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# SECTION EC

## ENGINE CONTROL SYSTEM

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# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

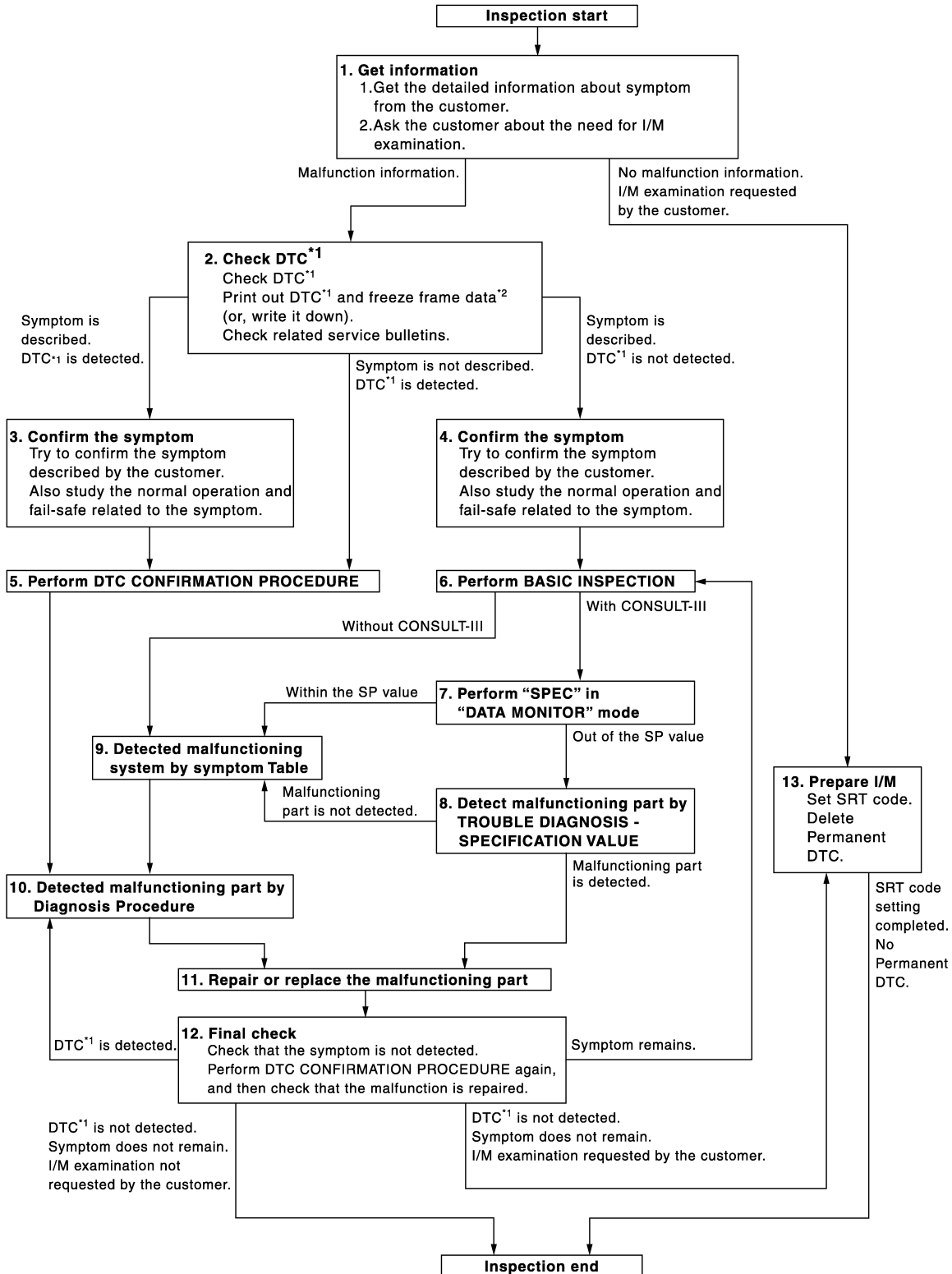
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000006503657

#### OVERALL SEQUENCE



JSBIA0067GB

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

\*1: Include 1st trip DTC.

\*2: Include 1st trip freeze frame data.

## DETAILED FLOW

### 1. GET INFORMATION FOR SYMPTOM

1. 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-17, "Diagnostic Work Sheet"](#).)
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.

No malfunction information, but a request for I/M examination>>GO TO 13.

### 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-117, "CONSULT-III Function"](#).)
  - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-475, "Symptom Table"](#).)
3. Check related service bulletins for information.

Are any symptoms described and any DTCs 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-479, "Description"](#) and [EC-462, "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-479, "Description"](#) and [EC-462, "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-464, "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?

# DIAGNOSIS AND REPAIR WORK FLOW

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

- YES >> GO TO 10.  
NO >> Check according to [GI-41, "Intermittent Incident"](#).

## 6. PERFORM BASIC INSPECTION

Perform [EC-19, "BASIC INSPECTION : Special Repair Requirement"](#).

Do you have CONSULT-III?

- 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", "MAS A/F SE-B2", "B/FUEL SCHDL", "A/F ALPHA-B1", and "A/F ALPHA-B2" are within the SP value using CONSULT-III "SPEC" in "DATA MONITOR" mode. Refer to [EC-126, "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-127, "Diagnosis Procedure"](#).

Is a malfunctioning part detected?

- YES >> GO TO 11.  
NO >> GO TO 9.

## 9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to [EC-475, "Symptom Table"](#) based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

>> 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 [GI-44, "Circuit Inspection"](#).

Is a 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-439, "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-117, "CONSULT-III Function"](#).

>> 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 completely repaired.

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.



# DIAGNOSIS AND REPAIR WORK FLOW

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

NO-1 >> No request for I/M examination from the customer: Before returning the vehicle to the customer, always erase unnecessary DTC in ECM and TCM (Transmission Control Module). Refer to [EC-117. "CONSULT-III Function"](#).

NO-2 >> I/M examination, requested from the customer: GO TO 13.

## 13. PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to [EC-28. "Description"](#).
2. Erase permanent DTCs. Refer to [EC-34. "Description"](#).

>> INSPECTION END

## Diagnostic Work Sheet

INFOID:000000006503658

### DESCRIPTION

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

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

Utilize a diagnostic worksheet like the WORKSHEET SAMPLE below in order to organize all the information for troubleshooting.

Some conditions may cause the MIL to illuminate steady or blink and DTC to be detected. Examples:

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

### KEY POINTS

**WHAT** ..... Vehicle & engine model  
**WHEN** ..... Date, Frequencies  
**WHERE**..... Road conditions  
**HOW** ..... Operating conditions,  
Weather conditions,  
Symptoms

SEF907L



## INSPECTION AND ADJUSTMENT

### BASIC INSPECTION

#### BASIC INSPECTION : Special Repair Requirement

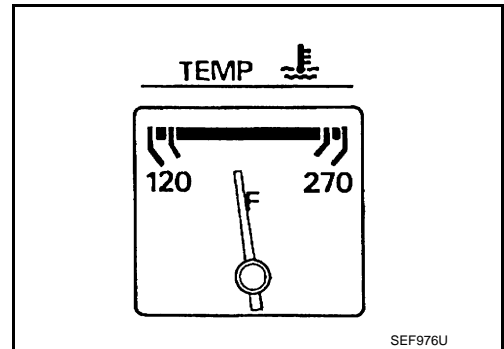
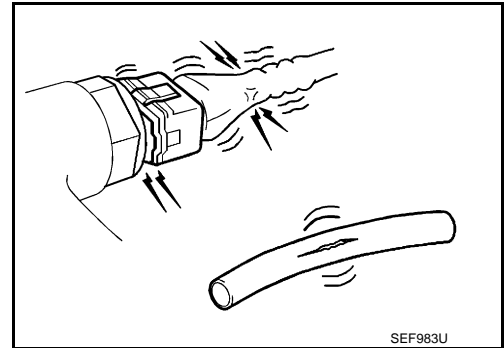
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EC

### 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.

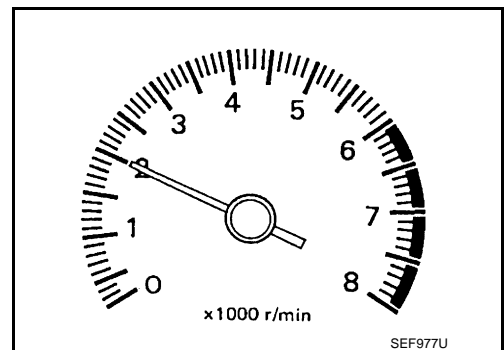


5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

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 IDLE SPEED

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

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# INSPECTION AND ADJUSTMENT

[MR18DE (EXCEPT FOR CALIFORNIA)]

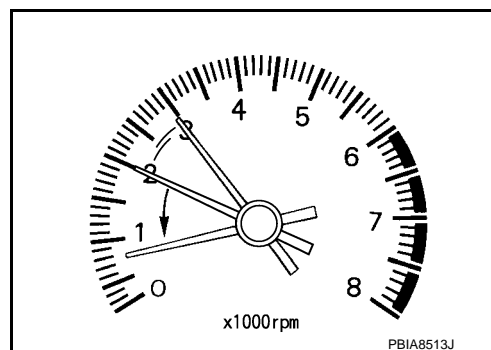
## < BASIC INSPECTION >

- 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-23, "IDLE SPEED : Special Repair Requirement"](#). For specification, refer to [EC-491, "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-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

## 5.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 6.

## 6.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-25, "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 IDLE SPEED AGAIN

- Start engine and warm it up to normal operating temperature.
- Check idle speed.  
For procedure, refer to [EC-23, "IDLE SPEED : Special Repair Requirement"](#).  
For specification, refer to [EC-491, "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-250, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-246, "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 rare.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [SEC-9, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#) or [SEC-173, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 4.

## 10.CHECK IGNITION TIMING

- Run engine at idle.

# INSPECTION AND ADJUSTMENT

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

2. Check ignition timing with a timing light.  
For procedure, refer to [EC-23, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-491, "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-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 12.

## 12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 13.

## 13.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 14.  
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

## 14.CHECK IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.  
For procedure, refer to [EC-23, "IDLE SPEED : Special Repair Requirement"](#).  
For specification, refer to [EC-491, "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-23, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-491, "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-44, "Removal and Installation"](#).

Is the inspection result normal?

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

## 17.DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-250, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-246, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 18.  
NO >> Repair or replace. Then GO TO 4.

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# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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 rare.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-22. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

## 19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, perform [EC-22. "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:000000006503660

When replacing ECM, this procedure must be performed.

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:000000006503661

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

Refer to [SEC-9. "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#) or [SEC-173. "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 2.

#### 2. PERFORM VIN REGISTRATION

Refer to [EC-23. "VIN REGISTRATION : Special Repair Requirement"](#).

>> GO TO 3.

#### 3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-24. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 4.

#### 4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

#### 5. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

## IDLE SPEED

### IDLE SPEED : Description

INFOID:000000006503662

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

# INSPECTION AND ADJUSTMENT

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

## IDLE SPEED : Special Repair Requirement

INFOID:000000006503663

### 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:000000006503664

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

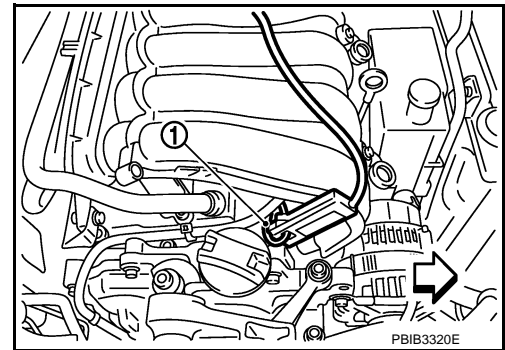
### IGNITION TIMING : Special Repair Requirement

INFOID:000000006503665

### 1.CHECK IGNITION TIMING

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

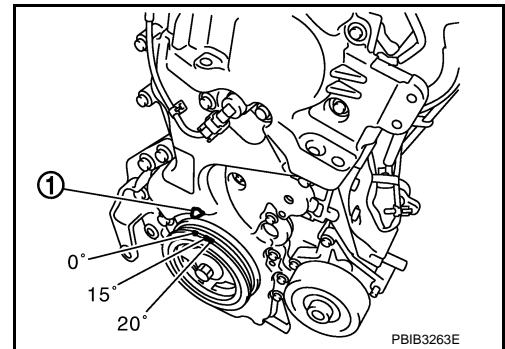
 : Vehicle front



2. Check ignition timing.

1 : Timing indicator

>> INSPECTION END



## VIN REGISTRATION

### VIN REGISTRATION : Description

INFOID:000000006503666

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).

### VIN REGISTRATION : Special Repair Requirement

INFOID:000000006503667

### 1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-23, "Model Variation"](#).

>> 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.

&gt;&gt; END

**ACCELERATOR PEDAL RELEASED POSITION LEARNING****ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description** INFOID:000000006503668

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:000000006503669**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.

&gt;&gt; END

**THROTTLE VALVE CLOSED POSITION LEARNING****THROTTLE VALVE CLOSED POSITION LEARNING : Description**INFOID:000000006503670

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 or electric throttle control actuator is cleaned.

**THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement**INFOID:000000006504994**1. START****With CONSULT-III**

1. Turn ignition switch ON.
2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode of "ENGINE" using CONSULT-III.
3. Follow the instructions on the CONSULT-III display.
4. Turn ignition switch OFF and wait at least 10 seconds.  
Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

**Without CONSULT-III**

1. Start the engine.  
**NOTE:**  
Engine coolant temperature is 25°C (77°F) or less before engine starts.
2. Warm up the engine.  
**NOTE:**  
Raise engine coolant temperature until it reaches 65°C (149°F) or more.
3. Turn ignition switch OFF and wait at least 10 seconds.  
Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

&gt;&gt; END

**IDLE AIR VOLUME LEARNING**



# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## IDLE AIR VOLUME LEARNING : Description

INFOID:000000006503672

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:000000006503673

### 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 12.9 V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- Selector lever: P or N (CVT), Neutral (M/T)
- 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 "FLUID TEMP SE" in "DATA MONITOR" mode of "TRANSMISSION" system indicates less than 0.9 V.
- 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-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-24, "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.

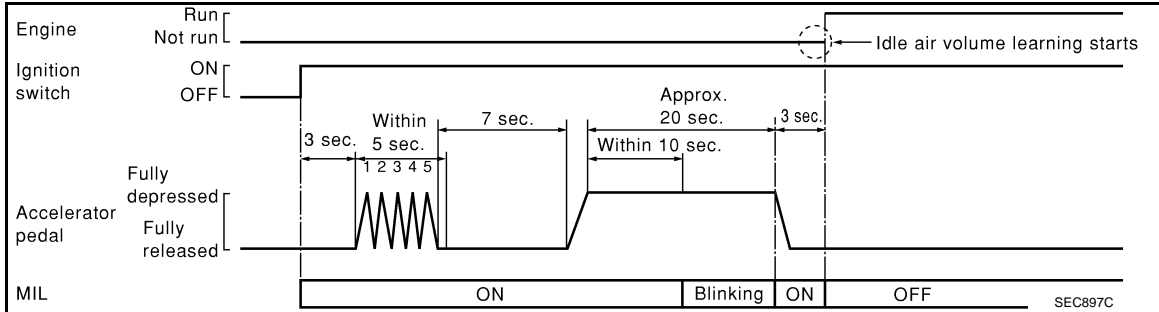
1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
3. 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

[MR18DE (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: 700 ± 50 rpm (in P or N position) M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 13 ± 5° BTDC (in P or N position) M/T: 13 ± 5° BTDC (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-126, "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 again:

- Engine stalls.
- Erroneous idle.

>> INSPECTION END

### MIXTURE RATIO SELF-LEARNING VALUE CLEAR

### MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000006503674

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 >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000006503675

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".

EC

C

#### 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.

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>> END

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# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## HOW TO SET SRT CODE

### Description

INFOID:000000006972217

### OUTLINE

In order to set all SRTs, the self-diagnoses as in the "SRT ITEM" table must have been performed at least once. Each diagnosis may require actual driving for a long period of time under various conditions.

### SRT ITEM

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

SRT item <sup>*1</sup> (CONSULT-III indication)	Performance Priority <sup>*2</sup>	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
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011

\*1: Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.

\*2: 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.

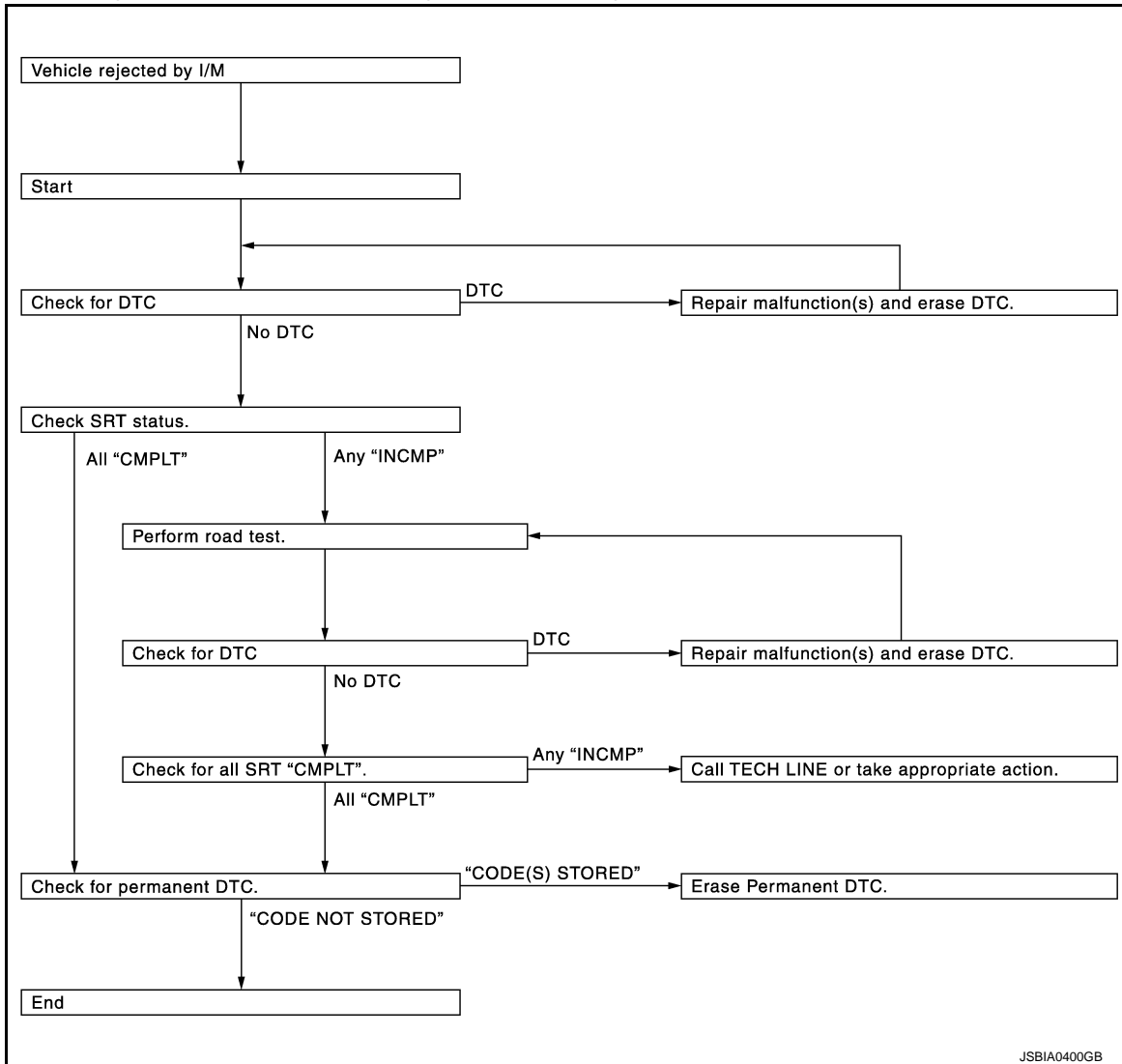
### SRT SERVICE PROCEDURE

# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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



## SRT Set Driving Pattern

INFOID:000000006972218

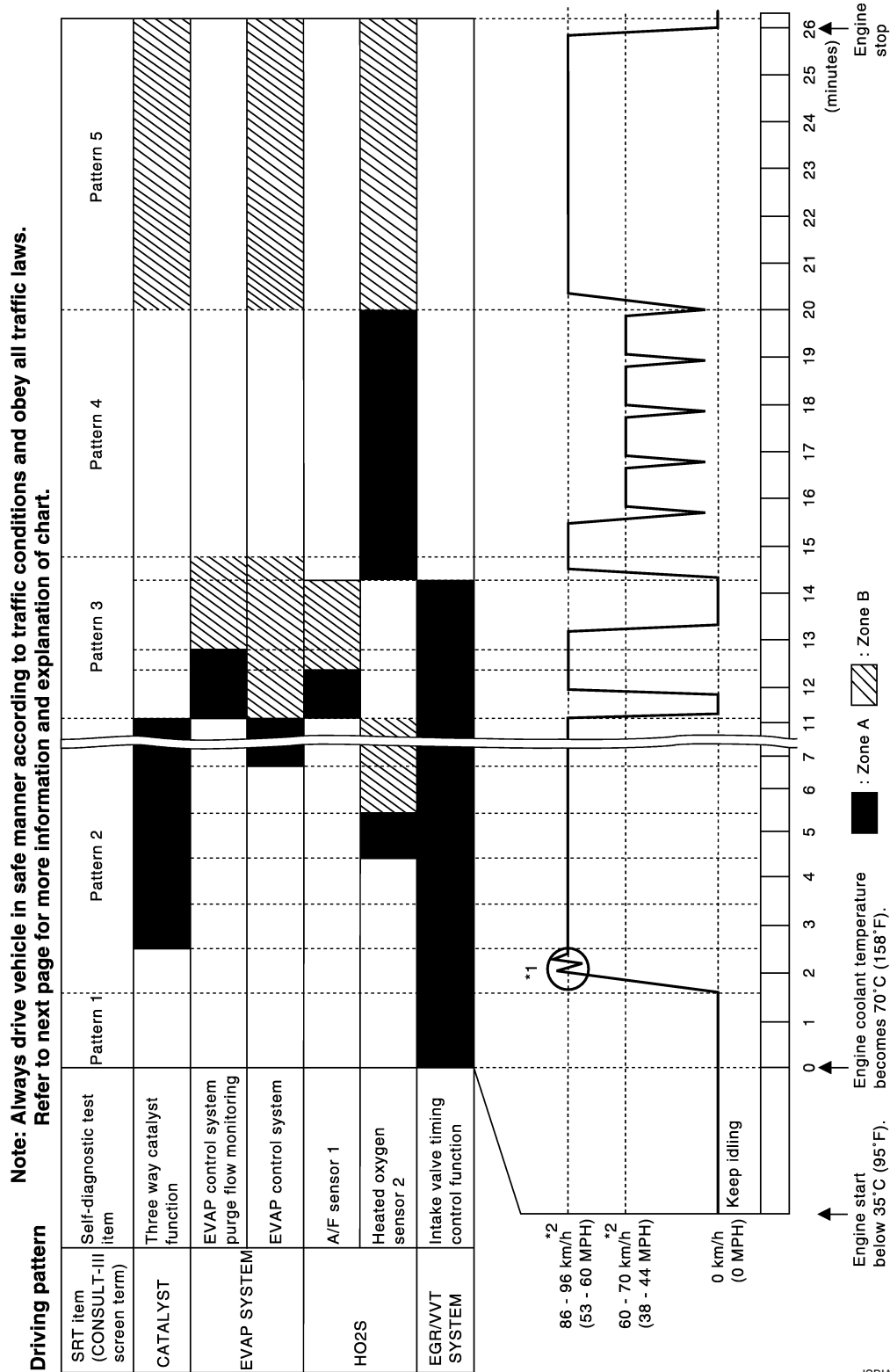
**CAUTION:**

# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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



JSBIA0162GB

\*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.

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
- "Zone A" is the fastest time where required for the diagnosis under normal conditions\*. If the diagnosis is not completed within "Zone A", the diagnosis can still be performed within "Zone B".

# HOW TO SET SRT CODE

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

\*: Normal conditions

- Sea level
- Flat road
- Ambient air temperature: 20 – 30°C (68 – 86°F)

## NOTE:

Diagnosis is performed as quickly as possible under normal conditions. However, under other conditions, diagnosis may also be performed. [For example: ambient air temperature other than 20 – 30°C (68 – 86°F)]

## Work Procedure

INFOID:000000006972219

### 1.CHECK DTC

Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to [EC-465, "DTC Index"](#).
- NO >> GO TO 2.

### 2.CHECK SRT STATUS

With CONSULT-III

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

Without CONSULT-III

Perform "SRT status" mode with [EC-114, "On Board Diagnosis Function"](#).

With GST

Select Service \$01 with GST.

Is SRT code(s) set?

- YES >> GO TO 11.
- NO-1 >> With CONSULT-III: GO TO 3.
- NO-2 >> Without CONSULT-III: GO TO 4.

### 3.DTC CONFIRMATION PROCEDURE

1. Select "SRT WORK SUPPORT" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.
2. For SRT(s) that is not set, perform the corresponding "DTC CONFIRMATION PROCEDURE" according to the "Performance Priority" in the "SRT ITEM" table. Refer to [EC-28, "Description"](#).
3. Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to [EC-465, "DTC Index"](#).
- NO >> GO TO 10.

### 4.PERFORM ROAD TEST

- Check the "Performance Priority" in the "SRT ITEM" table. Refer to [EC-28, "Description"](#).
- Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to [EC-29, "SRT Set Driving Pattern"](#).

In order to set all SRTs, the SRT set driving pattern must be performed at least once.

>> GO TO 5.

### 5.PATTERN 1

1. Check the vehicle condition;
  - Engine coolant temperature is –10 to 35°C (14 to 95°F).
  - Fuel tank temperature is more than 0°C (32°F).
2. Start the engine.
3. Keep engine idling until the engine coolant temperature is greater than 70°C (158°F)

## NOTE:

ECM terminal voltage is follows;

- Engine coolant temperature
    - –10 to 35°C (14 to 95°F): 3.0 – 4.3 V
    - 70°(158°F): Less than 4.1 V
  - Fuel tank temperature: Less than 1.4 V
- Refer to [EC-439, "Reference Value"](#).

## HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> GO TO 6.

### 6.PATTERN 2

1. Drive the vehicle. And 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.
2. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again

#### NOTE:

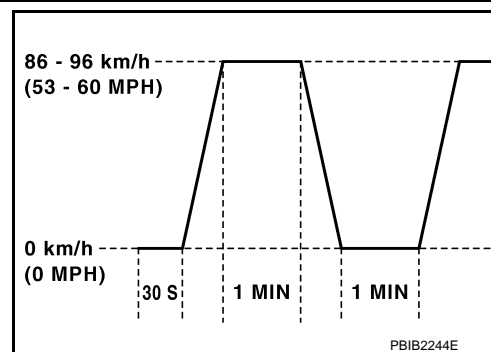
- Checking the vehicle speed with GST is advised.
- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

>> GO TO 7.

### 7.PATTERN 3

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during deceleration of vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).

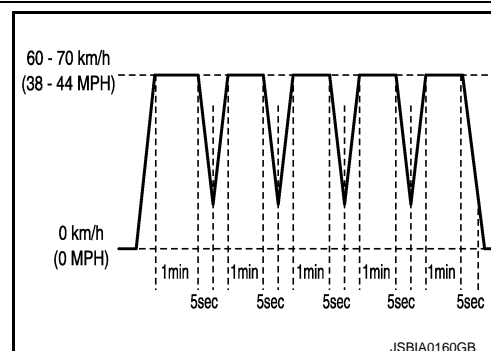
>> GO TO 8.



### 8.PATTERN 4

- Operate vehicle following the driving pattern shown in the figure.
- Drive the vehicle in a proper gear at 60 km/h (38 MPH) and maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.

>> GO TO 9.



### 9.PATTERN 5

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted again.

>> GO TO 10.

### 10.CHECK SRT STATUS

Ⓟ With CONSULT-III

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

ⓧ Without CONSULT-III

Perform "SRT status" mode with [EC-114, "On Board Diagnosis Function"](#).

Ⓢ With GST

Select Service \$01 with GST.

Is SRT(s) set?

YES >> GO TO 11.

NO >> Call TECH LINE or take appropriate action.

### 11.CHECK PERMANENT DTC



# HOW TO SET SRT CODE

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

**NOTE:**

Permanent DTC cannot be checked with a tool other than CONSULT-III or GST.

☐ With CONSULT-III

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

Ⓜ With GST

Select Service \$0A with GST.

Is permanent DTC(s) detected?

YES >> Proceed to [EC-34. "Description"](#).

NO >> END

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# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## HOW TO ERASE PERMANENT DTC

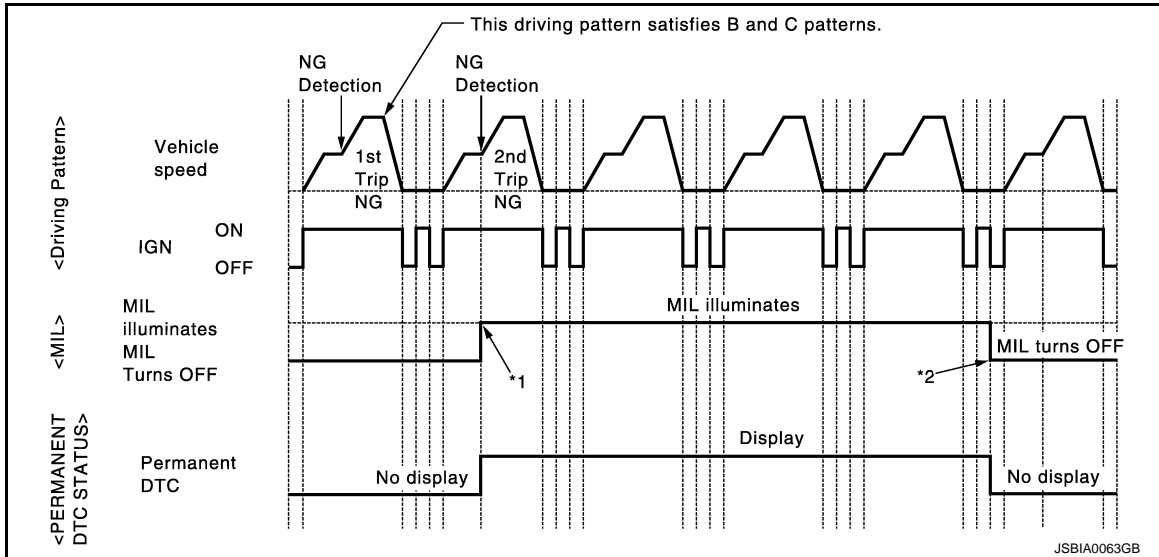
### Description

INFOID:000000006972220

### OUTLINE

When a DTC is stored in ECM

When a DTC is stored in ECM and MIL is ON, a permanent DTC is erased with MIL shutoff if the same malfunction is not detected after performing the driving pattern for MIL shutoff three times in a row.



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

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

When a DTC is not stored in ECM

The erasing method depends on a permanent DTC stored in ECM. Refer to the following table.

**NOTE:**

If the applicable permanent DTC includes multiple groups, perform the procedure of Group B first. If the permanent DTC is not erased, perform the procedure of Group A.

×: Applicable —: Not applicable

Group *	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	×	—	—
B	—	×	×

\*: For group, refer to [EC-465. "DTC Index"](#).

### PERMANENT DTC ITEM

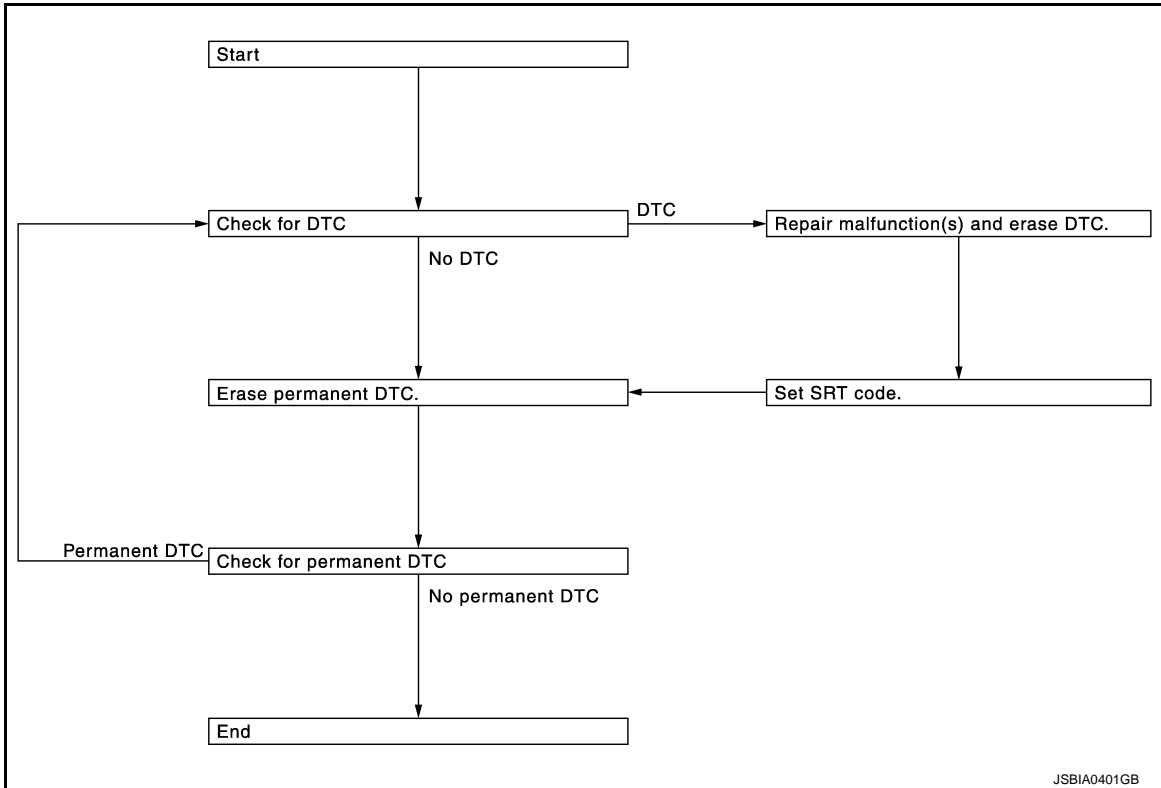
For permanent DTC items, MIL turns ON. Refer to [EC-465. "DTC Index"](#).

# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

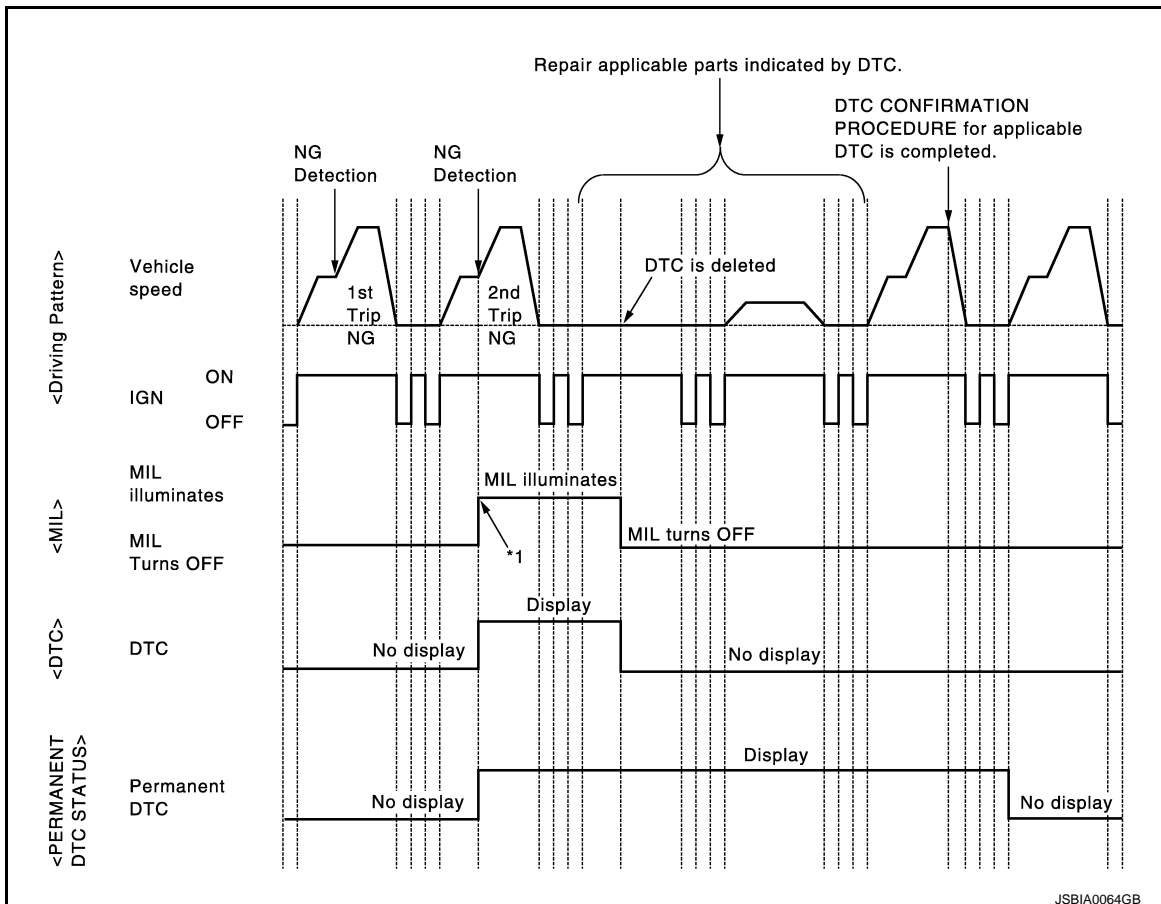
[MR18DE (EXCEPT FOR CALIFORNIA)]

## PERMANENT DTC SERVICE PROCEDURE



### Work Procedure (Group A)

INFOID:000000006972221



# HOW TO ERASE PERMANENT DTC

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

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

## 1. CHECK DTC

Check DTC.

Is any DTC detected?

YES-1 >>  With CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-117, "CONSULT-III Function"](#).

YES-2 >>  Without CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-114, "On Board Diagnosis Function"](#).

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 3.

NO >> END

## 3. PERFORM DTC CONFIRMATION PROCEDURE

Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM. Refer to [EC-465, "DTC Index"](#).

>> GO TO 4.

## 4. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 1.

NO >> END

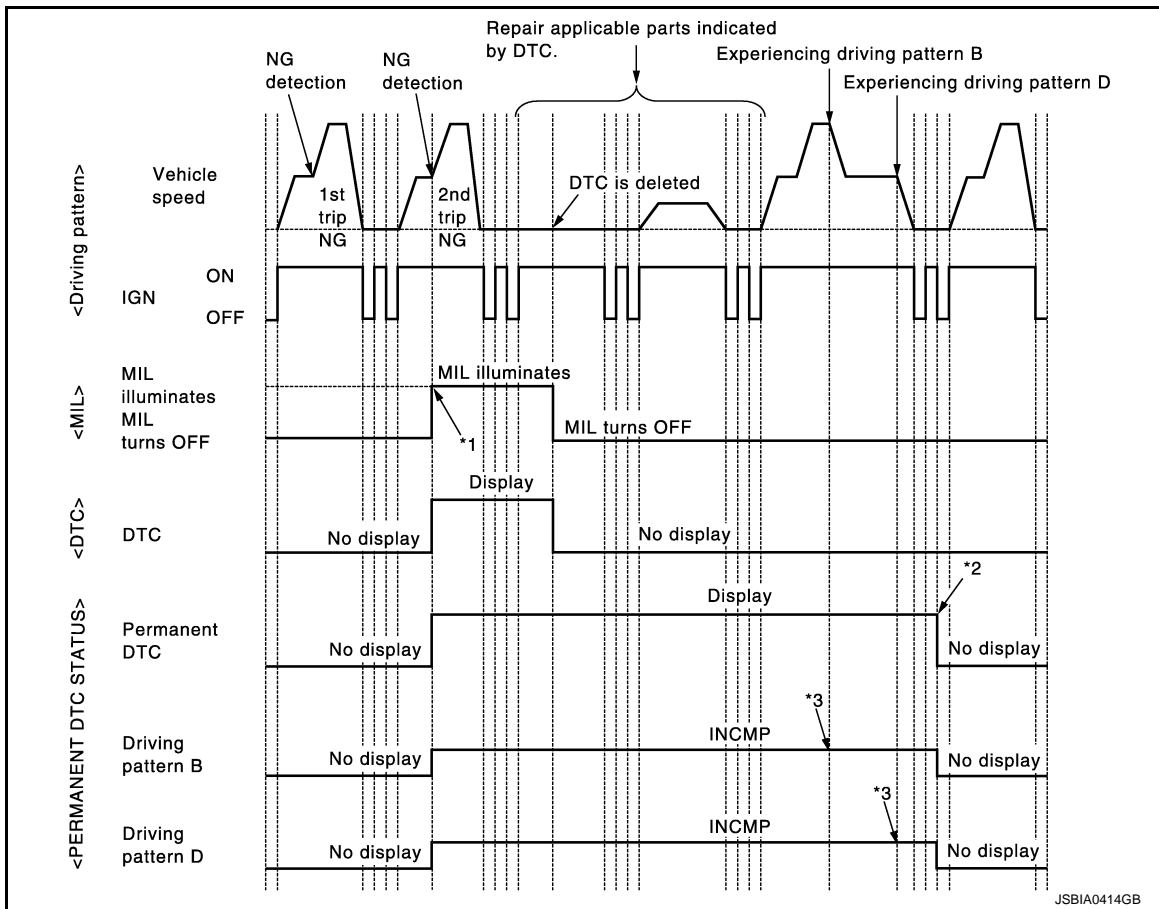
# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Work Procedure (Group B)

INFOID:000000006972222



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

\*2: After experiencing driving pattern B and D, permanent DTC is erased.

\*3: Indication does not change unless the ignition switch is turned from ON to OFF twice even after experiencing driving pattern B or D.

### NOTE:

Drive the vehicle according to only driving patterns indicating "INCMP" in driving patterns B and D on the "PERMANENT DTC STATUS" screen.

## 1. CHECK DTC

Check DTC.

Is any DTC detected?

YES-1 >>  With CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-117, "CONSULT-III Function"](#).

YES-2 >>  Without CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-114, "On Board Diagnosis Function"](#).

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

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

# HOW TO ERASE PERMANENT DTC

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 3.

NO >> END

## 3. DRIVE DRIVING PATTERN B

### CAUTION:

- Always drive at a safe speed.
- Never erase self-diagnosis results.
- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.

Ⓟ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT-III to drive the vehicle according to driving pattern B. Refer to [EC-117, "CONSULT-III Function"](#), [EC-111, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

Ⓢ With GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle according to driving pattern B. Refer to [EC-111, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

>> GO TO 4.

## 4. CHECK PERMANENT DTC

Ⓟ With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

Ⓢ With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 5.

NO >> END

## 5. DRIVE DRIVING PATTERN D

### CAUTION:

- Always drive at a safe speed.
- Never erase self-diagnosis results.
- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.

1. Drive the vehicle according to driving pattern D. Refer to [EC-111, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

>> GO TO 6.

## 6. CHECK PERMANENT DTC

Ⓟ With CONSULT-III

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

# HOW TO ERASE PERMANENT DTC

[MR18DE (EXCEPT FOR CALIFORNIA)]

< BASIC INSPECTION >

3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

 With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

- YES >> GO TO 1.  
NO >> END

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# ENGINE CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

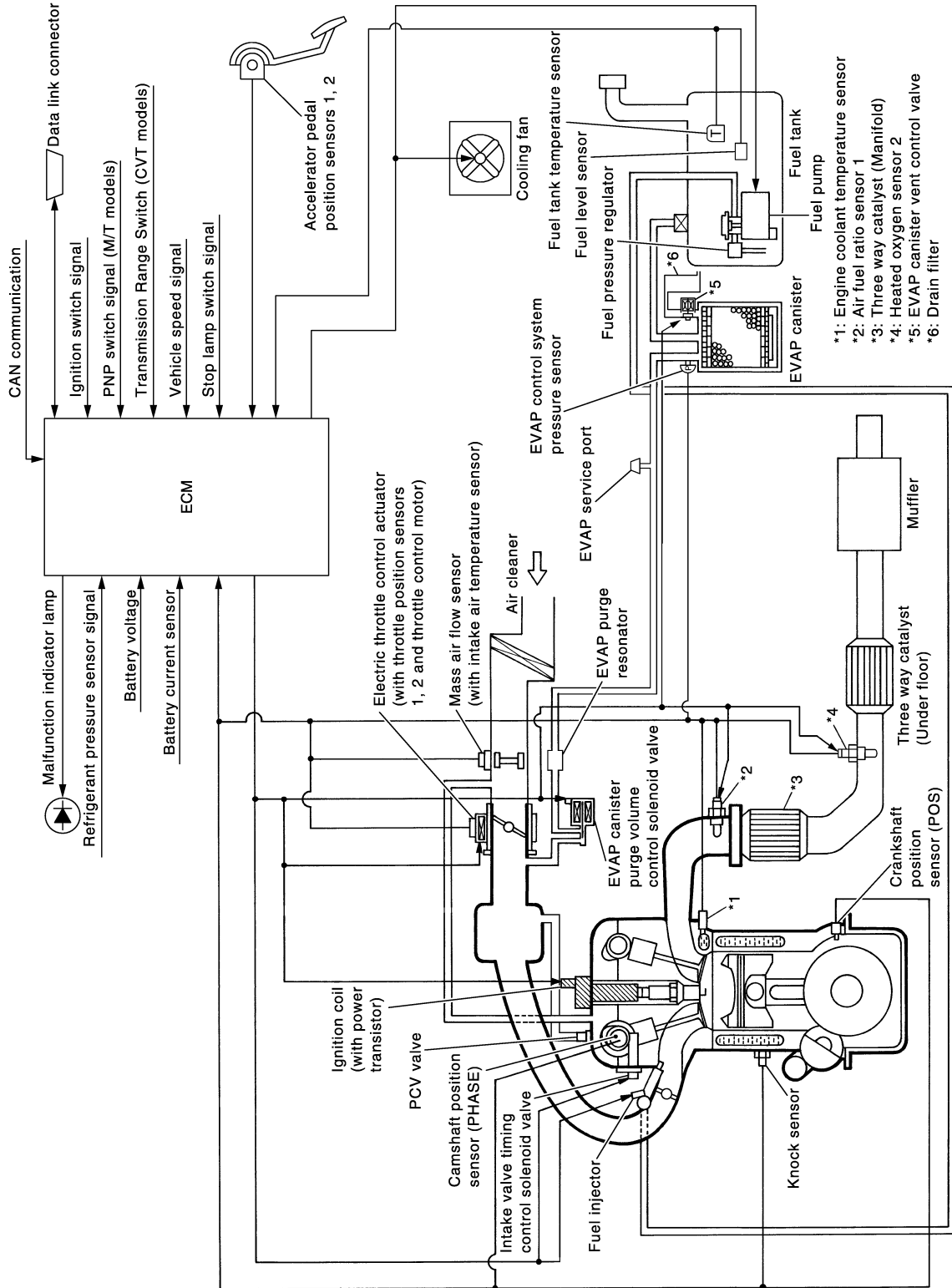
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### ENGINE CONTROL SYSTEM

#### System Diagram

INFOID:000000006503676



JMBIA2930GB



# ENGINE CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

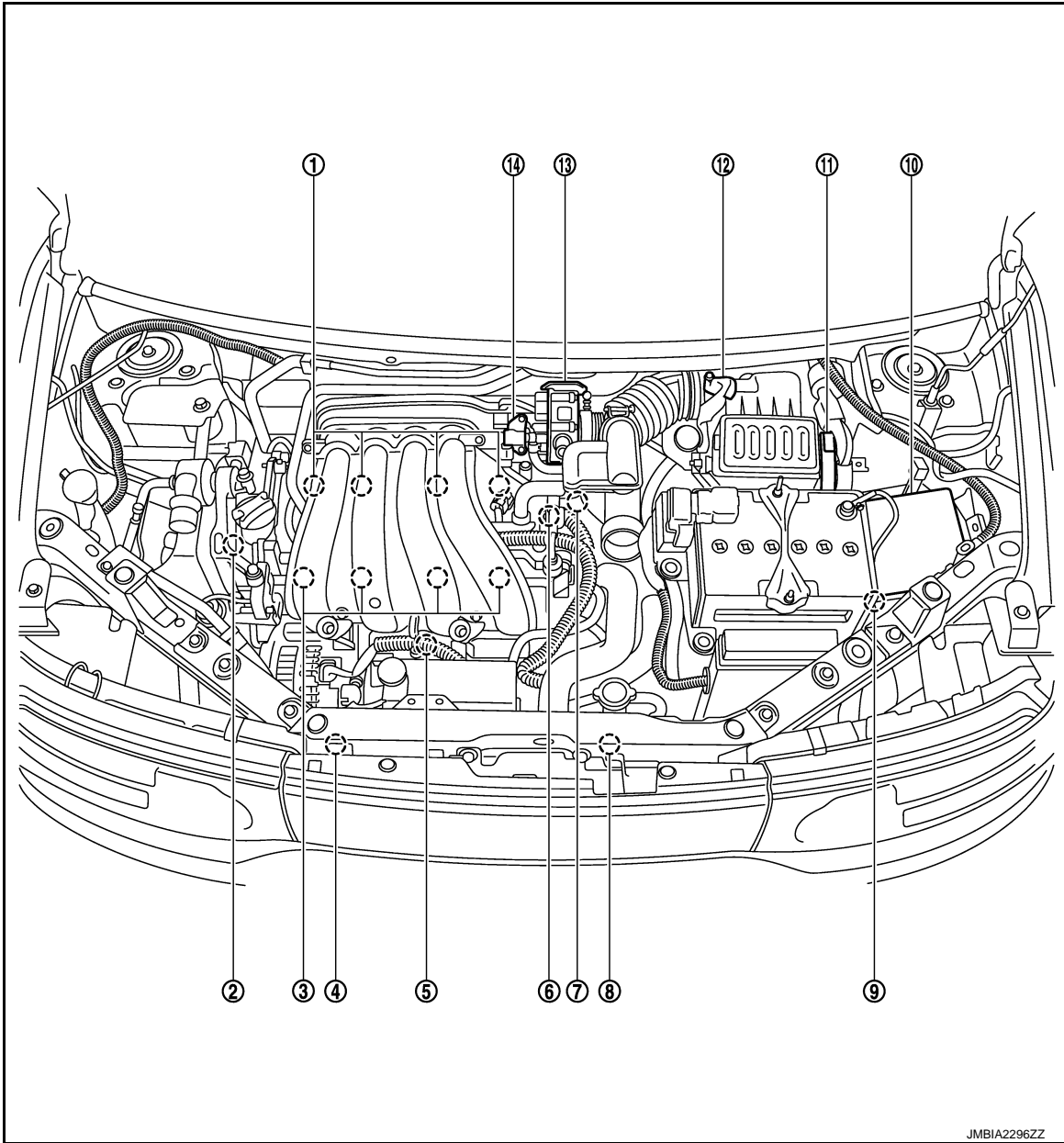
## System Description

INFOID:000000006503677

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

## Component Parts Location

INFOID:000000006503678



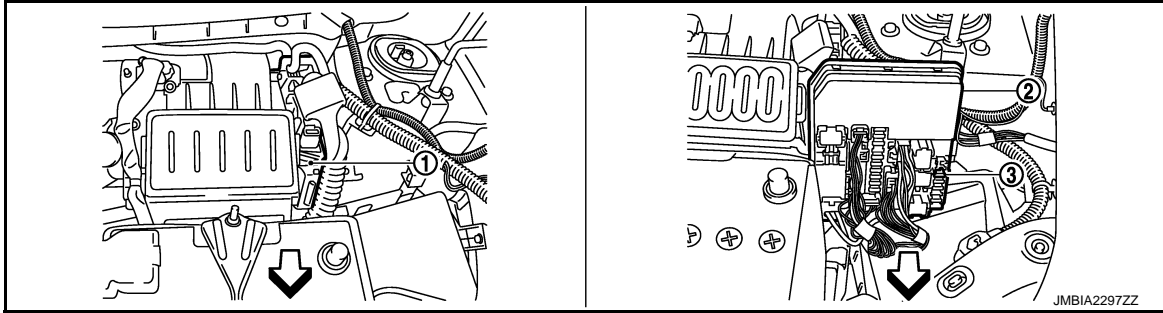
- |  |   |   |
|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

JMBIA2296ZZ

# ENGINE CONTROL SYSTEM

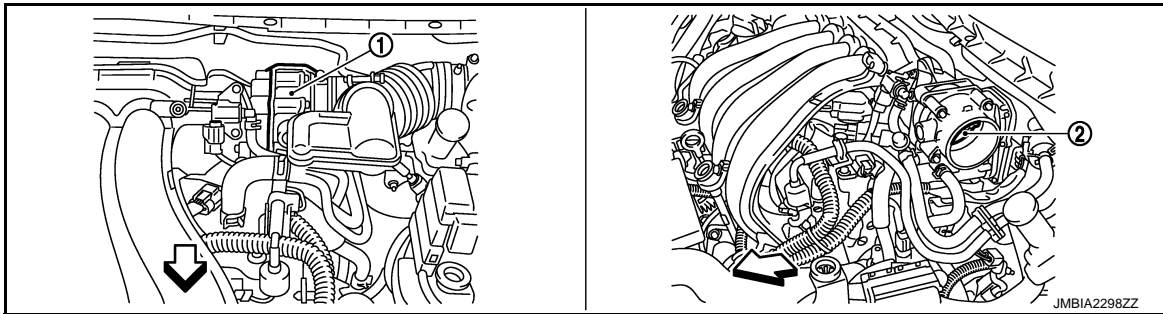
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



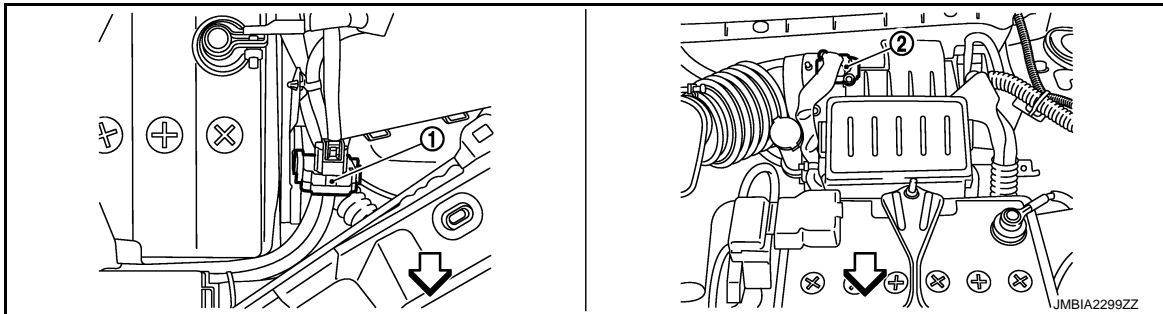
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



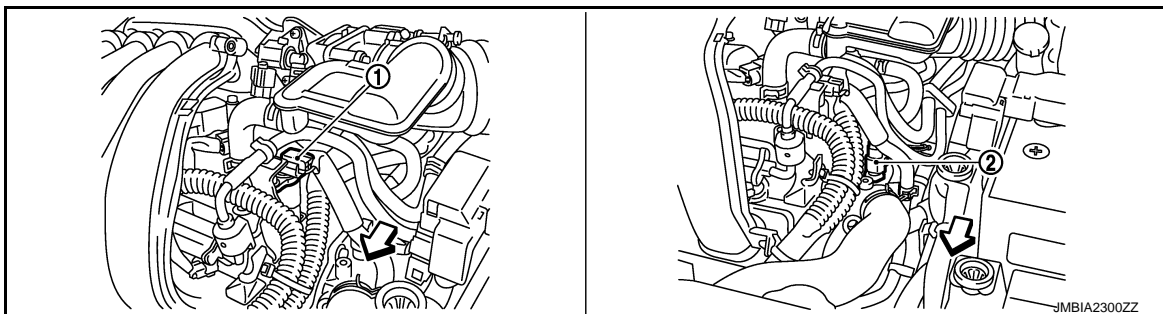
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



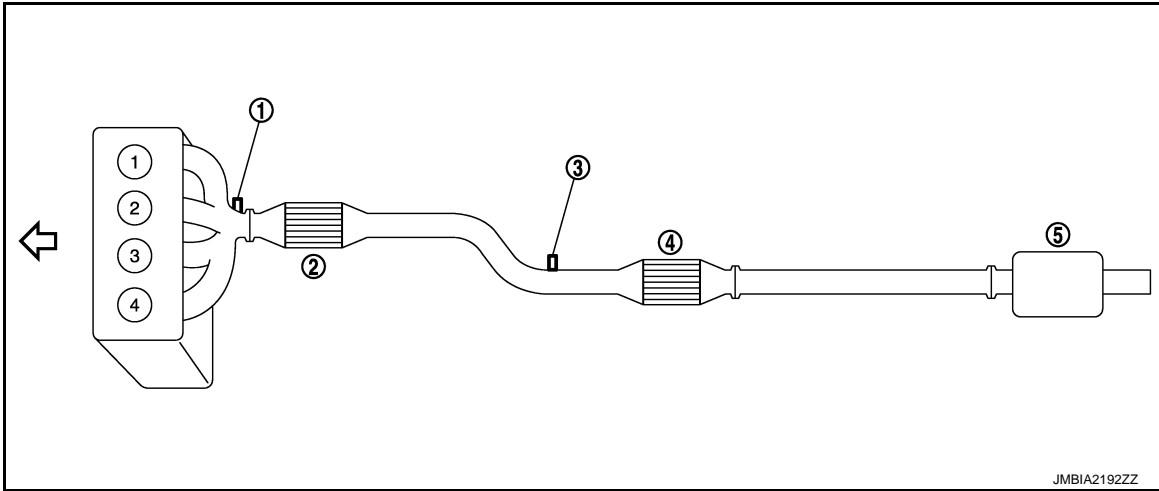
# ENGINE CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

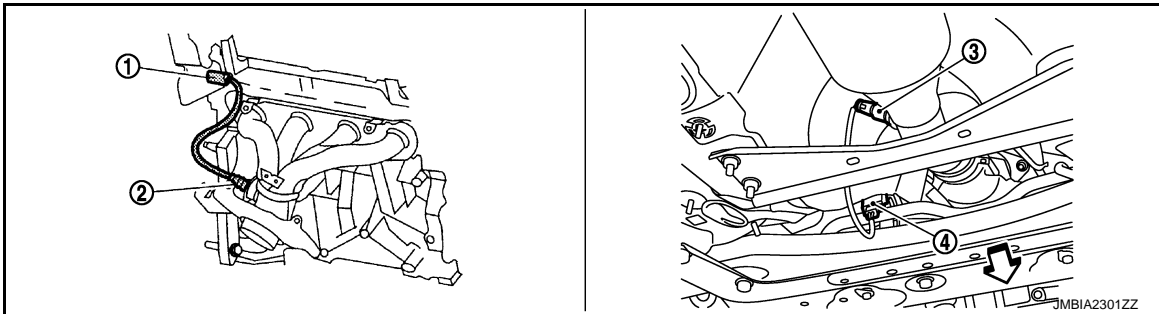
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



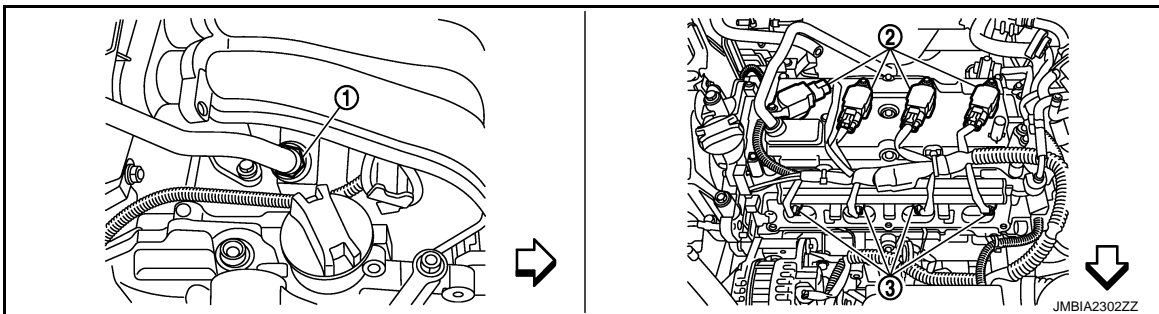
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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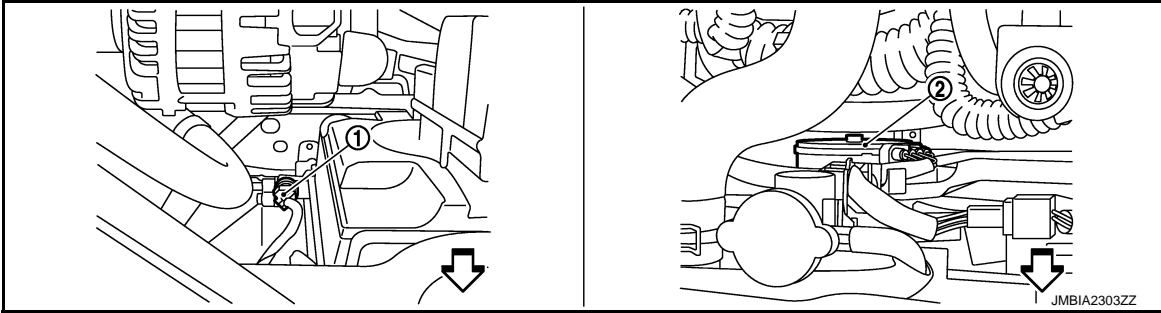
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# ENGINE CONTROL SYSTEM

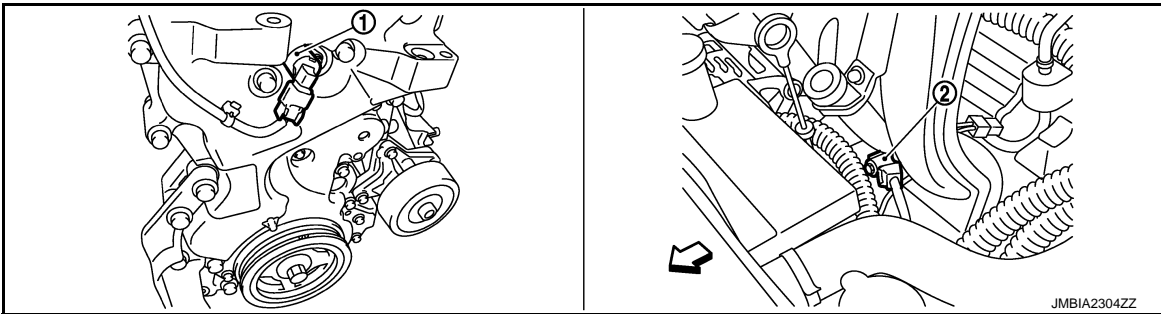
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



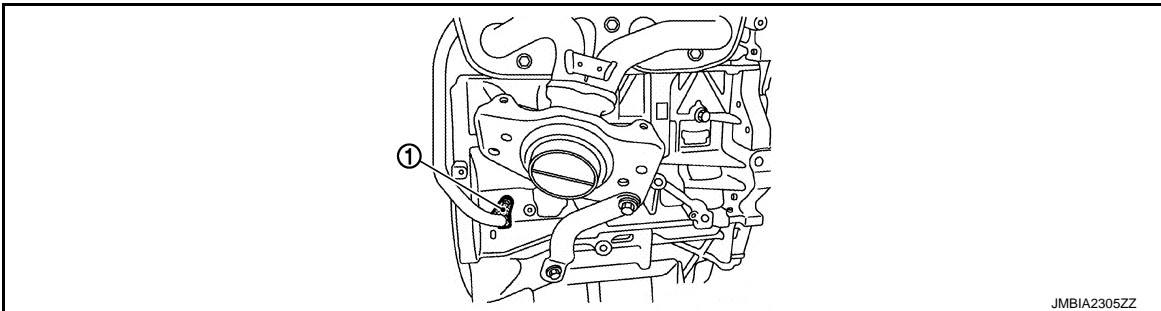
1. Refrigerant pressure sensor      2. Cooling fan motor

↶ Vehicle front

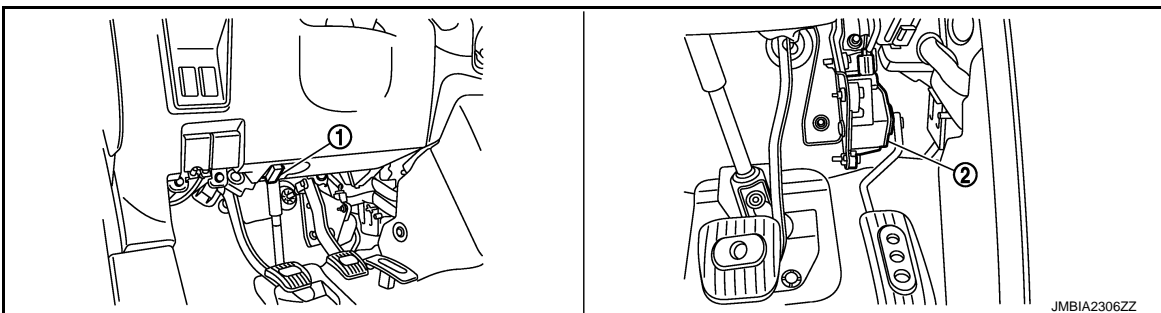


1. Intake valve timing control solenoid      2. Knock sensor valve

↶ Vehicle front



1. Crankshaft position sensor (POS)

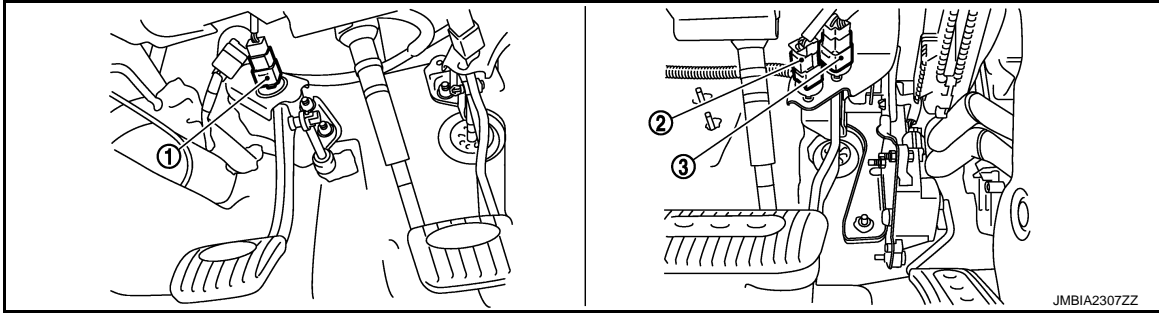


1. Data link connector      2. Accelerator pedal position sensor

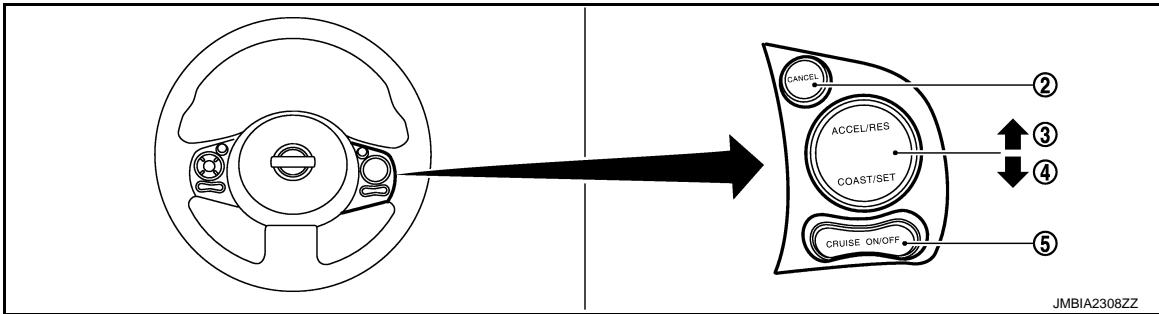
# ENGINE CONTROL SYSTEM

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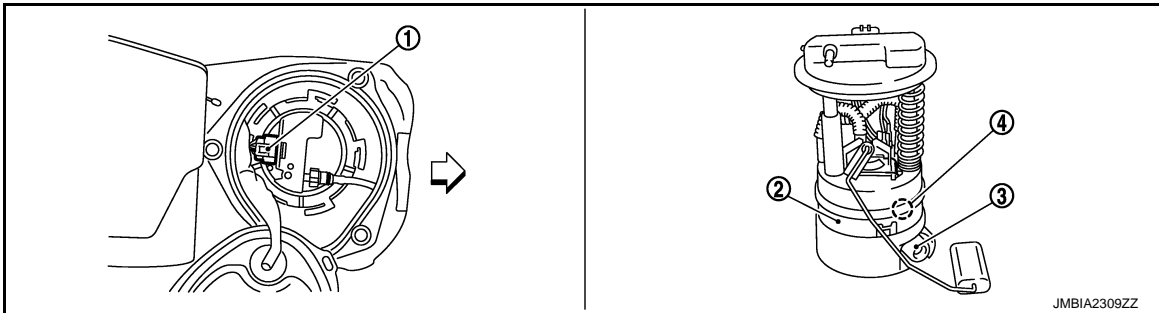
[MR18DE (EXCEPT FOR CALIFORNIA)]



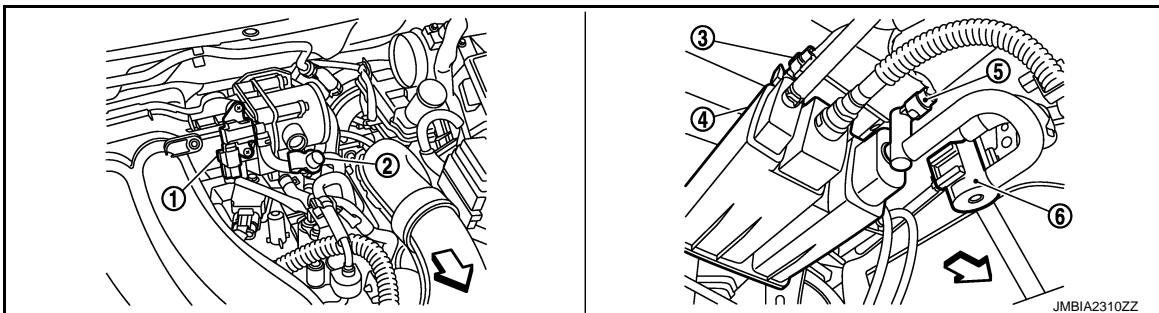
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump
  - 2. Fuel level sensor unit and fuel pump harness connector
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# ENGINE CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

4. EVAP canister  
 ↶ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006503679

Component	Reference
A/F sensor 1	<a href="#">EC-185, "Description"</a>
A/F sensor 1 heater	<a href="#">EC-144, "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-391, "Description"</a>
ASCD brake switch	<a href="#">EC-366, "Description"</a>
ASCD steering switch	<a href="#">EC-363, "Description"</a>
ASCD vehicle speed sensor	<a href="#">EC-373, "Description"</a>
Battery current sensor	<a href="#">EC-347, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-250, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246, "Description"</a>
Cooling fan motor	<a href="#">EC-79, "System Description"</a>
Electric throttle control actuator	<a href="#">EC-389, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169, "Description"</a>
EVAP canister purge volume control solenoid valve	<a href="#">EC-272, "Description"</a>
EVAP canister vent control valve	<a href="#">EC-280, "Description"</a>
EVAP control system pressure sensor	<a href="#">EC-288, "Description"</a>
Fuel injector	<a href="#">EC-418, "Description"</a>
Fuel level sensor	<a href="#">EC-314, "Description"</a>
Fuel pump	<a href="#">EC-421, "Description"</a>
Fuel tank temperature sensor	<a href="#">EC-228, "Description"</a>
Heated oxygen sensor 2	<a href="#">EC-195, "Description"</a>
Heated oxygen sensor 2 heater	<a href="#">EC-147, "Description"</a>
Ignition signal	<a href="#">EC-424, "Description"</a>
Intake air temperature sensor	<a href="#">EC-167, "Description"</a>
Intake valve timing control solenoid valve	<a href="#">EC-97, "System Description"</a>
Knock sensor	<a href="#">EC-244, "Description"</a>
Mass air flow sensor	<a href="#">EC-153, "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-334, "Description"</a>
Transmission range switch (CVT models)	
PCV valve	<a href="#">EC-436, "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-437, "Description"</a>
Stop lamp switch	<a href="#">EC-377, "Description"</a>
Throttle control motor	<a href="#">EC-387, "Description"</a>
Throttle control motor relay	<a href="#">EC-380, "Description"</a>
Throttle position sensor	<a href="#">EC-175, "Description"</a>

# MULTIPOINT FUEL INJECTION SYSTEM

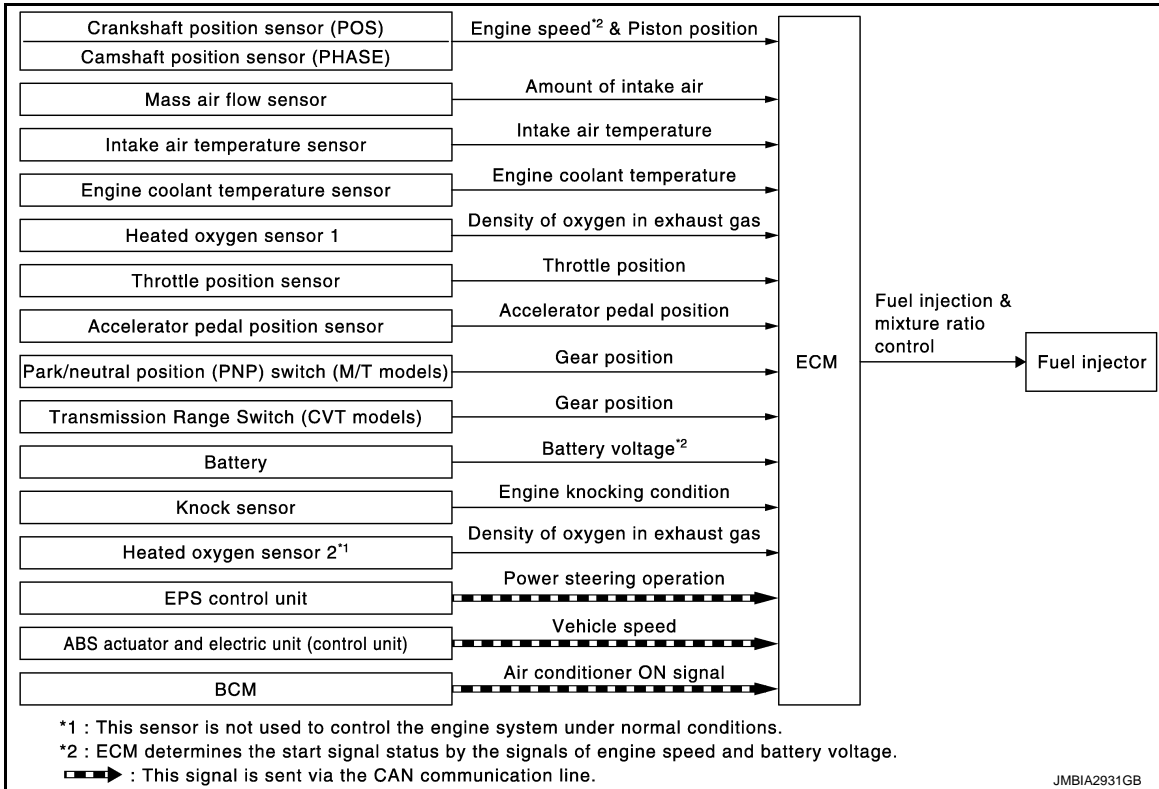
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## MULTIPOINT FUEL INJECTION SYSTEM

### System Diagram

INFOID:000000006503680



### System Description

INFOID:000000006503681

#### 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 (M/T models)	Gear position		
Transmission range switch (CVT models)	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
EPS control unit	Power steering operation*2		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
BCM	Air conditioner ON signal*2		

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

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

# MULTIPOINT FUEL INJECTION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

\*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.

