
2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to [EM-136, "Removal and Installation"](#).

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 4.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.

NO >> GO TO 5.

5. CLEAR THE MIXTURE RATIO SELF- LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174, P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-1224, "DTC Logic"](#) or [EC-1228, "DTC Logic"](#).

NO >> GO TO 6.

6. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect A/F sensor 1 harness connector.
2. Turn ignition switch ON.

P0133, P0153 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check the voltage between A/F sensor 1 harness connector and ground.

| DTC | A/F sensor 1 | | | Ground | Voltage |
|-------|--------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0133 | 1 | F12 | 4 | Ground | Battery voltage |
| P0153 | 2 | F61 | 4 | | |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0133 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0153 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector ground.

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0133 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0153 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-1155. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1165. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

P0133, P0153 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Replace mass air flow sensor.

11.CHECK PCV VALVE

Refer to [EC-1449, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve.

12.CHECK INTERMITTENT INCIDENT

Perform [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

A

EC

C

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O

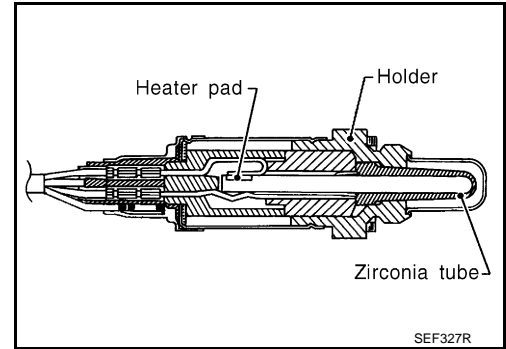
P

P0137, P0157 HO2S2

Description

INFOID:000000003170780

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



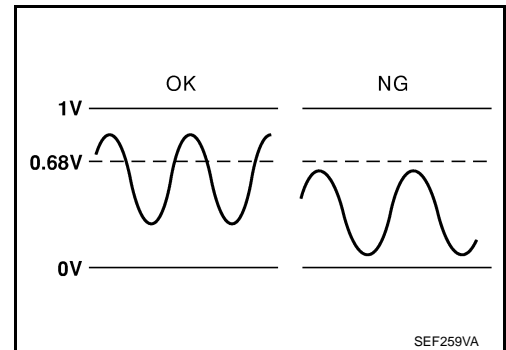
SEF327R

DTC Logic

INFOID:000000003170781

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 maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



SEF259VA

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0137 | Heated oxygen sensor 2 (bank 1) circuit low voltage | The maximum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |
| P0157 | Heated oxygen sensor 2 (bank 2) circuit low voltage | | |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

< COMPONENT DIAGNOSIS >

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. Make sure 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 to 70°C (158°F).
 7. Open engine hood.
 8. Select "HO2S2 (B1) P1147" (for DTC P0137) or "HO2S2 (B2) P1167" (for DTC P0157) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
 9. Start engine and following the instruction of CONSULT-III.
- NOTE:**
It will take at most 10 minutes until "COMPLETED" is displayed.
10. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-1206, "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-1205, "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-1206, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170782

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. 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 and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0137 | F13 | 33 | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. |
| P0157 | | 34 | | | |

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 and ground under the following condition.

< COMPONENT DIAGNOSIS >

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---------------------------------------|--|
| | Connector | Terminal | | | |
| P0137 | F13 | 33 | Ground | Keeping engine at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. |
| P0157 | | 34 | | | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0137 | F13 | 33 | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. |
| P0157 | | 34 | | | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-1206. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170783

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 [EC-1224. "DTC Logic"](#).
- 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 HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0137 | 1 | F62 | 1 | F13 | 35 | Existed |
| P0157 | 2 | F56 | 1 | | | |

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 or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0137, P0157 HO2S2

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0137 | 1 | F62 | 4 | F13 | 33 | Existed |
| P0157 | 2 | F56 | 4 | | 34 | |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| DTC | HO2S2 | | | ECM | | Ground | Continuity |
|-------|-------|-----------|----------|-----------|----------|--------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0137 | 1 | F62 | 4 | F13 | 33 | Ground | Not existed |
| P0157 | 2 | F56 | 4 | | 34 | | |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1207. "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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170784

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

With CONSULT-III

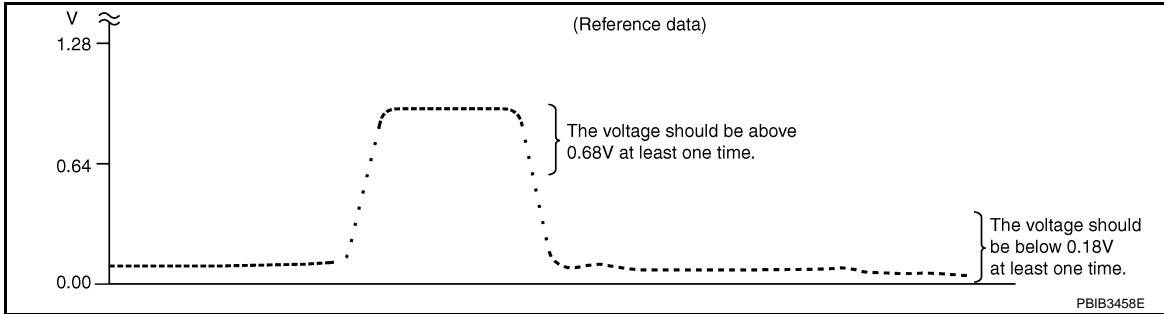
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

P0137, P0157 HO2S2

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---------------------------------------|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Keeping engine at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

A

EC

C

Is the inspection result normal?

D

YES >> INSPECTION END

NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

E

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

F

G

>> INSPECTION END

H

I

J

K

L

M

N

O

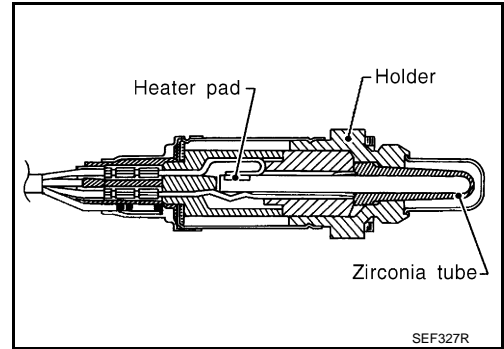
P

P0138, P0158 HO2S2

Description

INFOID:000000003170785

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



DTC Logic

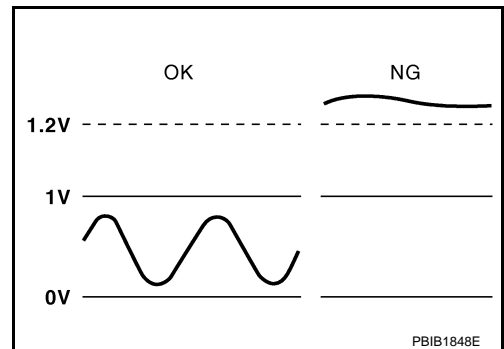
INFOID:000000003170786

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.

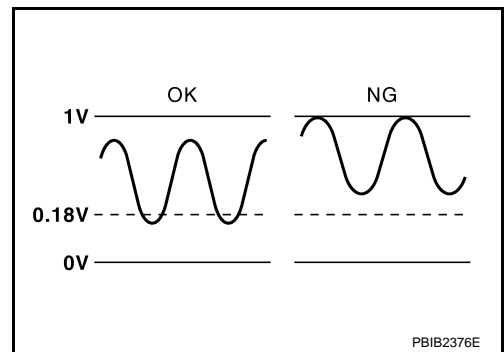
MALFUNCTION A

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition 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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|--|-------------------------|--|---|
| P0138 | Heated oxygen sensor 2 (bank 1) circuit high voltage | A) | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 |
| | | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector |

P0138, P0158 HO2S2

< COMPONENT DIAGNOSIS >

[VQ35DE]

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|--|-------------------------|--|---|
| P0158 | Heated oxygen sensor 2 (bank 2) circuit high voltage | A) | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 |
| | | B) | The minimum voltage from the sensor is not reached to the specified voltage. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1212. "Diagnosis Procedure"](#).

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.
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Start engine and following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to [EC-1212. "Diagnosis Procedure"](#).

CON NOT BE DIAGNOSED>>GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B 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 FOR MALFUNCTION B

Perform component function check. Refer to [EC-1212. "Component Function Check"](#).

NOTE:

< COMPONENT DIAGNOSIS >

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-1212, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170787

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. 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 and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0138 | F13 | 33 | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be below 0.18V at least once during this procedure. |
| P0158 | | 34 | | | |

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 and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0138 | F13 | 33 | Ground | Keeping engine speed at idle for 10 minutes | The voltage should be below 0.18V at least once during this procedure. |
| P0158 | | 34 | | | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0138 | F13 | 33 | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be below 0.18V at least once during this procedure. |
| P0158 | | 34 | | | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-1212, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170788

1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-1210, "DTC Logic"](#).

Which malfunction is detected?

- A >> GO TO 2.
- B >> GO TO 9.

< COMPONENT DIAGNOSIS >

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace ground connection.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0138 | 1 | F62 | 1 | F13 | 35 | Existed |
| P0158 | 2 | F56 | 1 | | | |

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 or 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 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0138 | 1 | F62 | 4 | F13 | 33 | Existed |
| P0158 | 2 | F56 | 4 | | 34 | |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| DTC | HO2S2 | | | ECM | | Ground | Continuity |
|-------|-------|-----------|----------|-----------|----------|--------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0138 | 1 | F62 | 4 | F13 | 33 | Ground | Not existed |
| P0158 | 2 | F56 | 4 | | 34 | | |

3. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 5.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> Repair or replace harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1215, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.

< COMPONENT DIAGNOSIS >

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

9.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.
 NO >> Repair or replace ground connection.

10.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE 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 [EC-1228, "DTC Logic"](#).
 NO >> GO TO 11.

11.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 HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0138 | 1 | F62 | 1 | F13 | 35 | Existed |
| P0158 | 2 | F56 | 1 | | | |

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

- YES >> GO TO 12.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0138 | 1 | F62 | 4 | F13 | 33 | Existed |
| P0158 | 2 | F56 | 4 | | 34 | |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

< COMPONENT DIAGNOSIS >

| DTC | HO2S2 | | | ECM | | Ground | Continuity |
|-------|-------|-----------|----------|-----------|----------|--------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0138 | 1 | F62 | 4 | F13 | 33 | Ground | Not existed |
| P0158 | 2 | F56 | 4 | | 34 | | |

A

EC

3. Also check harness for short to power.

Is the inspection result normal?

C

YES >> GO TO 13.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

13.CHECK HEATED OXYGEN SENSOR 2

D

Refer to [EC-1215, "Component Inspection"](#).

Is the inspection result normal?

E

YES >> GO TO 15.

NO >> GO TO 14.

14.REPLACE HEATED OXYGEN SENSOR 2

F

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

G

H

>> INSPECTION END

15.CHECK INTERMITTENT INCIDENT

I

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

J

Component Inspection

INFOID:000000003170789

K

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

L

YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

M

With CONSULT-III

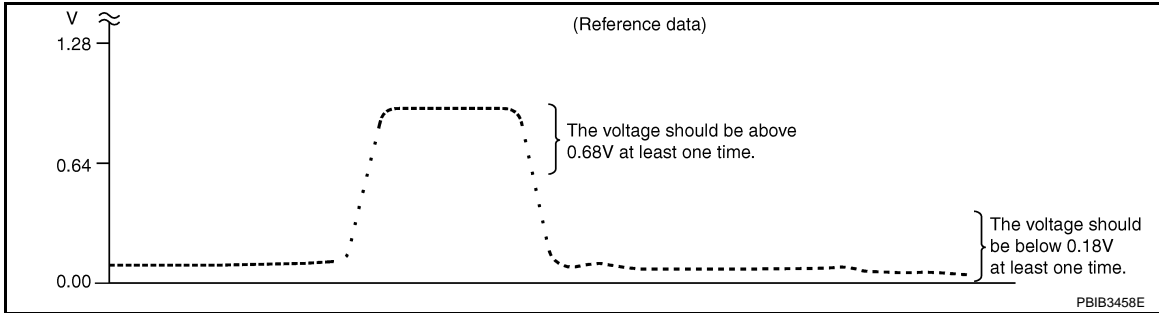
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no 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.

N

O

P

7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)/(B2)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---------------------------------------|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Keeping engine at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

A

EC

C

Is the inspection result normal?

D

YES >> INSPECTION END

NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

E

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

F

G

>> INSPECTION END

H

I

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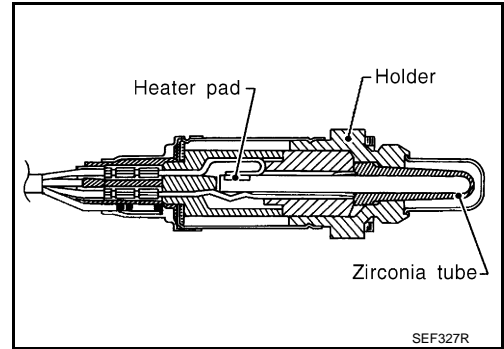
P

P0139, P0159 HO2S2

Description

INFOID:000000003170790

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 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

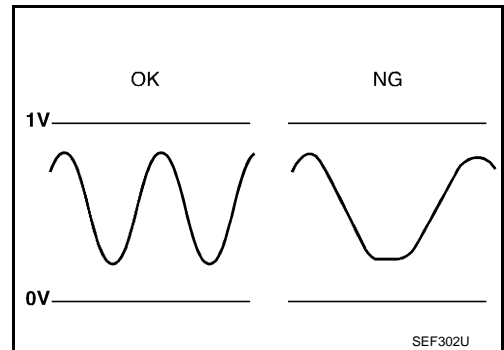


DTC Logic

INFOID:000000003170791

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 the various driving condition such as fuel-cut.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P0139 | Heated oxygen sensor 2 (bank 1) circuit slow response | It takes more time for the sensor to respond between rich and lean than the specified time. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks |
| P0159 | Heated oxygen sensor 2 (bank 2) circuit slow response | | |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For better results, perform “DTC WORK SUPPORT” at a temperature of 0 to 30 °C (32 to 86 °F).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

P0139, P0159 HO2S2

[VQ35DE]

< COMPONENT DIAGNOSIS >

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. Start engine and warm it up to the normal operating temperature.
 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. Open engine hood.
 7. Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
 8. Start engine and following the instruction of CONSULT-III.
- NOTE:**
It will take at most 10 minutes until "COMPLETED" is displayed.
9. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-1220, "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-1219, "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-1220, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170792

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. 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 and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|---|
| | Connector | Terminal | | | |
| P0139 | F13 | 33 | Ground | Revving up to 4,000 rpm under no load at least 10 times | A change of voltage should be more than 0.24V for 1 second during this procedure. |
| P0159 | | 34 | | | |

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 and ground under the following condition.

< COMPONENT DIAGNOSIS >

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---------------------------------------|---|
| | Connector | Terminal | | | |
| P0139 | F13 | 33 | Ground | Keeping engine at idle for 10 minutes | A change of voltage should be more than 0.24V for 1 second during this procedure. |
| P0159 | | 34 | | | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|---|
| | Connector | Terminal | | | |
| P0139 | F13 | 33 | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | A change of voltage should be more than 0.24V for 1 second during this procedure. |
| P0159 | | 34 | | | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1220. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170793

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023. "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 [EC-1224. "DTC Logic"](#) or [EC-1228. "DTC Logic"](#).

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 HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0139 | 1 | F62 | 1 | F13 | 35 | Existed |
| P0159 | 2 | F56 | 1 | | | |

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 or short to ground or short to power in harness or connectors.

< COMPONENT DIAGNOSIS >

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

| DTC | HO2S2 | | | ECM | | Continuity |
|-------|-------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0139 | 1 | F62 | 4 | F13 | 33 | Existed |
| P0159 | 2 | F56 | 4 | | 34 | |

2. Check the continuity between HO2S2 harness connector or ECM harness connector and ground.

| DTC | HO2S2 | | | ECM | | Ground | Continuity |
|-------|-------|-----------|----------|-----------|----------|--------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0139 | 1 | F62 | 4 | F13 | 33 | Ground | Not existed |
| P0159 | 2 | F56 | 4 | | 34 | | |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1221. "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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170794

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

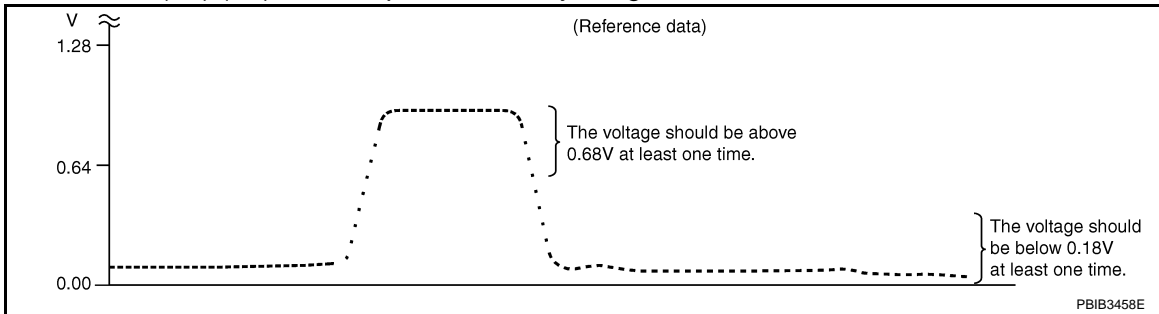
2.CHECK HEATED OXYGEN SENSOR 2

 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.

< COMPONENT DIAGNOSIS >

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 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V 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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Revving up to 4,000 rpm under no load at least 10 times | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|-------------------------------|--------|---------------------------------------|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Keeping engine at idle for 10 minutes | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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 and ground under the following condition.

| ECM | | Ground | Condition | Voltage |
|-----------|----------------------------------|--------|---|--|
| Connector | Terminal | | | |
| F13 | 33 [HO2S2 (bank 1) signal] | Ground | Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T) | The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure. |
| | 34 [HO2S2 (bank 2) signal] | | | |

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Is the inspection result normal?

D

YES >> INSPECTION END

NO >> GO TO 6.

6. REPLACE HEATED OXYGEN SENSOR 2

E

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

F

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>> INSPECTION END

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P

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000003170795

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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) | • Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) | • Intake air leaks • A/F sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor • Incorrect PCV hose connection |
| P0174 | Fuel injection system too lean (bank 2) | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).

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.

Crank engine while depressing accelerator pedal.

Does engine start?

YES >> Go to [EC-1225, "Diagnosis Procedure"](#).

NO >> Check exhaust and intake air leak 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-1225, "Diagnosis Procedure"](#).

NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.
 The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

- Check 1st trip DTC.

Is 1st trip DTC detected?

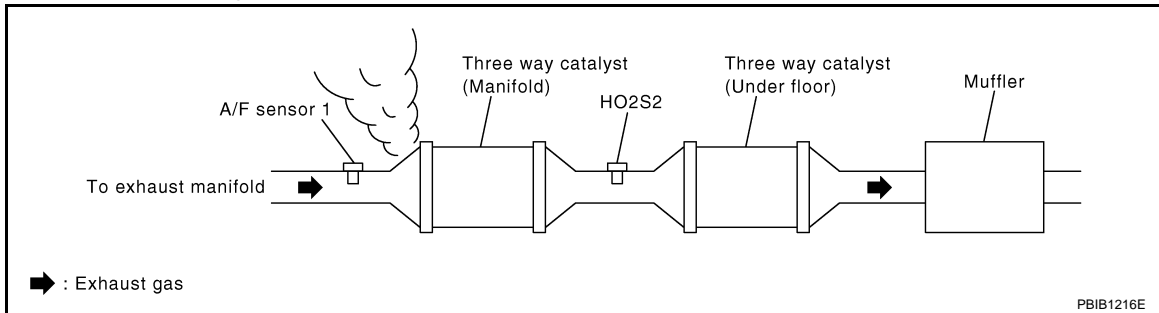
- YES >> Go to [EC-1225. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170796

1.CHECK EXHAUST GAS LEAK

- Start engine and run it at idle.
- Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> GO TO 2.
 NO >> Repair or replace.

2.CHECK FOR INTAKE AIR LEAK

- Listen for an intake air leak after the mass air flow sensor.
- Check PCV hose connection.

Is intake air leak detected?

- YES >> GO TO 3.
 NO >> Repair or replace.

3.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- Turn ignition switch OFF.
- Disconnect corresponding A/F sensor 1 harness connector.
- Disconnect ECM harness connector.
- Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

| DTC | A/F sensor 1 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0171 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0174 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0171 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0174 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1525, "Inspection"](#).

2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1525, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

Is the inspection result normal?

YES >> GO TO 6.

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.

6. 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 [EC-1531, "Mass Air Flow Sensor"](#).

 **With GST**

1. Install all removed parts.

2. Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to [EC-1531, "Mass Air Flow Sensor"](#).

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 [EC-1169, "Diagnosis Procedure"](#).

7. CHECK FUNCTION OF FUEL INJECTOR

 **With CONSULT-III**

1. Start engine.

2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.

3. Make sure that each circuit produces a momentary engine speed drop.

 **With GST**

1. Let engine idle.

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

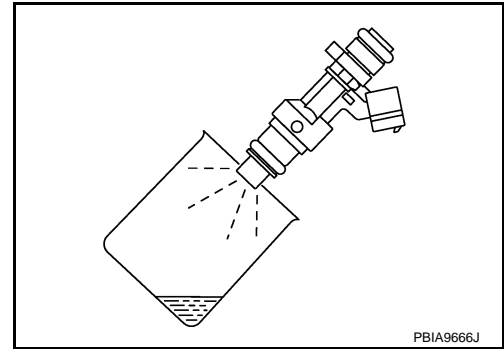
< COMPONENT DIAGNOSIS >

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 [EC-1431, "Diagnosis Procedure"](#).



8. CHECK FUEL INJECTOR

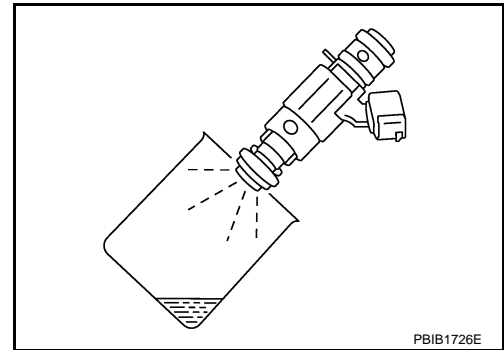
1. Turn ignition switch OFF.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Remove fuel tube assembly. Refer to [EM-146, "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
5. 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, make sure that fuel sprays out from fuel injectors on bank 1.
For DTC P0174, make sure 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-42, "Intermittent Incident"](#).

>> INSPECTION END

P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

DTC Logic

INFOID:000000003170797

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 the A/F sensors 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 lights up the MIL (2 trip detection logic).

| Sensor | Input signal to ECM | ECM function | Actuator |
|--------------|--|------------------------|---------------|
| A/F sensor 1 | Density of oxygen in exhaust gas (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. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) | • A/F sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor |
| P0175 | Fuel injection system too rich (bank 2) | | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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.

Crank engine while depressing accelerator pedal.

Does engine start?

- YES >> Go to [EC-1229, "Diagnosis Procedure"](#).
NO >> Remove spark plugs and check for fouling, etc.

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-1229, "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 the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.

P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

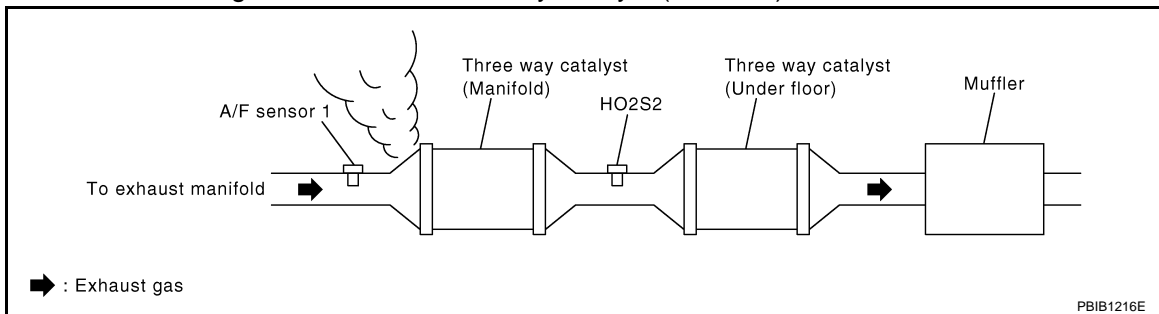
- YES >> Go to [EC-1229, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170798

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



Is exhaust gas leak detected?

- YES >> GO TO 2.
 NO >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> GO TO 3.
 NO >> Repair or replace.

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 |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0172 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P0175 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

| DTC | A/F sensor 1 | | | ECM | | Ground. | Continuity |
|-------|--------------|-----------|----------|-----------|----------|---------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P0172 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P0175 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1525, "Inspection"](#).

2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1525, "Inspection"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 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 [EC-1531, "Mass Air Flow Sensor"](#).

 **With GST**

1. Install all removed parts.

2. Check mass air flow sensor signal in "Service \$01" with GST.

For specification, refer to [EC-1531, "Mass Air Flow Sensor"](#).

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 [EC-1169, "Diagnosis Procedure"](#).

6.CHECK FUNCTION OF FUEL INJECTOR

 **With CONSULT-III**

1. Start engine.

2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.

3. Make sure that each circuit produces a momentary engine speed drop.

 **With GST**

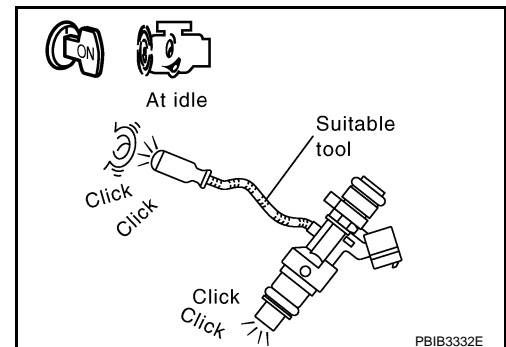
1. Let engine idle.

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 [EC-1431, "Diagnosis Procedure"](#).



7.CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-146, "Removal and Installation"](#).

P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

Keep fuel hose and all fuel injectors connected to fuel tube.

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. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from fuel injector.

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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.

C

8. CHECK INTERMITTENT INCIDENT

D

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

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P0181 FTT SENSOR

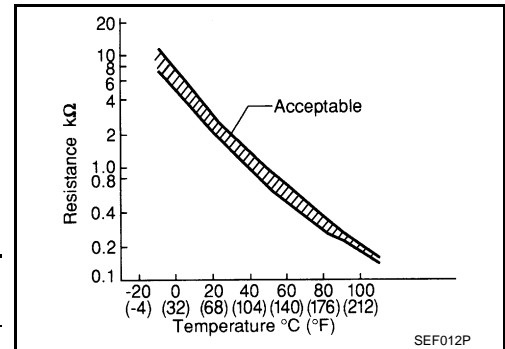
Description

INFOID:000000003170799

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000003170800

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0181 | Fuel tank temperature sensor circuit range/performance | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Fuel tank temperature sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-1233, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3. CHECK ENGINE COOLANT TEMPERATURE

With CONSULT-III

1. 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.

"COOLAN TEMP/S" less than 60°C (140°F)?

- YES >> INSPECTION END
- NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-II

P0181 FTT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

With CONSULT-III

1. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
2. Wait at least 10 seconds.
3. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1233. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170801

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

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.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

>> Repair open circuit or short to ground or short to power in harness or connector.

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 | |
| B42 | 5 | E10 | 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.

P0181 FTT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Harness connectors E30, M1
- Harness connectors M6, B1
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

>> Repair open circuit or short to ground or short to power in harness or connector.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1234, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170802

1. CHECK FUEL TANK TEMPERATURE SENSOR

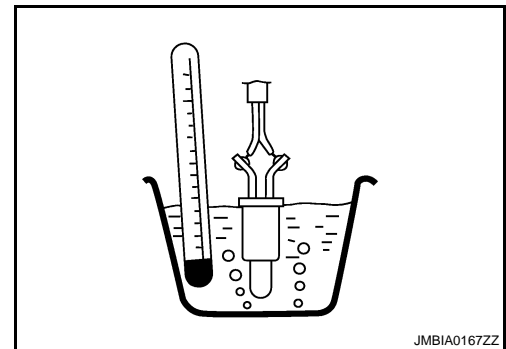
1. Turn ignition switch OFF.
2. Remove fuel level sensor unit.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance | |
|-----------|---------------------|------------|----------------|
| 4 and 5 | Temperature °C (°F) | 20 (68) | 2.3 - 2.7 kΩ |
| | | 50 (122) | 0.79 - 0.90 kΩ |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace “fuel level sensor unit and fuel pump”.

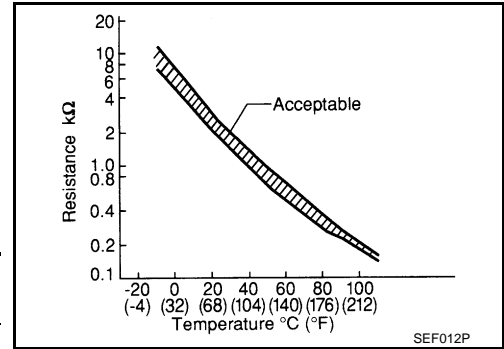


P0182, P0183 FTT SENSOR

Description

INFOID:000000003170803

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 °C (°F) | Voltage* V | Resistance 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 terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC Logic

INFOID:000000003170804

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0182 | Fuel tank temperature sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Fuel tank temperature sensor |
| P0183 | Fuel tank temperature sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-1235, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170805

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

P0182, P0183 FTT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
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 | | |
| B42 | 4 | Ground | Approx. 5V |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

>> Repair open circuit or short to ground or short to power in harness or connector.

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 | |
| B42 | 5 | E10 | 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 E30, M1
- Harness connectors M6, B1
- Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

>> Repair open circuit or short to ground or short to power in harness or connector.

6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1236, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170806

1.CHECK FUEL TANK TEMPERATURE SENSOR

P0182, P0183 FTT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

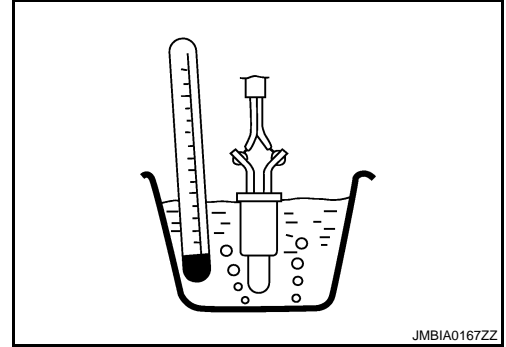
1. Turn ignition switch OFF.
2. Remove fuel level sensor unit.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals by heating with hot water as shown in the figure.

| Terminals | Condition | Resistance |
|-----------|-----------|------------------------|
| 4 and 5 | 20 (68) | 2.3 - 2.7 k Ω |
| | 50 (122) | 0.79 - 0.90 k Ω |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace “fuel level sensor unit and fuel pump”.



A

EC

C

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P

P0222, P0223 TP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

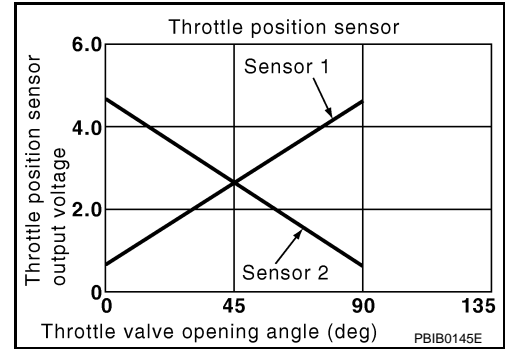
P0222, P0223 TP SENSOR

Description

INFOID:000000003170807

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 signal 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.



DTC Logic

INFOID:000000003170808

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-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0222 | Throttle position sensor 1 circuit low input | An excessively low voltage from the TP sensor 1 is sent to ECM. | <ul style="list-style-type: none">Harness or connectors (TP sensor 1 circuit is open or shorted.) |
| P0223 | Throttle position sensor 1 circuit high input | An excessively high voltage from the TP sensor 1 is sent to ECM. | <ul style="list-style-type: none">Electric throttle control actuator (TP sensor 1) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1238, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170809

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

P0222, P0223 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator | | Ground | Voltage |
|------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| F51 | 1 | Ground | Approx. 5V |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between electric throttle control actuator and ECM harness connector.

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F51 | 4 | F13 | 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 or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator and ECM harness connector.

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F51 | 2 | F13 | 37 | 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 or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-1239. "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-1240. "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170810

1.CHECK THROTTLE POSITION SENSOR

P0222, P0223 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector lever to D position (CVT) or 1st position (M/T).
6. Check the voltage between ECM harness connector and ground

| ECM | | Ground | Condition | Voltage (V) |
|-----------|----------------------------|--------|-----------------|-----------------|
| Connector | Terminal | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Fully released | More than 0.36V |
| | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | Fully released | Less than 4.75V |
| | | | Fully depressed | More than 0.36V |

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-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170811

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

DTC Logic

INFOID:000000003170812

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 |
|----------------------------------|---------------------|-------------------------------|
| Crankshaft position sensor (POS) | Engine speed | On board diagnosis of misfire |

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**
On the 1st trip that 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 light 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 on any one cylinder or on multiple cylinders.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|----------------------------|---|
| P0300 | Multiple cylinder misfire detected | Multiple cylinder misfire. | <ul style="list-style-type: none">• Improper spark plug• Insufficient compression• Incorrect fuel pressure• The fuel injector circuit is open or shorted• Fuel injector• Intake air leak• The ignition signal circuit is open or shorted• Lack of fuel• Signal plate• A/F sensor 1• Incorrect PCV hose connection |
| P0301 | No.1 cylinder misfire detected | No. 1 cylinder misfires. | |
| P0302 | No. 2 cylinder misfire detected | No. 2 cylinder misfires. | |
| P0303 | No. 3 cylinder misfire detected | No. 3 cylinder misfires. | |
| P0304 | No. 4 cylinder misfire detected | No. 4 cylinder misfires. | |
| P0305 | No. 5 cylinder misfire detected | No. 5 cylinder misfires. | |
| P0306 | No. 6 cylinder misfire detected | No. 6 cylinder misfires. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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. Restart engine and let it idle for about 15 minutes.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1242, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Turn ignition switch OFF and wait at least 10 seconds.

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

[VQ35DE]

< COMPONENT DIAGNOSIS >

2. Start engine and drive the vehicle under the 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.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation 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 \pm 400 rpm |
| Vehicle speed | Vehicle speed in the freeze frame data \pm 10 km/h (6 MPH) |
| Engine coolant temperature (T) condition | When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F). |
| | 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). |

The time to driving 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 |

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1242, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170813

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

Is intake air leak detected?

YES >> Discover air leak 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 it.

3. PERFORM POWER BALANCE TEST

 **With CONSULT-III**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 4.

4. CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let it idle.

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< COMPONENT DIAGNOSIS >

[VQ35DE]

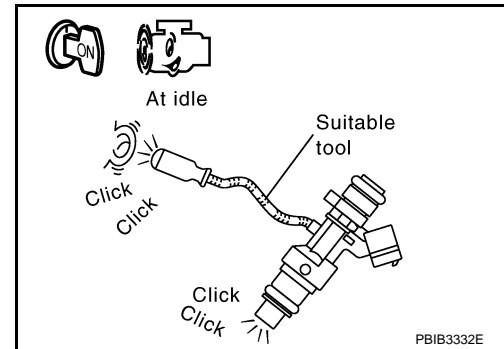
- Listen to each fuel injector make operating sound.

Clicking sound should be heard.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-1431. "Diagnosis Procedure"](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

- Turn ignition switch OFF.
- 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.
- Start engine.
- After engine stalls, crank it two or three times to release all fuel pressure.
- Turn ignition switch OFF.
- Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- Remove ignition coil and spark plug of the cylinder to be checked.
- Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- Connect spark plug and harness connector to ignition coil.
- 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.
- Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.**

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

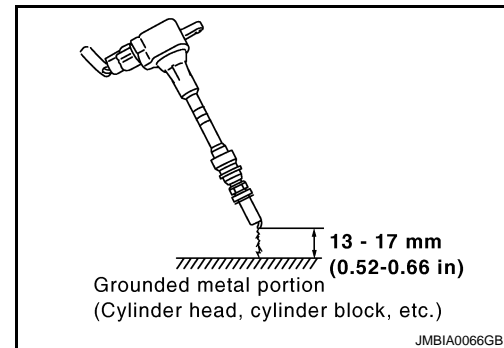
- Turn ignition switch OFF.
- Disconnect spark plug and connect a known-good spark plug.
- Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

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-1438. "Diagnosis Procedure"](#).

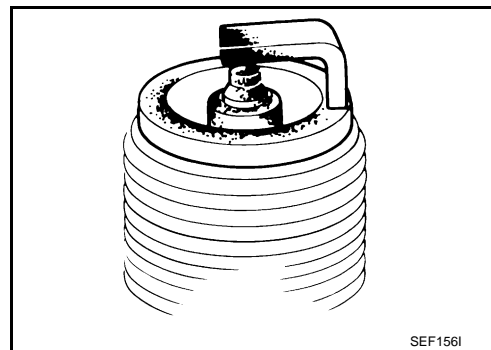


7. CHECK SPARK PLUG

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 [MA-27. "SPARK PLUG : Removal and Installation"](#).
- NO >> Repair or clean spark plug. Then GO TO 8.

**8. CHECK FUNCTION OF IGNITION COIL-III**

1. Reconnect the initial spark plugs.
2. Crank engine for about 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 [MA-27. "SPARK PLUG : Removal and Installation"](#).

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-128. "On-Vehicle Service"](#).

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

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-1525. "Inspection"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1525. "Inspection"](#).

At idle: Approximately 350 kPa (3.57 kg/cm², 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.

12. CHECK IGNITION TIMING

Check the following items.

For procedure, refer to [EC-1020. "IGNITION TIMING : Special Repair Requirement"](#).

For specification, refer to [EC-1531. "Idle Speed"](#) and [EC-1531. "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Follow the [EC-1016. "BASIC INSPECTION : Special Repair Requirement"](#).

13. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

[VQ35DE]

< COMPONENT DIAGNOSIS >

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.

| A/F sensor 1 | | | ECM | | Continuity |
|--------------|-----------|----------|-----------|----------|------------|
| Bank | Connector | Terminal | Connector | Terminal | |
| 1 | F12 | 1 | F13 | 45 | Existed |
| | | 2 | | 49 | |
| 2 | F61 | 1 | | 53 | |
| | | 2 | | 57 | |

5. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| A/F sensor 1 | | | ECM | | Ground. | Continuity |
|--------------|-----------|----------|-----------|----------|---------|-------------|
| Bank | Connector | Terminal | Connector | Terminal | | |
| 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | 2 | | 49 | | |
| 2 | F61 | 1 | | 53 | | |
| | | 2 | | 57 | | |

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

14.CHECK A/F SENSOR 1 HEATER

Refer to [EC-1155, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace (malfunctioning) A/F sensor 1.

15.CHECK MASS AIR FLOW SENSOR

 **With CONSULT-III**

1. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.
2. For specification, refer to [EC-1531, "Mass Air Flow Sensor"](#).

 **With GST**

1. Check mass air flow sensor signal in Service \$01 with GST.
2. For specification, refer to [EC-1531, "Mass Air Flow Sensor"](#).

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 [EC-1169, "Diagnosis Procedure"](#).

16.CHECK SYMPTOM TABLE

Check items on the rough idle symptom in [EC-1513, "Symptom Table"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace.

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 [EC-1110, "Diagnosis Description"](#).

>> GO TO 18.

P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

< COMPONENT DIAGNOSIS >

[VQ35DE]

18.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

P0327, P0328, P0332, P0333 KS

Description

INFOID:000000003170814

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:000000003170815

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detected condition | Possible cause |
|---------|--|---|--|
| P0327 | Knock sensor (bank 1) circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor |
| P0328 | Knock sensor (bank 1) circuit high input | An excessively high voltage from the sensor is sent to ECM. | |
| P0332 | Knock sensor (bank 2) circuit low input | An excessively low voltage from the sensor is sent to ECM. | |
| P0333 | Knock sensor (bank 2) circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1247. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170816

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
 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.
2. Check the continuity between knock sensor harness connector and ECM harness connector.

< COMPONENT DIAGNOSIS >

| DTC | Knock sensor | | | ECM | | Continuity |
|--------------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0327, P0328 | 1 | F202 | 2 | F13 | 67 | Existed |
| P0332, P0333 | 2 | F203 | 2 | | | |

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 F201, F76
- Harness for open or short between knock sensor and ECM

>> Repair open circuit 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 sensor | | | ECM | | Continuity |
|--------------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0327, P0328 | 1 | F202 | 1 | F13 | 61 | Existed |
| P0332, P0333 | 2 | F203 | 1 | | 62 | |

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 F201, F76
- Harness for open or short between knock sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK KNOCK SENSOR

Refer to [EC-1248, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace malfunctioning knock sensor.

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170817

1.CHECK KNOCK SENSOR

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminal as follows.

NOTE:

P0327, P0328, P0332, P0333 KS

< COMPONENT DIAGNOSIS >

[VQ35DE]

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

| Terminals | Resistance |
|-----------|---------------------------------------|
| 1 and 2 | Approx. 532 - 588 kΩ [at 20°C (68°F)] |

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning knock sensor.

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P0335 CKP SENSOR (POS)

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0335 CKP SENSOR (POS)

Description

INFOID:000000003170818

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.

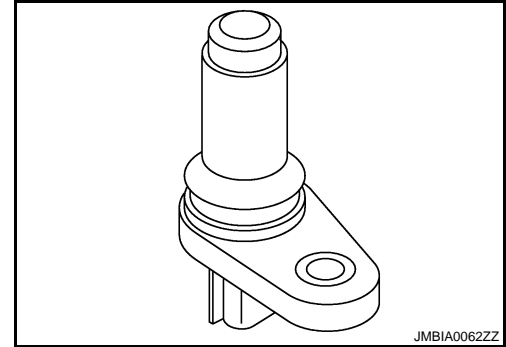
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

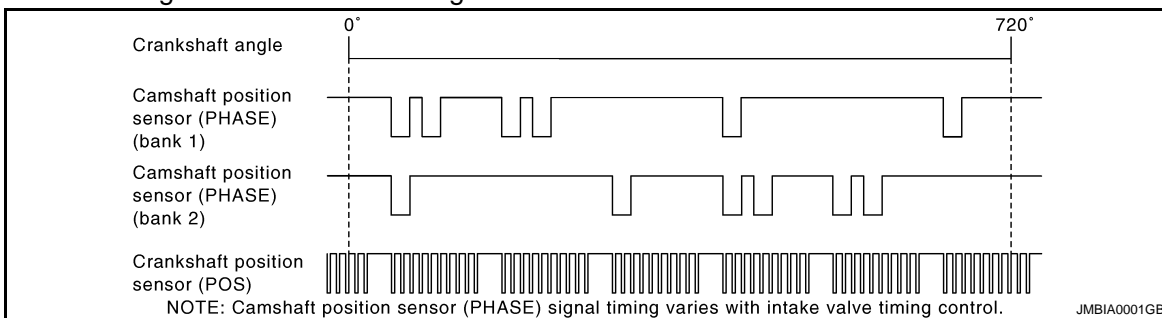
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



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DTC Logic

INFOID:000000003170819

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0335 | Crankshaft position sensor (POS) circuit | <ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors [CKP sensor (POS) circuit is open or shorted.] (APP sensor 2 circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) Crankshaft position sensor (POS) Accelerator pedal position sensor EVAP control system pressure sensor Refrigerant pressure sensor Signal plate |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

P0335 CKP SENSOR (POS)

[VQ35DE]

< COMPONENT DIAGNOSIS >

If engine does not start, crank engine for at least 2 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1251, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170820

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connection.

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CKP sensor (POS) harness connector and ground.

| CKP sensor (POS) | | Ground | Voltage (V) |
|------------------|----------|--------|-------------|
| Connector | Terminal | | |
| F30 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 3.

3. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch ON.
2. Disconnect ECM harness connector.
3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

| CKP sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 1 | F13 | 76 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5. CHECK COMPONENTS

P0335 CKP SENSOR (POS)

[VQ35DE]

< COMPONENT DIAGNOSIS >

Check the following.

- EVAP control system pressure sensor (Refer to [EC-1291, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace malfunctioning components.

6. CHECK APP SENSOR

Refer to [EC-1401, "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-1401, "Special Repair Requirement"](#).

>> INSPECTION END

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 sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

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 sensor (POS) | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F30 | 3 | F13 | 65 | Existed |

Continuity should exist.

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 or short to ground or short to power in harness or connectors.

10. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1253, "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?

P0335 CKP SENSOR (POS)

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 12.
- NO >> Replace the signal plate.

12.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

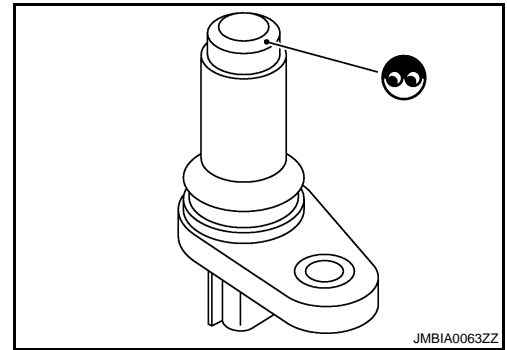
INFOID:000000003170821

1.CHECK CRANKSHAFT POSITION SENSOR (POS)-I

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS)



2.CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance crankshaft position sensor (POS) terminals as follows.

| Terminal No. (Polarity) | Resistance |
|-------------------------|--|
| 1 (+) - 2 (-) | Except 0 or ∞ Ω [at 25°C (77°F)] |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace crankshaft position sensor (POS)

P0340, P0345 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0340, P0345 CMP SENSOR (PHASE)

Description

INFOID:000000003170822

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

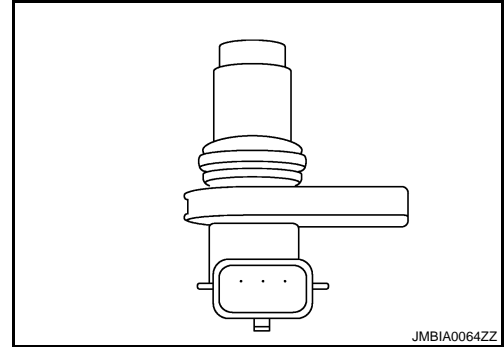
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

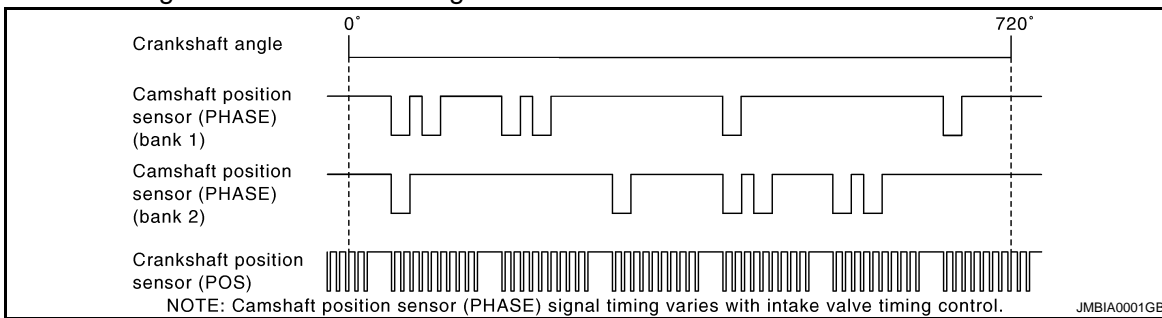
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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.