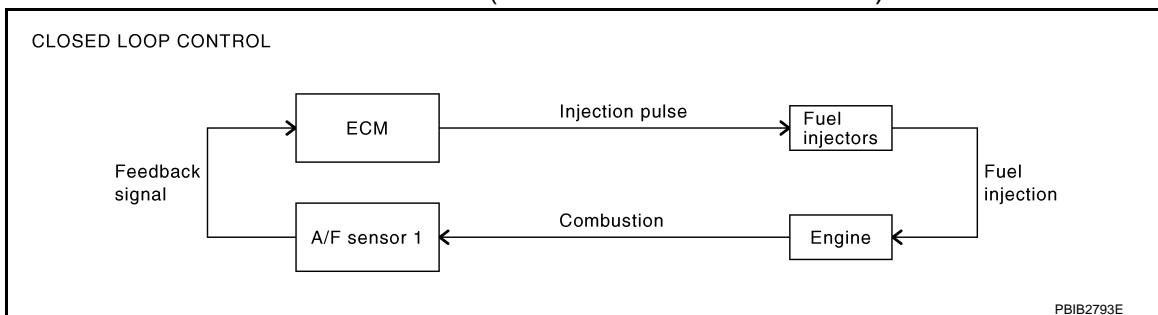
#### <Fuel increase>

- 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 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-185, "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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

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

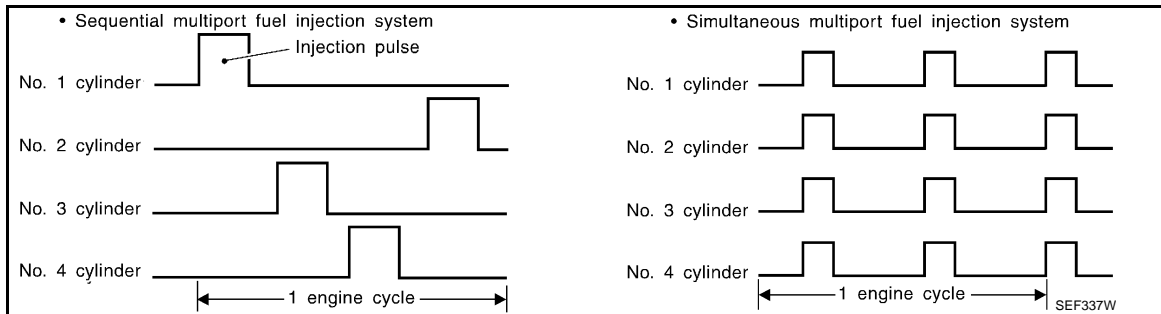
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

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

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

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

## FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multipoint Fuel Injection System

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

- Simultaneous 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.

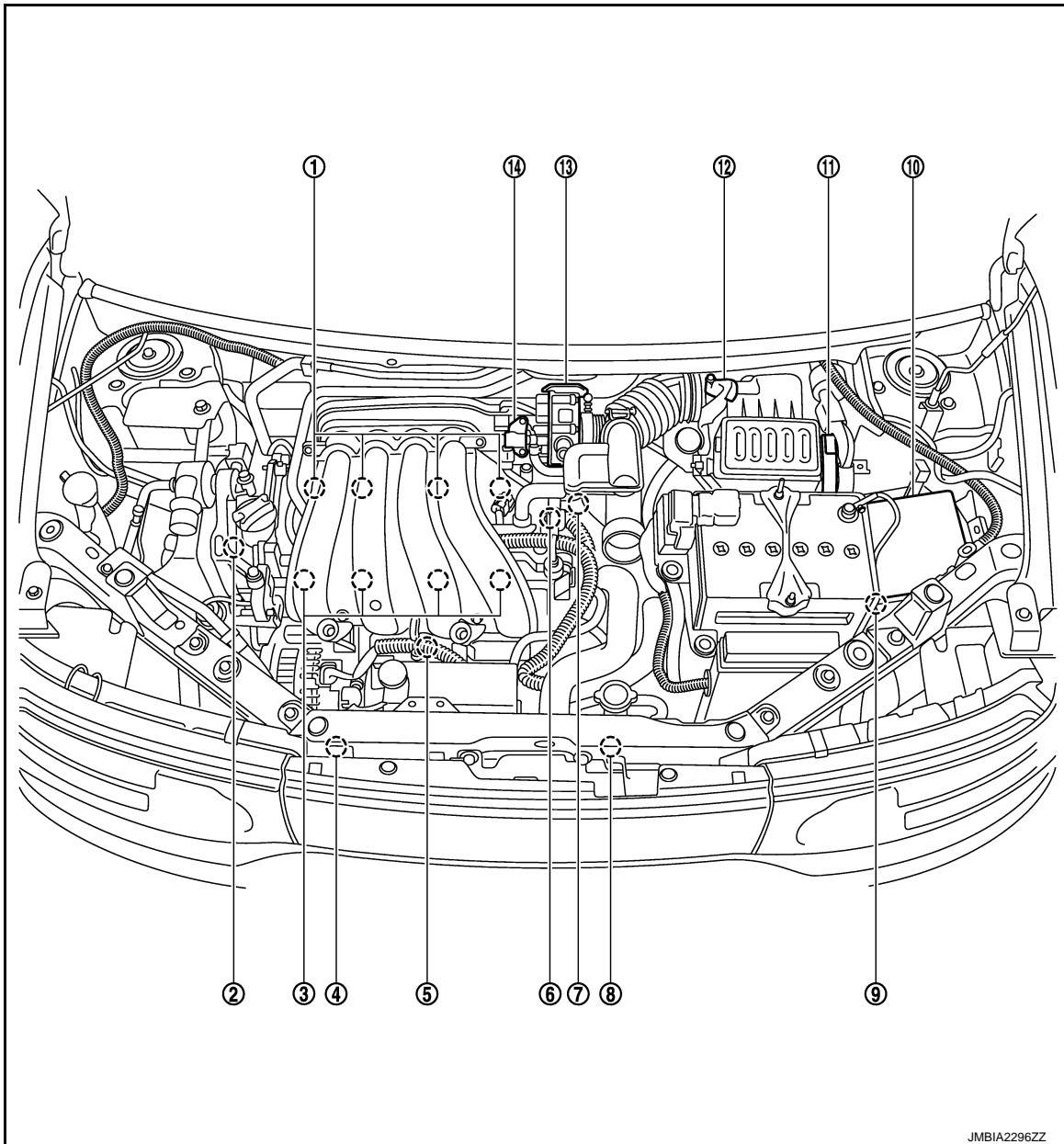
# MULTIPOINT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Parts Location

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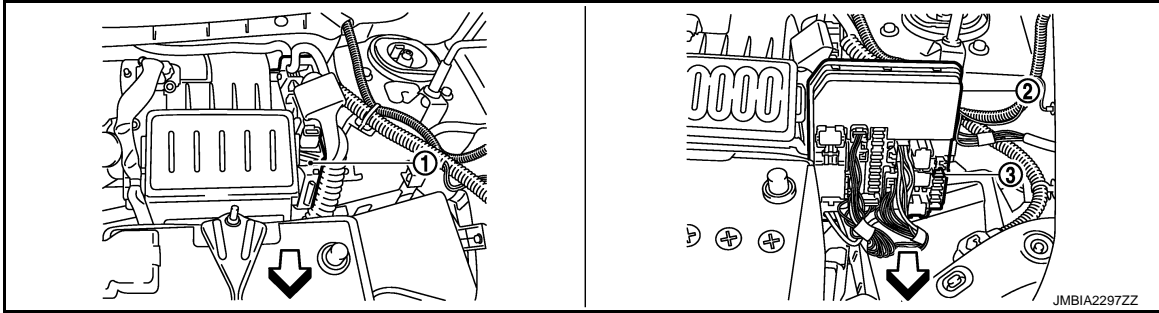
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| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid               | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

# MULTIPOINT FUEL INJECTION SYSTEM

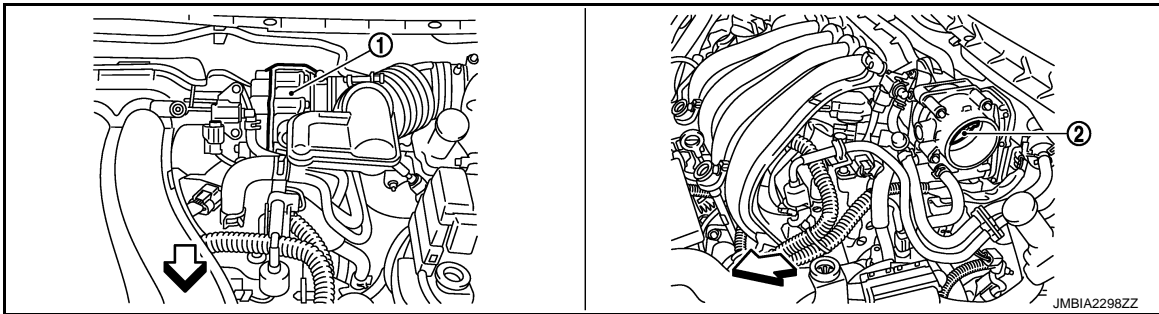
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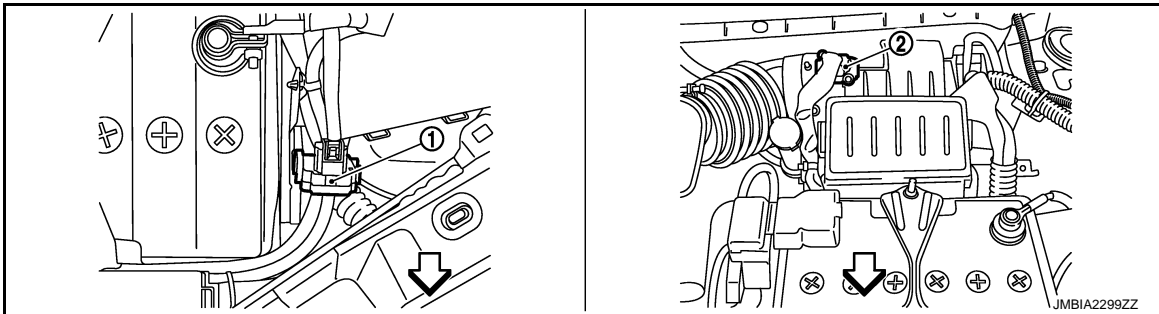
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



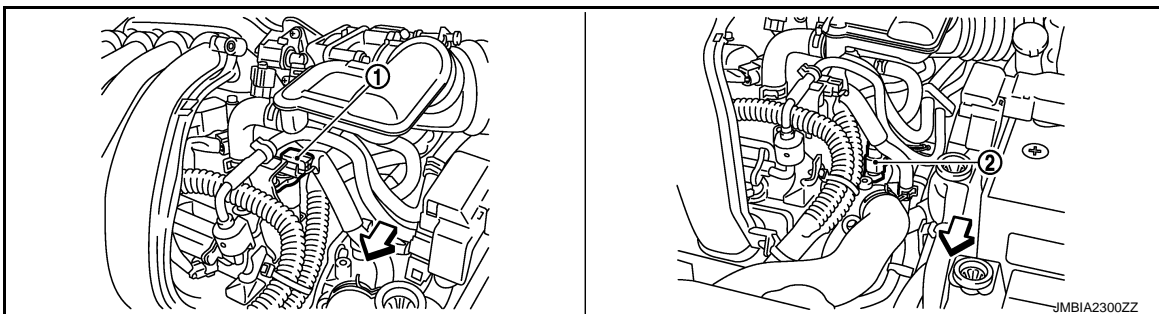
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

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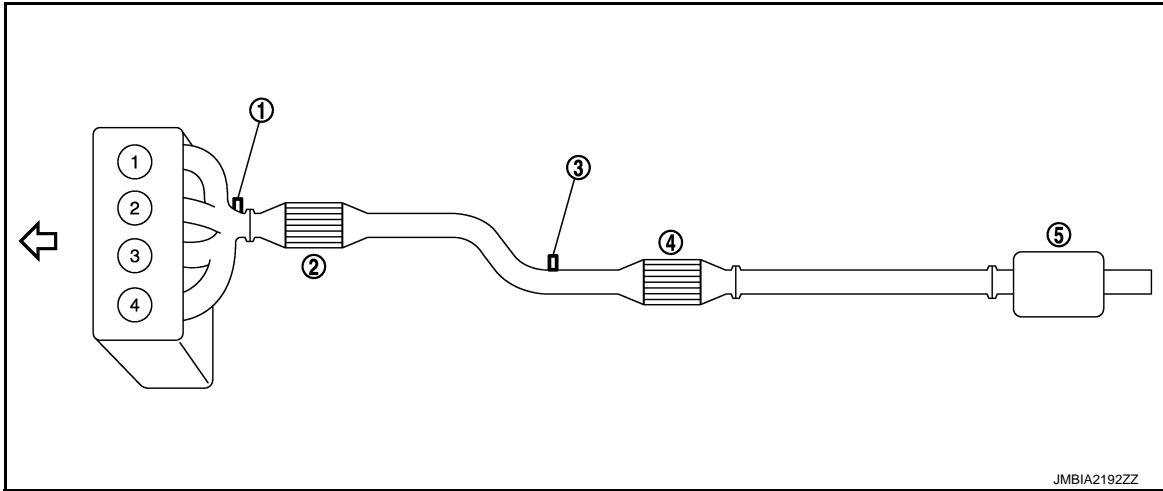
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[MR18DE (EXCEPT FOR CALIFORNIA)]

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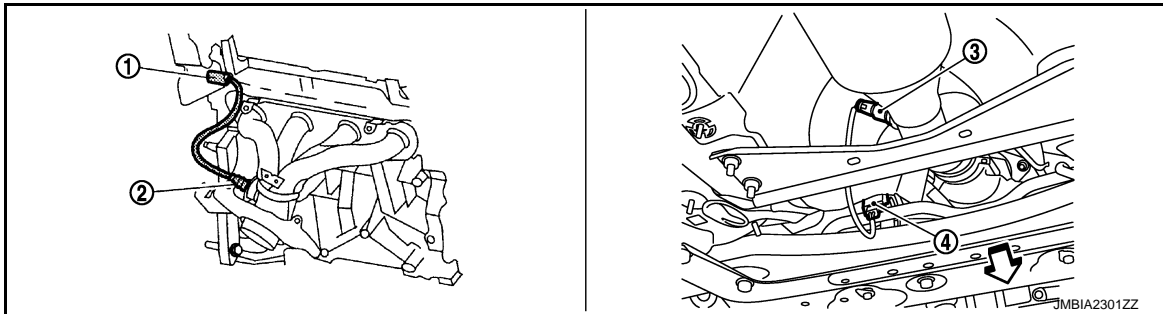
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

↶ Vehicle front



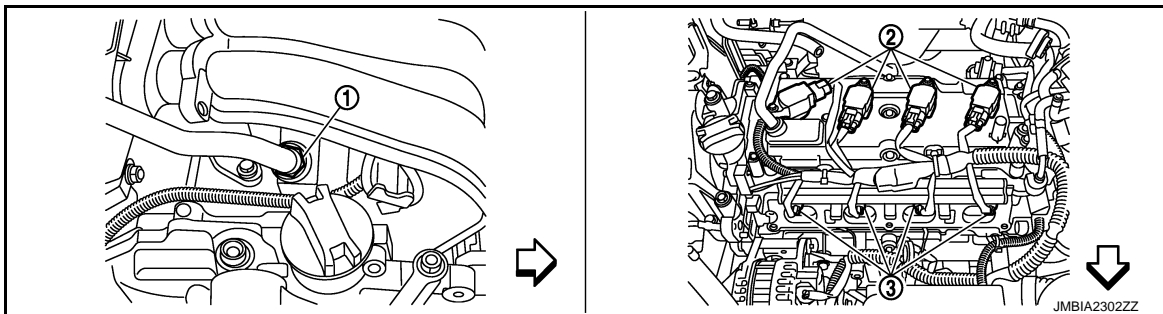
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

↶ Vehicle front



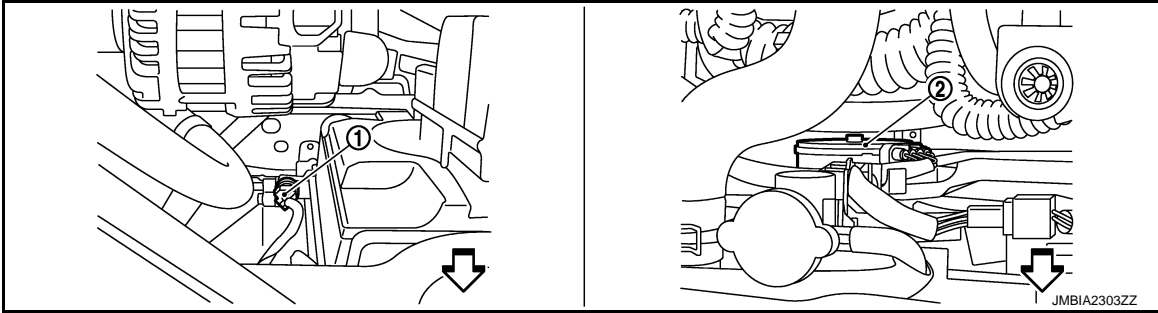
1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

↶ Vehicle front

# MULTIPOINT FUEL INJECTION SYSTEM

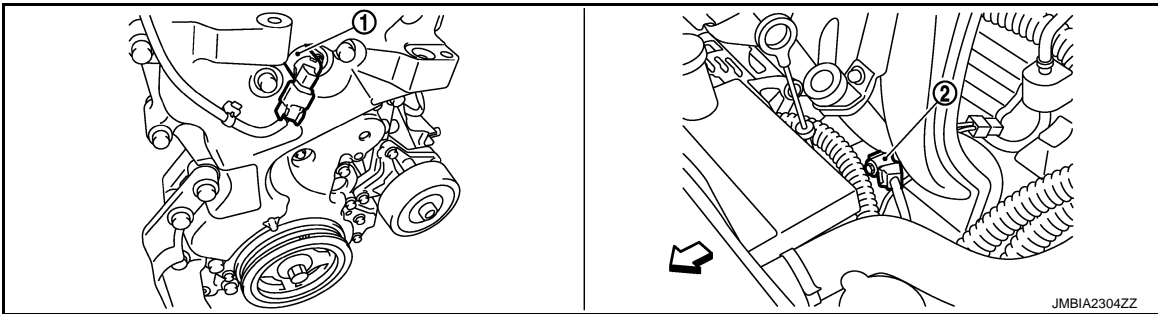
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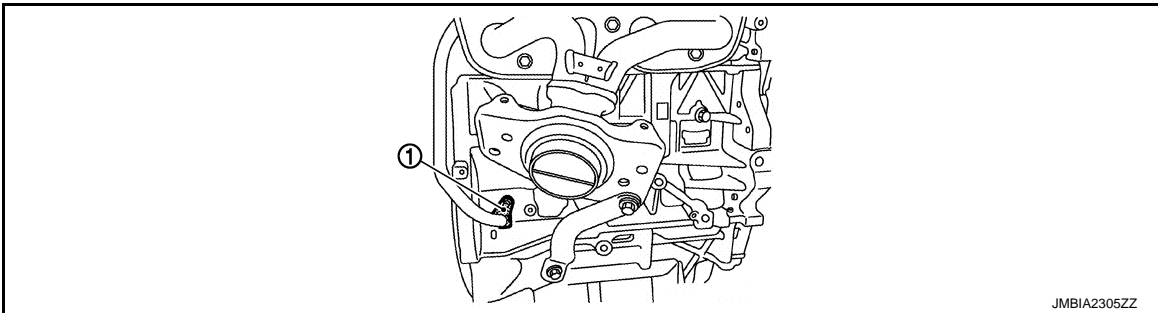
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

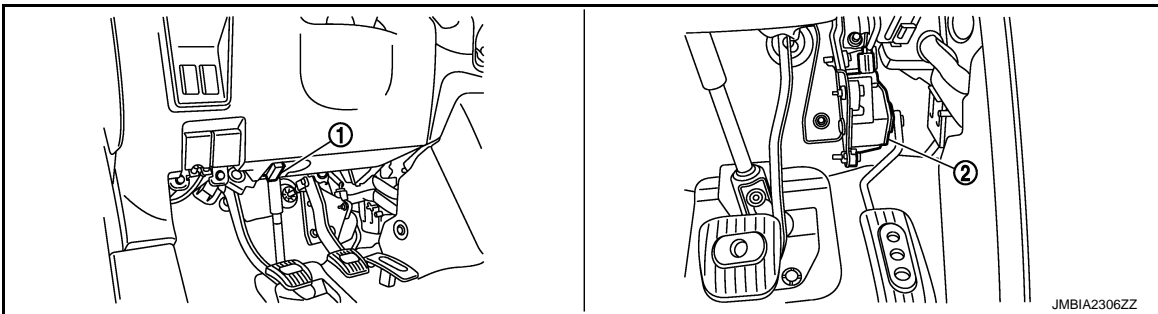


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)



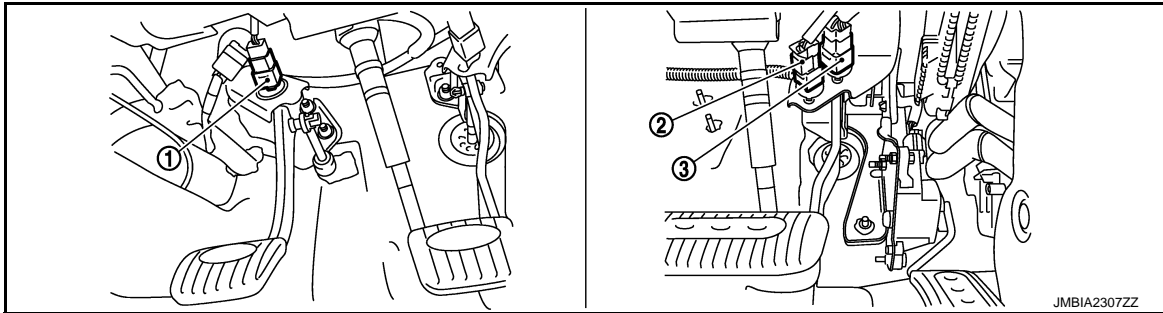
- 1. Data link connector
- 2. Accelerator pedal position sensor

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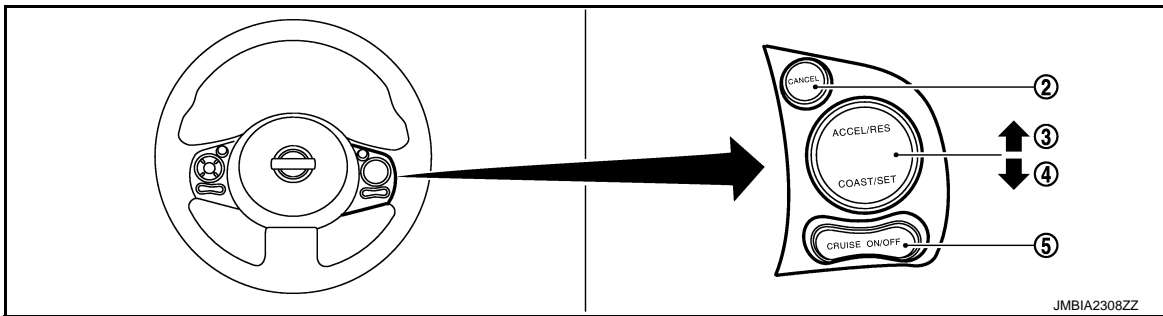
# MULTIPOINT FUEL INJECTION SYSTEM

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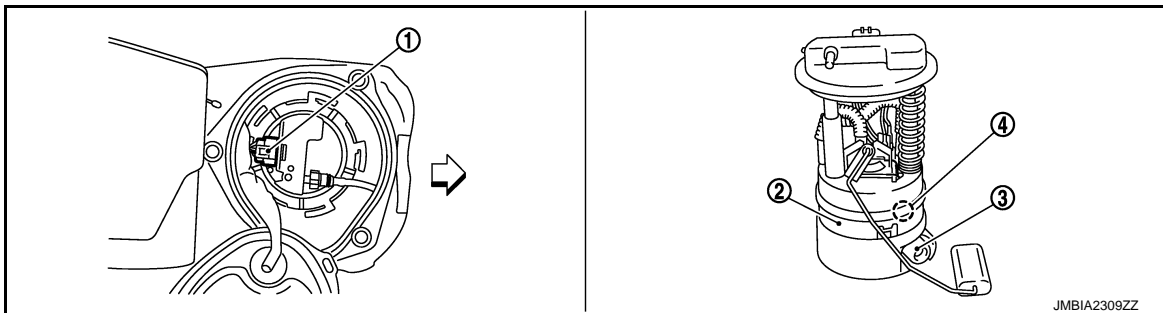
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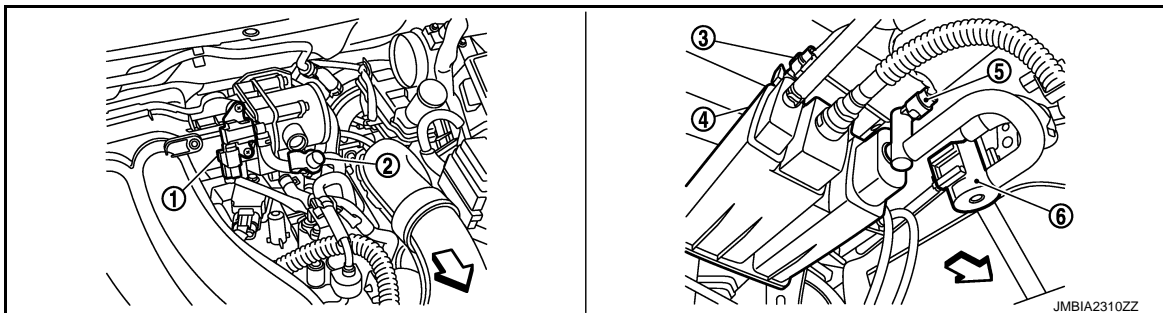
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# MULTIPOINT FUEL INJECTION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↶ Vehicle front

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## Component Description

INFOID:000000006503683

EC

Component	Reference
A/F sensor 1	<a href="#">EC-185, "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-391, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-250, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169, "Description"</a>
Fuel injector	<a href="#">EC-418, "Description"</a>
Heated oxygen sensor 2	<a href="#">EC-195, "Description"</a>
Intake air temperature sensor	<a href="#">EC-167, "Description"</a>
Knock sensor	<a href="#">EC-244, "Description"</a>
Mass air flow sensor	<a href="#">EC-153, "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-334, "Description"</a>
Transmission range switch (CVT models)	
Throttle position sensor	<a href="#">EC-175, "Description"</a>

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# ELECTRIC IGNITION SYSTEM

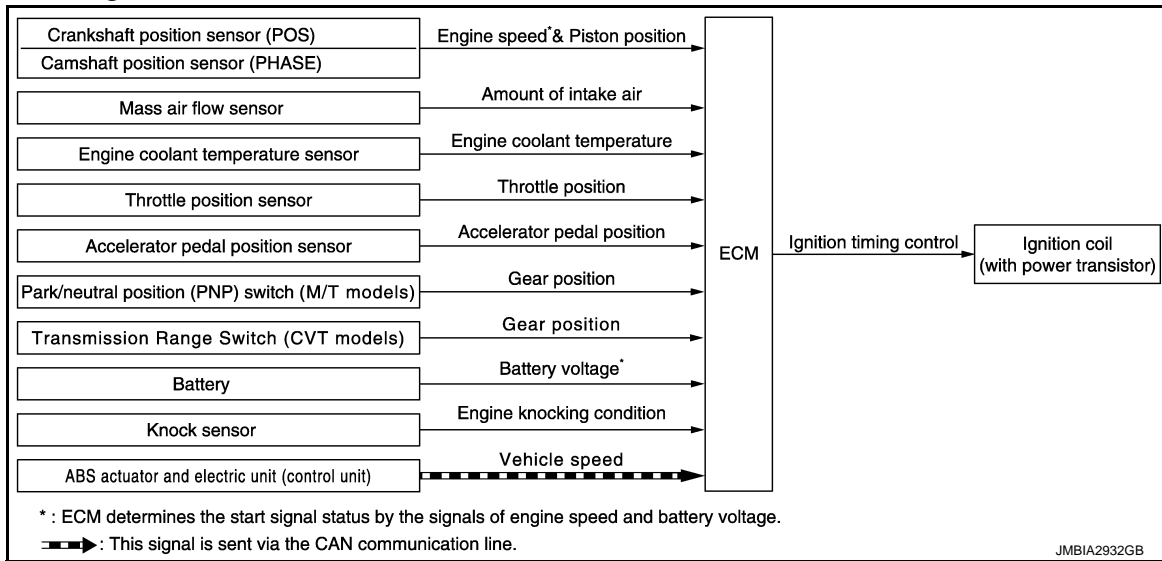
[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## ELECTRIC IGNITION SYSTEM

### System Diagram

INFOID:000000006503684



### System Description

INFOID:000000006503685

#### 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 (M/T models)	Gear position		
Transmission range switch (CVT models)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*1		

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

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

#### SYSTEM DESCRIPTION

Ignition order: 1 - 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



# ELECTRIC IGNITION SYSTEM

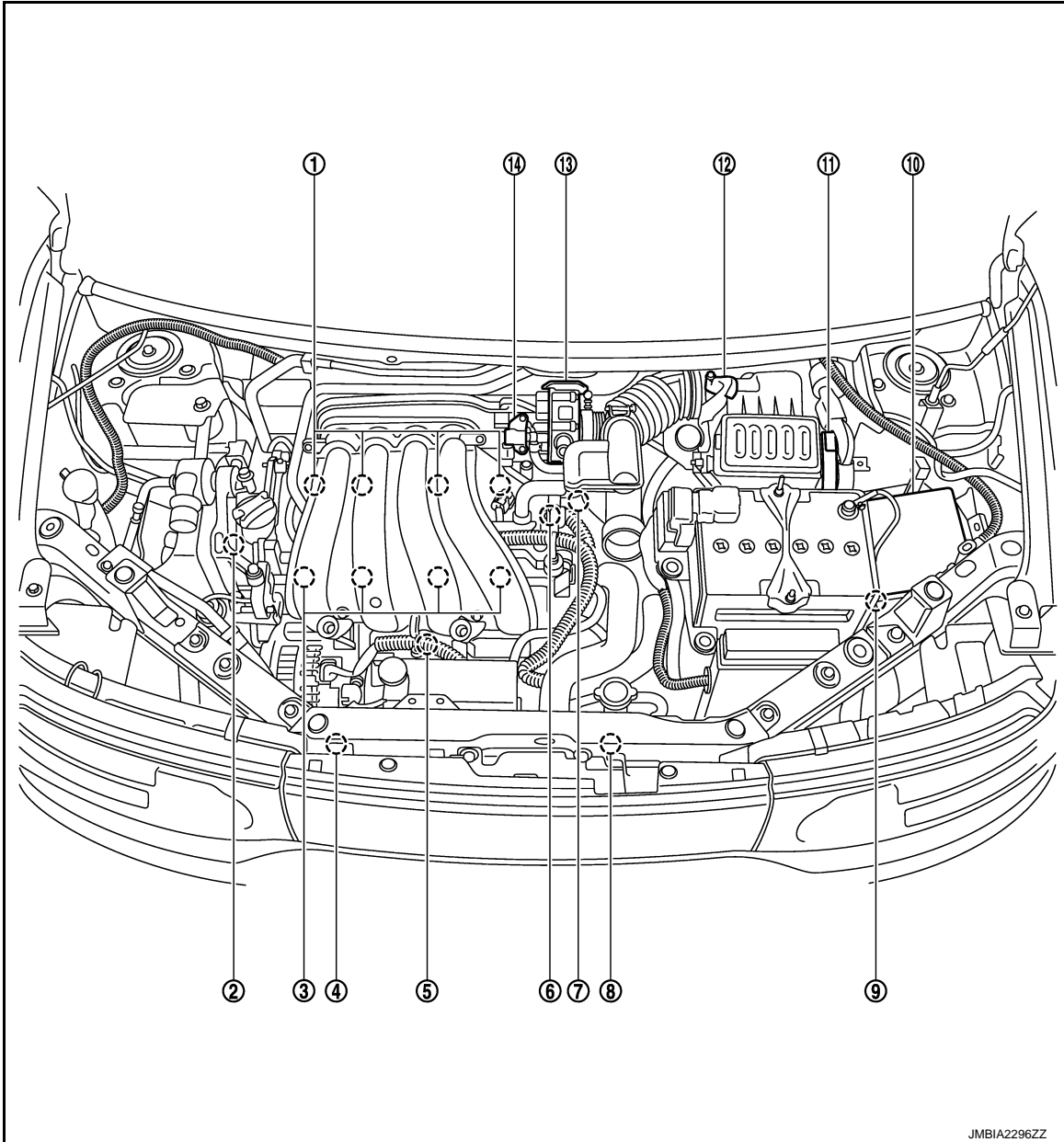
[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

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 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:000000006503686

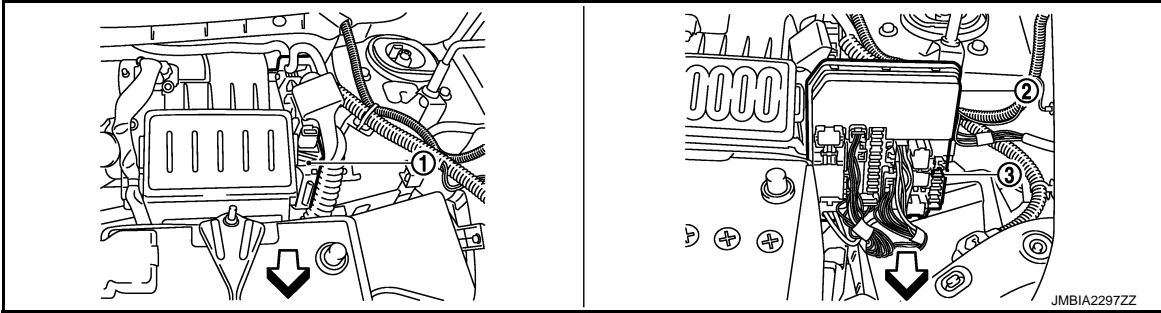


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|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

# ELECTRIC IGNITION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

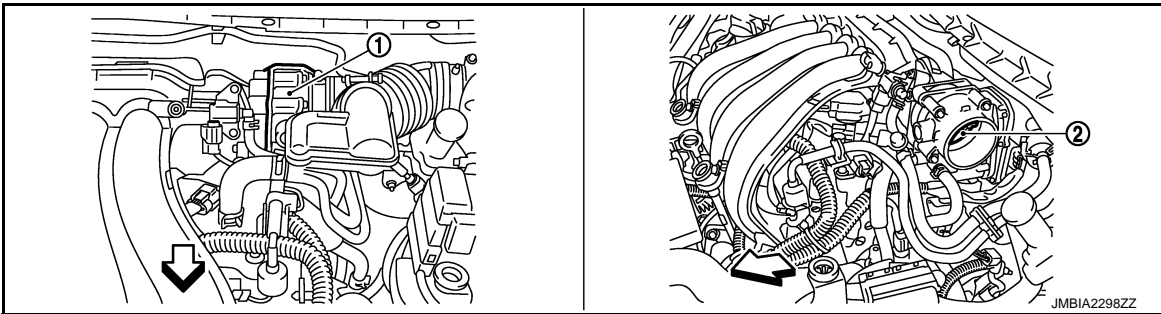


1. ECM

2. IPDM E/R

3. Fuel pump fuse (15 A)

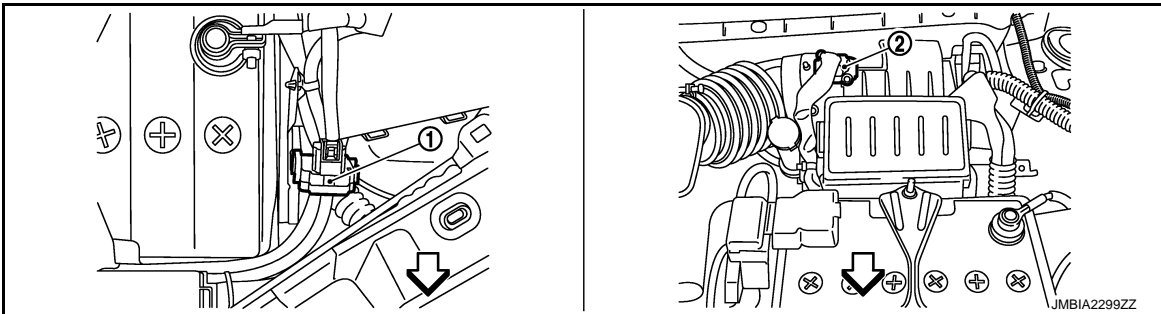
← Vehicle front



1. Electric throttle control actuator  
(with built-in position sensor, throttle  
control motor)

2. Throttle valve

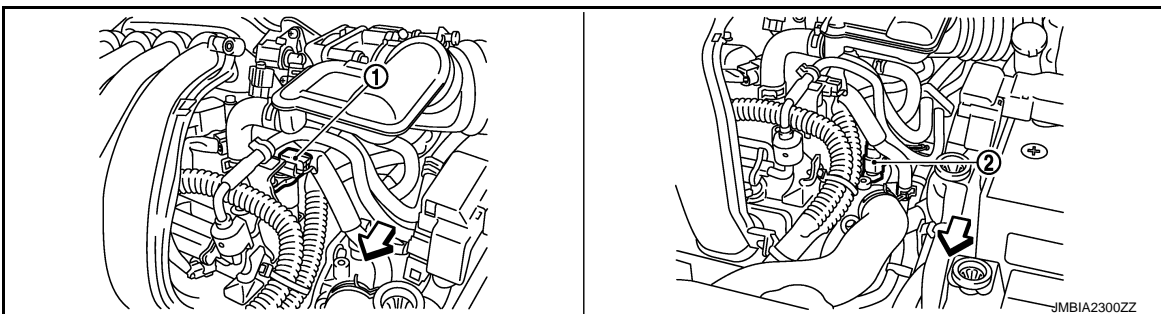
← Vehicle front



1. Battery current sensor

2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



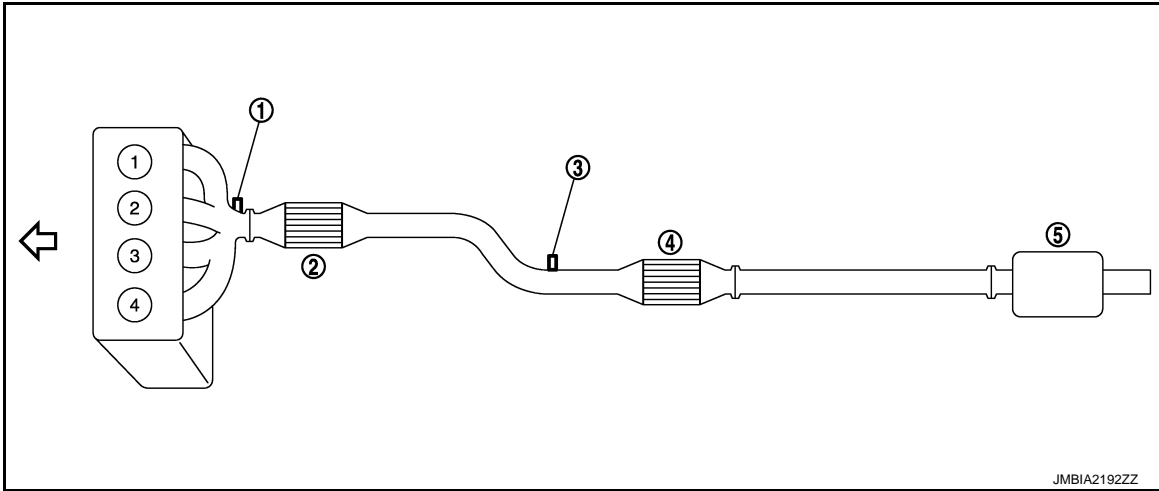
# ELECTRIC IGNITION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

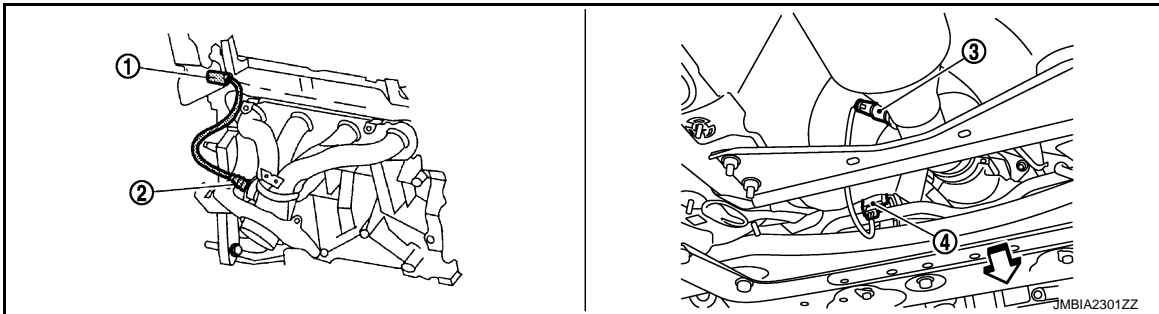
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



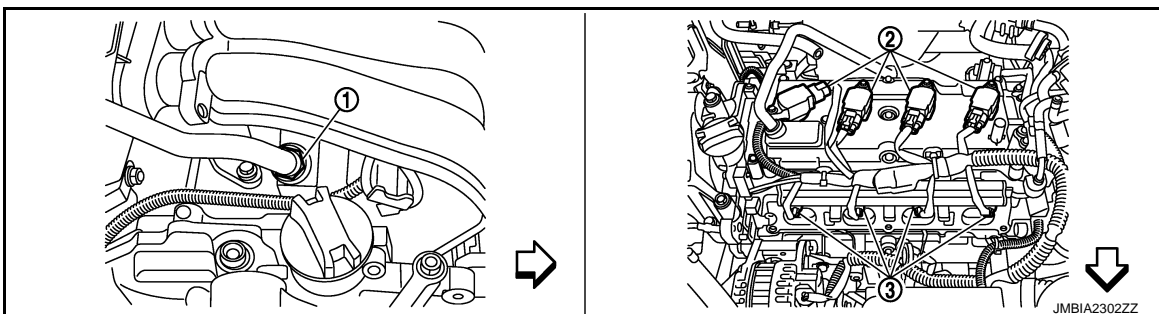
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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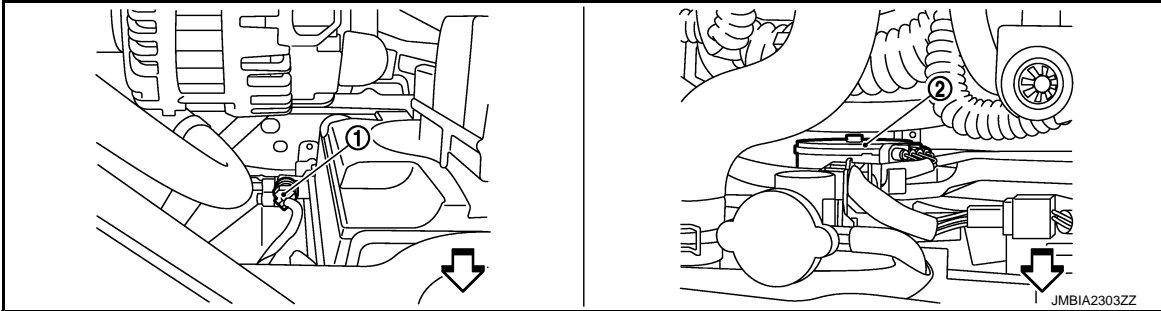
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# ELECTRIC IGNITION SYSTEM

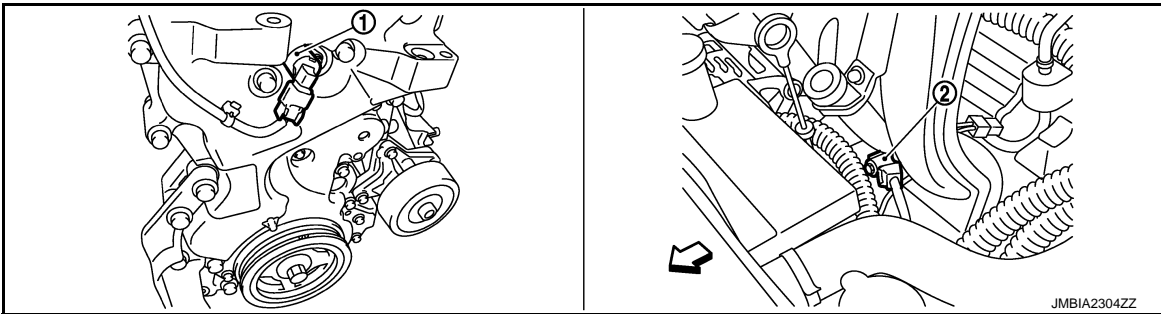
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[MR18DE (EXCEPT FOR CALIFORNIA)]



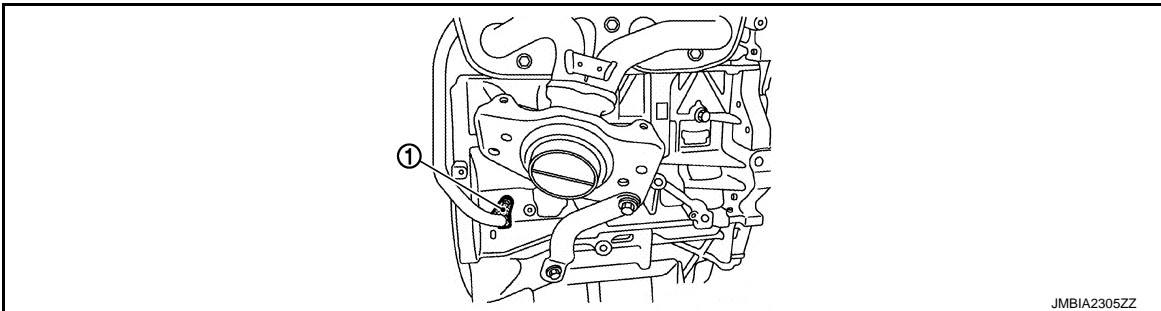
1. Refrigerant pressure sensor      2. Cooling fan motor

↶ Vehicle front

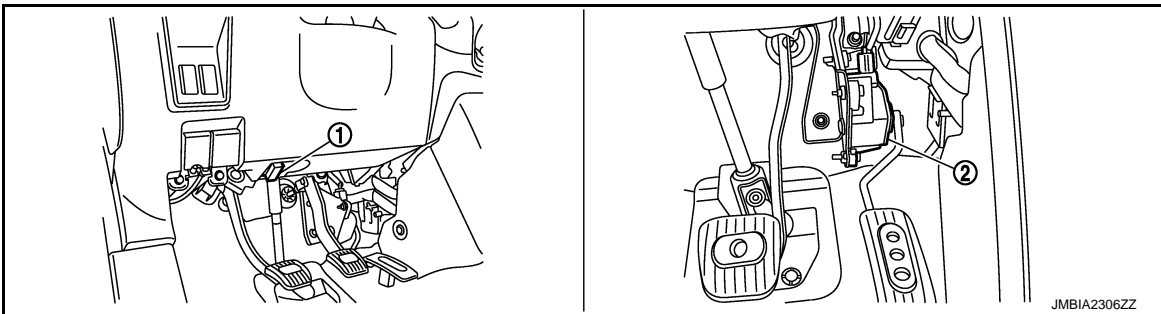


1. Intake valve timing control solenoid      2. Knock sensor valve

↶ Vehicle front



1. Crankshaft position sensor (POS)

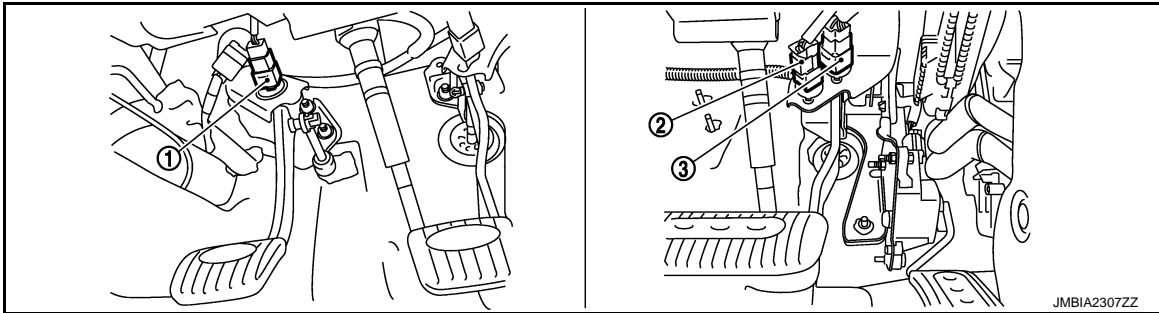


1. Data link connector      2. Accelerator pedal position sensor

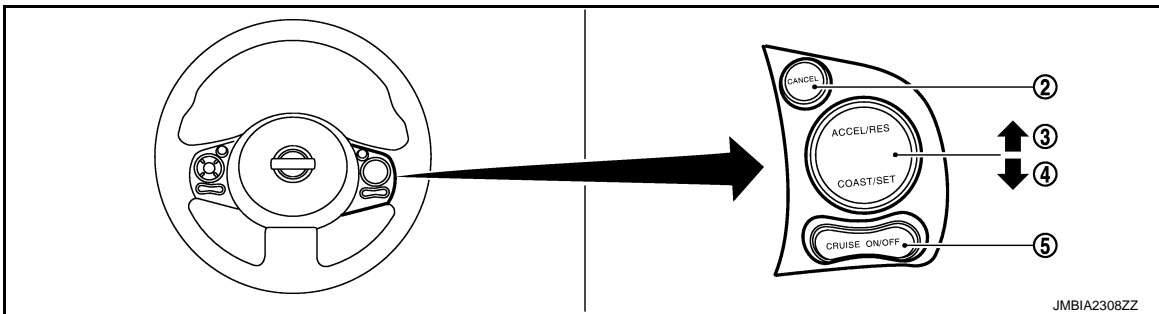
# ELECTRIC IGNITION SYSTEM

< SYSTEM DESCRIPTION >

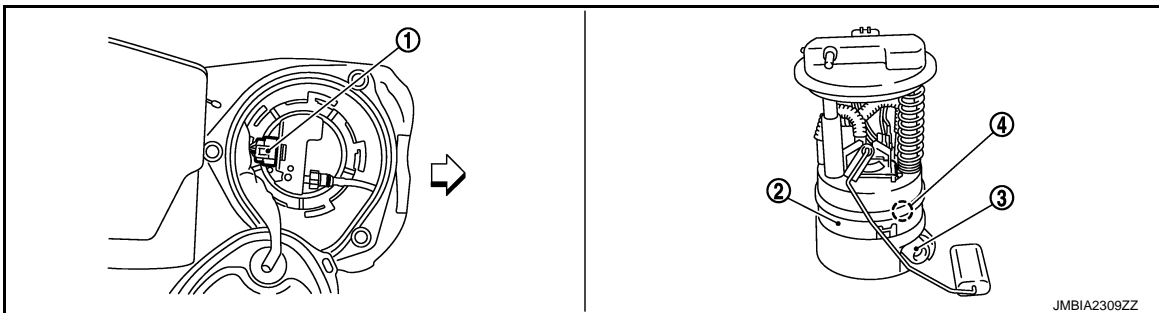
[MR18DE (EXCEPT FOR CALIFORNIA)]



- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch

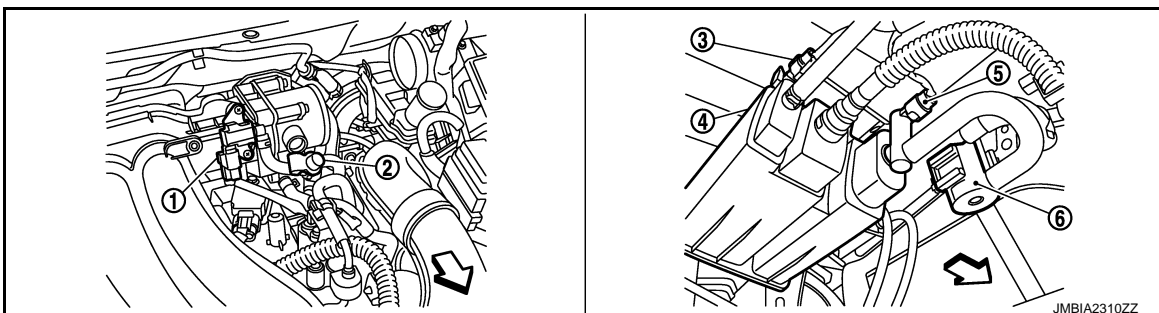


- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



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

↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# ELECTRIC IGNITION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

4. EVAP canister

5. EVAP canister vent control valve

6. Drain filter

↶ Vehicle front

## Component Description

INFOID:000000006503687

Component	Reference
Accelerator pedal position sensor	<a href="#">EC-391, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-250, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169, "Description"</a>
Ignition signal	<a href="#">EC-424, "Description"</a>
Knock sensor	<a href="#">EC-244, "Description"</a>
Mass air flow sensor	<a href="#">EC-153, "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-334, "Description"</a>
Transmission range switch (CVT models)	
Throttle position sensor	<a href="#">EC-175, "Description"</a>
Vehicle speed sensor	<a href="#">EC-320, "M/T MODELS : Description"</a>

# AIR CONDITIONING CUT CONTROL

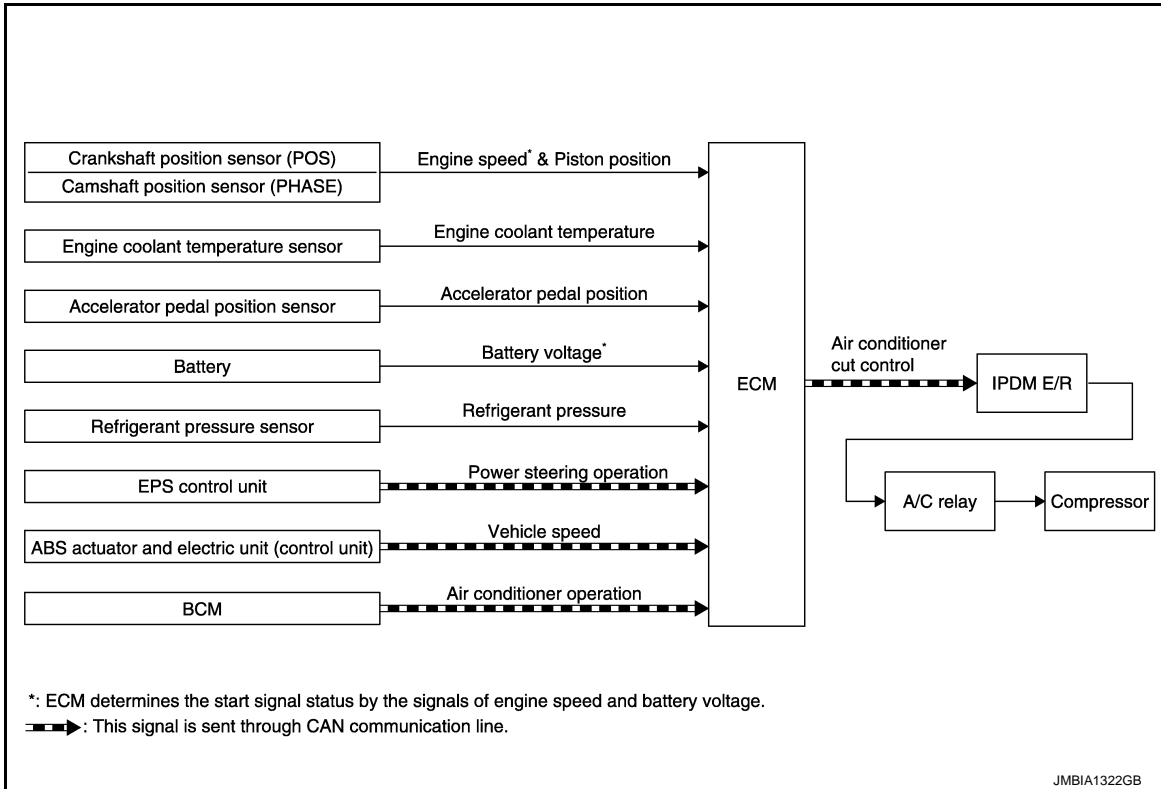
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## AIR CONDITIONING CUT CONTROL

### System Diagram

INFOID:000000006503688



### System Description

INFOID:000000006503689

#### 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		
EPS control unit	Power steering operation		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
BCM	Air conditioner ON signal*1		

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

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

#### SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

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

# AIR CONDITIONING CUT CONTROL

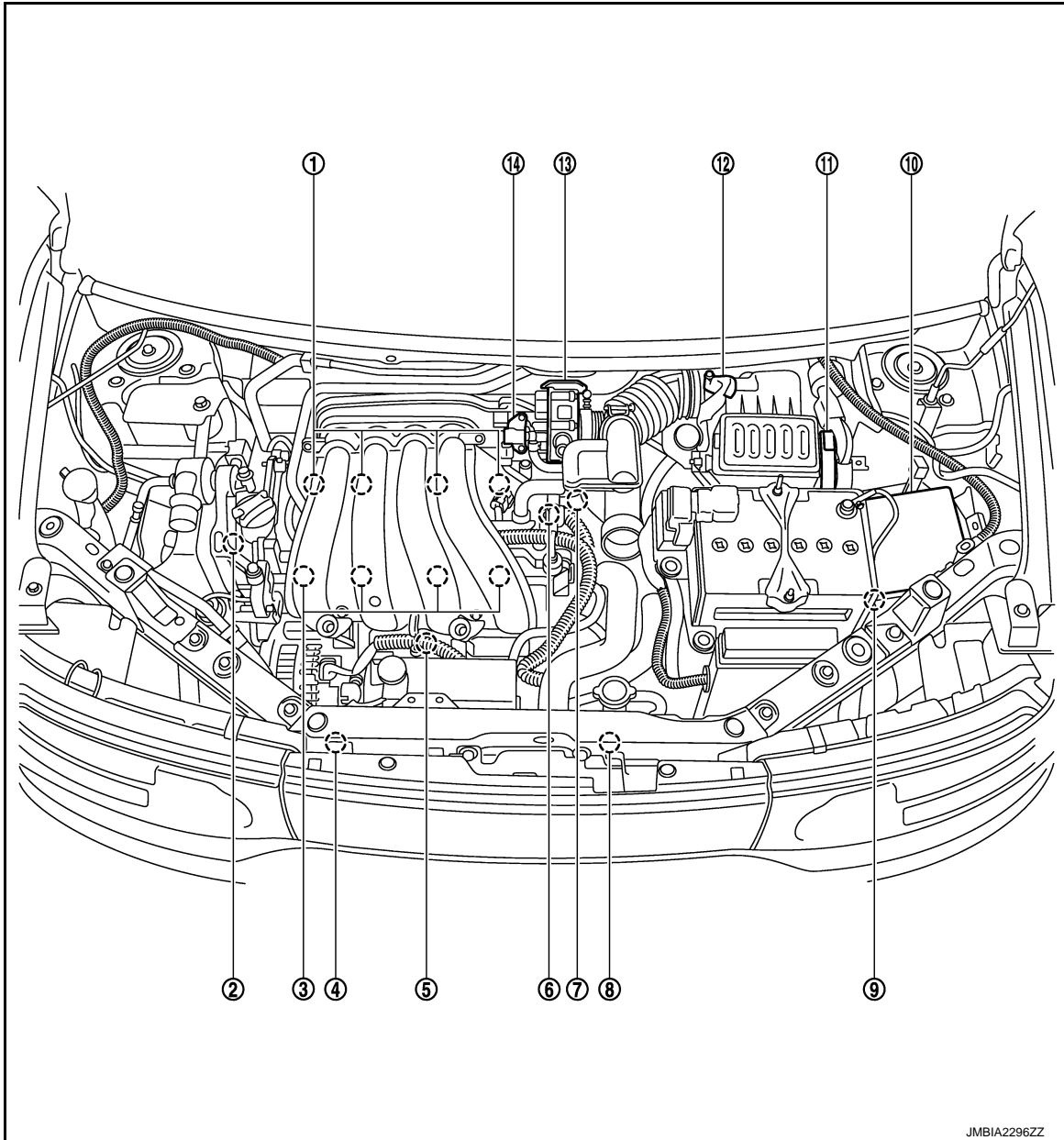
[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

## Component Parts Location

INFOID:000000006503690



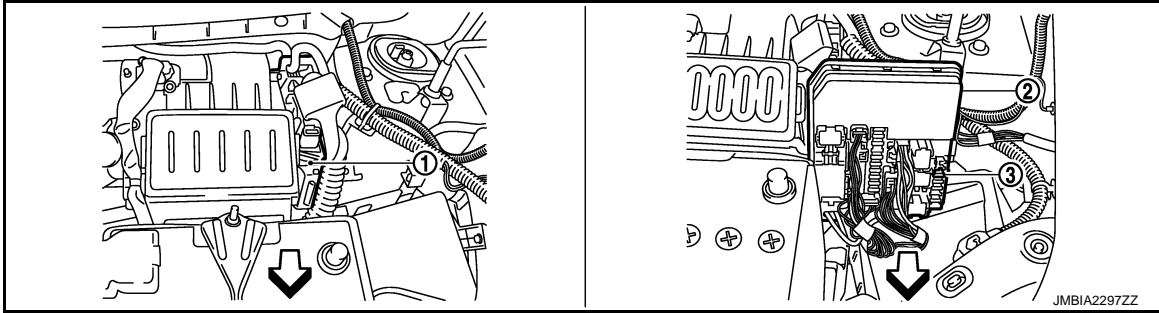
- |  |   |   |
|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |



# AIR CONDITIONING CUT CONTROL

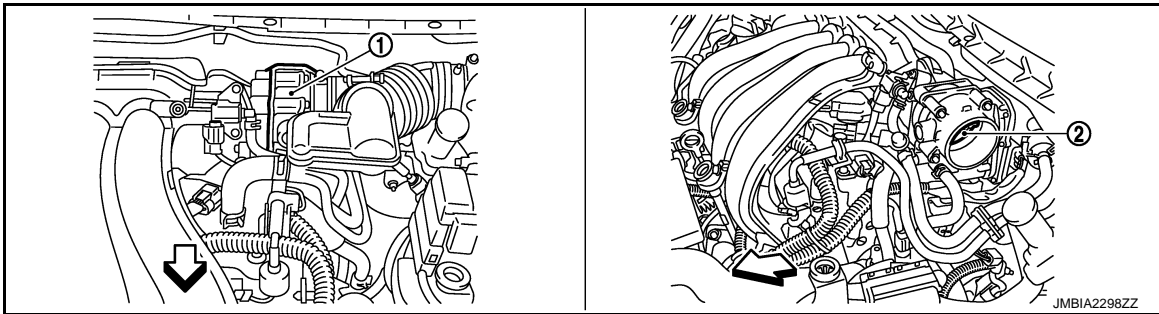
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



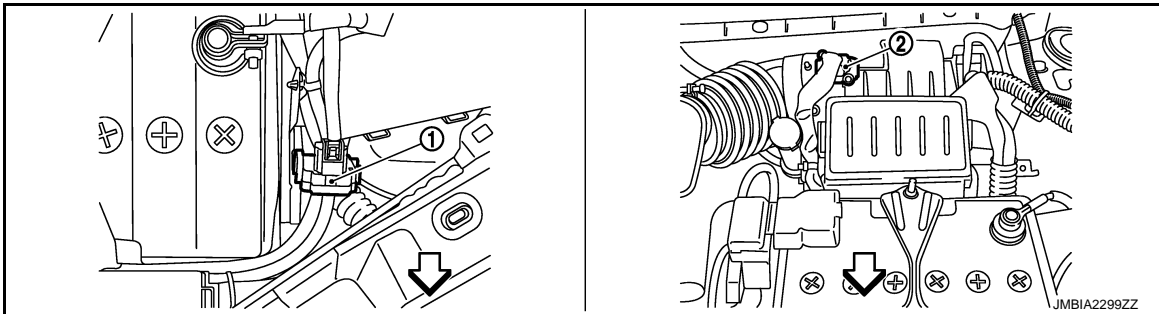
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



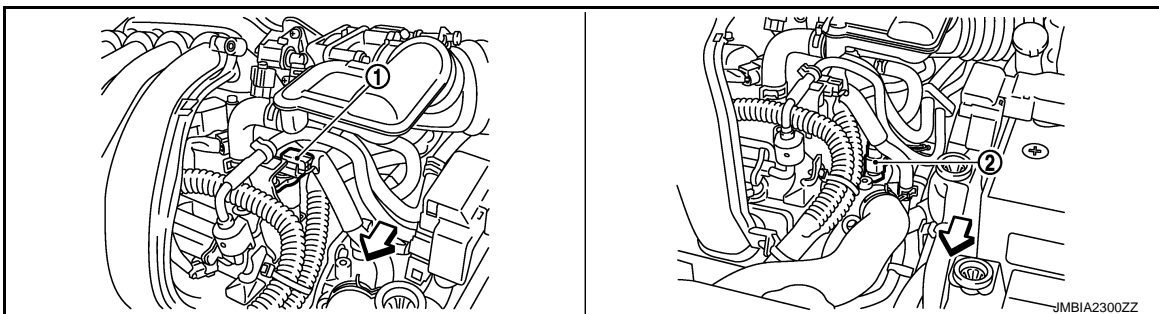
- 1. Electric throttle control actuator  
(with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



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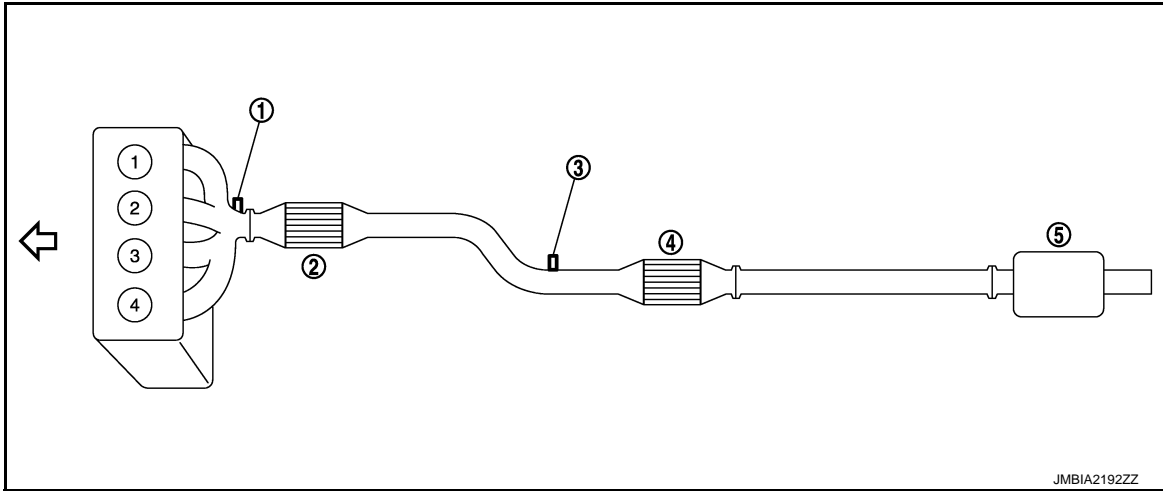
# AIR CONDITIONING CUT CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

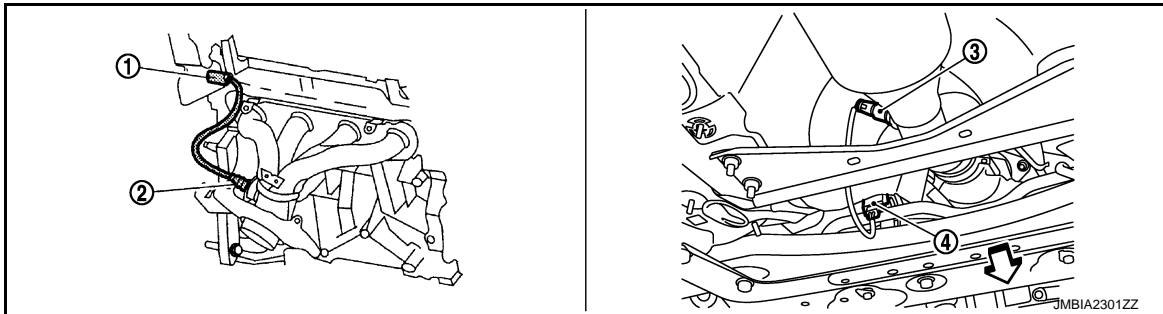
↶ Vehicle front



JMBIA2192ZZ

1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

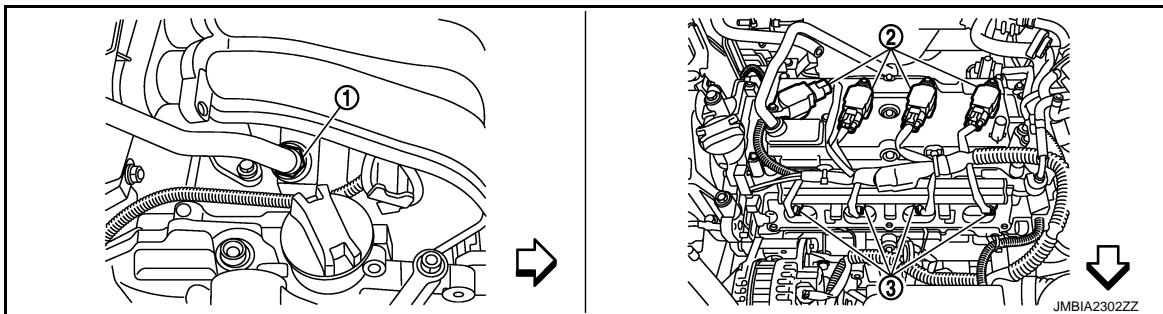
↶ Vehicle front



JMBIA2301ZZ

1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

↶ Vehicle front



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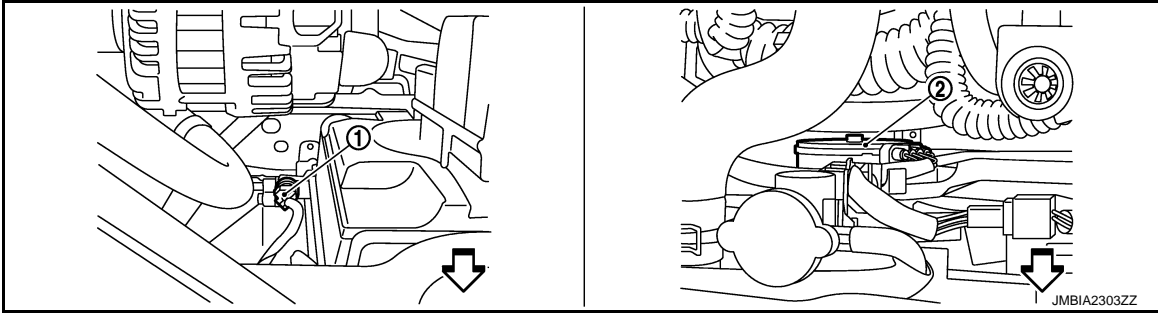
1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

↶ Vehicle front

# AIR CONDITIONING CUT CONTROL

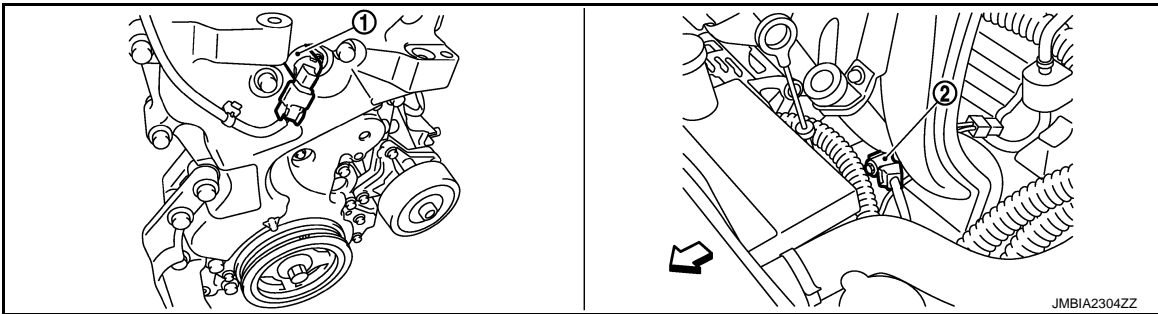
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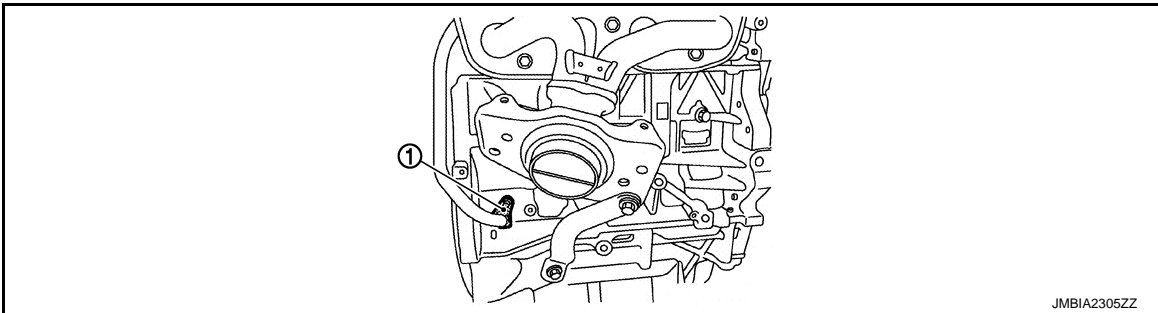
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

← Vehicle front

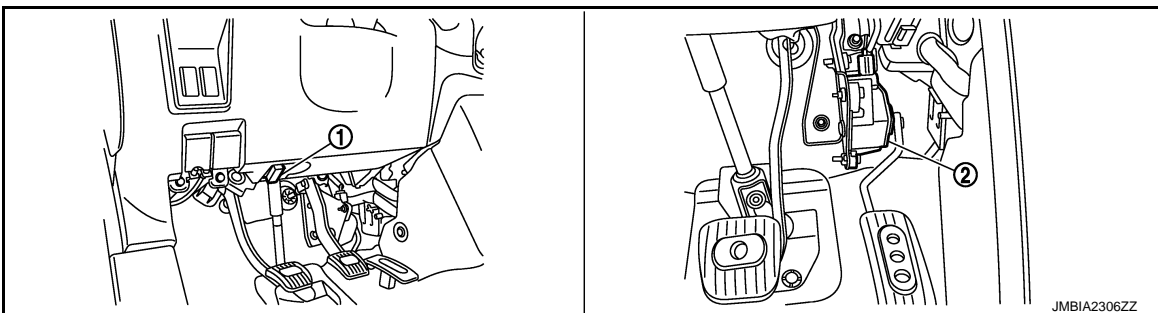


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

← Vehicle front



- 1. Crankshaft position sensor (POS)



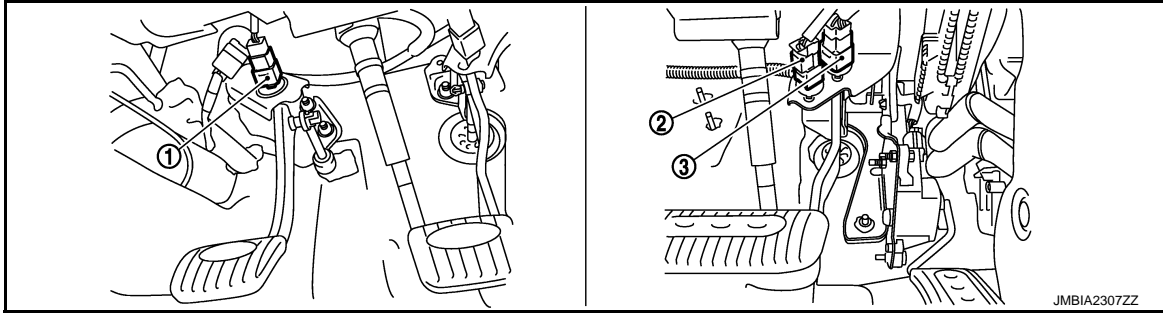
- 1. Data link connector
- 2. Accelerator pedal position sensor

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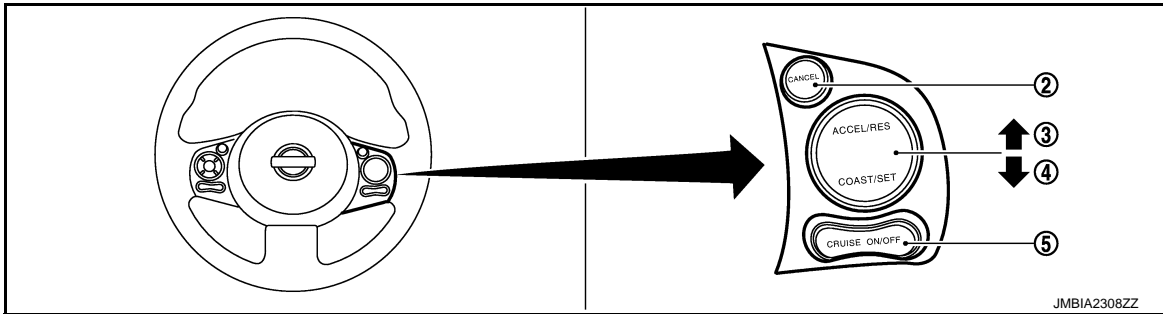
# AIR CONDITIONING CUT CONTROL

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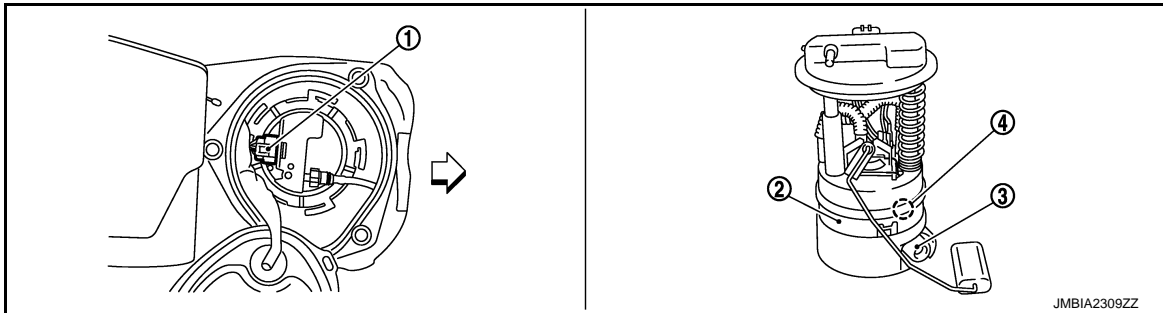
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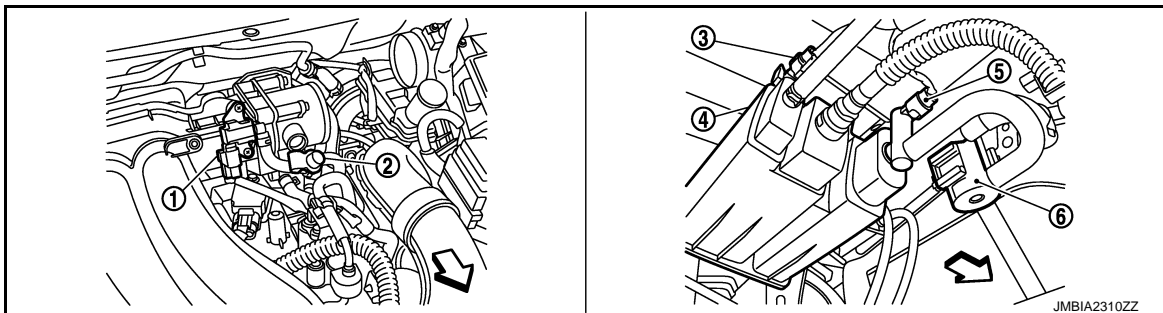
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# AIR CONDITIONING CUT CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↩ Vehicle front

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## Component Description

INFOID:000000006503691

EC

Component	Reference
Accelerator pedal position sensor	<a href="#">EC-391, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-250, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169, "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-437, "Description"</a>

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# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

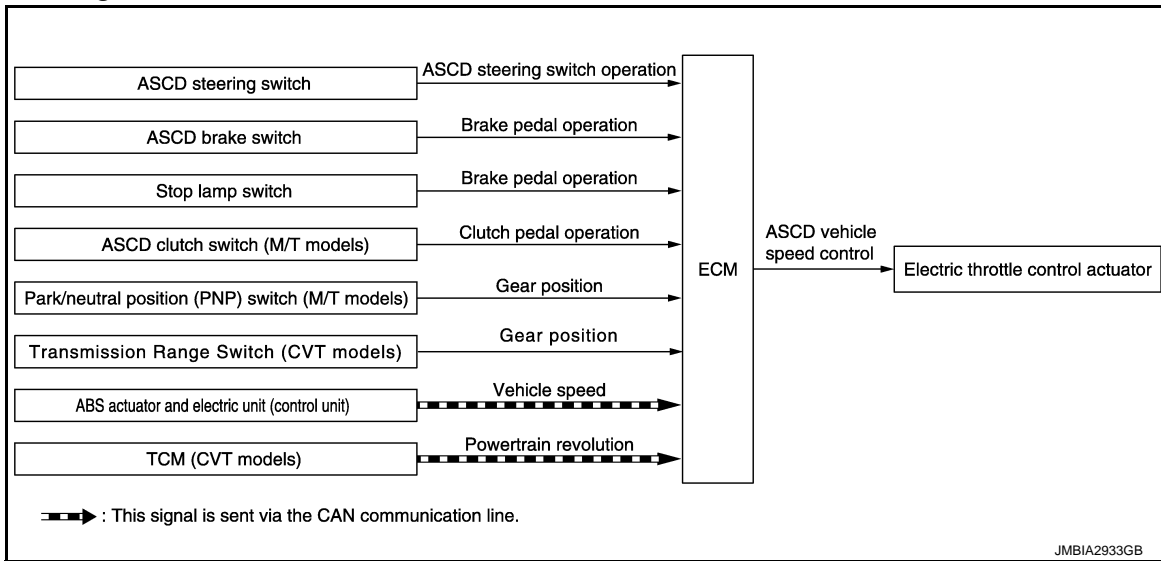
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

### System Diagram

INFOID:000000006503692



### System Description

INFOID:000000006503693

#### INPUT/OUTPUT SIGNAL CHART

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

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

#### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

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

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

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

**NOTE:**

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

#### SET OPERATION

Press MAIN switch. (The CRUISE 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.

#### ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will maintain the new set speed.

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## CANCEL OPERATION

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 position is changed to N, P, R
- 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 while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

## COAST OPERATION

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

## RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after 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 position is other than P and N (CVT models)
- Vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)

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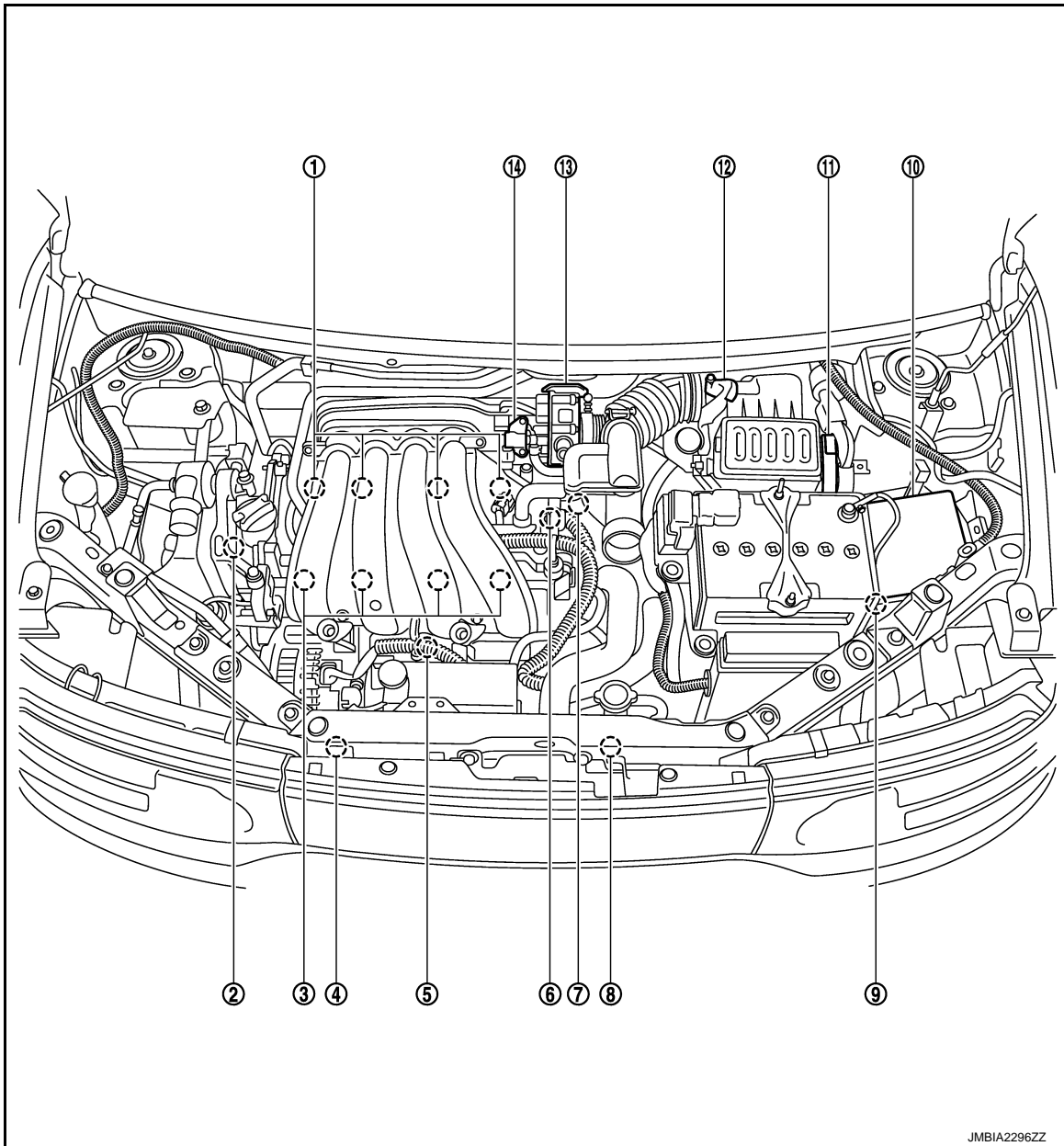
# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Parts Location

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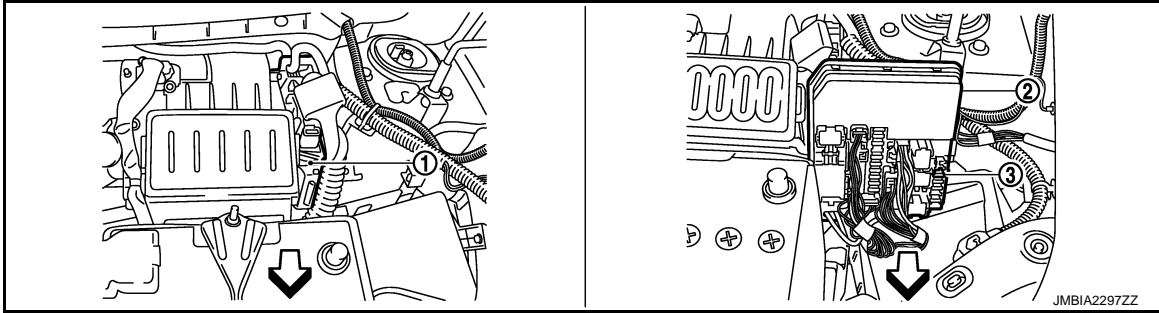
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|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |



# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

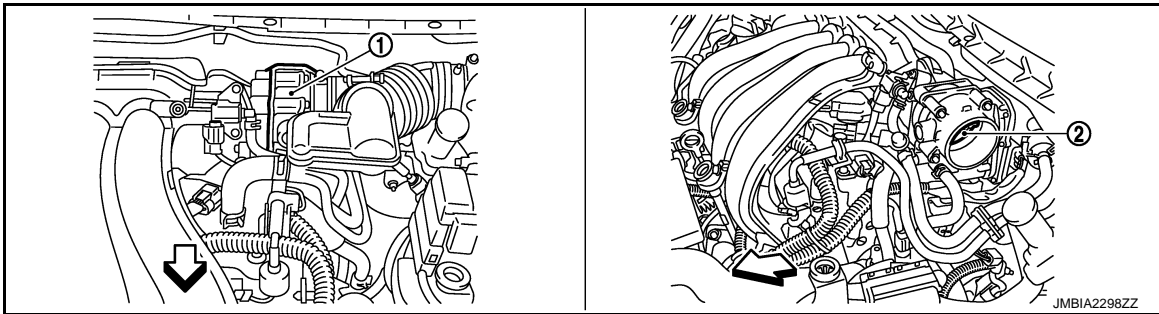
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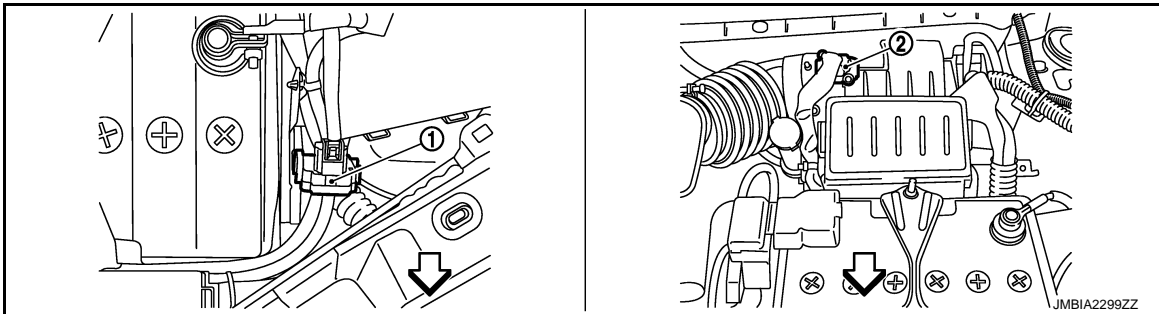
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



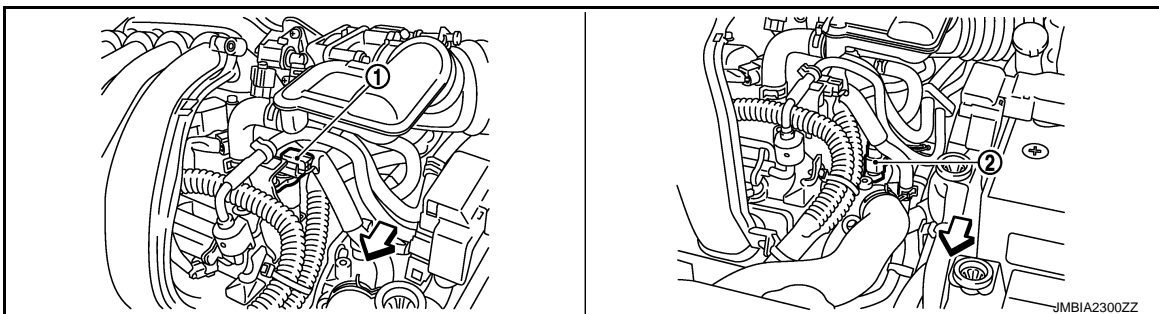
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



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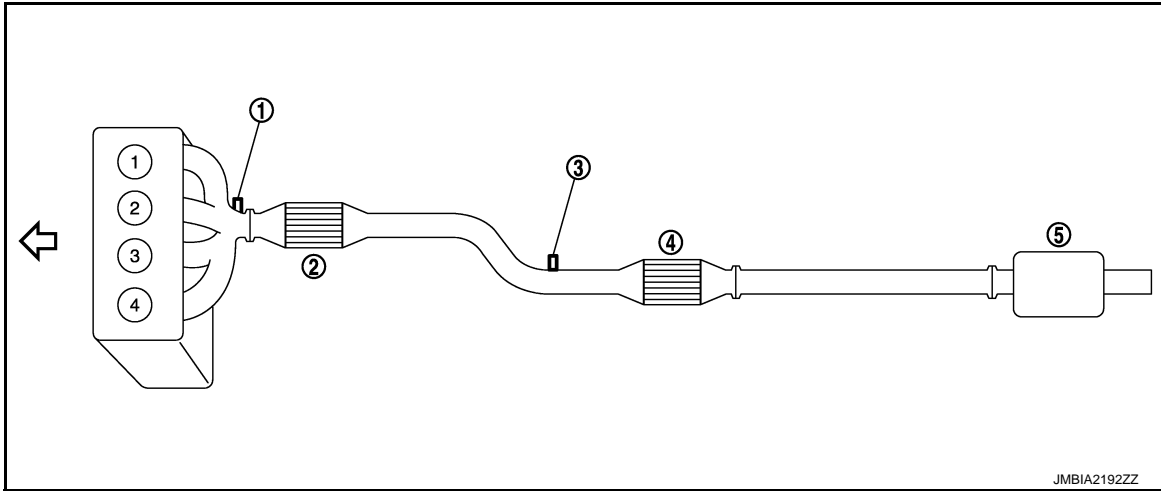
# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

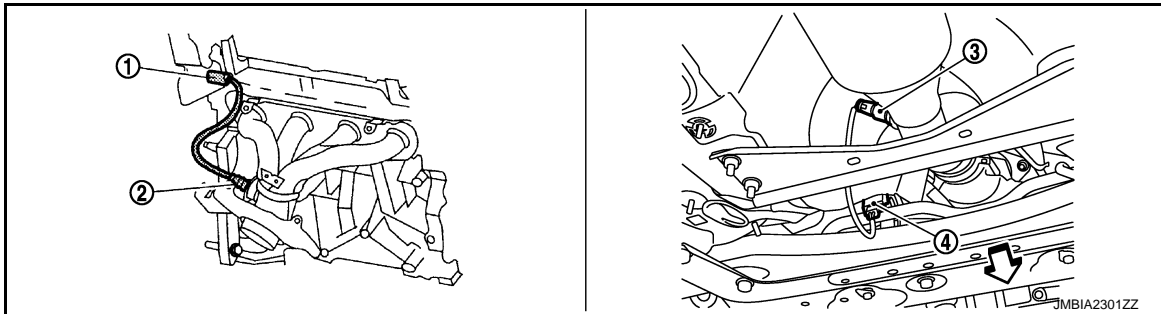
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

↶ Vehicle front



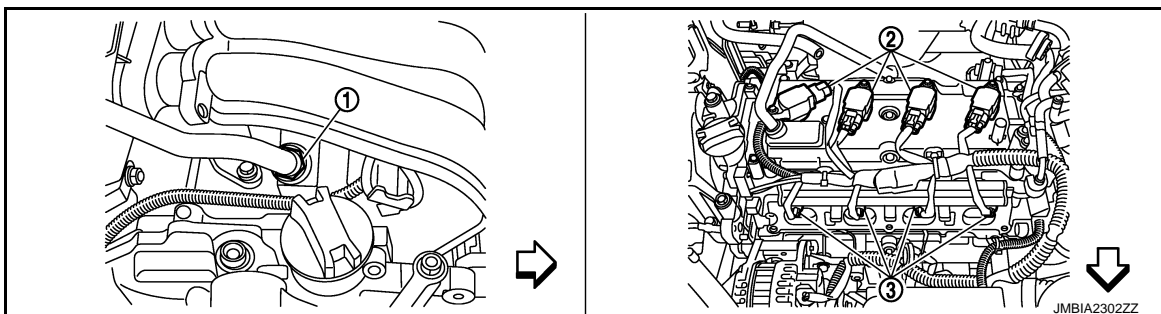
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

↶ Vehicle front



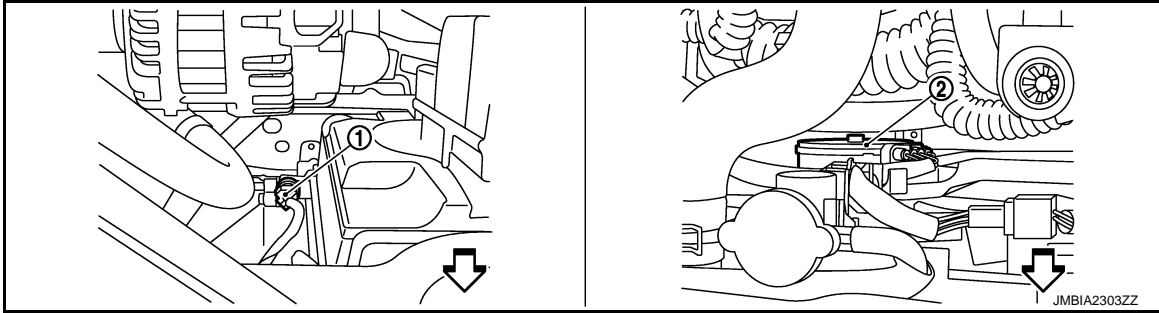
1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

↶ Vehicle front

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

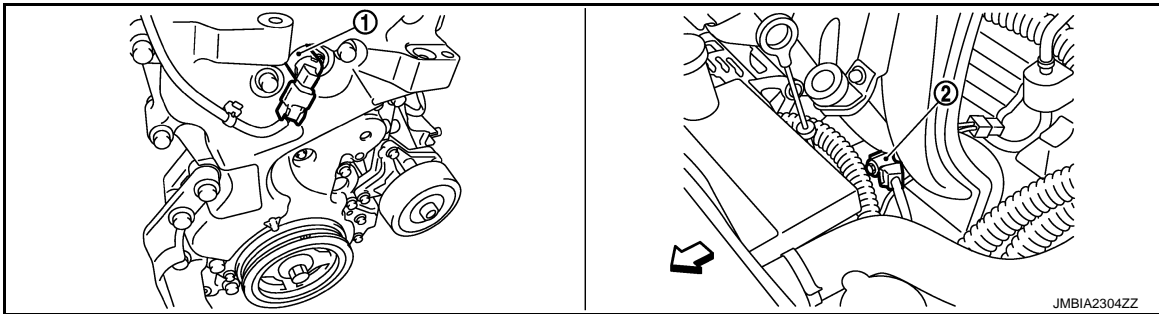
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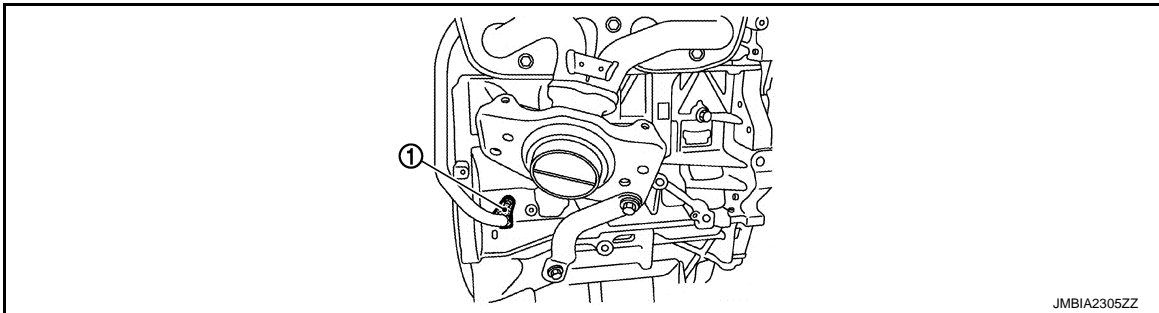
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

← Vehicle front

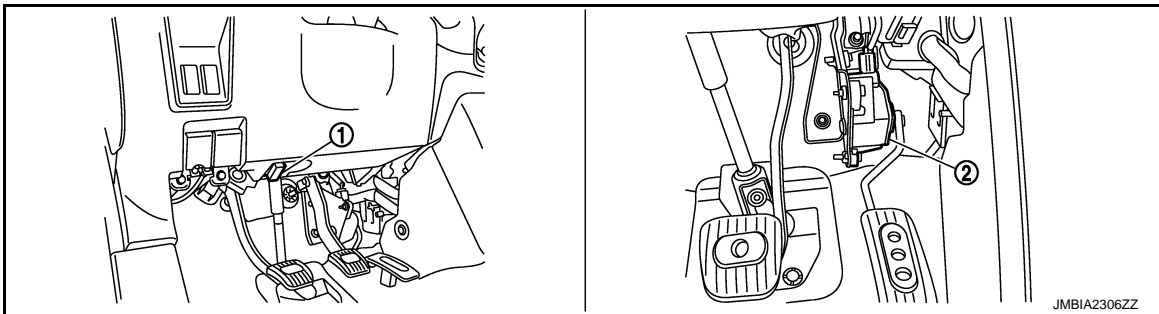


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

← Vehicle front



- 1. Crankshaft position sensor (POS)



- 1. Data link connector
- 2. Accelerator pedal position sensor

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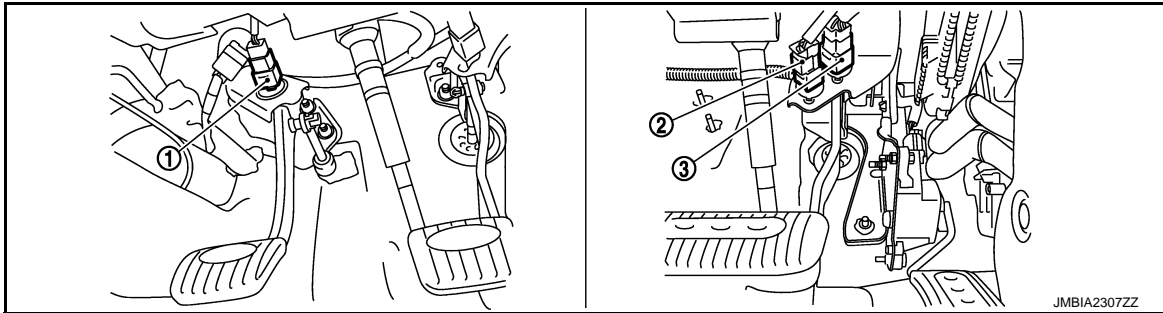
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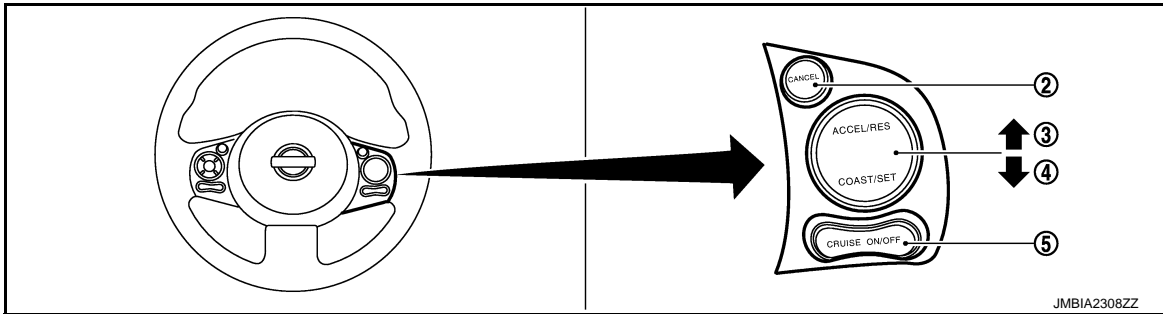
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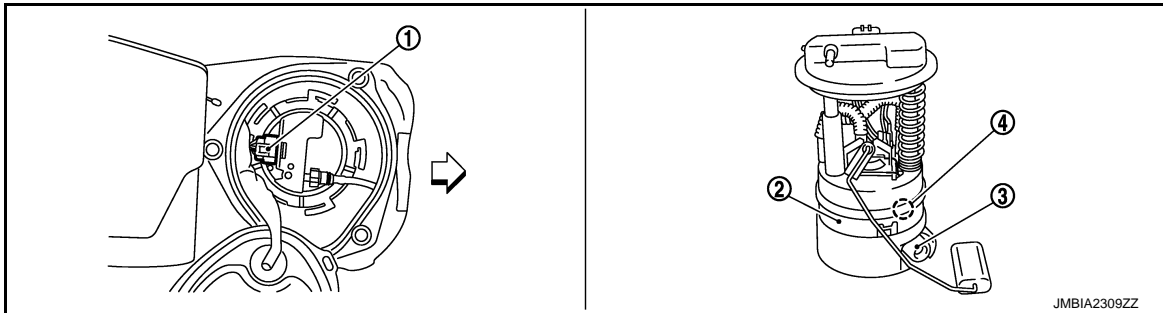
[MR18DE (EXCEPT FOR CALIFORNIA)]



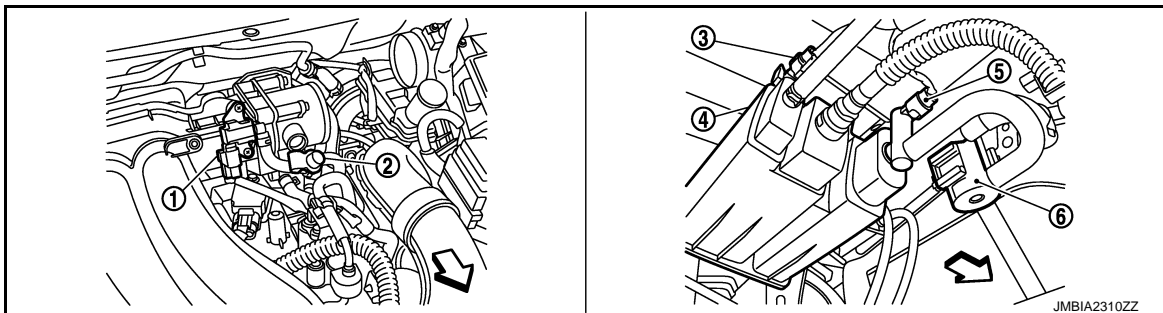
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump
  - 2. Fuel level sensor unit and fuel pump harness connector
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

< SYSTEM DESCRIPTION >

- |                  |                                     |                 |
|------------------|-------------------------------------|-----------------|
| 4. EVAP canister | 5. EVAP canister vent control valve | 6. Drain filter |
| ↳ Vehicle front  |                                     |                 |

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## Component Description

INFOID:000000006503695

EC

Component	Reference
ASCD steering switch	<a href="#">EC-363. "Description"</a>
ASCD brake switch	<a href="#">EC-366. "Description"</a>
ASCD indicator	<a href="#">EC-413. "Description"</a>
Electric throttle control actuator	<a href="#">EC-389. "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-334. "Description"</a>
Transmission range switch (CVT models)	
Stop lamp switch	<a href="#">EC-366. "Description"</a>

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## CAN COMMUNICATION

### System Description

INFOID:000000006503696

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-22, "CAN Communication Signal Chart"](#), about CAN communication for detail.

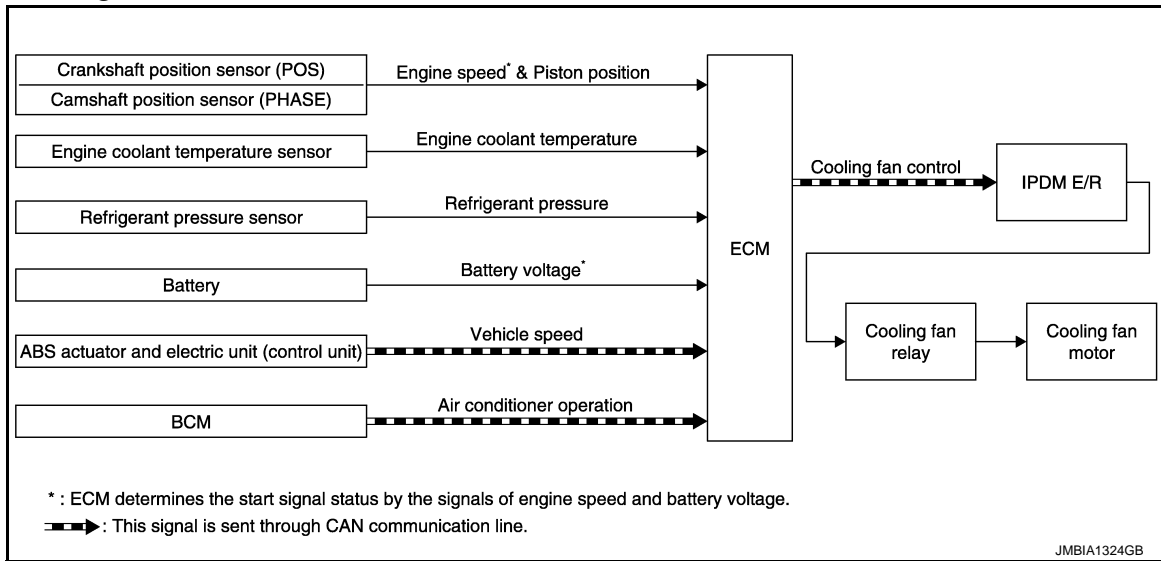
# COOLING FAN CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## COOLING FAN CONTROL

### System Diagram



### System Description

INFOID:000000006503698

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* <sup>1</sup>	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage* <sup>1</sup>		
ABS actuator and electric unit (control unit)	Vehicle speed* <sup>2</sup>		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal* <sup>2</sup>		
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 via the CAN communication line.

### SYSTEM DESCRIPTION

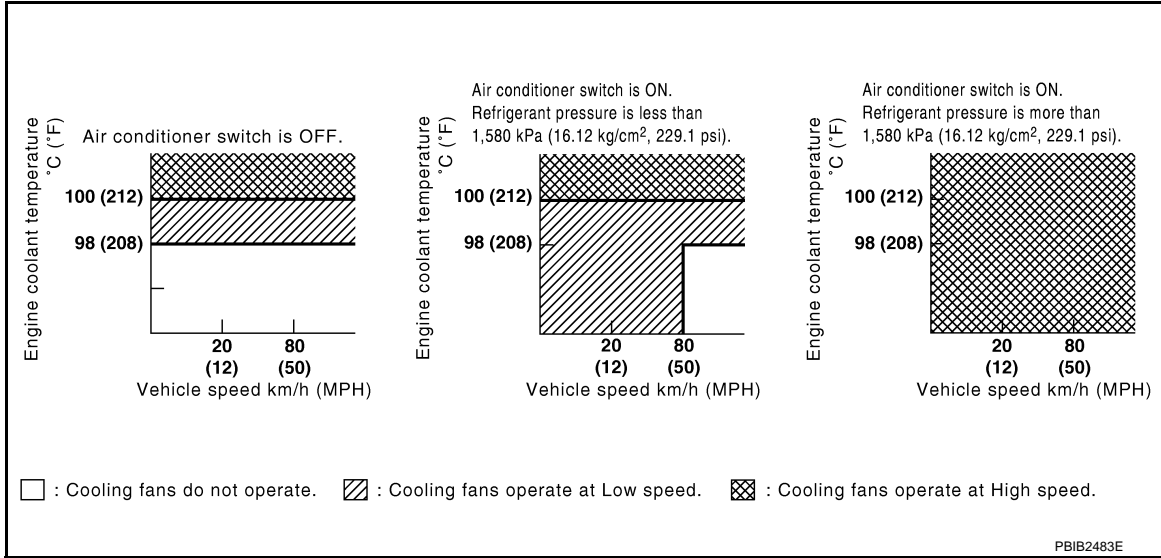
ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

# COOLING FAN CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

### Cooling Fan Operation



### Cooling Fan Relay Operation

The ECM controls cooling fan relays via the CAN communication line.

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



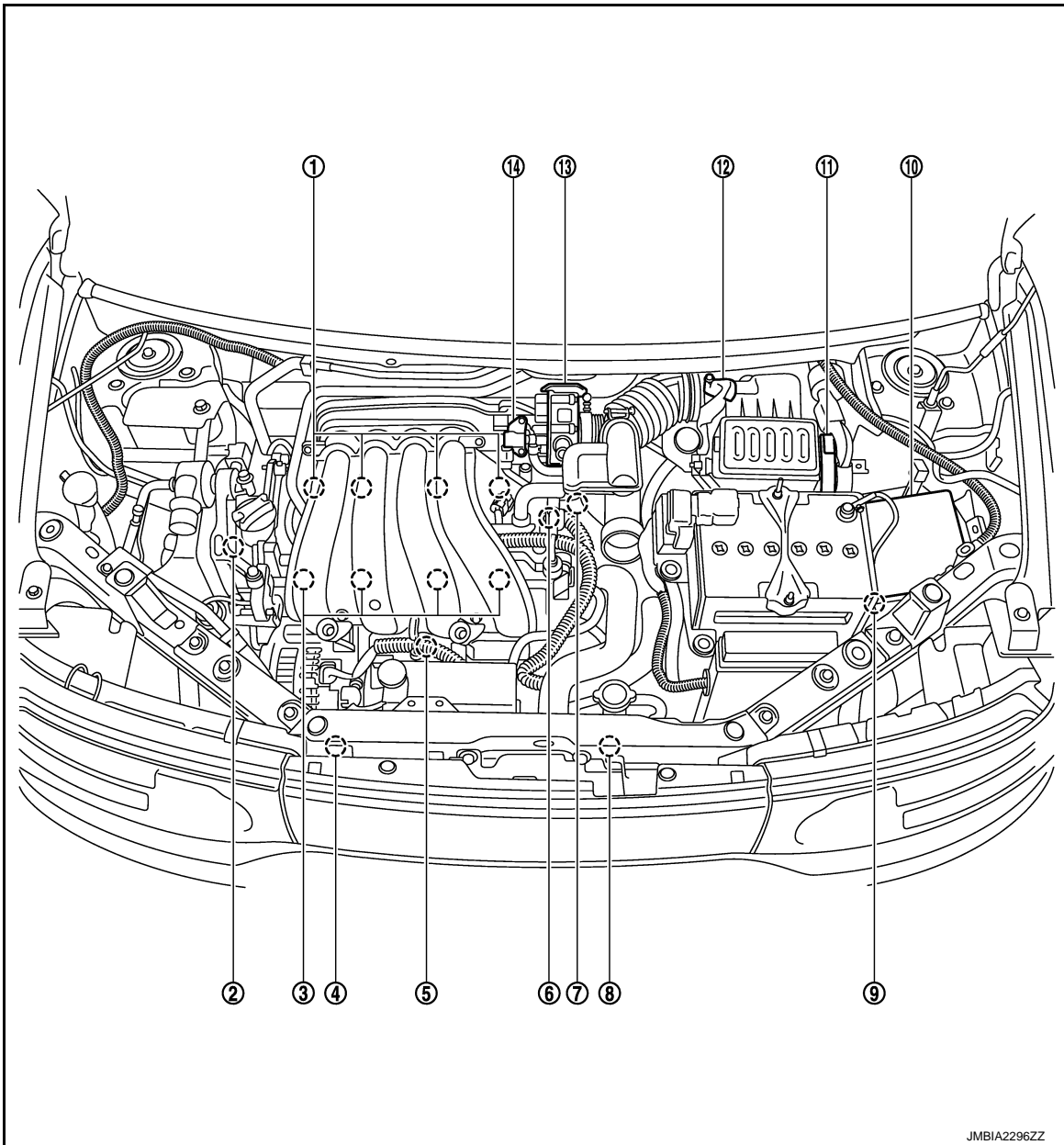
# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Parts Location

INFOID:000000006503699



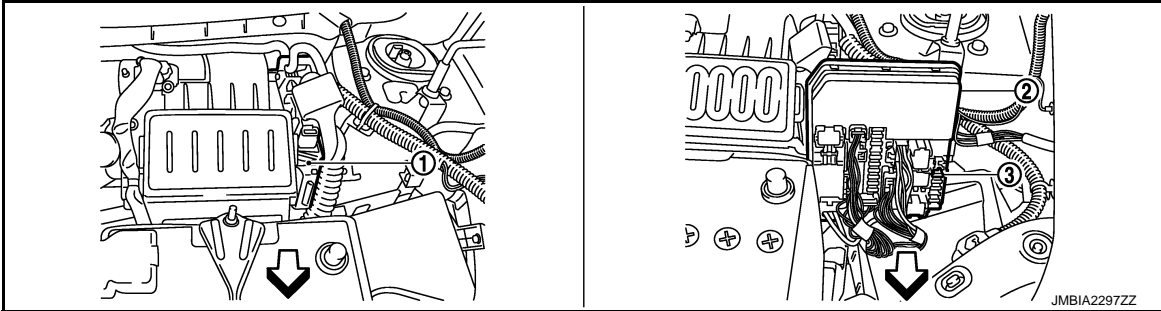
- |  |   |   |
|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

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# COOLING FAN CONTROL

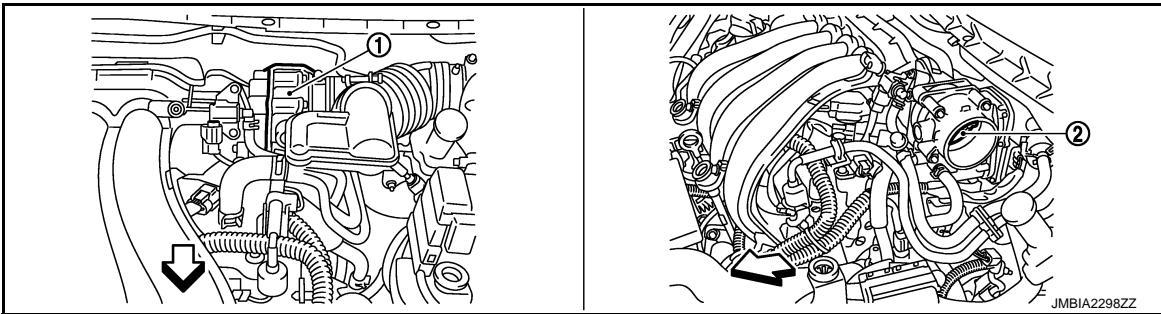
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



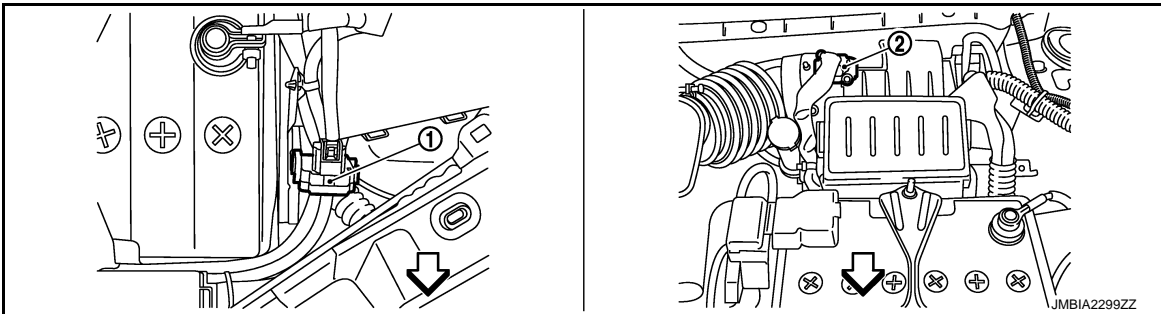
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



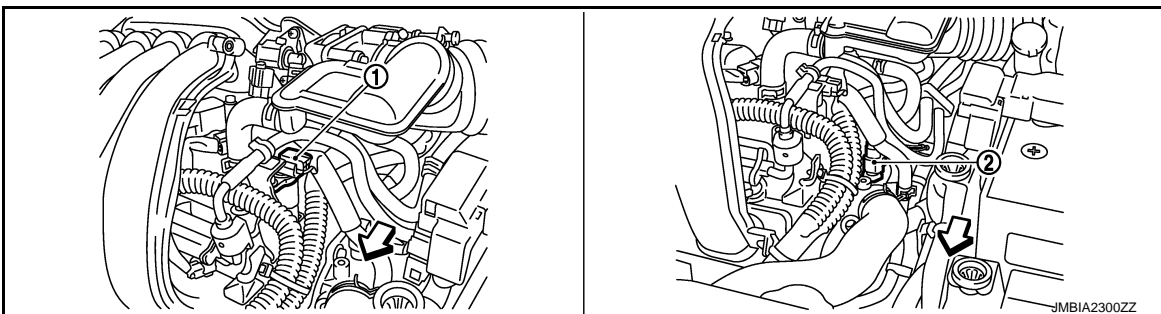
- 1. Electric throttle control actuator
- 2. Throttle valve  
(with built-in position sensor, throttle control motor)

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



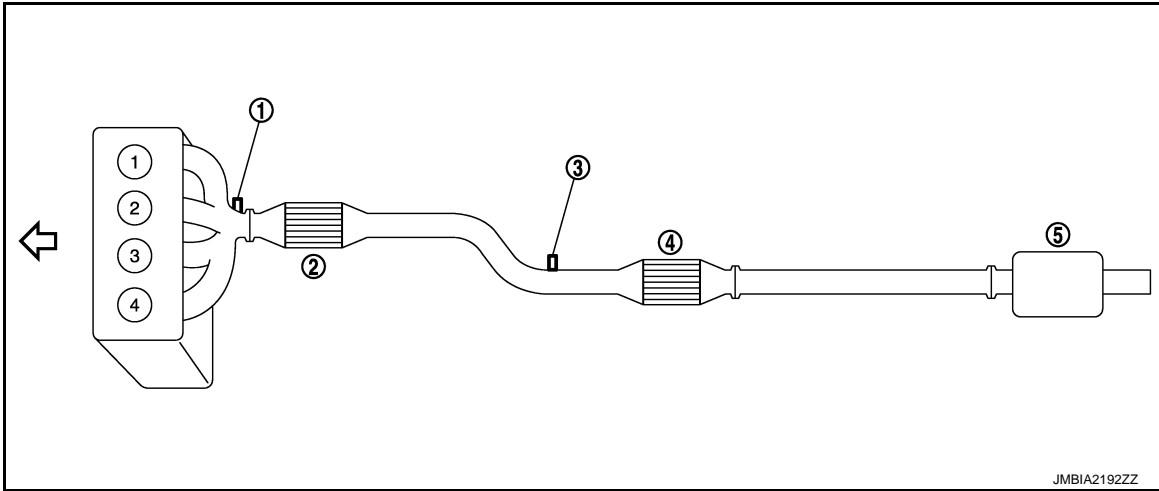
# COOLING FAN CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

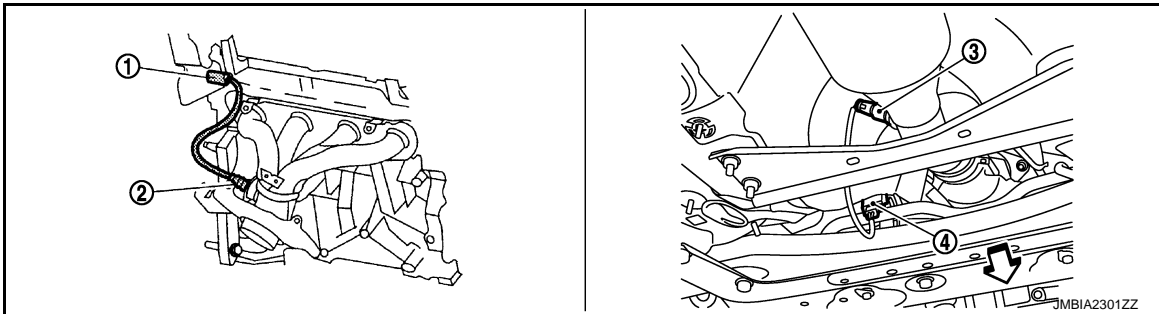
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



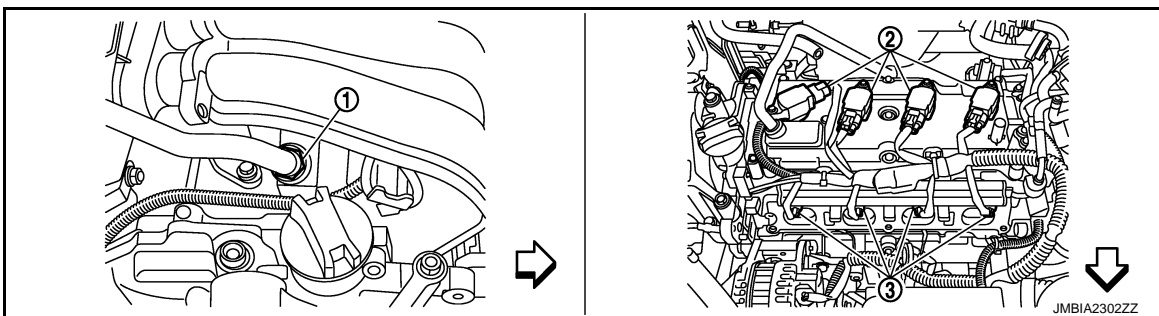
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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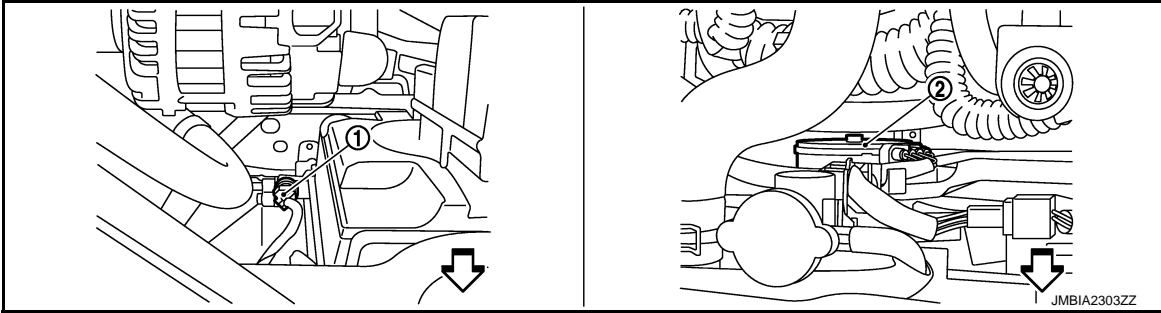
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# COOLING FAN CONTROL

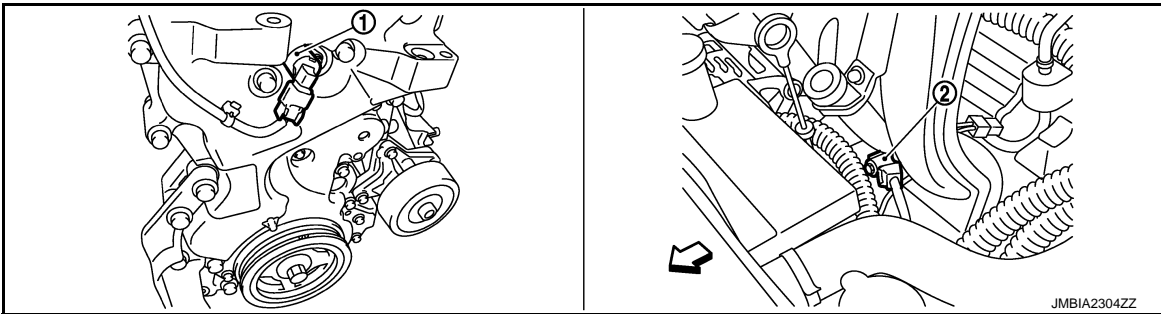
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



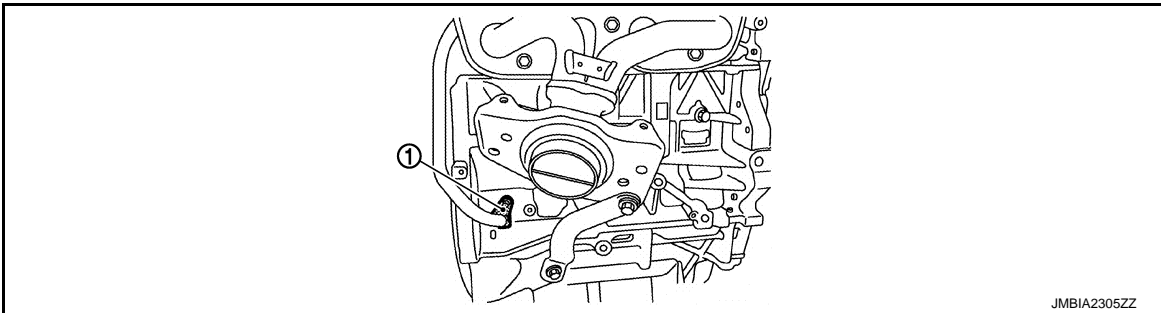
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

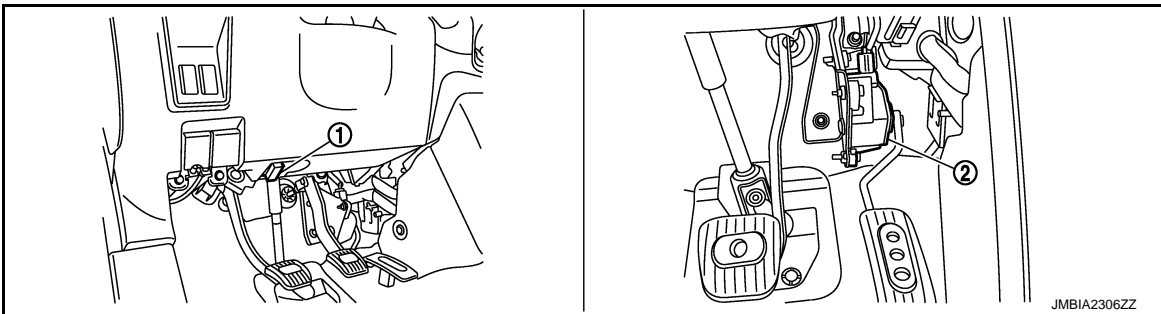


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

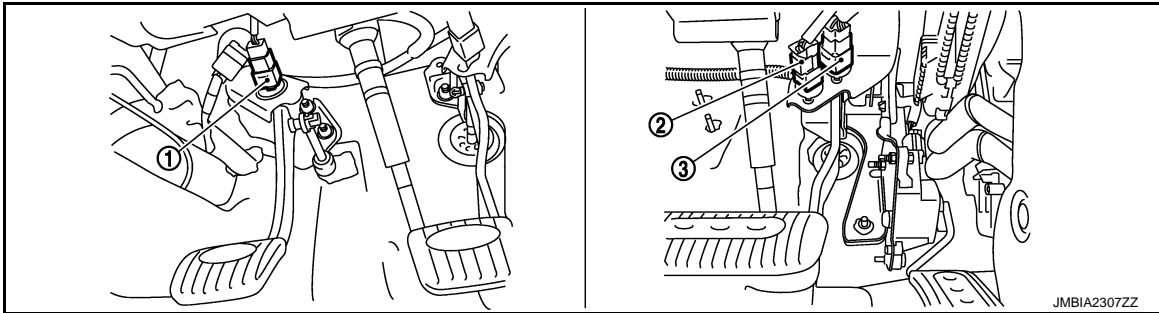


- 1. Data link connector
- 2. Accelerator pedal position sensor

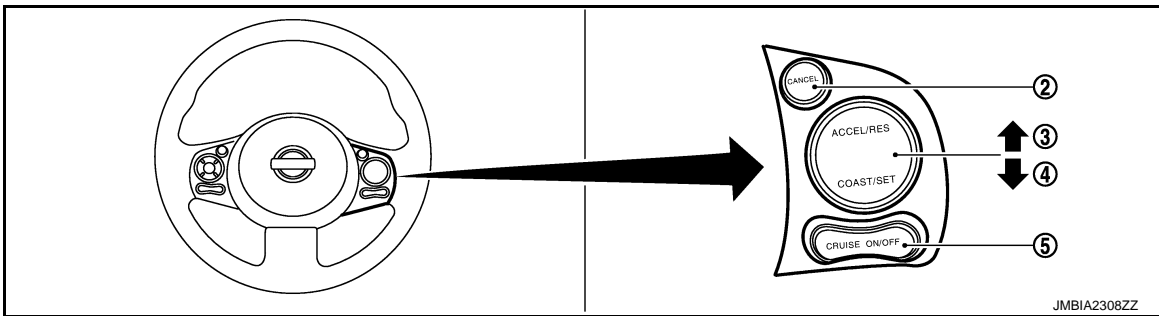
# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

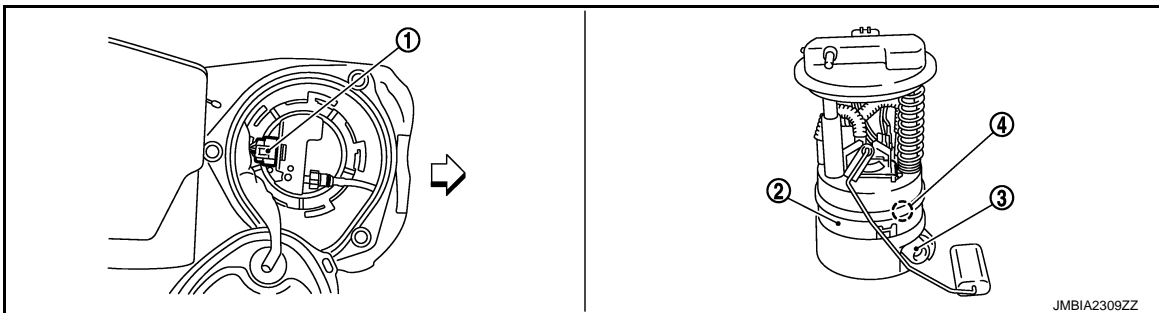
[MR18DE (EXCEPT FOR CALIFORNIA)]



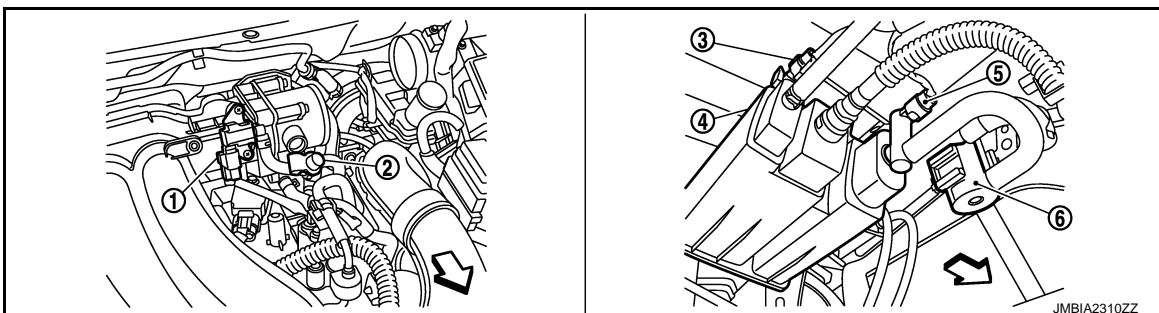
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump
  - 2. Fuel level sensor unit and fuel pump harness connector
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# COOLING FAN CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

4. EVAP canister  
↩ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006503700

Component	Reference
Camshaft position sensor (PHASE)	<a href="#">EC-250. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246. "Description"</a>
Cooling fan motor	<a href="#">EC-79. "System Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169. "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-437. "Description"</a>

# EVAPORATIVE EMISSION SYSTEM

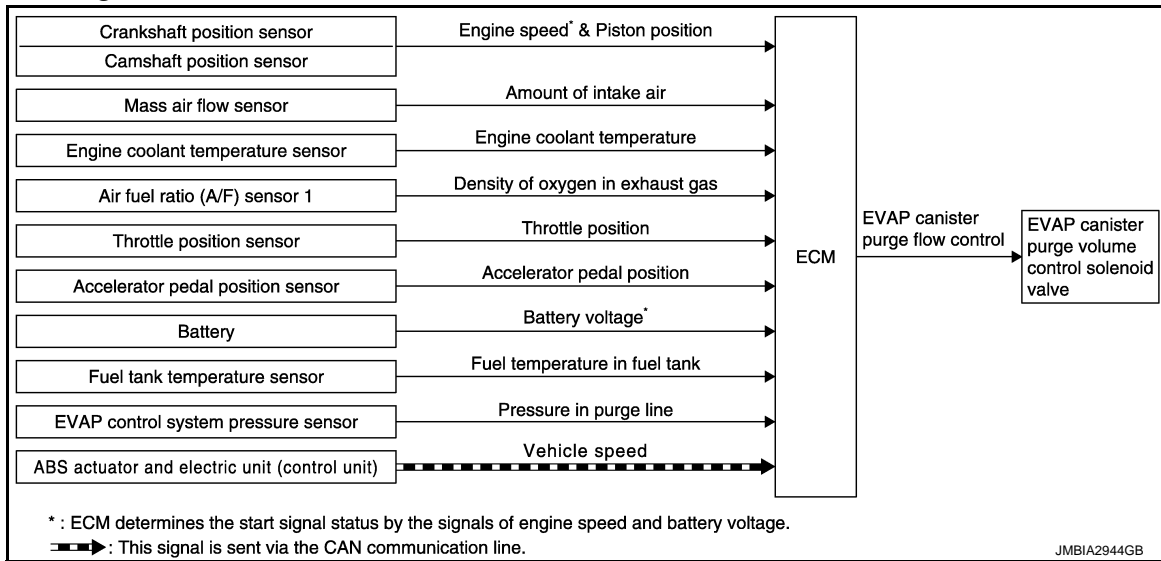
[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## EVAPORATIVE EMISSION SYSTEM

### System Diagram

INFOID:000000006503701



### System Description

INFOID:000000006503702

#### INPUT/OUTPUT SIGNAL CHART

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		
ABS actuator and electric unit (control unit)	Vehicle speed*2		

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

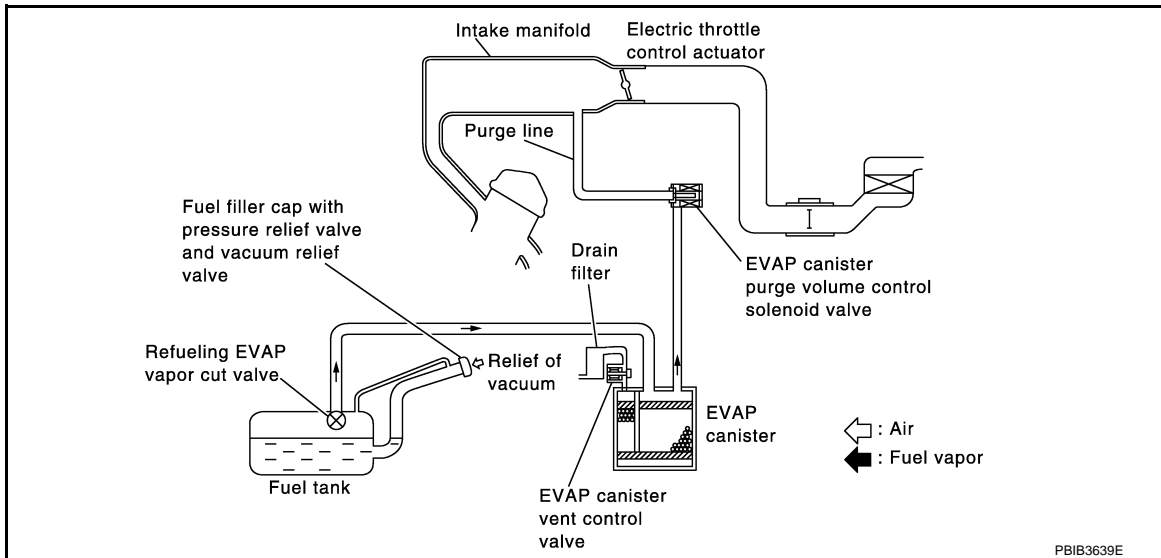
\*2: This signal is sent to the ECM via the CAN communication line.

# EVAPORATIVE EMISSION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## 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.

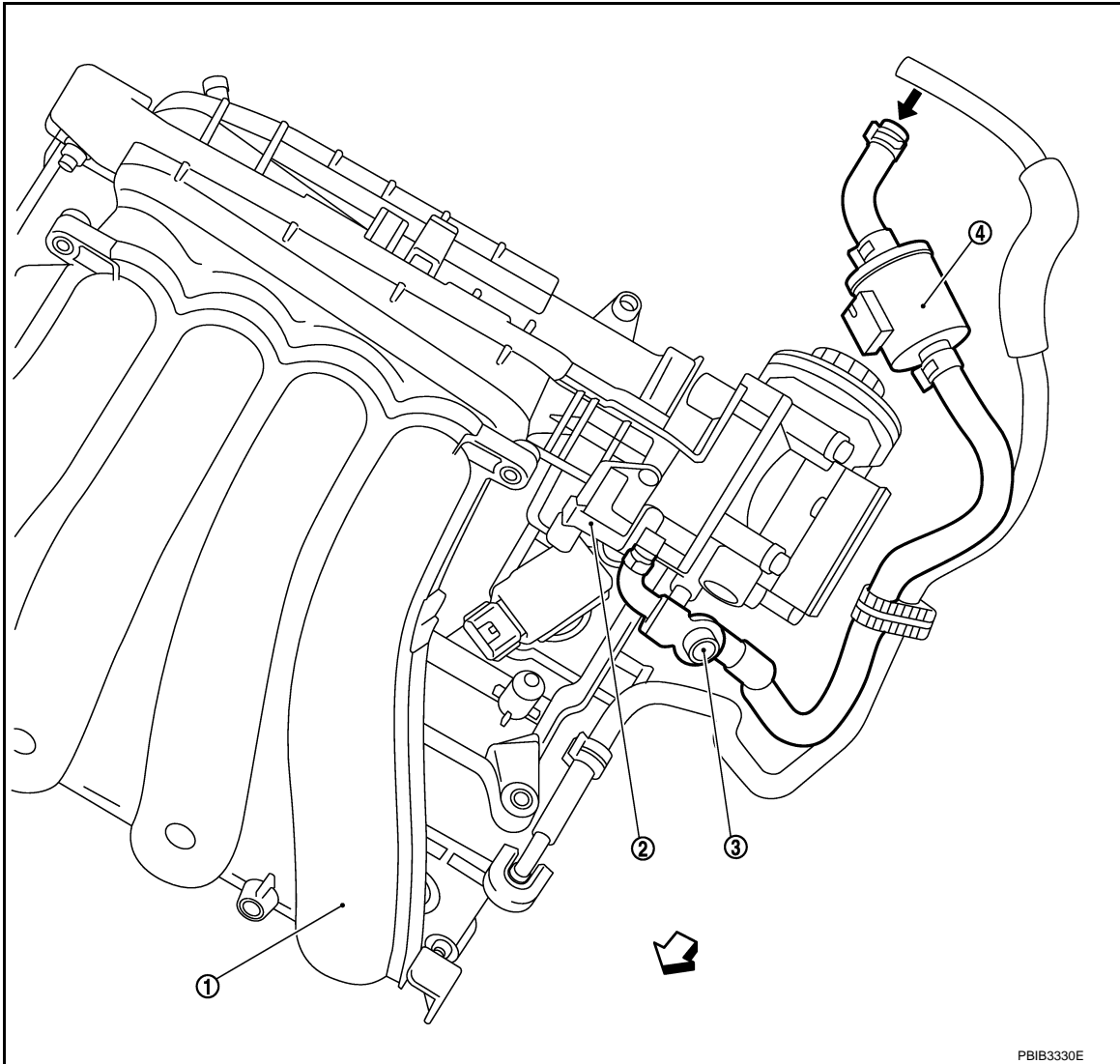
## EVAPORATIVE EMISSION LINE DRAWING



# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



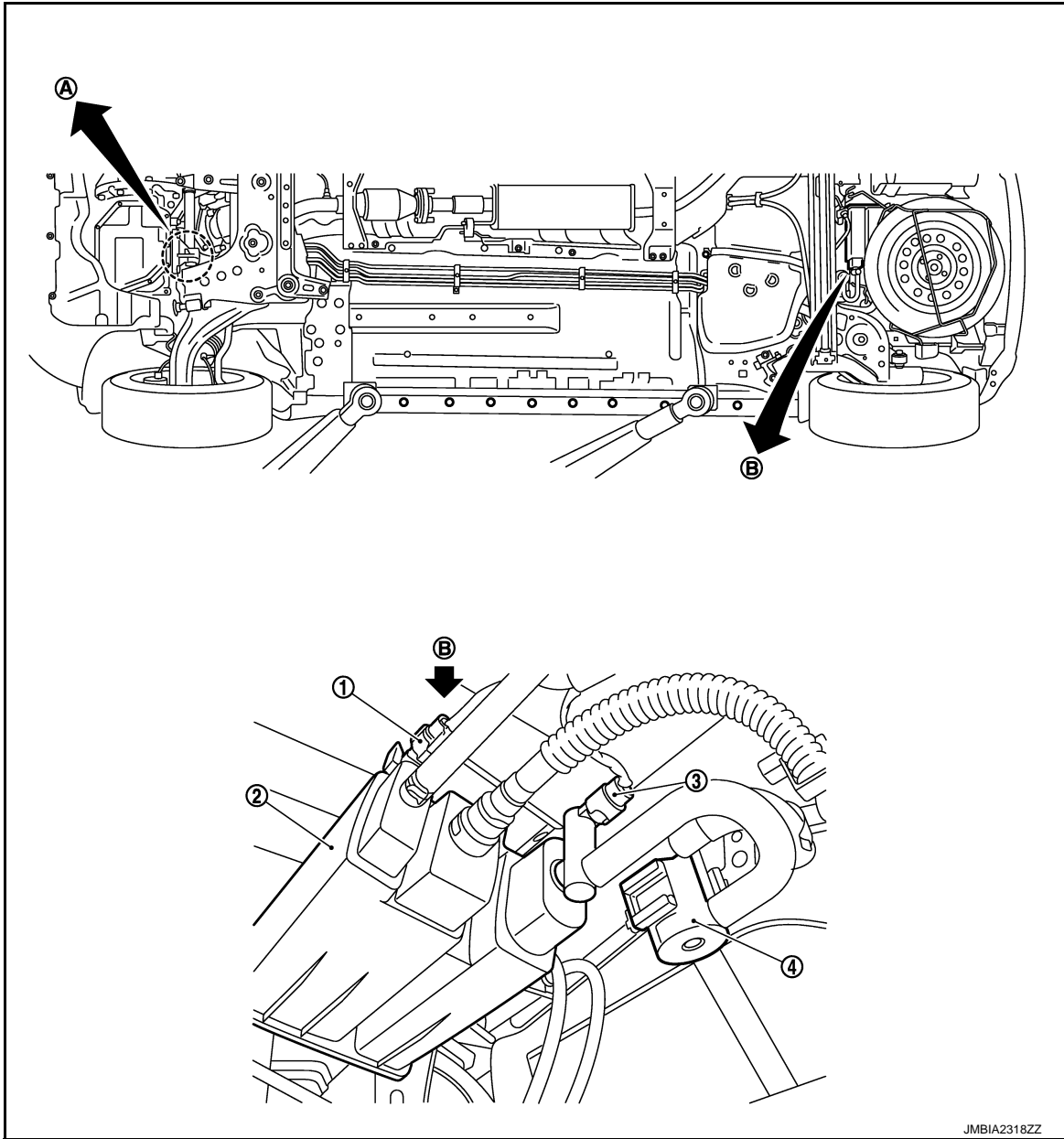
- 1. Intake manifold collector
  - 2. EVAP canister purge volume control
  - 3. EVAP service port solenoid valve
  - 4. EVAP purge resonator
- ↶ Vehicle front                      ↶ From next figure

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# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



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- 1. EVAP control system pressure sensor
- 2. EVAP canister
- 3. EVAP canister vent control valve
- 4. Drain filter
- A. To previous figure

**NOTE:**

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

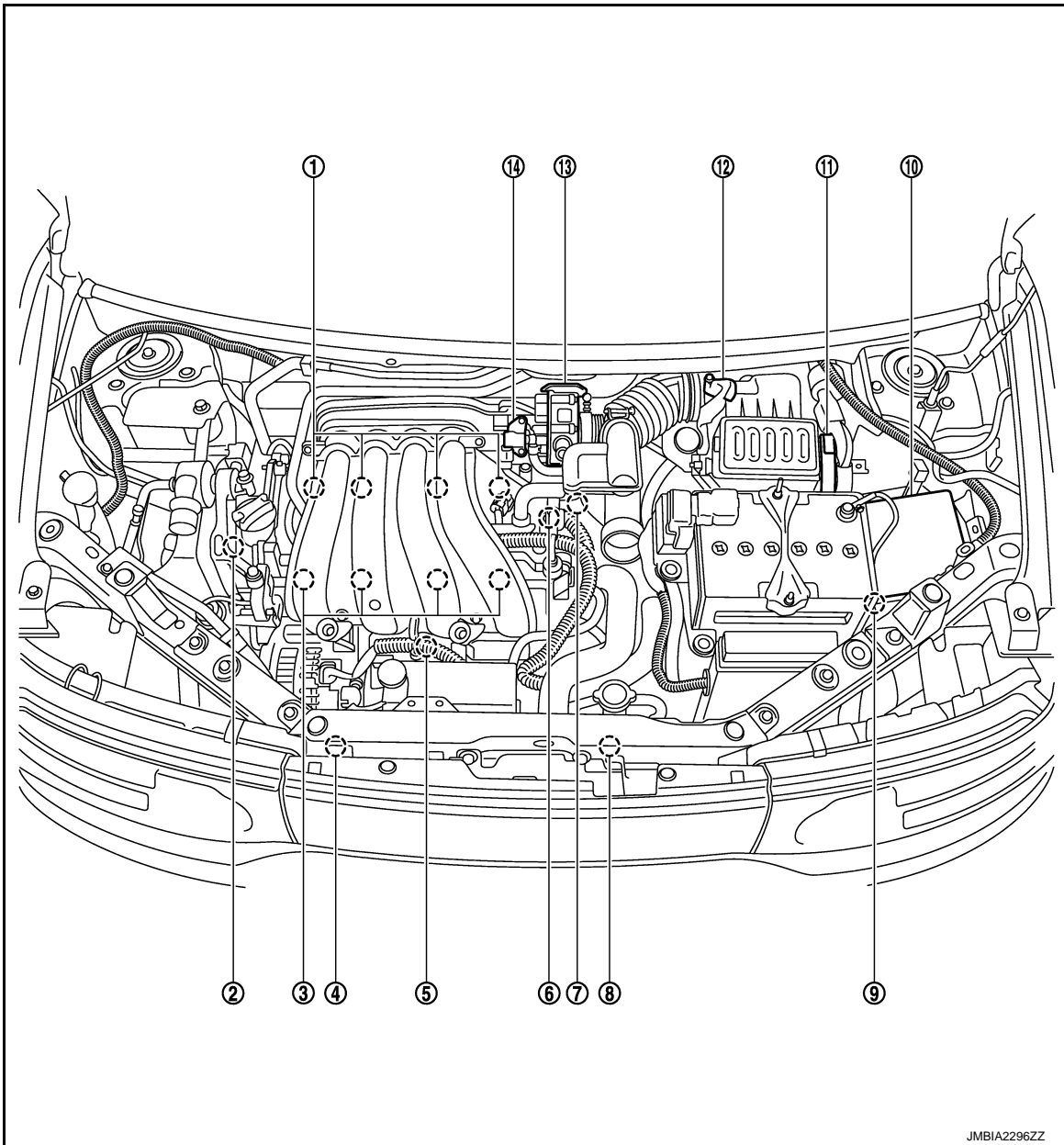
# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Parts Location

INFOID:000000006503703



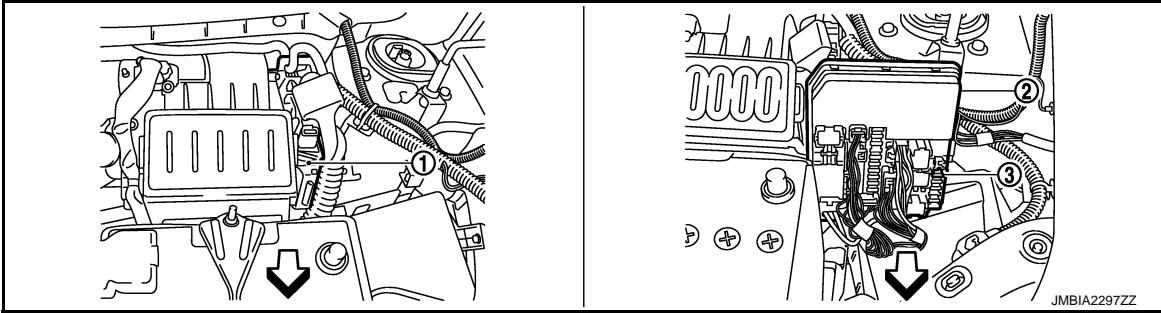
- |  |   |   |
|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

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# EVAPORATIVE EMISSION SYSTEM

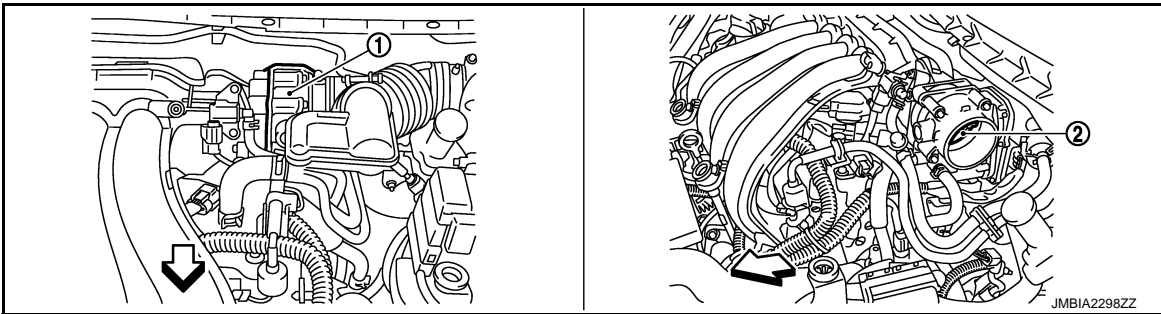
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



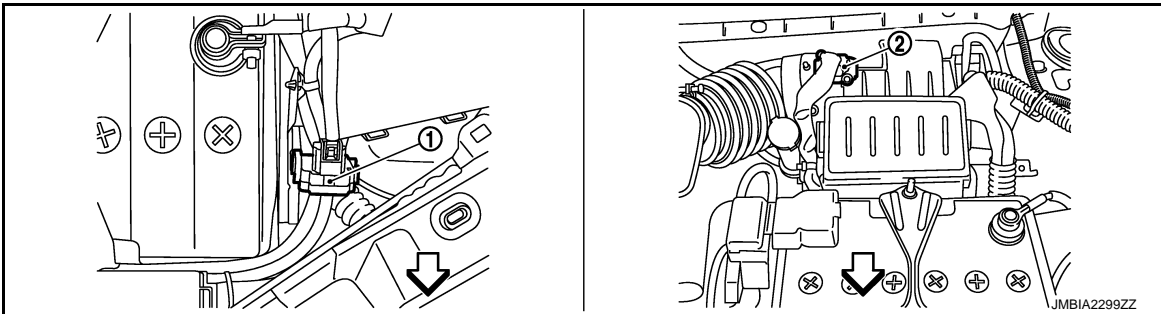
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