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DTC Logic

INFOID:000000003170823

DTC DETECTION LOGIC

NOTE:

If DTC P0340 or P0345 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0340 | Camshaft position sensor (PHASE) (bank 1) circuit | <ul style="list-style-type: none"> The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not sent to ECM during engine running. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to STR-27.) Starting system circuit (Refer to STR-34.) Dead (Weak) battery |
| P0345 | Camshaft position sensor (PHASE) (bank 2) circuit | <ul style="list-style-type: none"> The cylinder No. signal is not in the normal pattern during engine running. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to STR-27.) Starting system circuit (Refer to STR-34.) Dead (Weak) battery |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- Start engine and let it idle for at least 5 seconds.
If engine does not start, crank engine for at least 2 seconds.
- Check 1st trip DTC.

P0340, P0345 CMP SENSOR (PHASE)

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is 1st trip DTC detected?

- YES >> Go to [EC-1255, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1255, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170824

1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

- YES >> GO TO 2.
- NO >> Check starting system. (Refer to [STR-27, "Work Flow"](#).)

2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace ground connection.

3.CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between CMP sensor (PHASE) harness connector and ground

| DTC | CMP sensor (PHASE) | | | Ground | Voltage (V) |
|-------|--------------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P0340 | 1 | F55 | 1 | Ground | Battery voltage |
| P0345 | 2 | F60 | 1 | | |

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

| DTC | CMP sensor (PHASE) | | | ECM | | Continuity |
|-------|--------------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0340 | 1 | F55 | 2 | F13 | 64 | Existed |
| P0345 | 2 | F60 | 2 | | 68 | |

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 or short to ground or short to power in harness or connectors.

5.CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P0340, P0345 CMP SENSOR (PHASE)

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

| DTC | CMP sensor (PHASE) | | | ECM | | Continuity |
|-------|--------------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P0340 | 1 | F55 | 3 | F13 | 70 | Existed |
| P0345 | 2 | F60 | 3 | | 69 | |

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 or short to ground or short to power in harness or connectors.

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1256, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace malfunctioning camshaft position sensor (PHASE).

7.CHECK CAMSHAFT (INT)

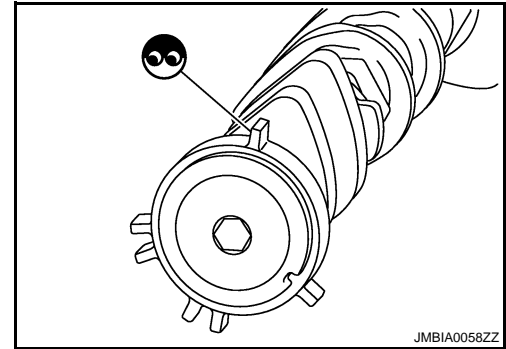
Check the following.

- 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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170825

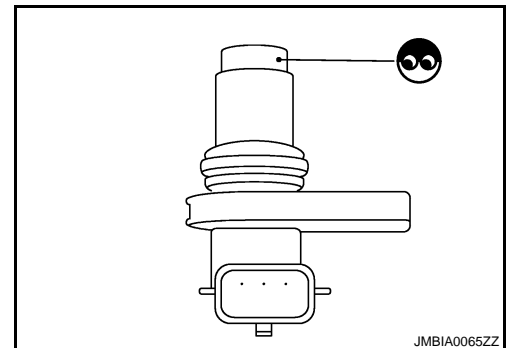
1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

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).



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as follows.

P0340, P0345 CMP SENSOR (PHASE)

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Terminal No. (Polarity) | Resistance |
|-------------------------|--|
| 1 (+) - 2 (-) | Except 0 or ∞ Ω [at 25°C (77°F)] |
| 1 (+) - 3 (-) | |
| 2 (+) - 3 (-) | |

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning camshaft position sensor (PHASE).

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P0420, P0430 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0420, P0430 THREE WAY CATALYST FUNCTION

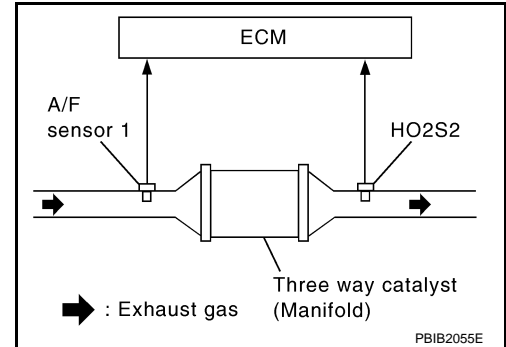
DTC Logic

INFOID:000000003170826

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 efficiency below threshold (bank 1) | <ul style="list-style-type: none"> • Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity. | <ul style="list-style-type: none"> • Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing |
| P0430 | Catalyst system efficiency below threshold (bank 2) | | |

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 7.

2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Do not hold engine speed for more than the specified minutes below.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-I

Ⓜ 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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.

P0420, P0430 THREE WAY CATALYST FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
10. 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

1. Wait 5 seconds at idle.
2. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).

Does the indication change to "CMPLT"?

- YES >> GO TO 6.
- NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than 70°C (158°F).
2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

6.PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1260, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1259, "Component Function Check"](#).

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
- NO >> Go to [EC-1260, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170827

1.PERFORM COMPONENT FUNCTION CHECK

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. Open engine hood.
6. Check the voltage between ECM harness connector and ground under the following condition.

| DTC | ECM | | Ground | Condition | Voltage |
|-------|-----------|----------|--------|---|--|
| | Connector | Terminal | | | |
| P0420 | F13 | 33 | Ground | Keeping engine speed at 2500 rpm constant under no load | The voltage fluctuation cycle takes more than 5 seconds. • 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0 |
| P0430 | | 34 | | | |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-1260, "Diagnosis Procedure"](#).

P0420, P0430 THREE WAY CATALYST FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

INFOID:000000003170828

Diagnosis Procedure

1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

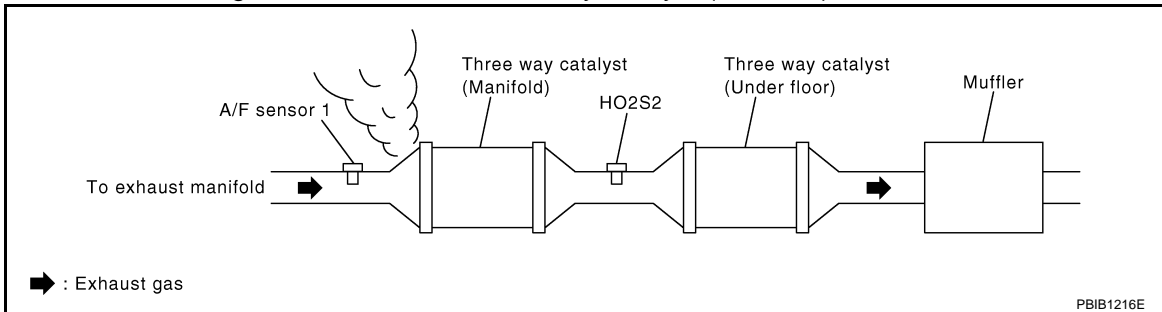
Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 3.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

YES >> Repair or replace.

NO >> GO TO 4.

4. CHECK IGNITION TIMING

Check the following items.

For procedure, refer to [EC-1020, "IGNITION TIMING : Special Repair Requirement"](#).

For specification, refer to [EC-1531, "Ignition Timing"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Follow the [EC-1016, "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 and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 1 | Ground | Battery voltage |
| | 3 | | |
| | 29 | | |
| | 30 | | |
| | 31 | | |
| | 32 | | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform [EC-1431, "Diagnosis Procedure"](#).

P0420, P0430 THREE WAY CATALYST FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. 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.

3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. 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.
11. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 7.

7. CHECK FUNCTION OF IGNITION COIL-II

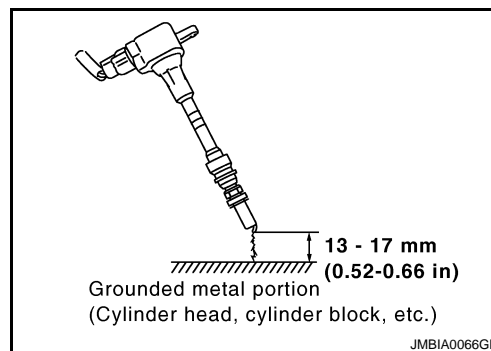
1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Check ignition coil, power transistor and their circuit. Refer to [EC-1438, "Diagnosis Procedure"](#).

8. CHECK SPARK PLUG



P0420, P0430 THREE WAY CATALYST FUNCTION

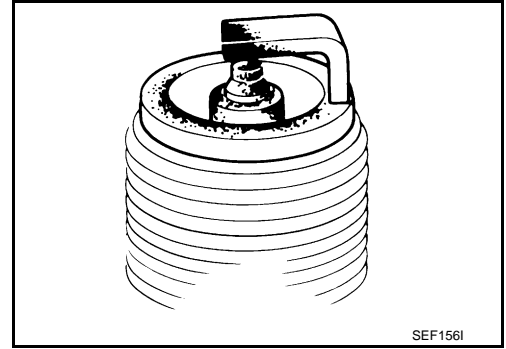
[VQ35DE]

< COMPONENT DIAGNOSIS >

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 [MA-27. "SPARK PLUG : Removal and Installation"](#).
- 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 about three 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 [MA-27. "SPARK PLUG : Removal and Installation"](#).

10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-146. "Removal and Installation"](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
3. Disconnect all ignition coil harness connectors.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.
Make sure 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-42. "Intermittent Incident"](#).

Is the trouble fixed?

- YES >> INSPECTION END
- NO >> Replace three way catalyst assembly.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0441 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000003170829

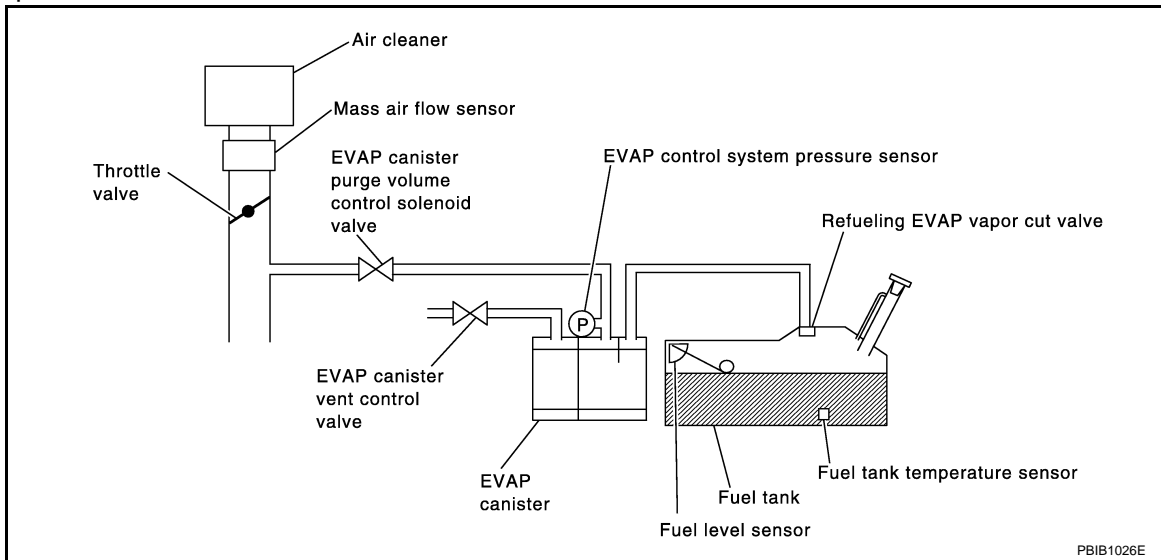
DTC DETECTION LOGIC

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 incorrect purge flow | EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. | <ul style="list-style-type: none"> • EVAP canister purge volume control solenoid valve stuck closed • EVAP control system pressure sensor and the circuit • Loose, disconnected or improper connection of rubber tube • Blocked rubber tube • Cracked EVAP canister • EVAP canister purge volume control solenoid valve circuit • Accelerator pedal position sensor • Blocked purge port • EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 6.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

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. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. 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" is not changed for a long time, retry from step 2.

Is "COMPLETED" displayed on CONSULT-III screen?

- YES >> GO TO 5.
NG >> 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-1265, "Diagnosis Procedure"](#).

6. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1264, "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-1265, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170830

1. PERFORM COMPONENT FUNCTION CHECK

Without CONSULT-III

1. Lift up drive wheels.
2. Start engine (VDC switch OFF) and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM harness connector and ground as follows.

P0441 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground |
|-----------|--|--------|
| Connector | Terminal | |
| E10 | 86 (EVAP control system pressure sensor signal) | Ground |

- Check EVAP control system pressure sensor value at idle speed and note it.
- Establish and maintain the following conditions for at least 1 minute.

| | |
|-----------------------------|-----------------------------------|
| Air conditioner switch | ON |
| Headlamp switch | ON |
| Rear window defogger switch | ON |
| Engine speed | Approx. 3,000 rpm |
| Gear position | Any position other than P, N or R |

- Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-1265, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170831

1.CHECK EVAP CANISTER

- Turn ignition switch OFF.
- Check EVAP canister for cracks.

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

 **With CONSULT-III**

- 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-1083, "System Diagram"](#).
- Start engine and let it idle.
- Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
- Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

| | |
|-----------------|-------------|
| PURG VOL CONT/V | Vacuum |
| 100% | Existed |
| 0% | Not existed |

Is the inspection result normal?

- YES >> GO TO 7.
 NO >> GO TO 4.

3.CHECK PURGE FLOW

 **Without CONSULT-III**

- Start engine and warm it up to normal operating temperature.
- 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 [EC-1083, "System Diagram"](#).
- Start engine and let it idle.

P0441 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

Do not depress accelerator pedal even slightly.

5. Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

6. Revving engine up to 2,000rpm after 100 seconds passed after starting engine.

Vacuum should exist.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 4.

4.CHECK EVAP PURGE LINE

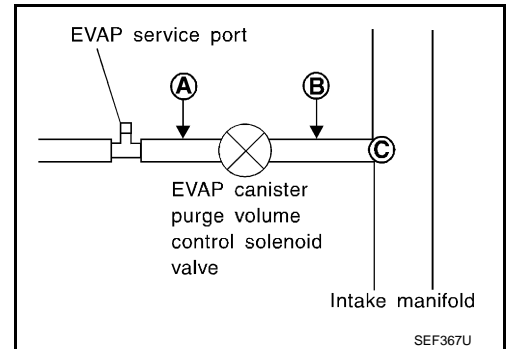
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-1083, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair it.

5.CHECK EVAP PURGE HOSE AND PURGE PORT

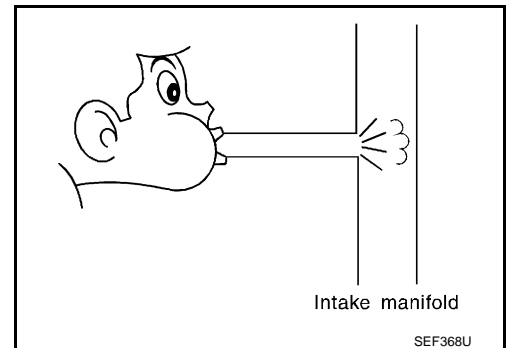
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



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 CONT/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-1277, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.

P0441 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP control system pressure sensor.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-1292. "DTC Logic"](#) for DTC P0452, [EC-1297. "DTC Logic"](#) for DTC P0453.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor.

10. 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 11.

NO >> Clean the rubber tube using an air blower.

11. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1283. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace EVAP canister vent control valve.

12. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-1083. "System Diagram"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace it.

13. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

14. CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

A

EC

C

D

E

F

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H

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J

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P

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0442 EVAP CONTROL SYSTEM

DTC Logic

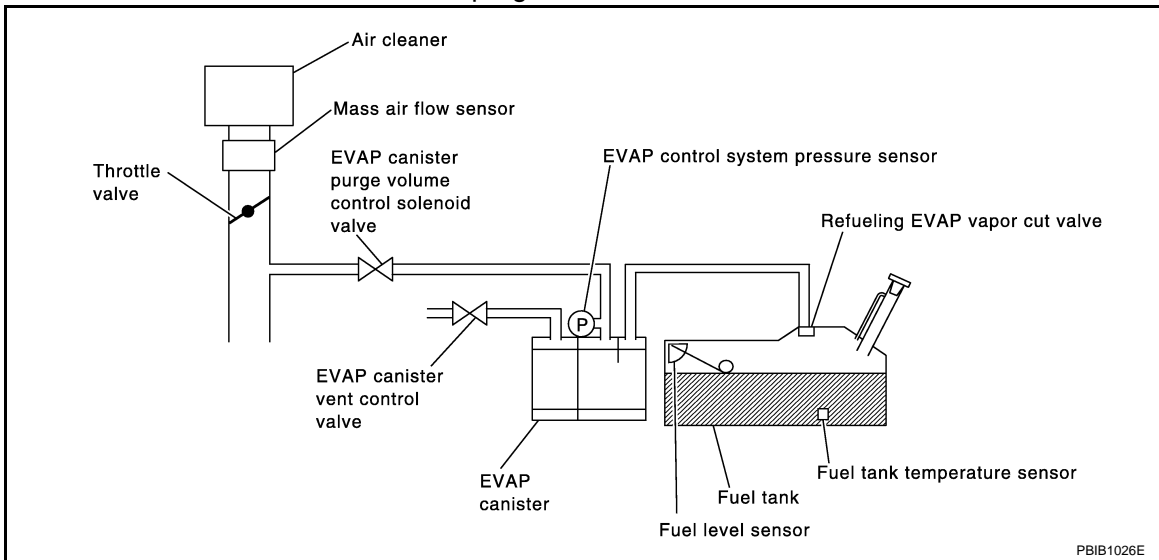
INFOID:000000003170832

DTC DETECTION LOGIC

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks 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 small leak detected (negative pressure) | EVAP control system has a leak, EVAP control system does not operate properly. | <ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

P0442 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
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. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-1016. "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-1269. "Diagnosis Procedure"](#).

3. PERFORM COMPONENT FUNCTION CHECK

With GST

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-1505. "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Check 1st trip DTC.

Is 1st trip DTC displayed?

- YES-1 >> P0441: Go to [EC-1265. "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-1269. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170833

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

P0442 EVAP CONTROL SYSTEM

[VQ35DE]

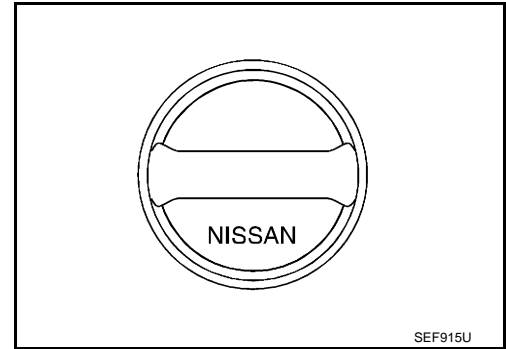
< COMPONENT DIAGNOSIS >

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.



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-1273. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5.CHECK FOR EVAP LEAK

Refer to [EC-1530. "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.
Refer to [EC-1529. "Removal and Installation"](#).
- EVAP canister vent control valve.
Refer to [EC-1283. "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 SATURATED WITH WATER

P0442 EVAP CONTROL SYSTEM

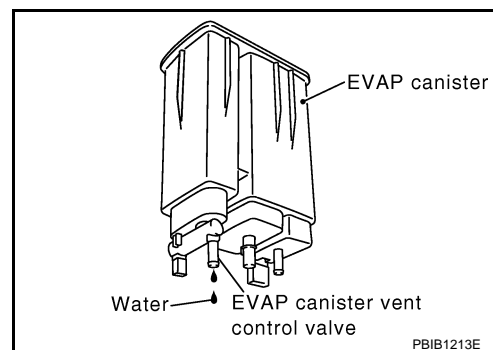
[VQ35DE]

< 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.



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 to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/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

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.
- NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1083. "System Diagram"](#).

Is the inspection result normal?

P0442 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 13.
NO >> Repair or reconnect the hose.

13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1277, "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-1234, "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-1291, "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 [EC-1083, "System Diagram"](#).

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, kink, looseness and improper connection. For location, refer to [EC-1444, "Description"](#).

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, kink, 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-1447, "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.

P0442 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Replace fuel level sensor unit.

22.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

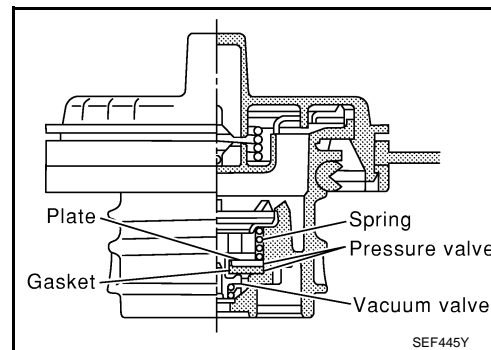
>> INSPECTION END

Component Inspection

INFOID:000000003170834

1.CHECK FUEL TANK VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



4. Check valve opening pressure and vacuum.

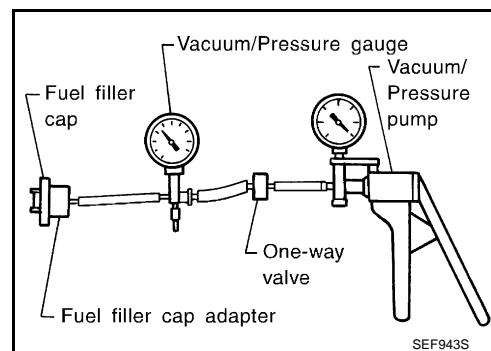
Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -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 come on.

>> INSPECTION END

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

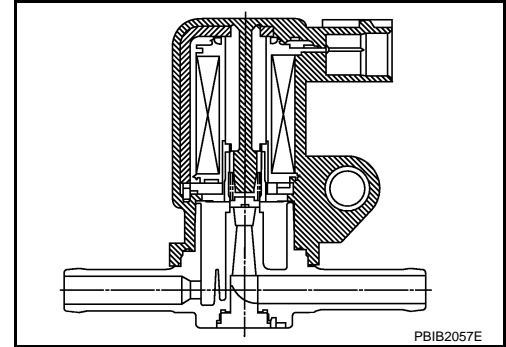
[VQ35DE]

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000003170835

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:000000003170836

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0443 | EVAP canister purge volume control solenoid 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 style="list-style-type: none">• EVAP control system pressure sensor• EVAP canister purge volume control solenoid valve (The valve is stuck open.)• EVAP canister vent control valve• EVAP canister• Hoses (Hoses are connected incorrectly or clogged.) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

Do you have CONSULT-III?

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. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. 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.
7. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> Go to [EC-1275, "Diagnosis Procedure"](#).

3. PERFORM DTC CONFIRMATION PROCEDURE

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

With GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC displayed?

- YES >> Go to [EC-1275, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170837

1. 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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

| EVAP canister purge volume control solenoid valve | | Ground | Voltage (V) |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E11
- Fuse block (J/B) E44, E45
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 25 | 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 or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

Water should not exist.

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-1291, "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 CONT/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-1277, "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-1283, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP canister vent control valve.

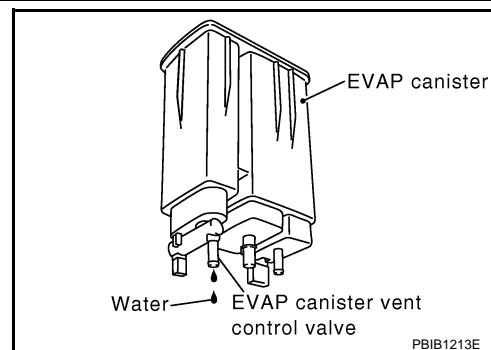
10. CHECK IF EVAP CANISTER SATURATED WITH WATER

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.



11. CHECK EVAP CANISTER

P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 13.

NO >> GO TO 12.

12.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.

13.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

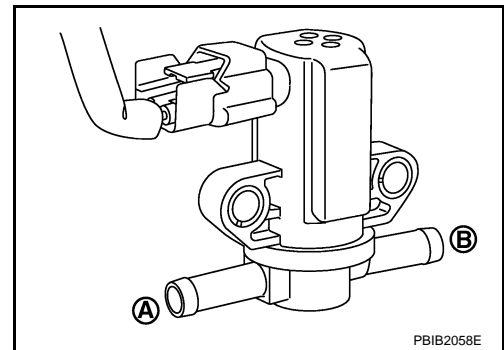
INFOID:000000003170838

1.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

☑ With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

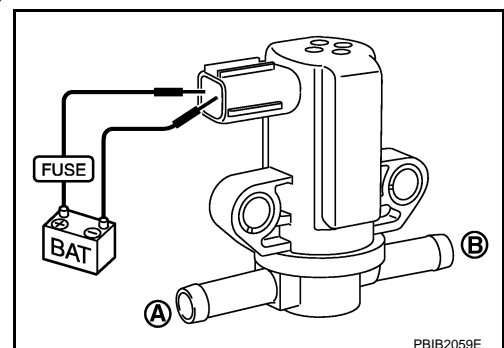
| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |



☒ Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V 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

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

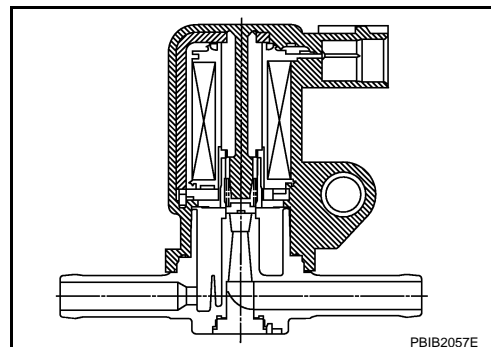
[VQ35DE]

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000003170839

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty 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.



DTC Logic

INFOID:000000003170840

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0444 | EVAP canister purge volume control solenoid valve circuit open | An excessively low voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is open or shorted.)• EVAP canister purge volume control solenoid valve |
| P0445 | EVAP canister purge volume control solenoid valve circuit shorted | An excessively high voltage signal is sent to ECM through the valve | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve circuit is shorted.)• EVAP canister purge volume control solenoid valve |

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1278, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170841

1.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.
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

| EVAP canister purge volume control solenoid valve | | Ground | Voltage (V) |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F29 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) E44, E45
- Harness connectors F2, E11
- 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 or short to ground or short to power in harness or connectors.

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 control solenoid valve | | ECM | | Continuity |
|---|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F29 | 2 | F14 | 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 or 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 CONT/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-1280, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

Component Inspection

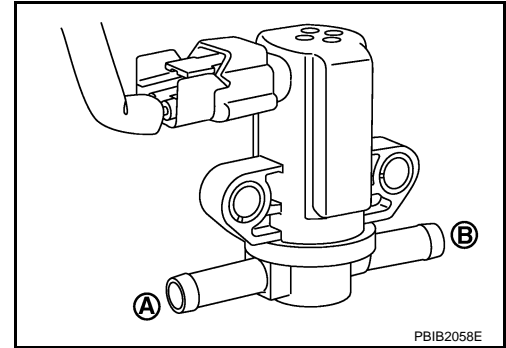
INFOID:000000003170842

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

④ With CONSULT-III

1. Turn ignition switch OFF.
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.
5. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
6. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

| Condition (PURG VOL CONT/V value) | Air passage continuity between (A) and (B) |
|--------------------------------------|---|
| 100% | Existed |
| 0% | Not existed |

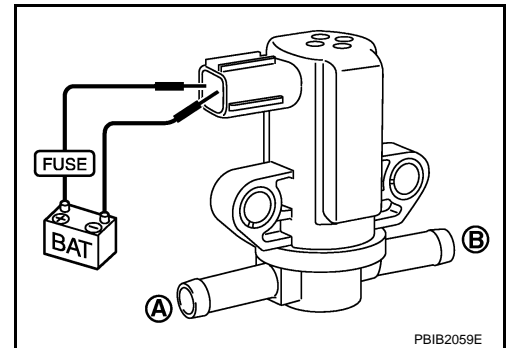


PBIB2058E

⊗ Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
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) |
|--|---|
| 12V direct current supply between terminals 1 and 2 | Existed |
| No supply | Not existed |



PBIB2059E

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister purge volume control solenoid valve

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0447 EVAP CANISTER VENT CONTROL VALVE

Description

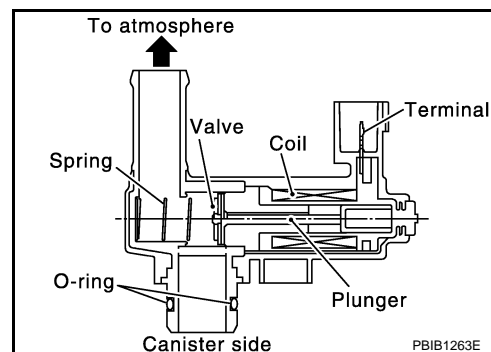
INFOID:000000003170843

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

INFOID:000000003170844

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P0447 | EVAP canister vent control valve circuit open | An improper voltage signal is sent to ECM through EVAP canister vent control valve. | <ul style="list-style-type: none">• Harness or connectors (The valve circuit is open or shorted.)• EVAP canister vent control valve |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1281, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170845

1. INSPECTION START

Do you have CONSULT-III?

YES or NO

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓜ With CONSULT-III

1. Turn ignition switch OFF and then turn ON.
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
3. Touch "ON/OFF" on CONSULT-III screen.
4. Check for operating sound of the valve.

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

Clicking sound should be heard.

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> GO TO 3.

3.CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EVAP canister vent control valve harness connector and ground.

| EVAP canister vent control valve | | Ground | Voltage (V) |
|----------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| B39 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E11
- Harness connectors E29, B10
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 109 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

| EVAP canister vent control valve | | ECM | | Continuity |
|----------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| B39 | 2 | E10 | 109 | Existed |

4. 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 E29, B10
- Junction block connectors E44, E45
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7.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 8.
- NO >> Clean the rubber tube using an air blower.

P0447 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1283, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170846

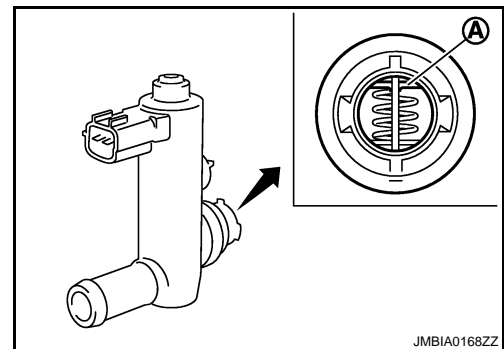
1. CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion (B) of EVAP canister vent control valve for being rusted.

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.
Make sure 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.

Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals 1 and 2 | Not existed |
| OFF | Existed |

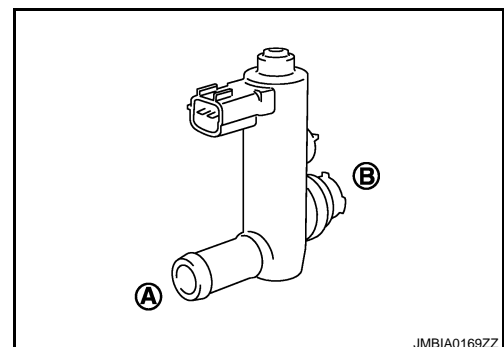
Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III



P0447 EVAP CANISTER VENT CONTROL VALVE

[VQ35DE]

< COMPONENT DIAGNOSIS >

④ 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.
Make sure 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

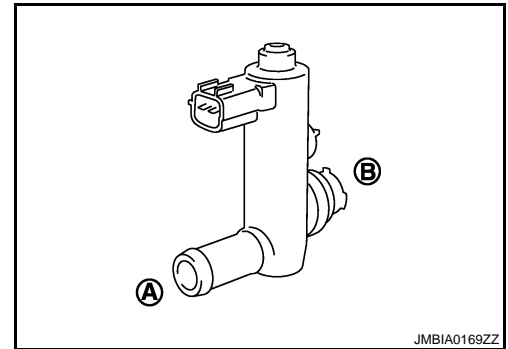
1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V 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



P0448 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0448 EVAP CANISTER VENT CONTROL VALVE

Description

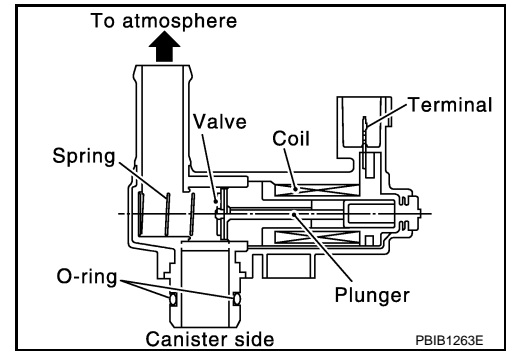
INFOID:000000003170847

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

INFOID:000000003170848

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P0448 | EVAP canister vent control valve close | EVAP canister vent control valve remains closed under specified driving conditions. | <ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • EVAP canister is saturated with water |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

④ 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 three 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.

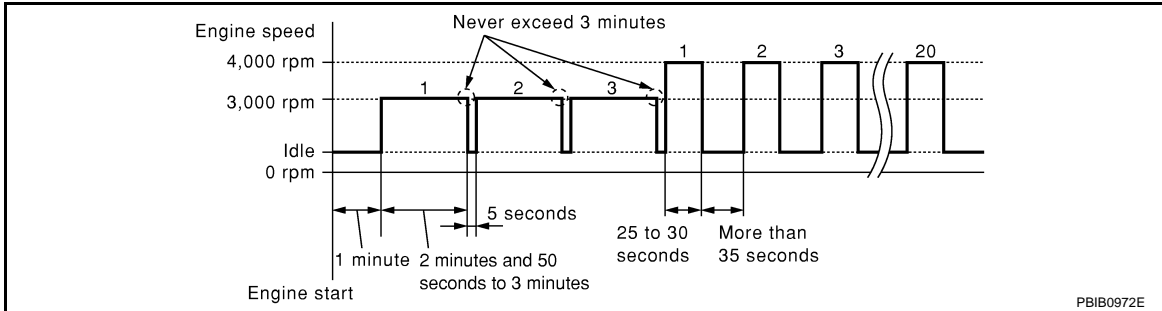
- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
 - Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

P0448 EVAP CANISTER VENT CONTROL VALVE

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Fully released accelerator pedal and keep engine idle for at least 35 seconds.



7. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1286. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170849

1.CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Clean rubber tube using an air blower.

2.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1287. "Component Inspection"](#).

Is the inspection result normal?

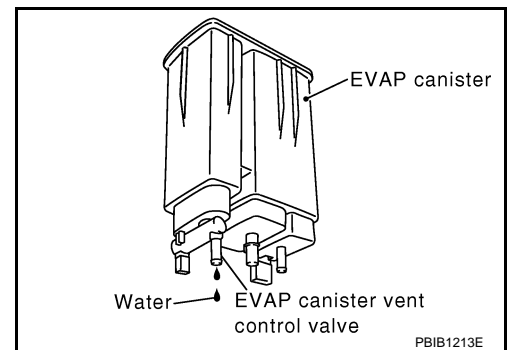
- YES >> GO TO 3.
- NO >> Replace EVAP canister vent control valve.

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

P0448 EVAP CANISTER VENT CONTROL VALVE

< COMPONENT DIAGNOSIS >

[VQ35DE]

- 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.
2. Check connectors for water.

Water should not exist.

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-1291, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170850

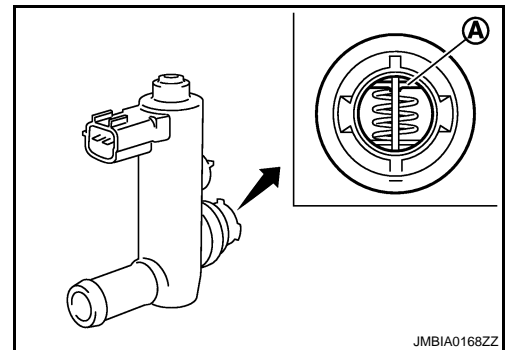
1. CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion (B) of EVAP canister vent control valve for being rusted.

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.

Make sure 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.

P0448 EVAP CANISTER VENT CONTROL VALVE

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals 1 and 2 | Not existed |
| OFF | Existed |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve

3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

With CONSULT-III

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

Make sure 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

- Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

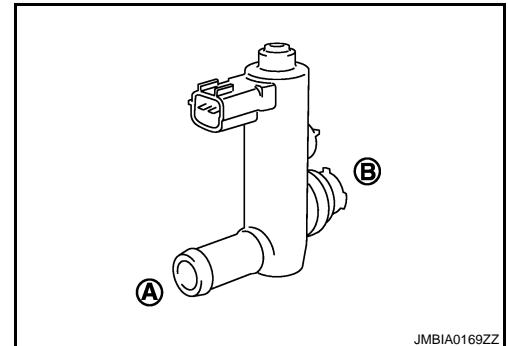
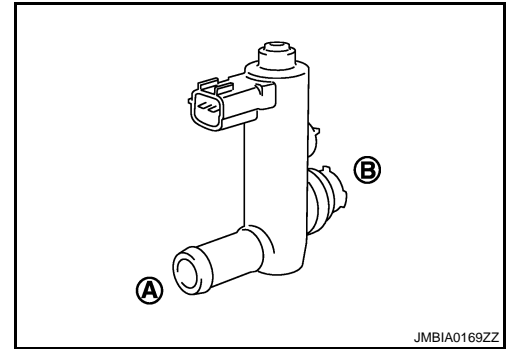
| Condition | Air passage continuity between (A) and (B) |
|---|--|
| 12V direct current supply between terminals (1) and (2) | No |
| OFF | Yes |

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve



P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

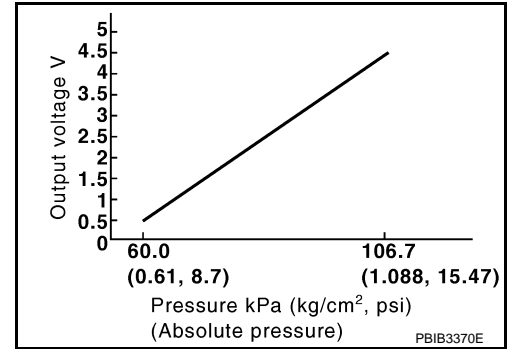
[VQ35DE]

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000003170851

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

INFOID:000000003170852

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P0451 | EVAP control system pressure sensor performance | ECM detects a sloshing signal from the EVAP control system pressure sensor | <ul style="list-style-type: none"> Harness or connectors (EVAP control system pressure sensor circuit is shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch OFF and wait at least 10 seconds.
- 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-1289, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170853

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace ground connection.

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage (V) |
|-------------------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| B41 | 3 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 4.

4. 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 |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair short to ground or short to power in harness or connectors.

5. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1253, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

6. CHECK APP SENSOR

Refer to [EC-1401, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 7.

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-1401, "Special Repair Requirement"](#).

>> INSPECTION END

P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1291, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170854

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 terminal and ground.

| ECM | | Ground | Applied vacuum kPa (kg/cm ² , psi) | Voltage V |
|-----------|---|--------|--|---------------------------------------|
| Connector | Terminal | | | |
| E10 | 86 (EVAP control system pressure sensor signal) | Ground | Not applied | 1.8 - 4.8 |
| | | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

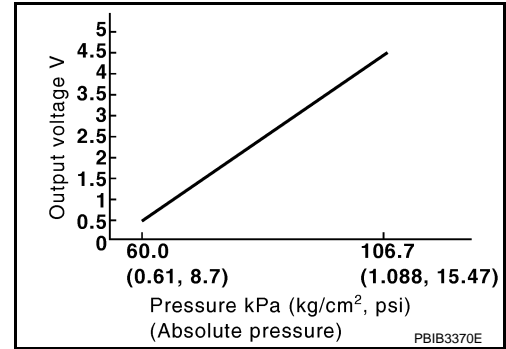
[VQ35DE]

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000003170855

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

INFOID:000000003170856

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0452 | EVAP control system pressure sensor low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. 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 and ground as follows.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1293, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170857

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace harness connector.

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 system pressure sensor | | Ground | Voltage (V) |
|-------------------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| B41 | 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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> GO TO 5.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- 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.

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair short to ground or short to power in harness or connectors.

7. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1253, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning components.

8. CHECK APP SENSOR

Refer to [EC-1401, "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-1401, "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.
3. 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 | |
| B41 | 1 | E10 | 96 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1295, "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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170858

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 terminal and ground.

| ECM | | Ground | Applied vacuum kPa (kg/cm ² , psi) | Voltage V |
|-----------|---|--------|--|---------------------------------------|
| Connector | Terminal | | | |
| E10 | 86 (EVAP control system pressure sensor signal) | Ground | Not applied | 1.8 - 4.8 |
| | | Ground | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

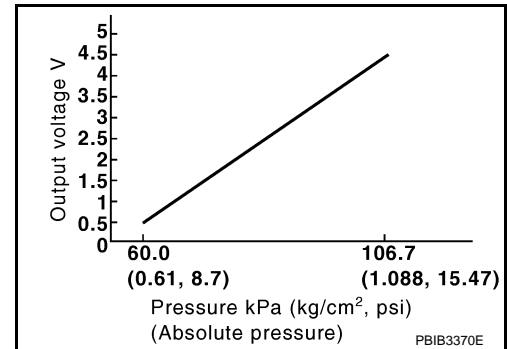
[VQ35DE]

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Description

INFOID:000000003170859

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

INFOID:000000003170860

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P0453 | EVAP control system pressure sensor high input | An excessively high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Rubber hose from EVAP canister vent control valve to vehicle frame |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

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. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. 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 and ground as follows.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground |
|-----------|---|--------|
| Connector | Terminal | |
| E10 | 95 (Fuel tank temperature sensor signal) | Ground |

3. Make sure that the voltage is less than 4.2V.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and wait at least 20 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1301, "Component Inspection"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170861

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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 sensor harness connector for water.

Water should not exist.

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

| EVAP control system pressure sensor | | Ground | Voltage (V) |
|-------------------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| B41 | 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.
3. 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 | |
| B41 | 3 | E10 | 91 | Existed |

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> GO TO 5.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- 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.

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair short to ground or short to power in harness or connectors.

7. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1253, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning components.

8. CHECK APP SENSOR

Refer to [EC-1401, "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-1401, "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.
3. 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 | |
| B41 | 1 | E10 | 96 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or 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 | |
| B41 | 2 | E10 | 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.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK RUBBER TUBE

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 15.
NO >> Clean the rubber tube using an air blower, repair or replace rubber tube.

15. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1283, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 16.
NO >> Replace EVAP canister vent control valve.

16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1301, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace EVAP control system pressure sensor.

17. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

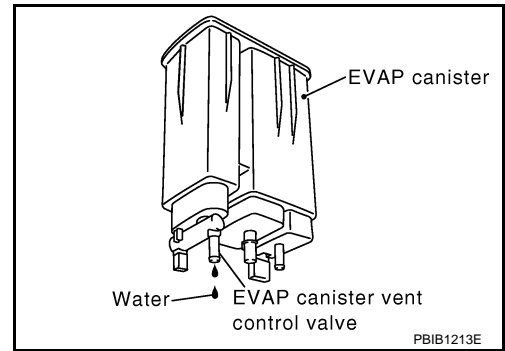
[VQ35DE]

< COMPONENT DIAGNOSIS >

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-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170862

1. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Turn ignition switch OFF.
2. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
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 terminal and ground.

| Connector | ECM | | Ground | Applied vacuum kPa (kg/cm ² , psi) | Voltage V |
|-----------|--|--|--------|--|------------------------------------|
| | Terminal | | | | |
| E10 | 86 | | Ground | Not applied | 1.8 - 4.8 |
| | (EVAP control system pressure sensor signal) | | | -26.7 (-0.272, -3.87) | 2.1 to 2.5V lower than above value |

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

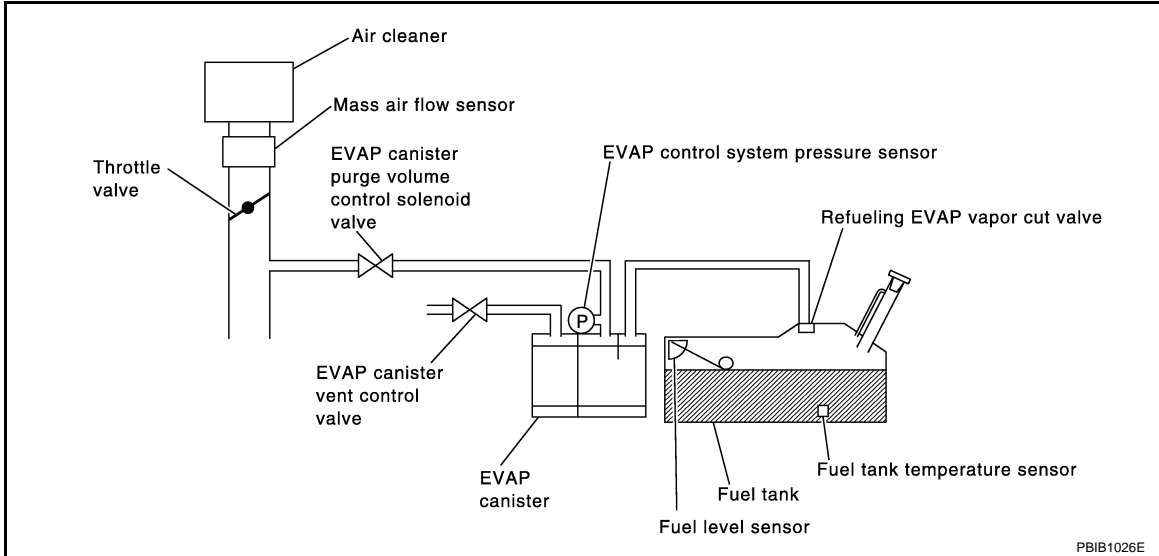
P0455 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000003170863

DTC DETECTION LOGIC

This diagnosis detects a very large leak (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 gross leak detected | EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly. | <ul style="list-style-type: none"> Fuel filler cap remains open or fails to close. Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Foreign matter caught in fuel filler cap. Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent. Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

CAUTION:

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

Never remove fuel filler cap during the DTC Confirmation Procedure.

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that the following conditions are met.

COOLAN TEMP/S: 0 - 70°C (32 - 158°F)

INT/A TEMP SE: 0 - 60°C (32 - 140°F)

6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-1016, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

OK >> Go to [EC-1303, "Diagnosis Procedure"](#).

NG >> GO TO 3.

3.CHECK DTC

Check DTC.

Which DTC is detected?

P0455 >> Go to [EC-1303, "Diagnosis Procedure"](#).

P0442 >> Go to [EC-1269, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

 **With GST**

NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-1505, "How to Set SRT Code"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to DRIVING PATTERN.
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES-1 >> P0455: Go to [EC-1303, "Diagnosis Procedure"](#).

YES-2 >> P0442: Go to [EC-1269, "Diagnosis Procedure"](#).

YES-3 >> P0441: Go to [EC-1265, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170864

1.CHECK FUEL FILLER CAP DESIGN

P0455 EVAP CONTROL SYSTEM

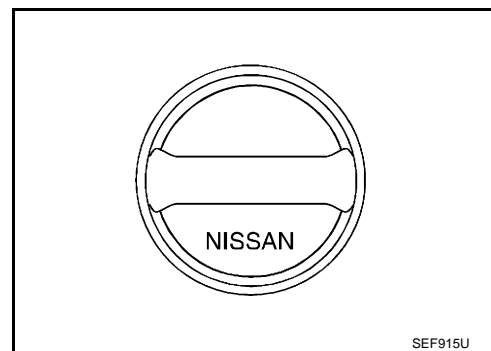
[VQ35DE]

< COMPONENT DIAGNOSIS >

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-1306. "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-1083. "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 [EC-1529. "Removal and Installation"](#).
- EVAP canister vent control valve.
Refer to [EC-1283. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Repair or replace EVAP canister vent control valve and O-ring.

8.CHECK FOR EVAP LEAK

Refer to [EC-1530. "Inspection"](#).

P0455 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

Is there any leak in EVAP line?

- YES >> Repair or replace.
- NO-1 >> With CONSULT-III: GO TO 9.
- NO-2 >> Without CONSULT-III: GO TO 10.

9. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

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

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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 13.
- NO >> GO TO 11.

11. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1083, "System Diagram"](#).

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

1. Start engine.
2. Perform "PURG VOL CONT/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 14.
- NO >> GO TO 13.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1277, "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-1234, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.

P0455 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Replace fuel level sensor unit.

15.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1291, "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, kink, looseness and improper connection. For location, refer to [EC-1444, "Description"](#).

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, kink, 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-1447, "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-42, "Intermittent Incident"](#).

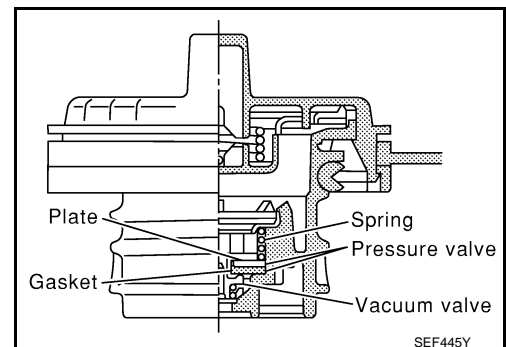
>> INSPECTION END

Component Inspection

INFOID:000000003170865

1.CHECK FUEL TANL VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



P0455 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

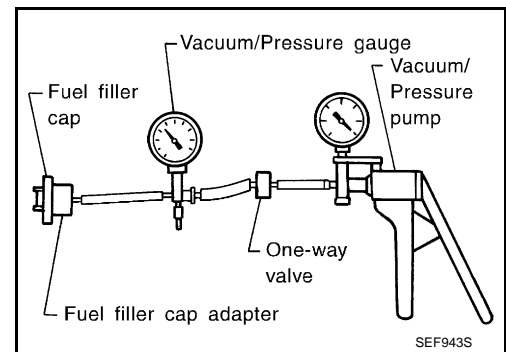
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



A

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P

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0456 EVAP CONTROL SYSTEM

DTC Logic

INFOID:000000003170866

DTC DETECTION LOGIC

NOTE:

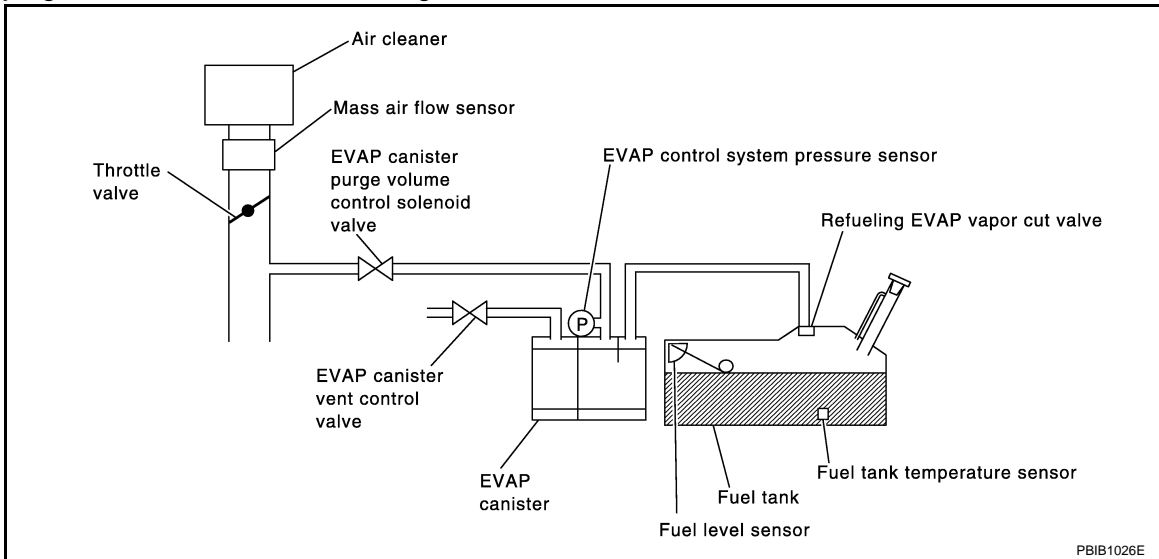
If DTC P0456 is displayed with DTC P0442, first perform the trouble diagnosis for DTC P0456.

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0456 | Evaporative emission control system very small leak (negative pressure check) | <ul style="list-style-type: none"> • EVAP system has a very small leak. • EVAP system does not operate properly. | <ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • EVAP canister is saturated with water • EVAP control system pressure sensor • Refueling EVAP vapor cut valve • ORVR system leaks • Fuel level sensor and the circuit • Foreign matter caught in EVAP canister purge volume control solenoid valve |

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

P0456 EVAP CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

YES or NO

- YES >> GO TO 2.
- NO >> GO TO 4.

2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:

After repair, make sure that the hoses and clips are installed properly.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Fuel is refilled or drained.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

④ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Make sure the following conditions are met.

FUEL LEVEL SE: 0.25 - 1.4V

COOLAN TEMP/S: 0 - 32°C (32 - 90°F)

FUEL T/TMP SE: 0 - 35°C (32 - 95°F)

INT A/TEMP SE: More than 0°C (32°F)

If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-1016, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-1310, "Diagnosis Procedure"](#).

4. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1310, "Component Function Check"](#).

NOTE:

Use component function check to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END

P0456 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Go to [EC-1310. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170867

1. PERFORM COMPONENT FUNCTION CHECK

 With GST

CAUTION:

- Do not use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port adapter 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 kg/cm², 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 kg/cm², 0.06 psi).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-1310. "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

INFOID:000000003170868

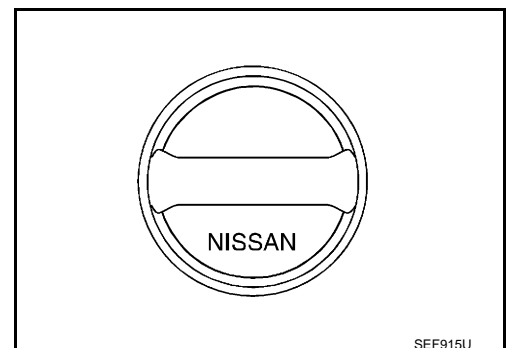
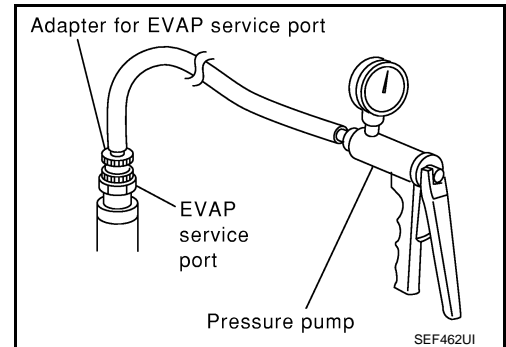
1. CHECK FUEL FILLER CAP DESIGN

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.

P0456 EVAP CONTROL SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

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-1313, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one.

5.CHECK FOR EVAP LEAK

Refer to [EC-1530, "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

6.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [EC-1529, "Removal and Installation"](#).

- EVAP canister vent control valve.

Refer to [EC-1283, "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 SATURATED WITH WATER

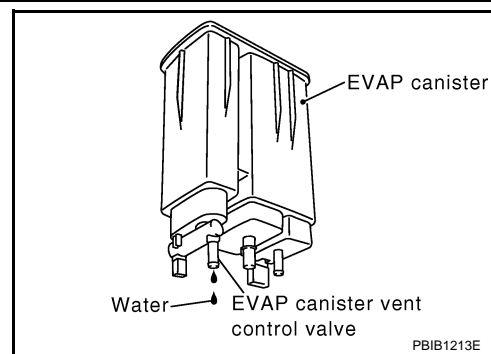
Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

Does water drain from the EVAP canister?

YES >> GO TO 8.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.



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

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- 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 to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/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

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at 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-1083, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 13.
NO >> Repair or reconnect the hose.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1277, "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-1234, "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-1291, "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 [EC-1083, "System Diagram"](#).

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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, kink, looseness and improper connection. For location, refer to [EC-1444, "Description"](#).

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, kink, 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-1447, "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-46, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> GO TO 22.
- NO >> Replace fuel level sensor unit.

22.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

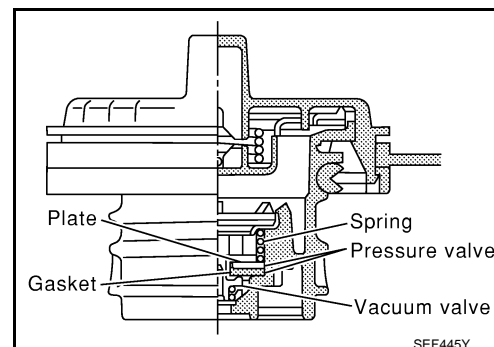
>> INSPECTION END

Component Inspection

INFOID:000000003170869

1.CHECK FUEL TANL VACUUM RELIEF VALVE

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



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4. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

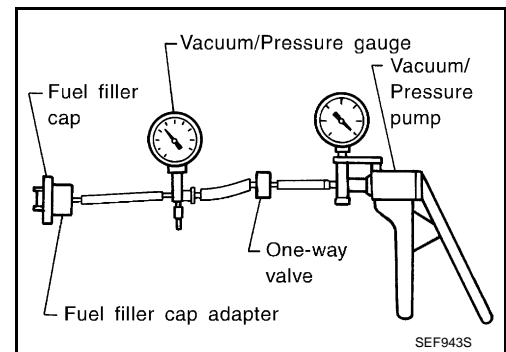
2. REPLACE FUEL FILLER CAP

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 come on.

>> INSPECTION END



P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0460 FUEL LEVEL SENSOR

Description

INFOID:000000003170870

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 through 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:000000003170871

DTC DETECTION LOGIC

NOTE:

- If DTC P0460 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is 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 |
|---------|---------------------------------|---|---|
| P0460 | Fuel level sensor circuit noise | Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1315, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170872

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#).

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0460 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

>> INSPECTION END

P0461 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0461 FUEL LEVEL SENSOR

Description

INFOID:000000003170873

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 through 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:000000003170874

DTC DETECTION LOGIC

NOTE:

- If DTC P0461 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "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 been driven.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|---|
| P0461 | Fuel level sensor circuit range/performance | The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |

DTC CONFIRMATION PROCEDURE

1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1317, "Component Function Check"](#).

Use component function check to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1318, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170875

1. PRECONDITIONING

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-6, "Removal and Installation"](#).

TESTING CONDITION:

Before starting component function check, preparation of draining fuel and refilling fuel is required.

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

2. PERFORM COMPONENT FUNCTION CHECK

 With CONSULT-III

NOTE:

P0461 FUEL LEVEL SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-1525, "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 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 ℓ (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 0.03V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1318, "Diagnosis Procedure"](#).

3.PERFORM COMPONENT FUNCTION CHECK

 Without CONSULT-III

NOTE:

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (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-1525, "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 ℓ (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-1318, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170876

1.CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [MWI-46, "Diagnosis Procedure"](#).

2.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0462, P0463 FUEL LEVEL SENSOR

Description

INFOID:000000003170877

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 through 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:000000003170878

DTC DETECTION LOGIC

NOTE:

- If DTC P0462 or P0463 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

This diagnosis indicates the former, to detect open or short circuit malfunction.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|---|---|
| P0462 | Fuel level sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (The sensor circuit is open or shorted)• Combination meter• Fuel level sensor |
| P0463 | Fuel level sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch ON.

>> 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-1319, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170879

1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-46, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Go to [MWI-46, "Diagnosis Procedure"](#).

2. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

P0462, P0463 FUEL LEVEL SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

>> INSPECTION END

P0500 VSS

Description

INFOID:000000003170880

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

INFOID:000000003170881

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|--|
| P0500 | Vehicle speed sensor | The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. | <ul style="list-style-type: none"> • Harness or connectors (The CAN communication line is open or shorted) • Harness or connectors (The vehicle speed signal circuit is open or shorted) • Wheel sensor • Combination meter • ABS actuator and electric unit (control unit) |

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 5.

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3.CHECK VEHICLE SPEED SENSOR FUNCTION

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.

 With CONSULT-III

1. Start engine (VDC switch OFF).
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-III. The vehicle speed on CONSULT-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 [EC-1322, "Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.

< COMPONENT DIAGNOSIS >

3. Maintain the following conditions for at least 50 consecutive seconds.

CAUTION:

Always drive vehicle at a safe speed.

| | |
|----------------|---|
| ENG SPEED | 1,600 - 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 (CVT) Except Neutral position (M/T) |
| PW/ST SIGNAL | OFF |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1322, "Diagnosis Procedure"](#).

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1322, "Component Function Check"](#).

Use component function check to check the overall function of the vehicle speed 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-1322, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170882

1.PERFORM COMPONENT FUNCTION CHECK

 **With GST**

1. Lift up drive wheels.

2. Start engine.

3. Read vehicle speed sensor signal in Service \$01 with GST.

The vehicle speed sensor 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-1322, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170883

1.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to [BRC-12, "CONSULT-III Function \(ABS\)"](#) or [BRC-76, "CONSULT-III Function \(ABS\)"](#) or [BRC-148, "CONSULT-III Function \(ABS\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

2.CHECK COMBINATION METER FUNCTION

Refer to [MWI-38, "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

P0506 ISC SYSTEM

Description

INFOID:000000003170884

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:000000003170885

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 system RPM lower than expected | The idle speed is less than the target idle speed by 100 rpm or more. | <ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

If the target idle speed is out of the specified value, perform [EC-1016, "BASIC INSPECTION : Special Repair Requirement"](#), before conducting DTC CONFIRMATION PROCEDURE.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C(14°F).

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1323, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170886

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> Discover air leak location and repair.
- NO >> GO TO 2.

2. REPLACE ECM

1. Stop engine.

P0506 ISC SYSTEM

< COMPONENT DIAGNOSIS >

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2. Replace ECM.
3. Go to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0507 ISC SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0507 ISC SYSTEM

Description

INFOID:000000003170887

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:000000003170888

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 system RPM higher than expected | The idle speed is more than the target idle speed by 200 rpm or more. | <ul style="list-style-type: none">• Electric throttle control actuator• Intake air leak• PCV system |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

If the target idle speed is out of the specified value, perform [EC-1016, "BASIC INSPECTION : Special Repair Requirement"](#), before conducting DTC Confirmation Procedure.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above $-10^{\circ}\text{C}(14^{\circ}\text{F})$.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1325, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170889

1. CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace.

2. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

P0507 ISC SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is intake air leak detected?

YES >> Discover air leak location and repair.

NO >> GO TO 3.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Go to [EC-1019](#), "[ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement](#)".

>> INSPECTION END

P0550 PSP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0550 PSP SENSOR

Description

INFOID:000000003170890

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

INFOID:000000003170891

DTC DETECTION LOGIC

NOTE:

If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P0550 | Power steering pressure sensor circuit | An excessively low or high voltage from the sensor is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted) Power steering pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for at least 5 seconds.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1327, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170892

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace ground connection.

2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

- Disconnect power steering pressure (PSP) sensor harness connector.
- Turn ignition switch ON.
- Check the voltage between PSP sensor harness connector and ground.

| PSP sensor | | Ground | Voltage (V) |
|------------|----------|--------|-------------|
| Connector | Terminal | | |
| F40 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

P0550 PSP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between PSP sensor harness connector and ECM harness connector.

| PSP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 3 | F13 | 48 | 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 or 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 sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F40 | 2 | F13 | 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 or short to ground or short to power in harness or connectors.

5. CHECK PSP SENSOR

Refer to [EC-1328, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace PSP sensor.

6. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170893

1. CHECK POWER STEERING PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check the voltage between ECM terminal and ground.

| ECM | | Ground | Condition | Voltage |
|-----------|----------|--------|-----------------------------------|------------|
| Connector | Terminal | | | |
| F13 | 41 | Ground | Steering wheel: Being turned. | 0.5 - 4.5V |
| | | | Steering wheel: Not being turned. | 0.4 - 0.8V |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace power steering pressure sensor.

P0603 ECM POWER SUPPLY

< COMPONENT DIAGNOSIS >

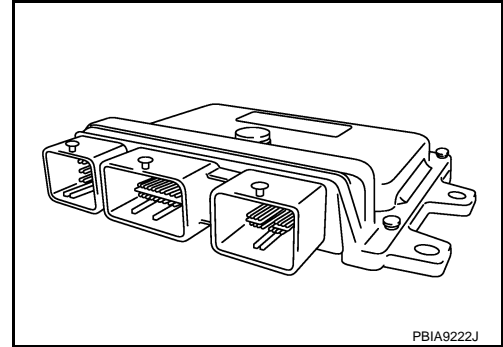
[VQ35DE]

P0603 ECM POWER SUPPLY

Description

INFOID:000000003170894

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

INFOID:000000003170895

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------|--|---|
| P0603 | ECM power supply circuit | ECM back-up RAM system does not function properly. | <ul style="list-style-type: none"> Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 1 second.
- Start engine and let it idle for 1 second.
- Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- Repeat steps 2 and 3 for four times.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1329. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170896

1. CHECK ECM POWER SUPPLY

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F13 | 77 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> GO TO 2.

< COMPONENT DIAGNOSIS >

2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse (No.42)
- IPDM E/R harness connector F10
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1329, "DTC Logic"](#).

 **With GST**

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1329, "DTC Logic"](#).

Is the 1st trip DTC P0603 displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

5. REPLACE ECM

1. Replace ECM.
2. Go to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

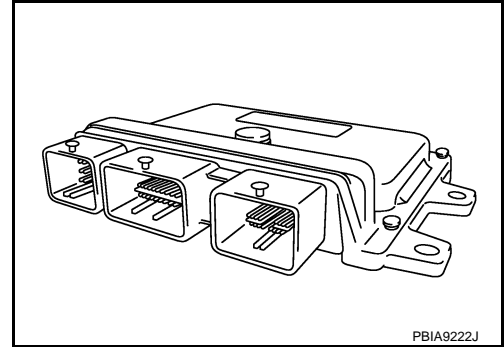
>> INSPECTION END

P0605 ECM

Description

INFOID:000000003170897

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



PBI A9222J

DTC Logic

INFOID:000000003170898

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|---|----------------|
| P0605 | Engine control module | A) | ECM calculation function is malfunctioning. | • ECM |
| | | B) | ECM EEP-ROM system is malfunctioning. | |
| | | C) | ECM self shut-off function is malfunctioning. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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-1332, "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 ON.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1332, "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 ON.
3. Repeat step 2 for 32 times.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1332, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170899

1.INSPECTION START

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1331, "DTC Logic"](#).

 With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1331, "DTC Logic"](#).

Is the 1st trip DTC P0605 displayed again?

- YES >> GO TO 2.
- NO >> INSPECTION END

2.REPLACE ECM

1. Replace ECM.
2. Go to [EC-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0607 ECM

Description

INFOID:000000003170900

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:000000003170901

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|---|----------------|
| P0607 | CAN communication bus | When detecting error during the initial diagnosis 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 [EC-1333, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170902

1.INSPECTION START

 With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. Perform DTC CONFIRMATION PROCEDURE.
See [EC-1333, "DTC Logic"](#).
5. Check DTC.

 With GST

1. Turn ignition switch ON.
2. Select "Service \$04" with GST.
3. Perform DTC CONFIRMATION PROCEDURE.
See [EC-1333, "DTC Logic"](#).
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-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[VQ35DE]

P0643 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000003170903

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|-----------------------------------|--|--|
| P0643 | Sensor power supply circuit short | ECM detects a voltage of power source for sensor is excessively low or high. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [CMP sensor (PHASE) circuit is shorted.] (PSP sensor circuit is shorted.) (Battery current sensor circuit is shorted.) • Accelerator pedal position sensor • Throttle position sensor • Camshaft position sensor (PHASE) • Power steering pressure sensor • Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Start engine and let it idle for 1 second.
3. Check DTC

Is DTC detected?

- YES >> Go to [EC-1334, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170904

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace ground connection.

2. CHECK ACCELERATOR PEDAL POSITION 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 | | |
| E40 | 5 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 7.

P0643 SENSOR POWER SUPPLY

< COMPONENT DIAGNOSIS >

[VQ35DE]

NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

| ECM | | Sensor | | |
|-----------|----------|-----------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 47 | TP sensor | F51 | 1 |
| | 51 | Battery current sensor | F5 | 1 |
| | 55 | PSP sensor | F40 | 1 |
| | 59 | CMP sensor (PHASE) (bank 1) | F55 | 1 |
| | 63 | CMP sensor (PHASE) (bank 2) | F60 | 1 |
| E10 | 83 | APP sensor | E40 | 5 |

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 [EC-1256, "Component Inspection"](#).)
- Battery current sensor (Refer to [EC-1353, "Component Inspection"](#).)
- Power steering pressure sensor (Refer to [EC-1328, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

5.CHECK TP SENSOR

Refer to [EC-1181, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK APP SENSOR

Refer to [EC-1401, "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-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

9.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P0850 PNP SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

P0850 PNP SWITCH

Description

INFOID:000000003170905

When the selector lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) switch is ON.

ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:000000003170906

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) switch is not changed in the process of engine starting and driving. | <ul style="list-style-type: none">• Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]• Park/neutral position (PNP) switch• Combination meter• TCM (CVT models) |

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 3.

3. CHECK PNP SWITCH FUNCTION

 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 (CVT) Neutral position (M/T) | ON |
| Except above position | OFF |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-1337, "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) |

P0850 PNP SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| | |
|----------------|----------------------------|
| B/FUEL SCHDL | 4.0 - 31.8 msec |
| VHCL SPEED SE | More than 64 km/h (40 mph) |
| Selector lever | Suitable position |

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1337. "Diagnosis Procedure"](#).

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1337. "Component Function Check"](#).

NOTE:

Use component function check check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1337. "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170907

1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage (V) |
|-----------|----------|--------|-------------------------------|-----------------|
| Connector | Terminal | | | |
| E10 | 102 | Ground | P or N (CVT) Neutral (M/T) | Approx. 0 |
| | | | Except above | Battery voltage |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1337. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170908

1.INSPECTION START

Check the transmission type of the vehicle.

Which type of transmission is the vehicle equipped?

CVT >> GO TO 2.

M/T >> GO TO 6.

2.CHECK DTC WITH TCM

Refer to [TM-216. "DTC Index"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK STARTING SYSTEM

Turn ignition switch OFF, then turn it to START.

Does starter motor operate?

YES >> GO TO 4.

NO >> Refer to [STR-27. "Work Flow"](#).

4.CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.

P0850 PNP SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

2. Disconnect TCM harness connector.
3. Disconnect IPDM E/R harness connector F10.
4. Check the continuity between TCM harness connector and IPDM E/R harness connector.

| TCM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F16 | 20 | F10 | 72 | Existed |

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect IPDM E/R harness connectors E18.
2. Disconnect ECM harness connector.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

| ECM | | IPDM E/R | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E10 | 102 | E18 | 30 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect park/neutral position (PNP) switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between PNP switch harness connector and ground.

| PNP switch | | Ground | Voltage (V) |
|------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F32 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse (No. 33)
- IPDM E/R harness connector F10
- Harness for open or short between PNP switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between PNP switch harness connector and ECM harness connector.

P0850 PNP SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| PNP switch | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F32 | 2 | E10 | 102 | Existed |

4. 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 connectors F1, E3
- Harness for open or short between PNP switch and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK PNP SWITCH

Refer to [TM-130, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace PNP switch.

11. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> Repair or replace.

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

O

P

P1148, P1168 CLOSED LOOP CONTROL

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1148, P1168 CLOSED LOOP CONTROL

DTC Logic

INFOID:000000003170909

DTC DETECTION LOGIC

NOTE:

**DTC P1148 or P1168 is displayed with another DTC for A/F sensor 1.
Perform the trouble diagnosis for the corresponding DTC.**

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|---|
| P1148 | Closed loop control function (bank 1) | The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition. | <ul style="list-style-type: none">• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)• A/F sensor 1• A/F sensor 1 heater |
| P1168 | Closed loop control function (bank 2) | The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition. | |

P1212 TCS COMMUNICATION LINE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1212 TCS COMMUNICATION LINE

Description

INFOID:000000003170910

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:000000003170911

DTC DETECTION LOGIC

NOTE:

- If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

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 can not receive the information from "ABS actuator and electric unit (control unit)" continuously. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.)• ABS actuator and electric unit (control unit)• Dead (Weak) battery |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V 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-1341, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170912

Go to [BRC-12, "CONSULT-III Function \(ABS\)"](#) or [BRC-76, "CONSULT-III Function \(ABS\)"](#) or [BRC-148, "CONSULT-III Function \(ABS\)"](#).

P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1217 ENGINE OVER TEMPERATURE

DTC Logic

INFOID:000000003170913

DTC DETECTION LOGIC

NOTE:

- If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

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 |
|---------|------------------------------------|--|---|
| P1217 | Engine over temperature (Overheat) | <ul style="list-style-type: none">• Cooling fan does not operate properly (Overheat).• Cooling fan system does not operate properly (Overheat).• Engine coolant was not added to the system using the proper filling method.• Engine coolant is not within the specified range. | <ul style="list-style-type: none">• Harness or connectors (The cooling fan circuit is open or shorted.)• IPDM E/R (Cooling fan relays)• Cooling fan motor• Radiator hose• Radiator• Radiator cap• Water pump• Thermostat |

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-33, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-23, "Changing Engine Oil"](#).

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-12, "Engine Oil Recommendation"](#).
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-1342, "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-1343, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170914

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.

P1217 ENGINE OVER TEMPERATURE

[VQ35DE]

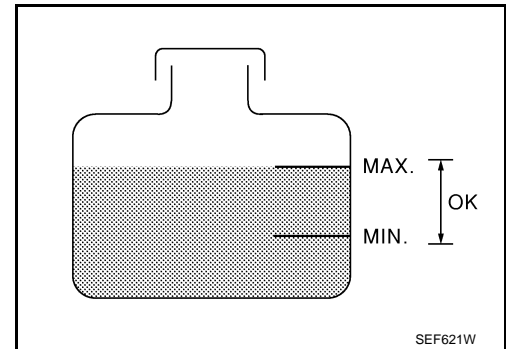
< COMPONENT DIAGNOSIS >

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 [EC-1343, "Diagnosis Procedure"](#).
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-1343, "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. Make sure 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 [PCS-10, "Diagnosis Description"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-1343, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003170915

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. Make sure that cooling fans-1 and -2 operate at each speed (LOW/MID/HI).

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).
2. Make sure 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-1422, "Diagnosis Procedure"](#).

2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to [CO-32, "System Inspection"](#).

Is leakage detected?

- YES >> GO TO 3.
NO >> GO TO 4.

3.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak.

- Hose
- Radiator
- Water pump

P1217 ENGINE OVER TEMPERATURE

[VQ35DE]

< COMPONENT DIAGNOSIS >

>> Repair or replace malfunctioning part.

4.CHECK RADIATOR CAP

Check radiator cap. Refer to [CO-32, "System Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap.

5.CHECK THERMOSTAT

Check thermostat. Refer to [CO-44, "Removal and Installation"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat

6.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1177, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace engine coolant temperature sensor.

7.CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

| Engine | Step | Inspection item | Equipment | Standard | Reference page |
|--------|------|--|--|--|--|
| OFF | 1 | <ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper | <ul style="list-style-type: none"> Visual | No blocking | — |
| | 2 | <ul style="list-style-type: none"> Coolant mixture | <ul style="list-style-type: none"> Coolant tester | 50 - 50% coolant mixture | MA-12, "Engine Oil Recommendation" |
| | 3 | <ul style="list-style-type: none"> Coolant level | <ul style="list-style-type: none"> Visual | Coolant up to MAX level in reservoir tank and radiator filler neck | CO-33, "Changing Engine Coolant" |
| | 4 | <ul style="list-style-type: none"> Radiator cap | <ul style="list-style-type: none"> Pressure tester | CO-32, "System Inspection" | |
| ON*2 | 5 | <ul style="list-style-type: none"> Coolant leaks | <ul style="list-style-type: none"> Visual | No leaks | CO-32, "System Inspection" |
| ON*2 | 6 | <ul style="list-style-type: none"> Thermostat | <ul style="list-style-type: none"> Touch the upper and lower radiator hoses | Both hoses should be hot | CO-44, "Removal and Installation" |
| ON*1 | 7 | <ul style="list-style-type: none"> Cooling fan | <ul style="list-style-type: none"> CONSULT-III | Operating | EC-1422, "Component Function Check" |
| OFF | 8 | <ul style="list-style-type: none"> Combustion gas leak | <ul style="list-style-type: none"> Color checker chemical tester 4 Gas analyzer | Negative | — |
| ON*3 | 9 | <ul style="list-style-type: none"> Coolant temperature gauge | <ul style="list-style-type: none"> Visual | Gauge less than 3/4 when driving | — |
| | | <ul style="list-style-type: none"> Coolant overflow to reservoir tank | <ul style="list-style-type: none"> Visual | No overflow during driving and idling | CO-33, "Changing Engine Coolant" |
| OFF*4 | 10 | <ul style="list-style-type: none"> Coolant return from reservoir tank to radiator | <ul style="list-style-type: none"> Visual | Should be initial level in reservoir tank | CO-33, "Changing Engine Coolant" |
| OFF | 11 | <ul style="list-style-type: none"> Cylinder head | <ul style="list-style-type: none"> Straight gauge feeler gauge | 0.1 mm (0.004 in) Maximum distortion (warping) | EM-193, "Inspection After Disassembly" |
| | 12 | <ul style="list-style-type: none"> Cylinder block and pistons | <ul style="list-style-type: none"> Visual | No scuffing on cylinder walls or piston | EM-211, "Inspection" |

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

P1217 ENGINE OVER TEMPERATURE

< COMPONENT DIAGNOSIS >

[VQ35DE]

For more information, refer to [CO-29, "Troubleshooting Chart"](#).

>> INSPECTION END

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P1225 TP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

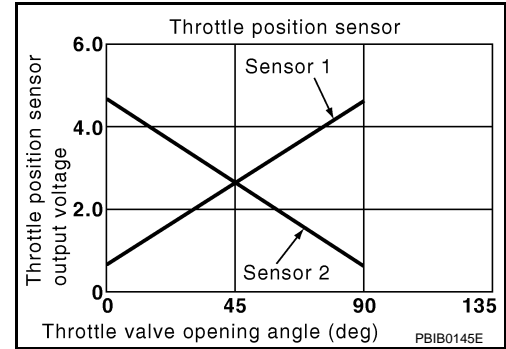
P1225 TP SENSOR

Description

INFOID:000000003170916

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 signal 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.



DTC Logic

INFOID:000000003170917

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P1225 | Closed throttle position learning performance | Closed throttle position learning value is excessively low. | • Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1346, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170918

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1225 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

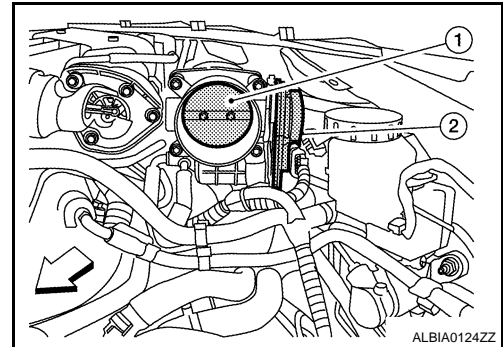
2: Electric throttle control actuator

↔: 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. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-1347, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170919

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

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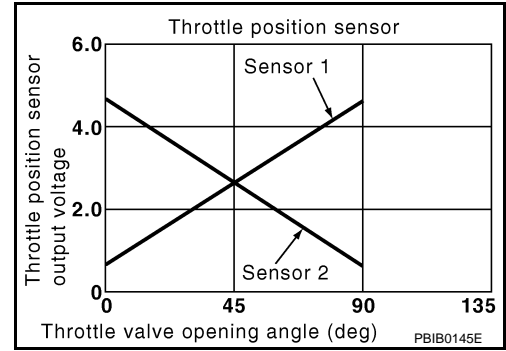
P1226 TP SENSOR

Description

INFOID:000000003170920

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 signal 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.



DTC Logic

INFOID:000000003170921

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|--|--|
| P1226 | Closed throttle position learning performance | Closed throttle position learning is not performed successfully, repeatedly. | <ul style="list-style-type: none"> Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Repeat steps 2 and 3 for 32 times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1348, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170922

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

P1226 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

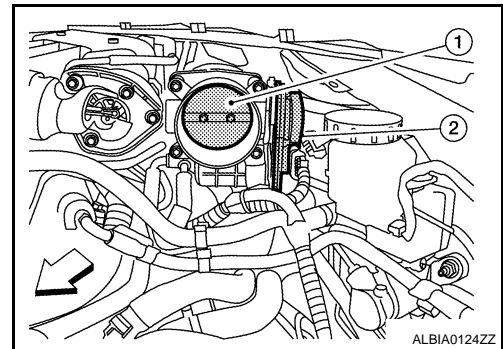
2: Electric throttle control actuator

↔: 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. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-1349, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170923

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

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P1421 COLD START CONTROL

[VQ35DE]

< COMPONENT DIAGNOSIS >

P1421 COLD START CONTROL

Description

INFOID:000000003170924

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

DTC Logic

INFOID:000000003170925

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 idle speed properly when engine is started with prewarming up condition. | <ul style="list-style-type: none">• Lack of intake air volume• Fuel injection system• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check that the "COOLAN TEMP/S" indication is between 4°C (39°F) and 36°C (97°F).
If "COOLAN TEMP/S" indication is within the specified value, go to the following steps.
If "COOLAN TEMP/S" indication is out of the specified value, cool engine down or warm engine up and go to step 1.
5. Start engine and let it idle for 5 minutes.
6. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1350, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170926

1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 2.
NO >> Follow the instruction of Idle Air Volume Learning.

2. CHECK INTAKE SYSTEM

Check for the cause of intake air volume lacking. Refer to the following.

- Crushed intake air passage
- Intake air passage clogging

P1421 COLD START CONTROL

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part

3. CHECK FUEL INJECTION SYSTEM FUNCTION

Perform [EC-1224, "DTC Logic"](#) for DTC P0171, P0174.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-1225, "Diagnosis Procedure"](#) for DTC P0171, P0174.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF DIAG RESULTS" mode with CONSULT-III.
3. Touch "ERASE".
4. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1350, "DTC Logic"](#).

With GST

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**
See [EC-1350, "DTC Logic"](#).

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-1019, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

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P1550 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1550 BATTERY CURRENT SENSOR

Description

INFOID:000000003170927

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 [CHG-6, "System Diagram"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000003170928

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|---|
| P1550 | Battery current sensor circuit range/performance | The output voltage of the battery current sensor remains within the specified range while engine is running. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-1352, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170929

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1550 BATTERY CURRENT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Battery current sensor | | Ground | Voltage (V) |
|------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-1353. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170930

1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.

P1550 BATTERY CURRENT SENSOR

[VQ35DE]

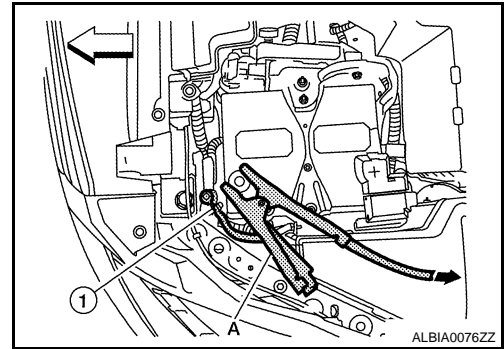
< COMPONENT DIAGNOSIS >

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 and ground.



| ECM | | Ground | Voltage (V) |
|-----------|---------------------------------------|--------|-------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [CHG-6. "System Diagram"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1551, P1552 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1551, P1552 BATTERY CURRENT SENSOR

Description

INFOID:000000003170931

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 [CHG-6, "System Diagram"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000003170932

DTC DETECTION LOGIC

NOTE:

If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|---|
| P1551 | Battery current sensor circuit low input | An excessively low voltage from the sensor is sent to ECM. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |
| P1552 | Battery current sensor circuit 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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-1355, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170933

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

P1551, P1552 BATTERY CURRENT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage (V) |
|------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-1356, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170934

1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.

P1551, P1552 BATTERY CURRENT SENSOR

[VQ35DE]

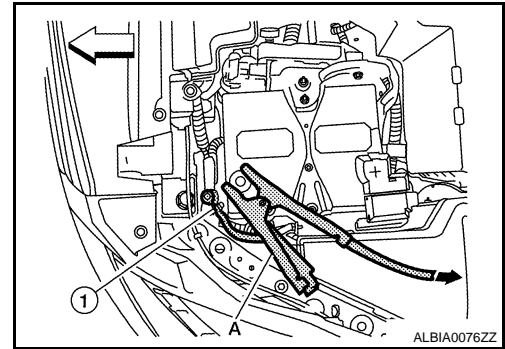
< COMPONENT DIAGNOSIS >

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 and ground.



| ECM | | Ground | Voltage (V) |
|-----------|---------------------------------------|--------|-------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [CHG-6. "System Diagram"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

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P1553 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1553 BATTERY CURRENT SENSOR

Description

INFOID:000000003170935

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 [CHG-6, "System Diagram"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000003170936

DTC DETECTION LOGIC

NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1553 | Battery current sensor performance | The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V 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-1358, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170937

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

P1553 BATTERY CURRENT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Battery current sensor | | Ground | Voltage (V) |
|------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 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 or short to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-1359, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170938

1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.

P1553 BATTERY CURRENT SENSOR

[VQ35DE]

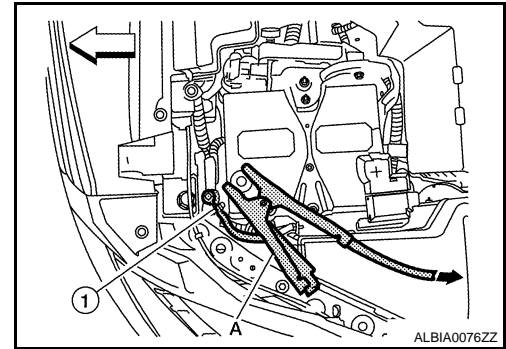
< COMPONENT DIAGNOSIS >

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 and ground.



| ECM | | Ground | Voltage (V) |
|-----------|---------------------------------------|--------|-------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [CHG-6. "System Diagram"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1554 BATTERY CURRENT SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1554 BATTERY CURRENT SENSOR

Description

INFOID:000000003170939

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 [CHG-6, "System Diagram"](#).

CAUTION:

Do not 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 the battery discharge may occur.

DTC Logic

INFOID:000000003170940

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------------------|--|---|
| P1554 | Battery current sensor performance | The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough. | <ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• Battery current sensor |

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1361, "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 [EC-1362, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000003170941

1.PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8V 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

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 and ground.

P1554 BATTERY CURRENT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

| ECM | | Ground | Voltage (V) |
|-----------|---------------------------------------|--------|-------------------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Above 2.3 at least once |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1362, "Diagnosis Procedure"](#)

Diagnosis Procedure

INFOID:000000003170942

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between battery current sensor harness connector and ground.

| Battery current sensor | | Ground | Voltage (V) |
|------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| F5 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 2 | F13 | 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 or 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 current sensor | | ECM | | Continuity |
|------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F5 | 3 | F13 | 42 | Existed |

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

P1554 BATTERY CURRENT SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK BATTERY CURRENT SENSOR

Refer to [EC-1363. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170943

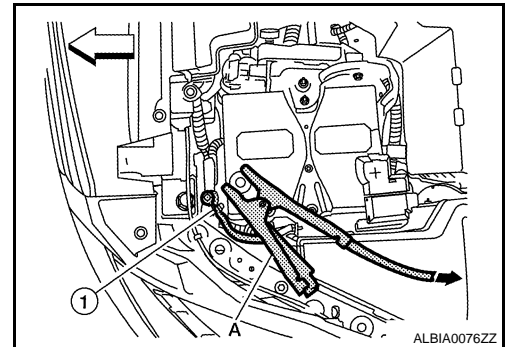
1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
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 and ground.



| ECM | | Ground | Voltage (V) |
|-----------|---------------------------------------|--------|-------------|
| Connector | Terminal | | |
| F13 | 42 (Battery current sensor signal) | Ground | Approx. 2.5 |

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [CHG-6. "System Diagram"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

P1564 ASCD STEERING SWITCH

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1564 ASCD STEERING SWITCH

Description

INFOID:000000003170944

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 [EC-1058, "System Diagram"](#) for the ASCD function.

DTC Logic

INFOID:000000003170945

DTC DETECTION LOGIC

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1331, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|------------------------|--|---|
| P1564 | ASCD steering switch | <ul style="list-style-type: none">An excessively high voltage signal from the ASCD steering switch is sent to ECM.ECM detects that input signal from the ASCD steering switch is out of the specified range.ECM detects that the ASCD steering switch is stuck ON. | <ul style="list-style-type: none">Harness or connectors (The switch circuit is open or shorted.)ASCD steering switchECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 10 seconds.
- Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 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.
- Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Go to [EC-1364, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170946

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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

- Turn ignition switch ON.
- Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT-III.

P1564 ASCD STEERING SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. Check each item indication under the following conditions.

| Monitor item | Condition | | Indication |
|---------------|--------------------------|----------|------------|
| MAIN SW | MAIN switch | Pressed | ON |
| | | Released | OFF |
| CANCEL SW | CANCEL switch | Pressed | ON |
| | | Released | OFF |
| RESUME/ACC SW | RESUME/ACCELERATE 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 and ground.

| ECM | | Ground | Condition | Voltage (V) |
|-----------|-------------------------------------|--------|--------------------------------------|-------------|
| Connector | Terminal | | | |
| E10 | 85 (ASCD steering switch signal) | Ground | MAIN switch: Pressed | Approx. 0 |
| | | | CANCEL switch: Pressed | Approx. 1 |
| | | | 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.

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 M88.
4. Check the continuity between combination switch and ECM harness connector.

| Combination switch | ECM | | Continuity |
|--------------------|----------|-----------|------------|
| | Terminal | Connector | |
| 16 | E10 | 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between combination switch and ECM harness connector.

P1564 ASCD STEERING SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Combination switch | | ECM | | Continuity |
|--------------------|-----------|----------|--|------------|
| Terminal | Connector | Terminal | | |
| 13 | E10 | 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 M1, E30
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to [EC-1366, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000003170947

1. CHECK ASCD STEERING SWITCH

1. Turn ignition switch OFF.
2. Disconnect combination switch (spiral cable) harness connector M88.
3. Check resistance between combination switch harness connector terminals as follows.

| Combination switch | | Condition | Resistance [Ω] |
|--------------------|-----------|--------------------------------------|-------------------------|
| Connector | Terminals | | |
| M88 | 13 and 16 | MAIN switch: Pressed | Approx. 0 |
| | | CANCEL switch: Pressed | Approx. 250 |
| | | 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

P1572 ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1572 ASCD BRAKE SWITCH

Description

INFOID:000000003170948

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 this input of two kinds (ON/OFF signal). Refer to [EC-1058, "System Diagram"](#) for the ASCD function.

DTC Logic

INFOID:000000003170949

DTC DETECTION LOGIC

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1331, "DTC Logic"](#).
- 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 OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------|-------------------------|--|--|
| P1572 | ASCD brake switch | 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 style="list-style-type: none"> • Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Stop lamp switch • ASCD brake switch • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • ECM |
| | | B) | ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident 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 make sure that CRUISE lamp lights up.
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 |

5. Check 1st trip DTC.

With GST

P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1368. "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. 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 |
| Driving location | Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed. |

2. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-1368. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170950

1.CHECK OVERALL FUNCTION-I

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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage (V) | |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0 |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.
- NO-1 >> CVT models: GO TO 3.
- NO-2 >> M/T models: GO TO 8.

2.CHECK OVERALL FUNCTION-II

With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Monitor item | Condition | | Indication |
|--------------|-------------|--------------------|------------|
| BRAKE SW2 | Brake pedal | Slightly depressed | ON |
| | | Fully released | OFF |

Without CONSULT-III

Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage (V) | |
|-----------|-------------------------------------|--------|----------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 106 (Stop lamp switch signal) | Ground | Brake pedal | Slightly depressed | Battery voltage |
| | | | Fully released | Approx. 0 | |

Is the inspection result normal?

YES >> GO TO 21.

NO >> GO TO 16.

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 brake switch | | Ground | Voltage (V) |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 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 E6
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or 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 brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | Existed |

4. 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.

- Junction block connector E45, E46

P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD BRAKE SWITCH

Refer to [EC-1372, "Component Inspection \(ASCD Brake Switch\)"](#)

Is the inspection result normal?

YES >> GO TO 21.

NO >> Replace ASCD brake switch.

8. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | | Voltage (V) |
|--------------------|----------|--------|-------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | | Fully released | Battery voltage |

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 9.

9. 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 brake switch | | Ground | Voltage (V) |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

3. Also check harness for short to ground and short to power.

P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

12.CHECK ASCD BRAKE SWITCH

Refer to [EC-1372. "Component Inspection \(ASCD Brake Switch\)"](#)

Is the inspection result normal?