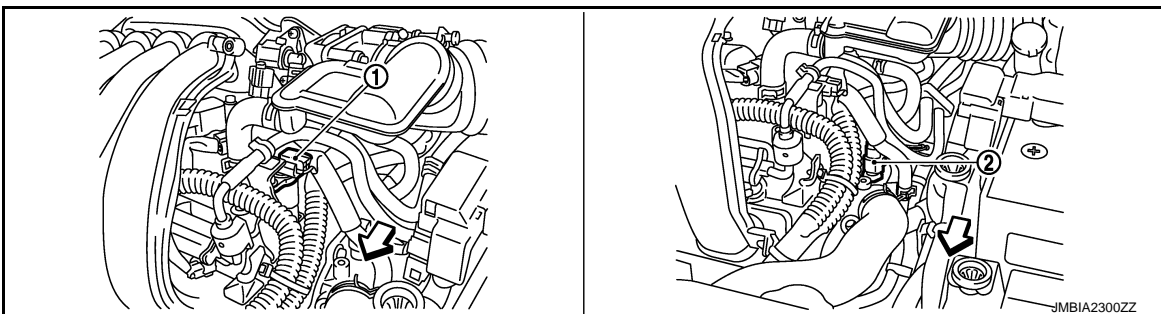
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



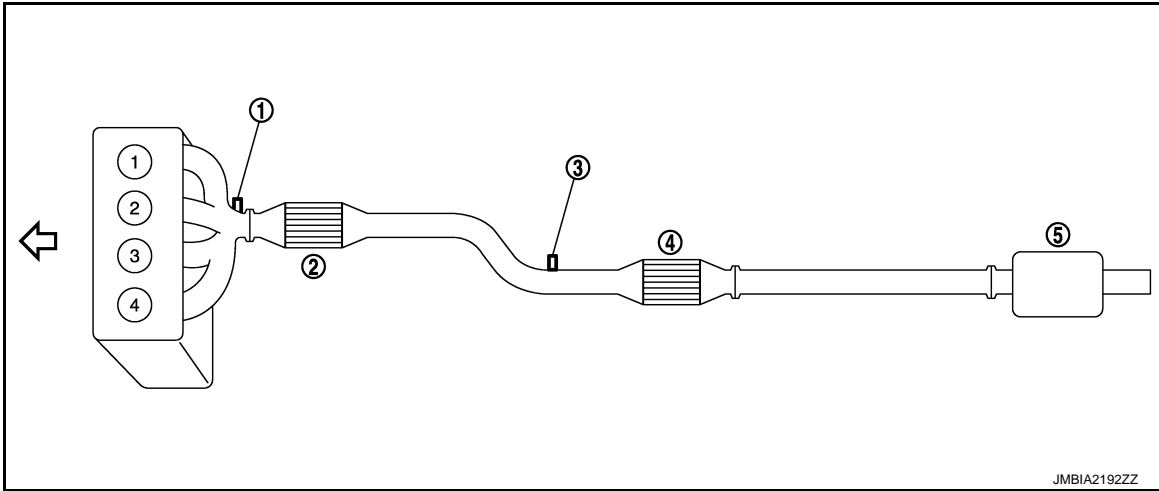
# EVAPORATIVE EMISSION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

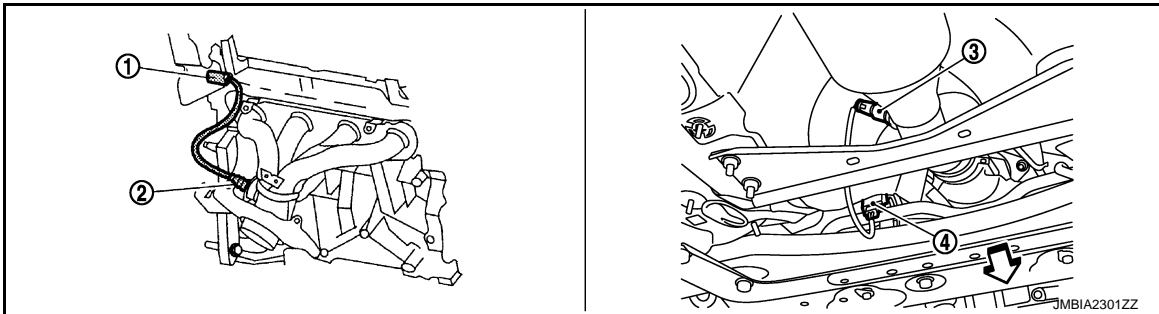
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



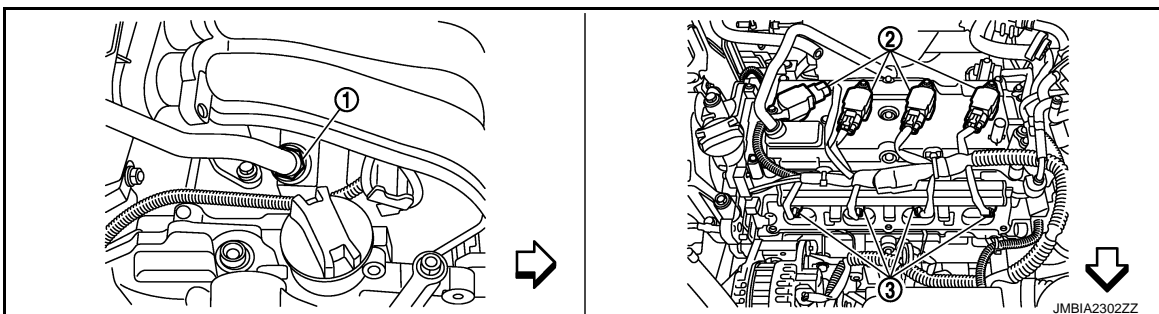
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffer

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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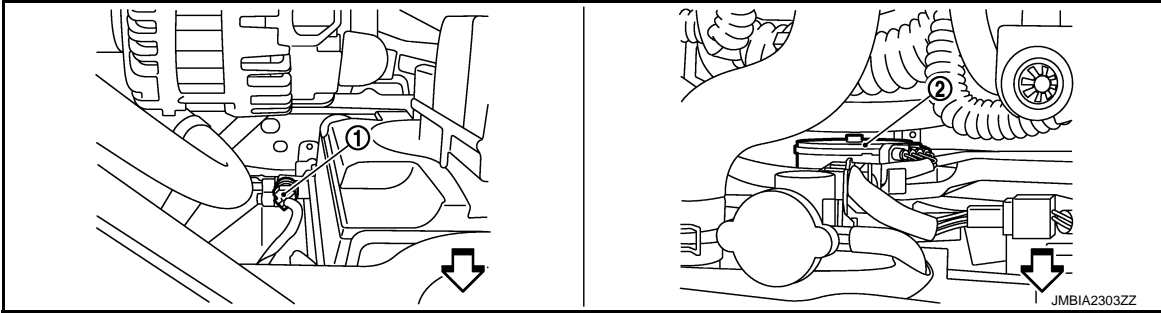
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# EVAPORATIVE EMISSION SYSTEM

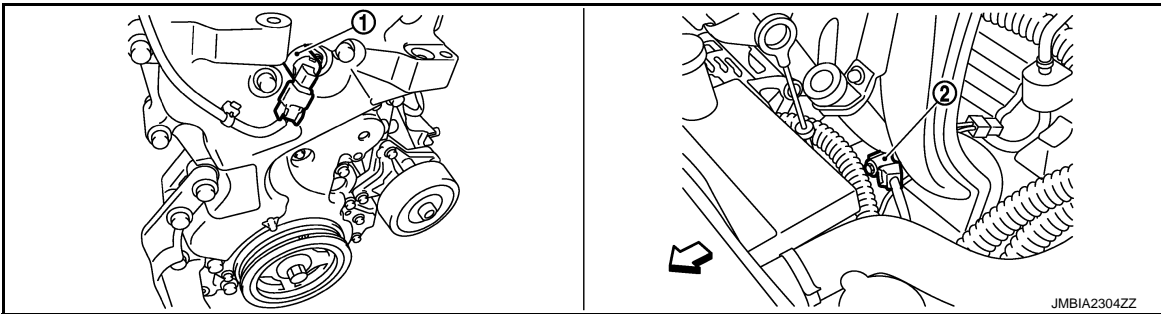
< SYSTEM DESCRIPTION >

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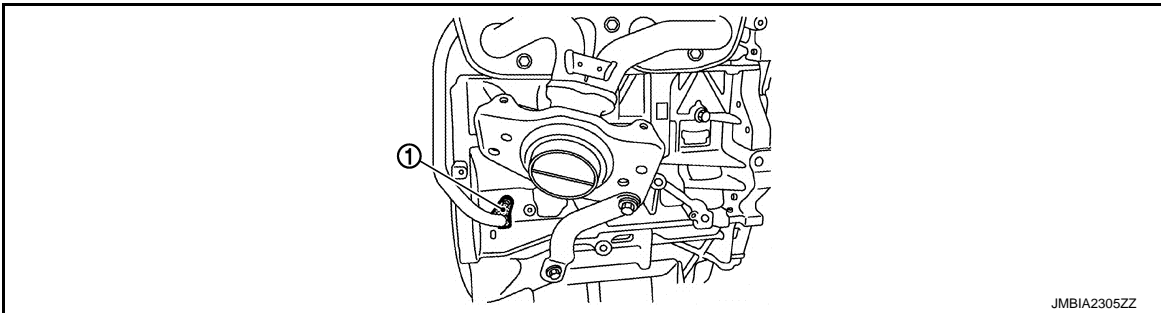
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

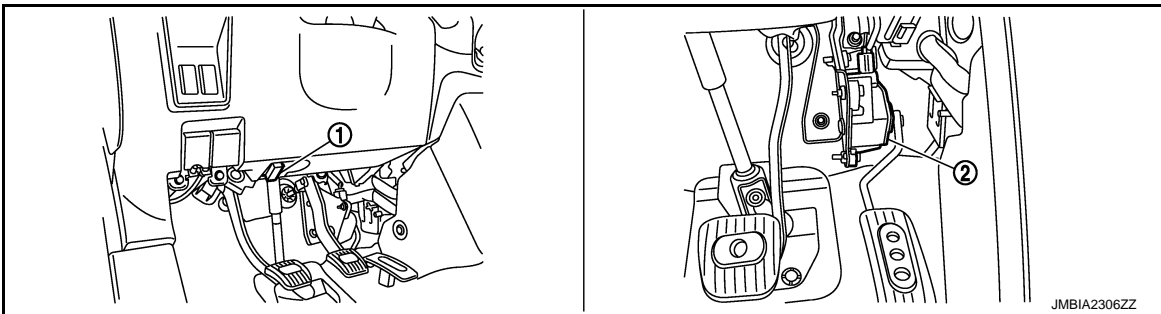


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

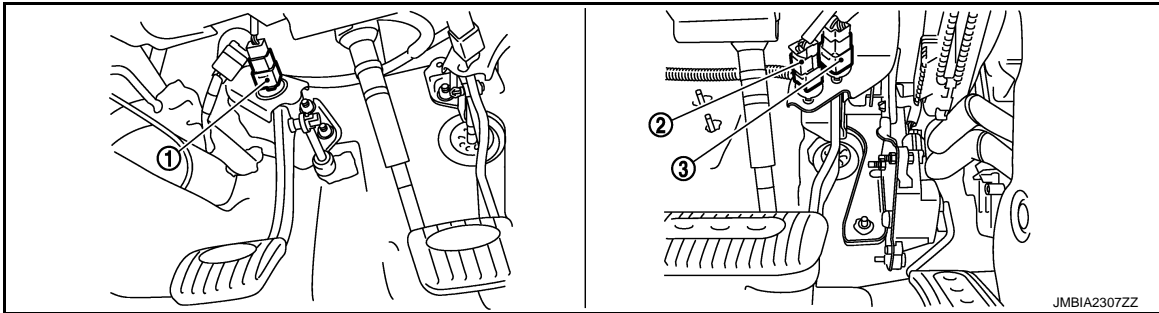


- 1. Data link connector
- 2. Accelerator pedal position sensor

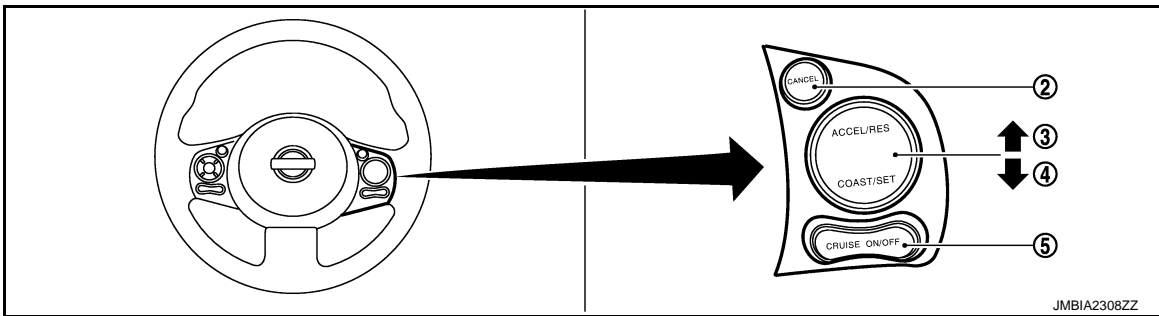
# EVAPORATIVE EMISSION SYSTEM

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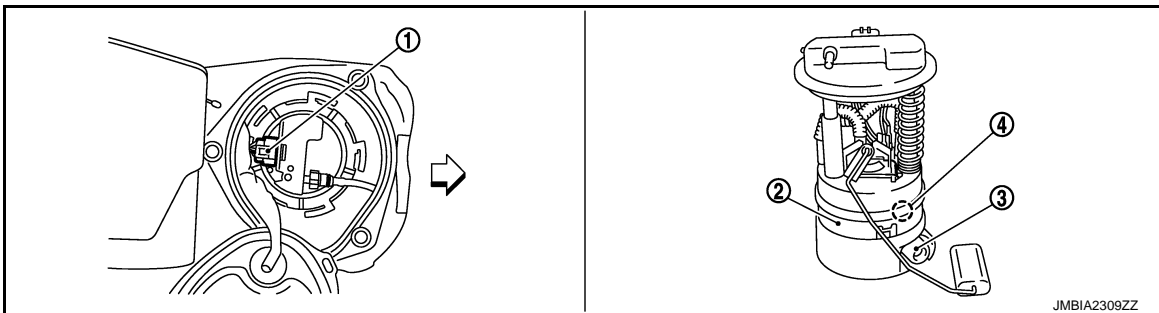
[MR18DE (EXCEPT FOR CALIFORNIA)]



- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch

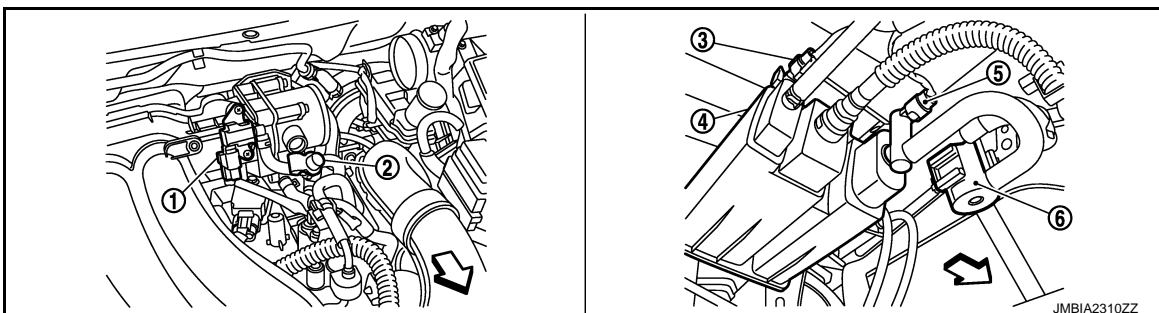


- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



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

↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# EVAPORATIVE EMISSION SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

4. EVAP canister  
↳ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006503704

Component	Reference
A/F sensor 1	<a href="#">EC-185, "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-391, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-250, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169, "Description"</a>
EVAP canister purge volume control solenoid valve	<a href="#">EC-272, "Description"</a>
EVAP control system pressure sensor	<a href="#">EC-288, "Description"</a>
Fuel tank temperature sensor	<a href="#">EC-228, "Description"</a>
Mass air flow sensor	<a href="#">EC-153, "Description"</a>
Throttle position sensor	<a href="#">EC-175, "Description"</a>



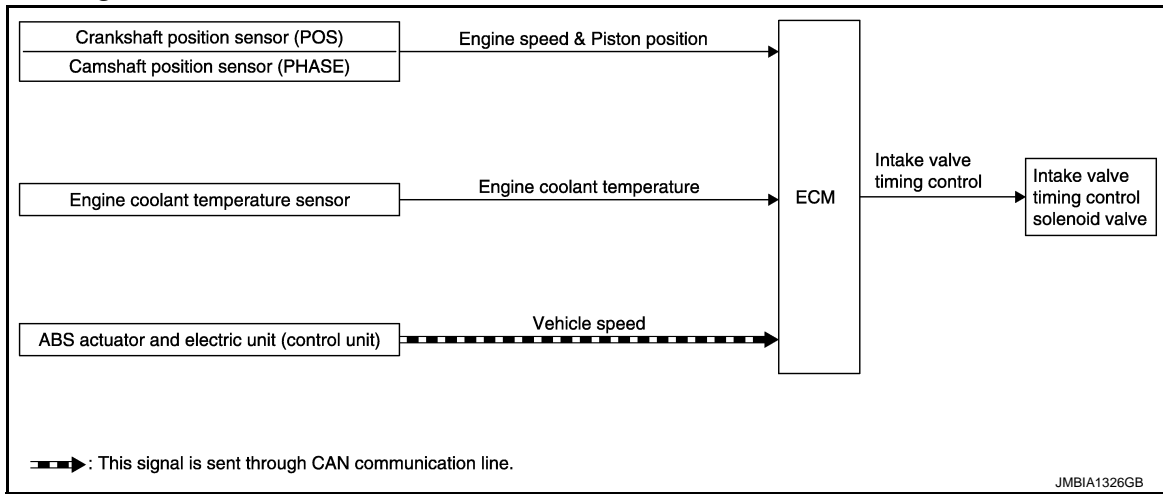
# INTAKE VALVE TIMING CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## INTAKE VALVE TIMING CONTROL

### System Diagram



### System Description

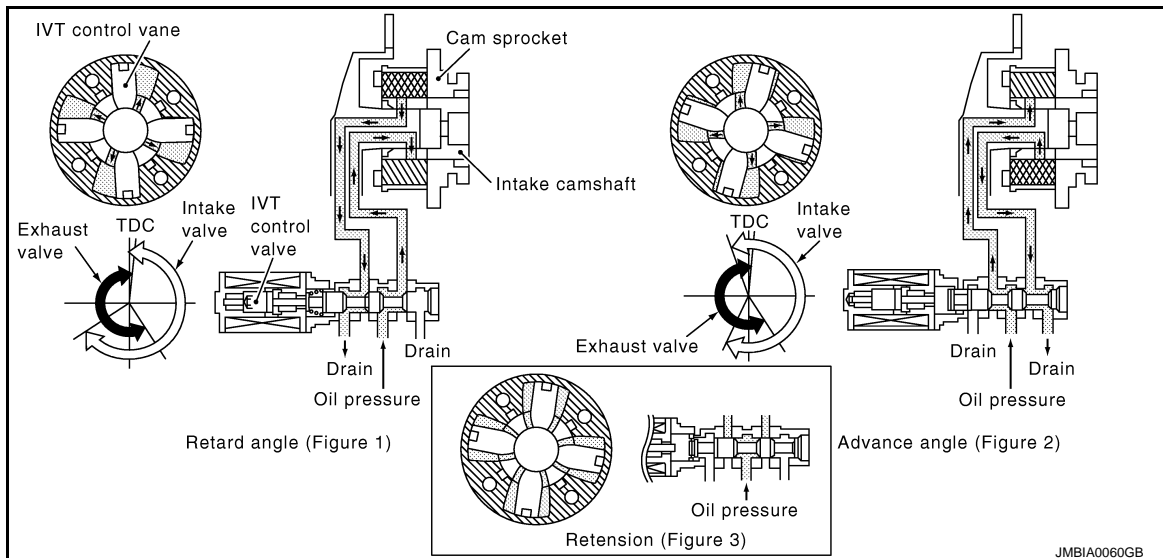
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### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	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		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			

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

### SYSTEM DESCRIPTION



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

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

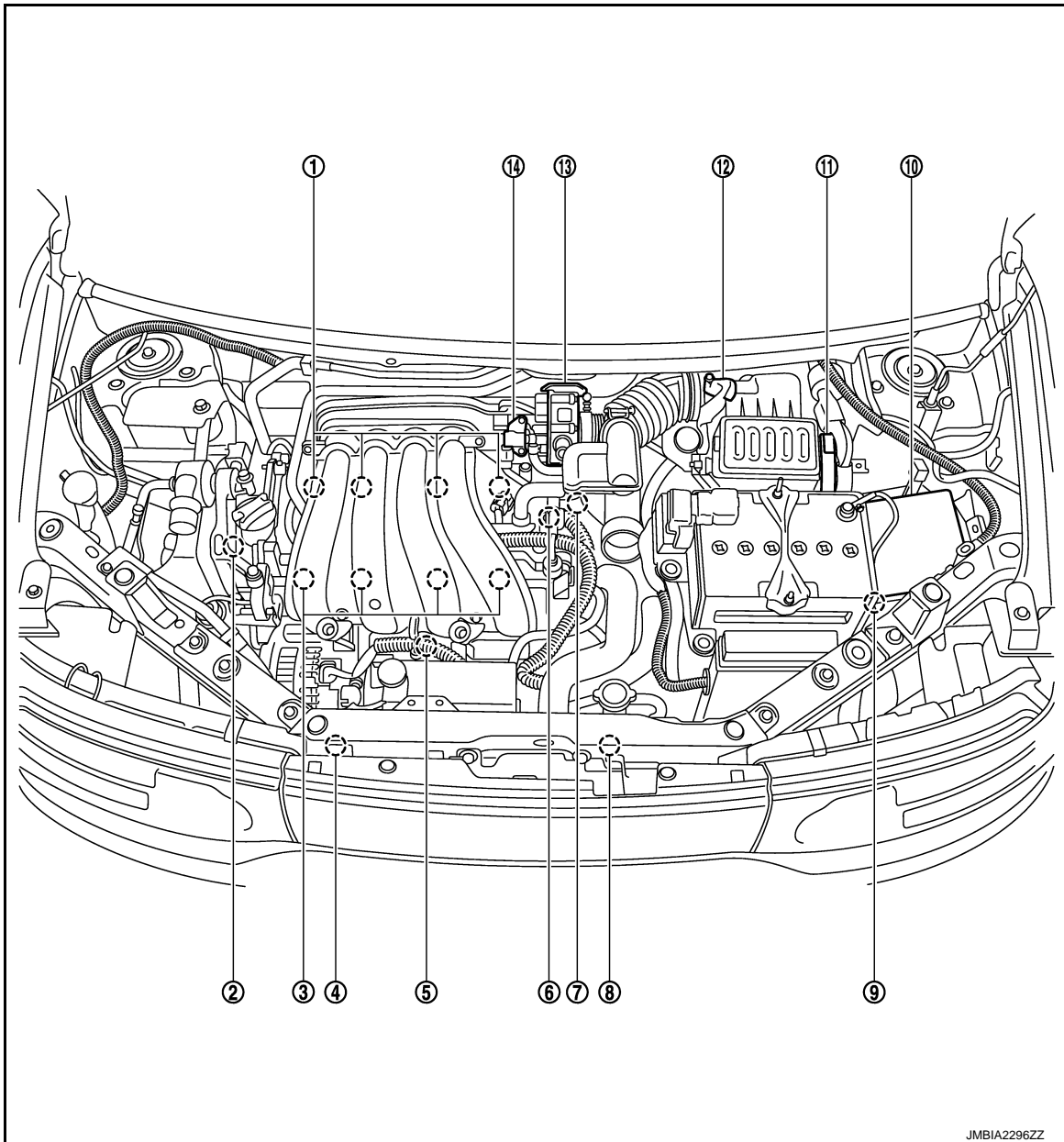
# INTAKE VALVE TIMING CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Parts Location

INFOID:00000006503707



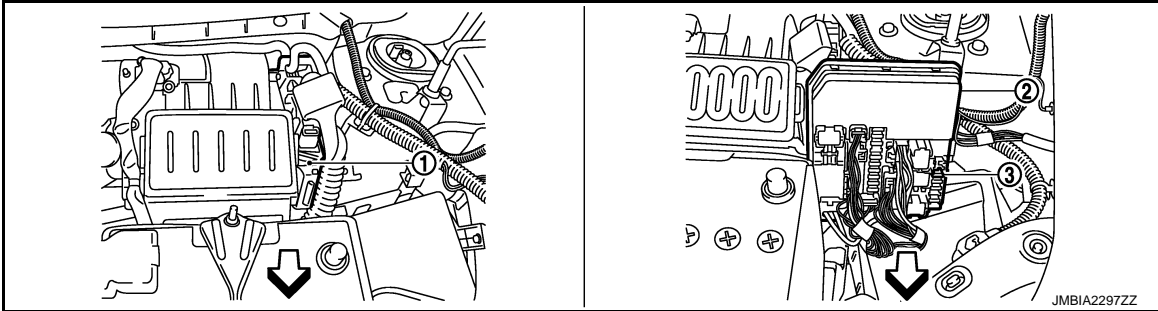
JMBIA2296ZZ

- |  |   |   |
|--|---|---|
| 1. Ignition coil (with power transistor) and spark plug  | 2. Intake valve timing control solenoid valve         | 3. Fuel injector  |
| 4. Refrigerant pressure sensor   | 5. Knock sensor                                       | 6. Camshaft position sensor (PHASE)                           |
| 7. Engine coolant temperature sensor   | 8. Cooling fan motor                                  | 9. Battery current sensor                                     |
| 10. IPDM E/R   | 11. ECM   | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) | 14. EVAP canister purge volume control solenoid valve |   |

# INTAKE VALVE TIMING CONTROL

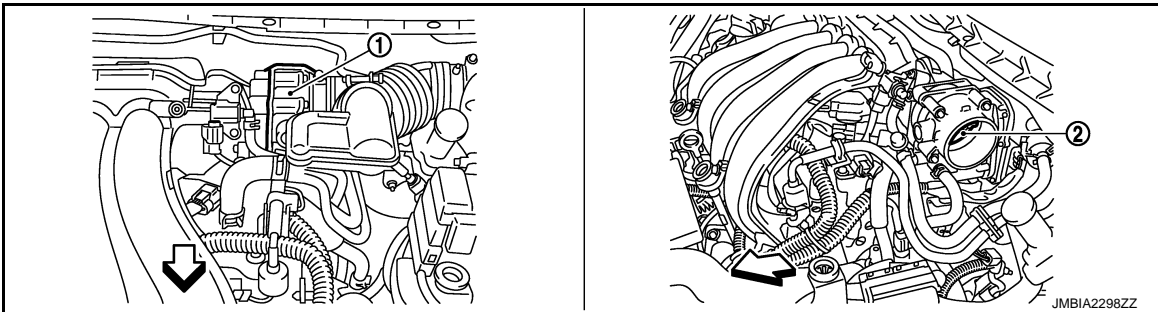
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



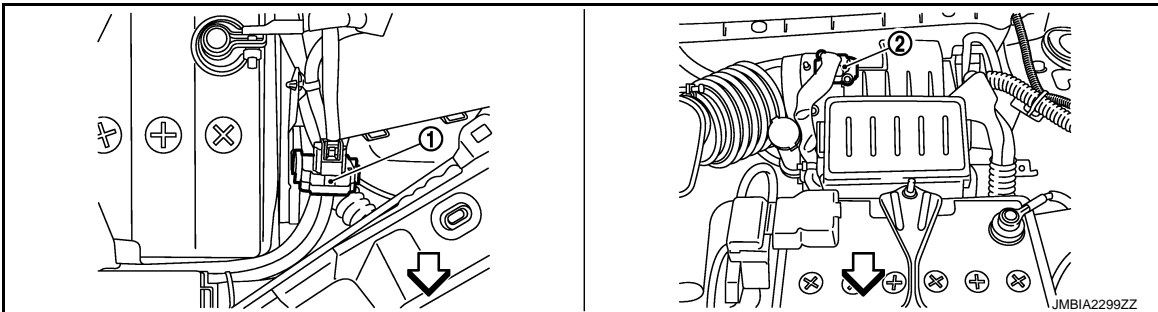
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



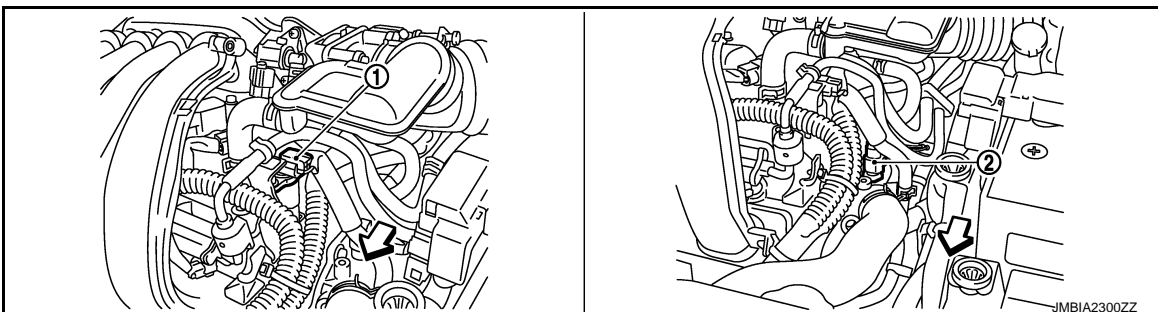
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



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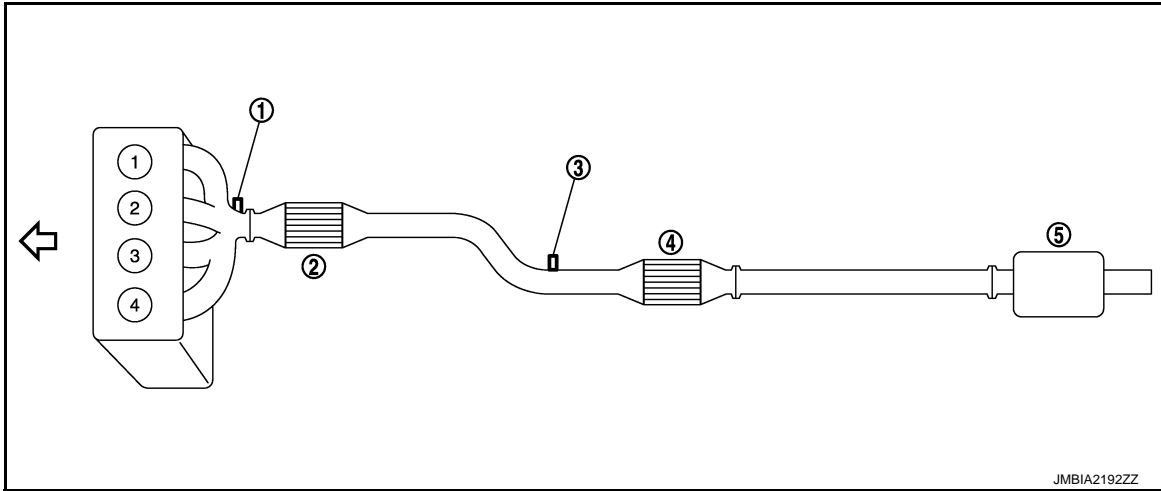
# INTAKE VALVE TIMING CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

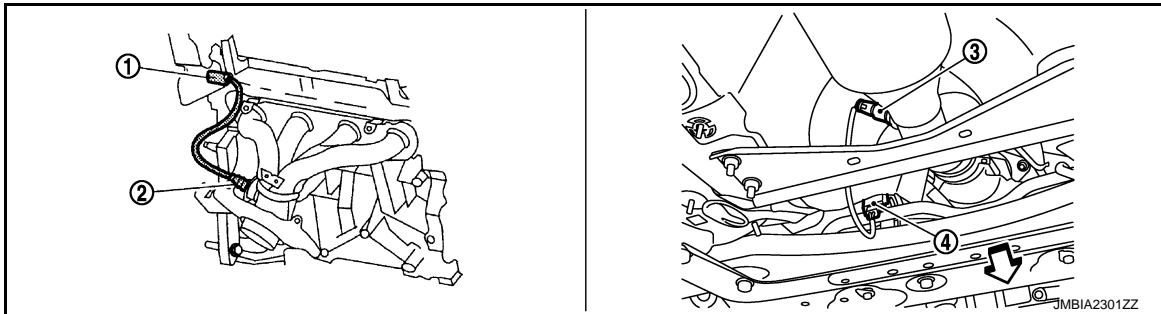
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

↶ Vehicle front



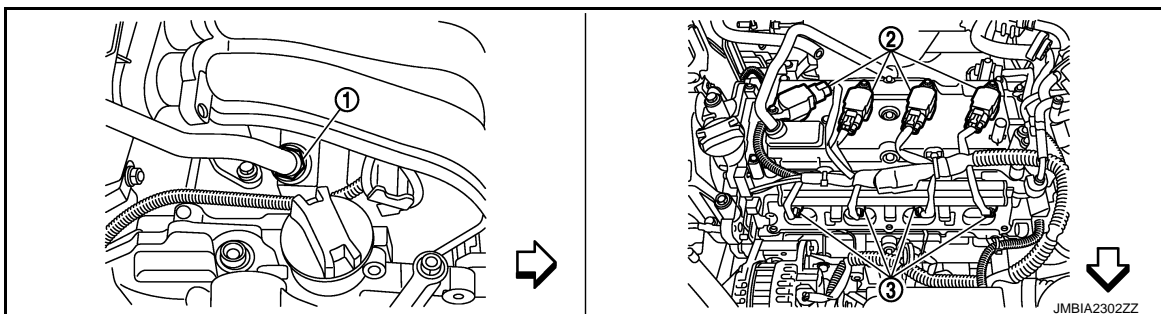
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

↶ Vehicle front



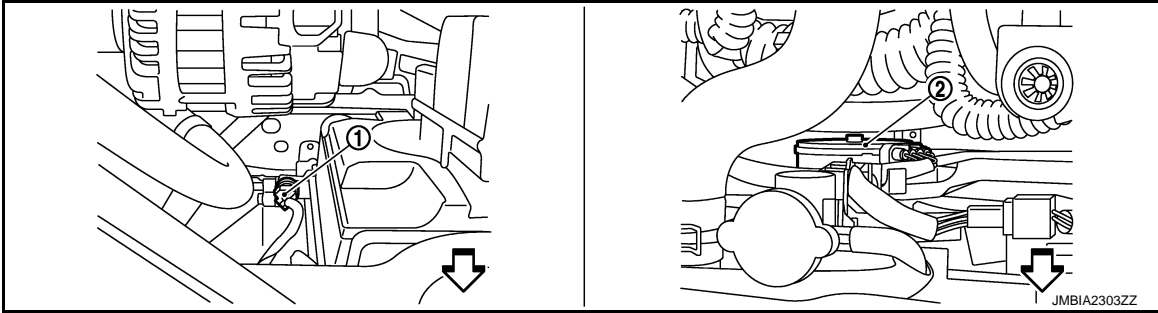
1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

↶ Vehicle front

# INTAKE VALVE TIMING CONTROL

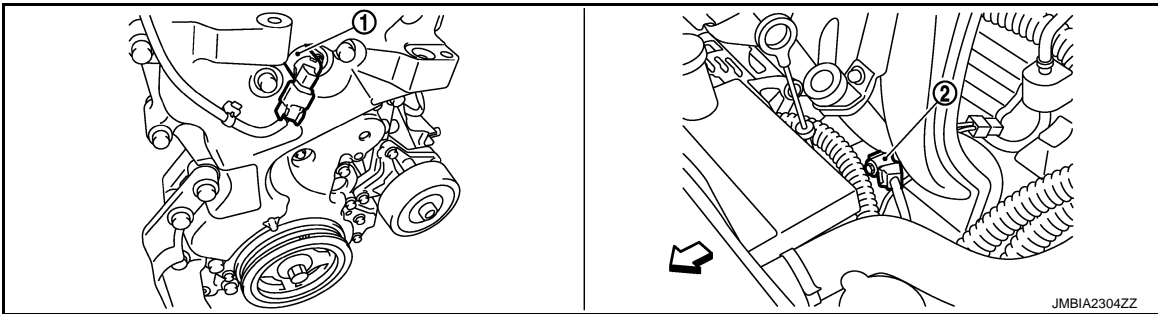
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]



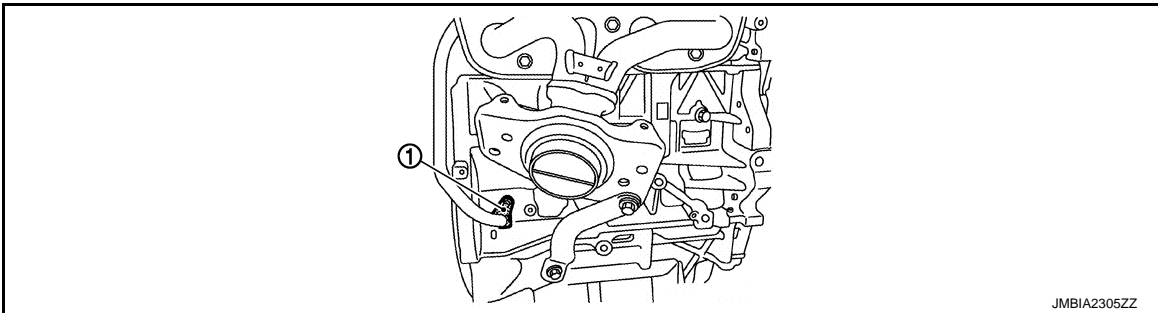
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

← Vehicle front

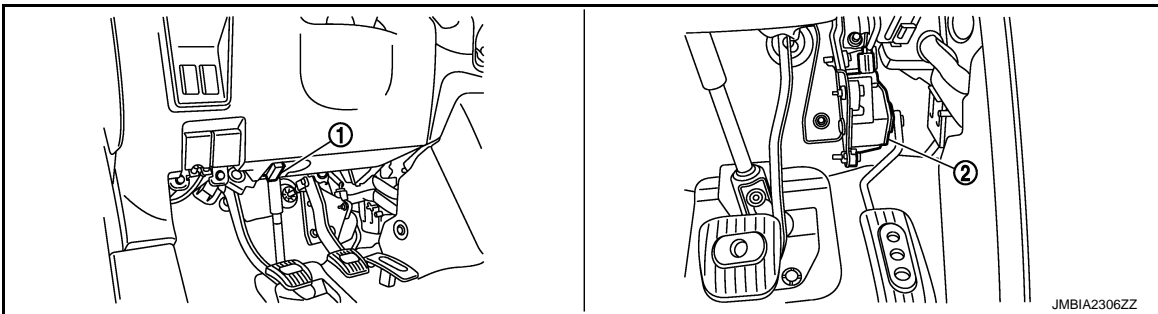


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

← Vehicle front



- 1. Crankshaft position sensor (POS)



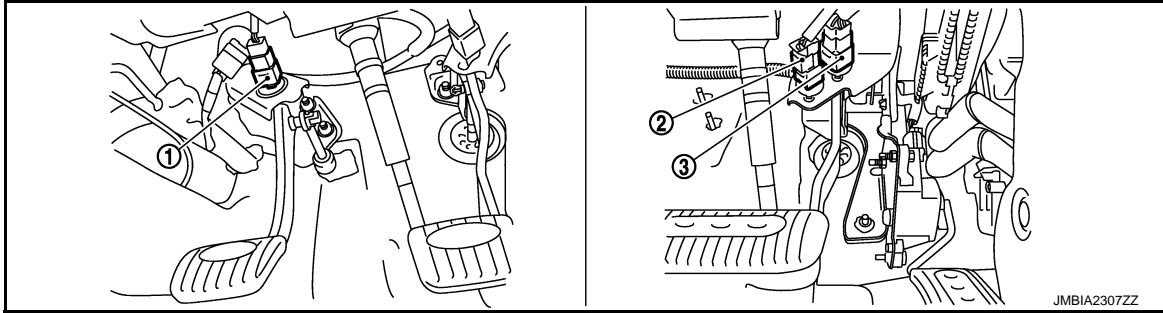
- 1. Data link connector
- 2. Accelerator pedal position sensor

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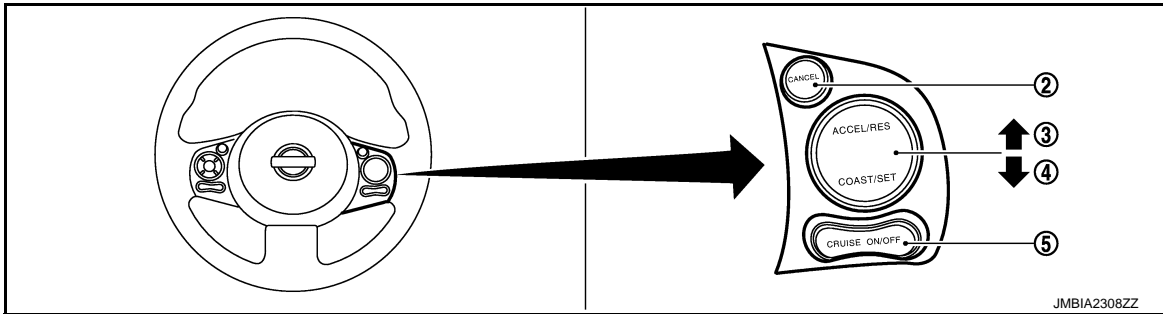
# INTAKE VALVE TIMING CONTROL

< SYSTEM DESCRIPTION >

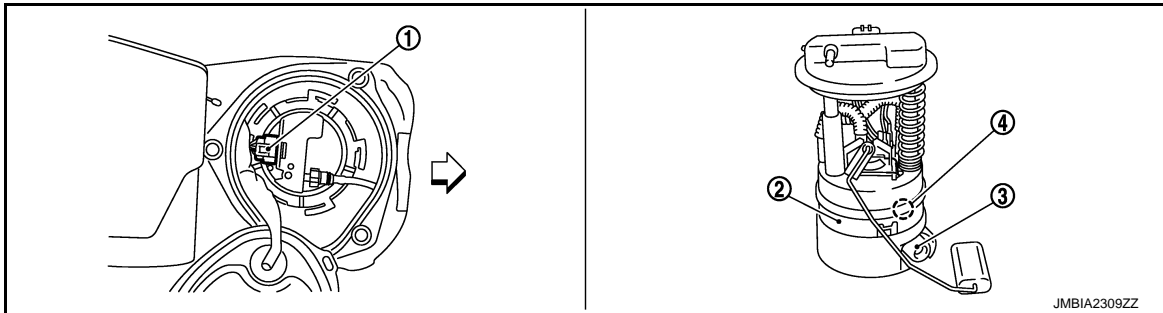
[MR18DE (EXCEPT FOR CALIFORNIA)]



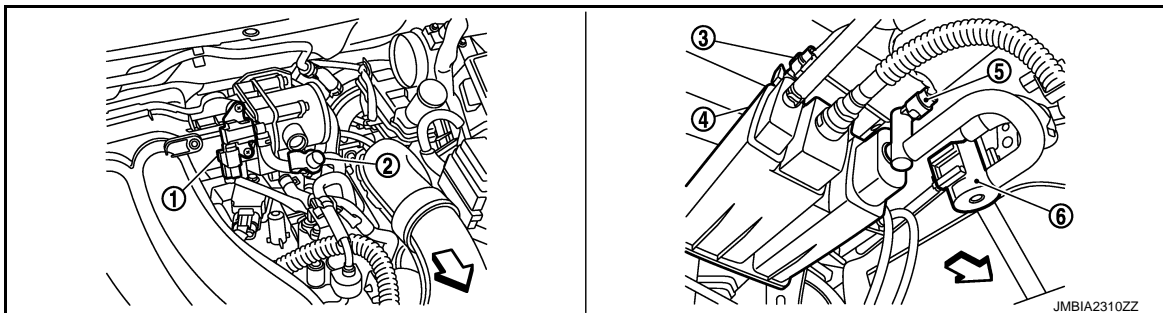
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# INTAKE VALVE TIMING CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↩ Vehicle front

A

## Component Description

INFOID:000000006503708

EC

Component	Reference
Camshaft position sensor (PHASE)	<a href="#">EC-250. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-246. "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-169. "Description"</a>
Intake valve timing control solenoid valve	<a href="#">EC-97. "System Description"</a>

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# FUEL FILLER CAP WARNING SYSTEM

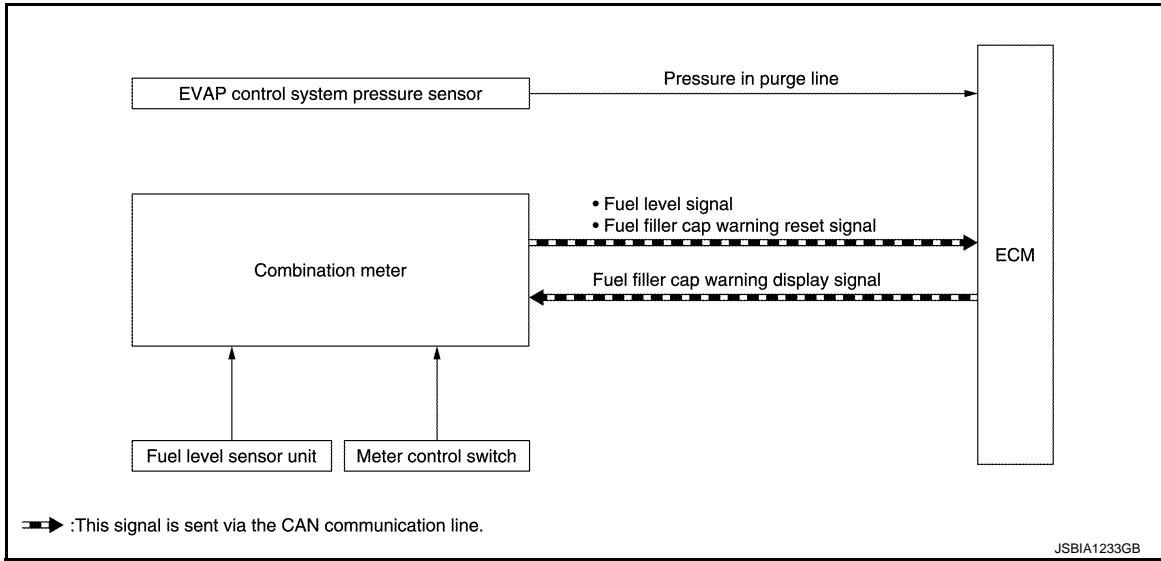
< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## FUEL FILLER CAP WARNING SYSTEM

### System Diagram

INFOID:000000006956486



### System Description

INFOID:000000006956487

#### INPUT/OUTPUT SIGNAL CHART

##### Input

Unit/Sensor	Input signal to ECM	ECM function
EVAP control system pressure sensor	Pressure in purge line	Fuel filler cap warning control
Combination meter	Fuel level signal*	
	Fuel filler cap warning reset signal*	

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

##### Output

Unit	Output signal	Actuator
ECM	Fuel filler cap warning display signal*	Combination meter

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

#### SYSTEM DESCRIPTION

The fuel filler cap warning system alerts the driver to the prevention of the fuel filler being left uncapped and malfunction occurrences after refueling, by turning ON the fuel filler cap warning display on the combination meter.

ECM judges a refueled state, based on a fuel level signal transmitted from the combination meter.

When a very small leak is detected through the EVAP leak diagnosis performed after judging the refueled state, ECM transmits a fuel filler cap warning display signal (request for display ON) to the combination meter via CAN communication.

When receiving the signal, the combination meter turns ON the fuel filler cap warning display.

#### **CAUTION:**

**Check fuel filler cap installation condition when the fuel filler cap warning display turns ON.**

#### Reset Operation

The fuel filler cap warning lamp turns OFF, according to any condition listed below:

- Reset operation is performed by operating the meter control switch on the combination meter. Refer to [MWI-18. "WARNING LAMPS/INDICATOR LAMPS : System Description"](#).
- When the reset operation is performed, the combination meter transmits a fuel filler cap warning reset signal to ECM via CAN communication. ECM transmits a fuel filler cap warning display signal (request for display OFF) to the combination meter via CAN communication. When receiving the signal, the combination meter turns OFF the fuel filler cap warning display.
- EVAP leak diagnosis result is normal.



# FUEL FILLER CAP WARNING SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- Fuel refilled.
- DTC erased by using CONSULT-III.

**NOTE:**

MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel filler cap warning display turns ON/OFF.

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# ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ON BOARD DIAGNOSTIC (OBD) SYSTEM

### Diagnosis Description

INFOID:000000006972223

This system is an on board diagnostic system that records exhaust emission-related diagnostic information and detects a sensors/actuator-related malfunction. A malfunction is indicated by the malfunction indicator lamp (MIL) and stored in ECU memory as a DTC. The diagnostic information can be obtained with the diagnostic tool (GST: Generic Scan Tool).

### GST (Generic Scan Tool)

INFOID:000000006972224

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to [GI-49. "Description"](#).

**NOTE:**

Service \$0A is not applied for regions where it is not mandated.

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## DIAGNOSIS SYSTEM (ECM)

### DIAGNOSIS DESCRIPTION

#### DIAGNOSIS DESCRIPTION : 1st Trip Detection Logic and Two Trip Detection Logic

INFOID:000000006972225

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 illuminate at this stage. <1st trip>

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

×: 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	Illuminated	Blinking	Illuminated				
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to <a href="#">EC-465, "DTC Index"</a> .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

#### DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:000000006972226

##### DTC AND 1ST TRIP DTC

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

If a malfunction is detected during the 1st trip, the 1st trip DTC is saved in the ECM memory. The MIL will not 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 saved 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.

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-465, "DTC Index"](#). 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/ISO 15031-5. 1st trip DTC detection occurs without illuminating the MIL and therefore does not warn the driver of a malfunction.

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-14, "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.

# DIAGNOSIS SYSTEM (ECM)

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

## < SYSTEM DESCRIPTION >

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
2		Except the above items
3	1st trip freeze frame data	

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

## DIAGNOSIS DESCRIPTION : Counter System

INFOID:000000006972227

### 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 turn 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.

### COUNTER SYSTEM CHART

Items	Fuel Injection System	Misfire	Other
MIL (turns OFF)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (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”.

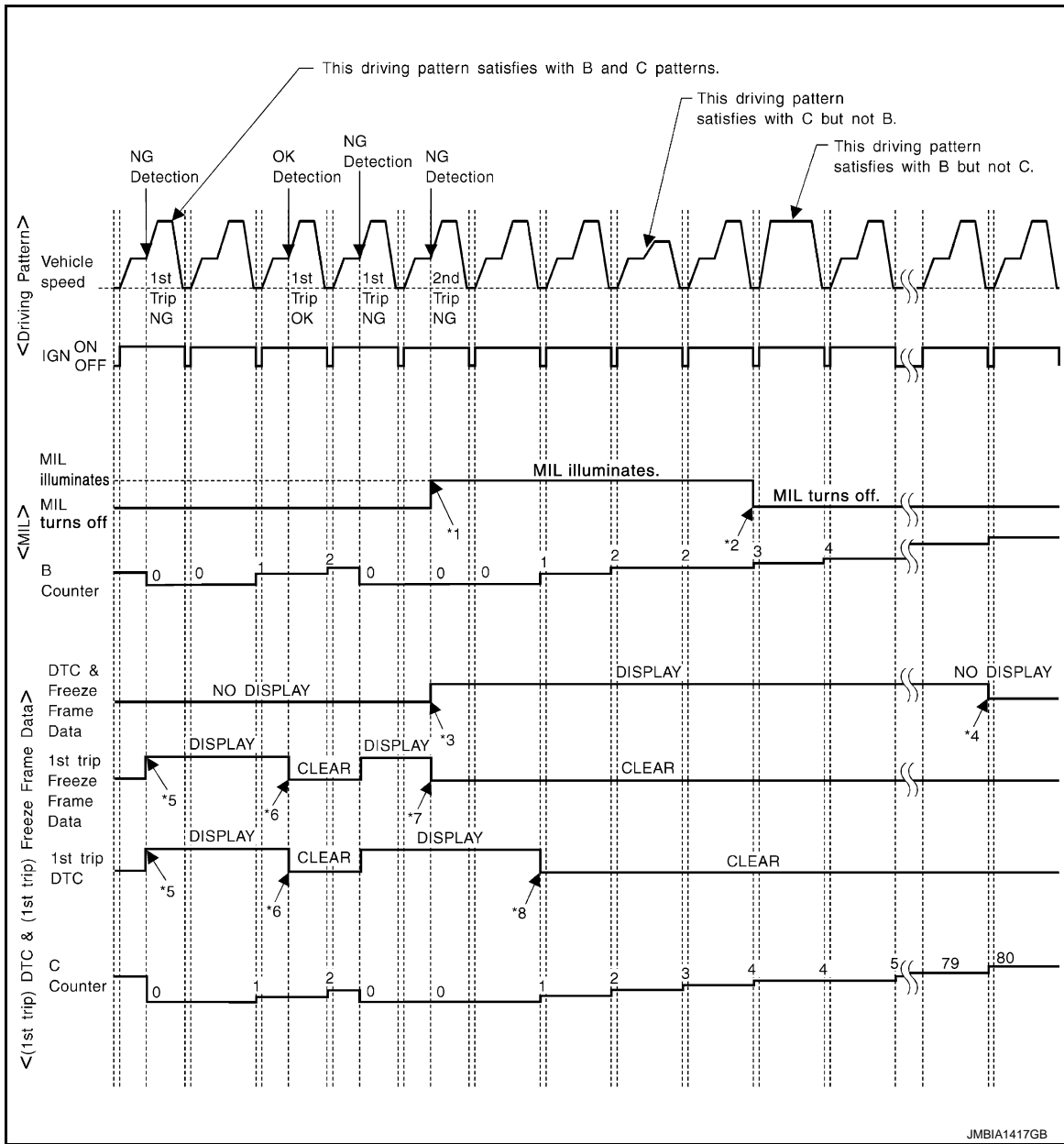
- \*1: Clear timing is at the moment OK is detected.
- \*2: Clear timing is when the same malfunction is detected in the 2nd trip.

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

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >



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

\*2: MIL will turn 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

Refer to [EC-111. "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

### Driving Pattern C

Refer to [EC-111. "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

Example:

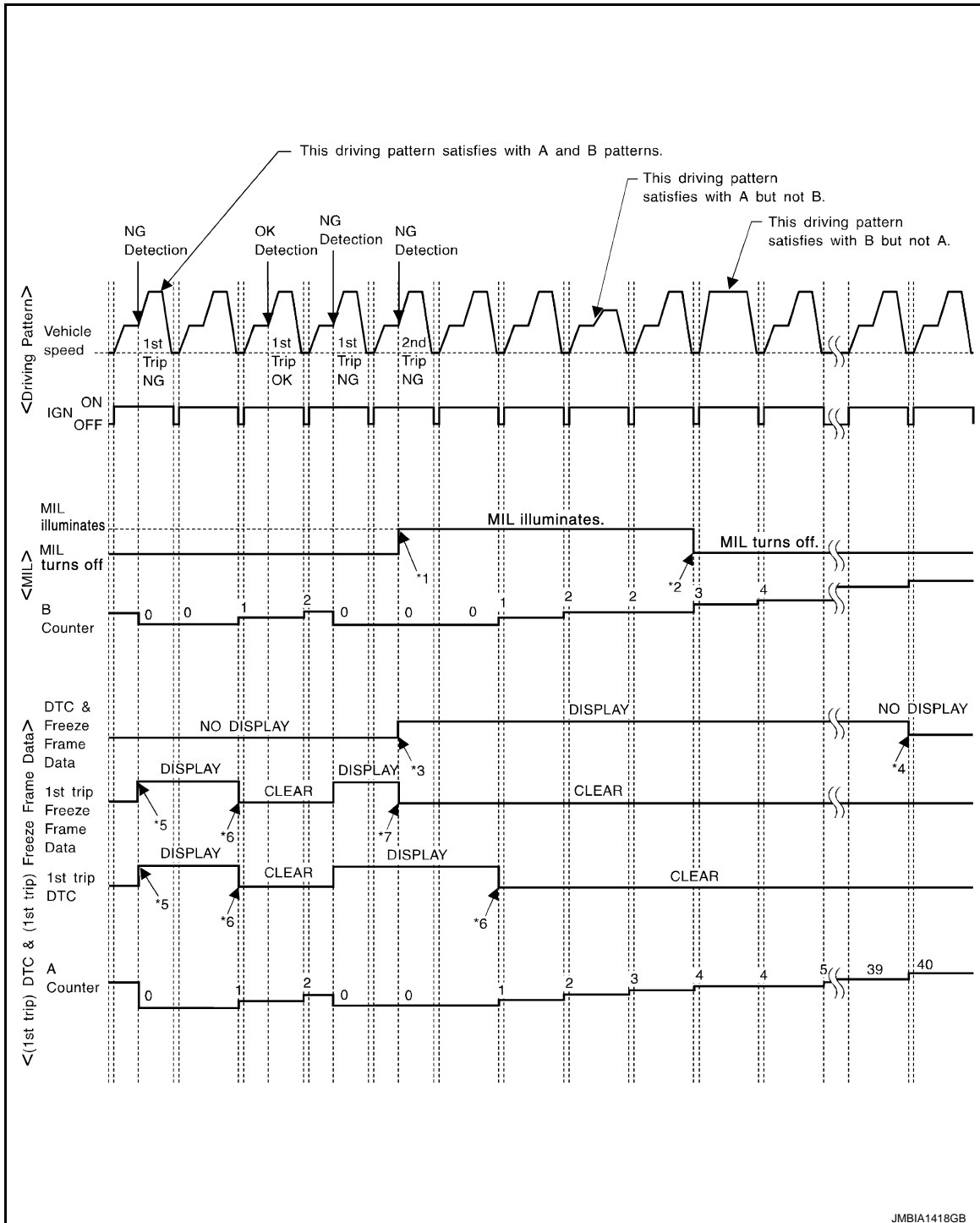
If the stored freeze frame data is as per the following:

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)

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



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# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

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

\*2: MIL will turn 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”

### Driving Pattern A

Refer to [EC-111, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

### Driving Pattern B

Refer to [EC-111, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

## DIAGNOSIS DESCRIPTION : Driving Pattern

INFOID:000000006972228

### **CAUTION:**

**Always drive at a safe speed.**

### DRIVING PATTERN A

Driving pattern A means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature rises by 20°C (36°F) or more after starting the engine.
- Engine coolant temperature reaches 70°C (158°F) or more.
- The ignition switch is turned from ON to OFF.

#### **NOTE:**

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern A.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern A.

### DRIVING PATTERN B

Driving pattern B means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- Under the closed loop control condition, the following state reaches 12 seconds or more in total: Vehicle speed of 4 km/h (2 MPH) or less with idling condition.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

#### **NOTE:**

- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

### DRIVING PATTERN C

Driving pattern C means operating vehicle as per the following:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

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## DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

### < SYSTEM DESCRIPTION >

Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]

Engine coolant temperature condition:

- When the freeze frame data shows lower than 70°C (158°F), engine coolant temperature should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), engine coolant temperature should be higher than or equal to 70°C (158°F).

#### NOTE:

- When the same malfunction is detected regardless of the above vehicle conditions, reset the counter of driving pattern C.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern C.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

### DRIVING PATTERN D

Driving pattern D means a trip satisfying the following conditions.

- The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.
- Idle speed lasts 30 seconds or more.
- A lapse of 600 seconds or more after engine start.

#### NOTE:

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern D.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern D.

### DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code

INFOID:000000006972229

System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979/ISO 15031-5.

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.

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 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.



# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

Self-diagnosis result		Example						
		Diagnosis	Ignition cycle					
	← ON →		OFF	← 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.

—: Self-diagnosis is not carried out.

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

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

If one or more SRT related self-diagnoses show 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 the number one (1) for each self-diagnosis (Case 1 & 2) or the number two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

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

**NOTE:**

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

## DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)

INFOID:000000006972231

When emission-related ECU detects a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions), it turns on/blinks MIL to inform the driver that a malfunction has been detected.

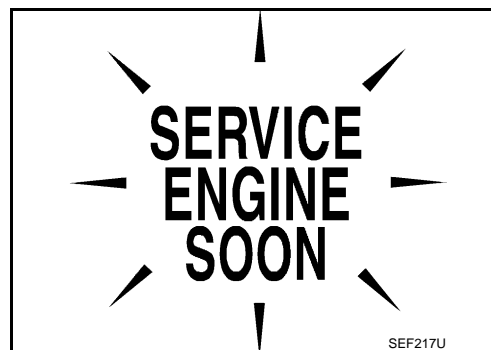
1. The MIL illuminates when ignition switch is turned ON (engine is not running).

**NOTE:**

Check the MIL circuit if MIL does not illuminate. Refer to [EC-429, "Component Function Check"](#).

2. When the engine is started, the MIL should go off.

**NOTE:**



# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

If MIL continues to illuminate/blink, perform self-diagnoses and inspect/repair accordingly because an emission-related ECU has detected a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions).

## On Board Diagnosis Function

INFOID:00000000697232

### ON BOARD DIAGNOSIS ITEM

The on board diagnostic system has the following functions.

Diagnostic test mode	Function
Bulb check	MIL can be checked.
SRT status	ECM can read if SRT codes are set.
Malfunction warning	If ECM detects a malfunction, it illuminates or blinks MIL to inform the driver that a malfunction has been detected.
Self-diagnostic results	DTCs or 1st trip DTCs stored in ECM can be read.
Accelerator pedal released position learning	ECM can learn the accelerator pedal released position. Refer to <a href="#">EC-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"</a> .
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to <a href="#">EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"</a> .
Idle air volume learning	ECM can learn the idle air volume. Refer to <a href="#">EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"</a> .
Mixture ratio self-learning value clear	Mixture ratio self-learning value can be erased. Refer to <a href="#">EC-27, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"</a> .

### BULB CHECK MODE

#### Description

This function allows damage inspection in the MIL bulb (blown, open circuit, etc.).

#### Operation Procedure

1. Turn ignition switch ON.
2. The MIL on the instrument panel should stay ON.  
If it remains OFF, check MIL circuit. Refer to [EC-429, "Diagnosis Procedure"](#).

### SRT STATUS MODE

#### Description

This function allows to read if ECM has completed the self-diagnoses of major emission control systems and components. For SRT, refer to [EC-112, "DIAGNOSIS DESCRIPTION : System Readiness Test \(SRT\) Code"](#).

#### Operation Procedure

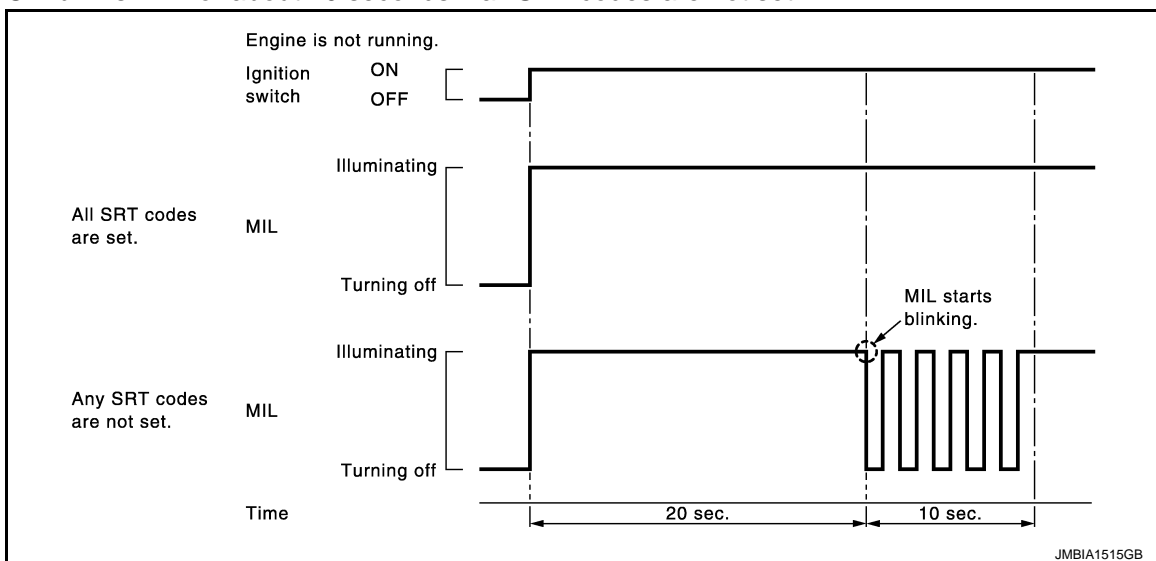
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown blow.
  - ECM continues to illuminate MIL if all SRT codes are set.

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

- ECM blinks MIL for about 10 seconds if all SRT codes are not set.



## MALFUNCTION WARNING MODE

### Description

In this function ECM turns on or blinks MIL when it detects a malfunction in the emission control system components and/or the powertrain control components (which affect vehicle emissions) to inform the driver that a malfunction has been detected.

### Operation Procedure

- Turn ignition switch ON.
- Check that MIL illuminates.  
If it remains OFF, check MIL circuit. Refer to [EC-429, "Diagnosis Procedure"](#).
- Start engine and let it idle.
  - For two trip detection logic diagnoses, ECM turns on MIL when it detects the same malfunction twice in the two consecutive driving cycles.
  - For 1st trip detection logic diagnoses, ECM turns on MIL when it detects a malfunction in one driving cycle.
  - ECM blinks MIL when it detects a malfunction that may damage the three way catalyst (misfire).

## SELF-DIAGNOSTIC RESULTS MODE

### Description

This function allows to indicate DTCs or 1st trip DTCs stored in ECM according to the number of times MIL is blinking.

### How to Set Self-diagnostic Results 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.
  - After ignition switch is turned off, ECM is always released from the "self-diagnostic results" mode.
- Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
  - Repeat the following procedure quickly five times within 5 seconds.
    - Fully depress the accelerator pedal.
    - Fully release the accelerator pedal.
  - Wait 7 seconds, fully depress the accelerator pedal and keep it depressed for approx. 10 seconds until the MIL starts blinking.

#### NOTE:

Do not release the accelerator pedal for 10 seconds if MIL starts blinking during this period. This blinking is displaying SRT status and is continued for another 10 seconds.

- Fully release the accelerator pedal.  
ECM has entered to "Self-diagnostic results" mode.

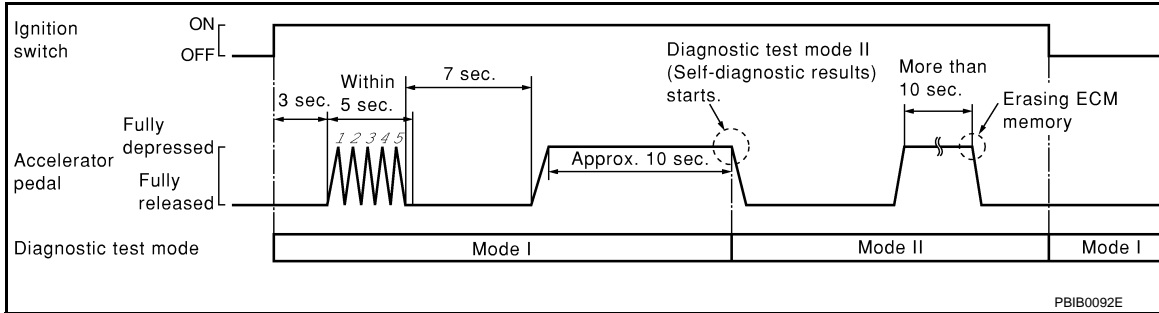
# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

### NOTE:

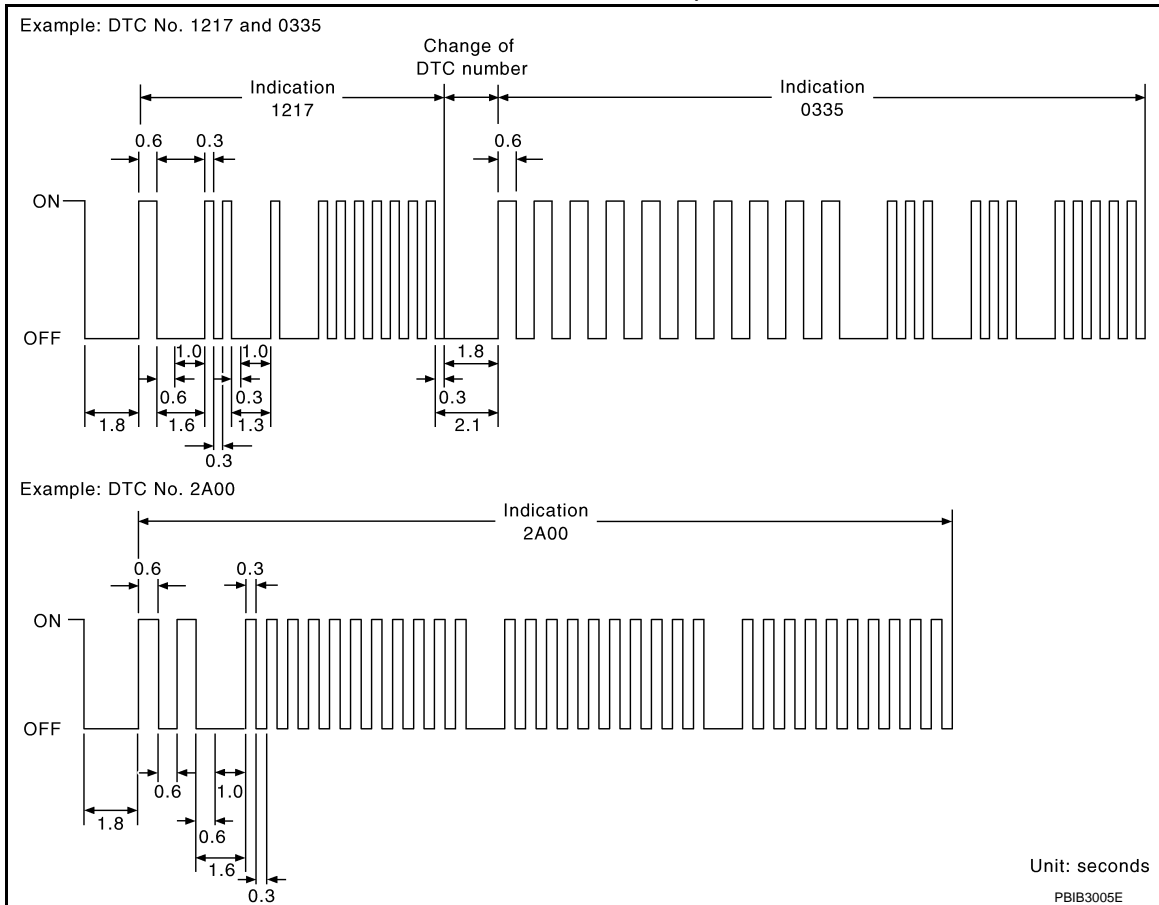
Wait until the same DTC (or 1st trip DTC) appears to completely confirm all DTCs.



### How to Read Self-diagnostic Results

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 "malfunction warning" mode, 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 unidentified 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 per the following.

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-seconds) - OFF (0.6-seconds) cycle.

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

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

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

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to [EC-465, "DTC Index"](#).

### How to Erase Self-diagnostic Results

By performing this procedure, ECM memory is erased and the following diagnostic information is erased as well.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

#### NOTE:

Also, if a battery terminal is disconnected, ECM memory is erased and the diagnostic information as listed above is erased. (The amount of time required for erasing may vary from a few seconds to several hours.)

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Set ECM in "self-diagnostic results" mode.
6. The diagnostic information has been erased from the backup memory in the ECM. Fully depress the accelerator pedal and keep it depressed for more than 10 seconds.
7. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

## CONSULT-III Function

INFOID:000000006972233

### 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 screen.
Self diagnostic result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/results can be confirmed.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU Identification	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

### WORK SUPPORT MODE

#### Work Item

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

Work item	Condition	Usage
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"><li>Fuel pump will stop by touching "START" during idling. Crank a few times after engine stalls.</li></ul>	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"><li>The idle air volume that keeps the engine within the specified range is memorized in ECM.</li></ul>	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"><li>The coefficient of self-learning control mixture ratio returns to the original coefficient.</li></ul>	When clearing mixture ratio self-learning value
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"><li>Ignition switch ON</li><li>Engine not running</li><li>Ambient temperature is above 0°C (32°F).</li><li>No vacuum and no high pressure in EVAP system</li><li>Fuel tank temp. is more than 0°C (32°F).</li><li>Within 10 minutes after starting "EVAP system close"</li><li>When trying to execute "EVAP system close" under the condition except above, CONSULT-III will discontinue it and display appropriate instruction.</li></ul> <p><b>NOTE:</b> <b>When starting engine, CONSULT-III may display "Battery voltage is low. Charge battery", even in using charged battery.</b></p>	When detecting EVAP vapor leak point of EVAP system
VIN REGISTRATION	<ul style="list-style-type: none"><li>In this mode, VIN is registered in ECM.</li></ul>	When registering VIN in ECM
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"><li>Idle condition</li></ul>	When setting target idle speed
TARGET IGN TIM ADJ*	<ul style="list-style-type: none"><li>Idle condition</li></ul>	When adjusting target ignition timing
CLSD THL POS LEARN	<ul style="list-style-type: none"><li>Ignition on and engine stopped.</li></ul>	When learning the throttle valve closed position

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

## SELF DIAGNOSTIC RESULT MODE

### Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-465. "DTC Index"](#).

### How to Read DTC and 1st Trip DTC

DTCs and 1st trip DTCs related to the malfunction are displayed in "self-diag results".

- When ECM detects a 1st trip DTC, "1t" is displayed for "TIME".
- When ECM has detected a current DTC, "0" is displayed for "TIME".
- If "TIME" is neither "0" nor "1t", the DTC occurred in the past and ECM shows the number of times the vehicle has been driven since the last detection of the DTC.

### How to Erase DTC and 1st Trip DTC

#### 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-465. "DTC Index"](#)), skip step 1.
- Erase DTC in TCM. Refer to [TM-180. "DTC Index"](#).
  - Select "ENGINE" with CONSULT-III.
  - Select "SELF-DIAG RESULTS".
  - Touch "ERASE". (DTC in ECM will be erased.)