YES >> GO TO 21.

NO >> Replace ASCD brake switch.

13.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 clutch switch harness connector and ECM harness connector.

| ASCD clutch switch | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E39 | 2 | E10 | 110 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 14.

14.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E45, E46
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

15.CHECK ASCD CLUTCH SWITCH

Refer to [EC-1373. "Component Inspection \(ASCD Clutch Switch\)"](#)

Is the inspection result normal?

YES >> GO TO 21.

NO >> Replace ASCD clutch switch.

16.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage (V) |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 18.

NO >> GO TO 17.

17.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.7)
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

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P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

18. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between stop lamp switch harness connector and ECM harness connector.

| Stop lamp switch | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E38 | 2 | E10 | 106 | Existed |

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

- YES >> GO TO 20.
NO >> GO TO 19.

19. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E45
- Harness for open or short between stop lamp switch and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

20. CHECK STOP LAMP SWITCH

Refer to [EC-1373, "Component Inspection \(Stop Lamp Switch\)"](#)

Is the inspection result normal?

- YES >> GO TO 21.
NO >> Replace stop lamp switch.

21. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:000000003170951

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 |
| | | 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 [BR-12, "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 |
| | | Slightly depressed. | Not existed |

Is the inspection result normal?

P1572 ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> INSPECTION END
NO >> Replace ASCD brake switch.

A

Component Inspection (ASCD Clutch Switch)

INFOID:000000003170952

1.CHECK ASCD CLUTCH SWITCH-I

EC

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check harness continuity between ASCD clutch switch terminals under the following conditions.

C

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

D

Is the inspection result normal?

E

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

F

1. Adjust ASCD clutch switch installation. Refer to [CL-5. "Inspection and Adjustment"](#).
2. Check harness continuity between ASCD clutch switch terminals under the following conditions.

G

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

H

Is the inspection result normal?

I

- YES >> INSPECTION END
NO >> Replace ASCD clutch switch.

Component Inspection (Stop Lamp Switch)

INFOID:000000003170953

J

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.

K

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

L

Is the inspection result normal?

M

- YES >> INSPECTION END
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12. "Inspection and Adjustment"](#).
2. Check harness continuity between stop lamp switch terminals under the following conditions.

O

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

P

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace stop lamp switch.

P1574 ASCD VEHICLE SPEED SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:000000003170954

The ECM receives two vehicle speed sensor 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 [EC-1058, "System Diagram"](#) for ASCD functions.

DTC Logic

INFOID:000000003170955

DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-1321, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1331, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------|---|---|
| P1574 | ASCD vehicle speed sensor | ECM detects a difference between two vehicle speed signals is out of the specified range. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.)• Combination meter• ABS actuator and electric unit (control unit)• Wheel sensor• TCM• ECM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> 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 [EC-1374, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170956

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-216, "DTC Index"](#).

Is the inspection result normal?

P1574 ASCD VEHICLE SPEED SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 2.
- NO >> Perform trouble shooting relevant to DTC indicated.

A

2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to [BRC-51. "DTC No. Index"](#) or [BRC-120. "DTC No. Index"](#) or [BRC-222. "DTC No. Index"](#).

EC

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace.

C

3.CHECK COMBINATION METER FUNCTION

Refer to [MWI-92. "DTC Index"](#).

D

>> INSPECTION END

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P

P1700 CVT CONTROL SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1700 CVT CONTROL SYSTEM

Description

INFOID:000000003170957

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for displayed other DTC. Refer to [TM-216, "DTC Index"](#). When this DTC is detected, the ASCD control is canceled.

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

Description

INFOID:000000003170958

ECM receives primary speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

DTC Logic

INFOID:000000003170959

DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to [EC-1250, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0340, P0345, first perform the trouble diagnosis for DTC P0340, P0345. Refer to [EC-1254, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1331, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P1715 | Input speed sensor (Primary speed sensor) (TCM output) | Primary speed sensor signal is different from the theoretical value calculated by ECM from secondary sensor signal and engine rpm signal. | <ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted)• Harness or connectors (Primary speed sensor circuit is open or shorted)• TCM |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1377, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170960

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-216, "DTC Index"](#).

OK or NG

- OK >> GO TO 2.
NG >> Perform trouble shooting relevant to DTC indicated.

2. REPLACE TCM

Replace TCM. Refer to [TM-254, "Removal and Installation"](#).

P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< COMPONENT DIAGNOSIS >

[VQ35DE]

>> INSPECTION END

P1720 VSS

Description

INFOID:000000003170961

ECM receives two vehicle speed signals via CAN communication line. One is sent from “ABS actuator and 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

INFOID:000000003170962

DTC DETECTION LOGIC

NOTE:

- If DTC P1720 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "DTC Logic"](#).
- If DTC P1720 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to [EC-1148, "DTC Logic"](#).
- If DTC P1720 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1333, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|-----------------------------------|---|---|
| P1720 | Vehicle speed sensor (TCM output) | A difference between two vehicle speed signals is out of the specified range. | <ul style="list-style-type: none"> • Harness or connectors (Secondary speed sensor circuit is open or shorted.) • Harness or connectors (Wheel sensor circuit is open or shorted.) • TCM • Secondary speed sensor • ABS actuator and electric unit (control unit) • Wheel sensor • Combination meter |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Drive vehicle at a 20 km/h (12 MPH) or more for at least 5 seconds without brake pedal depressing.
3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1379, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170963

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-216, "DTC Index"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)”

Refer to [BRC-51, "DTC No. Index"](#) or [BRC-120, "DTC No. Index"](#) or [BRC-222, "DTC No. Index"](#).

OK or NG

- OK >> GO TO 3.

P1720 VSS

[VQ35DE]

< COMPONENT DIAGNOSIS >

NG >> perform trouble shooting relevant to DTC indicated.

3.CHECK COMBINATION METER FUNCTION

Refer to [MWI-92, "DTC Index"](#).

>> INSPECTION END

P1800 VIAS CONTROL SOLENOID VALVE 1

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1800 VIAS CONTROL SOLENOID VALVE 1

Description

INFOID:000000003170964

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 feeds the vacuum signal to the power valve actuator 1.

DTC Logic

INFOID:000000003170965

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|---|
| P1800 | VIAS control solenoid valve 1 circuit | An excessively low or high voltage signal is sent to ECM through the valve 1. | <ul style="list-style-type: none"> • Harness or connectors (The solenoid valve 1 circuit is open or shorted.) • VIAS control solenoid valve 1 |

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V 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-1381, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170966

1.CHECK VIAS CONTROL SOLENOID VALVE 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve 1 harness connector.
3. Turn ignition switch ON.
4. Check the voltage between VIAS control solenoid valve 1 harness connector and ground.

| VIAS control solenoid valve 1 | | Ground | Voltage (V) |
|-------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F63 | 2 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair open circuit or 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.
3. Check the continuity between VIAS control solenoid valve 1 harness connector and ECM harness connector.

P1800 VIAS CONTROL SOLENOID VALVE 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

| VIAS control solenoid valve 1 | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F63 | 1 | F14 | 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 or short to ground or short to power in harness or connectors.

3. CHECK VIAS CONTROL SOLENOID VALVE 1

Refer to [EC-1382. "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-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

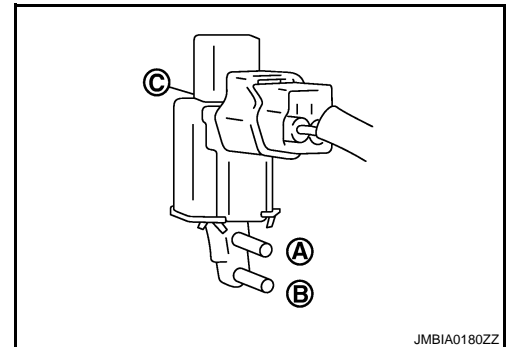
INFOID:000000003170967

1. CHECK VIAS CONTROL SOLENOID VALVE 1

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect VIAS purge 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 (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 |



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Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve 1 harness connector.
3. Disconnect VIAS purge hoses connected to VIAS volume control solenoid valve 1.
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) |
|---|--|--|
| 12V direct current supply between 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

P1801 VIAS CONTROL SOLENOID VALVE 2

< COMPONENT DIAGNOSIS >

[VQ35DE]

P1801 VIAS CONTROL SOLENOID VALVE 2

Description

INFOID:000000003170968

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 feeds the vacuum signal to the power valve actuator 2.

DTC Logic

INFOID:000000003170969

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|--|
| P1801 | VIAS control solenoid valve 2 circuit | An excessively low or high voltage signal is sent to ECM through the valve 2. | <ul style="list-style-type: none">• Harness or connectors (The solenoid valve 2 circuit is open or shorted.)• VIAS control solenoid valve 2 |

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V 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-1383, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170970

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 solenoid valve 2 | | Ground | Voltage (V) |
|-------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F65 | 2 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

2.DETECT MALFUNCTIONING PART

Check harness for open or short between VIAS control solenoid valve 2 and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK VIAS CONTROL SOLENOID VALVE 2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

P1801 VIAS CONTROL SOLENOID VALVE 2

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between VIAS control solenoid valve 2 harness connector and ECM harness connector.

| VIAS control solenoid valve 2 | | ECM | | Continuity |
|-------------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F65 | 1 | F14 | 26 | 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 or short to ground or short to power in harness or connectors.

4.CHECK VIAS CONTROL SOLENOID VALVE 2

Refer to [EC-1384, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace VIAS control solenoid valve 2.

5.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

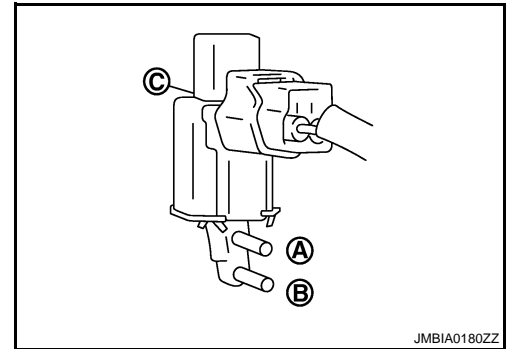
INFOID:000000003170971

1.CHECK VIAS CONTROL SOLENOID VALVE 2

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect VIAS purge hoses connected to VIAS control solenoid valve 2.
4. Turn ignition switch ON.
5. Select "VIAS S/V 2" in "ACTIVE TEST" mode with CONSULT-III.
6. Check air passage continuity and operation delay time under the following conditions.

| Condition (VIAS S/V 2) | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|------------------------|--|--|
| ON | Existed | Not existed |
| OFF | Not existed | Existed |



JMBIA0180ZZ

Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve 2 harness connector.
3. Disconnect VIAS purge hoses connected to VIAS volume control solenoid valve 2.
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) |
|---|--|--|
| 12V direct current supply between terminals 1 and 2 | Existed | Not existed |
| No supply | Not existed | Existed |

P1801 VIAS CONTROL SOLENOID VALVE 2

< COMPONENT DIAGNOSIS >

[VQ35DE]

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace VIAS control solenoid valve 2

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

O

P

P1805 BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

P1805 BRAKE SWITCH

Description

INFOID:000000003170972

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 driving.

DTC Logic

INFOID:000000003170973

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 extremely long time while the vehicle is driving. | <ul style="list-style-type: none">• Harness or connectors (Stop lamp switch circuit is open or shorted.)• Stop lamp switch |

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-1386, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170974

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

| Brake pedal | Stop lamp |
|--------------------|-----------------|
| Fully released | Not illuminated |
| Slightly depressed | Illuminated |

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.
2. Check the voltage between stop lamp switch harness connector and ground.

| Stop lamp switch | | Ground | Voltage (V) |
|------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E38 | 1 | Ground | Battery voltage |

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 E6
- 10A fuse (No.7)

P1805 BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Harness for open or short between battery and stop lamp switch

>> Repair open circuit or 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.

| Stop lamp switch | | ECM | | Continuity |
|------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E38 | 2 | E10 | 106 | 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.

- Fuse block (J/B) connector E6
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK STOP LAMP SWITCH

Refer to [EC-1387, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace stop lamp switch.

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Stop Lamp Switch)

INFOID:000000003170975

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.

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to [BR-12, "Inspection and Adjustment"](#).
2. Check harness continuity between stop lamp switch terminals under the following conditions.

P1805 BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Terminals | Condition | | Continuity |
|-----------|-------------|--------------------|-------------|
| 1 and 2 | Brake pedal | Fully released | Not existed |
| | | Slightly depressed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< COMPONENT DIAGNOSIS >

[VQ35DE]

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:000000003170976

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled 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:000000003170977

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|--|--|
| P2100 | Throttle control motor relay circuit open | ECM detects a voltage of power source for throttle control motor is excessively low. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay |
| P2103 | Throttle control motor relay circuit short | ECM detect the throttle control motor relay is stuck ON. | <ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V.

With DTC is detected?

P2100 >> GO TO 2.

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-1389, "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-1389, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170978

1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector F10.
4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< COMPONENT DIAGNOSIS >

[VQ35DE]

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 70 | F14 | 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 or short to ground or short to power in harness or connectors.

2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 54 | F14 | 2 | 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 or short to ground or short to power in harness or connectors.

3. CHECK FUSE

1. Disconnect 15A fuse (No. 43) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15A fuse.

4. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000003170979

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000003170980

DTC DETECTION LOGIC

NOTE:

If DTC P2101 is displayed with DTC P2100 or 2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-1389, "DTC Logic"](#) or [EC-1397, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---------------------------------------|---|--|
| P2101 | Electric throttle control performance | Electric throttle control function does not operate properly. | <ul style="list-style-type: none">Harness or connectors (Throttle control motor circuit is open or shorted)Electric throttle control actuator |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 2 seconds.
- Start engine and let it idle for 5 seconds.
- Check DTC.

Is DTC detected?

YES >> Go to [EC-1391, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170981

1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

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

- Check the voltage between ECM harness connector and ground.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< COMPONENT DIAGNOSIS >

[VQ35DE]

| ECM | | Ground | Condition | Voltage (V) |
|-----------|----------|--------|---------------------|-----------------|
| Connector | Terminal | | | |
| F14 | 2 | Ground | Ignition switch OFF | Approx. 0 |
| | | | Ignition switch ON | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector F10.
4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 70 | F14 | 15 | 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 or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector F10.
3. Check the continuity between IPDM E/R harness connector and ECM harness connector.

| IPDM E/R | | ECM | | Continuity |
|-----------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 54 | F14 | 2 | 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 or short to ground or short to power in harness or connectors.

5. CHECK FUSE

1. Disconnect 15A fuse (No. 43) from IPDM E/R.
2. Check 15A fuse for blown.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> Replace 15A fuse.

6. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R.
NO >> Repair or replace harness or connectors.

7. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

| Electric throttle control actuator | | ECM | | Continuity |
|------------------------------------|----------|-----------|----------|-------------|
| Connector | Terminal | Connector | Terminal | |
| F51 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 5 | Existed |
| | | | 6 | Not existed |

- Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

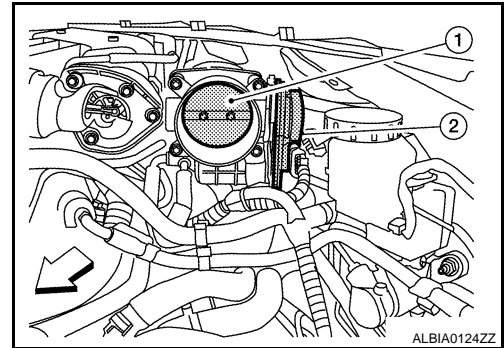
NO >> Repair or replace.

8. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- Remove the intake air duct.
- Check if foreign matter is caught between the throttle valve (1) and the housing.

2: Electric throttle control actuator

↶: Vehicle front



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-1393, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace harness or connectors.

11. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- Replace electric throttle control actuator.
- Refer to [EC-1394, "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170982

1. CHECK THROTTLE CONTROL MOTOR

- Turn ignition switch OFF.
- Disconnect electric throttle control actuator harness connector.
- Check resistance between electric throttle control actuator terminals as follows.

| Terminals | Resistance |
|-----------|-----------------------------------|
| 5 and 6 | Approx. 1 - 15 Ω [at 25°C (77°F)] |

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[VQ35DE]

< COMPONENT DIAGNOSIS >

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-1394, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170983

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2118 THROTTLE CONTROL MOTOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P2118 THROTTLE CONTROL MOTOR

Description

INFOID:000000003170984

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 and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000003170985

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--------------------------------------|--|---|
| P2118 | Throttle control motor circuit short | ECM detects short in both circuits between ECM and throttle control motor. | <ul style="list-style-type: none"> Harness or connectors (Throttle control motor circuit is shorted.) Electric throttle control actuator (Throttle control motor) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 2 seconds.
- Start engine and let it idle for 5 seconds.
- Check DTC.

Is DTC detected?

- YES >> Go to [EC-1395, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170986

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in [GI-45, "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

- Disconnect electric throttle control actuator harness connector.
- 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 | |
| F51 | 5 | F14 | 5 | Not existed |
| | | | 6 | Existed |
| | 6 | | 5 | Existed |
| | | | 6 | Not existed |

P2118 THROTTLE CONTROL MOTOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1396, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-1396, "Special Repair Requirement"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003170987

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 follows.

| Terminals | Resistance |
|-----------|--|
| 5 and 6 | Approx. 1 - 15 Ω [at 25°C (77°F)] |

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-1394, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170988

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:000000003170989

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 feeds 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.

DTC Logic

INFOID:000000003170990

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | | Possible cause |
|---------|------------------------------------|-------------------------|---|--------------------------------------|
| P2119 | Electric throttle control actuator | A) | Electric throttle control actuator does not function properly due to the return spring malfunction. | • Electric throttle control actuator |
| | | B) | Throttle valve opening angle in fail-safe mode is not in specified range. | |
| | | C) | ECM detect the throttle valve is stuck open. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Shift selector lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.
3. Shift selector lever to P position (CVT) or neutral position (M/T).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Shift selector lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.
7. Shift selector lever to P position (CVT) or neutral position (M/T).
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.

Is DTC detected?

YES >> Go to [EC-1397, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Shift selector lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.
3. Shift selector lever to N, P position (CVT) or neutral position (M/T).
4. Start engine and let it idle for 3 seconds.
5. Check DTC.

Is DTC detected?

YES >> Go to [EC-1397, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170991

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.

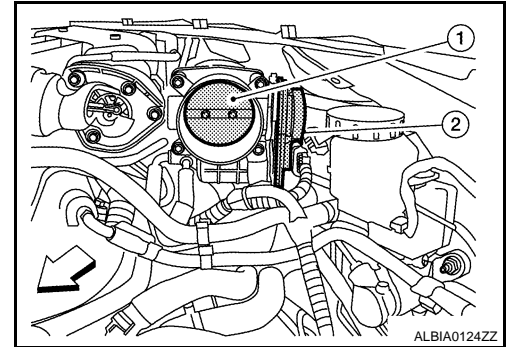
2: Electric throttle control actuator

↶: 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.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Go to [EC-1398, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170992

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2122, P2123 APP SENSOR

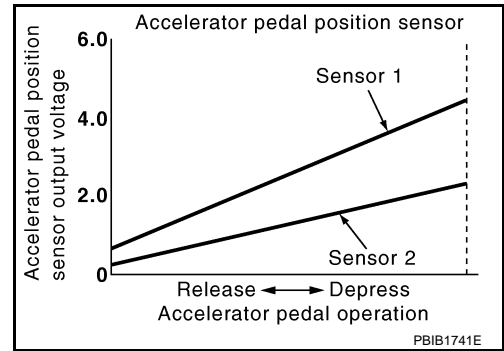
Description

INFOID:000000003170993

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000003170994

DTC DETECTION LOGIC

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|--|
| P2122 | Accelerator pedal position sensor 1 circuit low input | An excessively low voltage from the APP sensor 1 is sent to ECM. | <ul style="list-style-type: none"> Harness or connectors (APP sensor 1 circuit is open or shorted.) Accelerator pedal position sensor (APP sensor 1) |
| P2123 | Accelerator pedal position sensor 1 circuit high input | An excessively high voltage from the APP sensor 1 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1399, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003170995

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.

P2122, P2123 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

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 | | |
| E40 | 5 | Ground | Approx. 5 |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 4 | E10 | 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 or 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 3 | E10 | 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 or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-1401, "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-1401, "Special Repair Requirement"](#).

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P2122, P2123 APP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

Component Inspection

INFOID:000000003170996

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

| APP sensor | | Ground | Condition | Voltage (V) | |
|------------|-----------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E10 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.4 - 1.1 |
| | | | | Fully depressed | 3.7 - 4.8 |
| | 82 (APP sensor 2 signal) | | | Fully released | 0.20 - 0.55 |
| | | | | Fully depressed | 1.85 - 2.40 |

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-1401, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003170997

1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

P2127, P2128 APP SENSOR

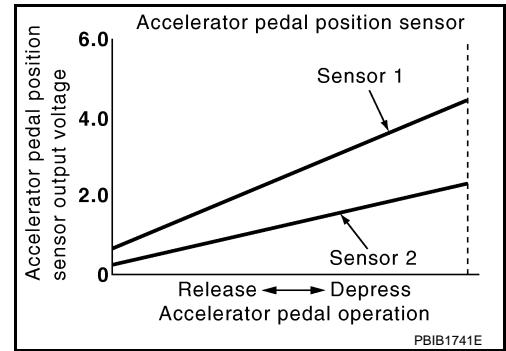
Description

INFOID:000000003170998

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000003170999

DTC DETECTION LOGIC

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P2127 | Accelerator pedal position sensor 2 circuit low input | An excessively low voltage from the APP sensor 2 is sent to ECM. | <ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • EVAP control system pressure sensor • Refrigerant pressure sensor |
| P2128 | Accelerator pedal position sensor 2 circuit high input | An excessively high voltage from the APP sensor 2 is sent to ECM. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1402, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003171000

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

P2127, P2128 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

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 | | |
| E40 | 6 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair open circuit.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1253, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-1291, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace malfunctioning components.

6.CHECK APP SENSOR 2 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.

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P2127, P2128 APP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 2 | E10 | 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 or short to ground or short to power in harness or connectors.

7. 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 1 | E10 | 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 or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-1404, "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-1405, "Special Repair Requirement"](#).

>> INSPECTION END

10. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003171001

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

| APP sensor | | Ground | Condition | Voltage (V) | |
|------------|--------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E10 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.4 - 1.1 |
| | | | | Fully depressed | 3.7 - 4.8 |
| | 82 (APP sensor 2 signal) | | | Fully released | 0.20 - 0.55 |
| | | | | Fully depressed | 1.85 - 2.40 |

Is the inspection result normal?

P2127, P2128 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> INSPECTION END
- NO >> GO TO 2.

A

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-1405. "Special Repair Requirement"](#).

EC

>> INSPECTION END

Special Repair Requirement

INFOID:000000003171002

C

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

D

Refer to [EC-1021. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

E

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

F

Refer to [EC-1021. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

G

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

H

>> END

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P2135 TP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

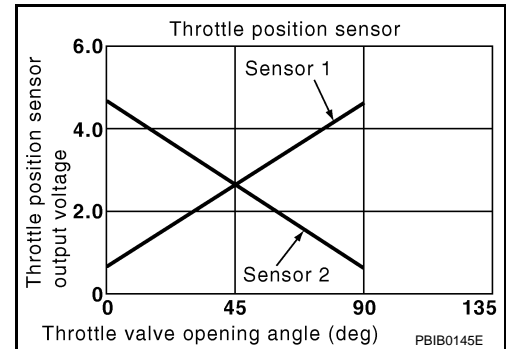
P2135 TP SENSOR

Description

INFOID:000000003171003

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 signal 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.



DTC Logic

INFOID:000000003171004

DTC DETECTION LOGIC

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|--|---|---|
| P2135 | Throttle position sensor circuit range/performance | Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2. | <ul style="list-style-type: none">• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.)• Electric throttle control actuator (TP sensor 1 and 2) |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1406, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003171005

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace ground connection.

2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.

P2135 TP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

- Turn ignition switch ON.
- Check the voltage between electric throttle control actuator harness connector and ground.

| Electric throttle control actuator | | Ground | Voltage (V) |
|------------------------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F51 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- 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 | |
| F51 | 4 | F13 | 36 | Existed |

- Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK THROTTLE POSITION SENSOR 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 | |
| F51 | 2 | F13 | 37 | Existed |
| | 3 | | 38 | |

- Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-1408, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- Replace electric throttle control actuator.
- Refer to [EC-1408, "Special Repair Requirement"](#)

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

P2135 TP SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

Component Inspection

INFOID:000000003171006

1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-1408, "Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector lever to D position (CVT) or 1st position (M/T).
6. Check the voltage between ECM harness connector and ground

| ECM | | Ground | Condition | Voltage (V) | |
|-----------|-------------------------|--------|-------------------|-----------------|-----------------|
| Connector | Terminal | | | | |
| F13 | 37 (TP sensor 1 signal) | Ground | Accelerator pedal | Fully released | More than 0.36V |
| | | | | Fully depressed | Less than 4.75V |
| | 38 (TP sensor 2 signal) | | | Fully released | Less than 4.75V |
| | | | | Fully depressed | More than 0.36V |

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-1408, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003171007

1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#)

>> END

P2138 APP SENSOR

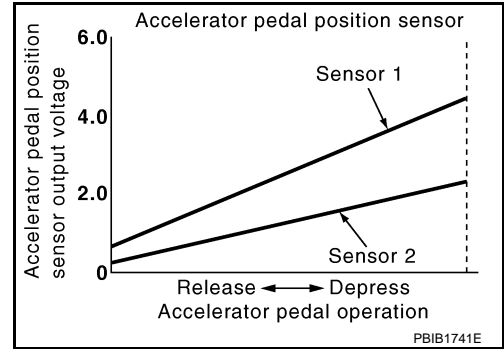
Description

INFOID:000000003171008

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed 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 the engine operation such as fuel cut.



DTC Logic

INFOID:000000003171009

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1334, "DTC Logic"](#).

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible cause |
|---------|---|---|--|
| P2138 | Accelerator pedal position sensor circuit range/performance | Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2. | <ul style="list-style-type: none"> Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) Accelerator pedal position sensor (APP sensor 1 and 2) Crankshaft position sensor (POS) EVAP control system pressure sensor Refrigerant pressure sensor |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V 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-1410, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

P2138 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000003171010

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45. "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 | | |
| E40 | 5 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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 | Terminal | | |
| E40 | 6 | 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 | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 6 | E10 | 87 | Existed |

Is the inspection result normal?

- YES >> GO TO 5.
 NO >> Repair open circuit.

5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

| ECM | | Sensor | | |
|-----------|----------|-----------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| F13 | 72 | Refrigerant pressure sensor | E219 | 1 |
| | 76 | CKP sensor (POS) | F30 | 1 |

P2138 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

| ECM | | Sensor | | |
|-----------|----------|-------------------------------------|-----------|----------|
| Connector | Terminal | Name | Connector | Terminal |
| E10 | 87 | APP sensor | E40 | 6 |
| | 91 | EVAP control system pressure sensor | B41 | 3 |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair short to ground or short to power in harness or connectors.

6.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1253, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-1291, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [HAC-48, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning components.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between APP sensor harness connector and ECM harness connector.

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 4 | E10 | 84 | Existed |
| | 2 | | 100 | |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

| APP sensor | | ECM | | Continuity |
|------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E40 | 3 | E10 | 81 | Existed |
| | 1 | | 82 | |

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9.CHECK APP SENSOR

Refer to [EC-1412, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Refer to [EC-1412, "Special Repair Requirement"](#).

P2138 APP SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000003171011

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check the voltage between ECM harness connector and ground.

| APP sensor | | Ground | Condition | Voltage (V) | |
|------------|--------------------------|--------|-------------------|-----------------|-------------|
| Connector | Terminal | | | | |
| E10 | 81 (APP sensor 1 signal) | Ground | Accelerator pedal | Fully released | 0.4 - 1.1 |
| | | | | Fully depressed | 3.7 - 4.8 |
| | 82 (APP sensor 2 signal) | | | Fully released | 0.20 - 0.55 |
| | | | | Fully depressed | 1.85 - 2.40 |

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-1412, "Special Repair Requirement"](#).

>> INSPECTION END

Special Repair Requirement

INFOID:000000003171012

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-1021, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

2.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-1021, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1022, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

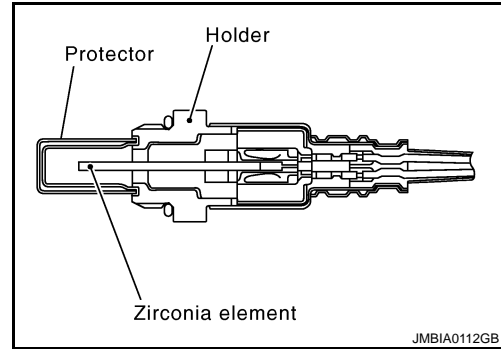
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P2A00, P2A03 A/F SENSOR 1

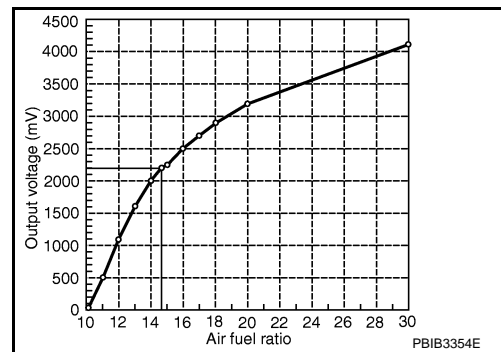
Description

INFOID:000000003171013

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 λ 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 about 800°C (1,472°F).



DTC Logic

INFOID:000000003171014

DTC DETECTION LOGIC

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

| DTC No. | Trouble diagnosis name | DTC detecting condition | Possible Cause |
|---------|--|---|---|
| P2A00 | Air fuel ratio (A/F) sensor 1 (bank 1) circuit range/performance | <ul style="list-style-type: none"> The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. | <ul style="list-style-type: none"> A/F sensor 1 A/F sensor 1 heater Fuel pressure Fuel injector Intake air leaks |
| P2A03 | Air fuel ratio (A/F) sensor 1 (bank 2) circuit range/performance | <ul style="list-style-type: none"> The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period. | |

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 1 minute under no load.
4. Let engine idle for 1 minute.
5. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.

< COMPONENT DIAGNOSIS >

6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-1414, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003171015

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E9. Refer to Ground Inspection in [GI-45, "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-136, "Removal and Installation"](#).

>> GO TO 3.

3.CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle.
2. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

- YES >> GO TO 4.
- NO >> Repair or replace.

4.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-1023, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"](#).
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 [EC-1224, "DTC Logic"](#) or [EC-1228, "DTC Logic"](#).
- 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.

6.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 | | | Ground | Voltage (V) |
|-------|------------|-----------|----------|--------|-----------------|
| | Bank | Connector | Terminal | | |
| P2A00 | 1 | F12 | 4 | Ground | Battery voltage |
| P2A03 | 2 | F61 | 4 | | |

Is the inspection result normal?

P2A00, P2A03 A/F SENSOR 1

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 8.
NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. 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 | | | ECM | | Continuity |
|-------|--------------|-----------|----------|-----------|----------|------------|
| | Bank | Connector | Terminal | Connector | Terminal | |
| P2A00 | 1 | F12 | 1 | F13 | 45 | Existed |
| | | | 2 | | 49 | |
| P2A03 | 2 | F61 | 1 | | 53 | |
| | | | 2 | | 57 | |

4. Check the continuity between A/F sensor 1 harness connector or ECM harness connector and ground.

| DTC | A/F sensor 1 | | | ECM | | Ground | Continuity |
|-------|--------------|-----------|----------|-----------|----------|--------|-------------|
| | Bank | Connector | Terminal | Connector | Terminal | | |
| P2A00 | 1 | F12 | 1 | F13 | 45 | Ground | Not existed |
| | | | 2 | | 49 | | |
| P2A03 | 2 | F61 | 1 | | 53 | | |
| | | | 2 | | 57 | | |

5. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Repair or replace.

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

ASCD BRAKE SWITCH

Description

INFOID:000000003171016

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 this input of two kinds (ON/OFF signal). Refer to [EC-1058, "System Diagram"](#) for the ASCD function.

Component Function Check

INFOID:000000003171017

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 | Condition | | Indication |
|--------------|------------------------------------|--------------------|------------|
| BRAKE SW1 | Brake pedal (CVT) | Slightly depressed | OFF |
| | Brake pedal and clutch pedal (M/T) | Fully released | ON |

Without CONSULT-III

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Condition | Voltage (V) | |
|-----------|-----------------------------------|--------|------------------------------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E10 | 110 (ASCD brake switch signal) | Ground | Brake pedal (CVT) | Slightly depressed | Approx. 0 |
| | | | Brake pedal and clutch pedal (M/T) | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-1416, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171018

1. CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

Which type of transmission?

- CVT >> GO TO 2.
M/T >> GO TO 7.

2. 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 brake switch | | Ground | Voltage (V) |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. 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 brake switch | | ECM | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E10 | 110 | 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.

- Junction block connector E45, E46
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD BRAKE SWITCH

Refer to [EC-1419. "Component Inspection \(ASCD Brake Switch\)"](#)

Is the inspection result normal?

- YES >> GO TO 15.
NO >> Replace ASCD brake switch.

7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check the voltage between ASCD clutch switch harness connector and ground.

| ASCD clutch switch | | Ground | Condition | Voltage (V) | |
|--------------------|----------|--------|-------------|--------------------|-----------------|
| Connector | Terminal | | | | |
| E39 | 1 | Ground | Brake pedal | Slightly depressed | Approx. 0 |
| | | | | Fully released | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 12.
NO >> GO TO 8.

8. 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 BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

| ASCD brake switch | | Ground | Voltage (V) |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E37 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

| ASCD brake switch | | ASCD clutch switch | | Continuity |
|-------------------|----------|--------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E37 | 2 | E39 | 1 | Existed |

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

11.CHECK ASCD BRAKE SWITCH

Refer to [EC-1419, "Component Inspection \(ASCD Brake Switch\)"](#)

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace ASCD brake switch.

12.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 clutch switch harness connector and ECM harness connector.

| ASCD clutch switch | | ECM | | Continuity |
|--------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E39 | 2 | E10 | 110 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 13.

13.DETECT MALFUNCTIONING PART

Check the following.

- Junction block connector E45, E46
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

ASCD BRAKE SWITCH

[VQ35DE]

< COMPONENT DIAGNOSIS >

14.CHECK ASCD CLUTCH SWITCH

Refer to [EC-1419. "Component Inspection \(ASCD Clutch Switch\)"](#)

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace ASCD clutch switch.

15.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

INFOID:000000003171019

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 |
| | | 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 [BR-12. "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 |
| | | Slightly depressed. | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch.

Component Inspection (ASCD Clutch Switch)

INFOID:000000003171020

1.CHECK ASCD CLUTCH SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check harness continuity between ASCD clutch switch terminals under the following conditions.

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD CLUTCH SWITCH-II

1. Adjust ASCD clutch switch installation. Refer to [CL-5. "Inspection and Adjustment"](#).
2. Check harness continuity between ASCD clutch switch terminals under the following conditions.

ASCD BRAKE SWITCH

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Terminals | Condition | | Continuity |
|-----------|--------------|--------------------|-------------|
| 1 and 2 | Clutch pedal | Fully released | Existed |
| | | Slightly depressed | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch.

ASCD INDICATOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

ASCD INDICATOR

Description

INFOID:000000003171021

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE lamp illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET lamp illuminates when following conditions are met.

- CRUISE lamp is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET lamp remains lit during ASCD control.

Refer to [EC-1058, "System Diagram"](#) for the ASCD function.

Component Function Check

INFOID:000000003171022

1.CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

| ASCD INDICATOR | CONDITION | | SPECIFICATION |
|----------------|--|--|---------------|
| CRUISE LAMP | <ul style="list-style-type: none">• Ignition switch: ON | <ul style="list-style-type: none">• MAIN switch: Pressed at the 1st time → at the 2nd time | ON → OFF |
| SET LAMP | <ul style="list-style-type: none">• MAIN switch: ON• When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) | <ul style="list-style-type: none">• ASCD: Operating | ON |
| | | <ul style="list-style-type: none">• ASCD: Not operating | OFF |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1421, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171023

1.CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147, "Diagnosis Procedure"](#).

2.CHECK COMBINATION METER FUNCTION

Refer to [MWI-92, "DTC Index"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair or replace.

COOLING FAN

< COMPONENT DIAGNOSIS >

[VQ35DE]

COOLING FAN

Description

INFOID:000000003171024

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 follows.

| Cooling fan speed | Cooling fan motor terminals | |
|-------------------|-----------------------------|---------|
| | (+) | (-) |
| Middle (MID) | 1 | 3 and 4 |
| | 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 middle speed condition.

Refer to [EC-1067, "System Diagram"](#).

Component Function Check

INFOID:000000003171025

1. CHECK COOLING FAN FUNCTION

With CONSULT-III

1. Turn ignition switch ON.
2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that cooling fan speed varies according to the percent.

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to [PCS-10, "Diagnosis Description"](#).
2. Make sure that cooling fan operates.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1422, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171026

1. CHECK COOLING FAN RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relays-2, -3 harness connectors.
3. Check the voltage between cooling fan relays-2, -3 harness connector and ground.

| Cooling fan relay | | Ground | Voltage (V) |
|-------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E42 | 2 | Ground | Battery voltage |
| | 5 | | |
| E43 | 2 | | |
| | 5 | | |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

COOLING FAN

[VQ35DE]

< COMPONENT DIAGNOSIS >

2. DETECT MALFUNCTIONING PART

Check the following.

- 40A fusible link (letter K)
- 10A fuse (No.33)
- IPDM E/R harness connector E18
- Harness for open or short between cooling fan relay-2 and battery
- Harness for open or short between cooling fan relay-3 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN RELAY OUTPUT SIGNAL CIRCUIT

1. Disconnect IPDM E/R harness connectors E17 and E18.
2. Check the continuity between cooling fan relay-2, -3 harness connector and IPDM E/R harness connector.

| Cooling fan relay | | IPDM E/R | | Continuity |
|-------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E42 | 1 | E17 | 42 | Existed |
| E43 | 1 | E18 | 34 | |

3. 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.

- Junction block connector E47, E48
- Harness for open or short between IPDM E/R and cooling fan relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK COOLING FAN MOTOR POWER SUPPLY CIRCUIT

1. Disconnect cooling fan motor-1 harness connector.
2. Check the voltage between cooling fan motor-1 harness connector and ground.

| Cooling fan motor-1 | | Ground | Voltage (V) |
|---------------------|----------|--------|-----------------|
| Connector | Terminal | | |
| E220 | 1 | Ground | Battery voltage |
| | 2 | | |

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E12, E203
- 40A fusible link (letter M)
- Harness for open or short between cooling fan motor-1 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK COOLING FAN MOTOR CIRCUIT

1. Disconnect cooling fan motor-2 harness connector.
2. Check the continuity between cooling fan relay-2, -3 harness connector and cooling fan motor-1, -2 harness connector.

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COOLING FAN

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Cooling fan relay | | Cooling fan motor | | Continuity |
|-------------------|----------|-------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E42 | 3 | E221 | 2 | Existed |
| | 7 | E220 | 3 | |
| E43 | 3 | E221 | 1 | |
| | 7 | E220 | 4 | |

3. Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

| IPDM E/R | | Cooling fan motor | | Continuity |
|-----------|----------|-------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E18 | 35 | E220 | 4 | Existed |
| | 38 | E221 | 1 | |

4. Check the continuity between cooling fan relay-2, -3 harness connector and ground.

| Cooling fan relay | | Ground | Continuity |
|-------------------|----------|--------|------------|
| Connector | Terminal | | |
| E42 | 6 | Ground | Existed |
| E43 | 6 | | |

5. Check the continuity between cooling fan motor-2 harness connector and ground.

| Cooling fan motor | | Ground | Continuity |
|-------------------|----------|--------|------------|
| Connector | Terminal | | |
| E221 | 3 | Ground | Existed |
| | 4 | | |

6. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E12, E203
- 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
- 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
- Harness for open or short between cooling fan motor-2 and ground
- Harness for open or short between cooling fan relay-2 and ground
- Harness for open or short between cooling fan relay-3 and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK COOLING FAN RELAYS-2 AND -3

Refer to [EC-1425, "Component Inspection \(Cooling Fan Relay\)"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning cooling fan relay.

COOLING FAN

< COMPONENT DIAGNOSIS >

[VQ35DE]

10. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-1425. "Component Inspection \(Cooling Fan Motor\)".](#)

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace malfunctioning cooling fan motor.

11. CHECK INTERMITTENT INCIDENT

Perform [GI-42. "Intermittent Incident".](#)

Is the inspection result normal?

- YES >> Replace IPDM E/R.
- NO >> Repair or replace harness connectors.

Component Inspection (Cooling Fan Motor)

INFOID:000000003171027

1. CHECK COOLING FAN MOTOR

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor harness connector.
3. Supply cooling fan motor terminals with battery voltage and check operation.

| | Condition | Terminals | |
|-------------------|-----------|-----------|---------|
| | | (+) | (-) |
| Cooling fan motor | A | 1 | 3 and 4 |
| | | 2 | 3 and 4 |
| | | 1 and 2 | 3 |
| | | 1 and 2 | 4 |
| | B | 1, 2 | 3, 4 |

Make sure that cooling fan speed of condition B is higher than that of A.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace cooling fan motor.

Component Inspection (Cooling Fan Relay)

INFOID:000000003171028

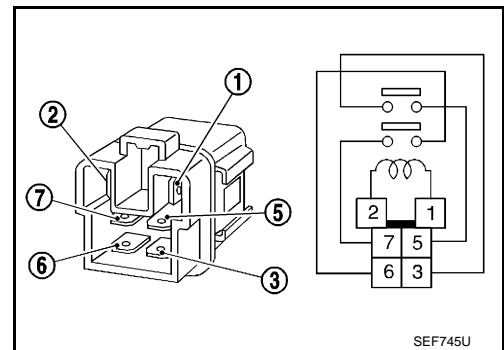
1. CHECK COOLING FAN RELAY

1. Disconnect cooling fan relays -2, -3 harness connector.
2. Check continuity between cooling fan relay -2, -3 terminals under the following conditions.

| Terminals | Conditions | Continuity |
|--------------------|---|-------------|
| 3 and 5 6 and 7 | 12V direct current supply between terminals 1 and 2 | Existed |
| | No current supply | Not existed |

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace cooling fan relay.



ELECTRICAL LOAD SIGNAL

Description

INFOID:000000003171029

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from BCM to ECM via IPDM E/R.

Component Function Check

INFOID:000000003171030

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 |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-1426, "Diagnosis Procedure"](#).

2. CHECK LIGHTING SWITCH FUNCTION

Check "LOAD SIGNAL" indication under the following conditions.

| Monitor item | Condition | Indication | |
|--------------|-----------------|--------------------|-----|
| LOAD SIGNAL | Lighting switch | ON at 2nd position | ON |
| | | OFF | OFF |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Go to [EC-1426, "Diagnosis Procedure"](#).

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-1426, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171031

1. INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to [EC-1426, "Component Function Check"](#).

Rear window defogger, headlamp or heater fan

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"](#).

ELECTRICAL LOAD SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

>> INSPECTION END

3.CHECK HEADLAMP SYSTEM

Refer to [EXL-4, "Work Flow"](#).

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to [HAC-4, "Work Flow"](#).

>> INSPECTION END

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ELECTRONIC CONTROLLED ENGINE MOUNT

< COMPONENT DIAGNOSIS >

[VQ35DE]

ELECTRONIC CONTROLLED ENGINE MOUNT

Description

INFOID:000000003171032

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

INFOID:000000003171033

1. CHECK OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Shift selector lever to D range (CVT), 1st (M/T) while depressing the brake pedal and parking brake pedal.
3. Disconnect electronic controlled engine mount control solenoid valve harness connector.
4. Make sure that body vibration increases compared with the condition of the above step 2 (with vehicle stopped).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> [EC-1428, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171034

1. CHECK VACUUM SOURCE

1. Turn ignition switch OFF.
2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
3. Disconnect vacuum hose connected to electronic controlled engine mount.
4. Start engine and let it idle.
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-1075, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace vacuum hoses and vacuum gallery.

3. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect electronic controlled engine mount control solenoid valve harness connector.
2. Turn ignition switch ON.
3. Check the voltage between front electronic controlled engine mount harness connector and ground.

| Electronic controlled engine mount control solenoid valve | | Ground | Voltage (V) |
|---|----------|--------|-----------------|
| Connector | Terminal | | |
| F64 | 1 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 4.

ELECTRONIC CONTROLLED ENGINE MOUNT

< COMPONENT DIAGNOSIS >

[VQ35DE]

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F1
- Junction block connector E44, E46
- 10A fuse (No. 3)
- Fuse block (J/B) E6
- Harness for open or short between electronic controlled engine mount control solenoid valve and fuse

>> Repair open circuit or 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 | |
| F14 | 28 | F64 | 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 or short to ground or short to power in harness connectors.

6. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Refer to [EC-1429. "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.
2. Install a vacuum pump to electronic controlled engine mount.
3. Make sure that a vacuum is kept when applying the vacuum of -40kPa (-400mbar, -300mmHg, -11.81inHg) 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-42. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake manifold collector.

NO >> Repair or replace.

Component Inspection

INFOID:000000003171035

1. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

 Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect electronic controlled engine mount control solenoid valve harness connector.
3. Disconnect electronic controlled engine mount purge hoses connected to electronic controlled engine mount control solenoid valve.
4. Check air passage continuity and operation delay time under the following conditions.

ELECTRONIC CONTROLLED ENGINE MOUNT

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Condition | Air passage continuity between (A) and (B) | Air passage continuity between (A) and (C) |
|---|--|--|
| 12V direct current supply between terminals 1 and 2 | Existed | Not existed |
| No supply | Not existed | Existed |

Is the inspection result normal?

YES >> INSPECTION END

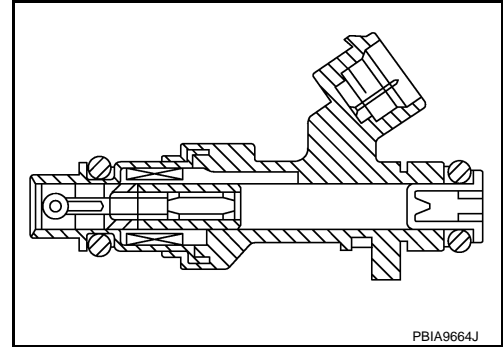
NO >> Replace electronic controlled engine mount control solenoid valve.