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

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

Freeze frame data item*	Description
DTC	<ul style="list-style-type: none"> <li>The engine control component part/control system has a trouble code that is displayed as DTC. (Refer to <a href="#">EC-465, "DTC Index."</a>)</li> </ul>
FUEL SYS-B1	<ul style="list-style-type: none"> <li>"Fuel injection system status" at the moment a malfunction is detected is displayed.</li> <li>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</li> </ul>
CAL/LD VALUE [%]	<ul style="list-style-type: none"> <li>The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> <li>The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> <li>"Long-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</li> </ul>
S-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> <li>"Short-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> <li>The engine speed at the moment a malfunction is detected is displayed.</li> </ul>
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> <li>The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> <li>The throttle valve opening angle at the moment a malfunction is detected is displayed.</li> </ul>
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> <li>The base fuel schedule at the moment a malfunction is detected is displayed.</li> </ul>
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> <li>The intake air temperature at the moment a malfunction is detected is displayed.</li> </ul>
FUEL SYS-B2	<ul style="list-style-type: none"> <li>These items displayed but are not applicable to this model.</li> </ul>
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	
INT MANI PRES [kPa]	
COMBUST CONDITION	

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

## DATA MONITOR MODE

### Monitored Item

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the engine is running, an abnormal value may be indicated.</li> </ul>
MAS A/F SE-B1	V	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>
B/FUEL SCHDL	ms	<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>
A/F ALPHA-B1	%	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>

# DIAGNOSIS SYSTEM (ECM)

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

< SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
COOLAN TEMP/S	°C or °F	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> </ul>
A/F SEN1 (B1)	V	<ul style="list-style-type: none"> <li>The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed.</li> </ul>	
HO2S2 (B1)	V	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 is displayed.</li> </ul>	
HO2S2 MNTR(B1)	RICH/LEAN	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.</li> </ul>	
BATTERY VOLT	V	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>	
ACCEL SEN 1	V	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor signal voltage is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.</li> </ul>
ACCEL SEN 2			
TP SEN 1-B1	V	<ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.</li> </ul>
TP SEN 2-B1			
FUEL T/TMP SE	°C or °F	<ul style="list-style-type: none"> <li>The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.</li> </ul>	
INT/A TEMP SE	°C or °F	<ul style="list-style-type: none"> <li>The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.</li> </ul>	
EVAP SYS PRES	V	<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
FUEL LEVEL SE	V	<ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>	
START SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.</li> </ul>	<ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul>
CLSD THL POS	ON/OFF	<ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch determined by the air conditioner ON signal.</li> </ul>	
P/N POSI SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal (M/T models) or Transmission range switch signal (CVT models).</li> </ul>	
PW/ST SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated.</li> </ul>	
LOAD SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>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.</li> </ul>	
IGNITION SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch signal.</li> </ul>	
HEATER FAN SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	



# DIAGNOSIS SYSTEM (ECM)

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

< SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
BRAKE SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1	msec	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>
IGN TIMING	BTDC	<ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
CAL/LD VALUE	%	<ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current air flow divided by peak air flow.</li> </ul>	
MASS AIRFLOW	g/s	<ul style="list-style-type: none"> <li>Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor.</li> </ul>	
PURG VOL C/V	%	<ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM(B1)	°CA	<ul style="list-style-type: none"> <li>Indicates [°CA] of intake camshaft advance angle.</li> </ul>	
INT/V SOL(B1)	%	<ul style="list-style-type: none"> <li>The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated.</li> <li>The advance angle becomes larger as the value increases.</li> </ul>	
AIR COND RLY	ON/OFF	<ul style="list-style-type: none"> <li>The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.</li> </ul>	
FUEL PUMP RLY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>	
VENT CONT/V	ON/OFF	<ul style="list-style-type: none"> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated.</li> <li>ON: Closed</li> <li>OFF: Open</li> </ul>	
THRTL RELAY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN	HI/LOW/ OFF	<ul style="list-style-type: none"> <li>Indicates the condition of the cooling fan (determined by ECM according to the input signals).</li> <li>HI: High speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>	
HO2S2 HTR (B1)	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.</li> </ul>	
I/P PULLY SPD	rpm	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the input shaft revolution signal.</li> </ul>	
VEHICLE SPEED	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.</li> </ul>	
IDL A/V LEARN	YET/CMPLT	<ul style="list-style-type: none"> <li>Display the condition of Idle Air Volume Learning</li> <li>YET: Idle air volume learning has not been performed yet.</li> <li>CMPLT: Idle air volume learning has already been performed successfully.</li> </ul>	
TRVL AFTER MIL	km or mile	<ul style="list-style-type: none"> <li>Distance traveled while MIL is activated.</li> </ul>	
A/F S1 HTR(B1)	%	<ul style="list-style-type: none"> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>	

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## DIAGNOSIS SYSTEM (ECM)

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

< SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
AC PRESS SEN	V	<ul style="list-style-type: none"> <li>The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	
A/F ADJ-B1	—	<ul style="list-style-type: none"> <li>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.</li> </ul>	
BUT CUR SEN	mV	<ul style="list-style-type: none"> <li>The signal voltage of battery current sensor is displayed.</li> </ul>	
ALT DUTY SIG	ON/OFF	<ul style="list-style-type: none"> <li>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.</li> </ul>	
ALT DUTY	%	<ul style="list-style-type: none"> <li>Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal.</li> </ul>	
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.</li> </ul>	
SET VHCL SPD	km/h or mph	<ul style="list-style-type: none"> <li>The preset vehicle speed is displayed.</li> </ul>	
MAIN SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>	
CANCEL SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	
RESUME/ACC SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from RESUME/ACC switch signal.</li> </ul>	
SET SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from SET switch signal.</li> </ul>	
BRAKE SW1	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ASCD brake switch signal and ASCD clutch switch signal (M/T models).</li> </ul>	
BRAKE SW2	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>	
VHCL SPD CUT	NON/CUT	<ul style="list-style-type: none"> <li>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.</li> </ul>	
LO SPEED CUT	NON/CUT	<ul style="list-style-type: none"> <li>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.</li> </ul>	
AT OD MONITOR	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CVT O/D according to the input signal from the TCM.</li> </ul>	
AT OD CANCEL	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CVT O/D cancel request signal from the TCM.</li> </ul>	
CRUISE LAMP	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	
SET LAMP	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>	
THRTL STK CNT B1*	—	—	

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
EVAP LEAK DIAG	YET/CMPLT	<ul style="list-style-type: none"> <li>Indicates the condition of EVAP leak diagnosis. YET: EVAP leak diagnosis has not been performed yet. CMPLT: EVAP leak diagnosis has been performed successfully.</li> </ul>	
EVAP DIAG READY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the ready condition of EVAP leak diagnosis. ON: Diagnosis has been ready condition. OFF: Diagnosis has not been ready condition.</li> </ul>	
HO2 S2 DIAG1 (B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P0139 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
HO2 S2 DIAG2 (B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P0139 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG2(B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P014C or P014D self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG3(B1)	ABSNT/PRSNT	<ul style="list-style-type: none"> <li>Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. ABSNT: The vehicle condition is not within the diagnosis range. PRSNT: The vehicle condition is within the diagnosis range.</li> </ul>	

\*: The item is indicated, but not used.

**NOTE:**

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

## ACTIVE TEST MODE

### Test Item

Test item	Condition	Judgment	Check item (Remedy)
FUEL INJECTION	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Fuel injector</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>
IGNITION TIMING	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Perform Idle Air Volume Learning.</li> </ul>
POWER BALANCE	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch OFF</li> <li>Selector lever: P or N position (CVT), Neutral position (M/T)</li> <li>Cut off each fuel injector signal one at a time using CONSULT-III.</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Compression</li> <li>Fuel injector</li> <li>Power transistor</li> <li>Spark plug</li> <li>Ignition coil</li> </ul>
COOLING FAN*	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Turn the cooling fan "LOW", "HI" and "OFF" using CONSULT-III.</li> </ul>	Cooling fan moves and stops.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>IPDM E/R (Cooling fan relay)</li> <li>Cooling fan motor</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the engine coolant temperature using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

Test item	Condition	Judgment	Check item (Remedy)
FUEL PUMP RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound.</li> </ul>	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Fuel pump relay</li> </ul>
PURG VOL CONT/V	<ul style="list-style-type: none"> <li>Engine: After warming up, run engine at 1,500 rpm.</li> <li>Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.</li> </ul>	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Solenoid valve</li> </ul>
FUEL/T TEMP SEN	<ul style="list-style-type: none"> <li>Change the fuel tank temperature using CONSULT-III.</li> </ul>		
VENT CONTROL/V	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn solenoid valve "ON" and "OFF" using the CONSULT-III and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Solenoid valve</li> </ul>
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change intake valve timing using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Intake valve timing control solenoid valve</li> </ul>
ALTERNATOR DUTY	<ul style="list-style-type: none"> <li>Engine: idle.</li> <li>Change duty ratio using CONSULT-III.</li> </ul>	Battery voltage charges.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>IPDM E/R</li> <li>Alternator</li> </ul>

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

## DTC & SRT CONFIRMATION MODE

### SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

### PERMANENT DTC STATUS Mode

How to display permanent DTC status

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.

#### NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

#### CAUTION:

# DIAGNOSIS SYSTEM (ECM)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

Since the “PERMANENT DTC STATUS” screen displays the previous trip information, repeat the following twice to update the information: “Ignition switch OFF”, “Wait for more than 10 seconds” and “Ignition switch ON”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS		
<p>CAUTION: Turn ignition switch from ON to OFF twice to update the information on the status screen.</p>		
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP
<p>The previous trip information is displayed. →</p>		

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**NOTE:**

This mode is not used in regions that permanent DTCs are not regulated by law.

**SRT WORK SUPPORT Mode**

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

**PERMANENT DTC WORK SUPPORT Mode**

This mode enables a technician to drive a vehicle to complete the driving pattern that is required for erasing permanent DTC.

**NOTE:**

This mode is not used in regions that permanent DTCs are not regulated by law.

**DTC WORK SUPPORT Mode**

Test mode	Test item	Corresponding DTC No.	Reference page
EVAPORATIVE SYSTEM	EVP SML LEAK P0442/P1442*	P0455	<a href="#">EC-302</a>
	EVP V/S LEAK P0456/P1456*	P0442	<a href="#">EC-265</a>
		P0456	<a href="#">EC-308</a>
	PURG VOL CN/V P1444	P0443	<a href="#">EC-272</a>
	PURG FLOW P0441	P0441	<a href="#">EC-259</a>
A/F SEN1	A/F SEN1 (B1) P1278/P1279	—	—
	A/F SEN1 (B1) P1276	P0130	<a href="#">EC-185</a>
HO2S2	HO2S2 (B1) P1146	P0138	<a href="#">EC-201</a>
	HO2S2 (B1) P1147	P0137	<a href="#">EC-195</a>
	HO2S2 (B1) P139	P0139	<a href="#">EC-209</a>

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

## DTC/CIRCUIT DIAGNOSIS

### TROUBLE DIAGNOSIS - SPECIFICATION VALUE

#### Description

INFOID:000000006503712

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:000000006503713

#### 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/cm<sup>2</sup>, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
  - 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-19. "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-127. "Diagnosis Procedure"](#).

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

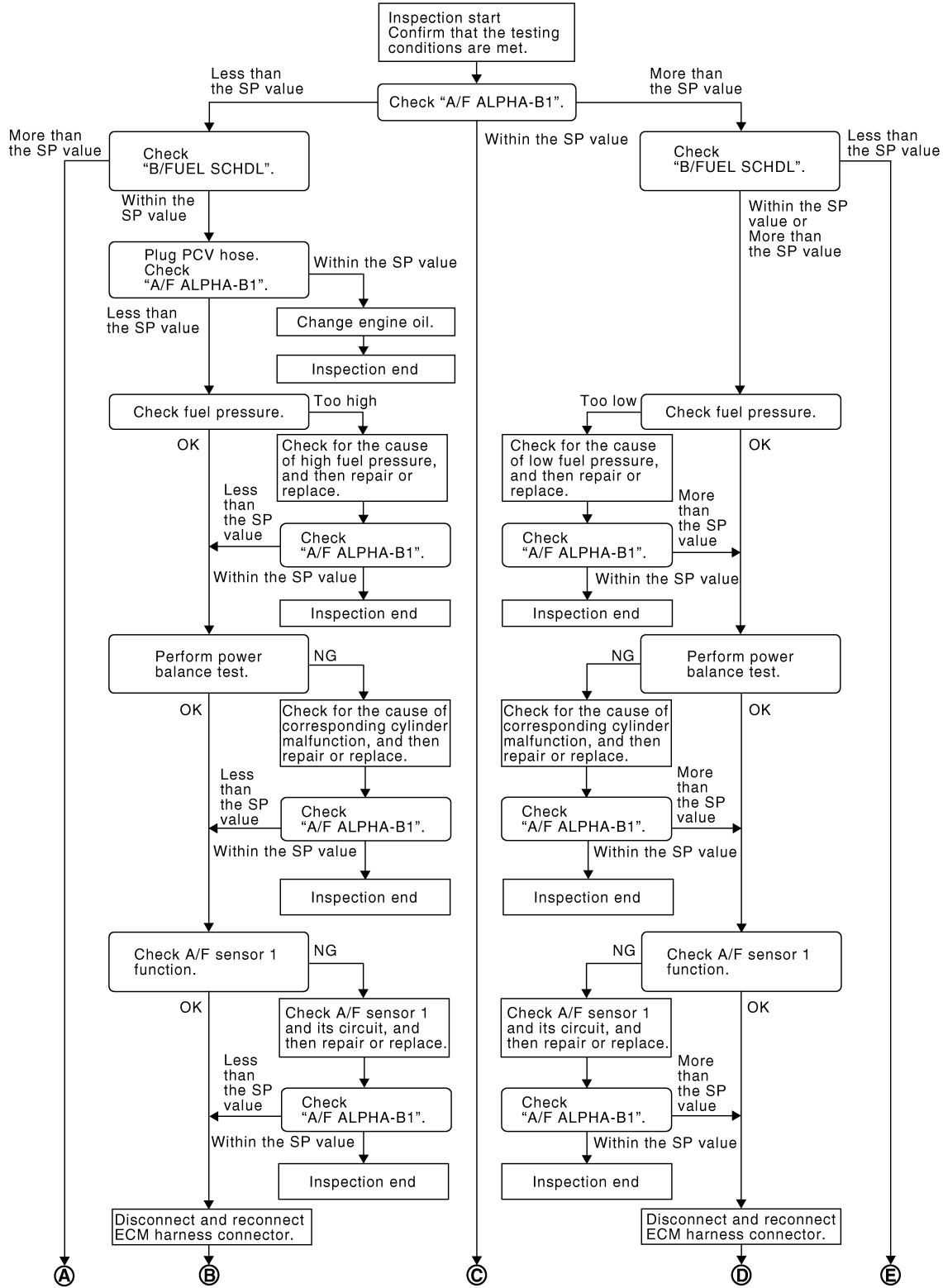
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Diagnosis Procedure

INFOID:000000006503714

### OVERALL SEQUENCE



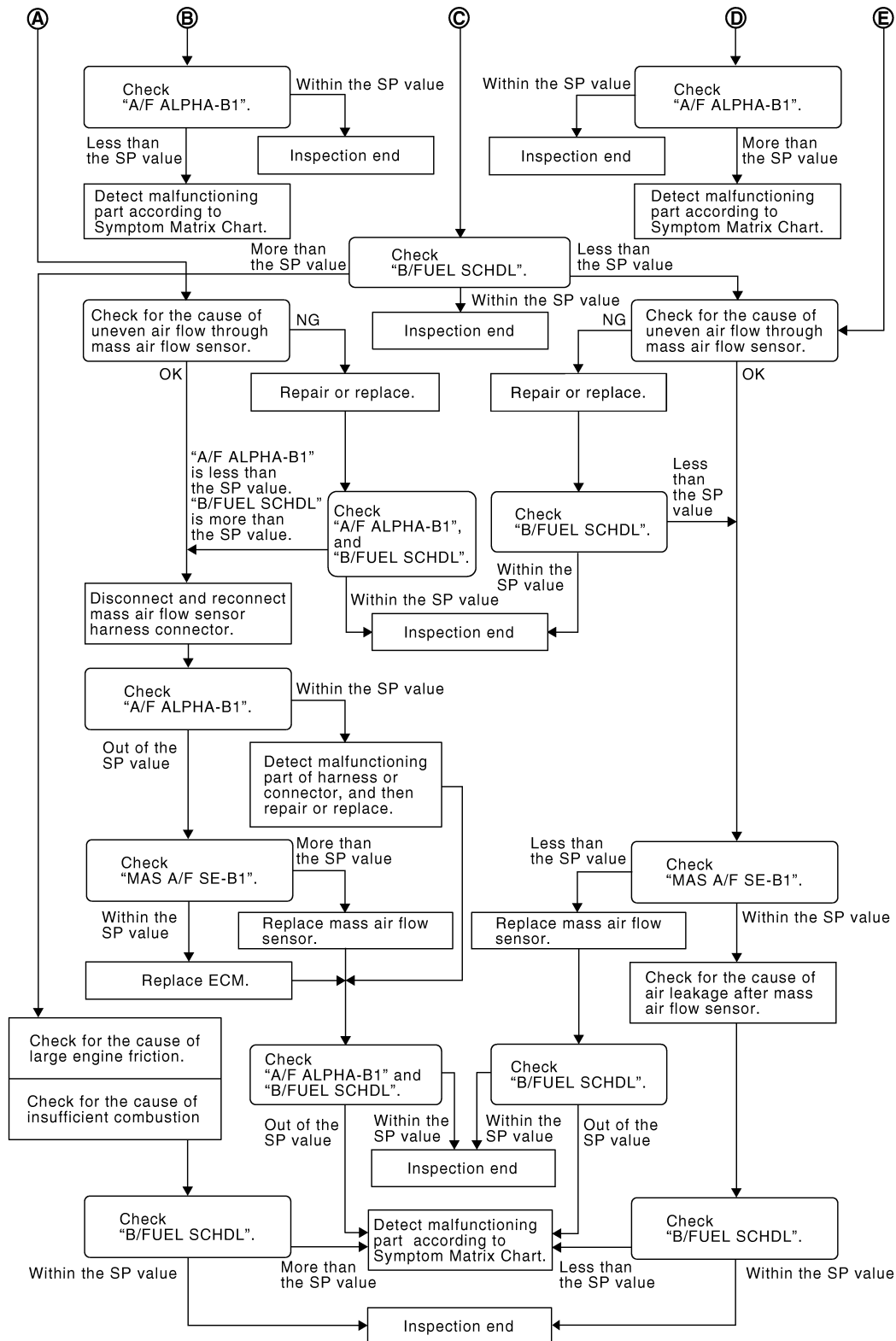
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# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]



PBIB3213E

## DETAILED PROCEDURE

### 1. CHECK "A/F ALPHA-B1"

#### ⑧ With CONSULT-III

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-126, "Component Function Check"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.



# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## NOTE:

Check "A/F ALPHA-B1" for approximately 1 minute because it 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-487, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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-424. "Component Function Check".](#))
2. Fuel injector and its circuit (Refer to [EC-418. "Component Function Check".](#))
3. Intake air leakage
4. Low compression pressure (Refer to [EM-21. "Inspection".](#))

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-185. "DTC Logic".](#)
- For DTC P0131, refer to [EC-189. "DTC Logic".](#)
- For DTC P0132, refer to [EC-192. "DTC Logic".](#)
- For DTC P014C, P014D, P015A and P015B, refer to [EC-215. "DTC Logic".](#)
- For DTC P2A00, refer to [EC-405. "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 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

A

>> GO TO 16.

### 16.CHECK "A/F ALPHA-B1"

EC

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.

C

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to [EC-475. "Symptom Table"](#).

D

### 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.

E

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.

F

### 18.DETECT MALFUNCTIONING PART

G

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.

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

### 19.CHECK INTAKE SYSTEM

K

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

L

M

Is the inspection result normal?

YES >> GO TO 21.

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

N

### 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 each indication is within the SP value.

O

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.

P

### 21.DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector.
3. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

## TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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-153, "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. Perform [EC-22, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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 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-475. "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-475. "Symptom Table"](#).

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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## POWER SUPPLY AND GROUND CIRCUIT

### Diagnosis Procedure

INFOID:000000006503715

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

#### 2. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

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

ECM		Ground	Continuity
Connector	Terminal		
F7	11	Ground	Existed
E16	107		
	108		
	109		
	112		

3. Also check harness for 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 F1, E8
- Harness for open or short between ECM and ground

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

#### 4. CHECK ECM POWER SUPPLY CIRCUIT-I

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

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

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

#### 5. DETECT MALFUNCTIONING PART

Check the following.

- 15 A fuse (No. 62)
- Harness for open or short between ECM and fuse

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

# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 6. CHECK ECM POWER SUPPLY CIRCUIT-II

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

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 9.

## 7. CHECK ECM POWER SUPPLY CIRCUIT-III

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

IPDM E/R		Ground	Voltage
Connector	Terminal		
E14	44	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace IPDM E/R. Refer to [PCS-34. "Removal and Installation"](#) (With I-KEY) or [PCS-64. "Removal and Installation"](#) (Without I-KEY).

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## 9. CHECK ECM POWER SUPPLY CIRCUIT-IV

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

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 10.

## 10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E14.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E14	40	Existed

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

Is the inspection result normal?

# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- YES >> GO TO 12.  
NO >> GO TO 11.

## 11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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 FUSE

1. Disconnect 20 A fuse (No. 43) from IPDM E/R.
2. Check 20 A fuse.

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace 20 A fuse.

## 13. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E14.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E14	43	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.

- Harness connectors E8, F1
- 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.

## 15. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY) .  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.



# U0101 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## U0101 CAN COMM CIRCUIT

### Description

INFOID:000000006503716

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:000000006503717

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101	Lost communication with TCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.	<ul style="list-style-type: none"><li>CAN communication line between TCM and ECM (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> [EC-137, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503718

Go to [LAN-13, "Trouble Diagnosis Flow Chart"](#).

# U0140 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## U0140 CAN COMM CIRCUIT

### Description

INFOID:000000006503719

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:000000006503720

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0140	Lost communication with BCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) with BCM for 2 seconds or more.	<ul style="list-style-type: none"><li>CAN communication line between BCM and ECM (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> [EC-138, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503721

Go to [LAN-13, "Trouble Diagnosis Flow Chart"](#).

# U1001 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## U1001 CAN COMM CIRCUIT

### Description

INFOID:000000006503722

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:000000006503723

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	<ul style="list-style-type: none"><li>Harness or connectors (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

- YES >> [EC-139, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503724

Go to [LAN-13, "Trouble Diagnosis Flow Chart"](#).

# P0011 IVT CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0011 IVT CONTROL

### DTC Logic

INFOID:000000006503725

### DTC DETECTION LOGIC

#### NOTE:

If DTC P0011 is displayed with DTC P0075, first perform the trouble diagnosis for [EC-332, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC 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"><li>• Crankshaft position sensor (POS)</li><li>• Camshaft position sensor (PHASE)</li><li>• Intake valve control solenoid valve</li><li>• Accumulation of debris to the signal pick-up portion of the camshaft</li><li>• Timing chain installation</li><li>• Foreign matter caught in the oil groove for intake valve timing control</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V 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 normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 4.2 msec
Selector lever	P or N position (CVT) Neutral position (M/T)

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-141, "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.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)

# P0011 IVT CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Selector lever	1st or 2nd position
Driving location	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-141, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

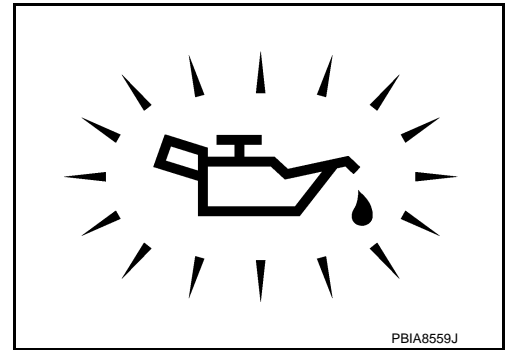
INFOID:000000006503726

### 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-13, "Inspection"](#).
- NO >> GO TO 2.



### 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-142, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-249, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).

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

Refer to [EC-252, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

### 5. CHECK CAMSHAFT (INTAKE)

Check the following.

# P0011 IVT CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

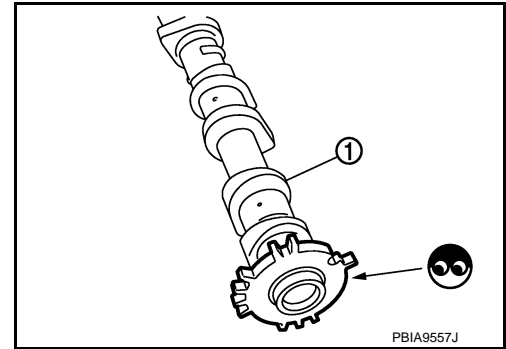
## < DTC/CIRCUIT DIAGNOSIS >

- 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. Refer to [EM-54, "Removal and Installation"](#).



## 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-44, "Removal and Installation"](#).

NO >> GO TO 7.

## 7. CHECK LUBRICATION CIRCUIT

Refer to [LU-7, "Inspection"](#), "INSPECTION AFTER INSTALLATION".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean lubrication line.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503727

### 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 per the following.

Terminals	Resistance
1 and 2	6.7 - 7.7 $\Omega$ [at 20°C (68°F)]
1 or 2 and ground	$\infty \Omega$ (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).
2. Provide 12 V 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.

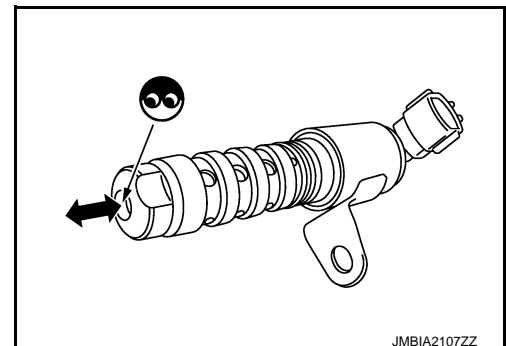
**CAUTION:**

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

**NOTE:**

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

Is the inspection result normal?



# P0011 IVT CONTROL

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

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# P0031, P0032 A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0031, P0032 A/F SENSOR 1 HEATER

### Description

INFOID:000000006503728

### 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:000000006503729

### 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"><li>• Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)</li><li>• A/F sensor 1 heater</li></ul>
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"><li>• Harness or connectors (The A/F sensor 1 heater circuit is shorted.)</li><li>• A/F sensor 1 heater</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Go to [EC-144, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503730

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F50	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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	
F50	3	F7	8	Existed

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

Is the inspection result normal?

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

## 5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-146, "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. Refer to [EM-30, "Exploded View"](#).

### CAUTION:

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

>> INSPECTION END

## 7. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "Intermittent Incident"](#).

>> Repair or replace.

# P0031, P0032 A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006503731

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

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.
3. Check resistance between A/F sensor 1 terminals as per the following.

Terminals	Resistance
3 and 4	1.8 - 2.44 $\Omega$ [at 20°C (68°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 air fuel ratio (A/F) sensor 1. Refer to [EM-30, "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P0037, P0038 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0037, P0038 HO2S2 HEATER

### Description

INFOID:000000006503732

### 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	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"><li>• Engine: After warming up</li><li>• Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li></ul>	ON

### DTC Logic

INFOID:000000006503733

### 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"><li>• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li><li>• Heated oxygen sensor 2 heater</li></ul>
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"><li>• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li><li>• Heated oxygen sensor 2 heater</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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 11 V 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 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?

# P0037, P0038 HO2S2 HEATER

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Go to [EC-148, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503734

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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 (HO2S2) harness connector.
2. Turn ignition switch ON.
3. Check the voltage between HO2S2 harness connector and ground.

HO2S2		Ground	Voltage
Connector	Terminal		
F30	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 E8, F1
- IPDM E/R connector E15
- 15 A fuse (No. 61)
- 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	
F30	3	F7	5	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-149, "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. Refer to [EX-5, "Exploded View"](#).

**CAUTION:**

# P0037, P0038 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

## 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503735

### 1. CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 (HO2S2) harness connector.
3. Check resistance between HO2S2 terminals as per the following.

Terminals	Resistance
2 and 3	3.3 - 4.4 $\Omega$ [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. Refer to [EX-5, "Exploded View"](#).

#### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0075 IVT CONTROL SOLENOID VALVE

### Description

INFOID:000000006503736

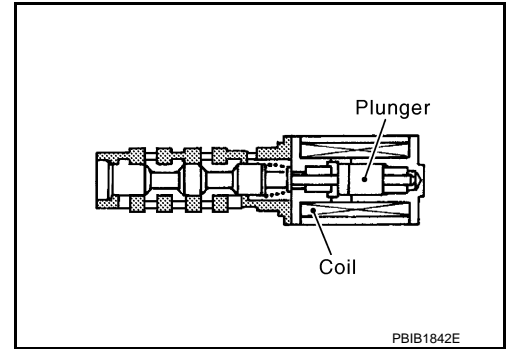
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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:000000006503737

#### 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"><li>• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)</li><li>• Intake valve timing control solenoid valve</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-150, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503738

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

1. Turn ignition switch OFF.
2. Disconnect intake valve timing (IVT) 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		
F41	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

##### 2. DETECT MALFUNCTIONING PART

# P0075 IVT CONTROL SOLENOID VALVE

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Check the following.

- Harness connectors E8, F1
- IPDM E/R connector E14
- Harness for open or short between IVT control solenoid valve and IPDM E/R

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

### 3.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 IVT control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	2	F8	73	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 VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-151, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503739

### 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 per the following.

Terminals	Resistance
1 and 2	6.7 - 7.7 $\Omega$ [at 20°C (68°F)]
1 or 2 and ground	$\infty \Omega$ (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

## P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

2. Provide 12 V 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 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.**

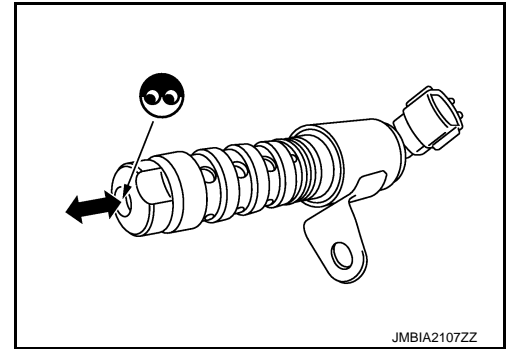
**NOTE:**

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43. "Exploded View"](#).



JMBIA2107ZZ



# P0101 MAF SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

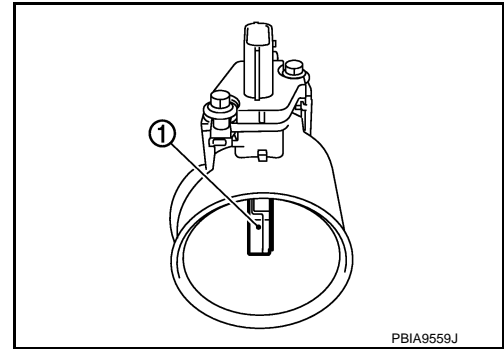
## P0101 MAF SENSOR

### Description

INFOID:000000006503740

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:000000006503741

#### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Mass air flow sensor</li> <li>• EVAP control system pressure sensor</li> </ul>
		B)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Intake air leaks</li> <li>• Mass air flow sensor</li> <li>• EVAP control system pressure sensor</li> <li>• Intake air temperature sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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-155. "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-155. "Diagnosis Procedure"](#).

# P0101 MAF SENSOR

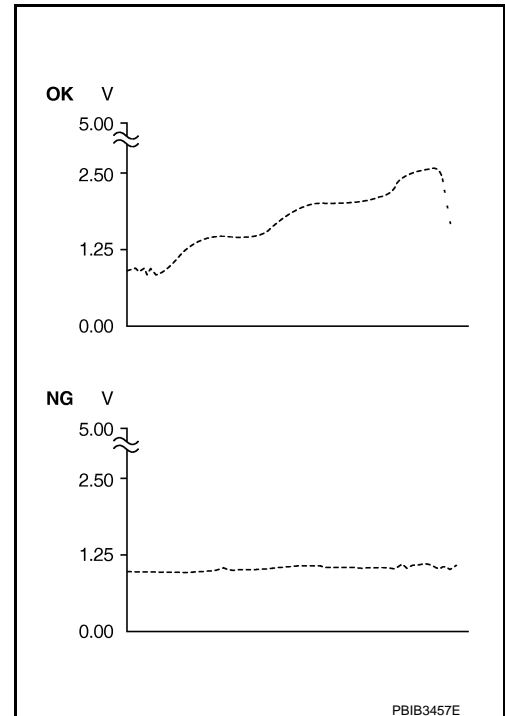
[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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-155, "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
TP SEN 1-B1	More than 1.5 V
TP SEN 2-B1	More than 1.5 V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help 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-155, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## 5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform component function check. Refer to [EC-154, "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-155, "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006503742

## 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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-155, "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
<b>MAF</b>	<b>14.1gm/sec</b>
THROTTLE POS	3%

SEF534P

INFOID:000000006503743

## Diagnosis Procedure

### 1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-153, "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 E38. Refer to [GI-44, "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		
F4	5	Ground	Battery voltage

Is the inspection result normal?

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

### 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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	
F4	4	F8	52	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	
F4	3	F8	45	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-168. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24. "Exploded View"](#).

## 9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-290. "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-156. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor. Refer to [EM-24. "Exploded View"](#).

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503744

## 1.CHECK MASS AIR FLOW SENSOR-I

 **With CONSULT-III**

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

# P0101 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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 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 the following.
  - Crushed air ducts
  - Malfunctioning seal of air cleaner element
  - Uneven dirt of air cleaner element
  - Improper specification of intake air system parts

**Is the inspection result normal?**

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

## 3. CHECK MASS AIR FLOW SENSOR-II

**Ⓜ With CONSULT-III**

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

# P0101 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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.

# P0101 MAF SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. Refer to [EM-24, "Exploded View"](#).

A

EC

C

D

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# P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

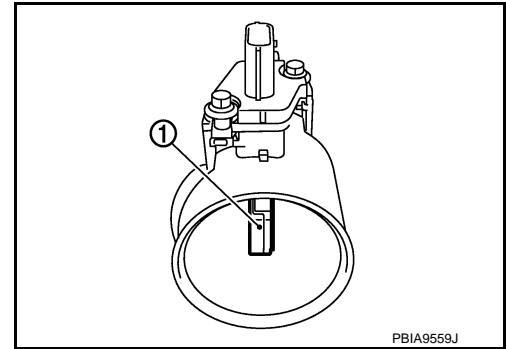
## P0102, P0103 MAF SENSOR

### Description

INFOID:000000006503745

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:000000006503746

### 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"><li>• Harness or connectors (The sensor circuit is open or shorted.)</li><li>• Intake air leaks</li><li>• Mass air flow sensor</li></ul>
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"><li>• Harness or connectors (The sensor circuit is open or shorted.)</li><li>• Mass air flow sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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-161, "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-161, "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-161, "Diagnosis Procedure"](#).
- NO >> INSPECTION END



# P0102, P0103 MAF SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006503747

## Diagnosis Procedure

### 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 E38. Refer to [GI-44, "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		
F4	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

### 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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	
F4	4	F8	52	Existed

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

Is the inspection result normal?

# P0102, P0103 MAF SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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	
F4	3	F8	45	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-162, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor. Refer to [EM-24, "Exploded View"](#).

## 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503748

### 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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 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 the following.
  - Crushed air ducts
  - Malfunctioning seal of air cleaner element
  - Uneven dirt of air cleaner element
  - Improper specification of intake air system parts

Is the inspection result normal?

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

## 3.CHECK MASS AIR FLOW SENSOR-II

 **With CONSULT-III**

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

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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.

# P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. Refer to [EM-24. "Exploded View"](#).

# P0111 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0111 IAT SENSOR

### DTC Logic

INFOID:000000006953469

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0111	IAT SENSOR 1 B1 [Intake air temperature (IAT) sensor circuit range/perfor- mance]	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"><li>• Harness or connectors (High or low resistance in the IAT sensor circuit)</li><li>• IAT sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.INSPECTION START

##### Is it necessary to erase permanent DTC?

YES >> GO TO 3.

NO >> GO TO 2.

#### 2.PERFORM COMPONENT FUNCTION CHECK

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

##### **NOTE:**

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

##### Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC-166, "Diagnosis Procedure"](#).

#### 3.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

##### **TESTING CONDITION:**

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 4.

#### 4.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

##### **NOTE:**

Cool the vehicle in an environment of ambient air temperature between  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) and  $35^{\circ}\text{C}$  ( $95^{\circ}\text{F}$ ).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

##### **CAUTION:**

**Never turn ignition switch ON during soaking.**

##### **NOTE:**

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

##### **CAUTION:**

**Never turn ignition switch OFF during idling.**

# P0111 IAT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-166, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Component Function Check

INFOID:000000006953470

### 1. CHECK INTAKE AIR TEMPERATURE (IAT) 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.

Terminals	Condition	Resistance (kΩ)
1 and 2	Temperature [°C (°F)]	25 (77)
		1.800 – 2.200

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Proceed to [EC-166, "Diagnosis Procedure"](#).

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-166, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006953471

### 1. CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

Check intake air temperature sensor. Refer to [EC-166, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006953472

### 1. CHECK INTAKE AIR TEMPERATURE (IAT) 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.

Terminals	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). Refer to [EM-24, "Exploded View"](#).

# P0112, P0113 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

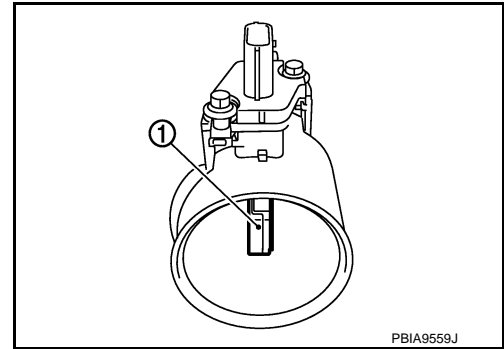
## P0112, P0113 IAT SENSOR

### Description

INFOID:000000006503749

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.

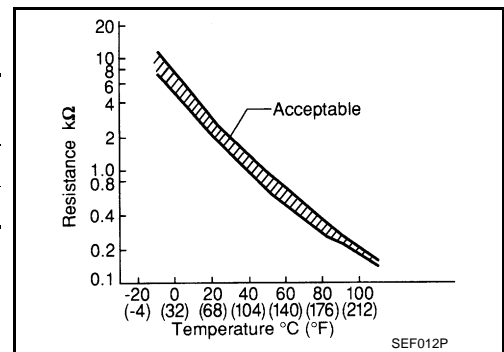
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



### <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 46 (Intake air temperature sensor) and ground.



### DTC Logic

INFOID:000000006503750

### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Intake air temperature sensor</li> </ul>
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-167, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503751

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

## P0112, P0113 IAT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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		
F4	5	Ground	Approx. 5 V

Is the inspection result normal?

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

### 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	
F4	4	F8	52	Existed

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

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

### 4.CHECK INTAKE AIR TEMPERATURE SENSOR

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

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

### 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503752

### 1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as per the following.

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). Refer to [EM-24, "Exploded View"](#).



# P0116 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

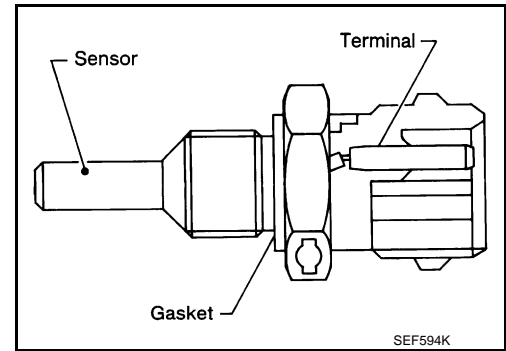
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0116 ECT SENSOR

### Description

INFOID:000000006503753

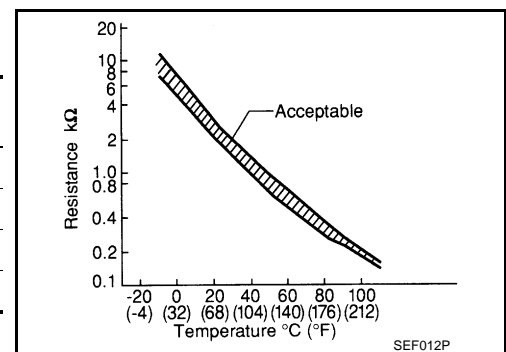
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



### DTC Logic

INFOID:000000006953502

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0116	Engine coolant temperature (ECT) sensor circuit range/performance	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"> <li>• Harness or connectors (High or low resistance in the ECT sensor circuit)</li> <li>• ECT sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. INSPECTION START

Is it necessary to erase permanent DTC?

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

#### 2. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-170, "Component Function Check"](#).

#### NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to [EC-171, "Diagnosis Procedure"](#).

# P0116 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 3. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

### TESTING CONDITION:

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 4.

## 4. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

### NOTE:

Cool the vehicle in an environment of ambient air temperature between  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) and  $35^{\circ}\text{C}$  ( $95^{\circ}\text{F}$ ).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

### CAUTION:

Never turn ignition switch ON during soaking.

### NOTE:

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

### CAUTION:

Never turn ignition switch OFF during idling.

5. Check 1st trip DTC.

### Is 1st trip DTC detected?

- YES >> Proceed to [EC-171, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Component Function Check

INFOID:000000006953507

## 1. CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect ECT sensor harness connector.
3. Remove ECT sensor. Refer to [CO-24, "Exploded View"](#).
4. Check resistance between ECT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (k $\Omega$ )	
1 and 2	Temperature [ $^{\circ}\text{C}$ ( $^{\circ}\text{F}$ )]	20 (68)	2.37 – 2.63
		50 (122)	0.68 – 1.00
		90 (194)	0.236 – 0.260

### Is the inspection result normal?

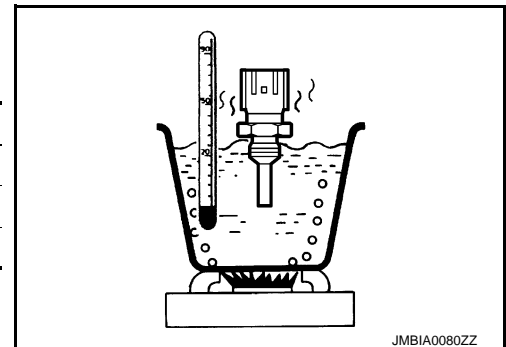
- YES >> GO TO 2.  
NO >> Proceed to [EC-171, "Diagnosis Procedure"](#).

## 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

### Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to [EC-171, "Diagnosis Procedure"](#).



# P0116 ECT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## Diagnosis Procedure

INFOID:000000006953508

### 1. CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Check ECT sensor. Refer to [EC-171, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace ECT sensor. Refer to [CO-24, "Exploded View"](#).

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503756

### 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. Refer to [CO-24, "Exploded View"](#).
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. Refer to [CO-24, "Exploded View"](#).

# P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

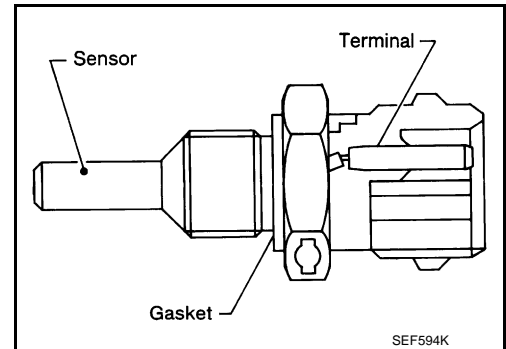
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0117, P0118 ECT SENSOR

### Description

INFOID:000000006503757

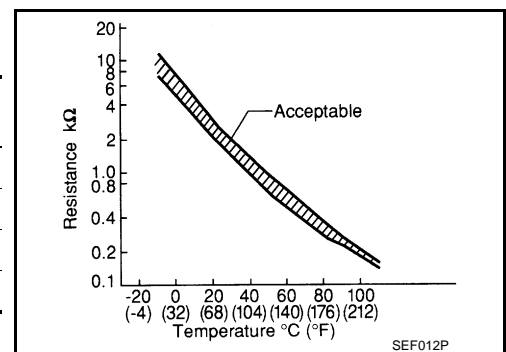
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



### DTC Logic

INFOID:000000006503758

#### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Engine coolant temperature sensor</li> </ul>
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-172, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503759

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

# P0117, P0118 ECT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

2. Check ground connection E38. Refer to [GI-44, "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		
F28	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F28	2	F8	44	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

### 4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-173, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

### 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503760

### 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. Refer to [CO-24, "Exploded View"](#).
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

## P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to [CO-24. "Exploded View"](#).

# P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

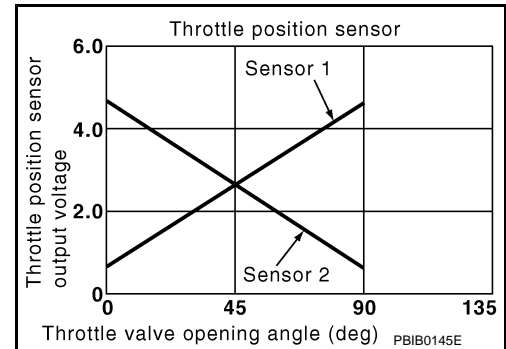
## P0122, P0123 TP SENSOR

### Description

INFOID:000000006503761

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

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



### DTC Logic

INFOID:000000006503762

#### 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-332, "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"><li>• Harness or connectors (TP sensor 2 circuit is open or shorted.)</li><li>• Electric throttle control actuator (TP sensor 2)</li></ul>
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 8 V at idle.

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

##### Is DTC detected?

YES >> Go to [EC-175, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503763

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit 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	
F29	3	F8	34	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-177, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

### 6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-177, "Special Repair Requirement"](#).

>> INSPECTION END

### 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END



# P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006503764

### 1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully de- pressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully de- pressed	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. Perform [EC-177. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503765

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P0125 ECT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

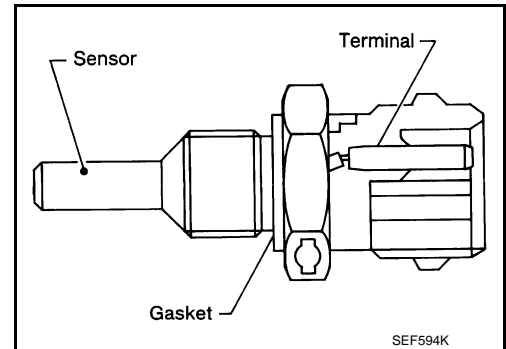
< DTC/CIRCUIT DIAGNOSIS >

## P0125 ECT SENSOR

### Description

INFOID:000000006503766

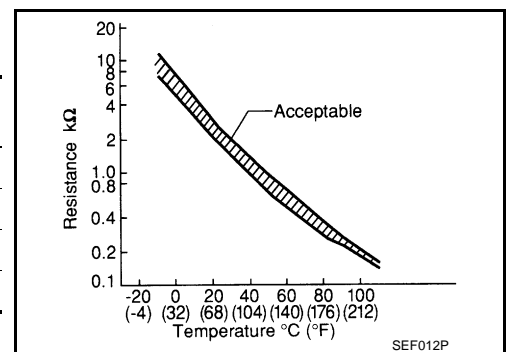
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



### DTC Logic

INFOID:000000006503767

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to [EC-169, "DTC Logic"](#).
- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-172, "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"> <li>• Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>• Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul style="list-style-type: none"> <li>• Harness or connectors (High resistance in the circuit)</li> <li>• Engine coolant temperature sensor</li> <li>• Thermostat</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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).

###### With GST

# P0125 ECT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Follow the procedure "With CONSULT-III" above.

Is it above 5°C (41°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" indication 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-179, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503768

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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-179, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

### 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-22, "Removal and Installation"](#).

### 4.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503769

### 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. Refer to [CO-24, "Exploded View"](#).
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

## P0125 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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. Refer to [CO-24. "Exploded View"](#).

# P0127 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

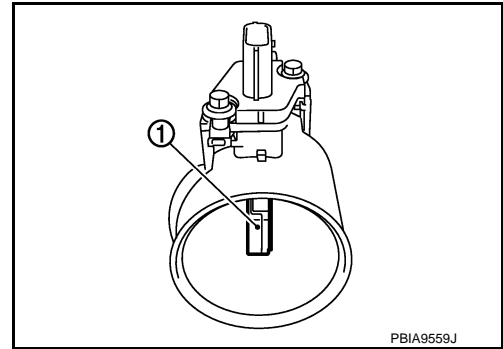
## P0127 IAT SENSOR

### Description

INFOID:000000006503770

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.

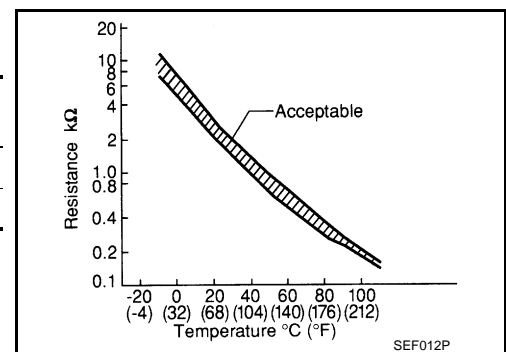
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



### <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 46 (Intake air temperature sensor) and ground.



### DTC Logic

INFOID:000000006503771

### 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"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Intake air temperature sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

**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

- Wait until engine coolant temperature is less than 96°C (205°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 96°C (205°F), turn ignition switch OFF and cool down engine.

#### NOTE:

Perform the following steps before engine coolant temperature is above 96°C (205°F).

# P0127 IAT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.

**CAUTION:**

**Always drive vehicle at a safe speed.**

6. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-182, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503772

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

### 2.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-182, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

### 3.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503773

### 1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as per the following.

Terminals	Condition	Resistance (k $\Omega$ )
1 and 2	Intake air temperature [ $^{\circ}$ C ( $^{\circ}$ 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). Refer to [EM-24, "Exploded View"](#).

# P0128 THERMOSTAT FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0128 THERMOSTAT FUNCTION

### DTC Logic

INFOID:000000006503774

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to [EC-238. "DTC 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"><li>• Thermostat</li><li>• Leakage from sealing portion of thermostat</li><li>• Engine coolant temperature sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

- For best results, perform at ambient temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) or higher.
- For best results, perform at engine coolant temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ).
- 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  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ), go to following step.  
If it is above  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ), cool down the engine to less than  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56km/h (35MPH)
---------------	--------------------------

##### CAUTION:

Always drive vehicle at a safe speed.

##### NOTE:

If "COOLAN TEMP/S" indication increases to more than  $71^{\circ}\text{C}$  ( $160^{\circ}\text{F}$ ) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.

###### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-183. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503775

##### 1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-184. "Component Inspection"](#).

# P0128 THERMOSTAT FUNCTION

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24. "Exploded View"](#).

## 2.CHECK THERMOSTAT

Refer to [CO-23. "Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace thermostat. Refer to [CO-22. "Removal and Installation"](#).

## Component Inspection

INFOID:000000006503776

## 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. Refer to [CO-24. "Exploded View"](#).
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. Refer to [CO-24. "Exploded View"](#).

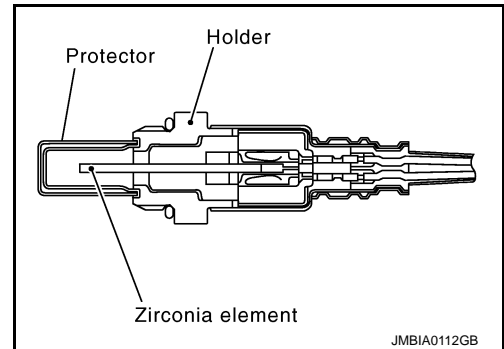


P0130 A/F SENSOR 1

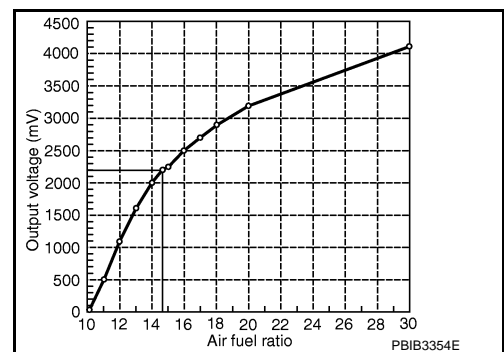
Description

INFOID:000000006503777

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006503778

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. 2.2 V.	<ul style="list-style-type: none"> <li>• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> <li>• A/F sensor 1</li> </ul>
		B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

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 11 V 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-187, "Diagnosis Procedure"](#).

# P0130 A/F SENSOR 1

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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

Does the indication fluctuate around 2.2 V?

- YES >> GO TO 4.
- NO >> Go to [EC-187. "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	1,000 - 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?

- YES >> INSPECTION END
- NO >> Go to [EC-187. "Diagnosis Procedure"](#).

## 7. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B

Perform Component Function Check. Refer to [EC-186. "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-187. "Diagnosis Procedure"](#).

## Component Function Check

INFOID:0000000006503779

## 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Shift the selector lever to the D position (CVT) or 1st position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

**CAUTION:**

**Always drive vehicle at a safe speed.**

**NOTE:**

Never apply brake during releasing the accelerator pedal.

- Repeat steps 2 to 3 for five times.
- Stop the vehicle and turn ignition switch OFF.
- Wait at least 10 seconds and restart engine.
- Repeat steps 2 to 3 for five times.
- Stop the vehicle.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-187, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503780

### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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

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

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F50	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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

- Turn ignition switch OFF.
- 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	
F50	1	F8	49	Existed
	2		53	

# P0130 A/F SENSOR 1

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41. "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. Refer to [EM-30. "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

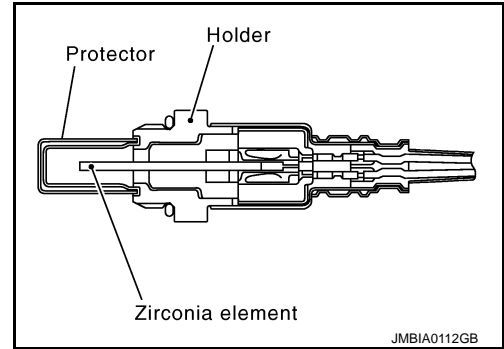
>> INSPECTION END

P0131 A/F SENSOR 1

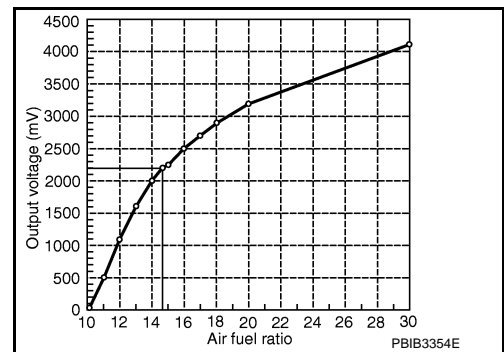
Description

INFOID:000000006503781

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006503782

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V 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. 0 V?

# P0131 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- YES >> Go to [EC-190, "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-190, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503783

## 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F50	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

# P0131 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41, "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. Refer to [EM-30, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

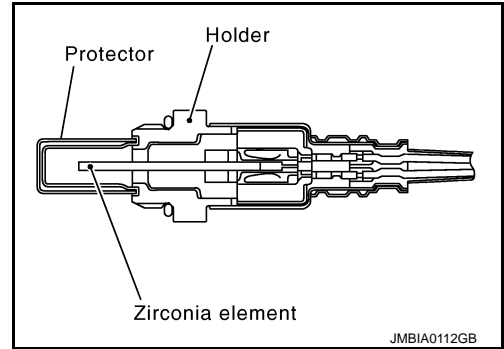
>> INSPECTION END

P0132 A/F SENSOR 1

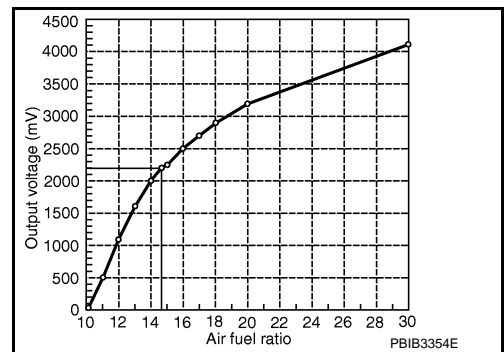
Description

INFOID:000000006503784

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006503785

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V 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. 5 V?



# P0132 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- YES >> Go to [EC-193. "Diagnosis Procedure"](#).  
NO >> GO TO 3.

## 3. PERFORM DTC CONFIRMATION PROCEDURE

### With CONSULT-III

- Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
- 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.**

- 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.

- Check 1st trip DTC.

### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC is detected?

- YES >> Go to [EC-193. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503786

## 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44. "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

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

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F50	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

# P0132 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41. "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. Refer to [EM-30. "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

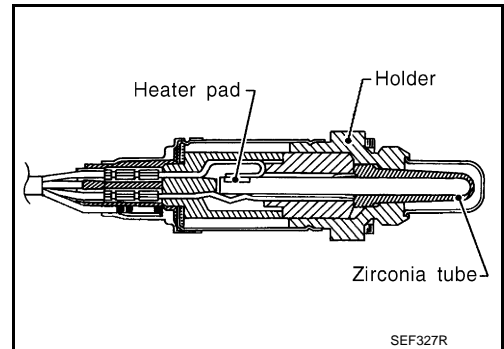
>> INSPECTION END

P0137 HO2S2

Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

INFOID:000000006503787

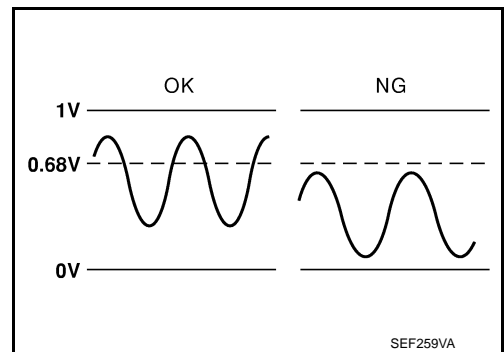


DTC Logic

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.

INFOID:000000006503788



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"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel pressure</li> <li>• Fuel injector</li> <li>• Intake air leaks</li> </ul>

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

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## P0137 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to 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 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Follow 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-197. "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-196. "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-197. "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006503789

### 1.PERFORM COMPONENT FUNCTION CHECK-I

**Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68 V at least once during this procedure.

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.

# P0137 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

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

## Diagnosis Procedure

INFOID:0000000006503790

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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-27. "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-220. "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 (HO2S2) 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	
F30	1	F8	59	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.

# P0137 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F30	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-198. "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. Refer to [EX-5. "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

## 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503791

### 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

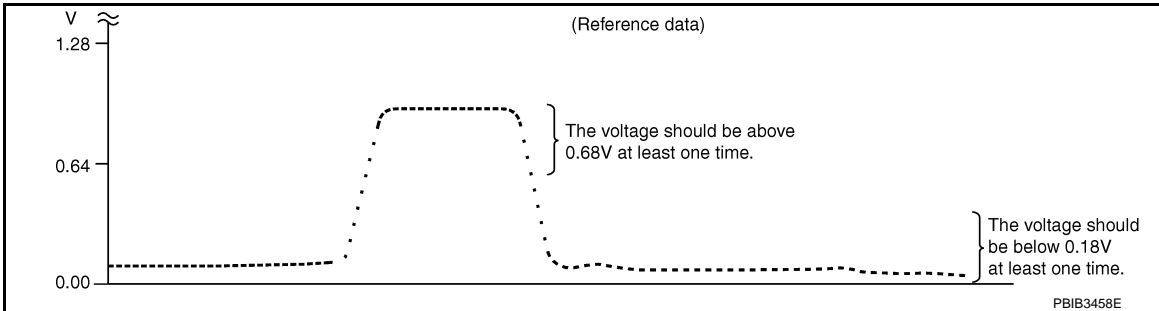
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.

# P0137 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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 0.68 V at least once when the "FUEL INJECTION" is + 25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

## 3.CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to 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			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

## 4.CHECK HEATED OXYGEN SENSOR 2-II

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

## 5.CHECK HEATED OXYGEN SENSOR 2-III

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

# P0137 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

## 6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to [EX-5, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

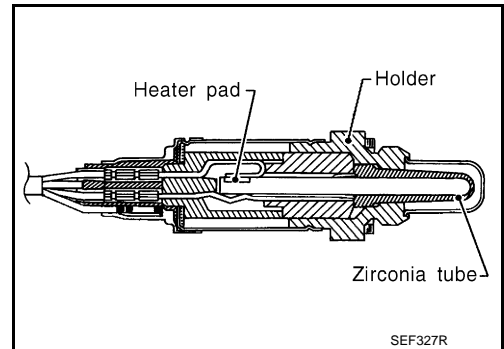


P0138 HO2S2

Description

INFOID:000000006503792

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



DTC Logic

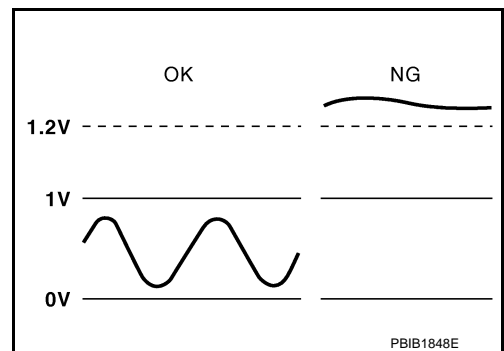
INFOID:000000006503793

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.

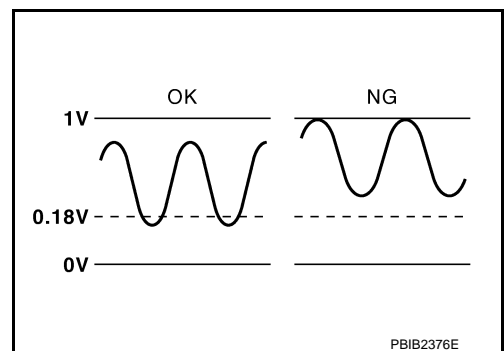
**MALFUNCTION A**

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"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> </ul>
		B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel pressure</li> <li>• Fuel injector</li> </ul>

&lt; DTC/CIRCUIT DIAGNOSIS &gt;

**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.

&gt;&gt; GO TO 2.

**2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A**

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 2 minutes.
5. Check 1st trip DTC.

Is 1st trip DTC detected?YES >> Go to [EC-203, "Diagnosis Procedure"](#).

NO-1 &gt;&gt; With CONSULT-III: GO TO 3.

NO-2 &gt;&gt; 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 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" indication is more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Follow 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 &gt;&gt; INSPECTION END

NG >> Go to [EC-203, "Diagnosis Procedure"](#).

CAN NOT BE DIAGNOSED&gt;&gt;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.

&gt;&gt; GO TO 3.

**5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B**

Perform component function check. Refer to [EC-203, "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 &gt;&gt; INSPECTION END

NO >> Go to [EC-203, "Diagnosis Procedure"](#).**Component Function Check**

INFOID:000000006503794

**1. PERFORM COMPONENT FUNCTION CHECK-I**

# P0138 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ⊗ Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.18 V 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			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.18 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-203. "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:0000000006503795

### 1.INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-201. "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 E38. Refer to [GI-44. "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

### 3.CHECK HO2S2 CONNECTOR FOR WATER

# P0138 HO2S2

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Disconnect heated oxygen sensor 2 harness connector.
2. Check connectors for water.

**Water should not exist.**

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

### 4. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F30	1	F8	59	Existed

3. 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 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	
F30	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F30	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	Ground	Not existed

3. Also check harness for 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 HEATED OXYGEN SENSOR 2

Refer to [EC-206. "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. Refer to [EX-5. "Exploded View"](#).

#### **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.

# P0138 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- Before installing new sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

## 8.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## 9.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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-27, "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-224, "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	
F30	1	F8	59	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	
F30	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F30	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-206, "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. Refer to [EX-5, "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

### 15. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503796

### 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**

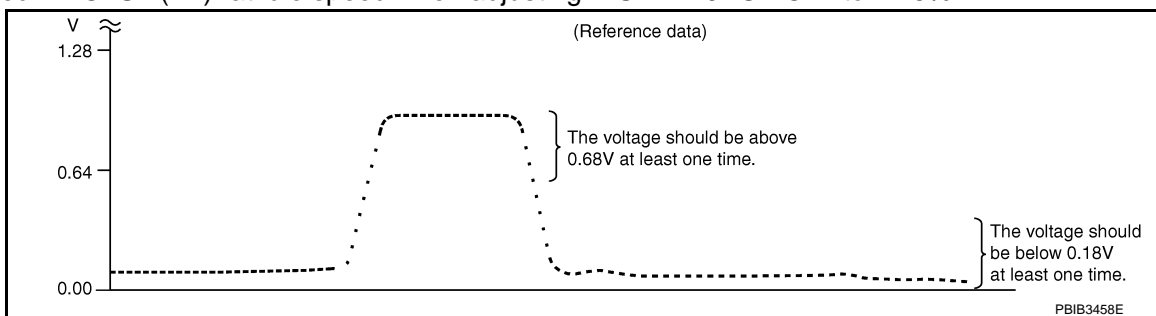
1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
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.

# P0138 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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



"HO2S2 (B1)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

## 3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT-III

1. Start engine and warm it up to 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			
F8	50 (HO2S2 signal)	Ground	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

## 4. CHECK HEATED OXYGEN SENSOR 2-II

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

## 5. CHECK HEATED OXYGEN SENSOR 2-III

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

# P0138 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END  
NO >> GO TO 6.

## 6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to [EX-5, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

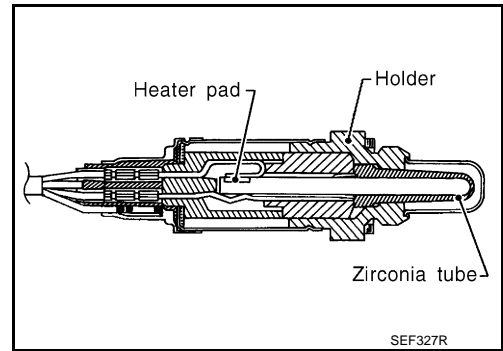


P0139 HO2S2

Description

INFOID:000000006503797

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

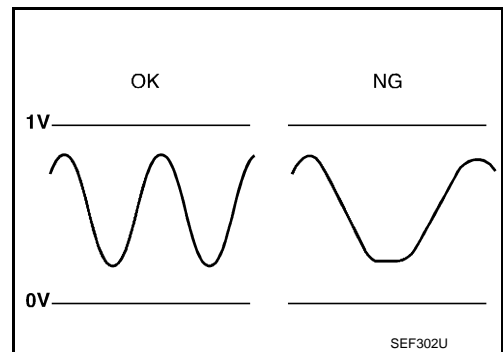


DTC Logic

INFOID:000000006503798

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 1 causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139	Heated oxygen sensor 2 (bank 1) circuit slow response	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel system</li> <li>• EVAP system</li> <li>• Intake air system</li> </ul>

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 perform the following procedure before conducting the next test.

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

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**

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 1 minute.
8. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
9. Drive the vehicle in a proper at 60 km/h (38MPH) and maintain the speed.

**CAUTION:****Always drive vehicle at a safe speed.**

10. Release the accelerator pedal fully at least 5 seconds.

**CAUTION:**

- Enable engine brake.
- Always drive carefully.
- Never apply brake when releasing the accelerator pedal.

11. Repeat step 9 and 10 at least 8 times.
12. Check the following item of "DATA MONITOR".

Data monitor item	Status
HO2 S2 DIAG1 (B1)	CMPLT
HO2 S2 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

YES &gt;&gt; GO TO 6.

NO-1: "CMPLT" is not displayed on DIAG 1&gt;&gt;Perform DTC confirmation procedure again.

NO-2: "CMPLT" is not displayed on DIAG 2&gt;&gt;GO TO 4.

**4. PERFORM DTC WORK SUPPORT**

1. Open engine hood.
2. Select "HO2S2 (B1) P0139" in "DTC WORK SUPPORT" mode with CONSULT-III.
3. Start engine and follow the instruction of CONSULT-III display.

**NOTE:**

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

Is "COMPLETED" displayed on CONSULT-III screen?

YES &gt;&gt; GO TO 6.

NO &gt;&gt; GO TO 5.

**5. 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.

&gt;&gt; GO TO 3.

**6. PERFORM SELF-DIAGNOSIS****Ⓜ With CONSULT-III**

Perform ECM self-diagnosis.

Is DTC "P0139" detected?

YES >> Proceed to [EC-211, "Diagnosis Procedure"](#).

NO &gt;&gt; INSPECTION END

**7. PERFORM COMPONENT FUNCTION CHECK**Perform component function check. Refer to [EC-211, "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.

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-211, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000006503799

1.PERFORM COMPONENT FUNCTION CHECK-I

Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.8 V 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			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.8 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.8 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-211, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006503800

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

# P0139 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 2. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-27. "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-220. "DTC Logic"](#) or [EC-224. "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	
F30	1	F8	59	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	
F30	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F30	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-213. "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. Refer to [EX-5. "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

**7. CHECK INTERMITTENT INCIDENT**

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

**Component Inspection**

INFOID:000000006503801

**1. INSPECTION START**

Do you have CONSULT-III?

Do you have CONSULT-III?

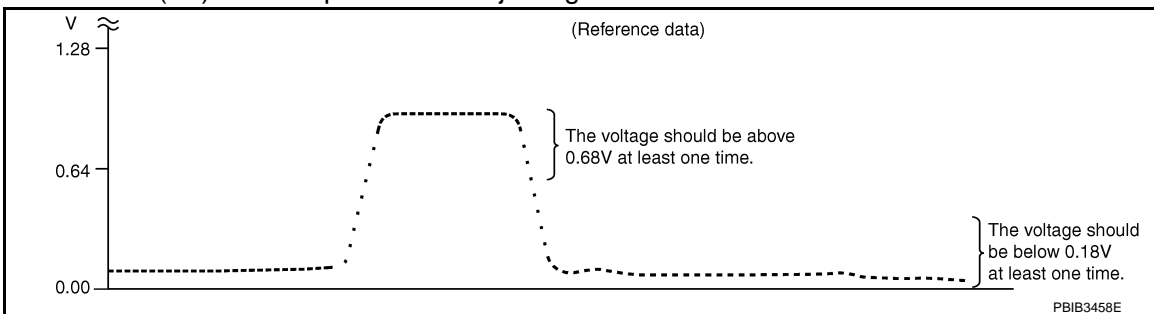
YES >> GO TO 2.

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 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 0.68 V at least once when the "FUEL INJECTION" is + 25%.**

**"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.**

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**3. CHECK HEATED OXYGEN SENSOR 2-I**

**Without CONSULT-III**

1. Start engine and warm it up to 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.

# P0139 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revvng up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

## 4.CHECK HEATED OXYGEN SENSOR 2-II

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

## 5.CHECK HEATED OXYGEN SENSOR 2-III

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

## 6.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to [EX-5. "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

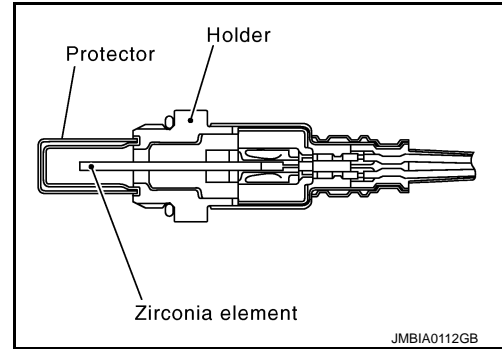
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P014C, P014D, P015A, P015B, A/F SENSOR 1

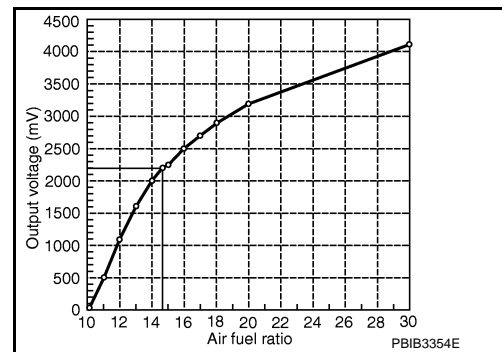
### Description

INFOID:000000006503802

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



### DTC Logic

INFOID:000000006954846

#### DTC DETECTION LOGIC

To judge malfunctions, 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
P014C	Air fuel ratio (A/F) sensor 1 (bank 1) circuit slow re- sponse	<ul style="list-style-type: none"> <li>The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> <li>A/F sensor 1</li> </ul>
P014D	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed re- sponse		
P015A	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed re- sponse		
P015B	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed re- sponse		

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

##### TESTING CONDITION:

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

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 5.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE-1

# P014C, P014D, P015A, P015B, A/F SENSOR 1

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

### Ⓟ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
6. Let engine idle for 1 minute.
7. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for about 1 minute.
9. Check the items status of "DATA MONITOR" as follows.

#### NOTE:

If "PRCNT" changed to "ABSNT", refer to [EC-126, "Component Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG3 (B1)	PRCNT

Is "PRCNT" displayed on CONSULT-III screen?

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

### 3. PERFORM DTC CONFIRMATION PROCEDURE-2

### Ⓟ With CONSULT-III

Perform DTC confirmation procedure-1 again.

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.  
NO >> Refer to [EC-126, "Component Function Check"](#).

### 4. PERFORM DTC CONFIRMATION PROCEDURE-2

### Ⓟ With CONSULT-III

1. Wait for about 20 seconds at idle.
2. Check the items status of "DATA MONITOR" as follows.

#### NOTE:

If "CMPLT" changed to "INCMP", refer to [EC-126, "Component Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG1 (B1)	CMPLT
A/F SEN1 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

- YES >> GO TO 5.  
NO >> Refer to [EC-126, "Component Function Check"](#).

### 5. PERFORM SELF-DIAGNOSIS

### Ⓟ With CONSULT-III

Check the "SELF-DIAG RESULT".

Is any DTC detected?

- YES >> Proceed to [EC-217, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### 6. 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 8.  
NO >> GO TO 7.



# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 7. 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.

## 8. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
7. Fully release accelerator pedal and then let engine idle for about 1 minute.
8. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-217. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503804

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "Circuit Inspection"](#).

Is the inspection result normal?

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

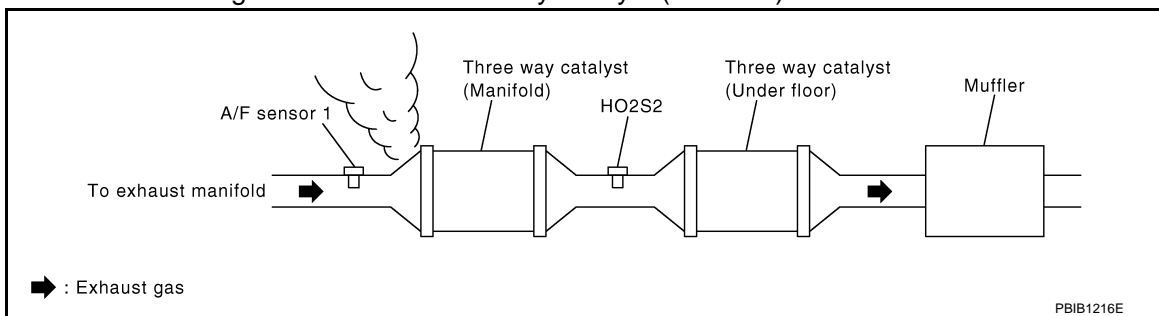
### 2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to [EM-30. "Exploded View"](#).

>> 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.

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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-27. "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-220. "DTC Logic"](#) or [EC-224. "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.
3. Check the voltage between A/F sensor 1 harness connector and ground.

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F50	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-146, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

## 10.CHECK MASS AIR FLOW SENSOR

Refer to [EC-156, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor. Refer to [EM-24, "Exploded View"](#).

## 11.CHECK PCV VALVE

Refer to [EC-436, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve. Refer to [EM-41, "Exploded View"](#).

## 12.CHECK INTERMITTENT INCIDENT

Perform [GI-41, "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. Refer to [EM-30, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0171 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000006503805

#### 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"><li>Fuel injection system does not operate properly.</li><li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li></ul>	<ul style="list-style-type: none"><li>Intake air leaks</li><li>A/F sensor 1</li><li>Fuel injector</li><li>Exhaust gas leaks</li><li>Incorrect fuel pressure</li><li>Lack of fuel</li><li>Mass air flow sensor</li><li>Incorrect PCV hose connection</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 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-27, "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.

**NOTE:**

**When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.**

Does engine start?

YES >> Go to [EC-221, "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 5 minutes.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-221, "Diagnosis Procedure"](#).

NO >> GO TO 5.

# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 5. PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine.
3. Maintain the following conditions for at least 10 consecutive minutes.  
Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
---------------	-----------------------------

**CAUTION:**

**Always drive vehicle at a safe speed.**

4. Check 1st trip DTC.

Is 1st trip DTC detected?

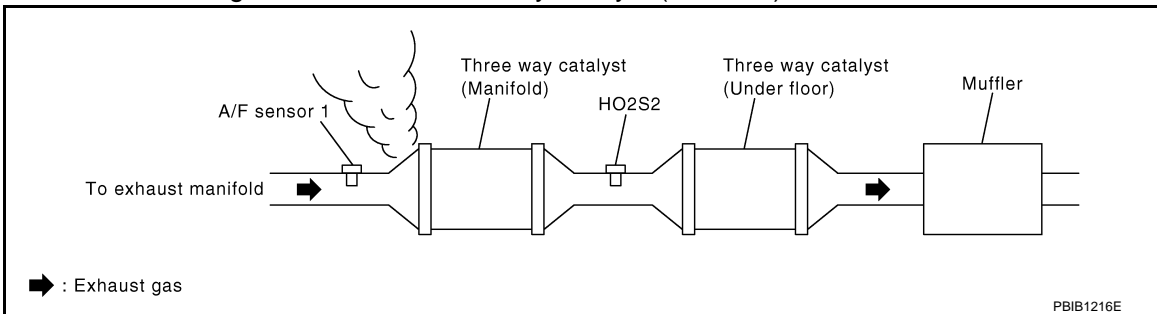
- YES >> Go to [EC-221, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503806

#### 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

1. Listen for an intake air leak after the mass air flow sensor.
2. 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

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	
F50	1	F8	49	Existed
	2		53	

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

# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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. Check fuel pressure. Refer to [EC-487, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).

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-491, "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-491, "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-153, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

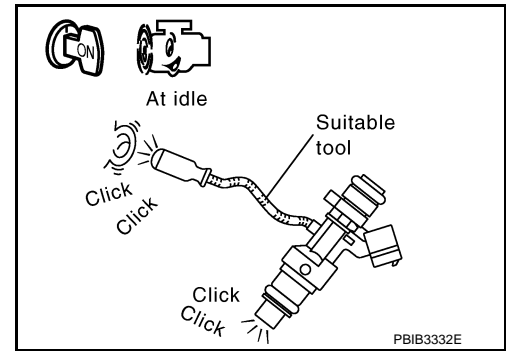
- Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-418. "Component Function Check"](#).



## 8. CHECK FUEL INJECTOR

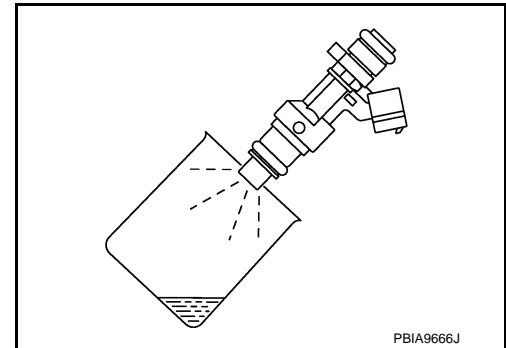
- Turn ignition switch OFF.
- Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- Disconnect all fuel injector harness connectors.
- Remove fuel tube assembly. Refer to [EM-36. "Removal and Installation"](#).  
Keep fuel hose and all fuel injectors connected to fuel 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. Refer to [EM-36. "Removal and Installation"](#).



## 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

# P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0172 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000006503807

#### 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"><li>Fuel injection system does not operate properly.</li><li>The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li></ul>	<ul style="list-style-type: none"><li>A/F sensor 1</li><li>Fuel injector</li><li>Exhaust gas leaks</li><li>Incorrect fuel pressure</li><li>Mass air flow sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-27, "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.

#### NOTE:

**When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.**

Does engine start?

- YES >> Go to [EC-225, "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 5 minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-225, "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.



# P0172 FUEL INJECTION SYSTEM FUNCTION

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Maintain the following conditions for at least 10 consecutive minutes.  
Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
---------------	-----------------------------

### CAUTION:

**Always drive vehicle at a safe speed.**

- Check 1st trip DTC.

Is 1st trip DTC detected?

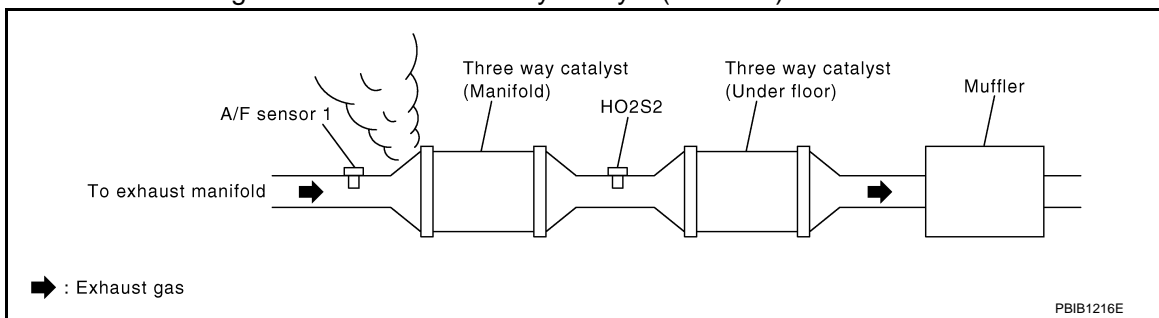
- YES >> Go to [EC-225. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503808

### 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.

Is 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	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

# P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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. Check fuel pressure. Refer to [EC-487, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).

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-491, "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-491, "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-153, "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.

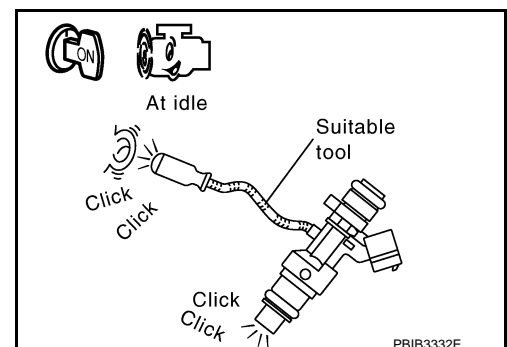
2. Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-418, "Component Function Check"](#).



# P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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.
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.

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. Refer to [EM-36. "Exploded View"](#).

## 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

A

EC

C

D

E

F

G

H

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J

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# P0181 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0181 FTT SENSOR

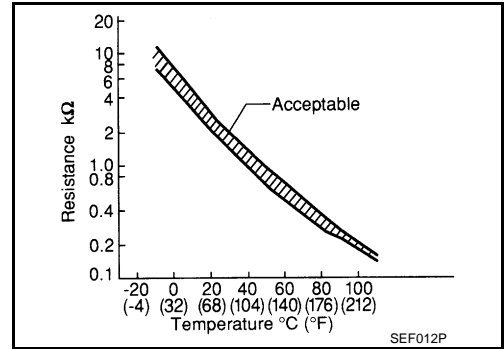
### Description

INFOID:000000006503809

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 43 (Fuel tank temperature sensor) and ground.

### DTC Logic

INFOID:000000006503810

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition		Possible cause
P0181	FTT SENSOR [Fuel tank temperature (FTT) sensor circuit range/performance]	A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from ECT sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>• Harness or connectors (The FTT sensor circuit is open or shorted)</li> <li>• FTT sensor</li> <li>• Combination meter</li> </ul>
		B)	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"> <li>• Harness or connectors (High or low resistance in the FTT sensor circuit)</li> <li>• FTT sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. INSPECTION START

Is it necessary to erase permanent DTC?

- YES >> GO TO 7.  
NO >> GO TO 2.

##### 2. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

>> GO TO 3.

##### 3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-I

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

# P0181 FTT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Proceed to [EC-230, "Diagnosis Procedure"](#).  
NO >> GO TO 4.

## 4. 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 5.

## 5. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-II

 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 >> Proceed to [EC-230, "Diagnosis Procedure"](#).  
NO >> GO TO 6.

## 6. PERFORM COMPONENT FUNCTION CHECK (FOR MALFUNCTION B)

Perform component function check. Refer to [EC-230, "Component Function Check"](#).

### NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to [EC-230, "Diagnosis Procedure"](#).

## 7. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

### TESTING CONDITION:

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 8.

## 8. PERFORM DTC CONFIRMATION PROCEDURE B

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

### NOTE:

Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

### CAUTION:

**Never turn ignition switch ON during soaking.**

### NOTE:

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

### CAUTION:

**Never turn ignition switch OFF during idling.**

# P0181 FTT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-230, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Component Function Check

INFOID:000000006978731

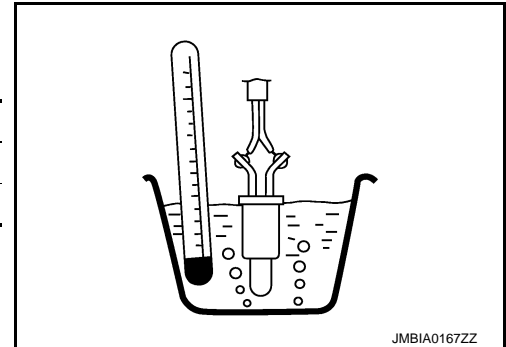
### 1.CHECK FUEL TANK TEMPERATURE (FTT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Remove fuel level sensor unit. Refer to [FL-5, "Removal and Installation"](#).
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 (kΩ)
4 and 5	Temperature [°C (°F)]	20 (68)
		50 (122)
		2.3 – 2.7
		0.79 – 0.90

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Proceed to [EC-230, "Diagnosis Procedure"](#).



### 2.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to [EC-230, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503811

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-41, "Intermittent Incident"](#).

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		
B40	4	Ground	Approx. 5 V

Is the inspection result normal?

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

### 3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

# P0181 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> 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 combination meter 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		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
B40	5	M34	24	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 M79, B4
- Harness for open or short between "fuel level sensor unit and fuel pump" and combination meter

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

## 6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-231, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace "fuel level sensor unit and fuel pump". Refer to [FL-5, "Exploded View"](#).

## 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503812

### 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. Refer to [FL-5, "Exploded View"](#).
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". Refer to [FL-5, "Exploded View"](#).

# P0182, P0183 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0182, P0183 FTT SENSOR

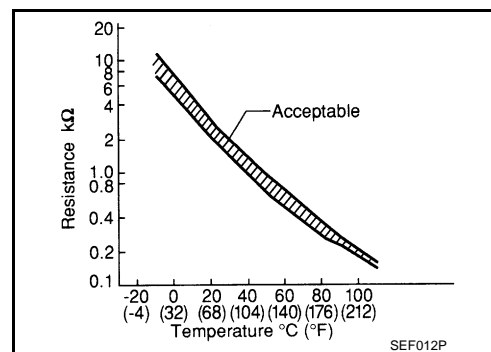
### Description

INFOID:000000006503813

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 43 (Fuel tank temperature sensor) and ground.

### DTC Logic

INFOID:000000006503814

#### 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"><li>• Harness or connectors (The sensor circuit is open or shorted.)</li><li>• Fuel tank temperature sensor</li></ul>
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-232, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503815

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-41, "Intermittent Incident"](#).

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.



# P0182, P0183 FTT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	4	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 combination meter 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		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
B40	5	M34	24	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 M79, B4
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter

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

## 6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-233, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

## 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503816

## 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. Refer to [FL-5, "Exploded View"](#).

## P0182, P0183 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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”. Refer to [FL-5, "Exploded View"](#).

# P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

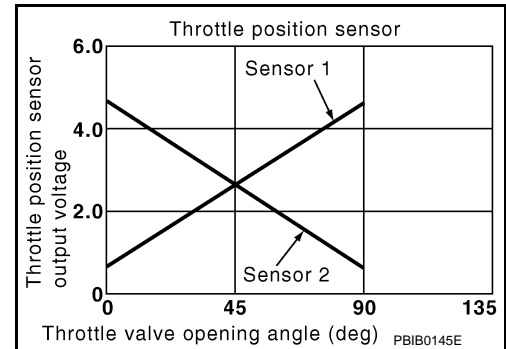
## P0222, P0223 TP SENSOR

### Description

INFOID:000000006503817

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

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



### DTC Logic

INFOID:000000006503818

#### 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-250, "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"><li>• Harness or connectors (TP sensor 1 circuit is open or shorted.)</li><li>• Electric throttle control actuator (TP sensor 1)</li></ul>
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 8 V at idle.

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

##### Is DTC detected?

YES >> Go to [EC-235, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503819

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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.

## P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit 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	
F29	1	F8	33	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-237, "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. Perform [EC-237, "Special Repair Requirement"](#).

>> INSPECTION END

### 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006503820

### 1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
			Fully de- pressed	Less than 4.75V	
	34 (TP sensor 2 signal)		Fully released	Less than 4.75V	
			Fully de- pressed	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. Perform [EC-400. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503821

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0300, P0301, P0302, P0303, P0304 MISFIRE

### DTC Logic

INFOID:000000006503822

#### 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, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.  
When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.  
When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.  
If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.  
When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.  
If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
- Two Trip Detection Logic (Exhaust quality deterioration)**  
For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only 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 cylinders misfire.	<ul style="list-style-type: none"><li>• Improper spark plug</li><li>• Insufficient compression</li><li>• Incorrect fuel pressure</li><li>• The fuel injector circuit is open or shorted</li><li>• Fuel injector</li><li>• Intake air leak</li><li>• The ignition signal circuit is open or shorted</li><li>• Lack of fuel</li><li>• Signal plate</li><li>• A/F sensor 1</li><li>• Incorrect PCV hose connection</li></ul>
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-239, "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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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)
Base fuel schedule	Base fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), 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-239, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503823

### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

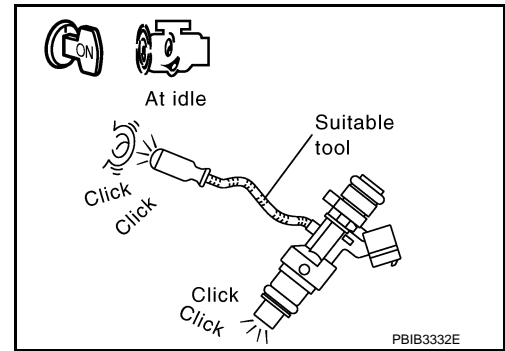
- Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-419. "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:

- During the operation, always stay 0.5 m (19.7 in) away from the spark plug and the ignition coil within. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV 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

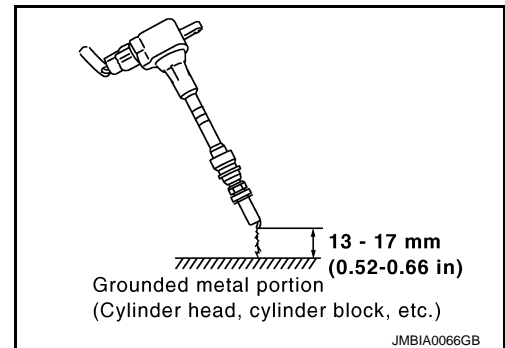
- Turn ignition switch OFF.
- Disconnect spark plug and connect a known-good spark plug.
- Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

**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-424. "Component Function Check"](#).





## P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

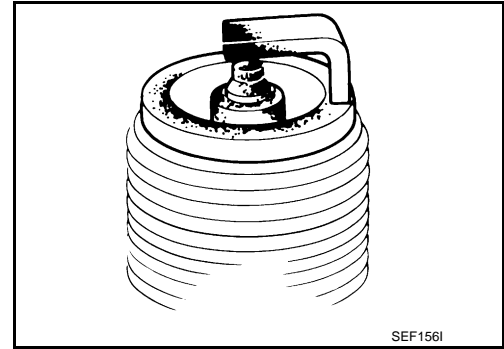
[MR18DE (EXCEPT FOR CALIFORNIA)]

### 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 [EM-114, "Spark Plug"](#).  
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 [EM-114, "Spark Plug"](#).

### 9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-21, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

### 10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Check fuel pressure. Refer to [EC-487, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).  
NO >> Repair or replace.

### 12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-19, "BASIC INSPECTION : Special Repair Requirement"](#). For specification, refer to [EC-491, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 13.  
NO >> Follow the [EC-19, "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.
3. Disconnect ECM harness connector.
4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

# P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

A/F sensor 1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-146, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace A/F sensor 1. Refer to [EM-30, "Exploded View"](#).

## 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-491, "Mass Air Flow Sensor"](#).

 **With GST**

Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to [EC-491, "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-153, "DTC Logic"](#).

## 16.CHECK SYMPTOM TABLE

Check items on the rough idle symptom in [EC-475, "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-114, "On Board Diagnosis Function"](#) or [EC-117, "CONSULT-III Function"](#).

>> GO TO 18.

**P0300, P0301, P0302, P0303, P0304 MISFIRE**

< DTC/CIRCUIT DIAGNOSIS >

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

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**18.CHECK INTERMITTENT INCIDENT**

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Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

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P0327, P0328 KS

Description

INFOID:000000006503824

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:000000006503825

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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Knock sensor</li> </ul>
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 10 V 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-244, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006503826

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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.
2. Disconnect ECM harness connector.
3. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	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 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	
F12	1	F8	37	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-245, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace knock sensor. Refer to [EM-87, "Exploded View"](#).

**5.CHECK INTERMITTENT INCIDENT**

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

**Component Inspection**

INFOID:000000006503827

**1.CHECK KNOCK SENSOR**

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as per the following.

**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. Refer to [EM-87, "Exploded View"](#).

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# P0335 CKP SENSOR (POS)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## P0335 CKP SENSOR (POS)

### Description

INFOID:000000006503828

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.

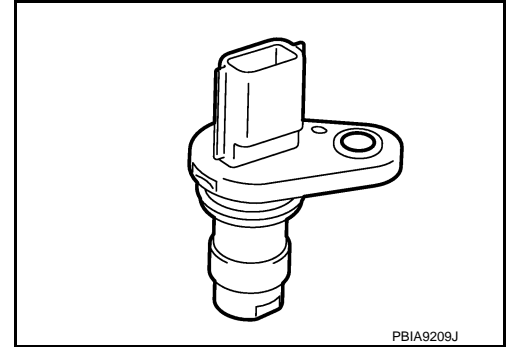
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

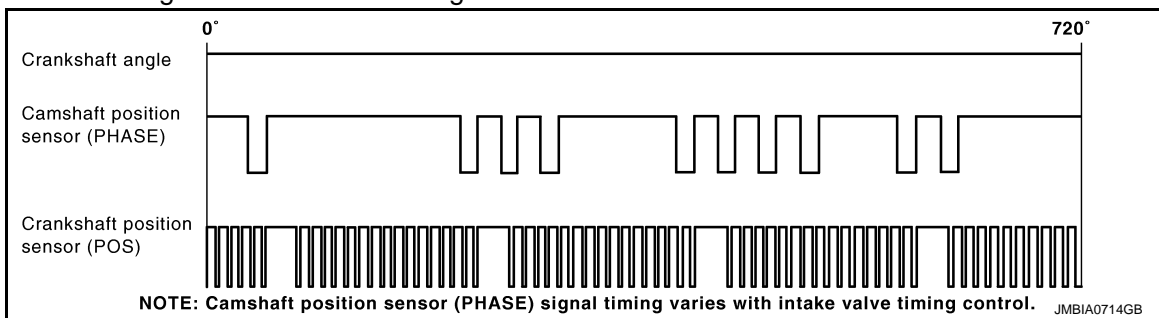
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



PBIA9209J



### DTC Logic

INFOID:000000006503829

### 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"> <li>The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>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.) (Battery current sensor circuit is shorted.)</li> <li>Crankshaft position sensor (POS)</li> <li>Refrigerant pressure sensor</li> <li>Accelerator pedal position sensor</li> <li>EVAP control system pressure sensor</li> <li>Signal plate</li> <li>Battery current sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

>> GO TO 2.

# P0335 CKP SENSOR (POS)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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-247, "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503830

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F20	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

### 3. CHECK 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	
F20	1	F8	75	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit.

### 4. CHECK CKP 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
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

## P0335 CKP SENSOR (POS)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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.

- Battery current sensor (Refer to [EC-349, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

### 6.CHECK APP SENSOR

Refer to [EC-393, "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. Perform [EC-393, "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	
F20	2	F8	62	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	
F20	3	F8	61	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-249, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).



# P0335 CKP SENSOR (POS)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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. Refer to [EM-87, "Exploded View"](#).

## 12. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503831

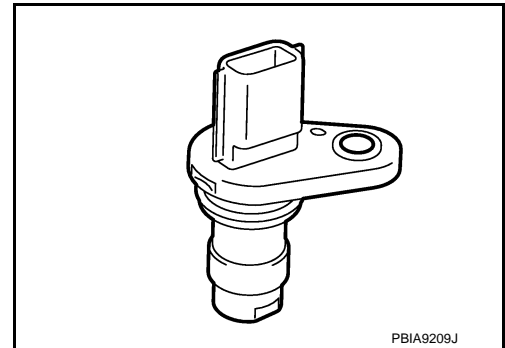
### 1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

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. Refer to [EM-87, "Exploded View"](#).
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).



### 2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as per the following.

Terminals (Polarity)	Resistance [ $\Omega$ at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).

# P0340 CMP SENSOR (PHASE)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## P0340 CMP SENSOR (PHASE)

### Description

INFOID:000000006503832

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.

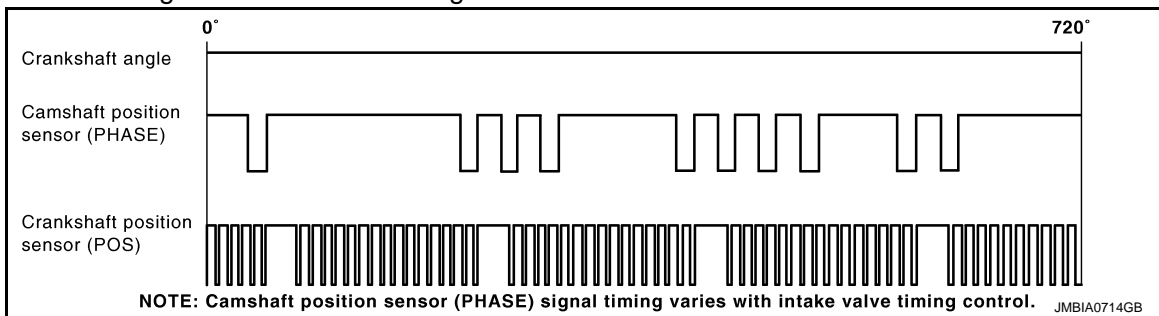
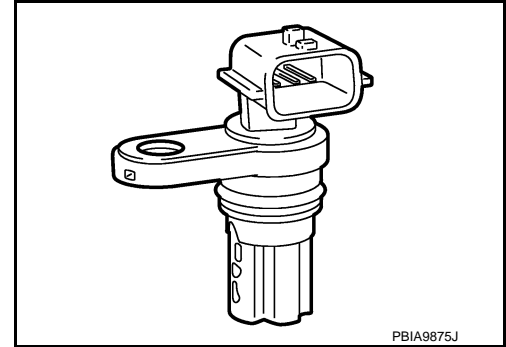
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

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.



### DTC Logic

INFOID:000000006503833

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-332, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> <li>The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> <li>The cylinder No. signal is not sent to ECM during engine running.</li> <li>The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> <li>Camshaft (INT)</li> <li>Starter motor</li> <li>Starting system circuit</li> <li>Dead (Weak) battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V 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 CMP SENSOR (PHASE)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is 1st trip DTC detected?

- YES >> Go to [EC-251, "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-251, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503834

### 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-2, "Work Flow"](#)).

### 2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F26	1	Ground	Approx. 5 V

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	
F26	2	F8	63	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.

# P0340 CMP SENSOR (PHASE)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	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-252. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54. "Exploded View"](#).

## 7.CHECK CAMSHAFT (INT)

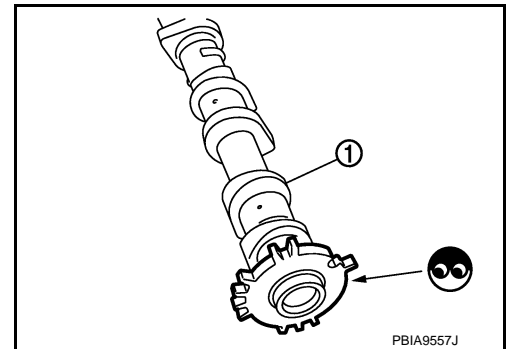
Check the following.

- 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. Refer to [EM-54. "Removal and Installation"](#).



## 8.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503835

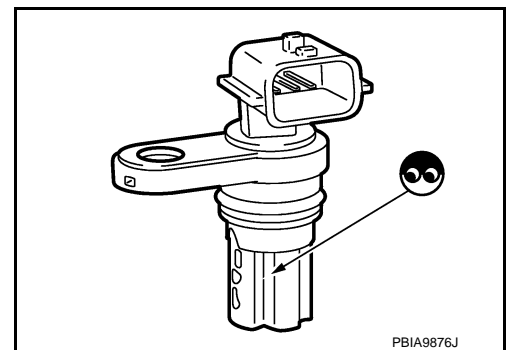
### 1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

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. Refer to [EM-54. "Exploded View"](#).
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54. "Exploded View"](#).



### 2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as per the following.

# P0340 CMP SENSOR (PHASE)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Terminals (Polarity)	Resistance [ $\Omega$ at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	

A

EC

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

C

D

E

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P

# P0420 THREE WAY CATALYST FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0420 THREE WAY CATALYST FUNCTION

### DTC Logic

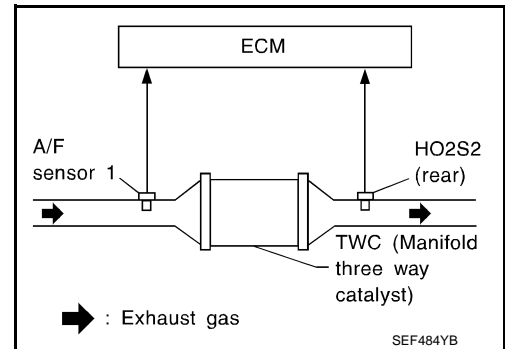
INFOID:000000006503836

#### 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"> <li>Three way catalyst (manifold) does not operate properly.</li> <li>Three way catalyst (manifold) does not have enough oxygen storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Three way catalyst (manifold)</li> <li>Exhaust tube</li> <li>Intake air leaks</li> <li>Fuel injector</li> <li>Fuel injector leaks</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul>

### 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 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" indication is more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- CMPLT >> GO TO 6.
- INCMP >> GO TO 4.

## 4. PERFORM DTC CONFIRMATION PROCEDURE-II

- Wait 5 seconds at idle.
- 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

- Stop engine and cool it down to less than 70°C (158°F).
- 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-255. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## 7. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-255. "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-255. "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006503837

## 1. PERFORM COMPONENT FUNCTION CHECK

### Without CONSULT-III

- Start engine and warm it up to 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.
- Open engine hood.
- Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (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-255. "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503838

## 1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

# P0420 THREE WAY CATALYST FUNCTION

[MR18DE (EXCEPT FOR CALIFORNIA)]

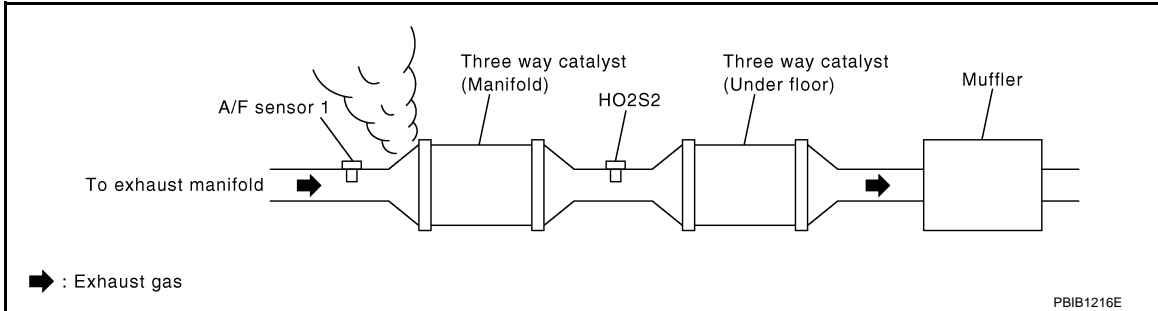
< DTC/CIRCUIT DIAGNOSIS >

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 IDLE SPEED AND IGNITION TIMING

For procedure, refer to [EC-23, "IGNITION TIMING : Special Repair Requirement"](#).  
For specification, refer to [EC-491, "Idle Speed"](#) and [EC-491, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Follow the instruction of [EC-19, "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		
F7	25	Ground	Battery voltage
	29		
	30		
	31		

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Perform [EC-418, "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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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:

- During the operation, always stay 0.5 m (19.7 in) away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV 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?

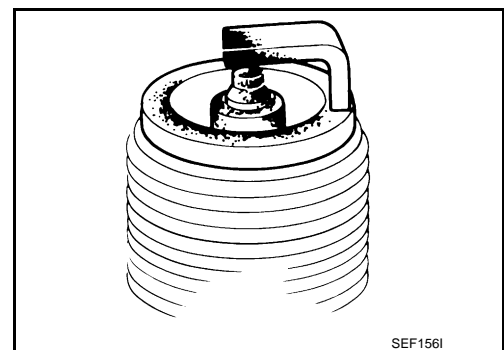
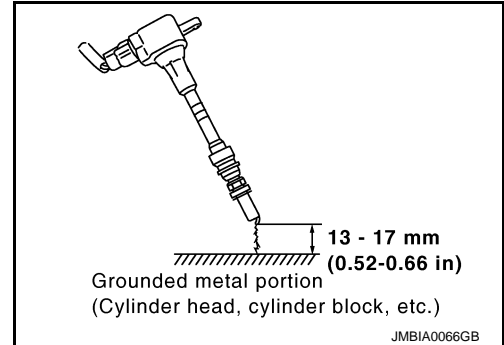
- YES >> GO TO 8.  
NO >> Check ignition coil, power transistor and their circuits. Refer to [EC-424. "Diagnosis Procedure"](#).

## 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 [EM-114. "Spark Plug"](#).  
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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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 [EM-114, "Spark Plug"](#).

### 10. CHECK FUEL INJECTOR

---

1. Turn ignition switch OFF. Refer to [EM-36, "Removal and Installation"](#).
2. Remove fuel injector assembly. Refer to [EM-36, "Exploded View"](#).  
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. Refer to [EM-36, "Exploded View"](#).

### 11. CHECK INTERMITTENT INCIDENT

---

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace three way catalyst assembly.

NO >> Repair or replace harness or connector

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0441 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006503839

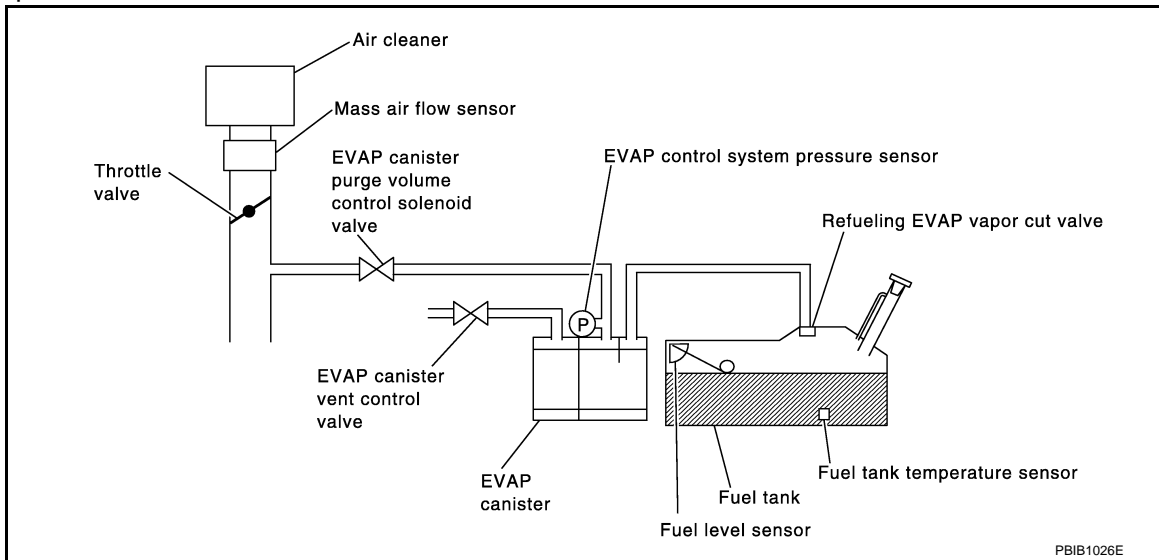
#### DTC DETECTION LOGIC

**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"> <li>• EVAP canister purge volume control solenoid valve stuck closed</li> <li>• EVAP control system pressure sensor and the circuit</li> <li>• Loose, disconnected or improper connection of rubber tube</li> <li>• Blocked rubber tube</li> <li>• Cracked EVAP canister</li> <li>• EVAP canister purge volume control solenoid valve circuit</li> <li>• Accelerator pedal position sensor</li> <li>• Blocked purge port</li> <li>• EVAP canister vent control valve</li> <li>• Drain filter</li> </ul>

#### 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.

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 3.

### 3.PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. 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.

NO >> 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-261, "Diagnosis Procedure"](#).

### 6.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-260, "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-261, "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006503840

### 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 and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

5. Set voltmeter probes to ECM harness connector and ground.

ECM		Ground
Connector	Terminal	
F8	42 (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
Selector lever	Any position other than P, N or R

8. Verify that EVAP control system pressure sensor value stays 0.1 V 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-261, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503841

### 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. Refer to [FL-14, "Removal and Installation"](#).

### 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-87, "System Description"](#).  
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 C/V" opening and check vacuum existence.

PURG VOL C/V	Vacuum
100%	Existed
0%	Not existed

Is the inspection result normal?

- YES >> GO TO 7.  
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.

## P0441 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

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-87, "System Description"](#).
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

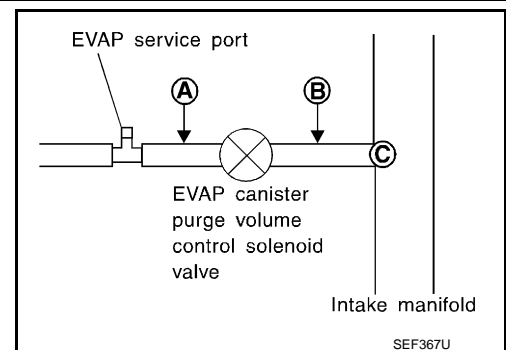
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.  
Refer to [EC-87, "System Description"](#).

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair it.

### 5.CHECK EVAP PURGE HOSE AND PURGE PORT

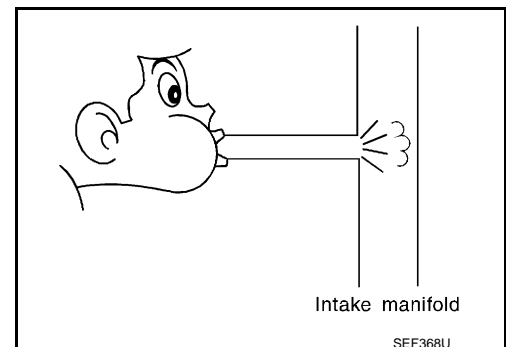
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



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.

## P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

### 7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-275, "Component Inspection"](#).

Is the inspection result normal?

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-291, "DTC Logic"](#) for DTC P0452, [EC-296, "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 DRAIN FILTER

Refer to [EC-264, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace drain filter.

### 12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-282, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace EVAP canister vent control valve.

### 13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-489, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace it.

### 14. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

### 15. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

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# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> INSPECTION END

## Component Inspection (Drain filter)

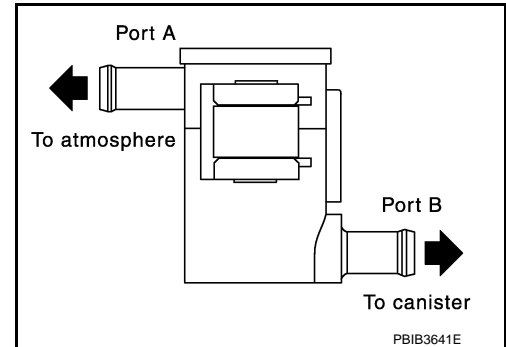
INFOID:000000006503842

### 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace drain filter.





# P0442 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0442 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006503843

#### DTC DETECTION LOGIC

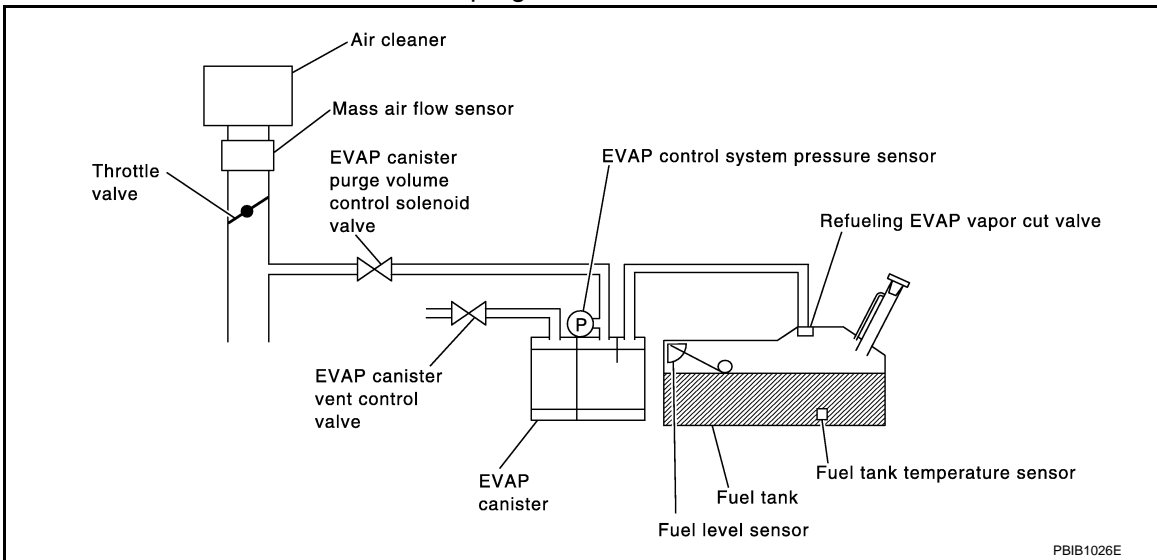
**NOTE:**

If DTC P0442 is displayed with DTC P0456, first perform the trouble diagnosis for DTC P0456. Refer to [EC-308, "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"> <li>• Incorrect fuel tank vacuum relief valve</li> <li>• Incorrect fuel filler cap used</li> <li>• Fuel filler cap remains open or fails to close.</li> <li>• Foreign matter caught in fuel filler cap.</li> <li>• Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>• Foreign matter caught in EVAP canister vent control valve.</li> <li>• EVAP canister or fuel tank leaks</li> <li>• EVAP purge line (pipe and rubber tube) leaks</li> <li>• EVAP purge line rubber tube bent</li> <li>• Loose or disconnected rubber tube</li> <li>• EVAP canister vent control valve and the circuit</li> <li>• EVAP canister purge volume control solenoid valve and the circuit</li> <li>• Fuel tank temperature sensor</li> <li>• O-ring of EVAP canister vent control valve is missing or damaged</li> <li>• EVAP canister is saturated with water</li> <li>• EVAP control system pressure sensor</li> <li>• Fuel level sensor and the circuit</li> <li>• Refueling EVAP vapor cut valve</li> <li>• ORVR system leaks</li> <li>• Drain filter</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

# P0442 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- 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

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 "EVP 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 the CONSULT-III screen, go to [EC-19, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-266, "Diagnosis Procedure"](#).

### 3. PERFORM COMPONENT FUNCTION CHECK

#### With GST

#### NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-29, "SRT Set Driving Pattern"](#) 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-261, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-266, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503844

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

# P0442 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

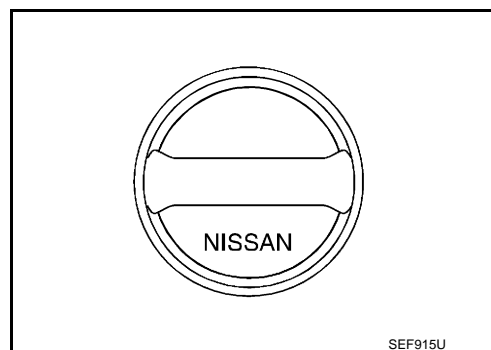
< DTC/CIRCUIT DIAGNOSIS >

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-270, "Component Inspection \(Fuel filler cap\)"](#).

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-489, "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

## 6. CHECK DRAIN FILTER

Refer to [EC-270, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace drain filter.

## 7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [FL-14, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-282, "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 IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

## P0442 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

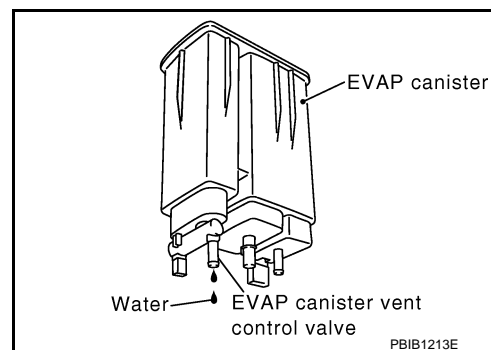
2. Does water drain from the EVAP canister?

Does water drain from the EVAP canister?

YES >> GO TO 9.

NO-1 >> With CONSULT-III: GO TO 11.

NO-2 >> Without CONSULT-III: GO TO 12.



### 9. 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 1.9 kg (4.2 lb).**

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 11.

YES-2 >> Without CONSULT-III: GO TO 12.

NO >> GO TO 10.

### 10. 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. Refer to [FL-14, "Exploded View"](#).

### 11. 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 C/V" opening to 100%.
5. Check vacuum hose for vacuum.

**Vacuum should exist.**

Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 13.

### 12. 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 13.

### 13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-87, "System Description"](#).

Is the inspection result normal?

## P0442 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 14.  
NO >> Repair or reconnect the hose.

### 14.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-275. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace EVAP canister purge volume control solenoid valve.

### 15.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-231. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace fuel level sensor unit. Refer to [FL-5. "Exploded View"](#).

### 16.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-288. "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> Replace EVAP control system pressure sensor.

### 17.CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-87. "System Description"](#).

Is the inspection result normal?

- YES >> GO TO 18.  
NO >> Repair or reconnect the hose.

### 18.CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 19.

### 19.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-430. "Description"](#).

Is the inspection result normal?

- YES >> GO TO 20.  
NO >> Repair or replace hoses and tubes.

### 20.CHECK RECIRCULATION LINE

Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

Is the inspection result normal?

- YES >> GO TO 21.  
NO >> Repair or replace hose, tube or fuel filler tube.

### 21.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-433. "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 22.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank.

### 22.CHECK FUEL LEVEL SENSOR

Refer to [MWI-42. "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 23.

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# P0442 EVAP CONTROL SYSTEM

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< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

## 23.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

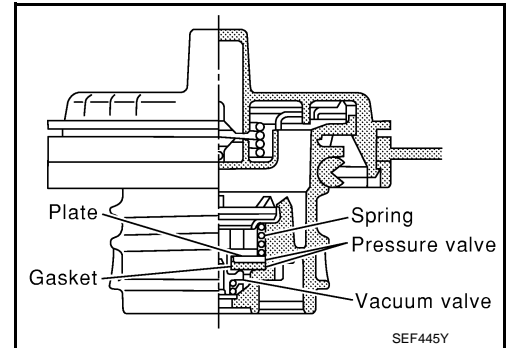
>> INSPECTION END

### Component Inspection (Fuel filler cap)

INFOID:000000006503845

#### 1.CHECK FUEL FILLER CAP

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
5. Check valve opening pressure and vacuum.

**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

#### 2.REPLACE FUEL FILLER CAP

Replace fuel filler cap.

**CAUTION:**

**Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.**

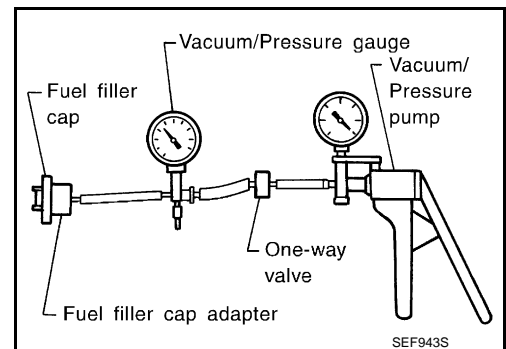
>> INSPECTION END

### Component Inspection (Drain filter)

INFOID:000000006503846

#### 1.CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.



# P0442 EVAP CONTROL SYSTEM

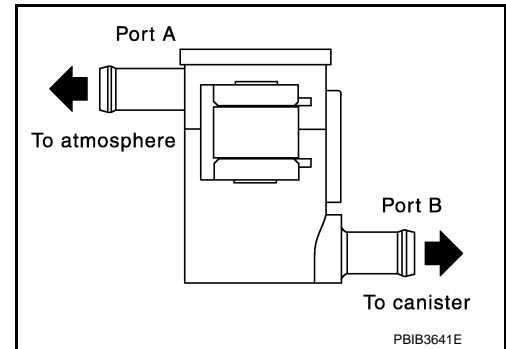
[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

### Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace drain filter.



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# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

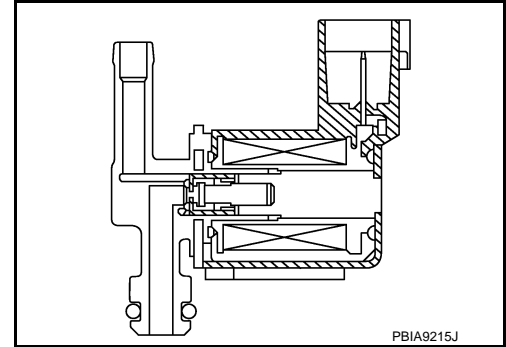
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Description

INFOID:000000006503847

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### DTC Logic

INFOID:000000006503848

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0443	EVAP canister purge volume control solenoid valve	A	The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"><li>• EVAP control system pressure sensor</li><li>• EVAP canister purge volume control solenoid valve (The valve is stuck open.)</li><li>• EVAP canister vent control valve</li><li>• EVAP canister</li><li>• Hoses (Hoses are connected incorrectly or clogged.)</li></ul>
		B	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

### 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 CONFIRMATION PROCEDURE when the fuel is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

#### Do you have CONSULT-III

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

#### 2. PERFORM DTC CONFIRMATION PROCEDURE A

##### Ⓜ With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that the following condition are met.  
FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to [EC-273, "Diagnosis Procedure"](#).  
NO >> GO TO 3.

#### 3. PERFORM DTC CONFIRMATION PROCEDURE B

##### Ⓜ With CONSULT-III



# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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-273. "Diagnosis Procedure"](#).

## 4.PERFORM DTC CONFIRMATION PROCEDURE A

 **With GST**

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

ECM		Ground	Voltage (V)
Connector	Terminal		
F8	43 (Fuel tank temperature sensor signal)	Ground	3.1 - 4.0

3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-273. "Diagnosis Procedure"](#).  
NO >> GO TO 5.

## 5.PERFORM DTC CONFIRMATION PROCEDURE

 **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 detected?

- YES >> Go to [EC-273. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503849

### 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		
F32	1	Ground	Battery voltage

Is the inspection result normal?

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

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E14
- 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	
F32	2	F7	9	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.

**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-290, "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-275, "Component Inspection"](#).

Is the inspection result normal?

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- 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-282, "Component Inspection"](#).

Is the inspection result normal?

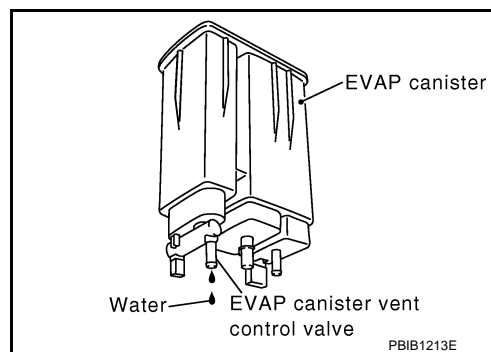
- YES >> GO TO 10.  
NO >> Replace EVAP canister vent control valve.

## 10.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

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.



## 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 1.9 kg (4.2 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. Refer to [FL-14, "Exploded View"](#).

## 13.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503850

### 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.

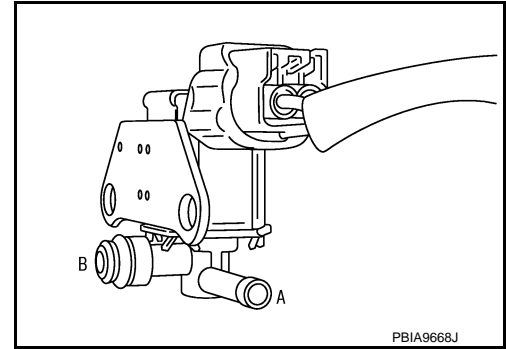
# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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 C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

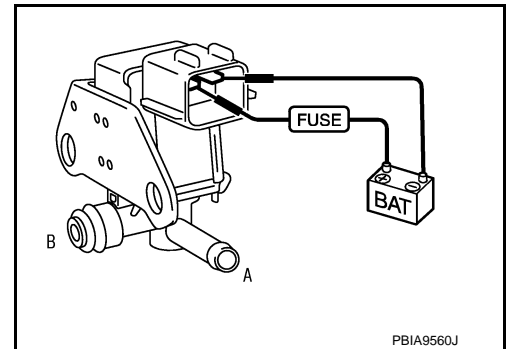


PBIA9668J

## ⊗ 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)
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed



PBIA9660J

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

< DTC/CIRCUIT DIAGNOSIS >

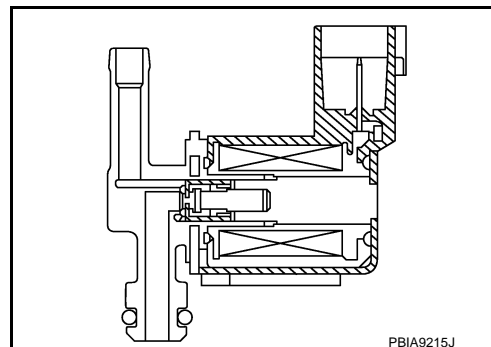
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Description

INFOID:000000006503851

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### DTC Logic

INFOID:000000006503852

### 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"> <li>Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>
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"> <li>Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>

### 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 11 V at idle.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for at least 13 seconds.
- Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-277. "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503853

#### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister purge volume control solenoid valve harness connector.
- Turn ignition switch ON.
- Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

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 E14
- Harness connectors E8, F1
- 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	
F32	2	F7	9	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-279, "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-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

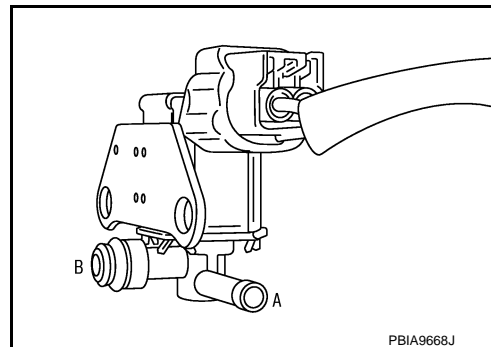
INFOID:000000006503854

### 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 C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

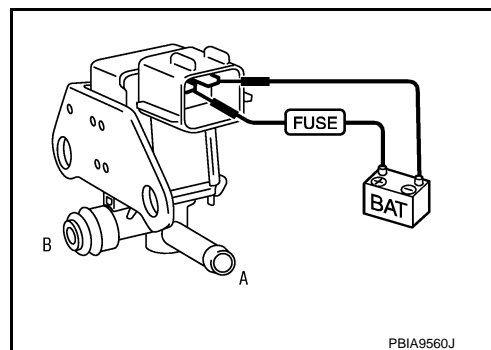
Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed



#### ☒ 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)
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister purge volume control solenoid valve

# P0447 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0447 EVAP CANISTER VENT CONTROL VALVE

### Description

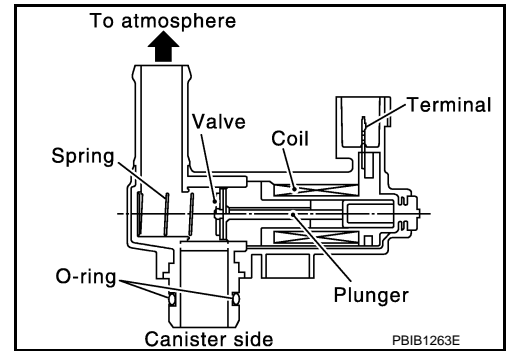
INFOID:000000006503855

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:000000006503856

### 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"><li>• Harness or connectors (The valve circuit is open or shorted.)</li><li>• EVAP canister vent control valve</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

**Before performing the following procedure, confirm battery voltage is more than 11 V 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-280, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503857

#### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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		
B20	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 E8, F1
- Harness connectors E105, M77
- Harness connectors B1, M18
- 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	
B20	2	F7	28	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 E8, F1
- Harness connectors E105, M77
- Harness connectors M79, B4
- 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?

# P0447 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 8.
- NO >> Clean the rubber tube using an air blower.

### 8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-282. "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-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

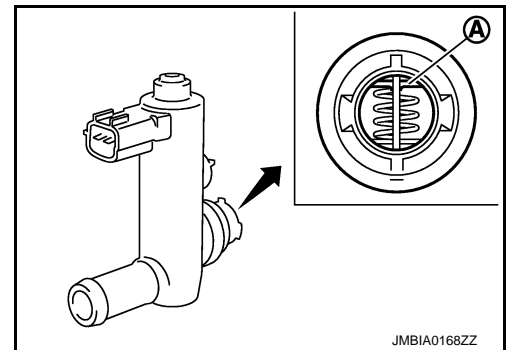
INFOID:000000006503858

### 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 (A) 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.**

VENT CONT/V condition	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.

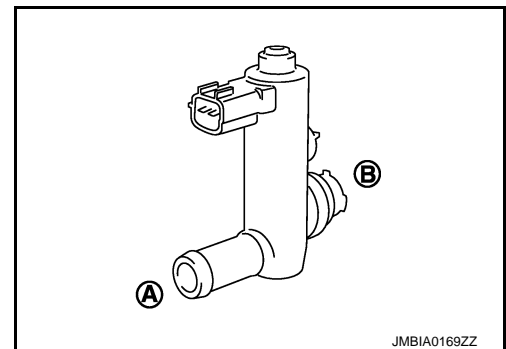
**Make sure new O-ring is installed properly.**

Condition	Air passage continuity between (A) and (B)
12 V 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

### 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.**

VENT CONT/V condition	Air passage continuity between (A) and (B)
ON	Not existed
OFF	Existed

Operation takes less than 1 second.

### Without CONSULT-III

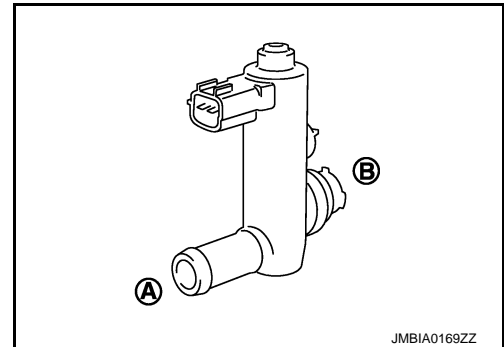
1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
2. Check air passage continuity and operation delay time under the following conditions.  
**Make sure new O-ring is installed properly.**

Condition	Air passage continuity between (A) and (B)
12 V 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.



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# P0448 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0448 EVAP CANISTER VENT CONTROL VALVE

### Description

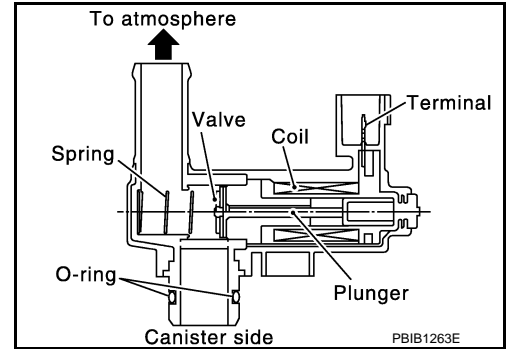
INFOID:000000006503859

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:000000006503860

### 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"><li>• EVAP canister vent control valve</li><li>• EVAP control system pressure sensor and the circuit</li><li>• Blocked rubber tube to EVAP canister vent control valve</li><li>• EVAP canister is saturated with water</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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

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.

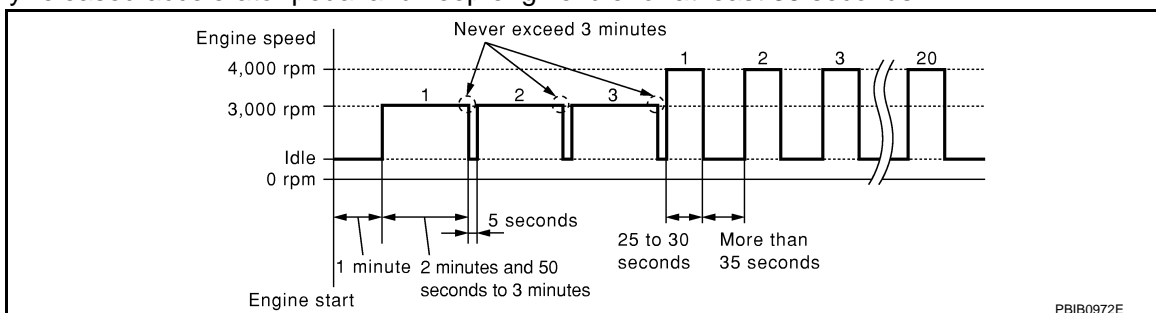
- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
  - Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

# P0448 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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-285, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503861

### 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-286, "Component Inspection"](#).

Is the inspection result normal?

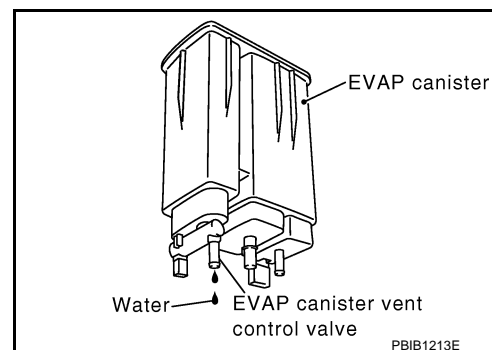
- YES >> GO TO 3.
- NO >> Replace EVAP canister vent control valve.

### 3. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Does water drain from 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 1.9 kg (4.2 lb).**

Is the inspection result normal?

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

### 5. DETECT MALFUNCTIONING PART

# P0448 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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. Refer to [FL-14, "Exploded View"](#).

## 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-290, "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-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503862

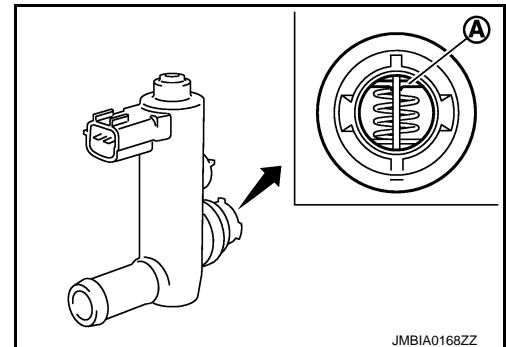
### 1. CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (A) 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

4. Check air passage continuity and operation delay time.  
**Make sure new O-ring is installed properly.**

VENT CONT/V condition	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)
12 V 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.**

VENT CONT/V condition	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.**

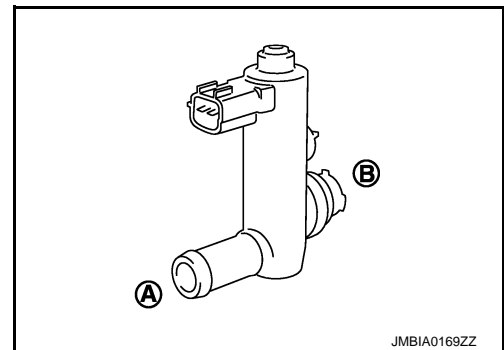
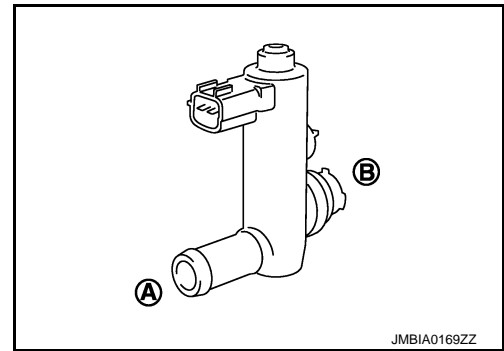
Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve.



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# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

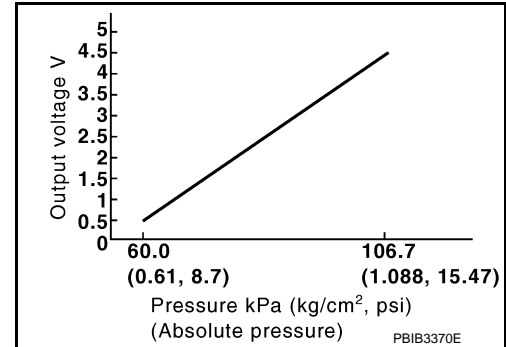
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006503863

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:000000006503864

### 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"><li>• 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.) (Battery current sensor circuit is shorted.)</li><li>• EVAP control system pressure sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li><li>• Battery current sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> 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-288, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503865

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).



# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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		
B21	3	Ground	Approx. 5 V

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
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-349, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-249, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace malfunctioning component.

## 6.CHECK APP SENSOR

Refer to [EC-393, "Component Inspection"](#).

Is the inspection result normal?

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

# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly
2. Perform [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-290, "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-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503866

## 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 [Applied vacuum kPa (kg/cm <sup>2</sup> , psi)]	Voltage
Connector	Terminal		
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

### CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace EVAP control system pressure sensor

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

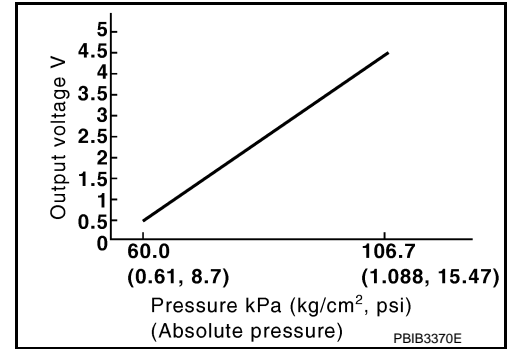
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006503867

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:000000006503868

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• Battery current sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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" indication 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 per the following.

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground
Connector	Terminal	
F8	43 (Fuel tank temperature sensor signal)	Ground

3. Make sure that the voltage is less than 4.2 V.
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-292, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503869

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
B21	3	Ground	Approx. 5 V

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	
B21	3	F8	76	Existed

Is the inspection result normal?

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 CIRCUIT

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-349, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-249, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace malfunctioning component.

## 8. CHECK APP SENSOR

Refer to [EC-393, "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. Perform [EC-393, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
B21	1	F8	51	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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	
B21	2	F8	42	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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-295, "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-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006503870

### 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 [Applied vacuum kPa (kg/cm <sup>2</sup> , psi)]	Voltage
Connector	Terminal		
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

#### CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace EVAP control system pressure sensor

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# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

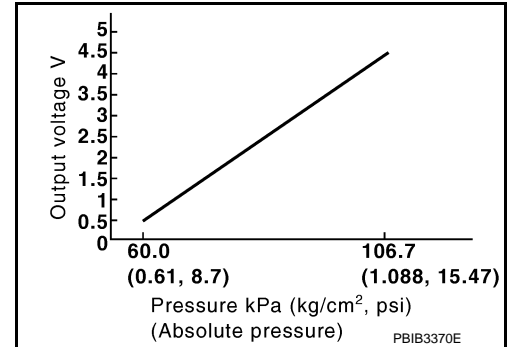
[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006503871

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:000000006503872

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• EVAP canister vent control valve</li> <li>• EVAP canister</li> <li>• Rubber hose from EVAP canister vent control valve to vehicle frame</li> <li>• Battery current sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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" indication 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes to ECM harness connector and ground as per the following.

ECM		Ground
Connector	Terminal	
F8	43 (Fuel tank temperature sensor signal)	Ground

3. Make sure that the voltage is less than 4.2 V.
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-297, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503873

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
B21	3	Ground	Approx. 5 V

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.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
B21	3	F8	76	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

## 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 CIRCUIT

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-349, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-249, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

## 8.CHECK APP SENSOR

Refer to [EC-393, "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. Perform [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 10.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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	
B21	1	F8	51	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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	
B21	2	F8	42	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Refer to [EC-282, "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-300, "Component Inspection"](#).

Is the inspection result normal?

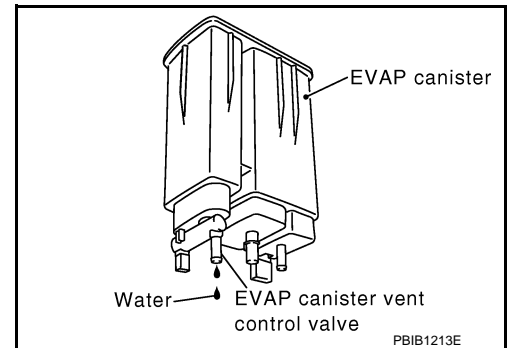
- YES >> GO TO 17.
- NO >> Replace EVAP control system pressure sensor.

## 17. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Does water drain from 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 1.9 kg (4.2 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. Refer to [FL-14, "Exploded View"](#).

## 20. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503874

### 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.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Condition [Applied vacuum kPa (kg/cm <sup>2</sup> , psi)]	Voltage
Connector	Terminal		
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor

A  
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# P0455 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

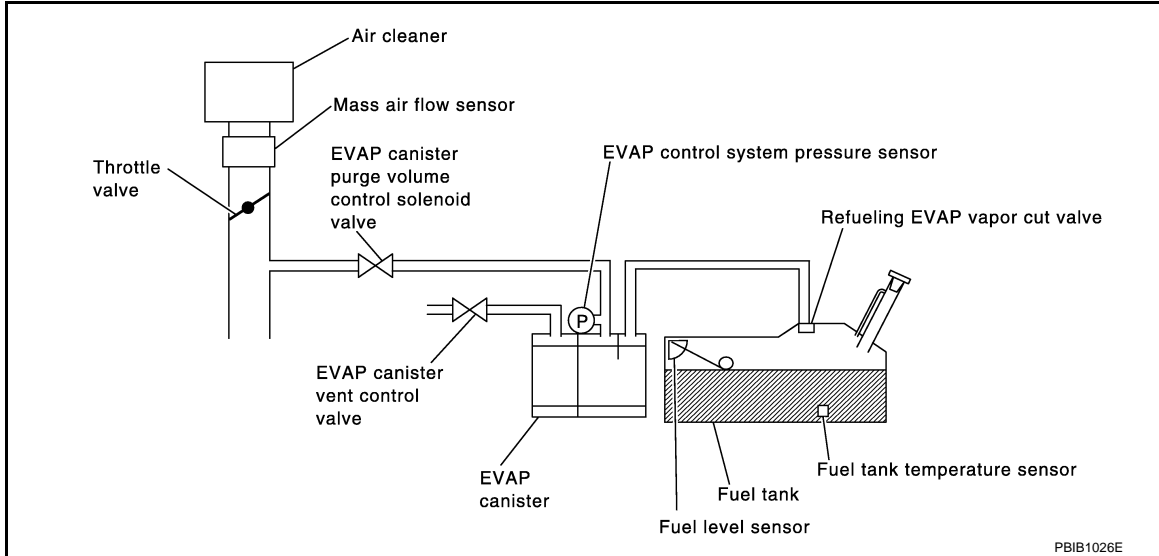
## P0455 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006503875

#### 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"> <li>Fuel filler cap remains open or fails to close.</li> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent control valve.</li> <li>EVAP canister or fuel tank leaks</li> <li>EVAP purge line (pipe and rubber tube) leaks</li> <li>EVAP purge line rubber tube bent.</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister vent control valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister vent control valve is missing or damaged.</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leaks</li> <li>Drain filter</li> </ul>

#### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may 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

# P0455 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## CAUTION:

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 - 30°C (32 - 86°F)**
6. Select "EVP 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-19. "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> GO TO 3.

## 3.CHECK DTC

Check DTC.

Which DTC is detected?

- P0455 >> Go to [EC-303. "Diagnosis Procedure"](#).
- P0442 >> Go to [EC-266. "Diagnosis Procedure"](#).

## 4.PERFORM DTC CONFIRMATION PROCEDURE

### With GST

### NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-29. "SRT Set Driving Pattern"](#) 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-303. "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-266. "Diagnosis Procedure"](#).
- YES-3 >> P0441: Go to [EC-261. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503876

## 1.CHECK FUEL FILLER CAP DESIGN

# P0455 EVAP CONTROL SYSTEM

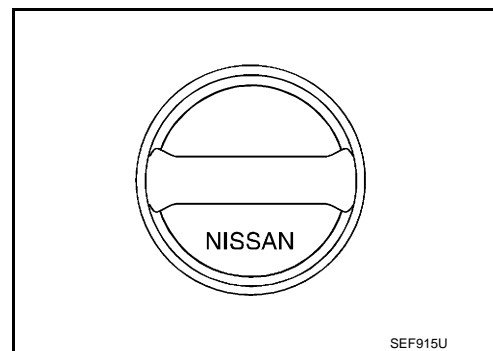
[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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. 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-306. "Component Inspection \(Fuel filler cap\)".](#)

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-87. "System Description".](#)

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 DRAIN FILTER

Refer to [EC-307. "Component Inspection \(Drain filter\)".](#)

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> Replace drain filter.

## 8.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.  
Refer to [FL-14. "Exploded View".](#)
- EVAP canister vent control valve.  
Refer to [EC-282. "Component Inspection".](#)



# P0455 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace EVAP canister vent control valve and O-ring.

## 9. CHECK FOR EVAP LEAK

Refer to [EC-489, "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.

## 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 C/V" opening to 100%.
5. Check vacuum hose for vacuum.

**Vacuum should exist.**

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

## 11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**Without CONSULT-III**

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-87, "System Description"](#).

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 13.

YES-2 >> Without CONSULT-III: GO TO 14.

NO >> Repair or reconnect the hose.

## 13. 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 15.

NO >> GO TO 14.

## 14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-275, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

## P0455 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace EVAP canister purge volume control solenoid valve.

### 15. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-231, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

### 16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-290, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Replace EVAP control system pressure sensor.

### 17. 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-430, "Description"](#).

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace hoses and tubes.

### 18. CHECK RECIRCULATION LINE

Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 19.

NO >> Repair or replace hose, tube or fuel filler tube.

### 19. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-433, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

YES >> GO TO 20.

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

### 20. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

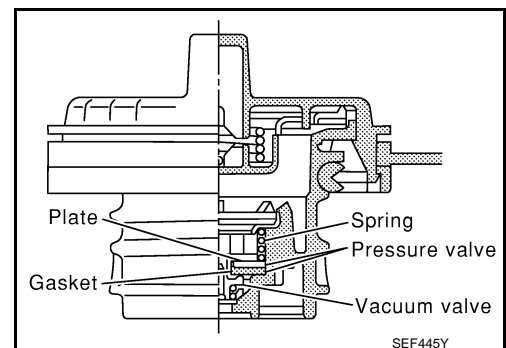
>> INSPECTION END

## Component Inspection (Fuel filler cap)

INFOID:000000006503877

### 1. CHECK FUEL FILLER CAP

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



# P0455 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
5. Check valve opening pressure and vacuum.

**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

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

## 2. REPLACE FUEL FILLER CAP

Replace fuel filler cap.

### CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END

## Component Inspection (Drain filter)

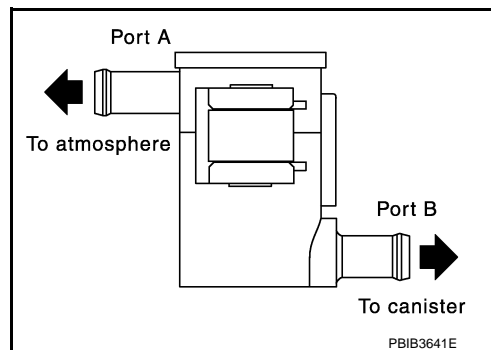
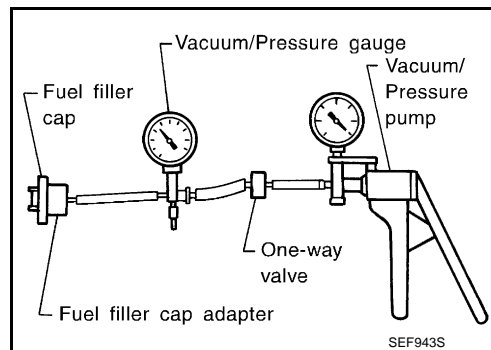
INFOID:000000006503878

## 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace drain filter.



# P0456 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0456 EVAP CONTROL SYSTEM

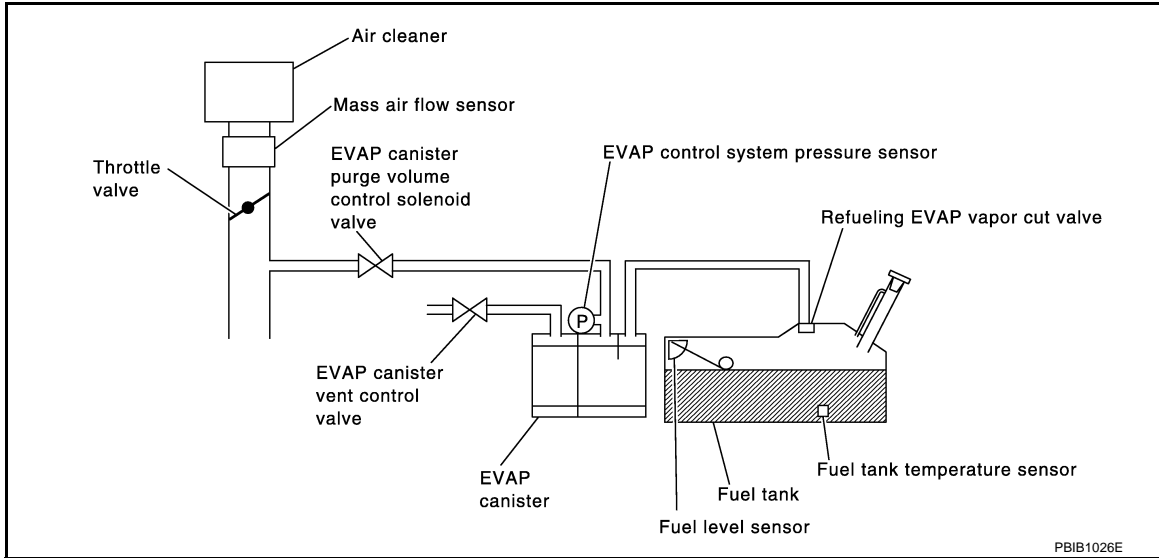
### DTC Logic

INFOID:000000006978708

### DTC DETECTION LOGIC

This diagnosis detects leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the negative pressure caused by decrease of fuel temperature in the fuel tank after turning ignition switch OFF.

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 leak	<ul style="list-style-type: none"> <li>EVAP system has a leak.</li> <li>EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Fuel filler cap remains open or fails to close.</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent control valve.</li> <li>EVAP canister or fuel tank leaks</li> <li>EVAP purge line (pipe and rubber tube) leaks</li> <li>EVAP purge line rubber tube bent</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister vent control valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister vent control valve is missing or damaged</li> <li>EVAP canister is saturated with water</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leaks</li> <li>Fuel level sensor and the circuit</li> <li>Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may 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

# P0456 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 1. PRECONDITIONING

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

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

Do you have CONSULT-III?

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

## 2. PERFORM DTC CONFIRMATION PROCEDURE-I

 **With CONSULT-III**

1. Turn ignition switch ON and select "EVAP DIAG READY" in "DATA MONITOR" mode with CONSULT-III.
2. Start engine and wait at idle until "OFF" of "EVAP DIAG READY" changes to "ON".

**NOTE:**

**It will take at most 2 hours until "OFF" of "EVAP DIAG READY" changes to "ON".**

3. Turn ignition switch OFF and wait at least 90 minutes.

**NOTE:**

**Never turn ignition switch ON during 90 minutes.**

4. Turn ignition switch ON and select "EVAP LEAK DIAG" in "DATA MONITOR" mode with CONSULT-III.
5. Check that "EVAP LEAK DIAG" indication.

Which is displayed on CONSULT-III?

- CMPLT >> GO TO 3.  
YET >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 1.

## 3. PERFORM DTC CONFIRMATION PROCEDURE-II

Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-309, "Diagnosis Procedure"](#).  
NO >> INSPECTION END.

## 4. PERFORM DTC CONFIRMATION PROCEDURE

 **With GST**

1. Start engine and wait engine idle for at least 2 hours.
2. Turn ignition switch OFF and wait at least 90 minutes.

**NOTE:**

**Never turn ignition switch ON during 90 minutes.**

3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-309, "Diagnosis Procedure"](#).  
NO >> INSPECTION END.

## Diagnosis Procedure

INFOID:000000006978709

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

# P0456 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

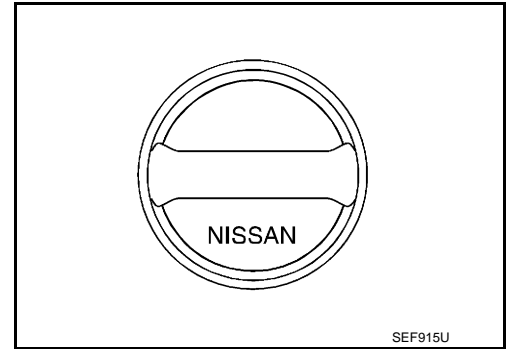
< DTC/CIRCUIT DIAGNOSIS >

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-313, "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-489, "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 [FL-14, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-286, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Exploded View"](#).

## 7. CHECK IF EVAP CANISTER SATURATED WITH WATER

## P0456 EVAP CONTROL SYSTEM

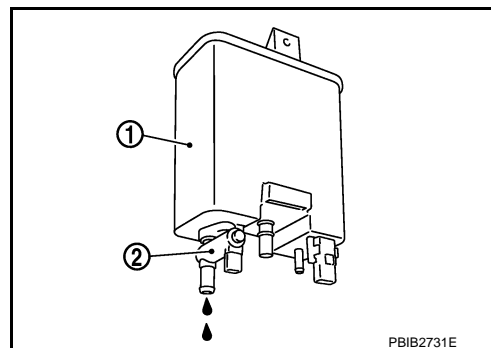
[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

1. Remove EVAP canister (1) with EVAP canister vent control valve (2) 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 assembly with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

**The weight should be less than 2.2 kg (4.9 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. Refer to [FL-14, "Exploded View"](#).

### 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 and let it idle.
3. Select "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-87, "System Diagram"](#).

Is the inspection result normal?

## P0456 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 13.  
NO >> Repair or reconnect the hose.

### 13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-275, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.  
NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

### 14.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-231, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

### 15.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-290, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

### 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-87, "System Description"](#).

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-430, "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 fuel filler 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 fuel filler tube.

### 20.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-433, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 21.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

### 21.CHECK FUEL LEVEL SENSOR

Refer to [MWI-43, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 22.



# P0456 EVAP CONTROL SYSTEM

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

## 22.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

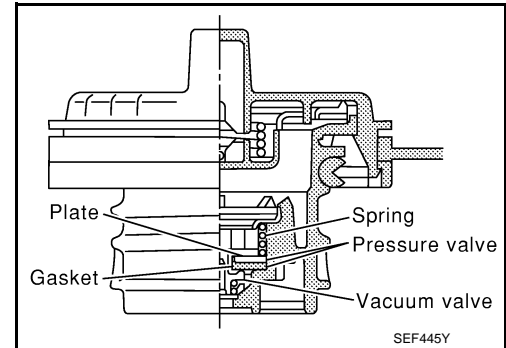
>> INSPECTION END

## Component Inspection

INFOID:000000006978710

### 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.

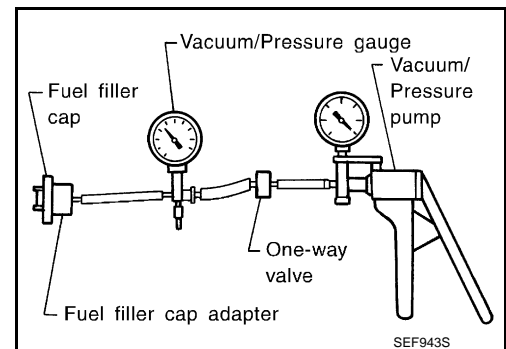
**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0460 FUEL LEVEL SENSOR

### Description

INFOID:000000006503884

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006503885

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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-314, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503886

#### 1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to [MWI-42, "Component Function Check"](#)

#### 2. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0461 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0461 FUEL LEVEL SENSOR

### Description

INFOID:000000006503887

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006503888

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P0461 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

### 1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-315, "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-316, "Diagnosis Procedure"](#).