FUEL INJECTOR

Description

INFOID:000000003171036

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:000000003171037

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to [EC-1431, "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. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

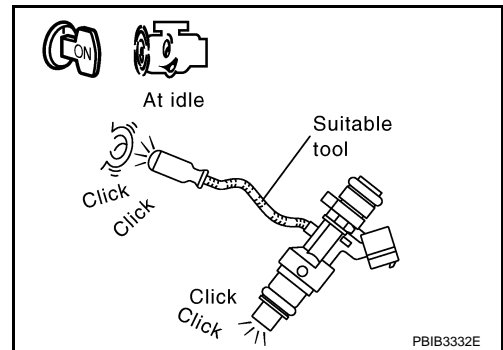
1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking sound should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1431, "Diagnosis Procedure"](#).



Diagnosis Procedure

INFOID:000000003171038

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.
4. Check the voltage between fuel injector harness connector and ground.

FUEL INJECTOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Fuel injector | | | Ground | Voltage (V) |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F17 | 1 | Ground | Battery voltage |
| 2 | F18 | 1 | | |
| 3 | F19 | 1 | | |
| 4 | F20 | 1 | | |
| 5 | F21 | 1 | | |
| 6 | F22 | 1 | | |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse (No.35)
- IPDM E/R harness connector F10
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check the continuity between fuel injector harness connector and ECM harness connector.

| Fuel injector | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F17 | 2 | F14 | 32 | Existed |
| 2 | F18 | 2 | | 31 | |
| 3 | F19 | 2 | | 30 | |
| 4 | F20 | 2 | | 29 | |
| 5 | F21 | 2 | | 3 | |
| 6 | F22 | 2 | | 1 | |

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 or short to ground or short to power in harness or connectors.

4. CHECK FUEL INJECTOR

Refer to [EC-1433, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning fuel injector.

5. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

OK or NG

OK >> Replace IPDM E/R.

NG >> INSPECTION END

FUEL INJECTOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

Component Inspection

INFOID:000000003171039

1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Check resistance between fuel injector terminals as follows.

| 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.

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FUEL PUMP

< COMPONENT DIAGNOSIS >

[VQ35DE]

FUEL PUMP

Description

INFOID:000000003171040

| Sensor | Input signal to ECM | ECM Function | Actuator |
|--|---------------------|-------------------|----------------------|
| Crankshaft position sensor (POS) Camshaft position sensor (PHASE) | Engine speed* | Fuel pump control | Fuel pump relay ↓ |
| 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 startability. 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 |
|----------------------------------|------------------------|
| Ignition switch is turned to ON. | Operates for 1 second. |
| Engine running and cranking | Operates. |
| When engine is stopped | Stops in 1.5 seconds. |
| Except as shown above | Stops. |

Component Function Check

INFOID:000000003171041

1. CHECK FUEL PUMP FUNCTION

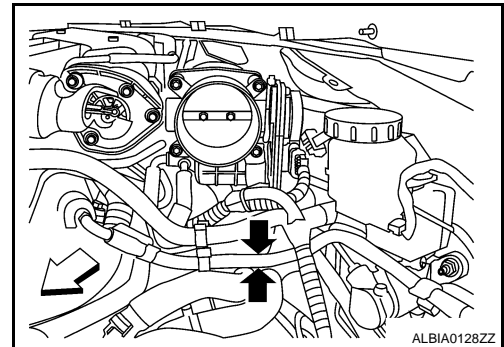
1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

←: 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-1434, "Diagnosis Procedure"](#).



Diagnosis Procedure

INFOID:000000003171042

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 and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F14 | 14 | Ground | Battery voltage |

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 2.

FUEL PUMP

< COMPONENT DIAGNOSIS >

[VQ35DE]

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

Check the voltage between IPDM E/R harness connector and ground.

| IPDM E/R | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| F10 | 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 F10
- Harness for open or short between IPDM E/R and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect condenser-1 harness connector.
4. Turn ignition switch ON.
5. Check the voltage between condenser-1 harness connector and ground.

| Condenser-1 | | Ground | Voltage (V) |
|-------------|----------|--------|--|
| Connector | Terminal | | |
| B17 | 1 | Ground | Battery voltage should exist for 1 seconds after ignition switch is turned ON. |

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 5.

5.CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15A fuse (No. 32).
3. Check 15A fuse.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuse.

6.CHECK CONDENSER-1 POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector E18.
2. Check the continuity between IPDM E/R harness connector and condenser-1 harness connector.

| IPDM E/R | | Condenser-1 | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E18 | 13 | B17 | 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

[VQ35DE]

< COMPONENT DIAGNOSIS >

Check the following.

- Harness connectors E29, B10
- IPDM E/R connector E18
- Harness for open or short between IPDM E/R and condenser-1

>> Repair open circuit or short to power in harness or connectors.

8. CHECK CONDENSER-1 GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check the continuity between condenser-1 harness connector and ground.

| Condenser-1 | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| B17 | 2 | Ground | Existed |

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29 (with rear view monitor)
- Harness for open or short between condenser-1 and ground

>> Repair open circuit or short to power in harness or connectors.

10. CHECK CONDENSER-1

Refer to [EC-1437. "Component Inspection \(Condenser-1\)".](#)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace condenser-1.

11. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. 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 | | Continuity |
|-----------|----------|--------------------------------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F18 | 13 | B42 | 1 | Existed |

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B10, E29
- Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R

>> Repair open circuit or short to power in harness or connectors.

13. CHECK FUEL PUMP GROUND CIRCUIT

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ground.

FUEL PUMP

< COMPONENT DIAGNOSIS >

[VQ35DE]

| Fuel level sensor unit and fuel pump | | Ground | Continuity |
|--------------------------------------|----------|--------|------------|
| Connector | Terminal | | |
| B42 | 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 B10, E29 (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-1437, "Component Inspection \(Fuel Pump\)"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace fuel pump.

16.CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair or replace harness or connectors.

Component Inspection (Fuel Pump)

INFOID:000000003171043

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 follows.

| 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)

INFOID:000000003171044

1.CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser-1 harness connector.
3. Check resistance between condenser-1 terminals as follows.

| Terminals | Resistance |
|-----------|-----------------------------|
| 1 and 2 | Above 1 MΩ [at 25°C (77°F)] |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser.

IGNITION SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

IGNITION SIGNAL

Description

INFOID:000000003171045

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:000000003171046

1.INSPECTION START

Turn ignition switch OFF, and restart engine.

Does the engine start?

YES-1 >> With CONSULT-III: GO TO 2.

YES-2 >> Without CONSULT-III: GO TO 3.

NO >> Go to [EC-1438, "Diagnosis Procedure"](#).

2.CHECK IGNITION SIGNAL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

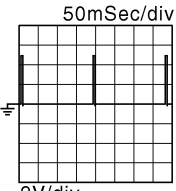
YES >> INSPECTION END

NO >> Go to [EC-1438, "Diagnosis Procedure"](#).

3.CHECK IGNITION SIGNAL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM harness connector ground with an oscilloscope.

| ECM | | Ground | Voltage signal |
|-----------|----------|--------|--|
| Connector | Terminal | | |
| F14 | 9 | Ground |  50mSec/div 2V/div JMBIA0035GB |
| | 10 | | |
| | 11 | | |
| | 18 | | |
| | 19 | | |
| | 21 | | |

NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-1438, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171047

1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check the voltage between ECM harness connector and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-----------------|
| Connector | Terminal | | |
| E10 | 105 | Ground | Battery voltage |

IGNITION SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to [EC-1143, "Diagnosis Procedure"](#).

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser-2 harness connector and ground.

| Condenser-2 | | Ground | Voltage (V) |
|-------------|----------|--------|-----------------|
| Connector | Terminal | | |
| F26 | 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 F10.
3. Check the continuity between IPDM E/R harness connector and condenser-2 harness connector.

| IPDM E/R | | Condenser-2 | | Continuity |
|-----------|----------|-------------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| F10 | 49 | F26 | 1 | Existed |

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Refer to [EC-1143, "Diagnosis Procedure"](#).

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between condenser-2 harness connector and ground.

| Condenser-2 | | Ground | Continuity |
|-------------|----------|--------|------------|
| Connector | Terminal | | |
| F26 | 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-2

Refer to [EC-1442, "Component Inspection \(Condenser-2\)"](#)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace condenser-2.

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 SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Ignition coil | | | Ground | Voltage (V) |
|---------------|-----------|----------|--------|-----------------|
| Cylinder | Connector | Terminal | | |
| 1 | F34 | 3 | Ground | Battery voltage |
| 2 | F35 | 3 | | |
| 3 | F36 | 3 | | |
| 4 | F37 | 3 | | |
| 5 | F38 | 3 | | |
| 6 | F39 | 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 | | |
| 1 | F34 | 2 | Ground | Existed |
| 2 | F35 | 2 | | |
| 3 | F36 | 2 | | |
| 4 | F37 | 2 | | |
| 5 | F38 | 2 | | |
| 6 | F39 | 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 | | | ECM | | Continuity |
|---------------|-----------|----------|-----------|----------|------------|
| Cylinder | Connector | Terminal | Connector | Terminal | |
| 1 | F34 | 1 | F14 | 11 | Existed |
| 2 | F35 | 1 | | 10 | |
| 3 | F36 | 1 | | 9 | |
| 4 | F37 | 1 | | 21 | |
| 5 | F38 | 1 | | 19 | |
| 6 | F39 | 1 | | 18 | |

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1441, "Component Inspection \(Ignition Coil with Power Transistor\)"](#).

Is the inspection result normal?

IGNITION SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

- YES >> GO TO 10.
NO >> Replace malfunctioning ignition coil with power transistor.

10.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000003171048

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 follows.

| Terminal No. (Polarity) | Resistance Ω [at 25°C (77°F)] |
|-------------------------|--------------------------------------|
| 1 and 2 | Except 0 or ∞ |
| 1 and 3 | Except 0 |
| 2 and 3 | |

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:

Do the following procedure in the place where ventilation is good without the combustible.

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 two or three 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 about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

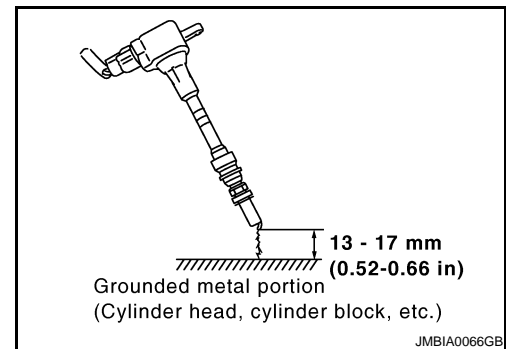
CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm (19.7 in). Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?



IGNITION SIGNAL

[VQ35DE]

< COMPONENT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace malfunctioning ignition coil with power transistor.

Component Inspection (Condenser-2)

INFOID:000000003171049

1. CHECK CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Check resistance between condenser-2 terminals as follows.

| Terminals | Resistance |
|-----------|-------------------------------------|
| 1 and 2 | Above 1 M Ω [at 25C° (77C°)] |

OK or NG

OK >> INSPECTION END

NG >> Replace condenser-2.

MALFUNCTION INDICATOR LAMP

< COMPONENT DIAGNOSIS >

[VQ35DE]

MALFUNCTION INDICATOR LAMP

Description

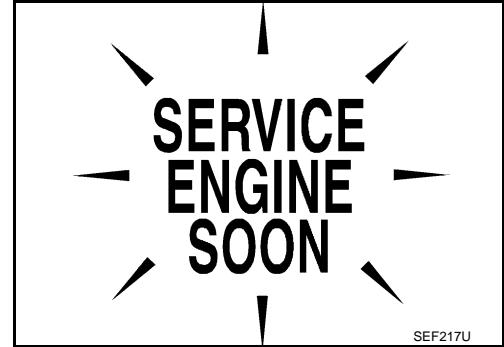
INFOID:000000003171050

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to [EC-1110. "Diagnosis Description"](#).



Component Function Check

INFOID:000000003171051

1.CHECK MIL FUNCTION

1. Turn ignition switch ON.
2. Make sure that MIL lights up.

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Go to [EC-1443. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171052

1.CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to [EC-1147. "Description"](#).

2.CHECK COMBINATION METER FUNCTION

Refer to [MWI-92. "DTC Index"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to [GI-42. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace combination meter.
NO >> Repair or replace.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

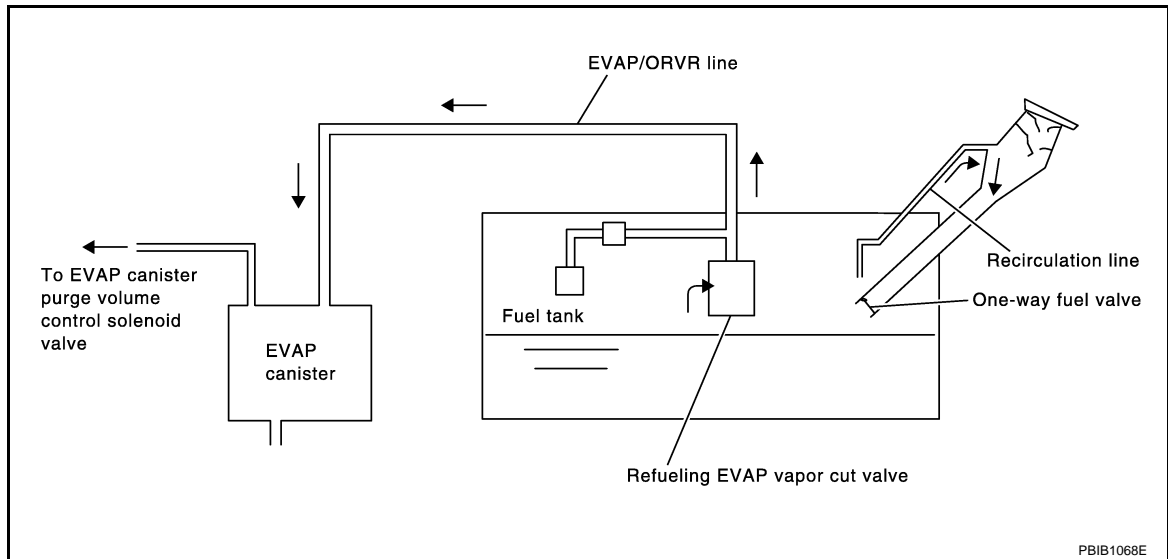
< COMPONENT DIAGNOSIS >

[VQ35DE]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

Description

INFOID:000000003171053



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is 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 refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - Put drained fuel in an explosion-proof container and put lid on securely.
 - Release fuel pressure from fuel line. Refer to [EC-1525, "Inspection"](#).
 - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Component Function Check

INFOID:000000003171054

1. CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

Is any symptom present?

- YES >> Go to [EC-1444, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000003171055

1. INSPECTION START

Check whether the following symptoms are present.

- A: Fuel odor from EVAP canister is strong.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[VQ35DE]

< COMPONENT DIAGNOSIS >

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

A or B

- 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?

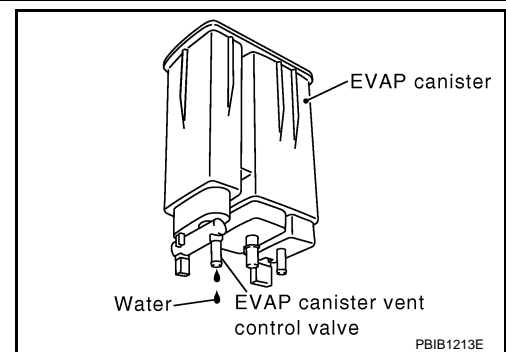
- YES >> GO TO 3.
- NO >> GO TO 4.

3.CHECK IF EVAP CANISTER 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-1447, "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.
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 8.
- NO >> GO TO 9.

8.CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

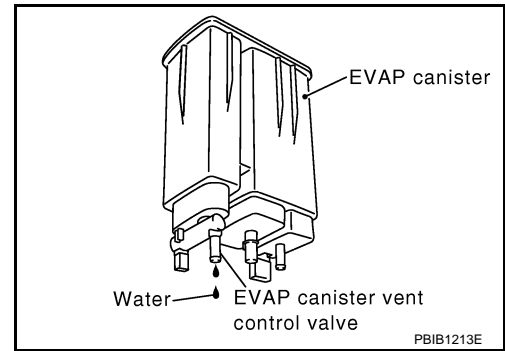
[VQ35DE]

< COMPONENT DIAGNOSIS >

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 6.
- NO >> GO TO 11.



9.REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 10.

10.DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

11.CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

Is the inspection result normal?

- YES >> GO TO 12.
- NO >> Repair or replace hoses and tubes.

12.CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace filler neck tube.

13.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1447. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.
- NO >> Replace refueling EVAP vapor cut valve with fuel tank.

14.CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Replace fuel filler tube.

15.CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

- YES >> GO TO 16.
- NO >> Repair or replace one-way fuel valve with fuel tank.

16.CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[VQ35DE]

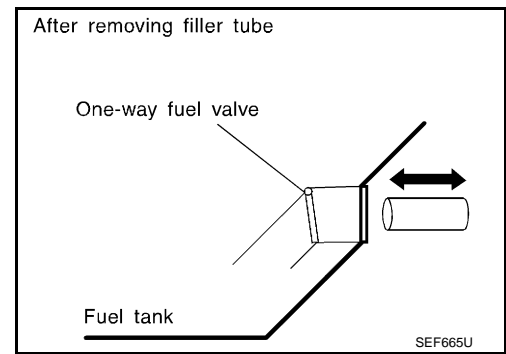
< COMPONENT DIAGNOSIS >

3. Check one-way fuel valve for operation as follows.
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.



INFOID:000000003171056

Component Inspection

1.INSPECTION START

Do you have CONSULT-III?

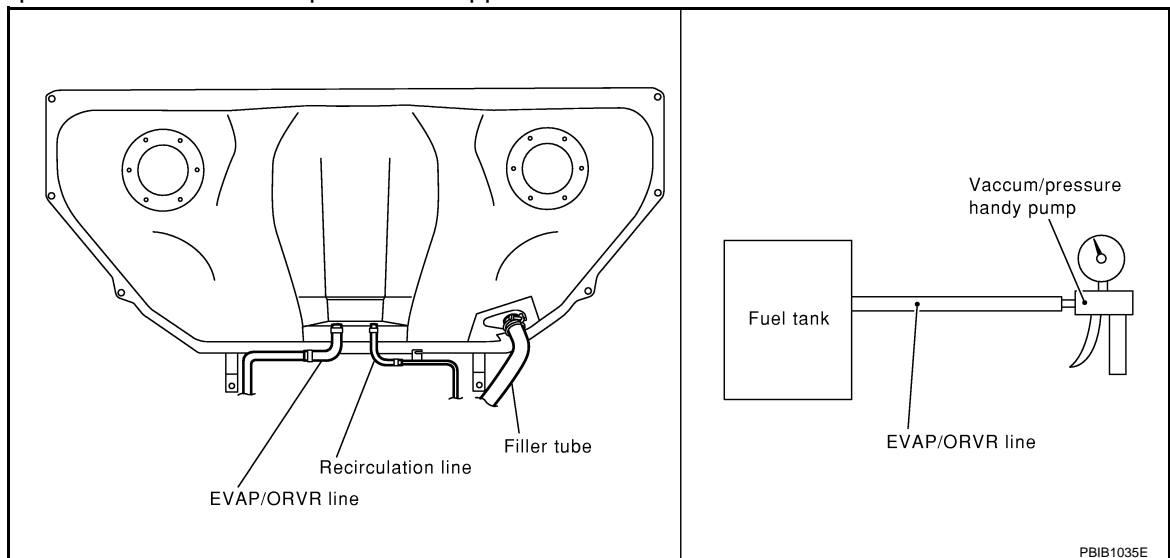
Do you have CONSULT-III?

- 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-10. "Removal and Installation"](#).
 3. Drain fuel from the tank as follows:
 - 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.
 4. Check refueling EVAP vapor cut valve for being stuck to close as follows.
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 follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.
- Always replace O-ring with new one.**
- Put fuel tank upside down.
 - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Is the inspection result normal?

- YES >> INSPECTION END

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[VQ35DE]

< COMPONENT DIAGNOSIS >

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

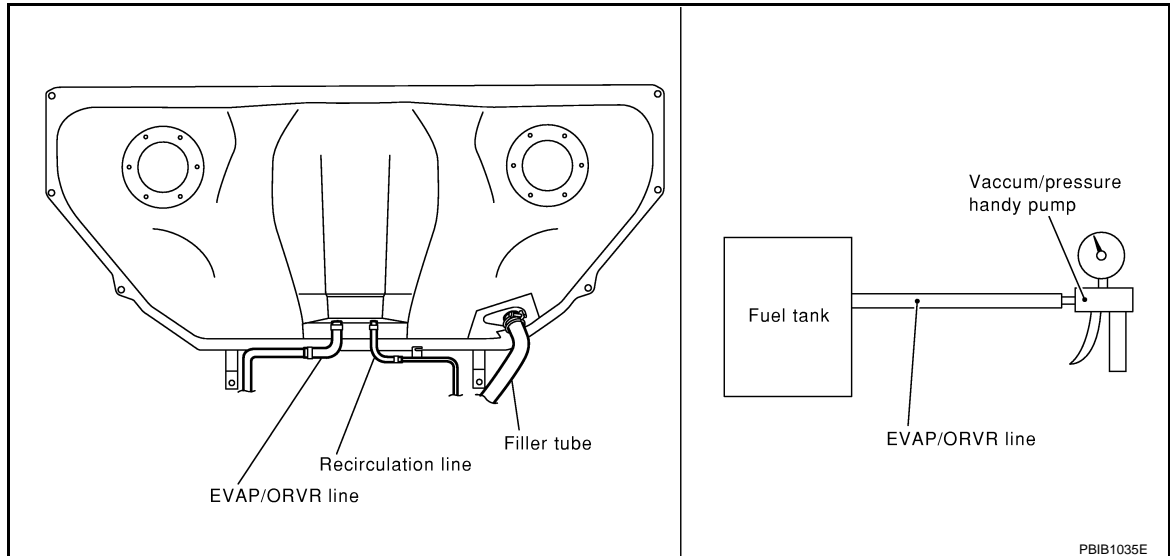
3. CHECK REFUELING EVAP VAPOR CUT VALVE

⊗ Without CONSULT-III

1. Turn ignition switch OFF.
2. Remove fuel tank. Refer to [FL-10. "Removal and Installation"](#).
3. Drain fuel from the tank as follows:
 - 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 follows.
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 follows.
 - Connect vacuum pump to hose end.
 - Remove fuel gauge retainer with fuel gauge unit.

Always replace O-ring with new one.

- Put fuel tank upside down.
- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm³, -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.

POSITIVE CRANKCASE VENTILATION

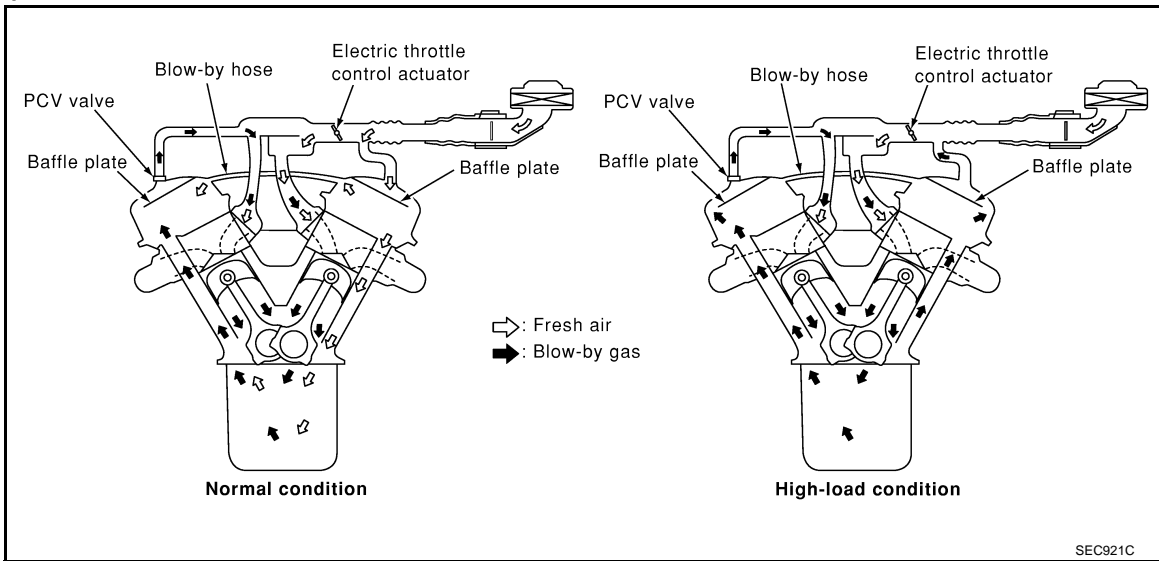
< COMPONENT DIAGNOSIS >

[VQ35DE]

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000003171057



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.

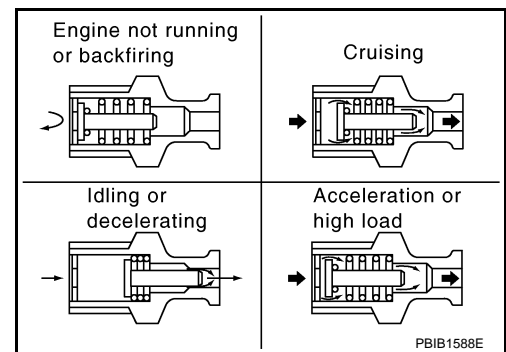
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then 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.



Component Inspection

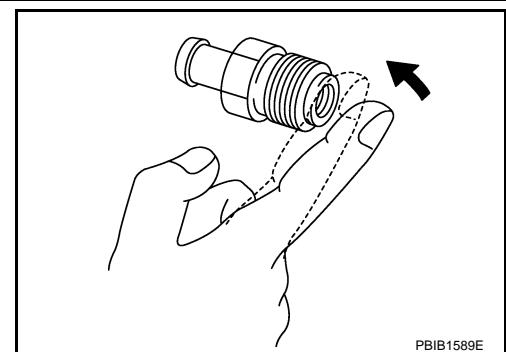
INFOID:000000003171058

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.



REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

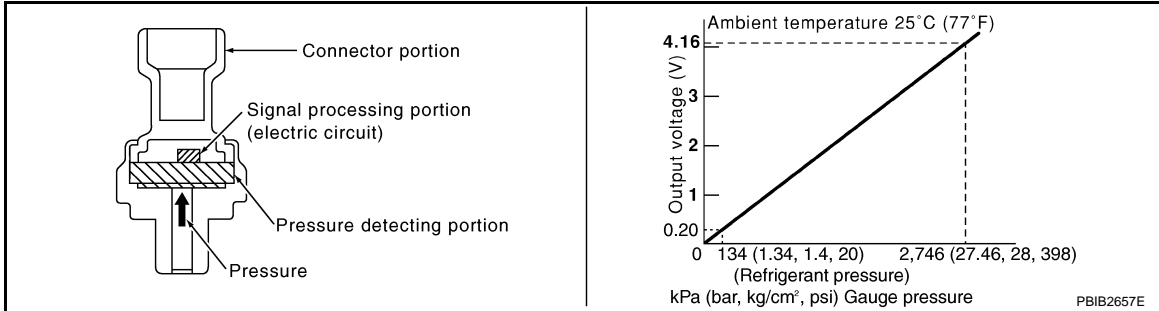
[VQ35DE]

REFRIGERANT PRESSURE SENSOR

Description

INFOID:000000003171059

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

INFOID:000000003171060

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 and ground.

| ECM | | Ground | Voltage (V) |
|-----------|----------|--------|-------------|
| Connector | Terminal | | |
| F13 | 39 | Ground | 1.0 - 4.0 |

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Go to [EC-1450. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171061

1. CHECK GROUND CONNECTION

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Check ground connection E9. Refer to Ground Inspection in [GI-45. "Circuit Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace ground connection.

2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.
3. Check the voltage between refrigerant pressure sensor harness connector and ground.

| Refrigerant pressure sensor | | Ground | Voltage (V) |
|-----------------------------|----------|--------|-------------|
| Connector | Terminal | | |
| E219 | 1 | Ground | Approx. 5 |

Is the inspection result normal?

- YES >> GO TO 4.
 NO >> GO TO 3.

REFRIGERANT PRESSURE SENSOR

[VQ35DE]

< COMPONENT DIAGNOSIS >

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E3
- IPDM E/R harness connectors E18, E201
- Junction block connector E44, E45
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or 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.
3. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 3 | F13 | 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 F1, E3
- IPDM E/R harness connectors E18, E201
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

| Refrigerant pressure sensor | | ECM | | Continuity |
|-----------------------------|----------|-----------|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| E219 | 2 | F13 | 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 F1, E3
- IPDM E/R harness connectors E18, E201
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

Is the inspection result normal?

REFRIGERANT PRESSURE SENSOR

< COMPONENT DIAGNOSIS >

[VQ35DE]

- YES >> Replace refrigerant pressure sensor.
- NO >> Repair or replace.

VARIABLE INDUCTION AIR SYSTEM

Description

INFOID:000000003171062

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.

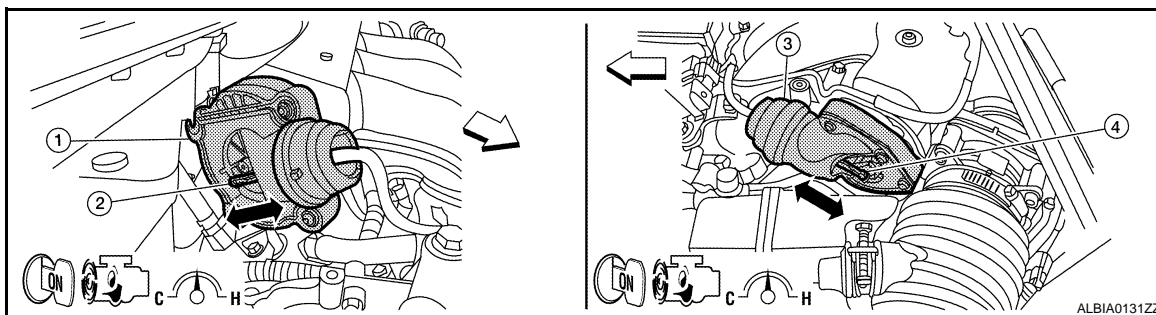
Component Function Check

INFOID:000000003171063

1. CHECK OVERALL FUNCTION-I

☐ With CONSULT-III

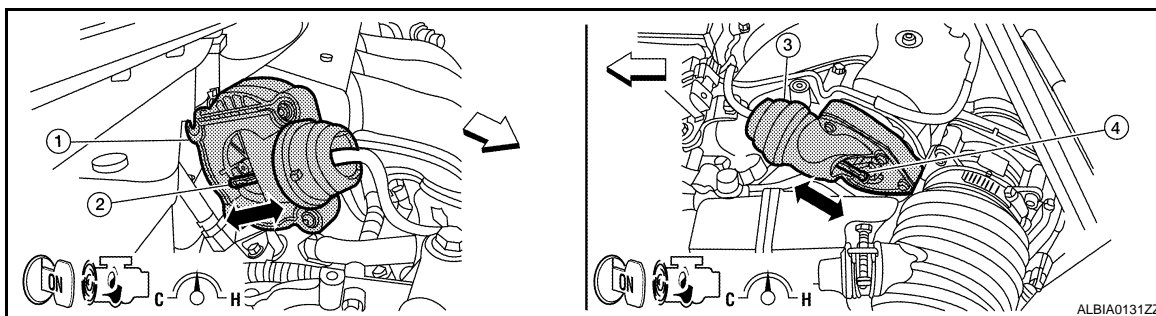
1. Start engine and let it idle.
2. Perform "VIAS S/V 1" in "ACTIVE TEST" mode with CONSULT-III.
3. Turn VIAS control solenoid valve 1 "ON" and "OFF", and make sure that power valve actuator 1 rod moves.



1. Power valve actuator 1
 2. Power valve actuator 1 rod
 3. Power valve actuator 2
 4. Power valve actuator 2 rod
- ← : Vehicle front

☒ Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve 1 harness connector.
3. Start engine and let it idle.
4. Apply 12 V of direct current between VIAS control solenoid valve 1 terminals 1 and 2.
5. Check power valve actuator 1 rod moves under the following conditions.



1. Power valve actuator 1
 2. Power valve actuator 1 rod
 3. Power valve actuator 2
 4. Power valve actuator 2 rod
- ← : Vehicle front

VARIABLE INDUCTION AIR SYSTEM

[VQ35DE]

< COMPONENT DIAGNOSIS >

| Condition | Operation |
|--|-----------------------------------|
| 12V direct current between terminals 1 and 2 | Power valve actuator 1 rod moves. |
| No current supply | |

Is the inspection result normal?

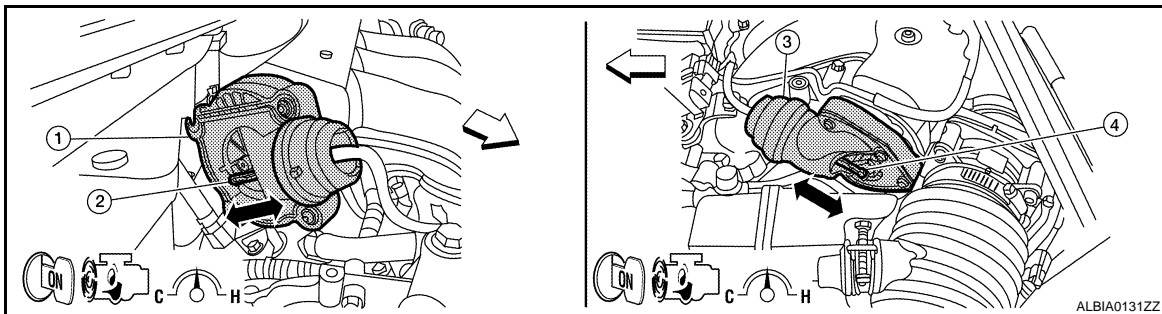
YES >> GO TO 2.

NO >> [EC-1455. "Diagnosis Procedure"](#).

2. CHECK OVERALL FUNCTION-II

④ With CONSULT-III

1. Perform "VIAS S/V 2" in "ACTIVE TEST" mode with CONSULT-III.
2. Turn VIAS control solenoid valve 2 "ON" and "OFF", and make sure that power valve actuator 2 rod moves.



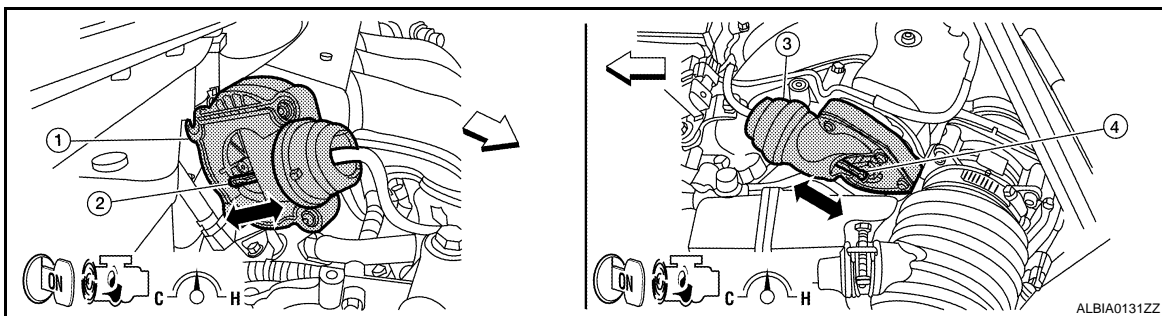
1. Power valve actuator 1 2. Power valve actuator 1 rod 3. Power valve actuator 2

4. Power valve actuator 2 rod

← : Vehicle front

⊗ Without CONSULT-III

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve 2 harness connector.
3. Start engine and let it idle.
4. Apply 12 V of direct current between VIAS control solenoid valve 2 terminals 1 and 2.
5. Check power valve actuator 2 rod moves under the following conditions.



1. Power valve actuator 1 2. Power valve actuator 1 rod 3. Power valve actuator 2

4. Power valve actuator 2 rod

← : Vehicle front

| Condition | Operation |
|--|-----------------------------------|
| 12V direct current between terminals 1 and 2 | Power valve actuator 2 rod moves. |
| No current supply | |

Is the inspection result normal?

YES >> INSPECTION END

VARIABLE INDUCTION AIR SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

NO >> [EC-1455. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000003171064

1.INSPECTION START

Confirm the malfunctioning system (power valve 1 or power valve 2). Refer to [EC-1453. "Component Function Check"](#).

Which system is related to the incident?

Power valve 1>>GO TO 2.

Power valve 2>>GO TO 6.

2.CHECK VACUUM EXISTENCE-I

With CONSULT-III

1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
2. Start engine and let it idle.
3. Perform "VIAS S/V 1" in "ACTIVE TEST" mode with CONSULT-III.
4. Turn VIAS control solenoid valve 1 "ON" and "OFF", and check vacuum existence under the following conditions.

| 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 and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve 1 terminals 1 and 2.
5. Check vacuum existence under the following conditions.

| Condition | Vacuum |
|---------------------------|-------------|
| 12V direct current supply | Existed |
| No supply | 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.

VARIABLE INDUCTION AIR SYSTEM

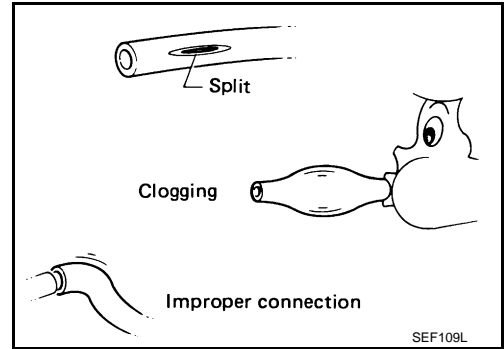
[VQ35DE]

< COMPONENT DIAGNOSIS >

2. Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to [EC-1100, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Repair hoses or tubes.



5. CHECK VIAS CONTROL SOLENOID VALVE 1

Refer to [EC-1382, "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.
4. Turn VIAS control solenoid valve 2 "ON" and "OFF", and check vacuum existence under the following conditions.

| VIAS S/V 2 | Vacuum |
|------------|-------------|
| ON | Existed |
| OFF | Not existed |

⊗ Without CONSULT-III

1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
2. Disconnect VIAS control solenoid valve 1 harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve 2 terminals 1 and 2.
5. Check vacuum existence under the following conditions.

| Condition | Vacuum |
|---------------------------|-------------|
| 12V direct current supply | Existed |
| No supply | Not existed |

Is the inspection result normal?

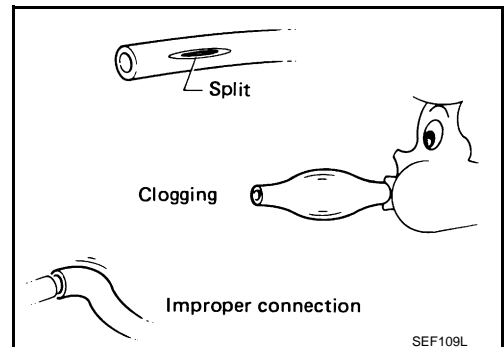
- YES >> Repair or replace power valve actuator 2.
NO >> GO TO 7.

7. CHECK VACUUM HOSE

1. Stop engine.
2. Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to [EC-1100, "System Diagram"](#).

Is the inspection result normal?

- YES >> GO TO 8.
NO >> Repair hoses or tubes.



VARIABLE INDUCTION AIR SYSTEM

< COMPONENT DIAGNOSIS >

[VQ35DE]

8. CHECK VIAS CONTROL SOLENOID VALVE 2

Refer to [EC-1384, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace VIAS control solenoid valve 2.

9. CHECK INTERMITTENT INCIDENT

Refer to [GI-42, "Intermittent Incident"](#).

>> INSPECTION END

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ECU DIAGNOSIS

ECM

Reference Value

INFOID:000000001343568

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 TIMING 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 | Condition | | Values/Status |
|-----------------|--|---------------------------------------|---|
| ENG SPEED | See EC-1531, "Idle Speed" . | | |
| MAS A/F SE-B1 | See EC-1135, "Description" . | | |
| B/FUEL SCHDL | See EC-1135, "Description" . | | |
| A/F ALPHA-B1 | See EC-1135, "Description" . | | |
| A/F ALPHA-B2 | See EC-1135, "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) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 (B2) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ↔ RICH |
| HO2S2 MNTR (B2) | <ul style="list-style-type: none"> • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ↔ RICH |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT-III value with the speedometer indication. | | Almost the same speed as speedometer indication |
| BATTERY VOLT | • Ignition switch: ON (Engine stopped) | | 11 - 14V |
| ACCEL SEN 1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| ACCEL SEN 2*1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| TP SEN 1-B1 | <ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (MT) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |
| TP SEN 2-B1*1 | <ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (MT) | Accelerator pedal: Fully released | More than 0.36V |
| | | Accelerator pedal: Fully depressed | Less than 4.75V |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Monitor Item | Condition | Values/Status | |
|---------------|---|---|------------------|
| FUEL T/TMP SE | • Ignition switch: ON | Indicates fuel tank temperature | A |
| INT/A TEMP SE | • Ignition switch: ON | Indicates intake air temperature | EC |
| EVAP SYS PRES | • Ignition switch: ON | Approx. 1.8 - 4.8V | |
| FUEL LEVEL SE | • Ignition switch: ON | Depending on fuel level of fuel tank | C |
| START SIGNAL | • Ignition switch: ON → START → ON | OFF → ON → OFF | |
| CLSD THL POS | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates.) | ON |
| P/N POSI SW | • Ignition switch: ON | Selector lever: P or N (CVT), neutral (M/T) | ON |
| | | Selector lever: Except above | OFF |
| PW/ST SIGNAL | • Engine: After warming up, idle the engine | Steering wheel: Not being turned | OFF |
| | | Steering wheel: Being turned | ON |
| LOAD SIGNAL | • Ignition switch: ON | Rear window defogger switch: ON and/or Lighting switch: 2nd position | ON |
| | | Rear window defogger switch and lighting switch: OFF | OFF |
| IGNITION SW | • Ignition switch: ON → OFF → ON | ON → OFF → ON | I |
| HEATER FAN SW | • Engine: After warming up, idle the engine | Heater fan switch: ON | ON |
| | | Heater fan switch: OFF | OFF |
| BRAKE SW | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| INJ PULSE-B1 | • Engine: After warming up • Selector lever: P or N (CVT), neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| INJ PULSE-B2 | • Engine: After warming up • Selector lever: P or N (CVT), neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| IGN TIMING | • Engine: After warming up • Selector lever: P or N (CVT), neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 7° - 17° BTDC |
| | | 2,000 rpm | 25° - 45° BTDC |
| CAL/LD VALUE | • Engine: After warming up • Selector lever: P or N (CVT), neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 5% - 35% |
| | | 2,500 rpm | 5% - 35% |
| MASS AIRFLOW | • Engine: After warming up • Selector lever: P or N (CVT), neutral (M/T) • Air conditioner switch: OFF • No load | Idle | 2.0 - 6.0 g·m/s |
| | | 2,500 rpm | 7.0 - 20.0 g·m/s |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Monitor Item | Condition | Values/Status | |
|----------------|---|--|-------------------|
| PURG VOL C/V | <ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Idle (Accelerator pedal: Not depressed even slightly, after engine starting.) | 0% |
| | | 2,000 rpm | — |
| INT/V TIM (B1) | <ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Idle | -5° - 5°C |
| | | 2,000 rpm | Approx. 0° - 30°C |
| INT/V TIM (B2) | <ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Idle | -5° - 5°C |
| | | 2,000 rpm | Approx. 0° - 30°C |
| INT/V SOL (B1) | <ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| INT/V SOL (B2) | <ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| VIAS S/V-1 | <ul style="list-style-type: none"> VIAS control solenoid valve: Operation | | ON |
| | <ul style="list-style-type: none"> VIAS control solenoid valve: Not operation | | OFF |
| VIAS S/V-2 | <ul style="list-style-type: none"> VIAS control solenoid valve: Operation | | ON |
| | <ul style="list-style-type: none"> VIAS control solenoid valve: Not operation | | OFF |
| AIR COND RLY | <ul style="list-style-type: none"> Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates) | ON |
| ENGINE MOUNT | <ul style="list-style-type: none"> Engine: After warming up | Below 950 rpm | IDLE |
| | | Above 950 rpm | TRVL |
| FUEL PUMP RLY | <ul style="list-style-type: none"> For 1 seconds after turning ignition switch: ON Engine running or cranking | | ON |
| | <ul style="list-style-type: none"> Except above | | OFF |
| VENT CONT/V | <ul style="list-style-type: none"> Ignition switch: ON | | OFF |
| THRTL RELAY | <ul style="list-style-type: none"> Ignition switch: ON | | ON |
| COOLING FAN | <ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF | Engine coolant temperature: 97°C (206°F) or less | OFF |
| | | Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F) | LOW |
| | | Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F) | MID |
| | | Engine coolant temperature: 105°C (221°F) or more | HI |
| HO2S2 HTR (B1) | <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm | | OFF |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Monitor Item | Condition | Values/Status |
|----------------------------------|---|--|
| HO2S2 HTR (B2) | <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | ON |
| | <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm | OFF |
| VEHICLE SPEED | <ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with the speedometer indication. | Almost the same speed as the speedometer indication |
| IDL A/V LEARN | <ul style="list-style-type: none"> • Engine: Running | Idle air volume learning has not been performed yet. YET |
| | | Idle air volume learning has already been performed successfully. CMPLT |
| ENG OIL TEMP | <ul style="list-style-type: none"> • Engine: After warming up | More than 70°C (158°F) |
| TRVL AFTER MIL | <ul style="list-style-type: none"> • Ignition switch: ON | Vehicle has traveled after MIL has turned ON. 0 - 65,535 km (0 - 40,723 miles) |
| A/F S1 HTR (B1) | <ul style="list-style-type: none"> • Engine: After warming up, idle the engine (More than 140 seconds after starting engine) | 4 - 100% |
| A/F S1 HTR (B2) | <ul style="list-style-type: none"> • Engine: After warming up, idle the engine (More than 140 seconds after starting engine) | 4 - 100% |
| AC PRESS SEN | <ul style="list-style-type: none"> • Engine: Idle • Both A/C switch and blower fan switch: ON (Compressor operates) | 1.0 - 4.0V |
| VHCL SPEED SE | <ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with the speedometer indication. | Almost the same speed as the speedometer indication |
| SET VHCL SPD | <ul style="list-style-type: none"> • Engine: Running | ASCD: Operating The preset vehicle speed is displayed |
| MAIN SW | <ul style="list-style-type: none"> • Ignition switch: ON | MAIN switch: Pressed ON |
| | | MAIN switch: Released OFF |
| CANCEL SW | <ul style="list-style-type: none"> • Ignition switch: ON | CANCEL switch: Pressed ON |
| | | CANCEL switch: Released OFF |
| RESUME/ACC SW | <ul style="list-style-type: none"> • Ignition switch: ON | RESUME/ACCELERATE switch: Pressed ON |
| | | RESUME/ACCELERATE switch: Released OFF |
| SET SW | <ul style="list-style-type: none"> • Ignition switch: ON | SET/COAST switch: Pressed ON |
| | | SET/COAST switch: Released OFF |
| BRAKE SW1 (ASCD brake switch) | <ul style="list-style-type: none"> • Ignition switch: ON | <ul style="list-style-type: none"> • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) ON |
| | | <ul style="list-style-type: none"> • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) OFF |
| BRAKE SW2 (Stop lamp switch) | <ul style="list-style-type: none"> • Ignition switch: ON | Brake pedal: Fully released OFF |
| | | Brake pedal: Slightly depressed ON |
| VHCL SPD CUT | <ul style="list-style-type: none"> • Ignition switch: ON | NON |
| LO SPEED CUT | <ul style="list-style-type: none"> • Ignition switch: ON | NON |
| AT OD MONITOR | <ul style="list-style-type: none"> • Ignition switch: ON | OFF |
| AT OD CANCEL | <ul style="list-style-type: none"> • Ignition switch: ON | OFF |
| CRUISE LAMP | <ul style="list-style-type: none"> • Ignition switch: ON | MAIN switch: Pressed at the 1st time → at the 2nd time ON → OFF |