### Component Function Check

INFOID:000000006503889

### 1. PRECONDITIONING

#### WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-2, "General Precautions"](#).

#### 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:

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.

## P0461 FUEL LEVEL SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

2. Release fuel pressure from fuel line, refer to [EC-487, "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 0.03 V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-316, "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-487, "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-316, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503890

### 1.CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to [MWI-42, "Component Function Check"](#)

### 2.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0462, P0463 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0462, P0463 FUEL LEVEL SENSOR

### Description

INFOID:000000006503891

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006503892

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P0462 or P0463 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li></ul>
P0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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 11 V and 16 V 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-317, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503893

##### 1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Refer to [MWI-42, "Component Function Check"](#)

##### 2. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

**P0462, P0463 FUEL LEVEL SENSOR**

< DTC/CIRCUIT DIAGNOSIS >

**[MR18DE (EXCEPT FOR CALIFORNIA)]**

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>> INSPECTION END

# P0500 VSS

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0500 VSS EXCEPT FOR M/T MODELS

### EXCEPT FOR M/T MODELS : Description

INFOID:000000006956556

ECM receives vehicle speed signals from two different paths via CAN communication line: One is from the ABS actuator and electric unit (control unit) via the combination unit and the other is from TCM.

### EXCEPT FOR M/T MODELS : DTC Logic

INFOID:000000006956557

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "DTC Logic"](#).

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0500	VEH SPEED SEN/CIRC (Vehicle speed sensor)	At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a output speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	<ul style="list-style-type: none"><li>• Harness or connector (The CAN communication line is open or shorted.)</li><li>• Combination meter</li><li>• ABS actuator and electric unit (control unit)</li><li>• Wheel sensor</li><li>• TCM</li><li>• Output speed sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 10 V or more at idle.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. Drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more.

#### 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.

4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-319, "EXCEPT FOR M/T MODELS : Diagnosis Procedure"](#)  
NO >> INSPECTION END

### EXCEPT FOR M/T MODELS : Diagnosis Procedure

INFOID:000000006956558

#### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-97, "CONSULT-III Function \(TRANSMISSION\)"](#).

# P0500 VSS

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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)

Check DTC with ABS actuator and electric unit (control unit). Refer to [BRC-23, "CONSULT-III Function"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

## 3.CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble shooting relevant to DTC indicated.

## 4.CHECK OUTPUT SPEED SENSOR

Check output speed sensor. Refer to [TM-115, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace or replace error-detected parts.

## 5.CHECK WHEEL SENSOR

Check wheel sensor. Refer to [BRC-41, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace or replace error-detected parts.

## M/T MODELS

### M/T MODELS : Description

INFOID:000000006503894

The vehicle speed signal is sent to the combination meter from the "ABS actuator and electric unit (control unit)" via the CAN communication line. The combination meter then sends a signal to the ECM via the CAN communication line.

### M/T MODELS : DTC Logic

INFOID:000000006503895

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The vehicle speed signal sent to ECM is almost 0 km/h (0 MPH) even when vehicle is being driven.	<ul style="list-style-type: none"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (The vehicle speed signal circuit is open or shorted)</li><li>• Wheel sensor</li><li>• Combination meter</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.



< DTC/CIRCUIT DIAGNOSIS >

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 SIGNAL

**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 4.

NO >> Go to [EC-322, "M/T MODELS : Diagnosis Procedure"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Select "DATA MONITOR" mode with CONSULT-III.
2. Warm engine 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	2,200 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.0 - 31.8 msec
Selector lever	Except Neutral position
PW/ST SIGNAL	OFF

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-322, "M/T MODELS : Diagnosis Procedure"](#).

NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-321, "M/T MODELS : Component Function Check"](#). Use component function check to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-322, "M/T MODELS : Diagnosis Procedure"](#).

M/T MODELS : Component Function Check

INFOID:000000006503896

1. PERFORM COMPONENT FUNCTION CHECK

 With GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed signal in Service \$01 with GST.  
The vehicle speed signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

YES >> INSPECTION END

## P0500 VSS

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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NO >> Go to [EC-322, "M/T MODELS : Diagnosis Procedure"](#).

### M/T MODELS : Diagnosis Procedure

INFOID:000000006503897

#### 1.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

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Refer to [BRC-23, "CONSULT-III Function"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

#### 2.CHECK COMBINATION METER

---

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

# P0506 ISC SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0506 ISC SYSTEM

### Description

INFOID:000000006503898

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:000000006503899

#### 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"><li>• Electric throttle control actuator</li><li>• Intake air leak</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform **EC-25, "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 11 V 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-323, "Diagnosis Procedure"**.

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503900

##### 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.
2. Replace ECM.

## P0506 ISC SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

3. Perform [EC-22. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

# P0507 ISC SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0507 ISC SYSTEM

### Description

INFOID:000000006503901

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:000000006503902

#### 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"><li>• Electric throttle control actuator</li><li>• Intake air leak</li><li>• PCV system</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform [EC-25, "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 11 V 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-325, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503903

##### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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Is intake air leak detected?

YES >> Discover air leak location and repair.

NO >> GO TO 3.

### 3.REPLACE ECM

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1. Stop engine.
2. Replace ECM.
3. Perform [EC-22. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

# P050A, P050E COLD START CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P050A, P050E COLD START CONTROL

### Description

INFOID:000000006953465

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

### DTC Logic

INFOID:000000006953466

### DTC DETECTION LOGIC

#### NOTE:

If DTC P050A or P050E is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up condition.	<ul style="list-style-type: none"><li>Lack of intake air volume</li><li>Fuel injection system</li><li>ECM</li></ul>
P050E	Cold start engine exhaust temperature too low	The temperature of the catalyst inlet does not rise to the proper temperature when the engine is started with pre-warming up condition.	

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

##### 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 the indication of "COOLAN TEMP/S".

##### With GST

Follow the procedure "With CONSULT-III" above.

Is the value of "COOLAN TEMP/S" between 4°C (59°F) and 36°C (97°F)?

YES >> GO TO 3.

NO-1 [If it is below 4°C (59°F)]>>Warm up the engine until the value of "COOLAN TEMP/S" reaches 4°C (59°F) or more. Retry from step 1.

NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.

#### 3. PERFORM DTC CONFIRMATION PROCEDURE-II

##### With CONSULT-III

- Set the select lever in N range.
- Start the engine and warm up in idle with the value of "COOLAN TEMP/S" between 4°C (59°F) and 40°C (104°F) for more than 15 seconds.
- Check 1st trip DTC.

##### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-328. "Diagnosis Procedure"](#).

# P050A, P050E COLD START CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006953467

### 1.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-25, "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
- Clogging of throttle body

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-220, "DTC Logic"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to [EC-221, "Diagnosis Procedure"](#) for DTC P0171.

### 4.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC Confirmation Procedure.  
See [EC-327, "DTC Logic"](#).

Is the 1st trip DTC P050A or P050E displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

### 5.REPLACE ECM

1. Replace ECM.
2. Go to [EC-22, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

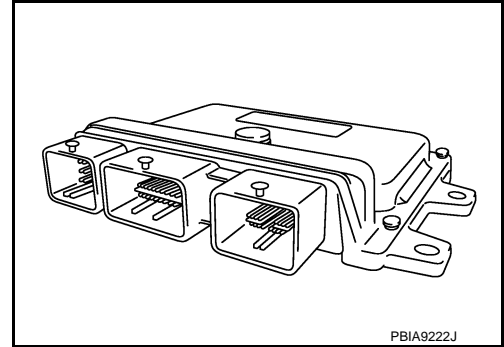


P0605 ECM

Description

INFOID:000000006503904

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



P8IA9222J

DTC Logic

INFOID:000000006503905

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-330, "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-330, "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-330, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## P0605 ECM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

### Diagnosis Procedure

INFOID:000000006503906

#### 1.INSPECTION START

---

1. Turn ignition switch ON.
2. Erase 1st trip DTC. Refer to [EC-114, "On Board Diagnosis Function"](#) or [EC-117, "CONSULT-III Function"](#).
3. Perform DTC CONFIRMATION PROCEDURE. Refer to [EC-329, "DTC Logic"](#).

Is the 1st trip DTC P0605 displayed again?

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

#### 2.REPLACE ECM

---

1. Replace ECM.
2. Perform [EC-22, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0607 ECM

Description

INFOID:000000006503907

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:000000006503908

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-331, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006503909

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC. Refer to [EC-114, "On Board Diagnosis Function"](#) or [EC-117, "CONSULT-III Function"](#).
3. Perform DTC CONFIRMATION PROCEDURE. Refer to [EC-331, "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. Perform [EC-22, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

# P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P0643 SENSOR POWER SUPPLY

### DTC Logic

INFOID:000000006503910

### 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"><li>• 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.]</li><li>• Accelerator pedal position sensor</li><li>• Throttle position sensor</li><li>• Battery current sensor</li><li>• Power steering pressure sensor</li><li>• Camshaft position sensor (PHASE)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

YES >> Go to [EC-332, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503911

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
E110	4	Ground	Approx. 5 V

#### Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

# P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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
F8	72	Electric throttle control actuator	F29	2
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.

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

## 4.CHECK COMPONENTS

Check the following.

- Camshaft position sensor (PHASE) (Refer to [EC-252, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

## 5.CHECK TP SENSOR

Refer to [EC-177, "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. Perform [EC-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> INSPECTION END

## 7.CHECK APP SENSOR

Refer to [EC-393, "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. Perform [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 9.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0850 PNP SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## P0850 PNP SWITCH

### Description

INFOID:000000006503912

For CVT models, transmission range switch is turn ON when the selector lever is P or N.  
For M/T models, park/neutral position (PNP) range switch is ON when the selector lever is Neutral position.  
ECM detects the position because the continuity of the line (the ON) exists.

### DTC Logic

INFOID:000000006503913

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850	Park/neutral position switch	For CVT models, the signal of transmission range switch is not changed in the process of engine starting and driving. For M/T models, 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"><li>• Harness or connectors [The transmission range switch circuit is open or shorted.(CVT models)] [The park/neutral position (PNP) switch circuit is open or shorted.(M/T models)]</li><li>• Transmission range switch (CVT models)</li><li>• Park/neutral position (PNP) switch (M/T models)</li></ul>

### 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.

Selector lever position	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-335. "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 60 consecutive seconds.

##### **CAUTION:**

**Always drive vehicle at a safe speed.**

# P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ENG SPEED	1,200 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.5 - 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-335, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## 5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-335, "Component Function Check"](#).

### NOTE:

Use component function check the overall function of the transmission range switch circuit (CVT models) or the park/neutral position (PNP) switch circuit (M/T models). During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-335, "Diagnosis Procedure"](#).

## Component Function Check

INFOID:0000000006503914

### 1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground under the following conditions.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	14 (PNP signal)	Ground	P or N (CVT) Neutral (M/T)	Approx. 0 V
			Except above	Battery voltage

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-335, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:0000000006503915

### 1.CHECK TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T) POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect transmission range switch (CVT) or park/neutral position (PNP) switch (M/T) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between transmission range switch (CVT) or PNP switch (M/T) harness connector and ground.

CVT models

Transmission range switch		Ground	Voltage
Connector	Terminal		
F21	1	Ground	Battery voltage

# P0850 PNP SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

M/T models

PNP switch (M/T)		Ground	Voltage
Connector	Terminal		
F23	2	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 E8, F1
- Harness connectors E105, M77 (M/T)
- IPDM E/R harness connector E14 (CVT)
- 10 A fuse (No. 3) (M/T)
- 10 A fuse (No. 56) (CVT)
- Harness for open or short between PNP switch and fuse (M/T)

Is the inspection result normal?

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

## 3.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 transmission range switch (CVT) or PNP switch (M/T) harness connector and ECM harness connector.

CVT models

Transmission range switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F21	2	F7	14	Existed

M/T models

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F23	3	F7	14	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 TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T)

Refer to [TM-108. "Component Inspection \(Transmission Range Switch\)"](#) (CVT) or [TM-8. "PARK/NEUTRAL POSITION \(PNP\) SWITCH : Component Inspection"](#) (M/T).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace transmission range switch (CVT) or PNP switch (M/T). Refer to [TM-210. "Exploded View"](#) (CVT) or [TM-22. "Exploded View"](#) (M/T).

## 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END



# P1148 CLOSED LOOP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1148 CLOSED LOOP CONTROL

### DTC Logic

INFOID:000000006503916

### 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"><li>• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li><li>• A/F sensor 1</li><li>• A/F sensor 1 heater</li></ul>
		The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	

A

EC

C

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# P1212 TCS COMMUNICATION LINE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1212 TCS COMMUNICATION LINE

### Description

INFOID:000000006503917

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:000000006503918

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-139, "DTC Logic"](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Harness or connectors (The CAN communication line is open or shorted.)</li><li>• ABS actuator and electric unit (control unit)</li><li>• Dead (Weak) battery</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

##### 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-338, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503919

Go to [GI-37, "Work Flow"](#).

# P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1217 ENGINE OVER TEMPERATURE

### DTC Logic

INFOID:000000006503920

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Cooling fan does not operate properly (Overheat).</li><li>• Cooling fan system does not operate properly (Overheat).</li><li>• Engine coolant was not added to the system using the proper filling method.</li><li>• Engine coolant is not within the specified range.</li></ul>	<ul style="list-style-type: none"><li>• Harness or connectors (The cooling fan circuit is open or shorted.)</li><li>• IPDM E/R (Cooling fan relay-1)</li><li>• Cooling fan relays-2 and -3</li><li>• Cooling fan motor</li><li>• Radiator hose</li><li>• Radiator</li><li>• Radiator cap</li><li>• Reservoir tank</li><li>• Water pump</li><li>• Thermostat</li><li>• Water control valve</li></ul>

##### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-9, "Draining"](#). Also, replace the engine oil. Refer to [LU-8, "Refilling"](#).

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-11, "Anti-Freeze Coolant Mixture Ratio"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

#### DTC CONFIRMATION PROCEDURE

##### 1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-339, "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-340, "Diagnosis Procedure"](#).

#### Component Function Check

INFOID:000000006503921

##### 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

[MR18DE (EXCEPT FOR CALIFORNIA)]

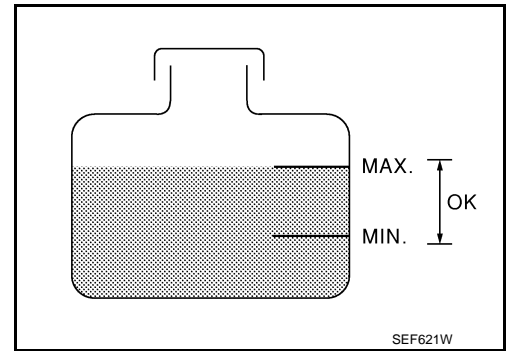
## < DTC/CIRCUIT DIAGNOSIS >

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-340, "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-340, "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 motor operates at each speed (LOW/HI).

### Without CONSULT-III

Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Go to [EC-340, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503922

## 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 motor operates at each speed (LOW/HI).

### Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#).
2. Make sure that cooling fan motor operates at each speed (Low/High).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Go to [EC-414, "Diagnosis Procedure"](#).

## 2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to [CO-9, "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 (Refer to [CO-25, "Inspection"](#).)
- Radiator (Refer to [CO-17, "Inspection"](#).)
- Water pump (Refer to [CO-20, "Inspection"](#).)

# P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> Repair or replace malfunctioning part.

## 4. CHECK RADIATOR CAP

Check radiator cap. Refer to [CO-13, "RADIATOR CAP : Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap. Refer to [CO-15, "Exploded View"](#).

## 5. CHECK THERMOSTAT

Check thermostat. Refer to [CO-23, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat. Refer to [CO-22, "Removal and Installation"](#).

## 6. CHECK WATER CONTROL VALVE

Check water control valve. Refer to [CO-26, "Water Control Valve"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace water control valve. Refer to [CO-24, "Exploded View"](#).

## 7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-171, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

## 8. 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"> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No blocking	—
	2	<ul style="list-style-type: none"> <li>Coolant mixture</li> </ul>	<ul style="list-style-type: none"> <li>Coolant tester</li> </ul>	<a href="#">MA-11, "Anti-Freeze Coolant Mixture Ratio"</a>	
	3	<ul style="list-style-type: none"> <li>Coolant level</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Coolant up to MAX level in reservoir tank and radiator filler neck	<a href="#">CO-9, "Inspection"</a>
	4	<ul style="list-style-type: none"> <li>Radiator cap</li> </ul>	<ul style="list-style-type: none"> <li>Pressure tester</li> </ul>	<a href="#">CO-13, "RADIATOR CAP : Inspection"</a>	
ON*2	5	<ul style="list-style-type: none"> <li>Coolant leaks</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No leaks	<a href="#">CO-9, "Inspection"</a>
ON*2	6	<ul style="list-style-type: none"> <li>Thermostat</li> </ul>	<ul style="list-style-type: none"> <li>Touch the upper and lower radiator hoses</li> </ul>	Both hoses should be hot	<a href="#">CO-23, "Inspection"</a>
ON*1	7	<ul style="list-style-type: none"> <li>Cooling fan motor</li> </ul>	<ul style="list-style-type: none"> <li>CONSULT-III</li> </ul>	Operating	<a href="#">EC-414, "Component Function Check"</a>
OFF	8	<ul style="list-style-type: none"> <li>Combustion gas leak</li> </ul>	<ul style="list-style-type: none"> <li>Color checker chemical tester 4 Gas analyzer</li> </ul>	Negative	—
ON*3	9	<ul style="list-style-type: none"> <li>Coolant temperature gauge</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> <li>Coolant overflow to reservoir tank</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No overflow during driving and idling	<a href="#">CO-9, "Inspection"</a>
OFF*4	10	<ul style="list-style-type: none"> <li>Coolant return from reservoir tank to radiator</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Should be initial level in reservoir tank	<a href="#">CO-9, "Inspection"</a>

# P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	11	<ul style="list-style-type: none"><li>• Cylinder head</li></ul>	<ul style="list-style-type: none"><li>• Straight gauge feeler gauge</li></ul>	0.1 mm (0.004 in) Maximum distortion (warping)	<a href="#">EM-68, "Disassembly and Assembly"</a>
	12	<ul style="list-style-type: none"><li>• Cylinder block and pistons</li></ul>	<ul style="list-style-type: none"><li>• Visual</li></ul>	No scuffing on cylinder walls or piston	<a href="#">EM-96, "Inspection"</a>

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-4, "Troubleshooting Chart"](#).

>> INSPECTION END

# P1225 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

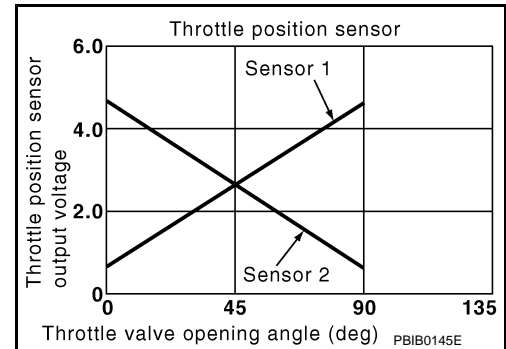
## P1225 TP SENSOR

### Description

INFOID:000000006503923

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

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



### DTC Logic

INFOID:000000006503924

#### 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 10 V 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-343, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503925

##### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-24, "Exploded View"](#).

# P1225 TP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

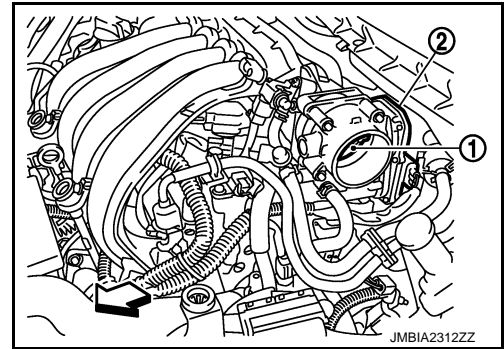
< DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



## 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-344, "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503926

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END



# P1226 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

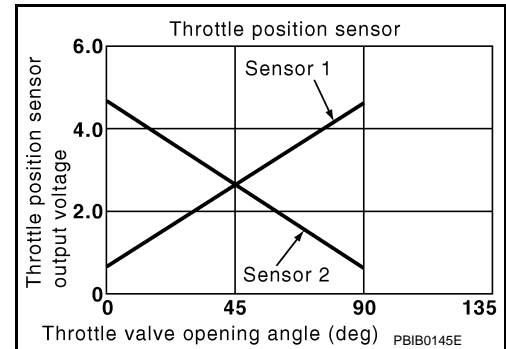
## P1226 TP SENSOR

### Description

INFOID:000000006503927

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

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



### DTC Logic

INFOID:000000006503928

#### 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 10 V 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-345, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503929

##### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-24, "Exploded View"](#).

# P1226 TP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

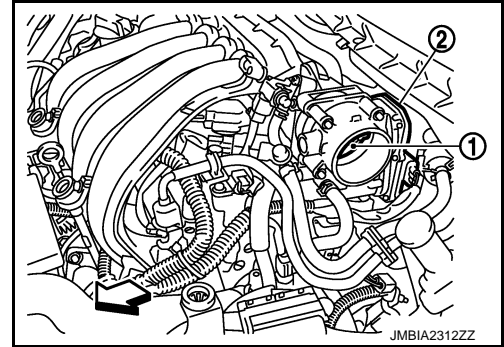
< DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



## 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-346, "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503930

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1550 BATTERY CURRENT SENSOR

### Description

INFOID:000000006503934

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006503935

#### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• EVAP control system pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-348. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

INFOID:00000006503936

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	74	Refrigerant pressure sensor	E49	1
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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-249. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437. "Diagnosis Procedure"](#).)

# P1550 BATTERY CURRENT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace malfunctioning components.

## 6. CHECK APP SENSOR

Refer to [EC-393, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> GO TO 7.

## 7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 8. 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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9. 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	
F53	3	F8	57	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10. CHECK BATTERY CURRENT SENSOR

Refer to [EC-349, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace battery negative cable assembly.

## 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:0000000006503937

## 1. CHECK BATTERY CURRENT SENSOR

# P1550 BATTERY CURRENT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

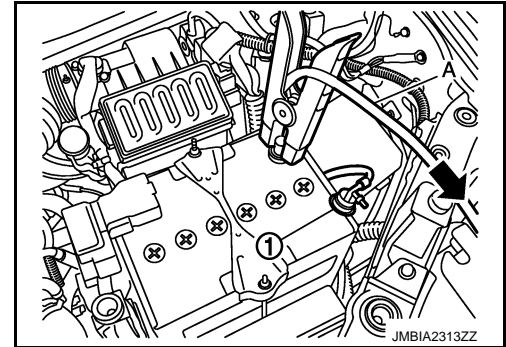
## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



Connector	ECM		Voltage
	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1551, P1552 BATTERY CURRENT SENSOR

### Description

INFOID:000000006503938

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006503939

#### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li></ul>
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 perform the following before conducting the next test.

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

#### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON**

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-352. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Diagnosis Procedure

INFOID:000000006503940

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	74	Refrigerant pressure sensor	E49	1
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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-249. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437. "Diagnosis Procedure"](#).)



# P1551, P1552 BATTERY CURRENT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace malfunctioning components.

## 6. CHECK APP SENSOR

Refer to [EC-393, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> GO TO 7.

## 7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 8. 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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9. 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	
F53	3	F8	57	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10. CHECK BATTERY CURRENT SENSOR

Refer to [EC-353, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace battery negative cable assembly.

## 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:0000000006503941

## 1. CHECK BATTERY CURRENT SENSOR

# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

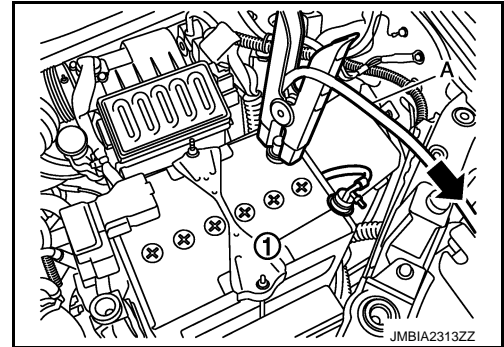
[MR18DE (EXCEPT FOR CALIFORNIA)]

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



Connector	ECM		Voltage
	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1553 BATTERY CURRENT SENSOR

### Description

INFOID:000000006503942

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006503943

#### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-356. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006503944

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	74	Refrigerant pressure sensor	E49	1
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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-249. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437. "Diagnosis Procedure"](#).)

# P1553 BATTERY CURRENT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-393, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 8.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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9.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	
F53	3	F8	57	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-357, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:0000000006503945

## 1.CHECK BATTERY CURRENT SENSOR

# P1553 BATTERY CURRENT SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

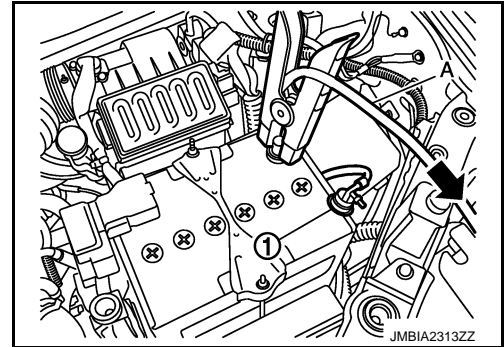
## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



Connector	ECM		Voltage
	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1554 BATTERY CURRENT SENSOR

### Description

INFOID:000000006503946

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006503947

#### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-359. "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-360. "Diagnosis Procedure"](#).

#### Component Function Check

INFOID:000000006503948

##### 1. PRECONDITIONING

#### TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 2.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 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 2,300 mV at least once.

### Without CONSULT-III

1. Start engine and let it idle.
2. Check the voltage between ECM harness connector and ground.

ECM			Voltage
Connector	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Above 2.3 V at least once

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Go to [EC-360, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006503949

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 4. CHECK SENSOR POWER SUPPLY CIRCUIT



# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E49	1
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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-249, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

## 6. CHECK APP SENSOR

Refer to [EC-393, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 7.

## 7. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Go to [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

## 8. 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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

YES >> GO TO 9.

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

## 9. 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.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Battery current sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F53	3	F8	57	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

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

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-362, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503950

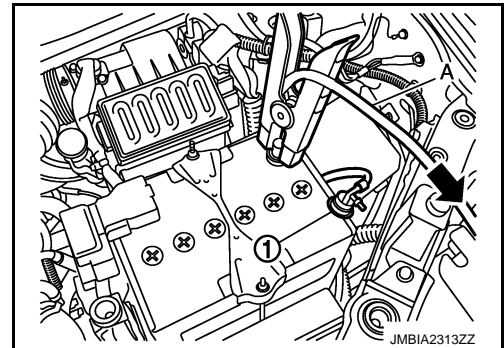
### 1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



Connector	ECM		Voltage
	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1564 ASCD STEERING SWITCH

### Description

INFOID:000000006503951

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-70, "System Description"](#) for the ASCD function.

### DTC Logic

INFOID:000000006503952

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-329, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	<ul style="list-style-type: none"><li>An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li><li>ECM detects that input signal from the ASCD steering switch is out of the specified range.</li><li>ECM detects that the ASCD steering switch is stuck ON.</li></ul>	<ul style="list-style-type: none"><li>Harness or connectors (The switch circuit is open or shorted.)</li><li>ASCD steering switch</li><li>ECM</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-363, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503953

##### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in [GI-44, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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 terminals.

ECM			Condition	Voltage
Connector	+	-		
	Terminal	Terminal		
E16	94 (ASCD steering switch signal)	95	MAIN switch: Pressed	Approx. 0V
			CANCEL 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 M352.
4. Check the continuity between combination switch and ECM harness connector.

Combination switch	ECM		Continuity
	Connector	Terminal	
Terminal			
16	E16	95	Existed

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

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> GO TO 4.

### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

# P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> 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 ECM harness connector and combination switch.

combination switch Terminal	ECM		Continuity
	Connector	Terminal	
13	E16	94	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

## 7. CHECK ASCD STEERING SWITCH

Refer to [EC-365. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch. Refer to [ST-8. "Exploded View"](#).

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503954

## 1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination switch		Condition	Resistance
Connector	Terminals		
M302	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. Refer to [ST-8. "Exploded View"](#).

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1572 ASCD BRAKE SWITCH

### Description

INFOID:000000006503955

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-70, "System Description"](#) for the ASCD function.

### DTC Logic

INFOID:000000006503956

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-329, "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"><li>• Harness or connectors (The stop lamp switch circuit is shorted.)</li><li>• Harness or connectors (The ASCD brake switch circuit is shorted.)</li><li>• Harness or connectors (The ASCD clutch switch circuit is shorted.)</li><li>• Stop lamp switch</li><li>• ASCD brake switch</li><li>• ASCD clutch switch</li><li>• Incorrect stop lamp switch installation</li><li>• Incorrect ASCD brake switch installation</li><li>• Incorrect ASCD clutch switch installation</li><li>• ECM</li></ul>
		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

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
3. 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.**

Vehicle speed	More than 30 km/h (19 mph)
Selector lever	Suitable position

4. Check DTC.

# P1572 ASCD BRAKE SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is DTC detected?

YES >> Go to [EC-367, "Diagnosis Procedure"](#).

NO >> GO TO 3.

## 3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

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.**

Vehicle speed	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 DTC.

Is DTC detected?

YES >> Go to [EC-367, "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006503957

### 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 terminals.

Connector	ECM		Condition	Voltage	
	+	-			
	Terminal	Terminal			
E16	100 (ASCD brake switch signal)	108	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.

NO >> GO TO 3.

### 2.CHECK OVERALL FUNCTION-II

#### With CONSULT-III

Select "BRAKE SW2" and check indication in "DATA MONITOR" mode with CONSULT-III.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal	Slightly depressed	ON
		Fully released	OFF

**⊗ Without CONSULT-III**

Check the voltage between ECM harness connector terminals.

ECM			Condition	Voltage	
Connector	+	-			
		Terminal	Terminal		
E16	99 (Stop lamp switch signal)	108	Brake pedal	Slightly depressed	Battery voltage
			Fully released	Approx. 0V	

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> GO TO 11.

### 3. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ASCD brake switch harness connector.
- Turn ignition switch ON.
- Check the voltage between ASCD brake switch harness connector and ground.

ASCD brake switch		Ground	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 9.  
NO-1 >> CVT models: GO TO 4.  
NO-2 >> M/T models: GO TO 5.

### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10 A fuse (No. 2)
- 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 CLUTCH SWITCH POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect ASCD clutch switch harness connector.
- Turn ignition switch ON.
- Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground	Voltage
Connector	Terminal		
E111	3	Ground	Battery voltage

Is the inspection result normal?

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



# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10 A fuse (No. 2)
- Harness for open or short between ASCD clutch switch and fuse

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

## 7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD clutch switch harness connector and ASCD brake switch harness connector.

ASCD clutch switch		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E111	4	E112	1	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 ground or short to power in harness or connectors.

## 8. CHECK ASCD CLUTCH SWITCH

Refer to [EC-371. "Component Inspection \(ASCD Clutch Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace ASCD clutch switch. Refer to [CL-10. "Exploded View".](#)

## 9. 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	
E112	2	E16	100	Existed

4. 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-370. "Component Inspection \(ASCD Brake Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace ASCD brake switch. Refer to [BR-17. "Exploded View".](#)

## 11. 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

## 12.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10A fuse (No.9)
- 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.

## 13.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	
E16	99	E114 (M/T) E115 (CVT)	2	Existed

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

Is the inspection result normal?

YES >> GO TO 15.

NG >> GO TO 14.

## 14.DETECT MALFUNCTIONING PART

Check the following.

- 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.

## 15.CHECK STOP LAMP SWITCH

Refer to [EC-371, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

## 16.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (ASCD Brake Switch)

INFOID:000000006503958

### 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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-7, "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. Refer to [BR-17, "Exploded View"](#).

## Component Inspection (ASCD Clutch Switch)

INFOID:000000006503959

### 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 [BR-7, "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. Refer to [CL-10, "Exploded View"](#).

## Component Inspection (Stop Lamp Switch)

INFOID:000000006503960

### 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly de-pressed	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-7, "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 de-pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

# P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1574 ASCD VEHICLE SPEED SENSOR

### Description

INFOID:000000006503961

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-70, "System Description"](#) for ASCD functions.

### DTC Logic

INFOID:000000006503962

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-139, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-320, "M/T MODELS : DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-329, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "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"><li>• Harness or connectors (The CAN communication line is open or shorted.)</li><li>• ABS actuator and electric unit (control unit)</li><li>• TCM</li><li>• ECM</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-373, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503963

#### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-96, "Diagnosis Description"](#).

Is DTC detected?

NO >> GO TO 2.

YES >> Perform trouble shooting relevant to DTC indicated.

## P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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### 2. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

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Refer to [BRC-23. "CONSULT-III Function"](#).

Is DTC detected?

NO >> INSPECTION END

YES >> Perform trouble shooting relevant to DTC indicated.

# P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1715 INPUT SPEED SENSOR

### Description

INFOID:000000006503964

ECM receives input shaft revolution signal from TCM via the CAN communication line. ECM uses this signal for engine control.

### DTC Logic

INFOID:000000006503965

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1715 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to [EC-246, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0340, first perform the trouble diagnosis for DTC P0340. Refer to [EC-250, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-329, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-331, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (TCM output)	Input shaft revolution signal is different from the theoretical value calculated by ECM from output shaft revolution signal and engine rpm signal.	<ul style="list-style-type: none"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (Primary speed sensor circuit is open or shorted)</li><li>• TCM</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-375, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503966

##### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-97, "CONSULT-III Function \(TRANSMISSION\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

##### 2. REPLACE TCM

Replace TCM. Refer to [TM-229, "Removal and Installation"](#).

# P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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>> INSPECTION END



# P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P1805 BRAKE SWITCH

### Description

INFOID:000000006503967

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:000000006503968

### 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"> <li>• Harness or connectors (Stop lamp switch circuit is open or shorted.)</li> <li>• Stop lamp switch</li> </ul>

### 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.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-377, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503969

#### 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. 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		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

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

#### 3. DETECT MALFUNCTIONING PART

Check the following.

# P1805 BRAKE SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Harness connectors E105, M77
- 10 A fuse (No. 9)
- 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	
E16	99	E114 (M/T) E115 (CVT)	2	Existed

3. 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 STOP LAMP SWITCH

Refer to [EC-378, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

### 6. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (Stop Lamp Switch)

INFOID:000000006503970

### 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-7, "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?

# P1805 BRAKE SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

A

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# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2100, P2103 THROTTLE CONTROL MOTOR RELAY

### Description

INFOID:000000006503971

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:000000006503972

### 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"><li>• Harness or connectors (Throttle control motor relay circuit is open)</li><li>• Throttle control motor relay</li></ul>
P2103	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	<ul style="list-style-type: none"><li>• Harness or connectors (Throttle control motor relay circuit is shorted)</li><li>• Throttle control motor relay</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

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-380, "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-380, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503973

#### 1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

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

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

## OK or NG

- OK >> GO TO 5.
- NG >> GO TO 2.

## 2.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

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

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	15	E15	57	Existed

4. 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 E8, F1
- 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.

## 4.CHECK FUSE

1. Disconnect 15 A fuse (No. 64) from IPDM E/R.
2. Check 15 A fuse for blown.

### Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace 15 A fuse.

## 5.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch: OFF	Approximately 0 V
			Ignition switch: ON	Battery voltage

## OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.

## 6.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	2	E15	54	Existed

5. 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 E8, F1
- 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.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY).
- NO >> Repair or replace harness or connectors.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### Description

INFOID:000000006503974

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. ECM controls the throttle valve opening angle in response to driving condition via the throttle control motor.

### DTC Logic

INFOID:000000006503975

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P2101 is displayed with DTC P2100, first perform the trouble diagnosis for DTC P2100. Refer to [EC-380, "DTC Logic"](#).
- If DTC P2101 is displayed with DTC P2119, first perform the trouble diagnosis for DTC P2119. Refer to [EC-389, "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"><li>• Harness or connectors (Throttle control motor circuit is open or shorted)</li><li>• Electric throttle control actuator</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to [EC-383, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006503976

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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 under the following conditions.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch: OFF	Approx. 0 V
			Ignition switch: ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 3.

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

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	57	F7	15	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 E8, F8
- 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.

## 5. 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	
E15	54	F7	2	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 E8, F1
- 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.

## 7. CHECK FUSE

1. Disconnect 15 A fuse (No. 64) from IPDM E/R.
2. Check 15 A fuse for blown.

Is the inspection result normal?



# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 8.  
NO >> Replace 15 A fuse.

## 8.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY).  
NO >> Repair or replace harness or connectors.

## 9.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.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

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

Is the inspection result normal?

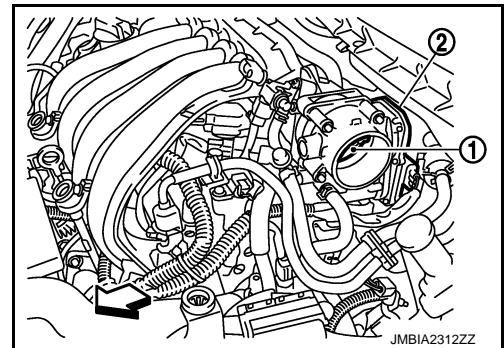
- YES >> GO TO 10.  
NO >> Repair or replace.

## 10.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct. Refer to [EM-24, "Exploded View"](#).
2. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



## 11.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-386, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 12.  
NO >> GO TO 13.

## 12.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> GO TO 13.  
NO >> Repair or replace harness or connectors.

## 13.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace malfunction electric throttle control actuator.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

2. Perform [EC-386, "Special Repair Requirement"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503977

### 1. CHECK THROTTLE CONTROL MOTOR

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Check the resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 $\Omega$ [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. Perform [EC-386, "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503978

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P2118 THROTTLE CONTROL MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2118 THROTTLE CONTROL MOTOR

### Description

INFOID:000000006503979

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. ECM controls the throttle valve opening angle in response to driving conditions via the throttle control motor.

### DTC Logic

INFOID:000000006503980

### 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"><li>Harness or connectors (Throttle control motor circuit is shorted.)</li><li>Electric throttle control actuator (Throttle control motor)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> 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-387, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503981

#### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

# P2118 THROTTLE CONTROL MOTOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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-388, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 5.

## 4.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "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. Perform [EC-388, "Special Repair Requirement"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503982

### 1.CHECK THROTTLE CONTROL MOTOR

1. Turn ignition switch OFF.

2. Disconnect electric throttle control actuator harness connector.

3. Check the resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 $\Omega$ [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. Perform [EC-386, "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503983

### 1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2.PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### Description

INFOID:000000006503984

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 feeds the voltage signal to the ECM. The ECM judges the current opening angle of the throttle valve and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.

### DTC Logic

INFOID:000000006503985

### 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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set selector 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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set selector 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-389, "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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set selector lever to 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-389, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503986

#### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-24, "Exploded View"](#).

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

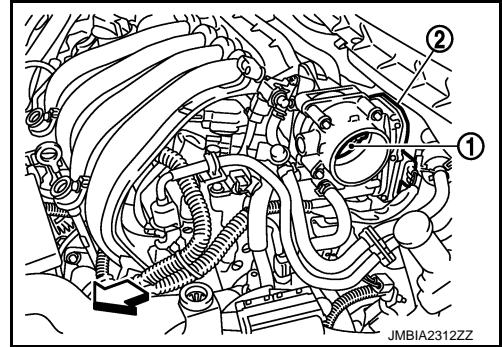
[MR18DE (EXCEPT FOR CALIFORNIA)]

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



### 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-390, "Special Repair Requirement"](#).

>> INSPECTION END

### Special Repair Requirement

INFOID:000000006503987

#### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

#### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2122, P2123 APP SENSOR

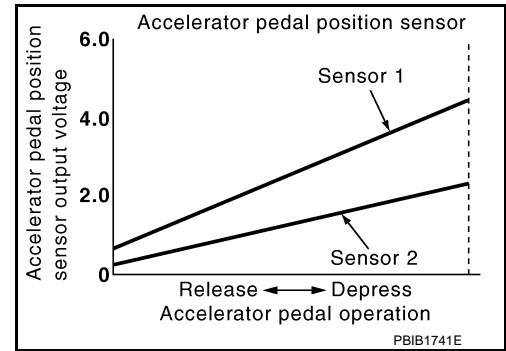
### Description

INFOID:000000006503988

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

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

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



### DTC Logic

INFOID:000000006503989

#### 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-332, "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"> <li>Harness or connectors (APP sensor 1 circuit is open or shorted.)</li> </ul>
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>Accelerator pedal position sensor (APP sensor 1)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

##### Is DTC detected?

- YES >> Go to [EC-391, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503990

##### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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

- Disconnect accelerator pedal position (APP) sensor harness connector.

## P2122, P2123 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
E110	2	E16	111	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	
E110	3	E16	110	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-393, "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. Perform [EC-393, "Special Repair Requirement"](#).

>> INSPECTION END

### 7.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END



# P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006503991

### 1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

### 2. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-393. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503992

### 1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-24. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

### 3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

# P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2127, P2128 APP SENSOR

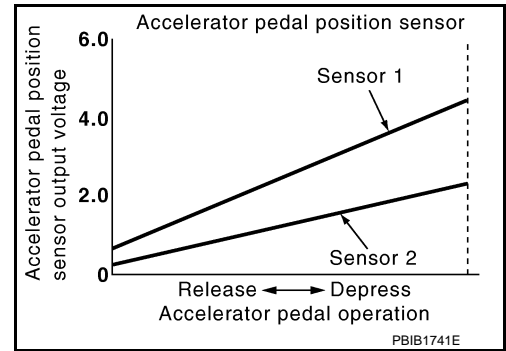
### Description

INFOID:000000006503993

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

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

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



### DTC Logic

INFOID:000000006503994

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.)</li> <li>• Accelerator pedal position sensor (APP sensor 2)</li> <li>• Crankshaft position sensor (POS)</li> <li>• Refrigerant pressure sensor</li> <li>• EVAP control system pressure sensor</li> <li>• Battery current sensor</li> </ul>
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 8 V at idle.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> Go to [EC-394, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006503995

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

# P2127, P2128 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT 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		
E110	5	Ground	Approx. 5 V

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	
E110	5	E16	102	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 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
F8	74	Refrigerant pressure sensor	E17	3
	75	CKP sensor (POS)	F15	1
	76	EVAP control system pressure sensor	B104	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E12	5

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-249, "Component Inspection".](#))
- EVAP control system pressure sensor (Refer to [EC-290, "Component Inspection".](#))
- Refrigerant pressure sensor (Refer to [EC-437, "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.

## P2127, P2128 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

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	
E110	1	E16	104	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	
E110	6	E16	103	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-396. "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. Perform [EC-397. "Special Repair Requirement"](#).

>> INSPECTION END

### 10.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006503996

### 1.CHECK ACCELERATOR PEDAL POSITION SENSOR

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

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

# P2127, P2128 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

## 2. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-404, "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006503997

### 1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-24, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

### 3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

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# P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

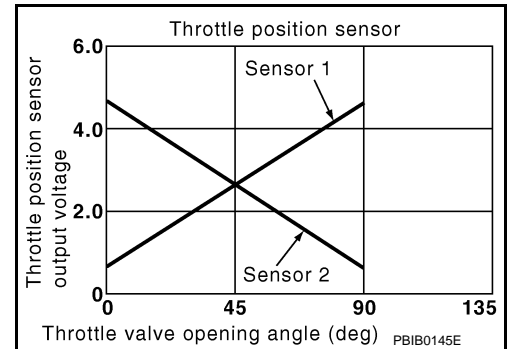
## P2135 TP SENSOR

### Description

INFOID:000000006503998

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

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



### DTC Logic

INFOID:000000006503999

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-332, "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"><li>Harness or connector (TP sensor 1 or 2 circuit is open or shorted.)</li><li>Electric throttle control actuator (TP sensor 1 or 2)</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-398, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006504000

##### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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

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

# P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

## 3.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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

## 4.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	
F29	1	F8	33	Existed
	3		34	

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-400, "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. Perform [EC-400, "Special Repair Requirement"](#).

>> INSPECTION END

## 7.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006504001

### 1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
			Fully de- pressed	Less than 4.75V	
	34 (TP sensor 2 signal)		Fully released	Less than 4.75V	
			Fully de- pressed	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. Perform [EC-400. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006504002

### 1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END



# P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## P2138 APP SENSOR

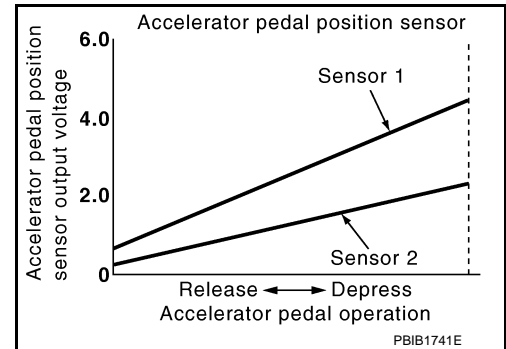
### Description

INFOID:000000006504003

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

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

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



### DTC Logic

INFOID:000000006504004

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-332, "DTC Logic"](#).

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

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

##### Is DTC detected?

- YES >> Go to [EC-402, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

# P2138 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006504005

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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		
E110	4	Ground	Approx. 5 V

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

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5 V

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	
E110	4	E16	106	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 SENSOR POWER SUPPLY CIRCUIT

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

# P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	74	Refrigerant pressure sensor	E17	3
	75	CKP sensor (POS)	F15	1
	76	EVAP control system pressure sensor	B104	3
	77	Battery current sensor	F53	1
E16	102	APP sensor	E12	5

Is the inspection result normal?

YES >> GO TO 6.

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

## 6. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-249, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-290, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-437, "Diagnosis Procedure"](#).)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

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

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed
	1		104	

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

Is the inspection result normal?

YES >> GO TO 8.

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

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

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

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

Is the inspection result normal?

YES >> GO TO 9.

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

## 9. CHECK APP SENSOR

Refer to [EC-404, "Component Inspection"](#).

Is the inspection result normal?

# P2138 APP SENSOR

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 11.
- NO >> GO TO 10.

## 10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-404. "Special Repair Requirement"](#).

>> INSPECTION END

## 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006504006

### 1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

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

Is the inspection result normal?

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

### 2. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-404. "Special Repair Requirement"](#).

>> INSPECTION END

## Special Repair Requirement

INFOID:000000006504007

### 1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-24. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 2.

### 2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-24. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 3.

### 3. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-25. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

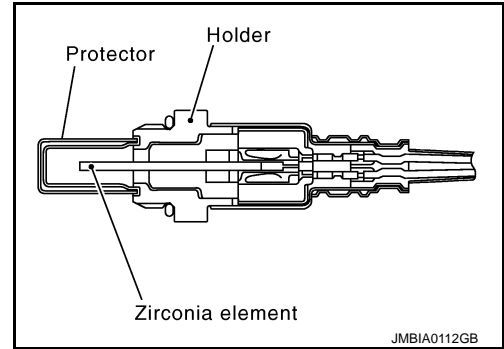
>> END

P2A00 A/F SENSOR 1

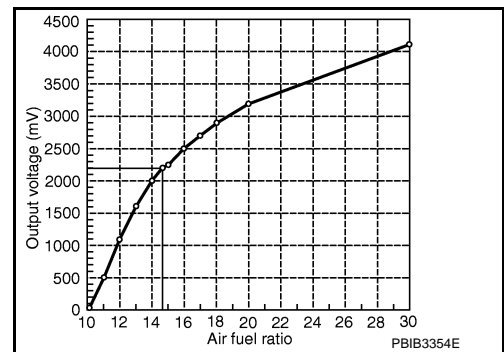
Description

INFOID:000000006504008

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006504009

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"> <li>The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.</li> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.</li> </ul>	<ul style="list-style-type: none"> <li>A/F sensor 1</li> <li>A/F sensor 1 heater</li> <li>Fuel pressure</li> <li>Fuel injector</li> <li>Intake air leaks</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear the mixture ratio self-learning value. Refer to [EC-27, "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.

# P2A00 A/F SENSOR 1

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-406, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006504010

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

### 2.CHECK HARNESS CONNECTOR

1. Disconnect A/F sensor 1 harness connector.
2. Check harness connector for water.

**Water should not exit.**

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace harness connector.

### 3.RETIGHTEN A/F SENSOR 1

1. Loosen and retighten the A/F sensor 1. Refer to [EM-30, "Exploded View"](#).

>> GO TO 4.

### 4.CHECK FOR INTAKE AIR LEAK

1. Reconnect A/F sensor 1 harness connector.
2. Start engine and run it at idle.
3. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

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

### 5.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-27, "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-220, "DTC Logic"](#) or [EC-224, "DTC Logic"](#).
- NO >> GO TO 6.

### 6.CHECK 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		
F50	4	Ground	Battery voltage

Is the inspection result normal?

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

# P2A00 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E15
- 10 A fuse (No. 61)
- 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	
F50	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F50	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-146, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

## 10. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "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. Refer to [EM-30, "Exploded View"](#).

### 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.

## P2A00 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- Before installing new sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved Anti-seize Lubricant (commercial service tool).

Do you have CONSULT-III?

YES >> GO TO 12.

NO >> GO TO 13.

### 12.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.

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-27, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ASCD BRAKE SWITCH

### Description

INFOID:000000006504011

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-70, "System Description"](#) for the ASCD function.

### Component Function Check

INFOID:000000006504012

#### 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 terminals.

Connector	ECM		Condition	Voltage	
	+	-			
	Terminal	Terminal			
E16	100 (ASCD brake switch signal)	108	Brake pedal (CVT)	Slightly depressed	Approx. 0 V
			Brake pedal and clutch pedal (M/T)	Fully released	Battery voltage

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Go to [EC-409, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504013

#### 1. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-I

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		
E112	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.  
 NO-1 >> CVT models: GO TO 2.  
 NO-2 >> M/T models: GO TO 3.

#### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77

# ASCD BRAKE SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- 10 A fuse (No. 2)
- 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.

### 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY 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	Voltage
Connector	Terminal		
E111	3	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 E105, M77
- 10 A fuse (No. 2)
- Harness for open or short between ASCD clutch switch and fuse

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

### 5. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD clutch switch harness connector and ASCD brake switch harness connector.

ASCD clutch switch		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E111	4	E112	1	Existed

4. 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 ASCD CLUTCH SWITCH

Refer to [EC-411, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Replace ASCD clutch switch. Refer to [CL-10, "Exploded View"](#).

### 7. 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	
E112	2	E16	100	Existed

# ASCD BRAKE SWITCH

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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 ASCD BRAKE SWITCH

Refer to [EC-411, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace ASCD brake switch. Refer to [BR-17, "Exploded View"](#).

## 9.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (ASCD Brake Switch)

INFOID:000000006504014

### 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-7, "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. Refer to [BR-17, "Exploded View"](#).

## Component Inspection (ASCD Clutch Switch)

INFOID:000000006504015

### 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

# ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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 [BR-7, "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 de-pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch. Refer to [CL-10, "Exploded View"](#).

# ASCD INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ASCD INDICATOR

### Description

INFOID:000000006504016

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-70. "System Description"](#) for the ASCD function.

### Component Function Check

INFOID:000000006504017

#### 1. ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD indicator	Condition		Specification
CRUISE LAMP	<ul style="list-style-type: none"><li>• Ignition switch: ON</li></ul>	<ul style="list-style-type: none"><li>• MAIN switch: Pressed at the 1st time → at the 2nd time</li></ul>	ON → OFF
SET LAMP	<ul style="list-style-type: none"><li>• MAIN switch: ON</li><li>• When vehicle speed: Between 40 km/h (25 MPH) and 190 km/h (118 MPH) (For the Middle East), 40 km/h (25 MPH) and 160 km/h (100 MPH) (Except for the Middle East)</li></ul>	<ul style="list-style-type: none"><li>• ASCD: Operating</li></ul>	ON
		<ul style="list-style-type: none"><li>• ASCD: Not operating</li></ul>	OFF

Is the inspection result normal?

YES >> INSPECTION END

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

### Diagnosis Procedure

INFOID:000000006504018

#### 1. CHECK DTC

Check that DTC U1001 is not displayed.

Is DTC detected?

NO >> GO TO 2.

YES >> Perform trouble diagnosis for DTC U1001. Refer to [EC-139. "DTC Logic"](#).

#### 2. CHECK COMBINATION METER OPERATION

Refer to [MWI-6. "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check combination meter circuit. Refer to [MWI-6. "METER SYSTEM : System Diagram"](#).

#### 3. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

# COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## COOLING FAN

### Description

INFOID:000000006504019

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 3-step control [HIGH/LOW/OFF].

### COOLING FAN MOTOR

Models without A/C

The cooling fan operates at each speed when the current flows in the cooling fan motor as per the following.

Cooling fan Speed	Cooling fan motor terminals	
	(+)	(-)
Low (LOW)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4

Models with A/C

The cooling fan operates at high (HI) speed when the current flows, and operates at low (LOW) speed when cooling fan motor and the resistor are circuited in series.

### Component Function Check

INFOID:000000006504020

#### 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. Touch "LOW" and "Hi" on the CONSULT-III screen.
4. Check that cooling fan operates at each speed.

##### Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#) or [PCS-41, "Diagnosis Description"](#).
2. Check that cooling fan operates at each speed.

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Refer to [EC-414, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504021

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

#### 2. CHECK COOLING FAN MOTOR CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check the continuity between IPDM E/R harness connector and cooling fan motor harness connector.

# COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

IPDM E/R		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	
E10	5	E62	1	Existed
	7		2	
E11	10		3	

3. Check the continuity between cooling fan motor harness connector and ground.

Cooling fan motor		Ground	Continuity
Connector	Terminal		
E62	4	Ground	Existed

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

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground

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

### 4. CHECK COOLING FAN MOTOR

Refer to [EC-415, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace cooling fan motor. Refer to [CO-18, "Exploded View"](#).

### 5. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "Intermittent Incident"](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY).
- NG >> Repair or replace harness or connector.

## Component Inspection

INFOID:000000006504022

### COOLING FAN MOTOR

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
		2	3
	High	1 and 2	3 and 4

**Cooling fan motor should operate.**

If NG, replace cooling fan motor. Refer to [CO-18, "Exploded View"](#).

# ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ELECTRICAL LOAD SIGNAL

### Description

INFOID:000000006504023

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication line.

### Component Function Check

INFOID:000000006504024

#### 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-416, "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-416, "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-416, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504025

#### 1. INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to [EC-416, "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-3, "Work Flow"](#).



# ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

>> INSPECTION END

A

## 3.CHECK HEADLAMP SYSTEM

Refer to [EXL-5. "Work Flow"](#).

EC

>> INSPECTION END

## 4.CHECK HEATER FAN CONTROL SYSTEM

Refer to [HA-3. "Work Flow"](#).

C

>> INSPECTION END

D

E

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# FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

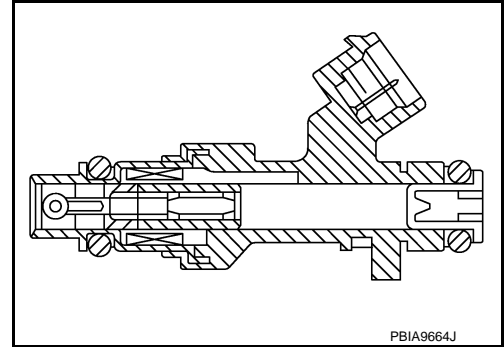
[MR18DE (EXCEPT FOR CALIFORNIA)]

## FUEL INJECTOR

### Description

INFOID:000000006504026

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:000000006504027

#### 1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to [EC-418, "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

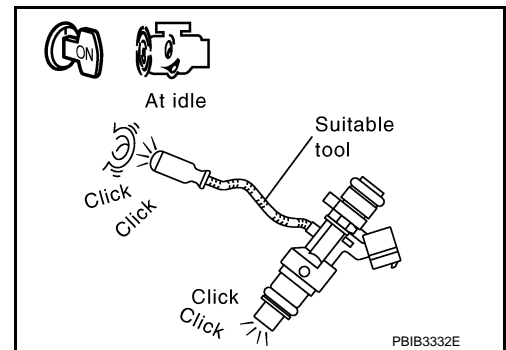
1. Let engine idle.
2. Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-418, "Diagnosis Procedure"](#).



### Diagnosis Procedure

INFOID:000000006504028

#### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	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 E15
- 15 A fuse (No. 62)
- 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	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

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-419, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Replace malfunctioning fuel injector. Refer to [EM-36, "Exploded View"](#).

## 5. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY).  
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

## Component Inspection

INFOID:000000006504029

## 1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.

## FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

3. Check resistance between fuel injector terminals as per the following.

Terminals	Resistance
1 and 2	11.1 - 14.5 $\Omega$ [at 10 - 60°C (50 - 140°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector. Refer to [EM-36, "Exploded View"](#).

# FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## FUEL PUMP

### Description

INFOID:000000006504030

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 start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
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:000000006504031

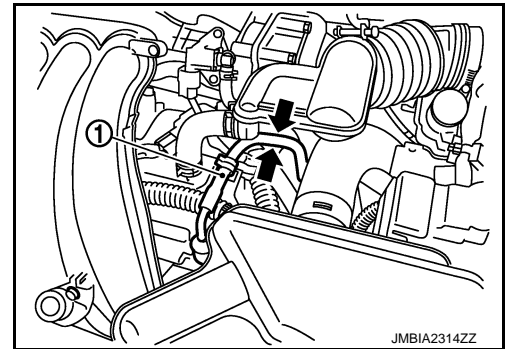
#### 1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose (1) with two fingers.

**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-421, "Diagnosis Procedure"](#).



### Diagnosis Procedure

INFOID:000000006504032

#### 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		
F7	23	Ground	Battery voltage

Is the inspection result normal?

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

#### 2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

# FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E13.
3. Turn ignition switch ON.
4. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E13	31	Ground	Battery voltage

Is the inspection result normal?

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

## 3.DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E8, F1
- 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.

## 4.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect "fuel level sensor unit and fuel pump" harness connector.
4. Turn ignition switch ON.
5. 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		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 5.

## 5.CHECK FUSE

1. Turn ignition switch OFF.
2. Disconnect 15 A fuse (No. 60) from IPDM E/R.
3. Check 15 A fuse.

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace 15 A fuse.

## 6.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E15.
2. Check the 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	
E15	55	B40	1	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> GO TO 7.

# FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M18
- Harness connectors M77, E105
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

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

## 8. 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		
B40	3	Ground	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

## 9. CHECK FUEL PUMP

Refer to [EC-423, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

## 10. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY).

NO >> Repair or replace harness or connectors.

## Component Inspection

INFOID:000000006504033

### 1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as per the following.

Terminals	Resistance
1 and 3	0.2 - 5.0 Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

# IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## IGNITION SIGNAL

### Description

INFOID:000000006504034

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:000000006504035

#### 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-424, "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.

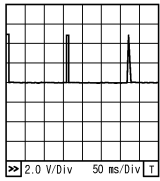
Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-424, "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		
F7	17	Ground	
	18		
	21		
	22		

#### NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-424, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504036

#### 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		
E16	105	Ground	Battery voltage



# IGNITION SIGNAL

[MR18DE (EXCEPT FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-134, "Diagnosis Procedure"](#).

### 2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect Condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

### 3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E43.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E14	44	F13	1	Existed

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

Is the inspection result normal?

YES >> Go to [EC-134, "Diagnosis Procedure"](#).

NO >> GO TO 4.

### 4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E43
- Harness for open or short between IPDM E/R and condenser

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

### 5.CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between Condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for 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 CONDENSER

Refer to [EC-428, "Component Inspection \(Condenser\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

# IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

NO >> Replace condenser.

## 7. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

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

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

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 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	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. 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 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	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

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 IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-427, "Component Inspection \(Ignition Coil with Power Transistor\)"](#).

Is the inspection result normal?

YES >> GO TO 11.

# IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

NO >> Replace malfunctioning ignition coil with power transistor. Refer to [EM-41, "Exploded View"](#).

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000006504037

### 1.CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as per the following.

Terminals	Resistance [ $\Omega$ at 25°C (77°F)]
1 and 2	Except 0 or $\infty$
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. Refer to [EM-41, "Exploded View"](#).

### 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:

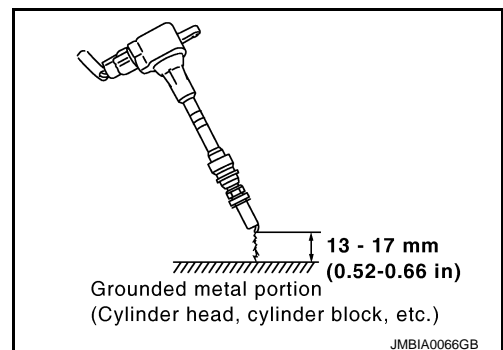
- During the operation, always stay 0.5 cm (19.7 in) away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 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



# IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

NO >> Replace malfunctioning ignition coil with power transistor. Refer to [EM-41, "Exploded View"](#).

## Component Inspection (Condenser)

INFOID:000000006504038

### 1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals as per the following.

Terminals	Resistance
1 and 2	Above 1 M $\Omega$ [at 25°C (77°F)]

#### Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace Condenser.

# MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## MALFUNCTION INDICATOR LAMP

### Description

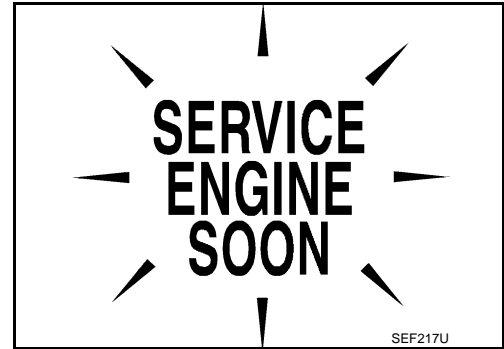
INFOID:000000006504039

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-113. "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp \(MIL\)"](#).



### Component Function Check

INFOID:000000006504040

#### 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-429. "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504041

#### 1. CHECK DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Perform trouble diagnosis for DTC UXXXX.

#### 2. CHECK DTC WITH METER

Refer to [MWI-30. "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-41. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace combination meter. Refer to [MWI-97. "Removal and Installation"](#).  
NO >> Repair or replace.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

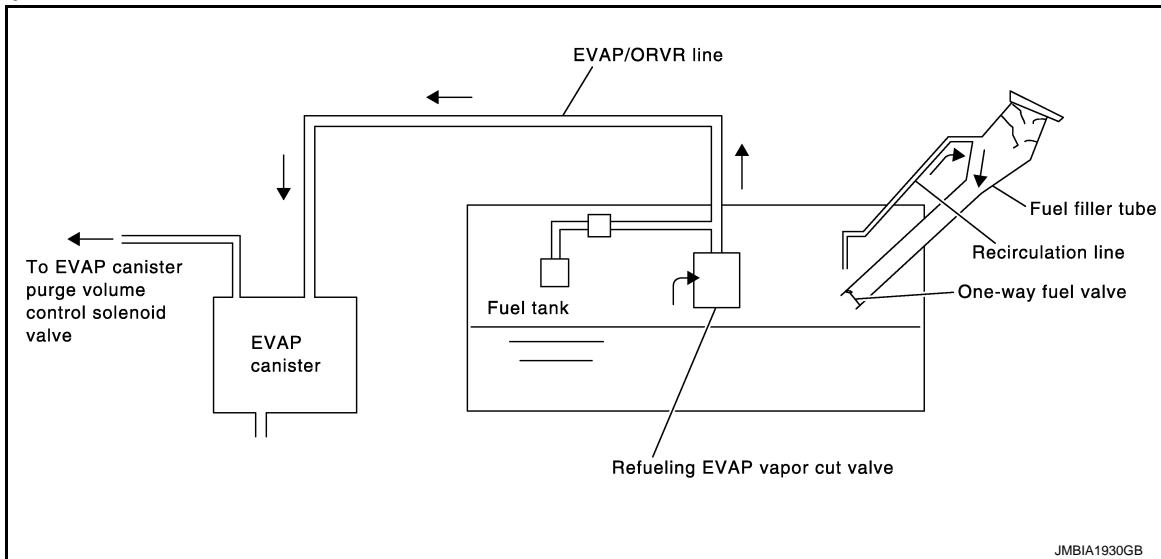
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### Description

INFOID:000000006504042



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 CO<sub>2</sub> 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-487, "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:000000006504043

#### 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-430, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006504044

#### 1. INSPECTION START

Check whether the following symptoms are present.

A: Fuel odor from EVAP canister is strong.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT 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 8.

## 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 1.9 kg (4.2 lb).**

Is the inspection result normal?

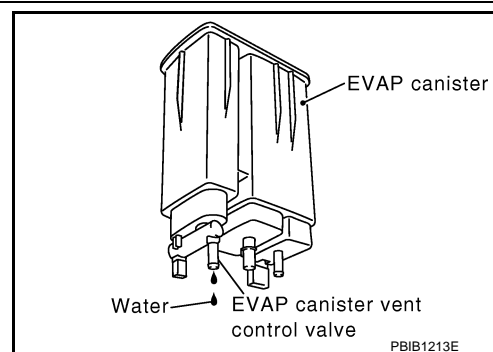
- YES >> GO TO 3.
- NO >> GO TO 4.

## 3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

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



## 4.REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 5.

## 5.CHECK DRAIN FILTER

Refer to [EC-435, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

- OK >> GO TO 6.
- NO >> Replace drain filter.

## 6.DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 7.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-433, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace refueling EVAP vapor cut valve with fuel tank.

## 8.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 1.9 kg (4.2 lb).**

Is the inspection result normal?

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR18DE (EXCEPT FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

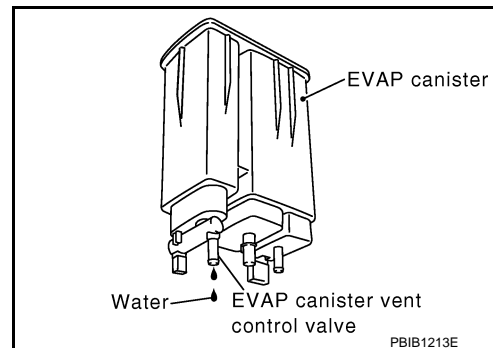
- YES >> GO TO 9.  
NO >> GO TO 10.

## 9. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 10.  
NO >> GO TO 13.



## 10. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 11.

## 11. CHECK DRAIN FILTER

Refer to [EC-435, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

- OK >> GO TO 12.  
NO >> Replace drain filter.

## 12. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 13. 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 14.  
NO >> Repair or replace hoses and tubes.

## 14. CHECK RECIRCULATION LINE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace fuel filler tube.

## 15. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-433, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank.

## 16. CHECK FUEL FILLER TUBE

Check fuel filler tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> Replace fuel filler tube.



# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## 17. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace one-way fuel valve with fuel tank.

## 18. CHECK ONE-WAY FUEL VALVE-II

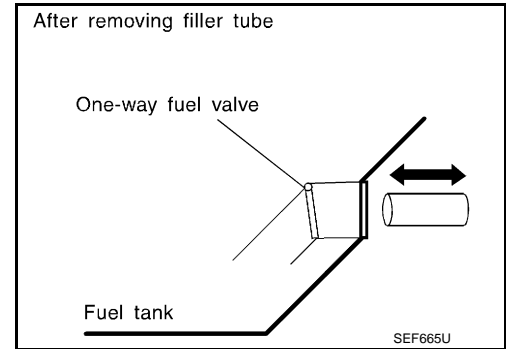
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose. Refer to [FL-5. "Exploded View"](#).
3. Check one-way fuel valve for operation as per the following.  
When a stick is inserted, the valve should open, when removing stick it should close.

**Do not drop any material into the tank.**

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



## Component Inspection (Refueling EVAP vapor cut valve)

INFOID:0000000006504045

### 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-9. "Removal and Installation"](#).
2. Drain fuel from the tank as per the following:
  - Remove fuel feed hose located on the fuel gauge retainer.
  - Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
  - Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
3. Check refueling EVAP vapor cut valve for being stuck to close as per the following.  
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
  - Connect vacuum pump to hose end.
  - Remove fuel gauge retainer with fuel gauge unit.

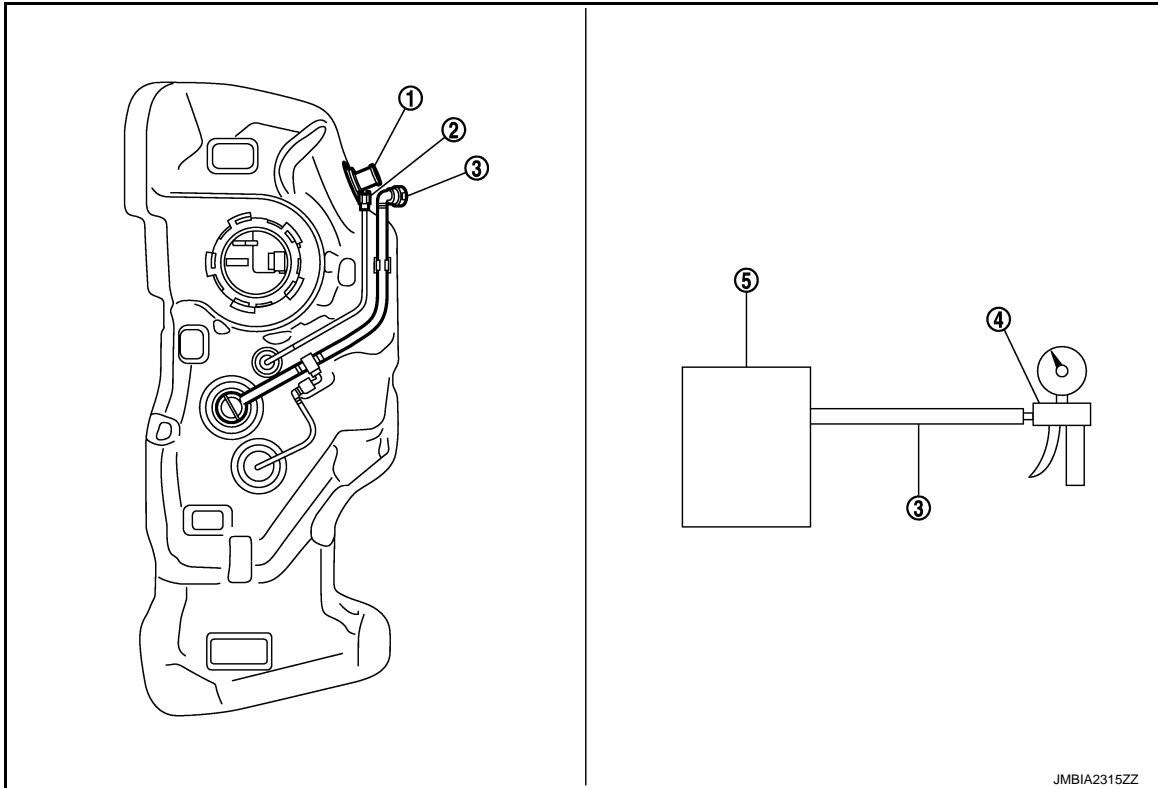
**Always replace O-ring with new one.**

  - Put fuel tank upside down.
  - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]



- |                               |                       |                   |
|-------------------------------|-----------------------|-------------------|
| 1. Filler tube                | 2. Recirculation line | 3. EVAP/ORVR line |
| 4. Vacuum/pressure handy pump | 5. Fuel tank          |                   |

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

⊗ **Without CONSULT-III**

1. Remove fuel tank. Refer to [FL-9. "Removal and Installation"](#).
2. Drain fuel from the tank as per the following:
  - Remove fuel gauge retainer.
  - Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as per the following.  
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
  - Connect vacuum pump to hose end.
  - Remove fuel gauge retainer with fuel gauge unit.

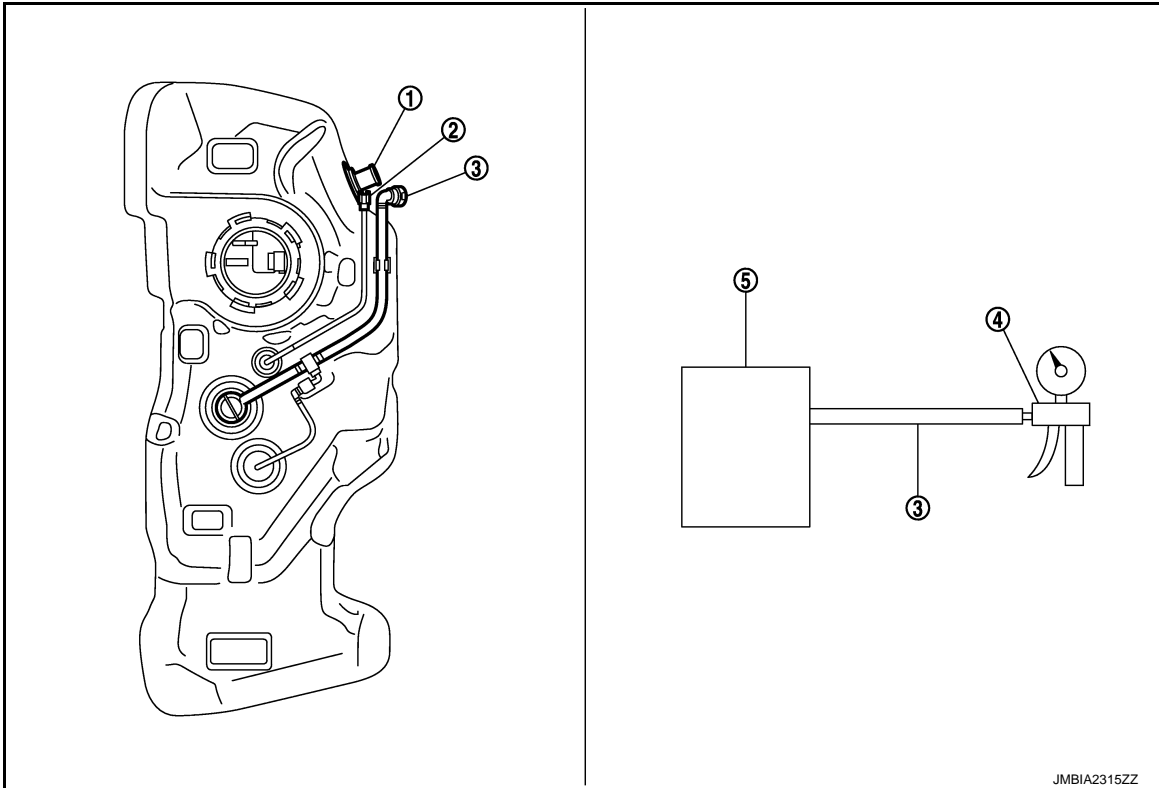
**Always replace O-ring with new one.**

  - Put fuel tank upside down.
  - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]



- 1. Filler tube
- 2. Recirculation line
- 3. EVAP/ORVR line
- 4. Vacuum/pressure handy pump
- 5. Fuel tank

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank.

## Component Inspection (Drain filter)

INFOID:000000006504046

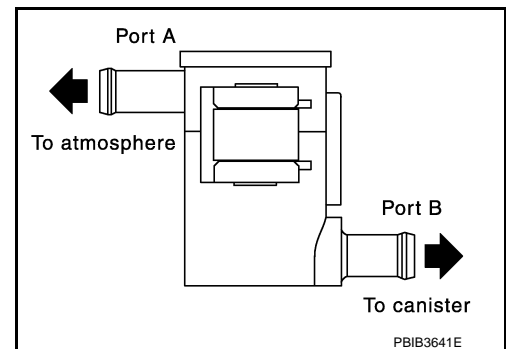
### 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace drain filter.