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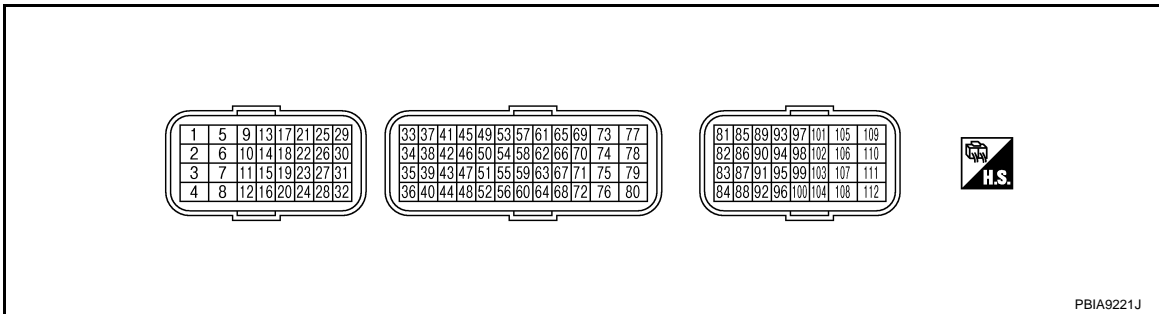
[VQ35DE]

| Monitor Item | Condition | Values/Status |
|--------------|---|----------------------------|
| SET LAMP | <ul style="list-style-type: none"> MAIN switch: ON When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) | ASCD: Operating ON |
| | | ASCD: Not operating OFF |
| ALT DUTY | <ul style="list-style-type: none"> Engine: Idle | 0 - 80% |
| A/F ADJ B1 | <ul style="list-style-type: none"> Engine: Running | -0.330 - 0.330 |
| A/F ADJ B2 | <ul style="list-style-type: none"> Engine: Running | -0.330 - 0.330 |
| BAT CUR SEN | <ul style="list-style-type: none"> Engine speed: Idle Battery: Fully charged*2 Selector lever: P or N (CVT), neutral (M/T) Air conditioner switch: OFF No load | Approx. 2,600 - 3,500mV |
| ALT DUTY SIG | <ul style="list-style-type: none"> Power generation voltage variable control: Operating | ON |
| | <ul style="list-style-type: none"> 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 [CHG-5, "System Diagram"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located in the engine room left side near battery. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

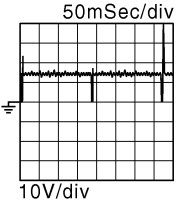
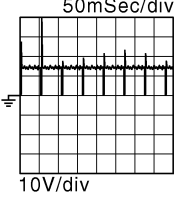
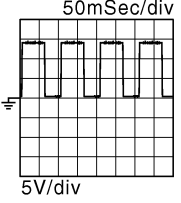
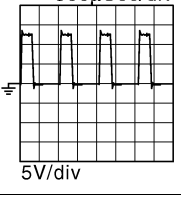
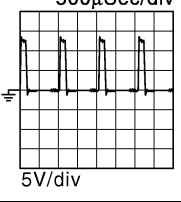
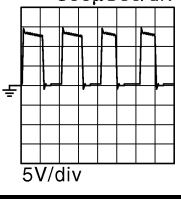
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

ECM

< ECU DIAGNOSIS >

[VQ35DE]

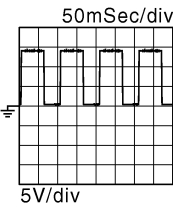
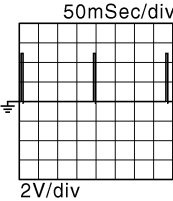
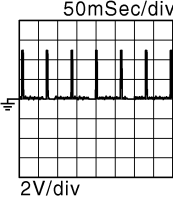
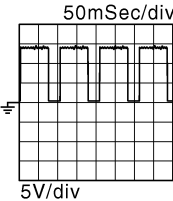
| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------------------------|--------|---|--|--------------|--|---|
| + | - | | Signal name | Input/Output | | |
| 1 3 29 30 31 32 | Ground | P/B L/W LG/R R/Y R/W R/B | Fuel injector No. 6 Fuel injector No. 5 Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1 | Output | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | BATTERY VOLTAGE (11 - 14V)★  50mSec/div 10V/div <small>JMBIA0047GB</small> |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | BATTERY VOLTAGE (11 - 14V)★  50mSec/div 10V/div <small>JMBIA0048GB</small> |
| | | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| | | | | | [Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine) | 2.9 - 8.8V★  50mSec/div 5V/div <small>JMBIA0030GB</small> |
| | | | | | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | 0 - 14V★  500µSec/div 5V/div <small>JMBIA0031GB</small> |
| | | | | | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | 0 - 14V★  500µSec/div 5V/div <small>JMBIA0032GB</small> |
| 6 | Ground | P | Throttle control motor (Close) | Output | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: In the middle of releasing operation | 0 - 14V★  500µSec/div 5V/div <small>JMBIA0033GB</small> |

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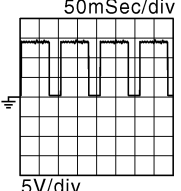
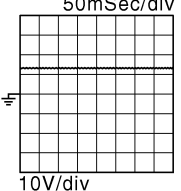
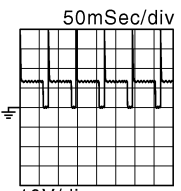
[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|---------------------------------|--------|--|--|--------------|---|--|
| + | - | | Signal name | Input/Output | | |
| 8 | Ground | SB | A/F sensor 1 heater (Bank 2) | Output | [Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine) | 2.9 - 8.8V★  50mSec/div 5V/div JMBIA0030GB |
| 9 10 11 18 19 21 | Ground | L/B G/R Y/R GR/R P/W GR/W | Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1 Ignition signal No. 6 Ignition signal No. 5 Ignition signal No. 4 | Output | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 0 - 0.2V★  50mSec/div 2V/div JMBIA0035GB |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 0.1 - 0.4V★  50mSec/div 2V/div JMBIA0036GB |
| 12 | Ground | B | ECM ground | — | [Engine is running] • Idle speed | 0V |
| 13 | Ground | P/Y | Heated oxygen sensor 2 heater (Bank 1) | Output | [Engine is running] • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10V★  50mSec/div 5V/div JMBIA0037GB |
| | | | | | [Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14V) |
| 14 | Ground | B/R | Fuel pump relay | Output | [Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running] | 0 - 1.5V |
| | | | | | [Ignition switch: ON] • More than 1 second after turning ignition switch ON | BATTERY VOLTAGE (11 - 14V) |
| 15 | Ground | O | Throttle control motor relay | Output | [Ignition switch: ON → OFF] | 0 - 1.0V → BATTERY VOLTAGE (11 - 14V) → 0V |
| | | | | | [Ignition switch: ON] | 0 - 1.0V |
| 16 | Ground | B | ECM ground | — | [Engine is running] • Idle speed | 0V |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|--|--|
| + | - | | Signal name | Input/Output | | |
| 17 | Ground | R | Heated oxygen sensor 2 heater (Bank 2) | Output | [Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10V★  <small>JMBIA0037GB</small> |
| | | | | | [Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14V) |
| 24 | Ground | W/B | ECM relay (Self shut-off) | Output | [Engine is running] <ul style="list-style-type: none"> [Ignition switch: OFF] • A few seconds after turning ignition switch OFF | 0 - 1.5V |
| | | | | | [Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF | BATTERY VOLTAGE (11 - 14V) |
| 25 | Ground | P/L | EVAP canister purge volume control solenoid valve | Output | [Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting | BATTERY VOLTAGE (11 - 14V)★  <small>JMBIA0039GB</small> |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) | BATTERY VOLTAGE (11 - 14V)★  <small>JMBIA0040GB</small> |
| 26 | Ground | GR | VIAS control solenoid valve 2 | Output | [Engine is running] <ul style="list-style-type: none"> • VIAS control solenoid valve 2: Not operation | BATTERY VOLTAGE (11 - 14V) |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • VIAS control solenoid valve 2: Operation | 0 - 1.0V |
| 27 | Ground | V | VIAS control solenoid valve 1 | Output | [Engine is running] <ul style="list-style-type: none"> • VIAS control solenoid valve 1: Not operation | BATTERY VOLTAGE (11 - 14V) |
| | | | | | [Engine is running] <ul style="list-style-type: none"> • VIAS control solenoid valve 1: Operation | 0 - 1.0V |

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[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|---|----------------------------|
| + | — | | Signal name | Input/Output | | |
| 28 | Ground | BR/W | Electronic controlled engine mount control solenoid valve | Output | [Engine is running] • Idle speed | 0 - 1.0V |
| | | | | | [Engine is running] • Engine speed: More than 950 rpm | BATTERY VOLTAGE (11 - 14V) |
| 33 | Ground | W | Heated oxygen sensor 2 (Bank 1) | Input | [Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0V |
| 34 | Ground | W/L | Heated oxygen sensor 2 (Bank 2) | Input | [Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0V |
| 35 | Ground | B | Sensor ground (Heated oxygen sensor 2) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 36 | Ground | B | Sensor ground (Throttle position sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 37 | Ground | W | Throttle position sensor 1 | Input | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | More than 0.36V |
| | | | | | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | Less than 4.75V |
| 38 | Ground | R | Throttle position sensor 2 | Input | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released | Less than 4.75V |
| | | | | | [Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed | More than 0.36V |
| 39 | Ground | R | Refrigerant pressure sensor | Input | [Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates) | 1.0 - 4.0V |

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< ECU DIAGNOSIS >

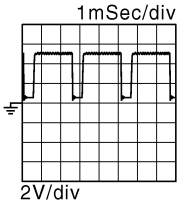
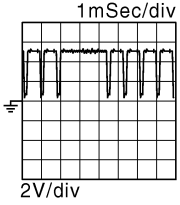
[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) | |
|--------------|--------|------------|---|--------------|---|--|---------|
| + | — | | Signal name | Input/Output | | | |
| 40 | Ground | G | Sensor ground (Refrigerant pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | A EC |
| 41 | Ground | O/B | Power steering pressure sensor | Output | [Engine is running] • Steering wheel: Being turned | 0.5 - 4.5V | C |
| | | | | | [Engine is running] • Steering wheel: Not being turned | 0.4 - 0.8V | D |
| 42 | Ground | G | Battery current sensor | Input | [Engine is running] • Battery: Fully charged*2 • Idle speed | 2.6 - 3.5V | E |
| 44 | Ground | G/B | Sensor ground (Battery current sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | F |
| 45 | Ground | B/W | A/F sensor 1 (Bank 1) | Input | [Ignition switch: ON] | 2.2V | |
| 46 | Ground | Y | Engine coolant temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with engine coolant temperature. | G |
| 47 | Ground | G | Sensor power supply (Throttle position sensor) | — | [Ignition switch: ON] | 5V | H |
| 48 | Ground | B/P | Sensor ground (Power steering pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | I |
| 49 | Ground | L | A/F sensor 1 (Bank 1) | Input | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 1.8V Output voltage varies with air fuel ratio. | J |
| 50 | Ground | L/Y | Intake air temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with intake air temperature. | K |
| 51 | Ground | R/L | Sensor power supply (Battery current sensor) | — | [Ignition switch: ON] | 5V | |
| 52 | Ground | B/G | Sensor ground (Engine coolant temperature sensor/Engine oil temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | L |
| 53 | Ground | V | A/F sensor 1 (Bank 2) | Input | [Ignition switch: ON] | 2.2V | M |
| 54 | Ground | G/R | Engine oil temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with engine oil temperature. | N |
| 55 | Ground | G/Y | Sensor power supply (Power steering pressure sensor) | — | [Ignition switch: ON] | 5V | O |
| 56 | Ground | G/B | Sensor ground (Mass air flow sensor/Intake air temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | P |
| 57 | Ground | LG | A/F sensor 1 (Bank 2) | Input | [Engine is running] • Warm-up condition • Engine speed: 2,000 rpm | 1.8V Output voltage varies with air fuel ratio. | |

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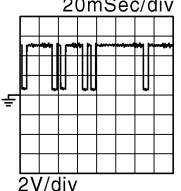
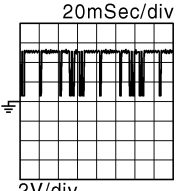
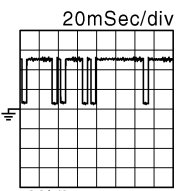
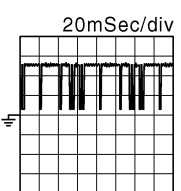
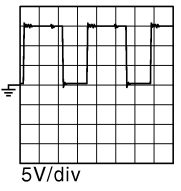
[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|--|--------------|--|---|
| + | — | | Signal name | Input/Output | | |
| 58 | Ground | O | Mass air flow sensor | Input | [Engine is running] • Warm-up condition • Idle speed | 0.9 - 1.2V |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,500 rpm | 1.6 - 1.9V |
| 59 | Ground | G/W | Sensor power supply [Camshaft position sensor (PHASE) (Bank 1)] | — | [Ignition switch: ON] | 5V |
| 60 | Ground | Y/B | Sensor ground [Crankshaft position sensor (POS)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 61 | Ground | GR | Knock sensor (Bank 1) | Input | [Engine is running] • Idle speed | 2.5V*1 |
| 62 | Ground | W | Knock sensor (Bank 2) | Input | [Engine is running] • Idle speed | 2.5V*1 |
| 63 | Ground | R/W | Sensor power supply [Camshaft position sensor (PHASE) (Bank 2)] | — | [Ignition switch: ON] | 5V |
| 64 | Ground | B/R | Sensor ground [Camshaft position sensor (PHASE) (Bank 1)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 65 | Ground | W | Crankshaft position sensor (POS) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 4.0 - 5.0★  |
| | | | | | [Engine is running] • Engine speed: 2,000 rpm | 4.0 - 5.0★  |
| 67 | Ground | GR/B | Sensor ground (Knock sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 68 | Ground | Y/G | Sensor ground [Camshaft position sensor (PHASE) (Bank 2)] | — | [Engine is running] • Warm-up condition • Idle speed | 0V |

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[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|--|--------------|--|---|
| + | - | | Signal name | Input/Output | | |
| 69 | Ground | BR/W | Camshaft position sensor (PHASE) (Bank 2) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 3.0 - 5.0★  |
| | | | | | [Engine is running] • Engine speed is 2,000 rpm | 3.0 - 5.0★  |
| 70 | Ground | W/R | Camshaft position sensor (PHASE) (Bank 1) | Input | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 3.0 - 5.0★  |
| | | | | | [Engine is running] • Engine speed is 2,000 rpm | 3.0 - 5.0★  |
| 72 | Ground | BR/W | Sensor power supply (Refrigerant pressure sensor) | — | [Ignition switch: ON] | 5V |
| 75 | Ground | Y | Intake valve timing control solenoid valve (Bank 2) | Output | [Engine is running] • Warm-up condition • Idle speed | BATTERY VOLTAGE (11 - 14V) |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000rpm | 7 - 12V★  |
| 76 | Ground | R/G | Sensor power supply [Crankshaft position sensor (POS)] | — | [Ignition switch: ON] | 5V |
| 77 | Ground | W/L | Power supply for ECM (Back-up) | Input | [Ignition switch: OFF] | BATTERY VOLTAGE (11 - 14V) |

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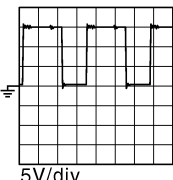
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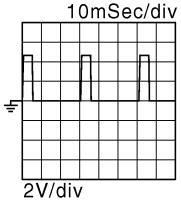
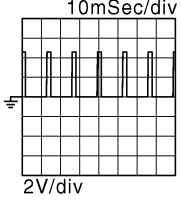
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| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
|--------------|--------|------------|---|--------------|---|--|
| + | - | | Signal name | Input/Output | | |
| 78 | Ground | R/L | Intake valve timing control solenoid valve (Bank 1) | Output | [Engine is running] • Warm-up condition • Idle speed | BATTERY VOLTAGE (11 - 14V) |
| | | | | | [Engine is running] • Warm-up condition • Engine speed: 2,000rpm | 7 - 12V★  5V/div JMBIA0038GB |
| 81 | Ground | W | Accelerator pedal position sensor 1 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.5 - 1.0V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 4.2 - 4.8V |
| 82 | Ground | G/B | Accelerator pedal position sensor 2 | Input | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released | 0.25 - 0.50V |
| | | | | | [Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed | 2.0 - 2.5V |
| 83 | Ground | R/W | Sensor power supply (Accelerator pedal position sensor 1) | — | [Ignition switch: ON] | 5V |
| 84 | Ground | B | Sensor ground (Accelerator pedal position sensor 1) | — | [Engine is running] • Warm-up condition • Idle speed | 0V |
| 85 | Ground | G/Y | ASCDC steering switch | Input | [Ignition switch: ON] • ASCDC steering switch: OFF | 4V |
| | | | | | [Ignition switch: ON] • MAIN switch: Pressed | 0V |
| | | | | | [Ignition switch: ON] • CANCEL switch: Pressed | 1V |
| | | | | | [Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed | 3V |
| | | | | | [Ignition switch: ON] • SET/COAST switch: Pressed | 2V |
| 86 | Ground | LG | EVAP control system pressure sensor | Input | [Ignition switch: ON] | 1.8 - 4.8V |
| 87 | Ground | P/L | Sensor power supply (Accelerator pedal position sensor 2) | — | [Ignition switch: ON] | 5V |
| 88 | Ground | O | Data link connector | Input/Output | [Ignition switch: ON] • CONSULT-III or GST: Disconnected | 5V - Battery voltage (11 - 14V) |

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[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) | |
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| + | — | | Signal name | Input/Output | | | |
| 91 | Ground | BR/L | Sensor power supply (EVAP control system pressure sensor) | — | [Ignition switch: ON] | 5V | A EC |
| 92 | Ground | R | Sensor ground (ASC/D steering switch) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | C |
| 93 | Ground | L/Y | Ignition switch | Input | [Ignition switch: OFF] | 0V | D |
| | | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | |
| 94 | Ground | V/W | Engine speed output signal | Output | [Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle | 1V★  2V/div JMBIA0076GB | E F |
| | | | | | [Engine is running] • Engine speed: 2,000 rpm | 1V★  2V/div JMBIA0077GB | G H I |
| 95 | Ground | R/Y | Fuel tank temperature sensor | Input | [Engine is running] | 0 - 4.8V Output voltage varies with fuel tank temperature. | J |
| 96 | Ground | V | Sensor ground (EVAP control system pressure sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | K |
| 97 | Ground | P | CAN communication line | Input/Output | — | — | L |
| 98 | Ground | L | CAN communication line | Input/Output | — | — | L |
| 100 | Ground | G | Sensor ground (Accelerator pedal position sensor 2) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | M |
| 102 | Ground | R/B | PNP switch | Input | [Ignition switch: ON] • Selector lever: P or N (CVT), neutral (M/T) | BATTERY VOLTAGE (11 - 14V) | N |
| | | | | | [Ignition switch: ON] • Selector lever: Except above | 0V | O |
| 104 | Ground | B/W | Sensor ground (Fuel tank temperature sensor) | — | [Engine is running] • Warm-up condition • Idle speed | 0V | P |
| 105 | Ground | R/G | Power supply for ECM | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) | |

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[VQ35DE]

| Terminal No. | | Wire color | Description | | Condition | Value (Approx.) |
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| + | — | | Signal name | Input/Output | | |
| 106 | Ground | SB | Stop lamp switch | Input | [Ignition switch: OFF] • Brake pedal: Fully released | 0V |
| | | | | | [Ignition switch: OFF] • Brake pedal: Slightly depressed | BATTERY VOLTAGE (11 - 14V) |
| 107 108 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | 0V |
| 109 | Ground | LG | EVAP canister vent control valve | Output | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14V) |
| 110 | Ground | G/B | ASCD brake switch | Input | [Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) | 0V |
| | | | | | [Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) | BATTERY VOLTAGE (11 - 14V) |
| 111 112 | Ground | B B | ECM ground | — | [Engine is running] • Idle speed | 0V |

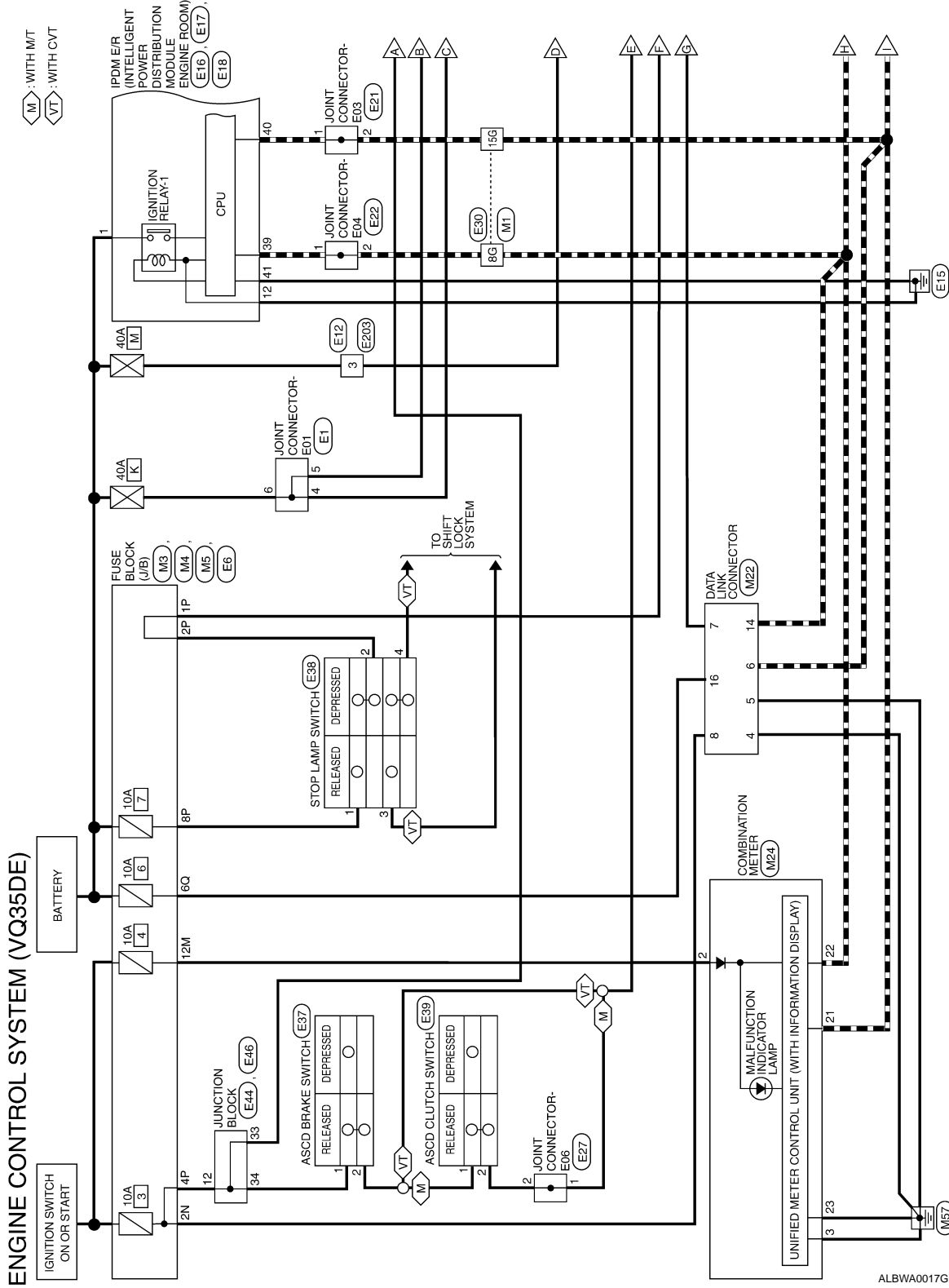
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

*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 [CHG-5. "System Diagram"](#).

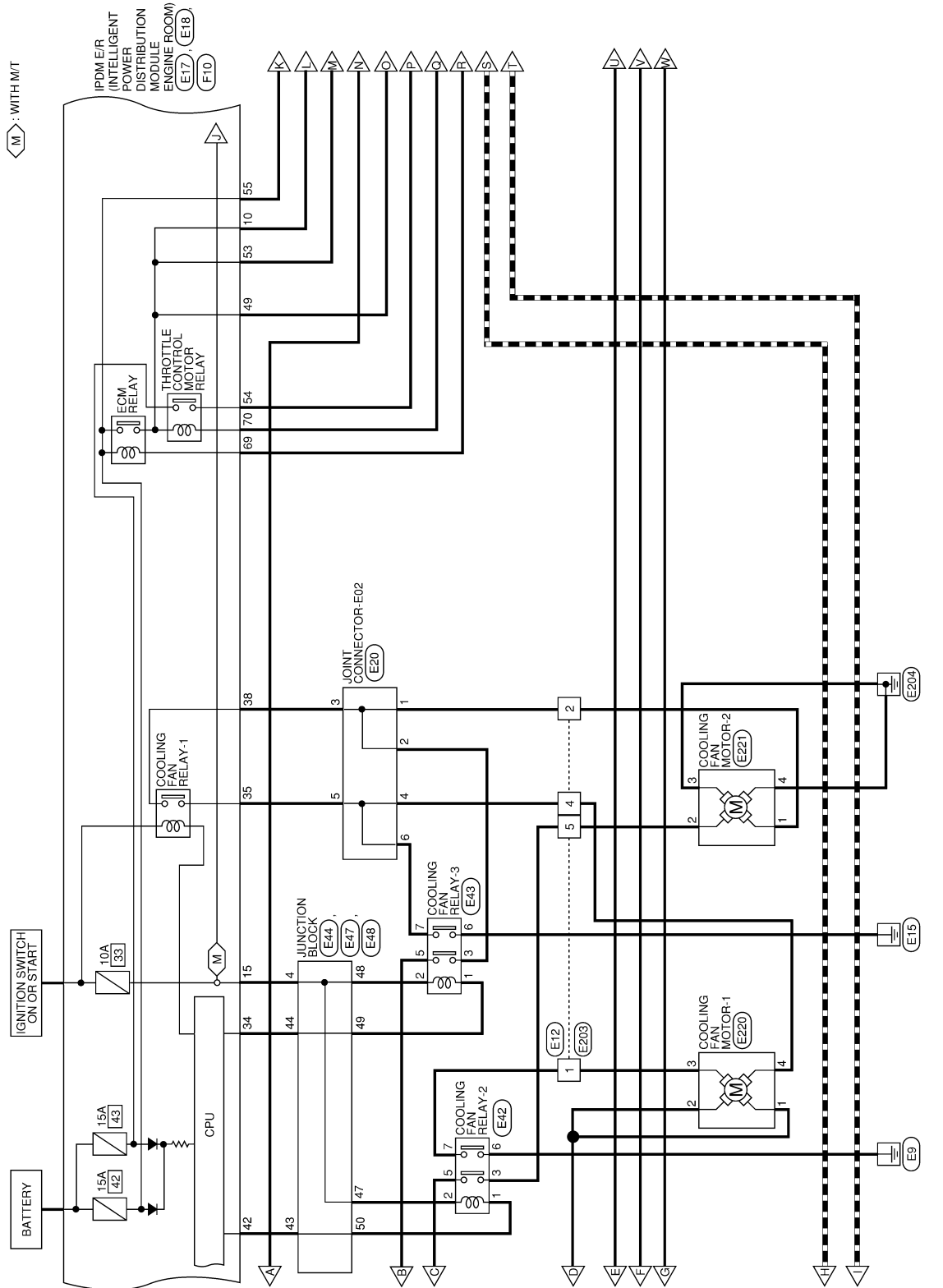
Wiring Diagram—ENGINE CONTROL SYSTEM—

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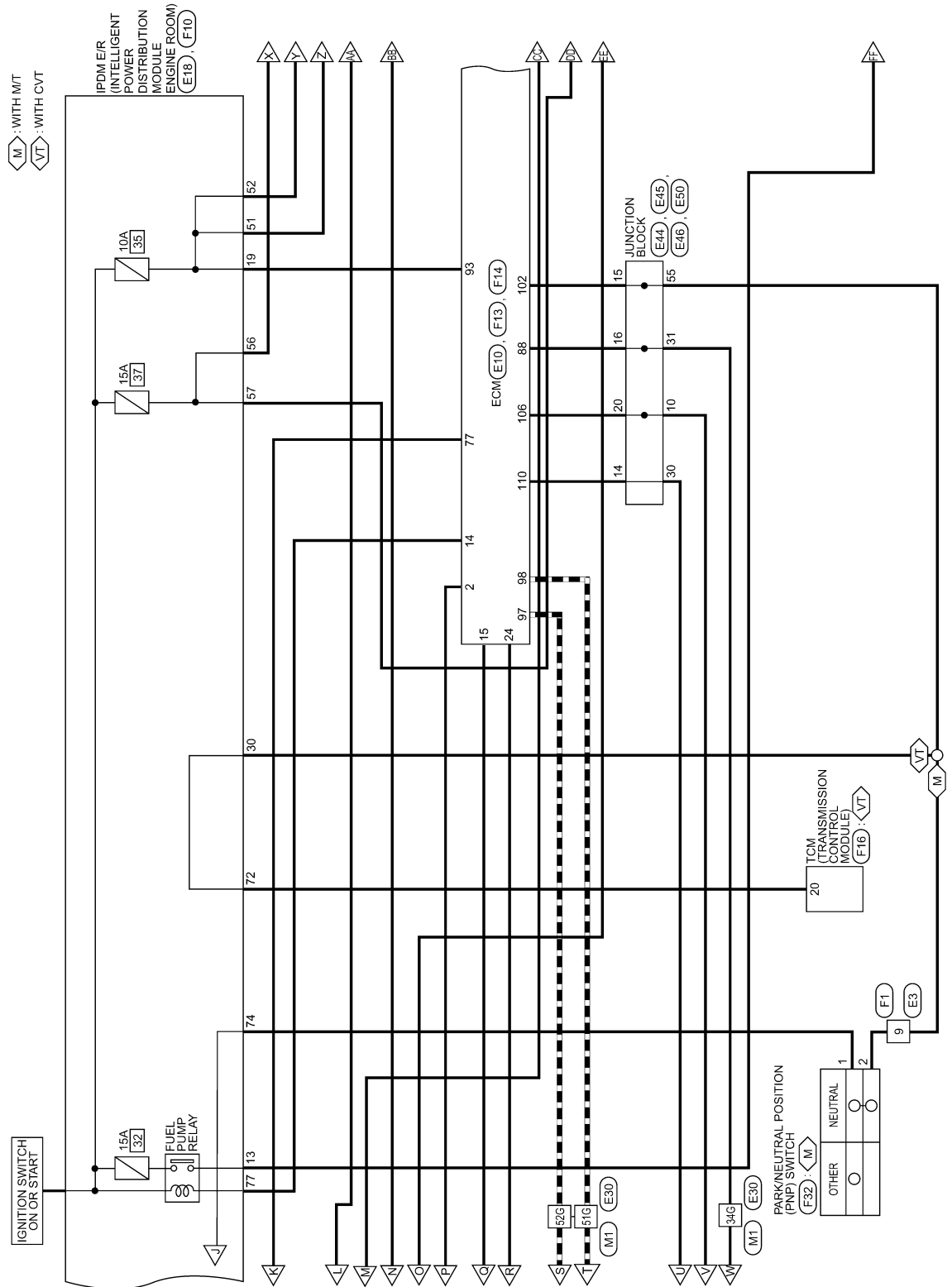


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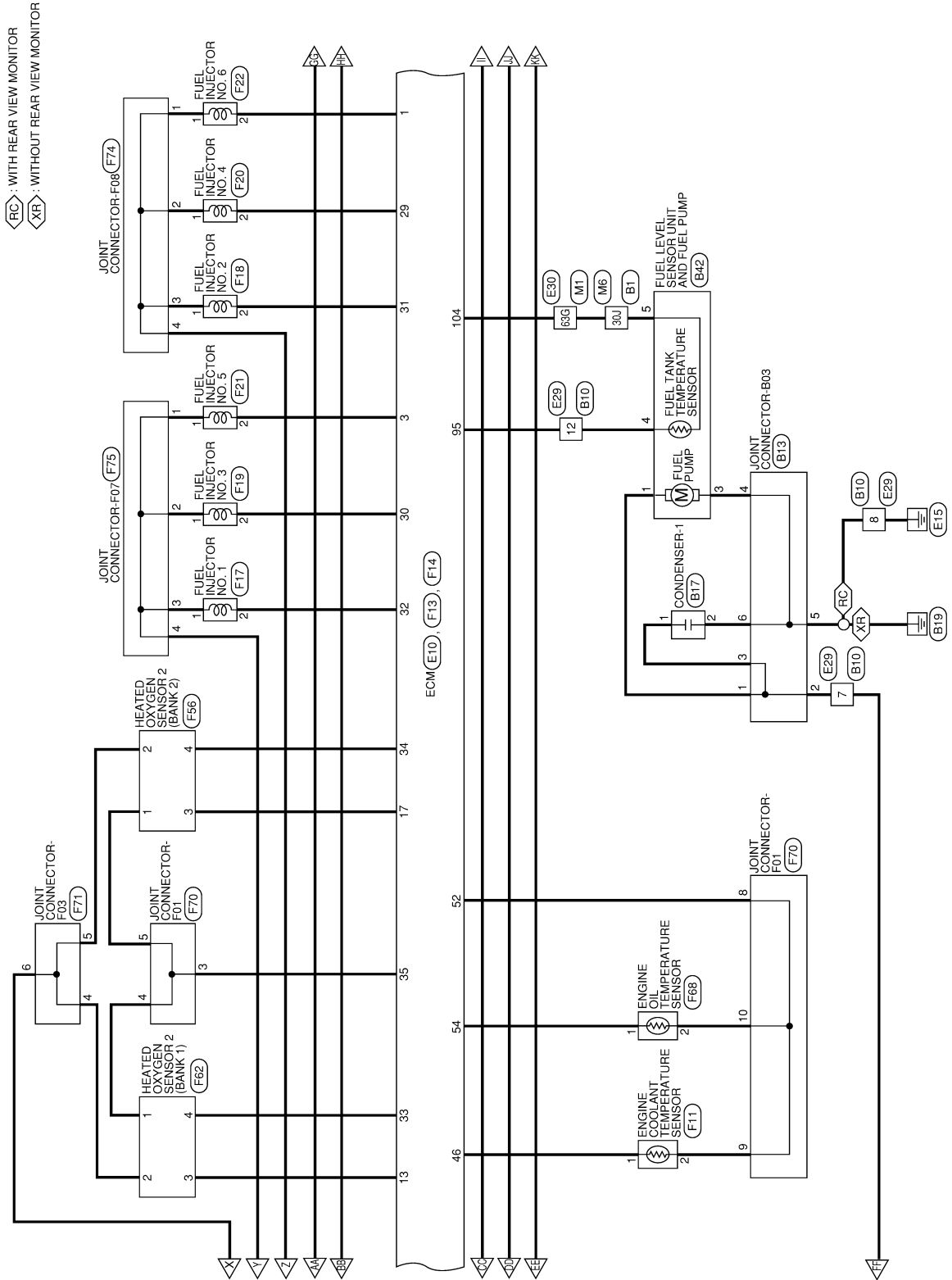


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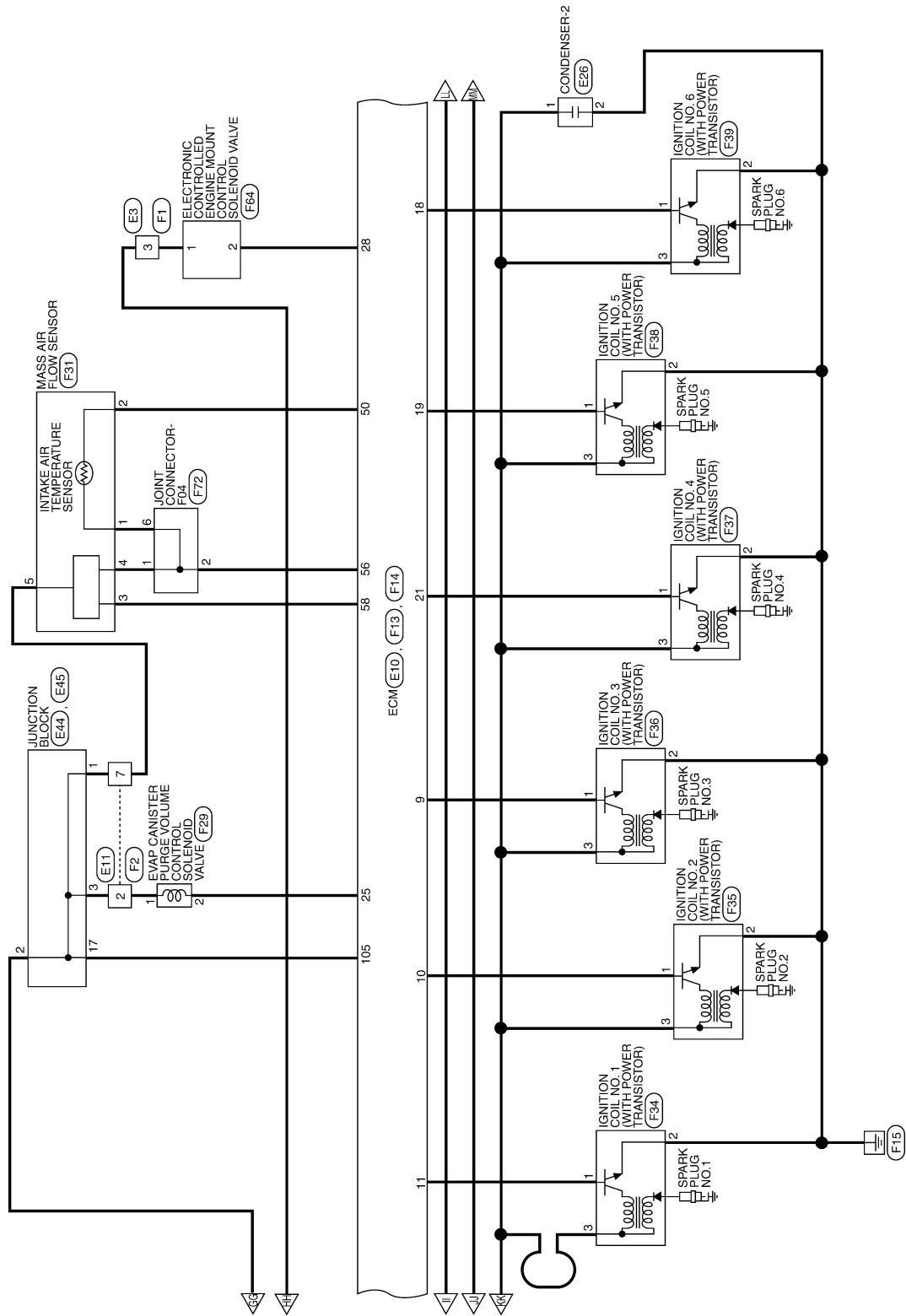


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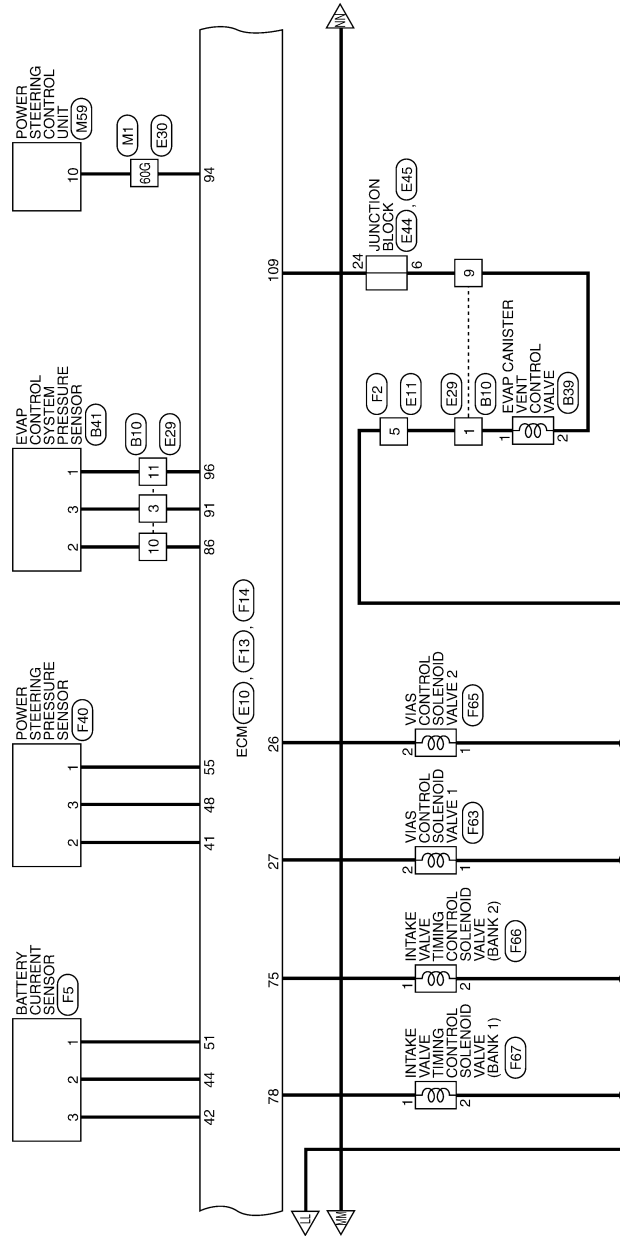


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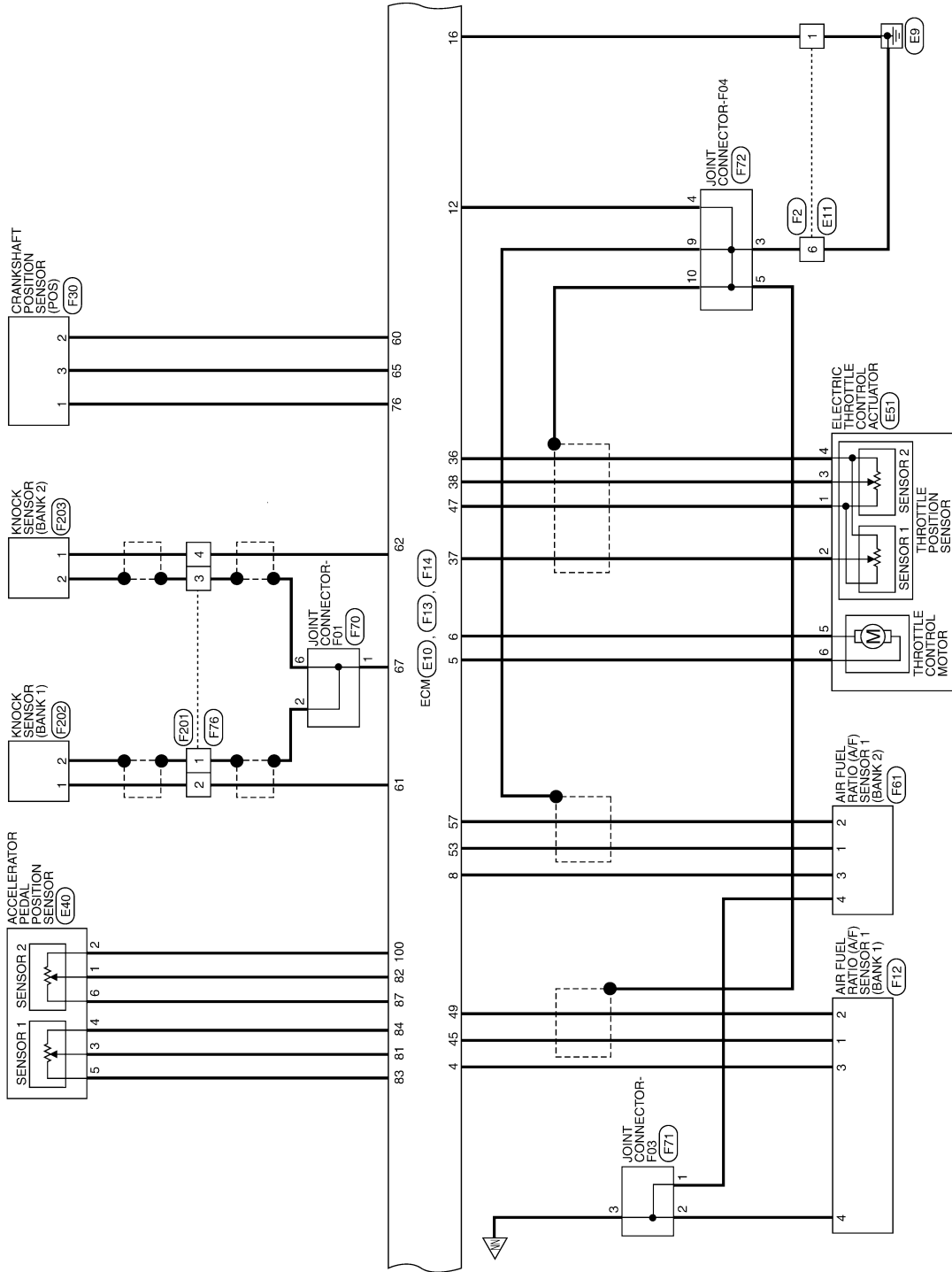


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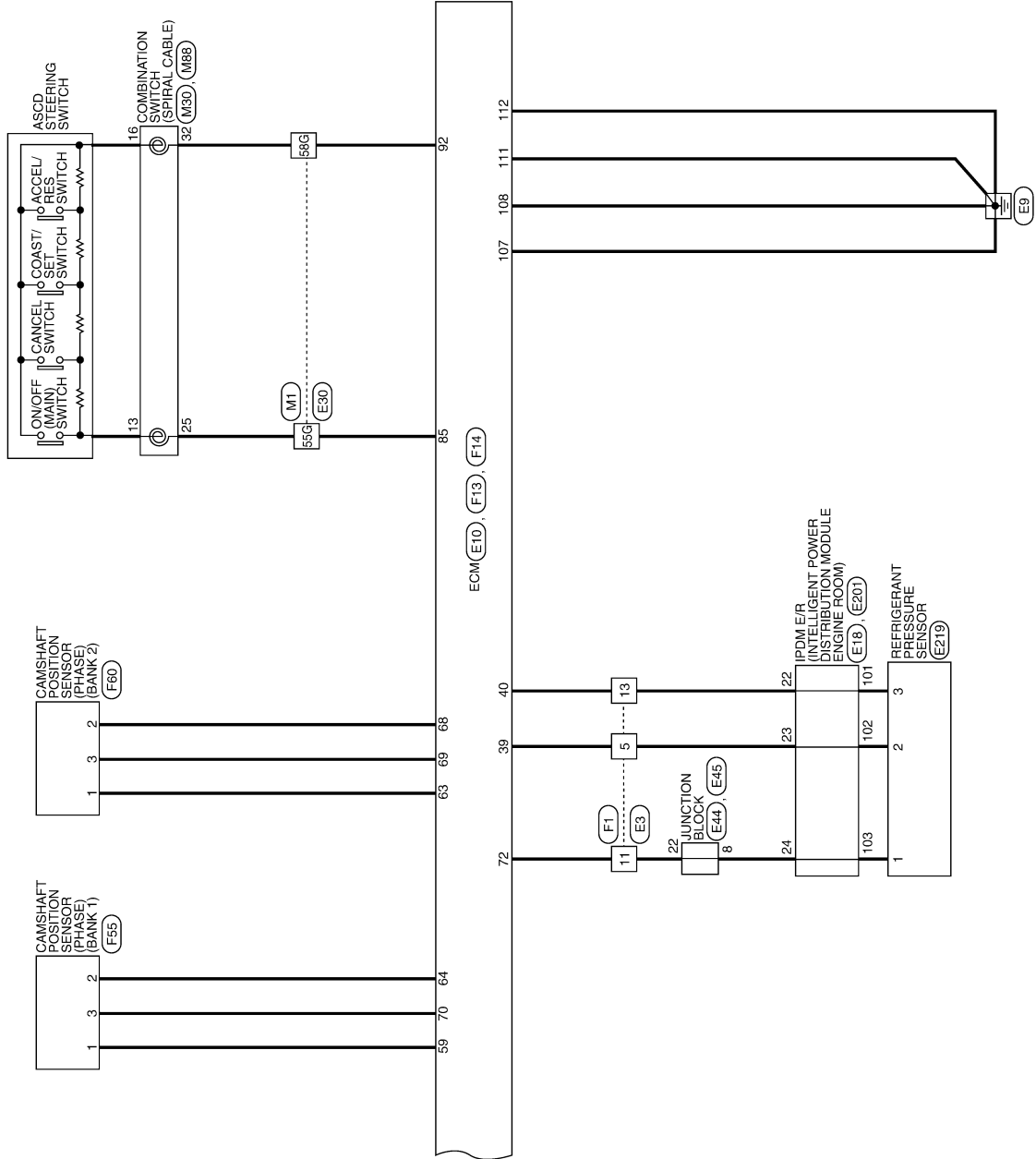


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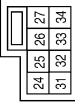
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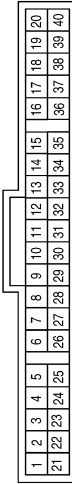
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| Connector No. | M30 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



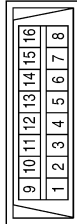
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 25 | G/Y | ASCD_SW |
| 32 | R | ASCD_GND |

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| Connector No. | M24 |
| Connector Name | COMBINATION METER |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2 | O | IGN |
| 3 | B | GND |
| 21 | L | CAN-H |
| 22 | P | CAN-L |
| 23 | B | GND |

| | |
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| Connector No. | M22 |
| Connector Name | DATA LINK CONNECTOR |
| Connector Color | WHITE |



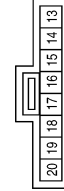
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | B | GND |
| 5 | B | GND |
| 6 | L | CAN-H |
| 7 | O | KLINE |
| 8 | G | IGN_SW |
| 14 | P | CAN-L |
| 16 | Y/R | BATT |

| | |
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| Connector No. | E1 |
| Connector Name | JOINT CONNECTOR-E01 |
| Connector Color | WHITE |



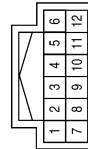
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 4 | W/L | - |
| 5 | W/L | - |
| 6 | W/L | - |

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| Connector No. | M88 |
| Connector Name | COMBINATION SWITCH (SPIRAL CABLE) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 13 | Y | ASCD_SW |
| 16 | B | ASCD_GND |

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|-----------------|-----------------------------|
| Connector No. | M59 |
| Connector Name | POWER STEERING CONTROL UNIT |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 10 | V/W | ENG_TACHO |

| | |
|-----------------|------------------|
| Connector No. | E6 |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1P | SB | - |
| 2P | R/G | - |
| 4P | G/R | - |
| 8P | Y/R | - |

| | |
|-----------------|--------------|
| Connector No. | E3 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 3 | G/R | - |
| 5 | B/R | - |
| 9 | R/B | - |
| 11 | BR/W | - |
| 13 | W/R | - |

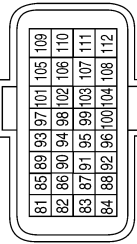
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| Connector No. | E11 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 92 | R | GND-ASCDSW |
| 93 | L/Y | IGNSW |
| 94 | V/W | TACHO(CABIN) |
| 95 | R/Y | TF |
| 96 | V | GND-FTRES |
| 97 | P | CAN-L |
| 98 | L | CAN-H |
| 100 | G | GND-APS2 |
| 102 | R/B | NEUT-H |
| 104 | B/W | GND-TF |
| 105 | R/G | VBR |
| 106 | SB | BRAKE |
| 107 | B | GND |
| 108 | B | GND |
| 109 | LG | CDCV |
| 110 | G/B | BNC5W |
| 111 | B | GND |
| 112 | B | GND |

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| Connector No. | E10 |
| Connector Name | ECM |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------|
| 81 | W | APS1 |
| 82 | G/B | APS2 |
| 83 | R/W | AVCC1-APS1 |
| 84 | B | GND-APS1 |
| 85 | G/Y | ASCDSW |
| 86 | LG | FTPRES |
| 87 | P/L | AVCC2-APS2 |
| 88 | O | KLINE |
| 91 | BR/L | AVCC2-FTPRES |

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| Connector No. | E12 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



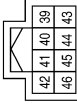
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

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| Connector No. | E16 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | BLACK |



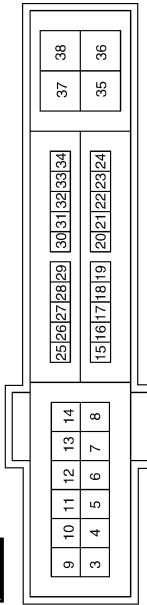
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | F/L_MAIN |

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| Connector No. | E17 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------------|
| 39 | P | CAN-L |
| 40 | L | CAN-H |
| 41 | B | S-GND |
| 42 | SB | MOTOR_FAN_RLY_MID |

| | |
|-----------------|--|
| Connector No. | E18 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|------------------|
| 10 | R/B | ECM_VB |
| 12 | B | P-GND |
| 13 | W | FUEL_PUMP |
| 15 | G/W | START_IG-E/R |
| 19 | L/Y | BCM_IGNSW |
| 22 | W/R | PD_SENS_GND-E/R |
| 23 | B/R | PD_SENS_SIG-E/R |
| 24 | BR/W | PD_SENSWR-E/R |
| 30 | R/B | CLUTCH_I/L_SW |
| 34 | O/L | MOTOR_FAN_RLY_HI |
| 35 | L/B | MOTOR_FAN_LO |
| 38 | R/W | F/L_MOTOR_FAN |

| | |
|-----------------|---------------------|
| Connector No. | E20 |
| Connector Name | JOINT CONNECTOR-E02 |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | - |
| 2 | R/W | - |
| 3 | R/W | - |
| 4 | L/B | - |
| 5 | L/B | - |
| 6 | L/B | - |

| | |
|-----------------|---------------------|
| Connector No. | E21 |
| Connector Name | JOINT CONNECTOR-E03 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L | - |
| 2 | L | - |

| | |
|-----------------|---------------------|
| Connector No. | E22 |
| Connector Name | JOINT CONNECTOR-E04 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | - |
| 2 | P | - |

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| Connector No. | E27 |
| Connector Name | JOINT CONNECTOR-E06 |
| Connector Color | WHITE |



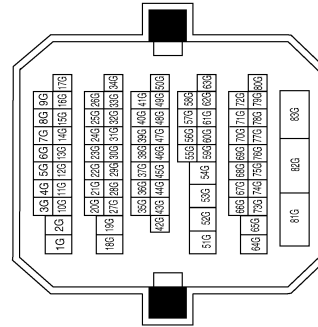
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |

| | |
|-----------------|--------------|
| Connector No. | E29 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/B | - |
| 3 | BR/L | - |
| 7 | W | - |
| 8 | B/Y | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

| | |
|-----------------|--------------|
| Connector No. | E30 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 8G | P | - |
| 15G | L | - |
| 34G | O | - |
| 51G | L | - |
| 52G | P | - |
| 55G | G/Y | - |
| 58G | R | - |
| 60G | V/W | - |
| 63G | B/W | - |

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|-----------------|-------------------|
| Connector No. | E37 |
| Connector Name | ASCD BRAKE SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | - |
| 2 | G/B | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH CVT) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |
| 3 | G/R | - |
| 4 | R/W | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E38 |
| Connector Name | STOP LAMP SWITCH (WITH M/T) |
| Connector Color | BLACK |



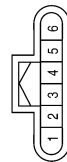
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | - |
| 2 | R/G | - |

| | |
|-----------------|--------------------|
| Connector No. | E39 |
| Connector Name | ASCD CLUTCH SWITCH |
| Connector Color | BROWN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | BR | - |
| 2 | G/B | - |

| | |
|-----------------|-----------------------------------|
| Connector No. | E40 |
| Connector Name | ACCELERATOR PEDAL POSITION SENSOR |
| Connector Color | BLACK |



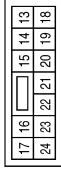
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | APS2 |
| 2 | G | GND-A2 |
| 3 | W | APS1 |
| 4 | B | GND-A1 |
| 5 | R/W | AVCC1 |
| 6 | P/L | AVCC2 |

| | |
|-----------------|---------------------|
| Connector No. | E42 |
| Connector Name | COOLING FAN RELAY-2 |
| Connector Color | BROWN |



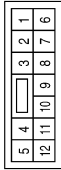
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | G/W | BAT |
| 3 | L | - |
| 5 | W/L | BAT |
| 6 | B | GND |
| 7 | R | - |

| | |
|-----------------|----------------|
| Connector No. | E45 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 14 | G/B | - |
| 15 | R/B | - |
| 16 | O | - |
| 17 | R/G | - |
| 20 | SB | - |
| 22 | BR/W | - |
| 24 | LG | - |

| | |
|-----------------|----------------|
| Connector No. | E44 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | BROWN |



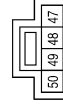
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | - |
| 2 | R/B | - |
| 3 | R/W | - |
| 4 | G/W | - |
| 6 | LG/W | - |
| 8 | BR/W | - |
| 10 | SB | - |
| 12 | G/R | - |

| | |
|-----------------|---------------------|
| Connector No. | E43 |
| Connector Name | COOLING FAN RELAY-3 |
| Connector Color | BROWN |



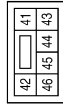
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O/L | - |
| 2 | Y | BAT |
| 3 | R/W | - |
| 5 | W/L | BAT |
| 6 | B | GND |
| 7 | L/B | - |

| | |
|-----------------|----------------|
| Connector No. | E48 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



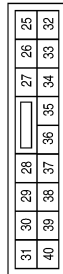
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 47 | G/W | - |
| 48 | Y | - |
| 49 | O/L | - |
| 50 | SB | - |

| | |
|-----------------|----------------|
| Connector No. | E47 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 43 | SB | - |
| 44 | O/L | - |

| | |
|-----------------|----------------|
| Connector No. | E46 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 30 | G/B | - |
| 31 | O | - |
| 33 | G/R | - |
| 34 | G/R | - |

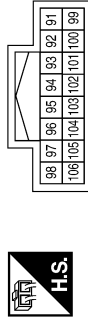
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|-----------------|----------------|
| Connector No. | E50 |
| Connector Name | JUNCTION BLOCK |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 55 | R/B | - |

| | |
|-----------------|--|
| Connector No. | E201 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 101 | O/L | PD_SENS_GND |
| 102 | R/B | PD_SENS_SIG |
| 103 | P | PD_SEND_PWR |

| | |
|-----------------|--------------|
| Connector No. | E203 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 2 | R/W | - |
| 3 | R/Y | - |
| 4 | L/B | - |
| 5 | L | - |

| | |
|-----------------|-----------------------------|
| Connector No. | E219 |
| Connector Name | REFRIGERANT PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P | AVCC2 |
| 2 | R | SIGNAL |
| 3 | W | GND |

| | |
|-----------------|---------------------|
| Connector No. | E220 |
| Connector Name | COOLING FAN MOTOR-1 |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/Y | LO + |
| 2 | R/Y | HI + |
| 3 | R | HI - |
| 4 | L/B | LO - |

| | |
|-----------------|---------------------|
| Connector No. | E221 |
| Connector Name | COOLING FAN MOTOR-2 |
| Connector Color | GRAY |



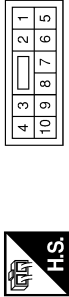
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | LO + |
| 2 | L | HI + |
| 3 | B | HI - |
| 4 | B | LO - |

| | |
|-----------------|------------------------|
| Connector No. | F5 |
| Connector Name | BATTERY CURRENT SENSOR |
| Connector Color | BLACK |



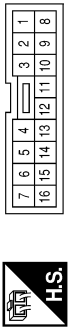
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/L | AVCC1 |
| 2 | G/B | GND |
| 3 | G | SIGNAL |

| | |
|-----------------|--------------|
| Connector No. | F2 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | - |
| 2 | R/W | - |
| 5 | R/B | - |
| 6 | B | - |
| 7 | R/G | - |

| | |
|-----------------|--------------|
| Connector No. | F1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 3 | G/R | - |
| 5 | R | - |
| 9 | R/B | - |
| 11 | BR/W | - |
| 13 | G | - |

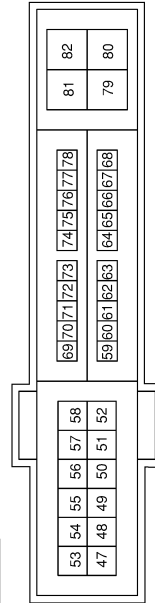
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| Connector No. | F11 |
| Connector Name | ENGINE COOLANT TEMPERATURE SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | TW |
| 2 | B/G | GND |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|--------------|
| 49 | R/B | IGN_COIL |
| 51 | LG | INJECTOR_#1 |
| 52 | Y/G | INJECTOR_#2 |
| 53 | R/B | VIAS |
| 54 | G/W | ETC |
| 55 | W/L | ECM_BAT |
| 56 | R/Y | O2_SENS_#1 |
| 57 | O | O2_SENS_#2 |
| 69 | W/B | SSOFF |
| 70 | O | MOTRLY |
| 72 | R/B | NPSW |
| 74 | Y | START_IG-EGI |
| 77 | B/R | FPR |

| | |
|-----------------|--|
| Connector No. | F10 |
| Connector Name | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE |



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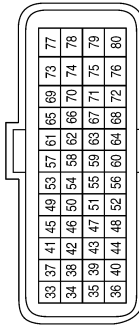
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| Connector No. | F12 |
| Connector Name | AIR FUEL RATIO (A/F) SENSOR 1 (BANK 1) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/W | AF(+) |
| 2 | L | AF(-) |
| 3 | BR/Y | HEATER(-) |
| 4 | O | HEATER(+) |

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|-----------------|-------|
| Connector No. | F13 |
| Connector Name | ECM |
| Connector Color | BROWN |

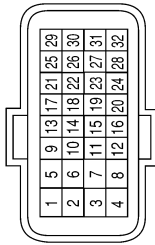


| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|------------------|
| 33 | W | O2SR1 |
| 34 | W/L | O2SR2 |
| 35 | B | GND-02SR1, 02SR2 |
| 36 | B | GND-TPS-B1 |
| 37 | W | TPS1-B1 |
| 38 | R | TPS2-B1 |
| 39 | R | PDPRES |
| 40 | G | GND-PDPRES |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|------------------------|
| 41 | O/B | PSPRES |
| 42 | G | CURSEN |
| 44 | G/B | GND-CURSEN, INTPREST |
| 45 | B/W | AF+1 |
| 46 | Y | TW |
| 47 | G | AVCC1-TPS-B1 |
| 48 | B/P | GND-PSPRES |
| 49 | L | AF-1 |
| 50 | L/Y | TA1 |
| 51 | R/L | AVCC1-CURSEN, INTPREST |
| 52 | B/G | GND-TW, T01 |
| 53 | V | AF+2 |
| 54 | G/R | T01 |
| 55 | G/Y | AVCC1-PSPRES |
| 56 | G/B | QA1, GND-TA1 |
| 57 | LG | AF-2 |
| 58 | O | QA1+ |

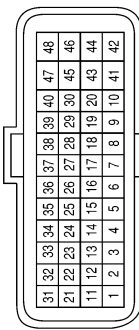
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|--------------------------|
| 59 | GW | AVCC1-PHASE 1 |
| 60 | Y/B | GND-POS |
| 61 | GR | KNK1 |
| 62 | W | KNK2 |
| 63 | R/W | AVCC1-PHASE 2, E-PHASE#2 |
| 64 | B/R | AVCC1-PHASE 1, E-PHASE#1 |
| 65 | W | POS |
| 67 | GR/B | GND-KNK 1, KNK 2 |
| 68 | Y/G | GND-PHASE 2, E-PHASE#2 |
| 69 | BR/W | PHASE 2 |
| 70 | W/R | PHASE 1 |
| 72 | BR/W | AVCC2-PDPRES |
| 75 | Y | CVTC#2 |
| 76 | R/G | AVCC2-POS |
| 77 | W/L | BATT |
| 78 | R/L | CVTC#1 |

| | |
|-----------------|------|
| Connector No. | F14 |
| Connector Name | ECM |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P/B | INJ #6 |
| 2 | G/W | VMOT-B1 |
| 3 | L/W | INJ #5 |
| 4 | BR/Y | AFH1 |

| | |
|-----------------|-----------------------------------|
| Connector No. | F16 |
| Connector Name | TCM (TRANSMISSION CONTROL MODULE) |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 20 | R/B | ST_RLY |

| | |
|-----------------|---------------------|
| Connector No. | F19 |
| Connector Name | FUEL INJECTOR NO. 3 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 5 | L | MOTOR1-B1 |
| 6 | P | MOTOR2-B1 |
| 8 | SB | AFH2 |
| 9 | L/B | IGN #3 |
| 10 | G/R | IGN #2 |
| 11 | Y/R | IGN #1 |
| 12 | B | GND |
| 13 | P/Y | O2HR1 |
| 14 | B/R | FPR |
| 15 | O | MOTRLY-B1 |
| 16 | B | GND |
| 17 | R | O2HR2 |

| | |
|-----------------|---------------------|
| Connector No. | F17 |
| Connector Name | FUEL INJECTOR NO. 1 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/B | GND |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | R/Y | GND |

| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 18 | GR/R | IGN #6 |
| 19 | P/W | IGN #5 |
| 21 | GR/W | IGN #4 |
| 24 | W/B | SSOFF |
| 25 | P/L | EVAP |
| 26 | GR | VIAS2 |
| 27 | V | VIAS1 |
| 28 | BR/W | EMMNV |
| 29 | LG/R | INJ #4 |
| 30 | R/Y | INJ #3 |
| 31 | R/W | INJ #2 |
| 32 | R/B | INJ #1 |

| | |
|-----------------|---------------------|
| Connector No. | F18 |
| Connector Name | FUEL INJECTOR NO. 2 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | R/W | C/U |

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|-----------------|---------------------|
| Connector No. | F22 |
| Connector Name | FUEL INJECTOR NO. 6 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | P/B | GND |

| | |
|-----------------|---------------------|
| Connector No. | F21 |
| Connector Name | FUEL INJECTOR NO. 5 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | IGN |
| 2 | L/W | GND |

| | |
|-----------------|---------------------|
| Connector No. | F20 |
| Connector Name | FUEL INJECTOR NO. 4 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | IGN |
| 2 | LG/R | GND |

| | |
|-----------------|----------------------------------|
| Connector No. | F30 |
| Connector Name | CRANKSHAFT POSITION SENSOR (POS) |
| Connector Color | BLACK |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/G | AVCC2 |
| 2 | Y/B | GND |
| 3 | W | POS |

| | |
|-----------------|---|
| Connector No. | F29 |
| Connector Name | EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | P/L | GND |

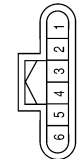
| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | TA- |
| 2 | L/Y | TA+ |
| 3 | O | QA+ |
| 4 | G/B | GND |
| 5 | R/G | VB |

| | |
|-----------------|-------------|
| Connector No. | F26 |
| Connector Name | CONDENSER-2 |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | B | GND |

| | |
|-----------------|----------------------|
| Connector No. | F31 |
| Connector Name | MASS AIR FLOW SENSOR |
| Connector Color | BLACK |



| | |
|-----------------|---|
| Connector No. | F35 |
| Connector Name | IGNITION COIL NO. 2 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F34 |
| Connector Name | IGNITION COIL NO. 1 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/R | SIGNAL |
| 2 | B | GND |
| 3 | R/G | VBR |

| | |
|-----------------|------------------------------------|
| Connector No. | F32 |
| Connector Name | PARK/NEUTRAL POSITION (PNP) SWITCH |
| Connector Color | WHITE |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | - |
| 2 | R/B | - |

| | |
|-----------------|---|
| Connector No. | F38 |
| Connector Name | IGNITION COIL NO. 5 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | P/W | SIGNAL |
| 2 | B | GND |
| 3 | R/G | VBR |

| | |
|-----------------|---|
| Connector No. | F37 |
| Connector Name | IGNITION COIL NO. 4 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | GR/W | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F36 |
| Connector Name | IGNITION COIL NO. 3 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



| Terminal No. | Color of wire | Signal Name |
|--------------|---------------|-------------|
| 1 | L/B | SIGNAL |
| 2 | B | GND |
| 3 | R/G | VBR |

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|-----------------|---|
| Connector No. | F55 |
| Connector Name | CAMSHAFT POSITION SENSOR (PHASE) (BANK 1) |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/W | AVCC1 |
| 2 | B/R | GND |
| 3 | W/R | PHASE |

| | |
|-----------------|--------------------------------|
| Connector No. | F40 |
| Connector Name | POWER STEERING PRESSURE SENSOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/Y | AVCC1 |
| 2 | O/B | OUTPUT |
| 3 | B/P | GND |

| | |
|-----------------|---|
| Connector No. | F39 |
| Connector Name | IGNITION COIL NO. 6 (WITH POWER TRANSISTOR) |
| Connector Color | GRAY |



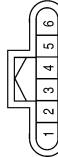
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | GR/W | SIGNAL |
| 2 | B | GND |
| 3 | R/W | VBR |

| | |
|-----------------|---|
| Connector No. | F60 |
| Connector Name | CAMSHAFT POSITION SENSOR (PHASE) (BANK 2) |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | AVCC1 |
| 2 | Y/G | GND |
| 3 | BR/W | PHASE |

| | |
|-----------------|------------------------------------|
| Connector No. | F57 |
| Connector Name | ELECTRIC THROTTLE CONTROL ACTUATOR |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G | INPUT |
| 2 | W | OUTPUT1 |
| 3 | R | OUTPUT2 |
| 4 | B | GND |
| 5 | P | MOTOR2 |
| 6 | L | MOTOR1 |

| | |
|-----------------|---------------------------------|
| Connector No. | F56 |
| Connector Name | HEATED OXYGEN SENSOR 2 (BANK 2) |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B/L | SENSOR(-) |
| 2 | R/Y | HEATER(+) |
| 3 | R | HEATER(-) |
| 4 | W/L | SENSOR(+) |

| | |
|-----------------|-------------------------------|
| Connector No. | F63 |
| Connector Name | VIAS CONTROL SOLENOID VALVE 1 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | V | GND |

| | |
|-----------------|---------------------------------|
| Connector No. | F62 |
| Connector Name | HEATED OXYGEN SENSOR 2 (BANK 1) |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | B | SENSOR(-) |
| 2 | R/Y | HEATER(+) |
| 3 | P/Y | HEATER(-) |
| 4 | W | SENSOR(+) |

| | |
|-----------------|--|
| Connector No. | F61 |
| Connector Name | AIR FUEL RATIO (A/F) SENSOR 1 (BANK 2) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | V | AF(+) |
| 2 | LG | AF(-) |
| 3 | SB | HEATER(-) |
| 4 | O | HEATER(+) |

| | |
|-----------------|---|
| Connector No. | F66 |
| Connector Name | INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 2) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y | CVTC |
| 2 | R/W | VBR |

| | |
|-----------------|-------------------------------|
| Connector No. | F65 |
| Connector Name | VIAS CONTROL SOLENOID VALVE 2 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/W | VBR |
| 2 | GR | GND |

| | |
|-----------------|---|
| Connector No. | F64 |
| Connector Name | ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | IGN |
| 2 | BR/W | ENMN1 |

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|-----------------|---|
| Connector No. | F67 |
| Connector Name | INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 1) |
| Connector Color | GRAY |



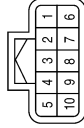
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R/L | CVTC |
| 2 | R/G | VBR |

| | |
|-----------------|-------------------------------|
| Connector No. | F68 |
| Connector Name | ENGINE OIL TEMPERATURE SENSOR |
| Connector Color | GRAY |



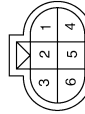
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/R | TO |
| 2 | B/G | GND |

| | |
|-----------------|---------------------|
| Connector No. | F70 |
| Connector Name | JOINT CONNECTOR-F01 |
| Connector Color | BLACK |



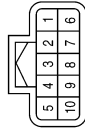
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | GR/B | - |
| 2 | SHIELD | - |
| 3 | B | - |
| 4 | B | - |
| 5 | B/L | - |
| 6 | SHIELD | - |
| 8 | B/G | - |
| 9 | B/G | - |
| 10 | B/G | - |

| | |
|-----------------|---------------------|
| Connector No. | F71 |
| Connector Name | JOINT CONNECTOR-F03 |
| Connector Color | GREEN |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | O | - |
| 2 | O | - |
| 3 | O | - |
| 4 | R/Y | - |
| 5 | R/Y | - |
| 6 | R/Y | - |

| | |
|-----------------|---------------------|
| Connector No. | F72 |
| Connector Name | JOINT CONNECTOR-F04 |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | G/B | - |
| 2 | G/B | - |
| 3 | B | - |
| 4 | B | - |
| 5 | SHIELD | - |
| 6 | G/B | - |
| 9 | SHIELD | - |
| 10 | SHIELD | - |

| | |
|-----------------|---------------------|
| Connector No. | F74 |
| Connector Name | JOINT CONNECTOR-E08 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | Y/G | - |
| 2 | Y/G | - |
| 3 | Y/G | - |
| 4 | Y/G | - |

| | |
|-----------------|--------------|
| Connector No. | F201 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BLUE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | GR/B | - |
| 2 | GR | - |
| 3 | SHIELD | - |
| 4 | W | - |

| | |
|-----------------|--------------|
| Connector No. | F76 |
| Connector Name | WIRE TO WIRE |
| Connector Color | BLUE |



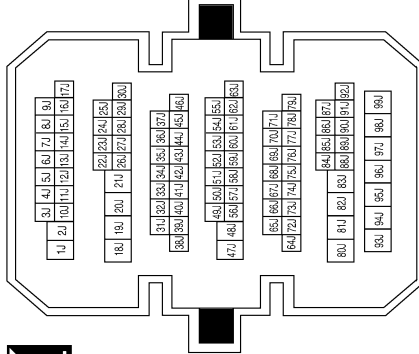
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SHIELD | - |
| 2 | G/R | - |
| 3 | SHIELD | - |
| 4 | W | - |

| | |
|-----------------|---------------------|
| Connector No. | F75 |
| Connector Name | JOINT CONNECTOR-E07 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | LG | - |
| 2 | LG | - |
| 3 | LG | - |
| 4 | LG | - |

| | |
|-----------------|--------------|
| Connector No. | B1 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 30J | B/W | - |

| | |
|-----------------|-----------------------|
| Connector No. | F203 |
| Connector Name | KNOCK SENSOR (BANK 2) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | KNK |
| 2 | SHIELD | - |

| | |
|-----------------|-----------------------|
| Connector No. | F202 |
| Connector Name | KNOCK SENSOR (BANK 1) |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | KNK |
| 2 | SHIELD | - |

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|-----------------|-------------|
| Connector No. | B17 |
| Connector Name | CONDENSER-1 |
| Connector Color | WHITE |



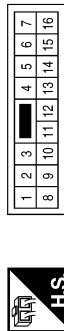
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | (+) |
| 2 | B/Y | (-) |

| | |
|-----------------|---------------------|
| Connector No. | B13 |
| Connector Name | JOINT CONNECTOR-B03 |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | SB | - |
| 2 | SB | - |
| 3 | W | - |
| 4 | B/Y | - |
| 5 | B/Y | - |
| 6 | B/Y | - |

| | |
|-----------------|--------------|
| Connector No. | B10 |
| Connector Name | WIRE TO WIRE |
| Connector Color | WHITE |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | R | - |
| 3 | BR/L | - |
| 7 | W | - |
| 8 | B/Y | - |
| 9 | LG/W | - |
| 10 | LG | - |
| 11 | V | - |
| 12 | R/Y | - |

| | |
|-----------------|--------------------------------------|
| Connector No. | B42 |
| Connector Name | FUEL LEVEL SENSOR UNIT AND FUEL PUMP |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | S/B | IGN |
| 3 | B/Y | GND |
| 4 | R/Y | TEMP SENS |
| 5 | B/W | SENSOR - |

| | |
|-----------------|-------------------------------------|
| Connector No. | B41 |
| Connector Name | EVAP CONTROL SYSTEM PRESSURE SENSOR |
| Connector Color | GRAY |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | V | GND |
| 2 | LG | SIGNAL |
| 3 | BR/L | AVCC2 |

| | |
|-----------------|----------------------------------|
| Connector No. | B39 |
| Connector Name | EVAP CANISTER VENT CONTROL VALVE |
| Connector Color | BLACK |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1 | W | BATT |
| 2 | R | C/U |

Fail Safe

NON DTC RELATED ITEM

ALBIA0213GB

INFOID:000000001343570

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Engine operating condition in fail-safe mode | Detected items | Remarks | Reference page |
|--|------------------------------------|--|-------------------------|
| Engine speed will not rise more than 2,500 rpm due to the fuel cut | Malfunction indicator lamp circuit | When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up MIL when there is malfunction on engine control system. 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 fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction. | EC-1110 |

DTC RELATED ITEM

| DTC No. | Detected items | Engine operating condition in fail-safe mode | | | | | | | | |
|--|--|---|-------------------|--|---|--------------|--|-------------------|-----------------------|--|
| P0011 P0021 | Intake valve timing control | The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function. | | | | | | | | |
| P0102 P0103 | Mass air flow sensor circuit | Engine speed will not rise more than 2,400 rpm due to the fuel cut. | | | | | | | | |
| P0117 P0118 | Engine coolant temperature sensor circuit | Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM. <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th>Condition</th> <th>Engine coolant temperature decided (CONSULT-III display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or START</td> <td>40°C (104°F)</td> </tr> <tr> <td>Approx 4 minutes or more after engine starting</td> <td>80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td>40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p> | Condition | Engine coolant temperature decided (CONSULT-III display) | Just as ignition switch is turned ON or START | 40°C (104°F) | Approx 4 minutes or more after engine starting | 80°C (176°F) | Except as shown above | 40 - 80°C (104 - 176°F) (Depends on the time) |
| Condition | Engine coolant temperature decided (CONSULT-III display) | | | | | | | | | |
| Just as ignition switch is turned ON or START | 40°C (104°F) | | | | | | | | | |
| Approx 4 minutes or more after engine starting | 80°C (176°F) | | | | | | | | | |
| Except as shown above | 40 - 80°C (104 - 176°F) (Depends on the time) | | | | | | | | | |
| P0122 P0123 P0222 P0223 P2135 | Throttle 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. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor. | | | | | | | | |
| P0500 | Vehicle speed sensor | When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running. | | | | | | | | |
| P0605 | ECM | (When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation. | | | | | | | | |
| P0643 | Sensor power supply | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | |
| P1805 | Brake switch | ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor. <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th>Vehicle condition</th> <th>Driving condition</th> </tr> </thead> <tbody> <tr> <td>When engine is idling</td> <td>Normal</td> </tr> <tr> <td>When accelerating</td> <td>Poor acceleration</td> </tr> </tbody> </table> | Vehicle condition | Driving condition | When engine is idling | Normal | When accelerating | Poor acceleration | | |
| Vehicle condition | Driving condition | | | | | | | | | |
| When engine is idling | Normal | | | | | | | | | |
| When accelerating | Poor acceleration | | | | | | | | | |
| P2100 P2103 | Throttle control motor relay | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | |
| P2101 | Electric throttle control function | ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. | | | | | | | | |
| 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. | | | | | | | | |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| DTC No. | Detected items | Engine operating condition in fail-safe mode |
|---|------------------------------------|---|
| P2119 | Electric throttle control actuator | <p>(When electric throttle control actuator does not function properly due to the return spring malfunction:) 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.</p> <hr/> <p>(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.</p> <hr/> <p>(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</p> |
| P2122 P2123 P2127 P2128 P2138 | Accelerator pedal position sensor | <p>The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.</p> <p>The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.</p> <p>So, the acceleration will be poor.</p> |

DTC Inspection Priority Chart

INFOID:000000001343571

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

| Priority | Detected items (DTC) | |
|----------|--|--|
| 1 | <ul style="list-style-type: none"> • U1000 U1001 CAN communication line • U1010 CAN communication • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0196 P0197 P0198 Engine oil temperature sensor • P0327 P0328 P0332 P0333 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 P0345 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0605 P0607 ECM • P0643 Sensor power supply • P0700 TCM • P0705 P0850 Park/Neutral position (PNP) switch • P1550 P1551 P1552 P1553 P1554 Battery current sensor • P1610 - P1615 NATS • P1700 CVT control system • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor | <p>A</p> <p>EC</p> <p>C</p> <p>D</p> <p>E</p> <p>F</p> <p>G</p> |
| 2 | <ul style="list-style-type: none"> • P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater • P0075 P0081 Intake valve timing control solenoid valve • P0130 P0131 P0132 P0133 P0150 P0151 P0152 P0153 P2A00 P2A03 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 P0157 P0158 P0159 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0550 Power steering pressure sensor • P0603 ECM power supply • P0710 P0175 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 CVT related sensors, solenoid valves and switches • P1217 Engine over temperature (OVERHEAT) • P1777 P1778 CVT step motor • P1805 Brake switch • P2101 Electric throttle control function • P2118 Throttle control motor • P2100 P2103 Throttle control motor relay | <p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p> |
| 3 | <ul style="list-style-type: none"> • P0011 P0021 Intake valve timing control • P0171 P0172 P0174 P0175 Fuel injection system function • P0300 - P0306 Misfire • P0420 P0430 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P1148 P1168 Closed loop control • P1211 TCS control unit • P1212 TCS communication line • P1421 Cold start control • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Primary speed sensor • P2119 Electric throttle control actuator | <p>M</p> <p>N</p> <p>O</p> <p>P</p> |

DTC Index

×:Applicable —: Not applicable

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Trip | MIL | Reference page |
|---|----------------------|-------------|----------|--|--|-------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | |
| CAN COMM CIRCUIT | U1000 | 1000*4 | — | 1 (CVT models) 2 (M/T models) | × (CVT models) — (M/T models) | EC-1147 |
| CAN COMM CIRCUIT | U1001 | 1001*4 | — | 2 | — | EC-1147 |
| CONTROL UNIT(CAN) | U1010 | 1010 | — | 1 (CVT models) 2 (M/T models) | × (CVT models) — (M/T models) | EC-1148 |
| NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED. | P0000 | 0000 | — | — | Flashing*7 | — |
| INT/V TIM CONT-B1 | P0011 | 0011 | — | 2 | × | EC-1149 |
| INT/V TIM CONT-B2 | P0021 | 0021 | — | 2 | × | EC-1149 |
| A/F SEN1 HTR (B1) | P0031 | 0031 | — | 2 | × | EC-1153 |
| A/F SEN1 HTR (B1) | P0032 | 0032 | — | 2 | × | EC-1153 |
| HO2S2 HTR (B1) | P0037 | 0037 | — | 2 | × | EC-1156 |
| HO2S2 HTR (B1) | P0038 | 0038 | — | 2 | × | EC-1156 |
| A/F SEN1 HTR (B2) | P0051 | 0051 | — | 2 | × | EC-1153 |
| A/F SEN1 HTR (B2) | P0052 | 0052 | — | 2 | × | EC-1153 |
| HO2S2 HTR (B2) | P0057 | 0057 | — | 2 | × | EC-1156 |
| HO2S2 HTR (B2) | P0058 | 0058 | — | 2 | × | EC-1156 |
| INT/V TIM V/CIR-B1 | P0075 | 0075 | — | 2 | × | EC-1159 |
| INT/V TIM V/CIR-B2 | P0081 | 0081 | — | 2 | × | EC-1159 |
| MAF SEN/CIRCUIT-B1 | P0101 | 0101 | — | 2 | × | EC-1162 |
| MAF SEN/CIRCUIT-B1 | P0102 | 0102 | — | 1 | × | EC-1168 |
| MAF SEN/CIRCUIT-B1 | P0103 | 0103 | — | 1 | × | EC-1168 |
| IAT SEN/CIRCUIT-B1 | P0112 | 0112 | — | 2 | × | EC-1173 |
| IAT SEN/CIRCUIT-B1 | P0113 | 0113 | — | 2 | × | EC-1173 |
| ECT SEN/CIRC | P0117 | 0117 | — | 1 | × | EC-1176 |
| ECT SEN/CIRC | P0118 | 0118 | — | 1 | × | EC-1176 |
| TP SEN 2/CIRC-B1 | P0122 | 0122 | — | 1 | × | EC-1179 |
| TP SEN 2/CIRC-B1 | P0123 | 0123 | — | 1 | × | EC-1179 |
| ECT SENSOR | P0125 | 0125 | — | 2 | × | EC-1182 |
| IAT SENSOR-B1 | P0127 | 0127 | — | 2 | × | EC-1185 |
| THERMSTAT FNCTN | P0128 | 0128 | — | 2 | × | EC-1187 |
| A/F SENSOR1 (B1) | P0130 | 0130 | — | 2 | × | EC-1189 |
| A/F SENSOR1 (B1) | P0131 | 0131 | — | 2 | × | EC-1193 |
| A/F SENSOR1 (B1) | P0132 | 0132 | — | 2 | × | EC-1196 |
| A/F SENSOR1 (B1) | P0133 | 0133 | × | 2 | × | EC-1199 |
| HO2S2 (B1) | P0137 | 0137 | × | 2 | × | EC-1204 |
| HO2S2 (B1) | P0138 | 0138 | × | 2 | × | EC-1210 |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Trip | MIL | Reference page |
|-------------------------------------|----------------------|-------|----------|------|-----|-------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | |
| HO2S2 (B1) | P0139 | 0139 | × | 2 | × | EC-1218 |
| A/F SENSOR1 (B2) | P0150 | 0150 | — | 2 | × | EC-1189 |
| A/F SENSOR1 (B2) | P0151 | 0151 | — | 2 | × | EC-1193 |
| A/F SENSOR1 (B2) | P0152 | 0152 | — | 2 | × | EC-1196 |
| A/F SENSOR1 (B2) | P0153 | 0153 | × | 2 | × | EC-1199 |
| HO2S2 (B2) | P0157 | 0157 | × | 2 | × | EC-1204 |
| HO2S2 (B2) | P0158 | 0158 | × | 2 | × | EC-1210 |
| HO2S2 (B2) | P0159 | 0159 | × | 2 | × | EC-1218 |
| FUEL SYS-LEAN-B1 | P0171 | 0171 | — | 2 | × | EC-1224 |
| FUEL SYS-RICH-B1 | P0172 | 0172 | — | 2 | × | EC-1228 |
| FUEL SYS-LEAN-B2 | P0174 | 0174 | — | 2 | × | EC-1224 |
| FUEL SYS-RICH-B2 | P0175 | 0175 | — | 2 | × | EC-1228 |
| FTT SENSOR | P0181 | 0181 | — | 2 | × | EC-1232 |
| FTT SEN/CIRCUIT | P0182 | 0182 | — | 2 | × | EC-1235 |
| FTT SEN/CIRCUIT | P0183 | 0183 | — | 2 | × | EC-1235 |
| TP SEN 1/CIRC-B1 | P0222 | 0222 | — | 1 | × | EC-1238 |
| TP SEN 1/CIRC-B1 | P0223 | 0223 | — | 1 | × | EC-1238 |
| MULTI CYL MISFIRE | P0300 | 0300 | — | 2 | × | EC-1241 |
| CYL 1 MISFIRE | P0301 | 0301 | — | 2 | × | EC-1241 |
| CYL 2 MISFIRE | P0302 | 0302 | — | 2 | × | EC-1241 |
| CYL 3 MISFIRE | P0303 | 0303 | — | 2 | × | EC-1241 |
| CYL 4 MISFIRE | P0304 | 0304 | — | 2 | × | EC-1241 |
| CYL 5 MISFIRE | P0305 | 0305 | — | 2 | × | EC-1241 |
| CYL 6 MISFIRE | P0306 | 0306 | — | 2 | × | EC-1241 |
| KNOCK SEN/CIRC-B1 | P0327 | 0327 | — | 2 | — | EC-1247 |
| KNOCK SEN/CIRC-B1 | P0328 | 0328 | — | 2 | — | EC-1247 |
| KNOCK SEN/CIRC-B2 | P0332 | 0332 | — | 2 | — | EC-1247 |
| KNOCK SEN/CIRC-B2 | P0333 | 0333 | — | 2 | — | EC-1247 |
| CKP SEN/CIRCUIT | P0335 | 0335 | — | 2 | × | EC-1250 |
| CMP SEN/CIRC-B1 | P0340 | 0340 | — | 2 | × | EC-1254 |
| CMP SEN/CIRC-B2 | P0345 | 0345 | — | 2 | × | EC-1254 |
| TW CATALYST SYS-B1 | P0420 | 0420 | × | 2 | × | EC-1258 |
| TW CATALYST SYS-B2 | P0430 | 0430 | × | 2 | × | EC-1258 |
| EVAP PURG FLOW/MON | P0441 | 0441 | × | 2 | × | EC-1263 |
| EVAP SMALL LEAK | P0442 | 0442 | × | 2 | × | EC-1268 |
| PURG VOLUME CONT/V | P0443 | 0443 | — | 2 | × | EC-1274 |
| PURG VOLUME CONT/V | P0444 | 0444 | — | 2 | × | EC-1278 |
| PURG VOLUME CONT/V | P0445 | 0445 | — | 2 | × | EC-1278 |
| VENT CONTROL VALVE | P0447 | 0447 | — | 2 | × | EC-1281 |
| VENT CONTROL VALVE | P0448 | 0448 | — | 2 | × | EC-1285 |
| EVAP SYS PRES SEN | P0451 | 0451 | — | 2 | × | EC-1289 |
| EVAP SYS PRES SEN | P0452 | 0452 | — | 2 | × | EC-1292 |

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[VQ35DE]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Trip | MIL | Reference page |
|-------------------------------------|----------------------|-------|----------|--|--|-------------------------|
| | CONSULT-III GST*2 | ECM*3 | | | | |
| EVAP SYS PRES SEN | P0453 | 0453 | — | 2 | × | EC-1297 |
| EVAP GROSS LEAK | P0455 | 0455 | — | 2 | × | EC-1302 |
| EVAP VERY SML LEAK | P0456 | 0456 | ×*6 | 2 | × | EC-1308 |
| FUEL LEV SEN SLOSH | P0460 | 0460 | — | 2 | × | EC-1315 |
| FUEL LEVEL SENSOR | P0461 | 0461 | — | 2 | × | EC-1317 |
| FUEL LEVL SEN/CIRC | P0462 | 0462 | — | 2 | × | EC-1319 |
| FUEL LEVL SEN/CIRC | P0463 | 0463 | — | 2 | × | EC-1319 |
| VEH SPEED SEN/CIRC*5 | P0500 | 0500 | — | 2 | × | EC-1321 |
| ISC SYSTEM | P0506 | 0506 | — | 2 | × | EC-1323 |
| ISC SYSTEM | P0507 | 0507 | — | 2 | × | EC-1325 |
| PW ST P SEN/CIRC | P0550 | 0550 | — | 2 | — | EC-1327 |
| ECM BACK UP/CIRCUIT | P0603 | 0603 | — | 2 | × | EC-1329 |
| ECM | P0605 | 0605 | — | 1 or 2 | × or — | EC-1331 |
| ECM | P0607 | 0607 | | 1 (CVT models) 2 (M/T models) | × (CVT models) — (M/T models) | EC-1333 |
| SENSOR POWER/CIRC | P0643 | 0643 | — | 1 | × | EC-1334 |
| PNP SW/CIRC | P0705 | 0705 | — | 2 | × | TM-129 |
| ATF TEMP SEN/CIRC | P0710 | 0710 | — | 1 | × | TM-132 |
| INPUT SPD SEN/CIRC | P0715 | 0715 | — | 2 | × | TM-134 |
| VEH SPD SEN/CIR AT*5 | P0720 | 0720 | — | 2 | × | TM-137 |
| TCC SOLENOID/CIRC | P0740 | 0740 | — | 2 | × | TM-143 |
| A/T TCC S/V FNCTN | P0744 | 0744 | — | 2 | × | TM-145 |
| L/PRESS SOL/CIRC | P0745 | 0745 | — | 2 | × | TM-147 |
| PRS CNT SOL/A FCTN | P0746 | 0746 | — | 1 | × | TM-149 |
| PRS CNT SOL/B FCTN | P0776 | 0776 | — | 2 | × | TM-151 |
| PRS CNT SOL/B CIRC | P0778 | 0778 | — | 2 | × | TM-154 |
| TR PRS SENS/A CIRC | P0840 | 0840 | — | 2 | × | TM-159 |
| TR PRS SENS/B CIRC | P0845 | 0845 | — | 2 | × | TM-165 |
| P-N POS SW/CIRCUIT | P0850 | 0850 | — | 2 | × | EC-1336 |
| CLOSED LOOP-B1 | P1148 | 1148 | — | 1 | × | EC-1340 |
| CLOSED LOOP-B2 | P1168 | 1168 | — | 1 | × | EC-1340 |
| TCS/CIRC | P1212 | 1212 | — | 2 | — | EC-1341 |
| ENG OVER TEMP | P1217 | 1217 | — | 1 | × | EC-1342 |
| CTP LEARNING-B1 | P1225 | 1225 | — | 2 | — | EC-1346 |
| CTP LEARNING-B1 | P1226 | 1226 | — | 2 | — | EC-1348 |
| COLD START CONTROL | P1421 | 1421 | — | 2 | × | EC-1350 |
| BAT CURRENT SENSOR | P1550 | 1550 | — | 2 | — | EC-1352 |
| BAT CURRENT SENSOR | P1551 | 1551 | — | 2 | — | EC-1355 |
| BAT CURRENT SENSOR | P1552 | 1552 | — | 2 | — | EC-1355 |
| BAT CURRENT SENSOR | P1553 | 1553 | — | 2 | — | EC-1358 |
| BAT CURRENT SENSOR | P1554 | 1554 | — | 2 | — | EC-1361 |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Items (CONSULT-III screen terms) | DTC*1 | | SRT code | Trip | MIL | Reference page |
|-------------------------------------|----------------------|-------|----------|------|-----|--|
| | CONSULT-III GST*2 | ECM*3 | | | | |
| ASCD SW | P1564 | 1564 | — | 1 | — | EC-1364 |
| ASCD BRAKE SW | P1572 | 1572 | — | 1 | — | EC-1367 |
| ASCD VHL SPD SEN | P1574 | 1574 | — | 1 | — | EC-1374 |
| LOCK MODE | P1610 | 1610 | — | 2 | — | SEC-34 or SEC-214 |
| ID DISCARD IMM-ECM | P1611 | 1611 | — | 2 | — | SEC-39 or SEC-219 |
| CHAIN OF ECM-IMMU | P1612 | 1612 | — | 2 | — | SEC-40 or SEC-220 |
| DIFFERENCE OF KEY | P1615 | 1615 | — | 2 | — | SEC-38 or SEC-218 |
| CVT C/U FUNCT | P1700 | 1700 | — | 1 | — | EC-1376 |
| IN PULY SPEED | P1715 | 1715 | — | 2 | — | EC-1377 |
| V/SP SEN(A/T OUT) | P1720 | 1720 | — | 2 | — | EC-1379 |
| LU-SLCT SOL/CIRC | P1740 | 1740 | — | 2 | × | TM-180 |
| STEP MOTR CIRC | P1777 | 1777 | — | 1 | × | TM-183 |
| STEP MOTR FNC | P1778 | 1778 | — | 2 | × | TM-186 |
| VIAS S/V-1 | P1800 | 1800 | — | 2 | — | EC-1381 |
| VIAS S/V-2 | P1801 | 1801 | — | 2 | — | EC-1383 |
| BRAKE SW/CIRCUIT | P1805 | 1805 | — | 2 | — | EC-1386 |
| ETC MOT PWR-B1 | P2100 | 2100 | — | 1 | × | EC-1389 |
| ETC FNCTN/CIRC-B1 | P2101 | 2101 | — | 1 | × | EC-1391 |
| ETC MOT PWR | P2103 | 2103 | — | 1 | × | EC-1389 |
| ETC MOT-B1 | P2118 | 2118 | — | 1 | × | EC-1395 |
| ETC ACTR-B1 | P2119 | 2119 | — | 1 | × | EC-1397 |
| APP SEN 1/CIRC | P2122 | 2122 | — | 1 | × | EC-1399 |
| APP SEN 1/CIRC | P2123 | 2123 | — | 1 | × | EC-1399 |
| APP SEN 2/CIRC | P2127 | 2127 | — | 1 | × | EC-1402 |
| APP SEN 2/CIRC | P2128 | 2128 | — | 1 | × | EC-1402 |
| TP SENSOR-B1 | P2135 | 2135 | — | 1 | × | EC-1406 |
| APP SENSOR | P2138 | 2138 | — | 1 | × | EC-1409 |
| A/F SENSOR1 (B1) | P2A00 | 2A00 | — | 2 | × | EC-1413 |
| A/F SENSOR1 (B2) | P2A03 | 2A03 | — | 2 | × | EC-1413 |

*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 of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

How to Set SRT Code

INFOID:000000001343573

To set all SRT codes, self-diagnosis 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.

 WITH CONSULT-III

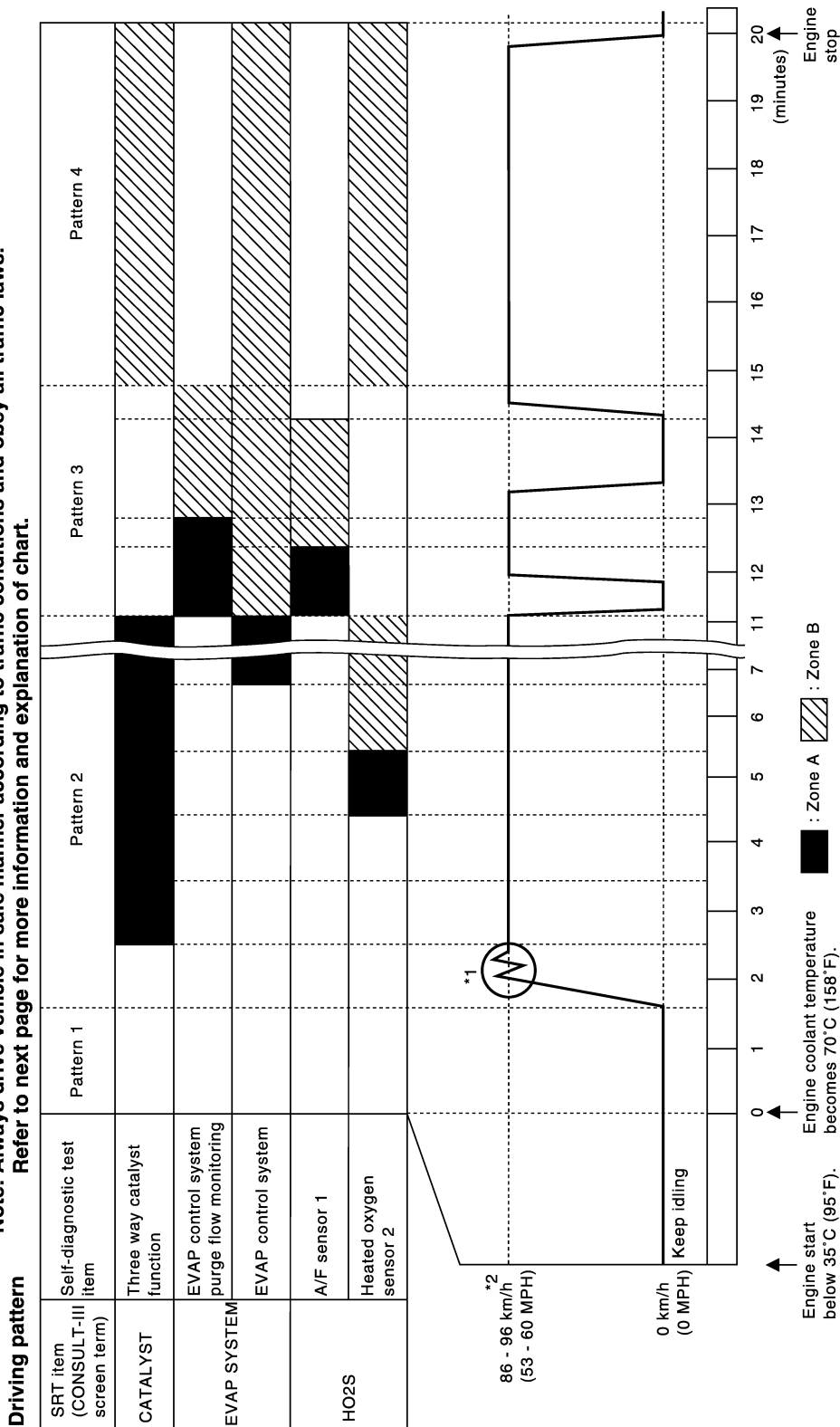
Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on "SRT Item".

⊗ 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

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.



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- 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°C (14 to 95°F) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3V).**
- 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 1.4V).**
- 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 4.1V).**

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:

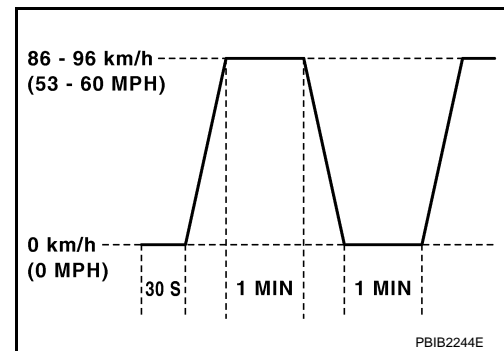
- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during decelerating vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).

Pattern 4:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*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.

Suggested Upshift Speeds for M/T Models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

| Gear change | For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]: | | For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]: |
|-------------|--|-------------------------------|--|
| | ACCEL shift position km/h (MPH) | CRUISE shift point km/h (MPH) | km/h (MPH) |
| 1st to 2nd | 25 (15) | 14 (9) | 24 (15) |
| 2nd to 3rd | 40 (25) | 30 (19) | 40 (25) |
| 3rd to 4th | 50 (31) | 42 (26) | 64 (40) |
| 4th to 5th | 58 (36) | 50 (31) | 72 (45) |
| 5th to 6th | 69 (43) | 59 (37) | 80 (50) |

Test Value and Test Limit

INFOID:000000001691497

The following is the information specified in Service \$06 of SAE J1979.

ECM

< ECU DIAGNOSIS >

[VQ35DE]

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 the bank 2 is not applied on this vehicle, only the items of the bank 1 is displayed)

| Item | OBD-MID | Self-diagnostic test item | DTC | Test value and Test limit (GST display) | | Description |
|------|---------|---|-------|--|---------------------|--|
| | | | | TID | Unit and Scaling ID | |
| HO2S | 01H | Air fuel ratio (A/F) sensor 1 (Bank 1) | P0131 | 83H | 0BH | Minimum sensor output voltage for test cycle |
| | | | P0131 | 84H | 0BH | Maximum sensor output voltage for test cycle |
| | | | P0130 | 85H | 0BH | Minimum sensor output voltage for test cycle |
| | | | P0130 | 86H | 0BH | Maximum sensor output voltage for test cycle |
| | | | P0133 | 87H | 04H | Response rate: Response ratio (Lean to Rich) |
| | | | P0133 | 88H | 04H | Response rate: Response ratio (Rich to Lean) |
| | | | P2A00 | 89H | 84H | The amount of shift in air fuel ratio |
| | | | P2A00 | 8AH | 84H | The amount of shift in air fuel ratio |
| | | | P0130 | 8BH | 0BH | Difference in sensor output voltage |
| | | | P0133 | 8CH | 83H | Response gain at the limited frequency |
| HO2S | 02H | Heated oxygen sensor 2 (Bank 1) | P0138 | 07H | 0CH | Minimum sensor output voltage for test cycle |
| | | | P0137 | 08H | 0CH | Maximum sensor output voltage for test cycle |
| | | | P0138 | 80H | 0CH | Sensor output voltage |
| | | | P0139 | 81H | 0CH | Difference in sensor output voltage |
| HO2S | 03H | Heated oxygen sensor 3 (Bank 1) | P0143 | 07H | 0CH | Minimum sensor output voltage for test cycle |
| | | | P0144 | 08H | 0CH | Maximum sensor output voltage for test cycle |
| | | | P0146 | 80H | 0CH | Sensor output voltage |
| | | | P0145 | 81H | 0CH | Difference in sensor output voltage |

ECM

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[VQ35DE]

| Item | OBD-MID | Self-diagnostic test item | DTC | Test value and Test limit (GST display) | | Description |
|---------------|---------|--|-------|---|--|---|
| | | | | TID | Unit and Scaling ID | |
| HO2S | 05H | Air fuel ratio (A/F) sensor 1 (Bank 2) | 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 |
| | | | P0150 | 86H | 0BH | Maximum sensor output voltage for test cycle |
| | | | 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 |
| | | | P0150 | 8BH | 0BH | Difference in sensor output voltage |
| | | | P0153 | 8CH | 83H | Response gain at the limited frequency |
| | 06H | Heated oxygen sensor 2 (Bank 2) | P0158 | 07H | 0CH | Minimum sensor output voltage for test cycle |
| | | | P0157 | 08H | 0CH | Maximum sensor output voltage for test cycle |
| | | | P0158 | 80H | 0CH | Sensor output voltage |
| | | | P0159 | 81H | 0CH | Difference in sensor output voltage |
| | 07H | Heated oxygen sensor 3 (Bank2) | P0163 | 07H | 0CH | Minimum sensor output voltage for test cycle |
| P0164 | | | 08H | 0CH | Maximum sensor output voltage for test cycle | |
| P0166 | | | 80H | 0CH | Sensor output voltage | |
| P0165 | | | 81H | 0CH | Difference in sensor output voltage | |
| CATA- LYST | 21H | Three way catalyst function (Bank1) | P0420 | 80H | 01H | O2 storage index |
| | | | P0420 | 82H | 01H | Switching time lag engine exhaust index value |
| | | | P2423 | 83H | 0CH | Difference in 3rd O2 sensor output voltage |
| | | | P2423 | 84H | 84H | O2 storage index in HC trap catalyst |
| | 22H | Three way catalyst function (Bank2) | P0430 | 80H | 01H | O2 storage index |
| | | | P0430 | 82H | 01H | Switching time lag engine exhaust index value |
| | | | P2424 | 83H | 0CH | Difference in 3rd O2 sensor output voltage |
| | | | P2424 | 84H | 84H | O2 storage index in HC trap catalyst |

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ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Item | OBD-MID | Self-diagnostic test item | DTC | Test value and Test limit (GST display) | | Description |
|------------------|---------|---------------------------------------|-------------------------------------|---|---------------------|--|
| | | | | TID | Unit and Scaling ID | |
| EGR SYSTEM | 31H | EGR function | P0400 | 80H | 96H | Low Flow Faults: EGR temp change rate (short term) |
| | | | P0400 | 81H | 96H | Low Flow Faults: EGR temp change rate (long term) |
| | | | P0400 | 82H | 96H | Low Flow Faults: Difference between max EGR temp and EGR temp under idling condition |
| | | | P0400 | 83H | 96H | Low Flow Faults: Max EGR temp |
| | | | P1402 | 84H | 96H | High Flow Faults: EGR temp increase rate |
| EVAP SYSTEM | 39H | EVAP control system leak (Cap Off) | P0455 | 80H | 0CH | Difference in pressure sensor output voltage before and after pull down |
| | 3BH | EVAP control system leak (Small leak) | P0442 | 80H | 05H | Leak area index (for more than 0.04inch) |
| | 3CH | EVAP control system (Very small leak) | P0456 | 80H | 05H | Leak area index (for more than 0.02inch) |
| | | | P0456 | 81H | FDH | Maximum internal pressure of EVAP system during monitoring |
| | 3DH | Purge flow system | P0441 | 83H | 0CH | Difference in pressure sensor output voltage before and after vent control valve close |
| O2 SENSOR HEATER | 41H | A/F sensor 1 heater (Bank 1) | Low Input:P0031 High Input:P0032 | 81H | 0BH | Converted value of Heater electric current to voltage |
| | 42H | Heated oxygen sensor 2 (Bank 1) | Low Input:P0037 High Input:P0038 | 80H | 0CH | Converted value of Heater electric current to voltage |
| | 43H | Heated oxygen sensor 3 (Bank 1) | P0043 | 80H | 0CH | Converted value of Heater electric current to voltage |
| | 45H | A/F sensor 1 heater (Bank 2) | Low Input:P0051 High Input:P0052 | 81H | 0BH | Converted value of Heater electric current to voltage |
| | 46H | Heated oxygen sensor 2 (Bank 2) | Low Input:P0057 High Input:P0058 | 80H | 0CH | Converted value of Heater electric current to voltage |
| | 47H | Heated oxygen sensor 3 (Bank 2) | P0063 | 80H | 0CH | Converted value of Heater electric current to voltage |
| SECONDARY AIR | 71H | Secondary Air system | P0411 | 80H | 01H | Secondary Air Injection System Incorrect Flow Detected |
| | | | Bank1: P0491 Bank2: P0492 | 81H | 01H | Secondary Air Injection System Insufficient Flow |
| | | | P2445 | 82H | 01H | Secondary Air Injection System Pump Stuck Off |
| | | | P2448 | 83H | 01H | Secondary Air Injection System High Airflow |
| | | | Bank1: P2440 Bank2: P2442 | 84H | 01H | Secondary Air Injection System Switching Valve Stuck Open |
| | | | P2440 | 85H | 01H | Secondary Air Injection System Switching Valve Stuck Open |
| | | | P2444 | 86H | 01H | Secondary Air Injection System Pump Stuck On |

ECM

< ECU DIAGNOSIS >

[VQ35DE]

| Item | OBD-MID | Self-diagnostic test item | DTC | Test value and Test limit (GST display) | | Description |
|-------------|---------|---|----------------|---|---------------------|--|
| | | | | TID | Unit and Scaling ID | |
| FUEL SYSTEM | 81H | Fuel injection system function (Bank 1) | P0171 or P0172 | 80H | 2FH | Long term fuel trim |
| | | | P0171 or P0172 | 81H | 24H | The number of lambda control clamped |
| | 82H | Fuel injection system function (Bank 2) | P0174 or P0175 | 80H | 2FH | Long term fuel trim |
| | | | P0174 or P0175 | 81H | 24H | The number of lambda control clamped |
| MISFIRE | A1H | Multiple Cylinder Misfire | P0301 | 80H | 24H | Misfiring counter at 1000rev of the first cylinder |
| | | | P0302 | 81H | 24H | Misfiring counter at 1000rev of the second cylinder |
| | | | P0303 | 82H | 24H | Misfiring counter at 1000rev of the third cylinder |
| | | | P0304 | 83H | 24H | Misfiring counter at 1000rev of the fourth cylinder |
| | | | P0305 | 84H | 24H | Misfiring counter at 1000rev of the fifth cylinder |
| | | | P0306 | 85H | 24H | Misfiring counter at 1000rev of the sixth cylinder |
| | | | P0307 | 86H | 24H | Misfiring counter at 1000rev of the seventh cylinder |
| | | | P0308 | 87H | 24H | Misfiring counter at 1000rev of the eighth cylinder |
| | | | P0300 | 88H | 24H | Misfiring counter at 1000rev of the multiple cylinders |
| | | | P0301 | 89H | 24H | Misfiring counter at 200rev of the first cylinder |
| | | | P0302 | 8AH | 24H | Misfiring counter at 200rev of the second cylinder |
| | | | P0303 | 8BH | 24H | Misfiring counter at 200rev of the third cylinder |
| | | | P0304 | 8CH | 24H | Misfiring counter at 200rev of the fourth cylinder |
| | | | P0305 | 8DH | 24H | Misfiring counter at 200rev of the fifth cylinder |
| | | | P0306 | 8EH | 24H | Misfiring counter at 200rev of the fifth cylinder |
| | | | P0307 | 8FH | 24H | Misfiring counter at 200rev of the fifth cylinder |
| | | | P0308 | 90H | 24H | Misfiring counter at 200rev of the fifth cylinder |
| | | | P0300 | 91H | 24H | Misfiring counter at 1000rev of the single cylinder |
| | | | P0300 | 92H | 24H | Misfiring counter at 200rev of the single cylinder |
| | | | P0300 | 93H | 24H | Misfiring counter at 200rev of the multiple cylinders |

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ECM

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[VQ35DE]

| Item | OBD-MID | Self-diagnostic test item | DTC | Test value and Test limit (GST display) | | Description |
|---------|---------|---------------------------|-------|---|---------------------|--|
| | | | | TID | Unit and Scaling ID | |
| MISFIRE | A2H | No.1 Cylinder Misfire | P0301 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0301 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A3H | No.2 Cylinder Misfire | P0302 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0302 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A4H | No.3 Cylinder Misfire | P0303 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0303 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A5H | No.4 Cylinder Misfire | P0304 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0304 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A6H | No.5 Cylinder Misfire | P0305 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0305 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A7H | No.6 Cylinder Misfire | P0306 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0306 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A8H | No.7 Cylinder Misfire | P0307 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0307 | 0CH | 24H | Misfire counts for last/current driving cycles |
| | A9H | No.8 Cylinder Misfire | P0308 | 0BH | 24H | EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles |
| | | | P0308 | 0CH | 24H | Misfire counts for last/current driving cycles |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[VQ35DE]

SYMPTOM DIAGNOSIS

ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:000000001343575

SYSTEM — BASIC ENGINE CONTROL SYSTEM

| | | SYMPTOM | | | | | | | | | | | | Reference page | |
|---|---------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|----------------|---|
| | | 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) |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Fuel | Fuel pump circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 3 | | 2 | EC-1434 |
| | Fuel pressure regulator system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | | | EC-1525 |
| | Fuel injector circuit | 1 | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-1431 |
| | Evaporative emission system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | EC-1084 |
| Air | Positive crankcase ventilation system | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | | EC-1449 |
| | Incorrect idle speed adjustment | | | | | | 1 | 1 | 1 | 1 | | 1 | | | EC-1016 |
| | Electric throttle control actuator | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | | 2 | | 2 | EC-1391 , EC-1397 |
| Ignition | Incorrect ignition timing adjustment | 3 | 3 | 1 | 1 | 1 | | 1 | 1 | | | 1 | | | EC-1016 |
| | Ignition circuit | 1 | 1 | 2 | 2 | 2 | | 2 | 2 | | | 2 | | | EC-1438 |
| Power supply and ground circuit | | 2 | 2 | 3 | 3 | 3 | | 3 | 3 | | 2 | 3 | | | EC-1143 |
| Mass air flow sensor circuit | | 1 | | | 2 | | | | | | | | | | EC-1162 , EC-1168 |
| Engine coolant temperature sensor circuit | | | | | | | 3 | | | 3 | | | | | EC-1176 , EC-1182 |
| Air fuel ratio (A/F) sensor 1 circuit | | | 1 | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | EC-1189 , EC-1193 , EC-1196 , EC-1199 , EC-1413 |
| Throttle position sensor circuit | | | | | | | 2 | | | 2 | | | | | EC-1179 , EC-1238 , EC-1346 , EC-1348 , EC-1406 |
| Accelerator pedal position sensor circuit | | | | 3 | 2 | 1 | | | | | | | | | EC-1334 , EC-1399 , EC-1402 , EC-1409 |

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[VQ35DE]

| | SYMPTOM | | | | | | | | | | | | Reference page | |
|--|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|----------------|--|
| | 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) |
| Warranty symptom code | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Knock sensor circuit | | | 2 | | | | | | | | 3 | | | EC-1247 |
| Crankshaft position sensor (POS) circuit | 2 | 2 | | | | | | | | | | | | EC-1250 |
| Camshaft position sensor (PHASE) circuit | 3 | 2 | | | | | | | | | | | | EC-1254 |
| Vehicle speed signal circuit | | 2 | 3 | | 3 | | | | | | 3 | | | EC-1321 |
| Power steering pressure sensor circuit | | 2 | | | | | 3 | 3 | | | | | | EC-1327 |
| ECM | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | EC-1329 , EC-1331 |
| Intake valve timing control solenoid valve circuit | | 3 | 2 | | 1 | 3 | 2 | 2 | 3 | | 3 | | | EC-1149 |
| PNP switch circuit | | | 3 | | 3 | | 3 | 3 | | | 3 | | | EC-1336 |
| VIAS control solenoid valve 1 circuit | | | | | 1 | | | | | | | | | EC-1381 |
| VIAS control solenoid valve 2 circuit | | | | | 1 | | | | | | | | | EC-1383 |
| Refrigerant pressure sensor circuit | | 2 | | | | 3 | | | 3 | | 4 | | | EC-1450 |
| Electrical load signal circuit | | | | | | | 3 | | | | | | | EC-1426 |
| Air conditioner circuit | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | 2 | HAC-83 |
| ABS actuator and electric unit (control unit) | | | 4 | | | | | | | | | | | BRC-225 |

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[VQ35DE]

| | | SYMPTOM | | | | | | | | | | | | Reference page | | |
|-----------------------|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-------------------|--------------------------------|------------------------|
| | | 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) | |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | | |
| Fuel | Fuel tank | 5 | 5 | | | | | | | | | | | | FL-10 | |
| | Fuel piping | | | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | FL-4 | |
| | Vapor lock | | | | | | | | | | | | | | | — |
| | Valve deposit | | | | | | | | | | | | | | | — |
| | Poor fuel (Heavy weight gasoline, Low octane) | 5 | | | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | — |
| Air | Air duct | | 5 | | | | | | | | | | | | EM-123 | |
| | Air cleaner | | | | | | | | | | | | | | EM-123 | |
| | Air leakage from air duct (Mass air flow sensor — electric throttle control actuator) | 5 | | 5 | 5 | 5 | | 5 | 5 | | | | 5 | | EM-123 | |
| | Electric throttle control actuator | | | | 5 | | 5 | | | | 5 | | | | EM-130 | |
| | Air leakage from intake manifold/Collector/Gasket | | | | | | | | | | | | | | | EM-130 |
| Cranking | Battery | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | | 1 | PG-132 | |
| | Generator circuit | | | | | | | | | | | | | | CHG-5 | |
| | Starter circuit | 3 | | | | | | | | | | 1 | | | STR-6 | |
| | Signal plate | 6 | | | | | | | | | | | | | EM-202 | |
| | PNP switch | 4 | | | | | | | | | | | | | STR-30, TM-129 | |
| Engine | Cylinder head | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | 3 | | EM-187 | |
| | Cylinder head gasket | | | | | | | | | 4 | | | | | | |
| | Cylinder block | | | | | | | | | | | | | | | |
| | Piston | | | | | | | | | | | | 4 | | | |
| | Piston ring | | | | | | | | | | | | | | | |
| | Connecting rod | 6 | 6 | 6 | 6 | 6 | | 6 | 6 | | | 6 | | | EM-202 | |
| | Bearing | | | | | | | | | | | | | | | |
| | Crankshaft | | | | | | | | | | | | | | | |
| Valve mechanism | Timing chain | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-159 | |
| | Camshaft | | | | | | | | | | | | | | EM-173 | |
| | Intake valve timing control | | | | | | | | | | | | | | | EM-173 |
| | Intake valve | | | | | | | | | | | | | | | |
| | Exhaust valve | | | | | | | | | | | | | | | 3 |

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ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[VQ35DE]

| | | SYMPTOM | | | | | | | | | | | | Reference page | |
|---|---|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|----------------|---|
| | | 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) |
| Warranty symptom code | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | HA | |
| Exhaust | Exhaust manifold/Tube/Muffler/Gasket | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-136 , EX-13 |
| | Three way catalyst | | | | | | | | | | | | | | |
| Lubrica-tion | Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | | 5 | | | EM-139 , LU-24 , LU-25 , LU-28 |
| | Oil level (Low)/Filthy oil | | | | | | | | | | | | | | LU-22 |
| Cooling | Radiator/Hose/Radiator filler cap | | | | | | | | | | | | | | CO-36 , CO-32 |
| | Thermostat | | | | | | | | | 5 | | | | | CO-44 |
| | Water pump | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | | 4 | 5 | | | CO-40 |
| | Water gallery | | | | | | | | | | | | | | CO-46 |
| | Cooling fan | | | | | | | | | | | | | | CO-39 |
| | Coolant level (Low)/Contaminat-ed coolant | | | | | | | | | 5 | | | | | CO-32 |
| NVIS (NISSAN Vehicle Immobilizer System — NATS) | | 1 | 1 | | | | | | | | | | | | SEC-11 |

1 - 6: The numbers refer to the order of inspection.

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[VQ35DE]

NORMAL OPERATING CONDITION

Description

INFOID:000000001343576

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 1,400 rpm under no load [for example, the selector lever position is P or N (A/T) or neutral (M/T) and engine speed is over 1,400 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,000 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-1033](#), "[System Description](#)".

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000001343577

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 SRC 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 SRC 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

INFOID:000000001343578

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:

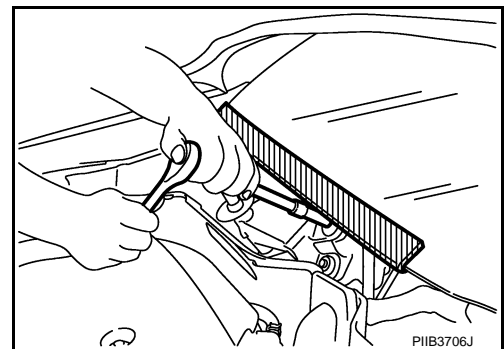
Comply with the following cautions to prevent any error and malfunction.

- 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

INFOID:000000001343579

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



PRECAUTIONS

< PRECAUTION >

[VQ35DE]

On Board Diagnostic (OBD) System of Engine and CVT

INFOID:000000001343580

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

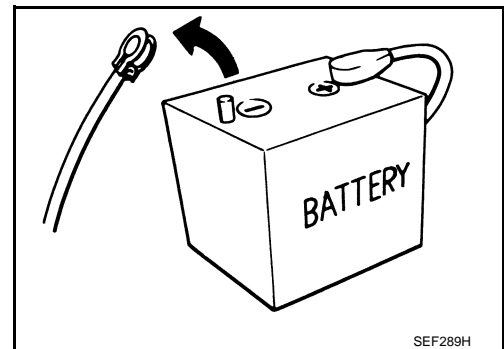
CAUTION:

- Be sure 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 light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up 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-locking type harness connector. For description and how to disconnect, refer to [PG-124, "Description"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure 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

INFOID:000000001343581

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- 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.

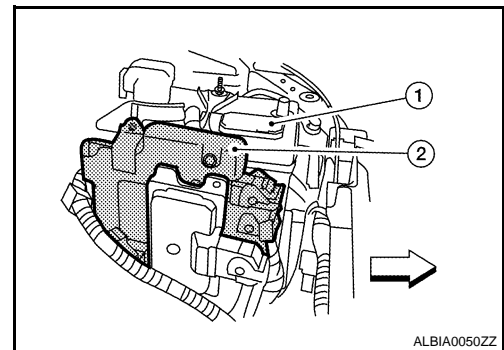


- Do not disassemble ECM (2).

1 : Battery

↔ : Vehicle front

- 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. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not 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



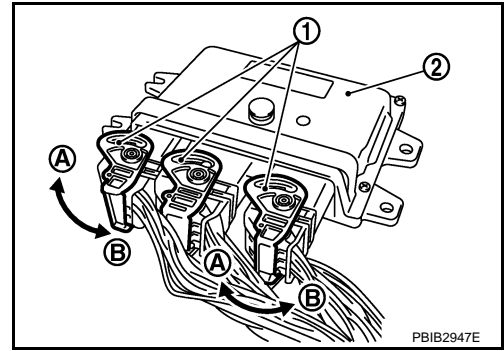
PRECAUTIONS

[VQ35DE]

< PRECAUTION >

- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.

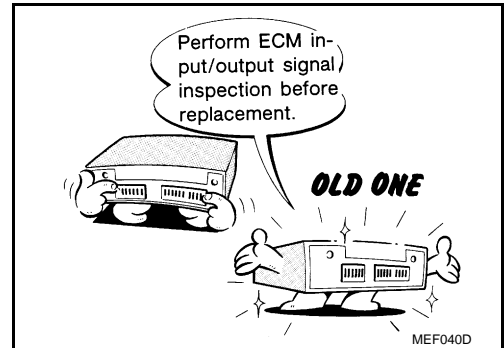
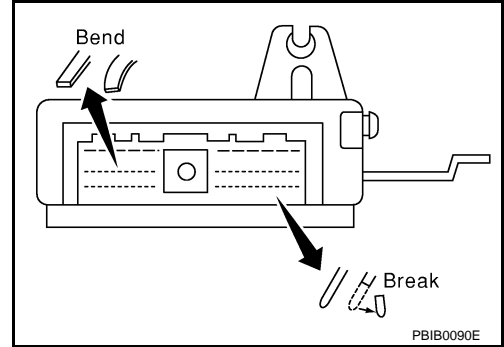
2 : ECM
A : Loosen



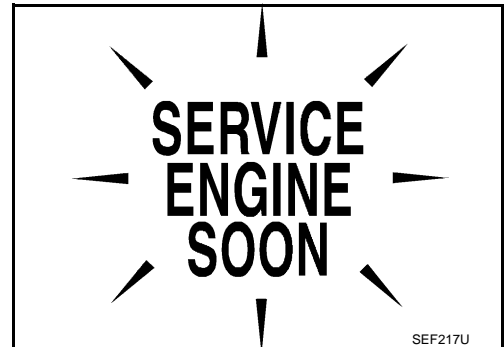
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).

Make sure 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 make sure ECM functions properly. Refer to [EC-1458, "Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not 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.

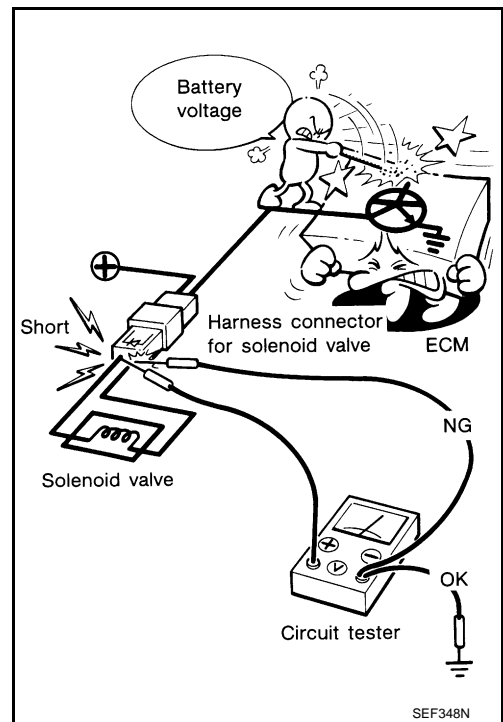


PRECAUTIONS

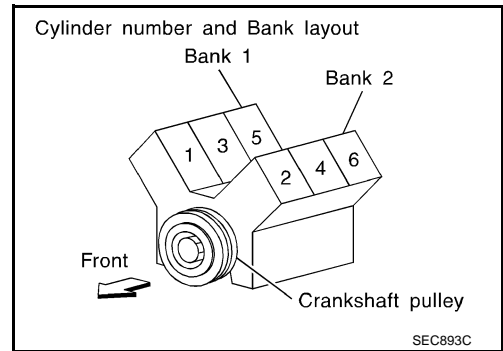
[VQ35DE]

< PRECAUTION >

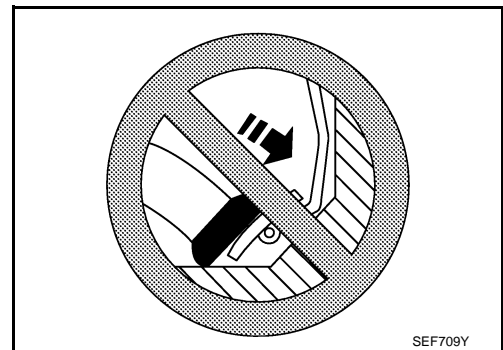
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



- B1 indicates the bank 1, B2 indicates the bank 2 as shown in the figure.
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

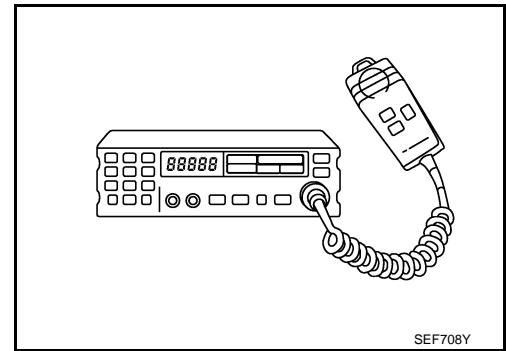


PRECAUTIONS

[VQ35DE]

< 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.
Do not 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.



PREPARATION

< PREPARATION >

[VQ35DE]

PREPARATION

PREPARATION

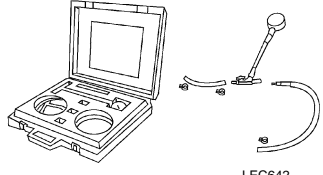
Special Service Tools

INFOID:000000001343582

A

EC

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | Description |
|---|------------------------|
| (J-44321) Fuel pressure gauge kit  LEC642 | Checking fuel pressure |

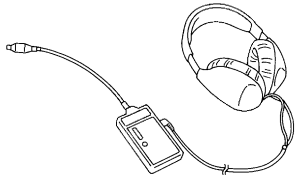
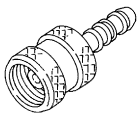

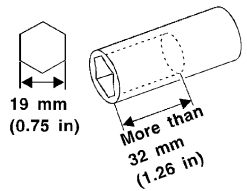
C

D

E

Commercial Service Tools

INFOID:000000001343583

| Tool name (Kent-Moore No.) | Description |
|--|---|
| Leak detector i.e.: (J-41416)  S-NT703 | Locating the EVAP leak |
| EVAP service port adapter i.e.: (J-41413-OBD)  S-NT704 | Applying positive pressure through EVAP service port |
| Fuel filler cap adapter i.e.: (MLR-8382)  S-NT815 | Checking fuel tank vacuum relief valve opening pressure |
| Socket wrench  S-NT705 | Removing and installing engine coolant temperature sensor |

F

G

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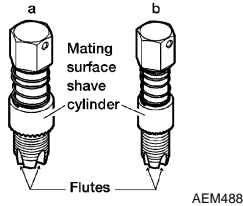

O

P

PREPARATION

< PREPARATION >

[VQ35DE]

| Tool name (Kent-Moore No.) | Description |
|---|---|
| <p>Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)</p>  | <p>Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor</p> |
| <p>Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)</p>  | <p>Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.</p> |

ON-VEHICLE MAINTENANCE

FUEL PRESSURE

Inspection

INFOID:000000001343584

FUEL PRESSURE RELEASE

④ 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 two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

⊗ Without CONSULT-III

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

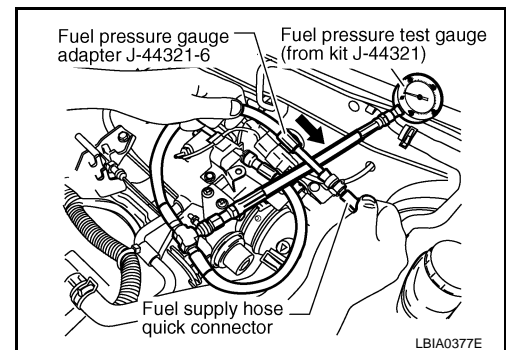
CAUTION:

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 L32 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 sealability.
- Use Fuel Pressure Gauge Kit J-44321 and Fuel Pressure Adapter J-44321-6 to check fuel pressure.

1. Release fuel pressure to zero.
2. Remove fuel hose using Quick Connector Release J-45488.
 - Do not twist or kink fuel hose because it is plastic hose.
 - Do not remove fuel hose from quick connector.
 - Keep fuel hose connections clean.
3. Install Fuel Pressure Adapter J-44321-6 and Fuel Pressure Gauge (from kit J44321) 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.
 - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.



At idling : Approximately 350 kPa (3.57 kg/cm², 51 psi)

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

FUEL PRESSURE

< ON-VEHICLE MAINTENANCE >

[VQ35DE]

9. If OK, replace fuel pressure regulator.
If NG, repair or replace.
10. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero.

EVAP LEAK CHECK

< ON-VEHICLE MAINTENANCE >

[VQ35DE]

EVAP LEAK CHECK

Inspection

INFOID:000000001343585

CAUTION:

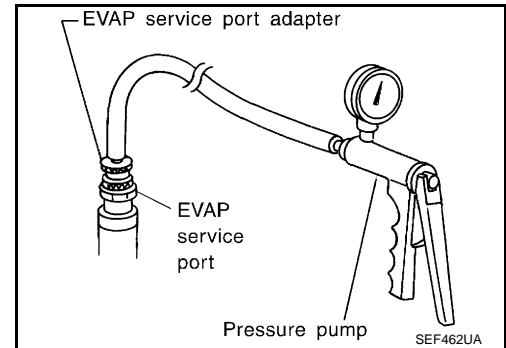
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

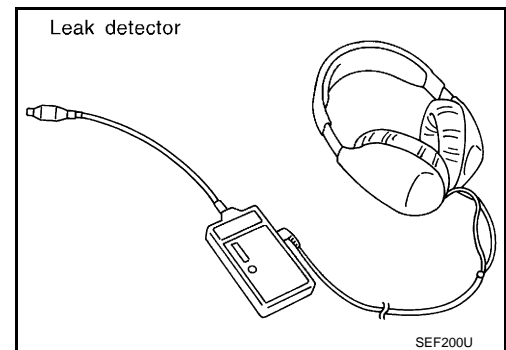
- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

Ⓟ WITH CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port.
2. Turn ignition switch ON.
3. 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.
6. Remove EVAP service port adapter and hose with pressure pump.

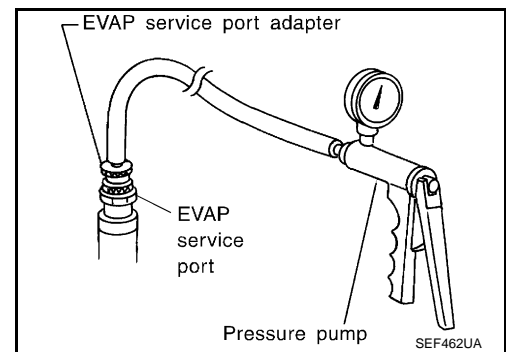


7. Locate the leak using a leak detector. Refer to [EC-1083. "System Diagram"](#).



ⓧ WITHOUT CONSULT-III

1. To locate the EVAP leak, install EVAP service port adapter 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.
3. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
4. Remove EVAP service port adapter and hose with pressure pump.

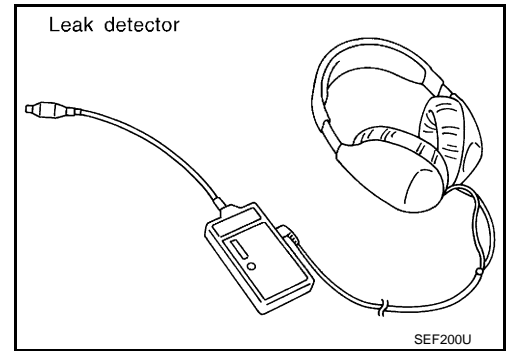


EVAP LEAK CHECK

< ON-VEHICLE MAINTENANCE >

[VQ35DE]

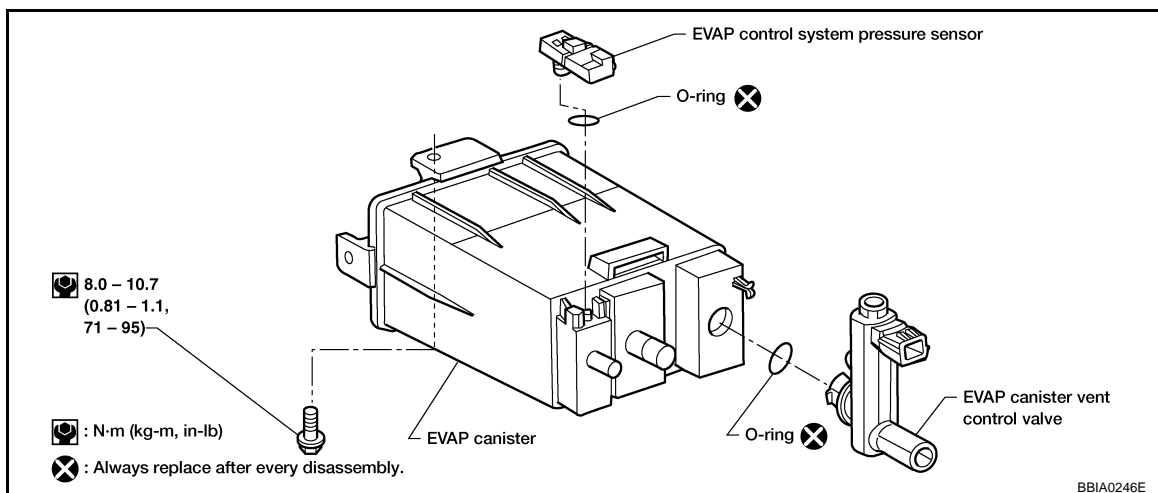
5. Locate the leak using a leak detector. Refer to [EC-1083, "System Diagram"](#).



ON-VEHICLE REPAIR

EVAP CANISTER

Exploded View



Removal and Installation

INFOID:000000001343587

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:

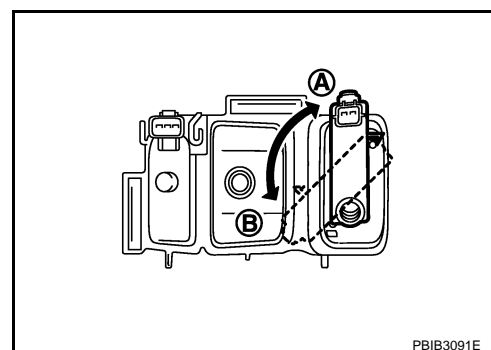
Tighten EVAP canister fixing bolt to the specified torque.

DISASSEMBLY

1. Turn EVAP canister vent control valve counterclockwise.

- A : Lock
- B : Unlock

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.

EVAP CANISTER

< ON-VEHICLE REPAIR >

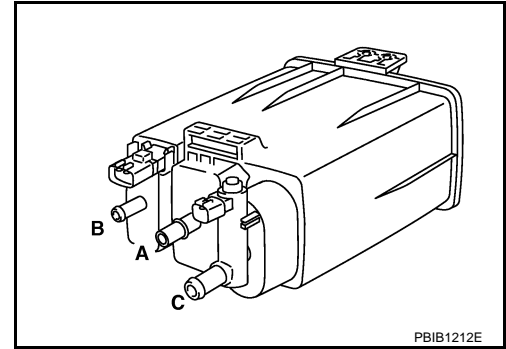
[VQ35DE]

INFOID:000000001343588

Inspection

Check EVAP canister as follows:

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.



SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ35DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

INFOID:000000001691718

| Transmission | Condition | Specification |
|--------------|-------------------------------|---------------|
| CVT | No load (in P or N position) | 600 ± 50 rpm |
| M/T | No load (in neutral position) | 600 ± 50 rpm |

Ignition Timing

INFOID:000000001691719

| Transmission | Condition | Specification |
|--------------|-------------------------------|---------------|
| CVT | No load (in P or N position) | 18 ± 5° BTDC |
| M/T | No load (in neutral position) | 18 ± 5° BTDC |

Calculated Load Value

INFOID:000000001691720

| Condition | Specification (Using CONSULT-III or GST) |
|--------------|--|
| At idle | 10 – 35 % |
| At 2,500 rpm | 10 – 35 % |

Mass Air Flow Sensor

INFOID:000000001691721

| | |
|--|--|
| 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* 7.0 – 20.0 g·m/sec at 2,500 rpm* |

*: Engine is warmed up to normal operating temperature and running under no load.