# POSITIVE CRANKCASE VENTILATION

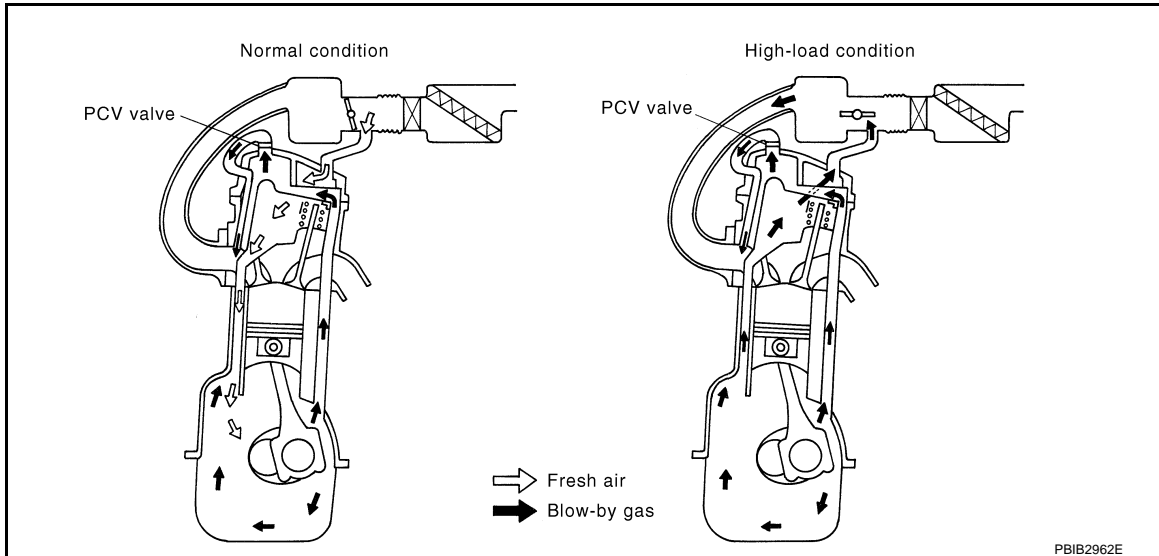
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## POSITIVE CRANKCASE VENTILATION

### Description

INFOID:000000006504047



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

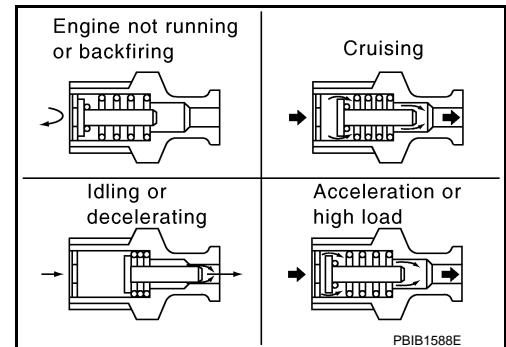
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



### Component Inspection

INFOID:000000006504048

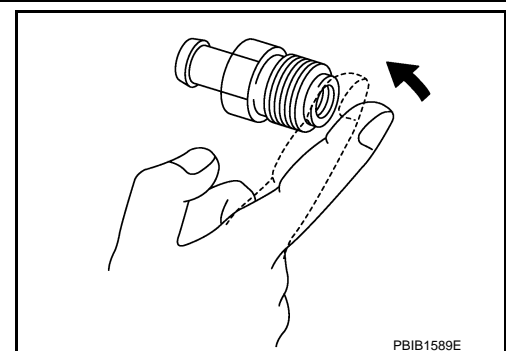
#### 1. CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover (Refer to [EM-41. "Exploded View"](#)). 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. Refer to [EM-41. "Exploded View"](#).



# REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

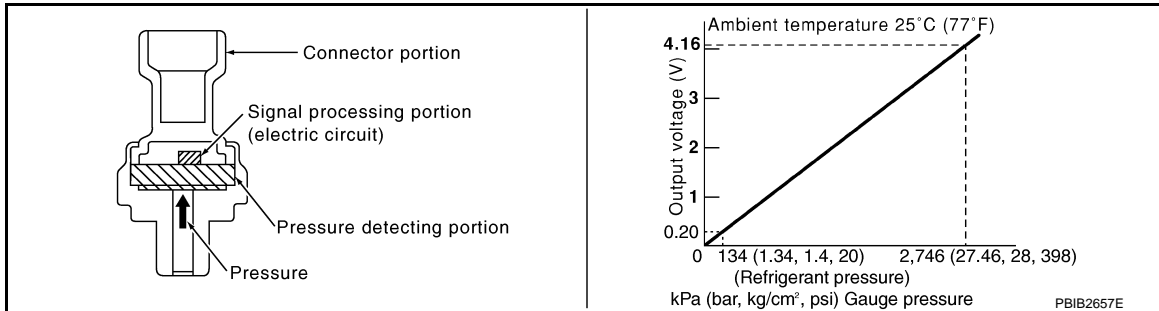
[MR18DE (EXCEPT FOR CALIFORNIA)]

## REFRIGERANT PRESSURE SENSOR

### Description

INFOID:000000006504049

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:000000006504050

#### 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		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Go to [EC-437, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006504051

#### 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 E38. Refer to [GI-44, "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		
E49	3	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 4.

# REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

NO >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E8
- 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	
E49	1	F8	48	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 E8, F1
- 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	
E49	2	F8	41	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 E8, F1
- 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-41. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor. Refer to [HA-40. "REFRIGERANT PRESSURE SENSOR : Removal and Installation"](#).

NO >> Repair or replace.

# ECU DIAGNOSIS INFORMATION

## ECM

### Reference Value

INFOID:000000006504052

#### 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 <a href="#">EC-127, "Diagnosis Procedure"</a> .		
B/FUEL SCHDL	See <a href="#">EC-127, "Diagnosis Procedure"</a> .		
A/F ALPHA-B1	See <a href="#">EC-127, "Diagnosis Procedure"</a> .		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158F)
A/F SEN1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.		0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)	- 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 - 14 V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
TP SEN 1-B1	• Ignition switch: ON (Engine stopped) • Selector lever position: D (CVT) or 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
TP SEN 2-B1*1	• Ignition switch: ON (Engine stopped) • Selector lever position: D (CVT) or 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
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 position: P or N (CVT) or Neutral (M/T)	ON
		Selector lever position: Except above	OFF

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Monitor Item	Condition	Values/Status	
PW/ST SIGNAL	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>	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"> <li>Ignition switch: ON → OFF → ON</li> </ul>		ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	8 - 18°BTDC
		2,000 rpm	25 - 45°BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	1.0 - 4.0 g/s
		2,500 rpm	2.0 - 10.0 g/s
PURG VOL C/V	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	0%
		2,000 rpm	0 - 50%
INT/V TIM (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	-5 - 5°CA
		2,000 rpm	Approx. 0 - 40°CA
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	0 - 2%
		2,000 rpm	Approx. 0 - 90%
AIR COND RLY	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>For 1 second after turning ignition switch: ON</li> <li>Engine running or cranking</li> </ul>		ON
	<ul style="list-style-type: none"> <li>Except above</li> </ul>		OFF
THRTL RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		ON



# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Monitor Item	Condition		Values/Status
COOLING FAN	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> <li>Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 98°C (208°F) or less	OFF
		Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>- Engine: After warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		ON
VEHICLE SPEED	<ul style="list-style-type: none"> <li>Turn drive wheels and compare CONSULT-III value with the speedometer indication.</li> </ul>		Almost the same speed as the speedometer indication
IDL A/V LEARN	<ul style="list-style-type: none"> <li>Engine: running</li> </ul>	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"> <li>Ignition switch: ON</li> </ul>	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"> <li>Engine: After warming up, idle the engine (More than 140 seconds after starting engine)</li> </ul>		4 - 100%
AC PRESS SEN	<ul style="list-style-type: none"> <li>Engine: Idle</li> <li>Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>		1.0 - 4.0 V
EVAP SYS PRES	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Approx 1.8 - 4.8 V
VENT CONT/V	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		OFF
I/P PULLY SPD	<ul style="list-style-type: none"> <li>Vehicle speed: More than 20 km/h (12MPH)</li> </ul>		Almost the same speed as the tachometer indication.
A/F ADJ-B1	<ul style="list-style-type: none"> <li>Engine: Running</li> </ul>		-0.330 - 0.330
FUEL T/TMP SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Indicates fuel tank temperature.
INT/A TEMP SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Indicates intake air temperature.
FUEL LEVEL SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Depending on fuel level of fuel tank.
BAT CUR SEN	<ul style="list-style-type: none"> <li>Engine speed: Idle</li> <li>Battery: Fuel charged*2</li> <li>Selector lever: P or N (CVT), Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>		Approx 2,600 - 3,500 mV
ALT DUTY	<ul style="list-style-type: none"> <li>Engine: Idle</li> </ul>		0 - 80%
ALT DUTY SIG	<ul style="list-style-type: none"> <li>Power generation voltage variable control: Operating</li> </ul>		ON
	<ul style="list-style-type: none"> <li>Power generation voltage variable control: Not operating</li> </ul>		OFF
VHCL SPEED SE	<ul style="list-style-type: none"> <li>Turn drive wheels and compare CONSULT-III value with the speedometer indication.</li> </ul>		Almost the same speed as the speedometer indication.
SET VHCL SPD	<ul style="list-style-type: none"> <li>Engine: Running</li> </ul>	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		MAIN switch: pressed
			MAIN switch: Released
CANCEL SW	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		CANCEL switch: pressed
			CANCEL switch: Released
SET SW	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		SET/COAST switch: pressed
			SET/COAST switch: Released

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## < ECU DIAGNOSIS INFORMATION >

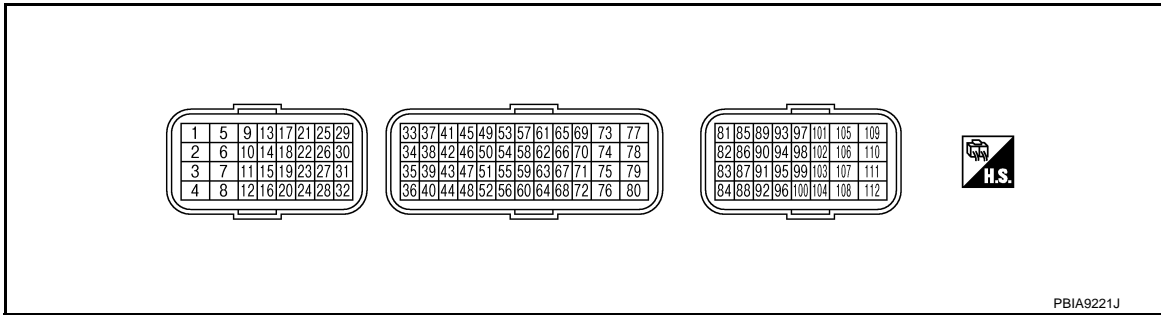
## [MR18DE (EXCEPT FOR CALIFORNIA)]

Monitor Item	Condition		Values/Status
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: pressed	ON
		RESUME/ACCELERATE 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 • Vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF
THRTL STK CNT B1	<b>NOTE:</b> The item is indicated, but not used.		—
EVAP LEAK DIAG	Ignition switch: ON		Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON		Indicates the ready condition of EVAP leak diagnosis.
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.		INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.		CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.		INCMP
	DTC P0139 self-diagnosis (slow response) is complete.		CMPLT
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis is incomplete.		INCMP
	DTC P015A and P015B self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNT

\*: 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.

\*: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

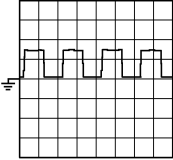
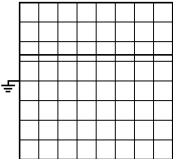
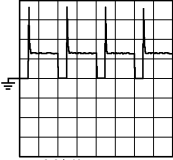
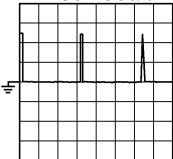
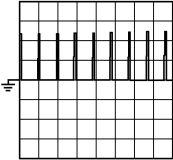
- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
1 (P)	108 (B)	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	3.2 V★ 1mSec/div  5V/div JMBIA0324GB
2 (SB)	108 (B)	Throttle control motor relay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4 (L)	108 (B)	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	1.8 V★ 5mSec/div  5V/div JMBIA0326GB
5 (G)	59 (O)	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	10 V★ 50mSec/div  10V/div JMBIA0325GB
				[Ignition switch: ON] • Engine stopped	BATTERY VOLTAGE (11 - 14 V)

# ECM

< ECU DIAGNOSIS INFORMATION >

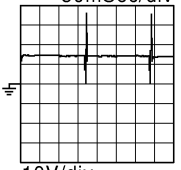
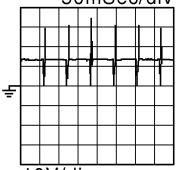
[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
8 (G)	53 (LG)	A/F sensor 1 heater	Output	[Engine is running] • Warm-up condition • Engine speed: Idle speed (More than 140 seconds after starting engine)	2.9 - 8.8 V★ 50mSec/div  10V/div JMBIA0325GB
9 (P)	108 (B)	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div  10V/div JMBIA0327GB
				[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	10 V★ 50mSec/div  10V/div JMBIA0328GB
11 (B)	—	ECM ground	—	—	—
14 (L)	108 (B)	PNP signal	Input	[Ignition switch: ON] • Selector lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: ON] • Selector lever: Except above	0 V
15 (Y)	108 (B)	Throttle control motor relay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: ON]	0 - 1.0 V
17 (R)	108 (B)	Ignition signal No. 1	Output	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	0 - 0.3 V★ 50mSec/div  2V/div JMBIA0329GB
18 (LG)		Ignition signal No. 2			
21 (G)		Ignition signal No. 4			
22 (SB)		Ignition signal No. 3			0.2 - 0.5 V★ 50mSec/div  2V/div JMBIA0330GB

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
23 (GR)	108 (B)	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
25 (V)	108 (B)	Fuel injector No. 4	Output	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div  10V/div <small>JMBIA0331GB</small>
29 (Y)		Fuel injector No. 3			BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div  10V/div <small>JMBIA0332GB</small>
30 (O)		Fuel injector No. 2			
31 (L)		Fuel injector No. 1			
28 (W)	108 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
32 (P)	108 (B)	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0 V
				[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
33 (LG)	36 (Y)	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
				[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34 (R)	36 (Y)	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
				[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36 (Y)	—	Sensor ground (Throttle position sensor)	—	—	—
37 (W)	40 (—)	Knock sensor	Input	[Engine is running] • Idle speed	2.5 V
38 (BR)	44 (GR)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.

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< ECU DIAGNOSIS INFORMATION >

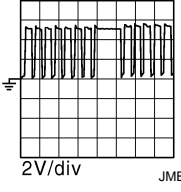
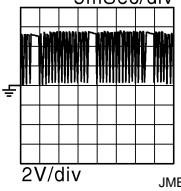
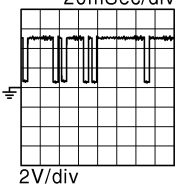
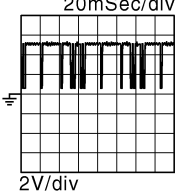
[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
40 (-)	-	Sensor ground (Knock sensor)	-	-	-
41 (GR)	48 (BR)	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
42 (V)	51 (Y)	EVAP control system pressure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V
43 (P)	108 (B)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.
44 (GR)	-	Sensor ground (Engine coolant temperature sensor)	-	-	-
45 (G)	52 (R)	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.7 - 1.1 V
				[Engine is running] • Warm-up condition • Engine speed : 2,500 rpm	1.3 - 1.7 V
46 (L)	55 (P)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.
48 (BR)	-	Sensor ground (Refrigerant pressure sensor)	-	-	-
49 (V)	53 (LG)	A/F sensor 1	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
50 (W)	59 (O)	Heated oxygen sensor 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 - 1.0 V
51 (Y)	-	Sensor ground (EVAP control system pressure sensor)	-	-	-
52 (R)	-	Sensor ground (Mass air flow sensor)	-	-	-
53 (LG)	-	Sensor ground (A/F sensor 1)	-	-	-
55 (P)	-	Sensor ground (Intake air temperature sensor)	-	-	-
57 (GR)	64 (SB)	Battery current sensor	Input	[Engine is running] • Battery: Fully charged *1 • Idle speed	2.6 - 3.5 V
59 (O)	-	Sensor ground (Heated oxygen sensor 2)	-	-	-

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

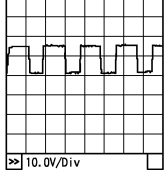
Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
61 (W)	62 (B)	Crankshaft position sensor (POS)	Input	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	4.0 V★ 5mSec/div  2V/div JMBIA0333GB
				[Engine is running] • Engine speed: 2,000 rpm	4.0 V★ 5mSec/div  2V/div JMBIA0334GB
62 (B)	—	Sensor ground [Crankshaft position sensor (POS)]	—	—	—
63 (L)	—	Sensor ground [Camshaft position sensor (PHASE)]	—	—	—
64 (SB)	—	Sensor ground (Battery current sensor)	—	—	—
65 (Y)	63 (L)	Camshaft position sensor (PHASE)	Input	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	0 - 5.0★ 20mSec/div  2V/div JMBIA0045GB
				[Engine is running] • Engine speed is 2,000 rpm	0 - 5.0★ 20mSec/div  2V/div JMBIA0046GB
66*2 (L)	108 (B)	Power supply for ECM (Back-up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
71 (Y)	108 (B)	Sensor power supply [Battery current sensor]	—	[Ignition switch: ON]	5 V
72 (O)	36 (Y)	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5 V

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminal No.		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
73 (P)	108 (B)	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Warm-up condition • When revving engine up to 2,000rpm Quickly	7 - 10 V★ 
74 (W)	108 (B)	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V
75 (R)	62 (B)	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5 V
76 (LG)	51 (Y)	Sensor power supply [EVAP control system pressure sensor]	—	[Ignition switch: ON]	5 V
78 (G)	63 (L)	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5 V
83 (P)	108 (B)	CAN communication line	Input/Output	—	—
84 (L)	108 (B)	CAN communication line	Input/Output	—	—
88 (LG)	108 (B)	Data link connector	Input/Output	—	—
93 (L)	108 (B)	Ignition switch	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
94 (SB)	95 (BR) <sup>*3</sup> (B) <sup>*4</sup>	ASC D steering switch	Input	[Ignition switch: ON] • ASC D steering switch: OFF	4 V
				[Ignition switch: ON] • MAIN switch: Pressed	0 V
				[Ignition switch: ON] • CANCEL switch: Pressed	1 V
				[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3 V
				[Ignition switch: ON] • SET/COAST switch: Pressed	2 V
95 (BR) <sup>*3</sup> (B) <sup>*4</sup>	—	Sensor ground (ASC D steering switch)	—	—	—
99 (W)	108 (B)	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0 V
				[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)



# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Terminal No.		Description		Condition	Value (Approx.)	
+	-	Signal name	Input/Output			
100 (SB)	108 (B)	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T)	0 V	EC
				[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)	C
102 (O)	108 (B)	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5 V	D
103 (G)	104 (R)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V	E
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V	F
104 (R)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—	G
105 (G)	108 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	H
106 (V)	108 (B)	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5 V	I
107 (B) 108 (B) 109 (B) 112 (B)	—	ECM ground	—	—	—	J
110 (BR)	111 (Y)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V	K
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V	L
111 (Y)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—	M

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

\*1: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

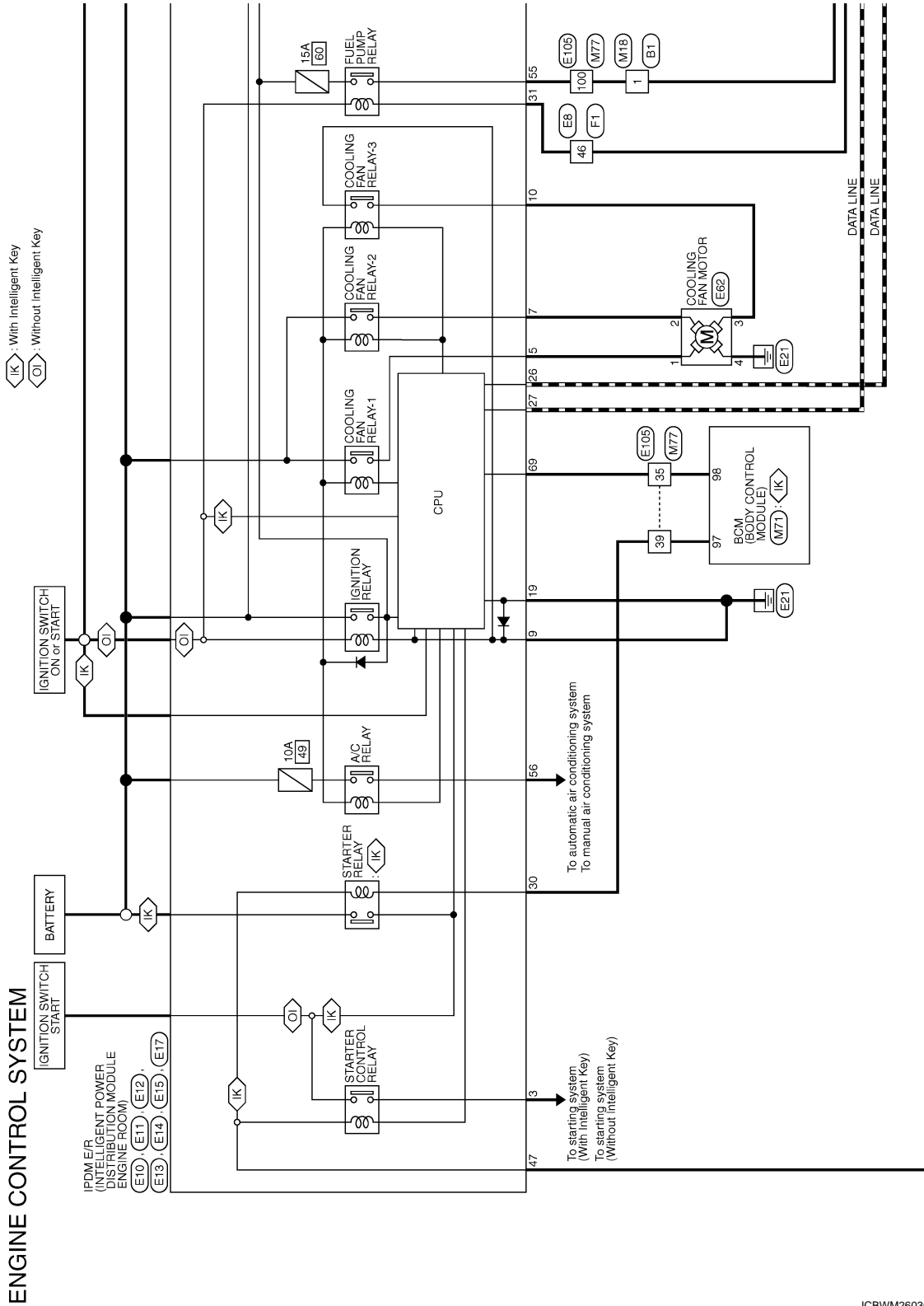
\*2: Except for Canada

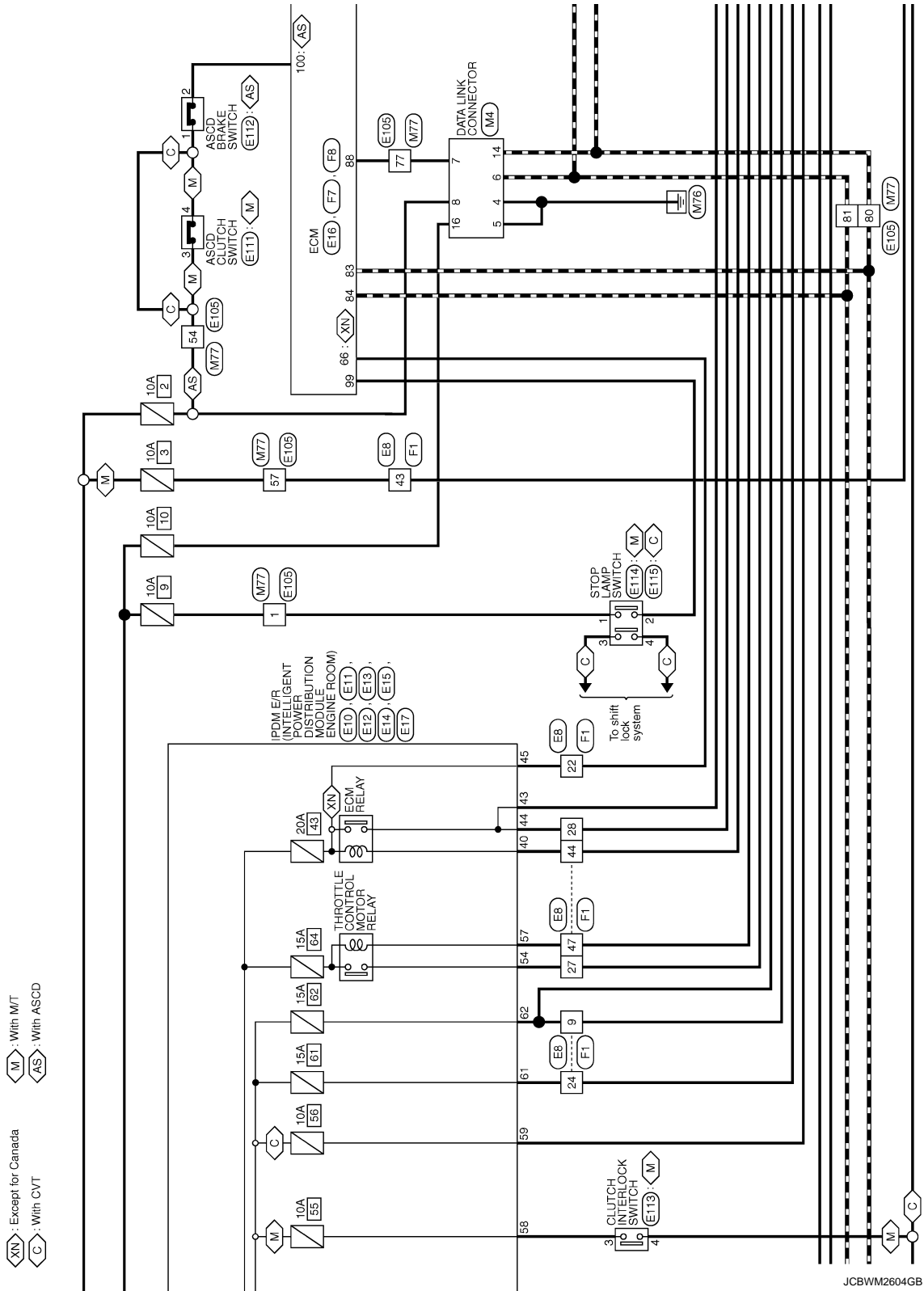
\*3: CVT models

\*4: M/T models

Wiring Diagram — ENGINE CONTROL SYSTEM —

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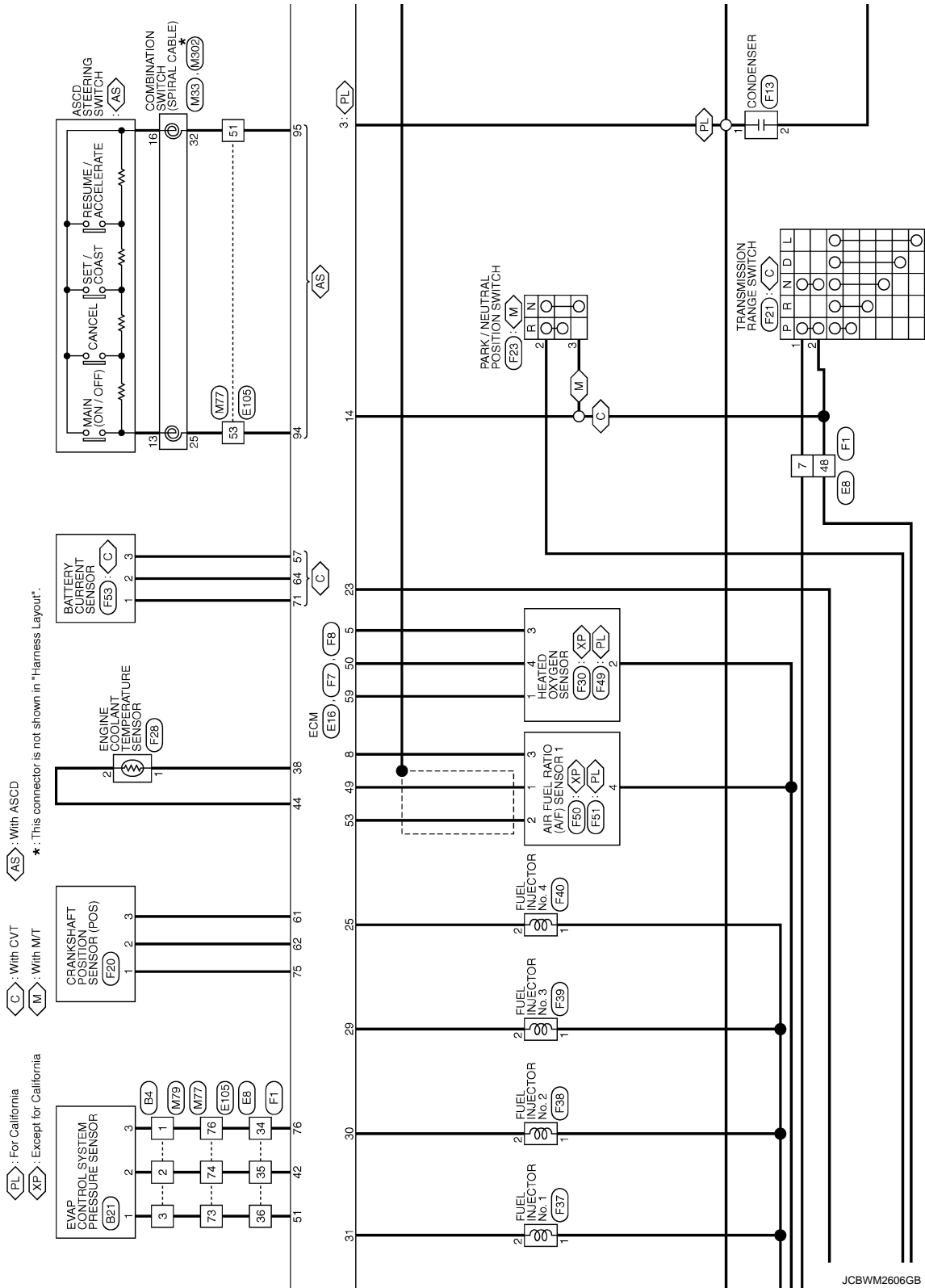


XN: Except for Canada  
 M: With M/T  
 AS: With ASCD  
 C: With CVT

JCBWM2604GB

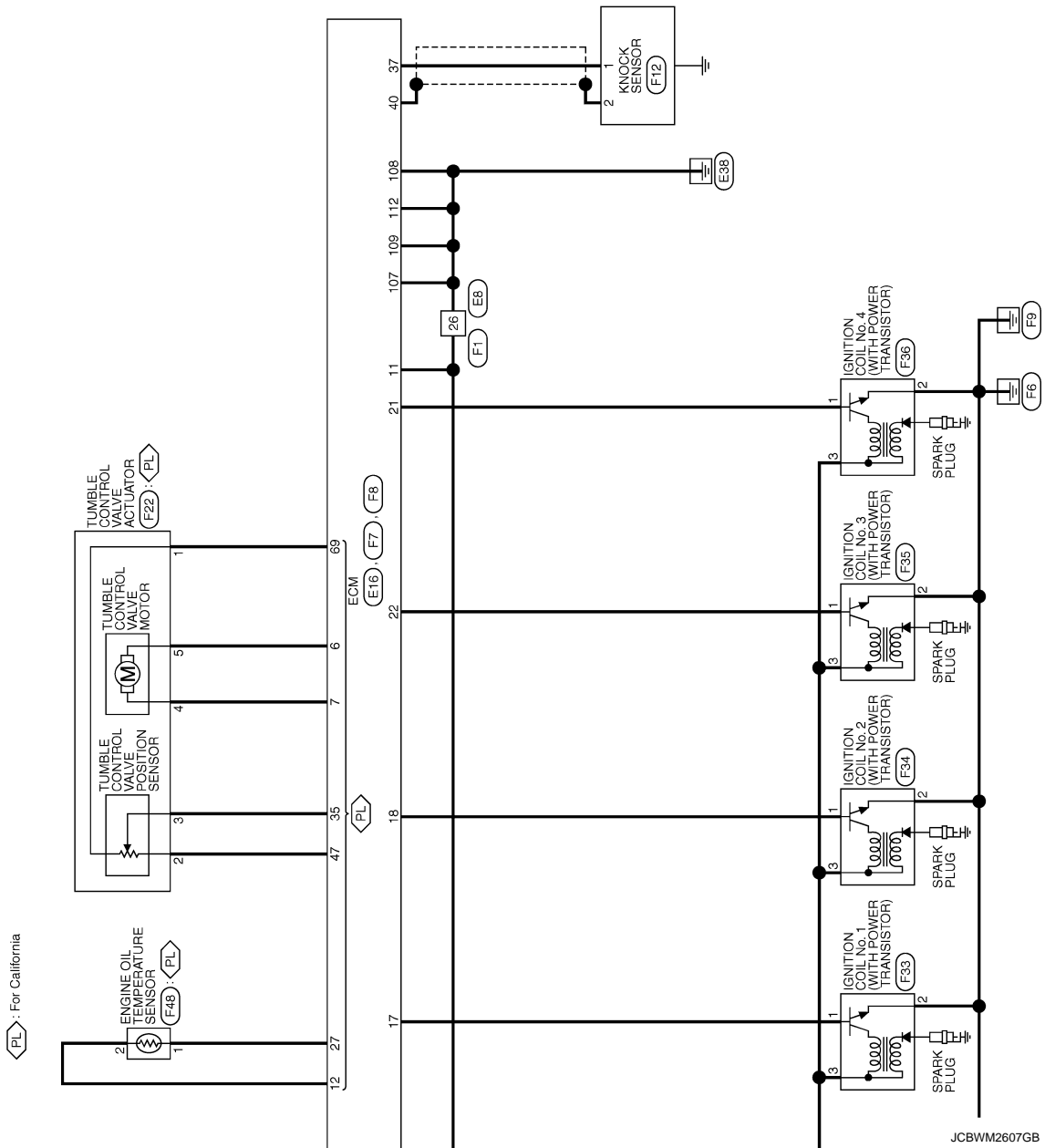
A  
**EC**  
 C  
 D  
 E  
 F  
 G  
 H  
 I  
 J  
 K  
 L  
 M  
 N  
 O  
 P





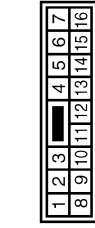
JCBWM2606GB

A  
 EC  
 C  
 D  
 E  
 F  
 G  
 H  
 I  
 J  
 K  
 L  
 M  
 N  
 O  
 P



ENGINE CONTROL SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	HS16MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	W	-
3	V	-
4	L	-
5	Y	-
6	W	-
7	LG	-
8	GR	-
9	SB	-
10	W	-
11	G	-
12	V	-
13	BR	-
14	B	-
15	R	-
16	GR	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	V	-
3	O	-
4	P	-
5	W	-
8	SB	-
9	GR	-
10	SB	-

11	G	-
12	SB	-
13	R	-
16	GR	-
17	BR	-
18	L	-
20	LG	-
22	Y	-
23	BR	-
24	O	-

Connector No.	B20
Connector Name	EVAP CANISTER VENT CONTROL VALVE
Connector Type	EG2FB-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	L	-

Connector No.	B21
Connector Name	EVAP CONTROL SYSTEM PRESSURE SENSOR
Connector Type	EG2FG-RS



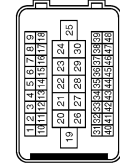
Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-
3	W	-

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	EG2FG-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	BR	-
3	B	-
4	P	-
5	L	-

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAA38MB-RS10-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	LG	-
3	Y	-
4	W	-
7	Y	-
8	SB	-
9	L	-
10	V	-
11	P	-
12	BR	-
13	LG	-
14	Y	-
15	SB	-
16	L	-
17	W	-
18	O	-
21	G	-

22	Y	-
23	SB	-
24	W	-
25	BR	-
26	B	- [For California]
27	B/Y	- [Except for California]
28	GR	-
29	P	-
30	V	-
31	G	-
32	O	-
33	W	-
34	Y	-
35	V	-
36	P	-
37	LG	-
39	SR	-
40	GR	-
41	O	-
42	V	-
43	R	- [With CVT]
44	LG	- [With M/T]
46	W	-
47	G	-
48	BR	-

Connector No.	E10
Connector Name	POWER INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	MR6FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	BR	-
4	P	-
5	LG	-
6	SB	-
7	Y	-
8	V	-

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

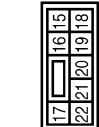
ENGINE CONTROL SYSTEM

Connector No.	E11
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	MD0FB-1C



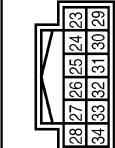
Terminal No.	9	B/W	Signal Name [Specification]
10	L	-	-
13	W	-	-

Connector No.	E12
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS08FBF-CS



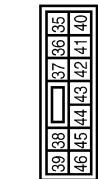
Terminal No.	18	Y	Signal Name [Specification]
19	B/W	-	-
21	W	-	-
22	V	-	-

Connector No.	E13
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH12FV-NH



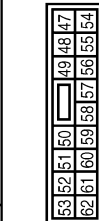
Terminal No.	24	LG	Signal Name [Specification]
25	Y	-	-
26	P	-	-
27	L	-	-
28	P	-	-
30	SB	-	-
31	W	-	-
33	O	-	-
34	R	-	-

Connector No.	E14
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FBR-CS



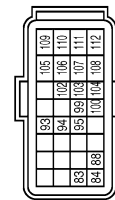
Terminal No.	36	Y	Signal Name [Specification]
37	V	-	-
38	G	-	-
39	V	-	-
40	R	-	-
41	SB	-	-
43	G	-	-
44	P	-	-
45	Y	-	-
46	O	-	-

Connector No.	E15
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FBR-CS



Terminal No.	47	BR	Signal Name [Specification]
48	W	-	-
50	GR	-	-
51	R	-	-
52	P	-	-
54	GR	-	-
55	P	-	-
56	SB	-	-
57	G	-	-
58	R	- [With CVT]	-
59	Y	- [With M/T]	-
60	V	-	-
61	W	-	-
62	L	-	-

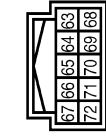
Connector No.	E16
Connector Name	ECM
Connector Type	RI12AFB-R2B-L-RH



Terminal No.	83	P	Signal Name [Specification]
84	L	CAN-L	-
88	LG	CAN-H	-
89	W	K LINE	-
93	L	IGNSW	-
94	SB	ASGDSW	-
95	B	GND-ASGDSW [Mth. CVT]	-
99	W	BRAKE	-
100	SB	ENGCSW	-
102	O	AVCC-APS 2	-
103	G	APS 2	-
104	R	GND-APS 2	-
105	G	VBR	-
106	V	AVCC-APS 1	-
107	B	GND	-
108	B	GND	-
109	B	GND	-
110	BR	APS 1	-
111	Y	GND-APS 1	-

Terminal No.	112	B	GND
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Connector No.	E17
Connector Name	ENGINE INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH10FB-NH



Terminal No.	64	R	Signal Name [Specification]
66	L	-	-
69	Y	-	-

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB



Terminal No.	1	O	Signal Name [Specification]
2	G	-	-
3	W	-	-



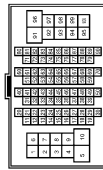
ENGINE CONTROL SYSTEM

Connector No.	E105
Connector Name	COOLING FAN MOTOR
Connector Type	RS04FGY-PR



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-
3	L	-
4	B/W	-

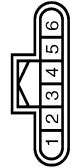
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS18-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-
3	SB	-
4	G	-
5	P	-
6	L	- [With NAV]
7	Y	- [Without NAV]
8	O	-
9	W	-
10	SB	-
31	V	-
32	R	-
33	GR	-
34	P	-
35	Y	-
36	BR	-
38	SB	-

44	R	-
45	V	-
46	P	-
48	L	-
51	BR	- [With CVT]
51	B	- [With M/T]
53	SB	-
54	W	- [With CVT]
54	O	- [With M/T]
57	LG	-
59	L	-
60	O	-
61	G	-
62	W	-
63	L	-
67	GR	- [With CVT]
67	Y	- [With M/T]
69	P	-
70	SHIELD	-
71	GR	-
72	LG	-
73	P	-
74	V	-
76	Y	-
77	LG	-
78	O	-
79	G	-
80	P	-
81	L	-
82	W	-
83	BR	-
84	B	-
87	GR	-
91	W	-
92	Y	-
93	Y	-
94	R	-
95	V	-
96	LG	-
97	R	-
98	SB	-
99	G	-
100	P	-

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RM08FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	Y	-
3	BR	-
4	V	-
5	O	-
6	G	-

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M04FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	O	-
4	R	-

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FER-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With CVT]
1	R	- [With M/T]
2	SB	-

Connector No.	E113
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Type	M04FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-
4	BR	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

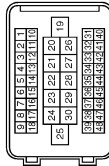
ENGINE CONTROL SYSTEM

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	MD4W-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-
3	O	-
4	G	-

Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SA31PF-RS1D-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	LG	-
3	R	-
4	Y	-
7	V	-
8	G	-
9	SB	-
10	L	-
11	Y	-
12	GR	-
13	BR	-
14	G	-
15	W	-
16	Y	-
17	P	-
18	BR	-
21	G	-
22	L	-

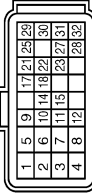
23	W	-
24	R	-
25	R	-
26	B	-
27	SB	-
28	V	-
29	V	-
30	BR	-
31	GR	-
32	BR	-
33	W	-
34	LG	-
35	V	-
36	Y	-
37	SB	-
38	W	-
39	G	-
40	P	-
41	O	-
42	G	-
43	R	-
44	P	-
46	GR	-
47	Y	-
48	BR	-

Connector No.	F4
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH06FE



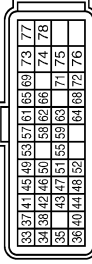
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	G	-
4	R	-
5	BR	-

Connector No.	F7
Connector Name	ECM
Connector Type	RH24FY-RZ6-R-RH



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	MOTOR 1
2	SB	VMOT
3	V	VSCV
4	L	MOTOR 2
5	G	O2HR
6	W	SCV 1
7	R	SCV 2
8	G	AF HEATER GND
9	B	EVAP
11	B	GND
12	GR	GNDA-TO
14	L	NEUT-H
15	Y	MOTRL-Y
17	R	IGN#1
18	LG	IGN#2
21	G	IGN#4
22	SB	IGN#3
23	GR	FPR
25	V	INJ#4
27	R	TO
28	SB	GDCV [For California]
28	W	GDCV [Except for California]
29	Y	INJ#2
30	O	INJ#2
31	L	INJ#1
32	P	SSOFF

Connector No.	F8
Connector Name	ECM
Connector Type	RH40FER-RZ6-L-RH



Terminal No.	Color of Wire	Signal Name [Specification]
33	LG	TPS 1
34	R	TPS 2
35	V	SCVPOS
36	Y	GND-TPS
37	W	KNK
38	BR	TW
40	SHIELD	GND-KNK
41	GR	PDPRES
42	V	FTPRES
43	P	TF
44	GR	GND-TW
45	G	OA+
46	L	TA
47	LG	GND-SCVPOS
48	BR	GND-PDPRES
49	V	AF+
50	W	OZSR
51	Y	GND-FTPRES
52	R	OA-
53	LG	AF-
55	P	GND-TA
57	GR	CURSEN
59	O	GND-OZSR
61	W	POS
62	B	GND-POS
63	L	GND-PHASE
64	SB	GND-CURSEN
65	Y	PHASE
66	L	BATT
69	SB	AVCC-SCVPOS
71	Y	AVCC-CURSEN
72	O	AVCC-TPS
73	P	CVTC
74	W	AVCC-PDPRES
75	R	AVCC-POS
76	LG	AVCC-FTPRES
78	G	AVCC-PHASE

ENGINE CONTROL SYSTEM

Connector No.	F12
Connector Name	KNOCK SENSOR
Connector Type	BS02FB-ANY



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	
2	SHIELD	

Connector No.	F13
Connector Name	CONDENSER
Connector Type	MD2FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	B	

Connector No.	F20
Connector Name	CRANKSHAFT POSITION SENSOR (POS)
Connector Type	RH03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	
2	B	

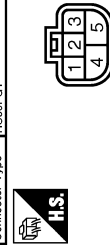
Connector No.	3	W	
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Connector No.	F21
Connector Name	TRANSMISSION RANGE SWITCH
Connector Type	RK03FG



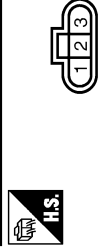
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	BR	
3	R	
4	GR	
5	SB	
6	W	
7	Y	
8	G	

Connector No.	F22
Connector Name	TUMBLE CONTROL VALVE ACTUATOR
Connector Type	HS03FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	VDD
2	LG	GND
3	V	OUT
4	R	OPEN
5	W	CLOSE

Connector No.	F23
Connector Name	PARK / NEUTRAL POSITION SWITCH
Connector Type	FEA03FG



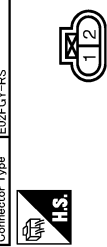
Terminal No.	Color of Wire	Signal Name [Specification]
1	G	
2	R	
3	L	

Connector No.	F26
Connector Name	GAMSHAFT POSITION SENSOR (PHASE)
Connector Type	RH03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	
2	L	
3	Y	

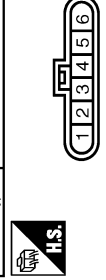
Connector No.	F28
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR
Connector Type	ED0FY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	
2	R	
3	G	
4	W	

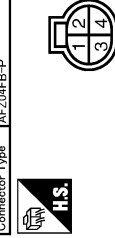
1	BR	
2	GR	

Connector No.	F29
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR
Connector Type	HS08FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	
2	O	
3	R	
4	Y	
5	L	
6	P	

Connector No.	F30
Connector Name	HEATED OXYGEN SENSOR
Connector Type	AFZ04FB-P



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	
2	R	
3	G	
4	W	

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
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ENGINE CONTROL SYSTEM

Connector No.	F32
Connector Name	BYPASS CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
Connector Type	EO3FL-RS-LGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	P	-

Connector No.	F33
Connector Name	IGNITION COIL No. 1 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	B	-
3	V	-

Connector No.	F34
Connector Name	IGNITION COIL No. 2 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

2	B	-
3	V	-

Connector No.	F35
Connector Name	IGNITION COIL No. 3 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	B	-
3	V	-

Connector No.	F36
Connector Name	IGNITION COIL No. 4 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	B	-
3	V	-

Connector No.	F37
Connector Name	FUEL INJECTOR No. 1
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	L	-

Connector No.	F38
Connector Name	FUEL INJECTOR No. 2
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	F39
Connector Name	FUEL INJECTOR No. 3
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	Y	-

Connector No.	F40
Connector Name	FUEL INJECTOR No. 4
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	V	-

Connector No.	F41
Connector Name	REFUELLING VALVE TRIMMING CONTROL SOLENOID VALVE
Connector Type	EO2FG-RS-LGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-

Connector No.	F48
Connector Name	ENGINE OIL TEMPERATURE SENSOR
Connector Type	EO2FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	GR	-

ENGINE CONTROL SYSTEM

Connector No.	F49
Connector Name	HEATED OXYGEN SENSOR
Connector Type	AFZ04FGY-P



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-
3	G	-
4	W	-

Connector No.	F50
Connector Name	AIR FUEL RATIO (A/F) SENSOR 1
Connector Type	RH04MDSY-BR



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	LG	-
3	G	-
4	R	-

Connector No.	F51
Connector Name	AIR FUEL RATIO (A/F) SENSOR 1
Connector Type	AFZ04FBR



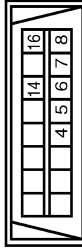
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	LG	-
3	G	-
4	R	-

Connector No.	F53
Connector Name	BATTERY CURRENT SENSOR
Connector Type	RH03FBE



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	SB	-
3	GR	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD18FW



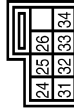
Terminal No.	Color of Wire	Signal Name [Specification]
4	B	-
5	B	-
6	L	-
7	GR/R	-
8	O	-
14	P	-
16	LG/R	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	MS18FW-CS



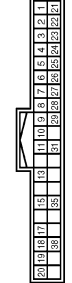
Terminal No.	Color of Wire	Signal Name [Specification]
1	G/R	-
3	L/W	-
4	L	-
5	Y	-
6	L/B	-
7	LG	-
8	GR	-
9	SB	-
10	W/L	-
11	G	-
12	V	-
13	L	-
15	L	-
16	GR	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-IV



Terminal No.	Color of Wire	Signal Name [Specification]
24	W/L	-
25	R/L	-
26	B/R	-
31	GR/B	- [With NAVI]
32	B/W	- [Without NAVI]
33	L/G	-
34	R/B	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH

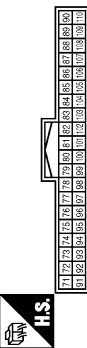


Terminal No.	Color of Wire	Signal Name [Specification]
1	L	GAN-H
2	P	GAN-L
3	V	VEHICLE SPEED SIGNAL (2-PULSE)
4	L	VEHICLE SPEED SIGNAL (8-PULSE)
6	BR/Y	FUEL LEVEL SENSOR SIGNAL
7	R/G	AIR BAG SIGNAL
8	P	OVERDRIVE CONTROL SWITCH SIGNAL
9	O	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
10	SB	PARKING BRAKE SWITCH SIGNAL
11	G/R	BRAKE FLUID LEVEL SWITCH SIGNAL
13	B/R	ILLUMINATION CONTROL SIGNAL
15	L/Y	ACC POWER SUPPLY
17	G	WASHER LEVEL SWITCH SIGNAL
18	R/Y	SECURITY SIGNAL
19	V/W	AMBIENT SENSOR SIGNAL
20	R/W	AMBIENT SENSOR GROUND
21	B	GROUND
22	B	GROUND
23	B	GROUND
24	V	FUEL LEVEL SENSOR GROUND
25	B	VDC GROUND
27	LG	BATTERY POWER SUPPLY
28	GR	IGNITION SIGNAL
29	BR	PASSENGER SEAT BELT WARNING SIGNAL
31	R	A/C AUTO AMP CONNECTION REGULATION SIGNAL
35	BR	ENGINE COOLANT TEMPERATURE SIGNAL
38	GR	ALTERNATOR SIGNAL

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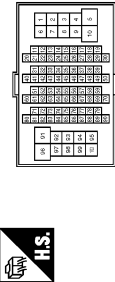
ENGINE CONTROL SYSTEM

Connector No.	M71
Connector Name	BCM BODY CONTROL MODULE
Connector Type	TH40FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
75	SB	DRIVER DOOR REQUEST SW
76	L/O	PUSH SW
78	LG	DRIVER DOOR ANT+
79	V	DRIVER DOOR ANT-
80	BR/Y	PASSENGER DOOR ANT+
81	L/Y	PASSENGER DOOR ANT-
82	W/B	BACK DOOR ANT+
83	B/W	BACK DOOR ANT-
84	Y/G	ROOM ANT+
85	Y/L	ROOM ANT-
86	P	LUGGAGE ROOM ANT-
87	L	LUGGAGE ROOM ANT+
90	W/L	PUSH-BUTTON IGNITION SW ILL POWER
91	Y	ACC/ON IND
92	BR/R	PUSH-BUTTON IGNITION SW ILL GND
93	GR/W	H-KEY WARN BUZZER
96	BR/W	ACC RELAY COINT
97	L/R	STARTER RELAY COINT
98	BR	IGN RELAY (PDM E/R) COINT
99	W/R	IGN RELAY COINT
100	G	PASSENGER DOOR REQUEST SW
102	G	SHIFT N/P
104	Y/R	CVT SHIFT SELECTOR POWER SUPPLY
105	B/O	STOP LAMP SW 2
106	Y/B	BLOWER FAN MOTOR RELAY COINT

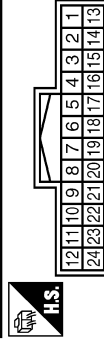
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH86FW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	B/O	
2	R	
3	G/R	
4	G/B	
5	L	
6	L	
7	W/R	
8	G/W	
9	Y/L	
10	W	
31	GR/L	
32	L/B	
33	R/Y	
34	SB	
35	BR	
36	G	
39	L/R	
44	G/O	
45	LG/R	
46	GR/W	
48	L/O	
51	B/W	
52	R/L	
54	O	
57	GR	
59	V	
60	R/W	
61	V/W	
62	W/L	
63	W/B	
67	Y/R	
68	LG	
70	SHIELD	
71	P/B	
72	R/G	
73	R	
74	L/Y	
76	W/G	

77	GR/R	
78	O	
79	LG	
80	P	
81	L	
82	GR	
83	G/R	
84	B	
87	G	
91	R	
92	O	
93	Y	
94	R/B	
95	L/W	
96	Y	
97	L	
98	BR/W	
99	W	
100	G/R	

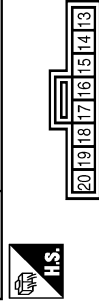
Connector No.	M79
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W/G	
2	L/Y	
3	R	
4	P/B	
5	W	
8	SB	
9	L/G	
10	GR/B	
11	G/B	
12	G/R	
13	R/G	
15	R/L	
16	GR/R	
17	BR/Y	
18	V	
20	GR/L	
22	L	

23	Y/L	
24	G/W	

Connector No.	M202
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY



Terminal No.	Color of Wire	Signal Name [Specification]
13	R	
14	Y	
15	P	
16	B	
17	W	
18	G	
19	P	
20	R	

Fail Safe

NON DTC RELATED ITEM

JCBWM2615GB

INFOID:000000006504054

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Detected items	Engine operating condition in fail-safe mode	Remarks
Malfunction indicator lamp circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut	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.

## 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.								
P0101 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 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 engine starting</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 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)									
More than approx. 4 minutes 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	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.								
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 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.								
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 INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

DTC No.	Detected items	Engine operating condition in fail-safe mode
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

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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"> <li>• U0101 U0140 U1001 CAN communication line</li> <li>• P0101 P0102 P0103 Mass air flow sensor</li> <li>• P0111 P0112 P0113 P0127 Intake air temperature sensor</li> <li>• P0116 P0117 P0118 P0125 Engine coolant temperature sensor</li> <li>• P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor</li> <li>• P0128 Thermostat function</li> <li>• P0181 P0182 P0183 Fuel tank temperature sensor</li> <li>• P0327 P0328 Knock sensor</li> <li>• P0335 Crankshaft position sensor (POS)</li> <li>• P0340 Camshaft position sensor (PHASE)</li> <li>• P0460 P0461 P0462 P0463 Fuel level sensor</li> <li>• P0500 Vehicle speed sensor</li> <li>• P0605 P607 ECM</li> <li>• P0643 Sensor power supply</li> <li>• P0705 Transmission range switch</li> <li>• P0850 Park/neutral position (PNP) switch</li> <li>• P1550 P1551 P1552 P1553 P1554 Battery current sensor</li> <li>• P1610 - P1615 NATS</li> <li>• P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> </ul>



# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

Priority	Detected items (DTC)
2	<ul style="list-style-type: none"> <li>• P0031 P0032 Air fuel ratio (A/F) sensor 1 heater</li> <li>• P0037 P0038 Heated oxygen sensor 2 heater</li> <li>• P0075 Intake valve timing control solenoid valve</li> <li>• P0130 P0131 P0132 P014C P014D P015A P015B P2A00 Air fuel ratio (A/F) sensor 1</li> <li>• P0137 P0138 P0139 Heated oxygen sensor 2</li> <li>• P0441 EVAP control system purge flow monitoring</li> <li>• P0443 P0444 P0445 EVAP canister purge volume control solenoid valve</li> <li>• P0447 P0448 EVAP canister vent control valve</li> <li>• P0451 P0452 P0453 EVAP control system pressure sensor</li> <li>• P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches</li> <li>• P1217 Engine over temperature (OVERHEAT)</li> <li>• P1805 Brake switch</li> <li>• P2100 P2103 Throttle control motor relay</li> <li>• P2101 Electric throttle control function</li> <li>• P2118 Throttle control motor</li> </ul>
3	<ul style="list-style-type: none"> <li>• P0011 Intake valve timing control</li> <li>• P0171 P0172 Fuel injection system function</li> <li>• P0300 - P0304 Misfire</li> <li>• P0420 Three way catalyst function</li> <li>• P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> <li>• P0455 EVAP control system (GROSS LEAK)</li> <li>• P0506 P0507 Idle speed control system</li> <li>• P050A P050E Cold start control</li> <li>• P1148 Closed loop control</li> <li>• P1212 TCS communication line</li> <li>• P1564 ASCD steering switch</li> <li>• P1572 ASCD brake switch</li> <li>• P1574 ASCD vehicle speed sensor</li> <li>• P1715 Input speed sensor</li> <li>• P2119 Electric throttle control actuator</li> </ul>

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## DTC Index

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x:Applicable —: Not applicable

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>						
U0101	0101 <sup>*5</sup>	LOST COMM (TCM)	—	1	×	B	<a href="#">EC-137</a>
U0140	0140 <sup>*5</sup>	LOST COMM (BCM)	—	1	×	B	<a href="#">EC-138</a>
U1001	1001 <sup>*5</sup>	CAN COMM CIRCUIT	—	2	—	—	<a href="#">EC-139</a>
<b>P0000</b>	<b>0000</b>	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	—	<b>Flashing<sup>*8</sup></b>	—	—
P0011	0011	INT/V TIM CONT-B1	×	2	×	B	<a href="#">EC-140</a>
P0031	0031	A/F SEN1 HTR (B1)	—	2	×	B	<a href="#">EC-144</a>
P0032	0032	A/F SEN1 HTR (B1)	—	2	×	B	<a href="#">EC-144</a>
P0037	0037	HO2S2 HTR (B1)	—	2	×	B	<a href="#">EC-147</a>
P0038	0038	HO2S2 HTR (B1)	—	2	×	B	<a href="#">EC-147</a>
P0075	0075	INT/V TIM V/CIR-B1	—	2	×	B	<a href="#">EC-150</a>
P0101	0101	MAF SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-153</a>
P0102	0102	MAF SEN/CIRCUIT-B1	—	1	×	B	<a href="#">EC-160</a>
P0103	0103	MAF SEN/CIRCUIT-B1	—	1	×	B	<a href="#">EC-160</a>
P0111	0111	IAT SENSOR 1 B1	—	2	×	A	<a href="#">EC-165</a>
P0112	0112	IAT SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-167</a>

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# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>						
P0113	0113	IAT SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-167</a>
P0116	0116	ECT SEN/CIRC	—	2	×	A	<a href="#">EC-169</a>
P0117	0117	ECT SEN/CIRC	—	1	×	B	<a href="#">EC-172</a>
P0118	0118	ECT SEN/CIRC	—	1	×	B	<a href="#">EC-172</a>
P0122	0122	TP SEN 2/CIRC-B1	—	1	×	B	<a href="#">EC-175</a>
P0123	0123	TP SEN 2/CIRC-B1	—	1	×	B	<a href="#">EC-175</a>
P0125	0125	ECT SENSOR	—	2	×	B	<a href="#">EC-178</a>
P0127	0127	IAT SENSOR-B1	—	2	×	B	<a href="#">EC-181</a>
P0128	0128	THERMSTAT FNCTN	—	2	×	B	<a href="#">EC-183</a>
P0130	0130	A/F SENSOR1 (B1)	—	2	×	A	<a href="#">EC-185</a>
P0131	0131	A/F SENSOR1 (B1)	—	2	×	B	<a href="#">EC-189</a>
P0132	0132	A/F SENSOR1 (B1)	—	2	×	B	<a href="#">EC-192</a>
P0137	0137	HO2S2 (B1)	×	2	×	A	<a href="#">EC-195</a>
P0138	0138	HO2S2 (B1)	×	2	×	A	<a href="#">EC-201</a>
P0139	0139	HO2S2 (B1)	×	2	×	A	<a href="#">EC-209</a>
P014C	014C	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-215</a>
P014D	014D	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-215</a>
P015A	015A	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-215</a>
P015B	015B	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-215</a>
P0171	0171	FUEL SYS-LEAN-B1	—	2	×	B	<a href="#">EC-220</a>
P0172	0172	FUEL SYS-RICH-B1	—	2	×	B	<a href="#">EC-224</a>
P0181	0181	FTT SENSOR	—	2	×	A and B	<a href="#">EC-228</a>
P0182	0182	FTT SEN/CIRCUIT	—	2	×	B	<a href="#">EC-232</a>
P0183	0183	FTT SEN/CIRCUIT	—	2	×	B	<a href="#">EC-232</a>
P0222	0222	TP SEN 1/CIRC-B1	—	1	×	B	<a href="#">EC-235</a>
P0223	0223	TP SEN 1/CIRC-B1	—	1	×	B	<a href="#">EC-235</a>
P0300	0300	MULTI CYL MISFIRE	—	1 or 2	×	B	<a href="#">EC-238</a>
P0301	0301	CYL 1 MISFIRE	—	1 or 2	×	B	<a href="#">EC-238</a>
P0302	0302	CYL 2 MISFIRE	—	1 or 2	×	B	<a href="#">EC-238</a>
P0303	0303	CYL 3 MISFIRE	—	1 or 2	×	B	<a href="#">EC-238</a>
P0304	0304	CYL 4 MISFIRE	—	1 or 2	×	B	<a href="#">EC-238</a>
P0327	0327	KNOCK SEN/CIRC-B1	—	2	—	—	<a href="#">EC-244</a>
P0328	0328	KNOCK SEN/CIRC-B1	—	2	—	—	<a href="#">EC-244</a>
P0335	0335	CKP SEN/CIRCUIT	—	2	×	B	<a href="#">EC-246</a>
P0340	0340	CMP SEN/CIRC-B1	—	2	×	B	<a href="#">EC-250</a>
P0420	0420	TW CATALYST SYS-B1	×	2	×	A	<a href="#">EC-254</a>
P0441	0441	EVAP PURG FLOW/MON	×	2	×	A	<a href="#">EC-259</a>
P0442	0442	EVAP SMALL LEAK	×	2	×	A	<a href="#">EC-265</a>
P0443	0443	PURG VOLUME CONT/V	—	2	×	A	<a href="#">EC-272</a>
P0444	0444	PURG VOLUME CONT/V	—	2	×	B	<a href="#">EC-277</a>
P0445	0445	PURG VOLUME CONT/V	—	2	×	B	<a href="#">EC-277</a>
P0447	0447	VENT CONTROL VALVE	—	2	×	B	<a href="#">EC-280</a>

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page	
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>							
P0448	0448	VENT CONTROL VALVE	—	2	×	B	<a href="#">EC-284</a>	A
P0451	0451	EVAP SYS PRES SEN	—	2	×	A	<a href="#">EC-288</a>	EC
P0452	0452	EVAP SYS PRES SEN	—	2	×	B	<a href="#">EC-291</a>	
P0453	0453	EVAP SYS PRES SEN	—	2	×	B	<a href="#">EC-296</a>	C
P0455	0455	EVAP GROSS LEAK	—	2	×	A	<a href="#">EC-302</a>	
P0456	0456	EVAP VERY SML LEAK	× <sup>*7</sup>	2	×	A	<a href="#">EC-308</a>	D
P0460	0460	FUEL LEV SEN SLOSH	—	2	×	A	<a href="#">EC-314</a>	
P0461	0461	FUEL LEVEL SENSOR	—	2	×	B	<a href="#">EC-315</a>	
P0462	0462	FUEL LEVL SEN/CIRC	—	2	×	B	<a href="#">EC-317</a>	E
P0463	0463	FUEL LEVL SEN/CIRC	—	2	×	B	<a href="#">EC-317</a>	
P0500	0500	VEHICLE SPEED SEN A <sup>*6</sup>	—	2	×	B	<a href="#">EC-320</a>	F
P0506	0506	ISC SYSTEM	—	2	×	B	<a href="#">EC-323</a>	
P0507	0507	ISC SYSTEM	—	2	×	B	<a href="#">EC-325</a>	
P050A	050A	COLD START CONTROL	—	2	×	A	<a href="#">EC-327</a>	G
P050E	050E	COLD START CONTROL	—	2	×	A	<a href="#">EC-327</a>	
P0605	0605	ECM	—	1 or 2	× or —	B	<a href="#">EC-329</a>	H
P0607	0607	ECM	—	1 (CVT) 2 (M/T)	× (CVT) — (M/T)	B	<a href="#">EC-331</a>	
P0643	0643	SENSOR POWER/CIRC	—	1	×	B	<a href="#">EC-332</a>	I
P0705	0705	T/M RANGE SENSOR A	—	2	×	B	<a href="#">TM-106</a>	
P0710	0710	FLUID TEMP SENSOR A <sup>*9</sup>	—	1	×	B	<a href="#">TM-109</a>	J
P0715	0715	INPUT SPEED SENSOR A	—	2	×	B	<a href="#">TM-112</a>	
P0720	0720	OUTPUT SPEED SENSOR <sup>*6</sup>	—	2	×	B	<a href="#">TM-115</a>	
P0740	0740	TORQUE CONVERTER	—	2	×	B	<a href="#">TM-119</a>	K
P0744	0744	TORQUE CONVERTER	—	2	×	B	<a href="#">TM-122</a>	
P0745	0745	PC SOLENOID A	—	2	×	B	<a href="#">TM-125</a>	
P0746	0746	PC SOLENOID A	—	1	×	B	<a href="#">TM-127</a>	L
P0776	0776	PC SOLENOID B	—	2	×	B	<a href="#">TM-129</a>	
P0778	0778	PC SOLENOID B	—	2	×	B	<a href="#">TM-131</a>	M
P0840	0840	FLUID PRESS SEN/SW A	—	2	×	B	<a href="#">TM-133</a>	
P0850	0850	P-N POS SW/CIRCUIT	—	2	×	B	<a href="#">EC-334</a>	
P1148	1148	CLOSED LOOP-B1	—	1	×	A	<a href="#">EC-337</a>	N
P1212	1212	TCS/CIRC	—	2	—	—	<a href="#">EC-338</a>	
P1217	1217	ENG OVER TEMP	—	1	×	B	<a href="#">EC-339</a>	O
P1225	1225	CTP LEARNING-B1	—	2	—	—	<a href="#">EC-343</a>	
P1226	1226	CTP LEARNING-B1	—	2	—	—	<a href="#">EC-345</a>	
P1550	1550	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-347</a>	P
P1551	1551	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-351</a>	
P1552	1552	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-351</a>	
P1553	1553	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-355</a>	
P1554	1554	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-359</a>	
P1564	1564	ASCD SW	—	1	—	—	<a href="#">EC-363</a>	

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group*4	Reference page
CONSULT-III GST*2	ECM*3						
P1572	1572	ASCD BRAKE SW	—	1	—	—	<a href="#">EC-366</a>
P1574	1574	ASCD VHL SPD SEN	—	1	—	—	<a href="#">EC-373</a>
P1610	1610	LOCK MODE	—	2	—	—	<a href="#">SEC-33</a>
P1611	1611	ID DISCORD, IMMU-ECM	—	2	—	—	<a href="#">SEC-34</a>
P1612	1612	CHAIN OF ECM-IMMU	—	2	—	—	<a href="#">SEC-36</a>
P1614	1614	CHAIN OF IMMU-KEY	—	2	—	—	<a href="#">SEC-6</a>
P1615	1615	DIFFERENCE OF KEY	—	2	—	—	<a href="#">SEC-6</a>
P1715	1715	IN PULY SPEED	—	2	—	—	<a href="#">EC-375</a>
P1740	1740	SLCT SOLENOID	—	2	×	B	<a href="#">TM-148</a>
P1777	1777	STEP MOTOR	—	1	×	B	<a href="#">TM-151</a>
P1778	1778	STEP MOTOR	—	2	×	B	<a href="#">TM-154</a>
P1805	1805	BRAKE SW/CIRCUIT	—	2	—	—	<a href="#">EC-377</a>
P2100	2100	ETC MOT PWR-B1	—	1	×	B	<a href="#">EC-380</a>
P2101	2101	ETC FNCTN/CIRC-B1	—	1	×	B	<a href="#">EC-383</a>
P2103	2103	ETC MOT PWR	—	1	×	B	<a href="#">EC-380</a>
P2118	2118	ETC MOT-B1	—	1	×	B	<a href="#">EC-387</a>
P2119	2119	ETC ACTR-B1	—	1	×	B	<a href="#">EC-389</a>
P2122	2122	APP SEN 1/CIRC	—	1	×	B	<a href="#">EC-391</a>
P2123	2123	APP SEN 1/CIRC	—	1	×	B	<a href="#">EC-391</a>
P2127	2127	APP SEN 2/CIRC	—	1	×	B	<a href="#">EC-394</a>
P2128	2128	APP SEN 2/CIRC	—	1	×	B	<a href="#">EC-394</a>
P2135	2135	TP SENSOR-B1	—	1	×	B	<a href="#">EC-398</a>
P2138	2138	APP SENSOR	—	1	×	B	<a href="#">EC-401</a>
P2A00	2A00	A/F SENSOR1 (B1)	—	2	×	A	<a href="#">EC-405</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: This number is prescribed by SAE J2012/ISO 15031-6.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*4: Refer to [EC-34, "Description"](#), "PERMANENT DTC".

\*5: The troubleshooting for this DTC needs CONSULT-III.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

\*7: SRT code will not be set if the self-diagnostic result is NG.

\*8: When the ECM is in the mode that displays SRT status, MIL may flash. For the details, refer to [EC-28, "Description"](#).

\*9: When erasing this DTC, always use CONSULT-III or GST.

## Test Value and Test Limit

INFOID:000000006504059

The following is the information specified in Service \$06 of SAE J1979/ISO 15031-5.

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. (e.g., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

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
			P014C	8DH	04H	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1
			P014C	8EH	04H	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1
			P014D	8FH	84H	O2 Sensor Slow Response - Lean to Rich Bank 1 Sensor 1
			P014D	90H	84H	O2 Sensor Slow Response - Lean to Rich Bank 1 Sensor 1
			P015A	91H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1
			P015A	92H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1
	P015B	93H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1		
	P015B	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1		
	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
	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

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[MR18DE (EXCEPT FOR CALIFORNIA)]

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
			P014E	8DH	04H	O2 Sensor Slow Response - Rich to Lean Bank 2 Sensor 1
			P014E	8EH	04H	O2 Sensor Slow Response - Rich to Lean Bank 2 Sensor 1
			P014F	8FH	84H	O2 Sensor Slow Response - Lean to Rich Bank 2 Sensor 1
			P014F	90H	84H	O2 Sensor Slow Response - Lean to Rich Bank 2 Sensor 1
			P015C	91H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 2 Sensor 1
			P015C	92H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 2 Sensor 1
			P015D	93H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1
	P015D	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1		
	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

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[MR18DE (EXCEPT FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATALYST	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
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
VVT SYSTEM	35H	VVT Monitor (Bank1)	P0011	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0014	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0011	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	36H	VVT Monitor (Bank2)	P0021	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0024	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0021	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)

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[MR18DE (EXCEPT FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
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 0.04 inch)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			P0456	81H	FDH	Maximum internal pressure of EVAP system during monitoring
			P0456	82H	FDH	Internal pressure of EVAP system at the end of 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 heater (Bank 1)	Low Input:P0037 High Input:P0038	80H	0CH	Converted value of Heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (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 heater (Bank 2)	Low Input:P0057 High Input:P0058	80H	0CH	Converted value of Heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (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
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



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[MR18DE (EXCEPT FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple Cylinder Misfires	P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder
			P0305	84H	24H	Misfiring counter at 1000 revolution of the fifth cylinder
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder
			P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			P0302	8AH	24H	Misfiring counter at 200 revolution of the second cylinder
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder
			P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders

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[MR18DE (EXCEPT FOR CALIFORNIA)]

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 >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## SYMPTOM DIAGNOSIS

### ENGINE CONTROL SYSTEM SYMPTOMS

#### Symptom Table

INFOID:000000006504060

#### 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	<a href="#">EC-421</a>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-487</a>
	Fuel injector circuit	1	1	2	3	2		2	2			2			<a href="#">EC-418</a>
	Evaporative emission system	3	3	4	4	4	4	4	4	4	4	4			<a href="#">EC-87</a>
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		<a href="#">EC-436</a>
	Incorrect idle speed adjustment						1	1	1	1		1			<a href="#">EC-23</a>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<a href="#">EC-383</a> <a href="#">EC-387</a>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<a href="#">EC-23</a>
	Ignition circuit	1	1	2	2	2		2	2			2			<a href="#">EC-424</a>
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			<a href="#">EC-134</a>
Mass air flow sensor circuit		1			2										<a href="#">EC-153</a> <a href="#">EC-160</a>
Engine coolant temperature sensor circuit							3			3					<a href="#">EC-169</a> <a href="#">EC-172</a>
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			<a href="#">EC-185</a> <a href="#">EC-189</a> <a href="#">EC-192</a> <a href="#">EC-215</a> <a href="#">EC-405</a>
Throttle position sensor circuit							2			2					<a href="#">EC-175</a> <a href="#">EC-235</a> <a href="#">EC-343</a> <a href="#">EC-345</a> <a href="#">EC-398</a>
Accelerator pedal position sensor circuit				3	2	1									<a href="#">EC-391</a> <a href="#">EC-394</a> <a href="#">EC-401</a>
Knock sensor circuit				2								3			<a href="#">EC-244</a>

# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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												<a href="#">EC-246</a>
Camshaft position sensor (PHASE) circuit	3	2												<a href="#">EC-250</a>
Vehicle speed signal circuit		2	3		3						3			<a href="#">EC-320</a>
ECM	2	2	3	3	3	3	3	3	3	3	3			<a href="#">EC-329</a> <a href="#">EC-331</a>
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			<a href="#">EC-140</a>
transmission range switch circuit			3		3		3	3			3			<a href="#">EC-334</a>
PNP switch circuit			3		3		3	3			3			<a href="#">EC-334</a>
Refrigerant pressure sensor circuit		2				3			3		4			<a href="#">EC-437</a>
Electrical load signal circuit							3							<a href="#">EC-416</a>
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<a href="#">HAC-131</a> <a href="#">HAC-211</a>
ABS actuator and electric unit (control unit)			4											<a href="#">BRC-96</a>

1 - 6: The numbers refer to the order of inspection.

(continued on next table)

## SYSTEM — ENGINE MECHANICAL & OTHER

# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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	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												<a href="#">FL-13</a>					
	Fuel piping			5	5	5		5	5			5			<a href="#">FL-4</a>					
	Vapor lock	5														—				
	Valve deposit																—			
	Poor fuel (Heavy weight gasoline, Low octane)			5	5	5	5		5	5			5				—			
Air	Air duct	5	5	5	5	5	5	5	5	5	5	5	5	5	5	<a href="#">EM-15</a>				
	Air cleaner																			
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)																			
	Electric throttle control actuator																			
	Air leakage from intake manifold/Collector/Gasket																			
Cranking	Battery	1	1	1		1		1	1					1	<a href="#">PG-3</a>					
	Generator circuit														<a href="#">CHG-5</a>					
	Starter circuit	3										1			<a href="#">STR-2</a>					
	Signal plate	6													<a href="#">EM-87</a>					
	Transmission range switch	4													<a href="#">TM-106 (CVT)</a>					
	PNP switch	4													<a href="#">TM-8 (M/T)</a>					
Engine	Cylinder head	5	5	5	5	5	5	5	5	5	5	5	5	5	5	<a href="#">EM-66</a>				
	Cylinder head gasket																4		3	
	Cylinder block	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	<a href="#">EM-87</a>			
	Piston																			4
	Piston ring																			
	Connecting rod																			
	Bearing																			
	Crankshaft																			

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# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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		A A	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														<a href="#">EM-43</a>
	Camshaft														<a href="#">EM-54</a>
	Intake valve timing control	5	5	5	5	5		5	5			5			<a href="#">EM-43</a>
	Intake valve												3		<a href="#">EM-66</a>
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			<a href="#">EM-30</a> <a href="#">EX-4</a>
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<a href="#">EM-33</a> <a href="#">LU-7</a> <a href="#">LU-11</a>
	Oil level (Low)/Filthy oil														
Cooling	Radiator/Hose/Radiator filler cap														
	Thermostat									5					
	Water pump														
	Water gallery	5	5	5	5	5		5	5		4	5			<a href="#">CO-13</a> <a href="#">CO-13</a>
	Cooling fan														
	Coolant level (Low)/Contaminated coolant										5				
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												

1 - 6: The numbers refer to the order of inspection.

# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## NORMAL OPERATING CONDITION

### Description

INFOID:000000006504061

#### FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,500 rpm under no load (for example, the selector lever position is neutral and engine speed is over 2,500 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 2,000 rpm, then fuel cut will be cancelled.

**NOTE:**

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-47](#), "[System Description](#)".

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# PRECAUTIONS

< PRECAUTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## PRECAUTION

### PRECAUTIONS

#### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000006504062

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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never 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 WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### **WARNING:**

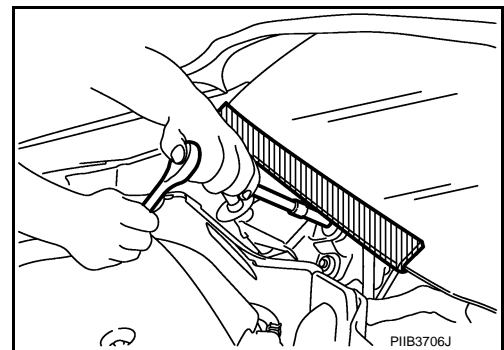
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### Precaution for Procedure without Cowl Top Cover

INFOID:000000006504063

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



#### On Board Diagnosis (OBD) System of Engine and CVT

INFOID:000000006504064

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.)



# PRECAUTIONS

[MR18DE (EXCEPT FOR CALIFORNIA)]

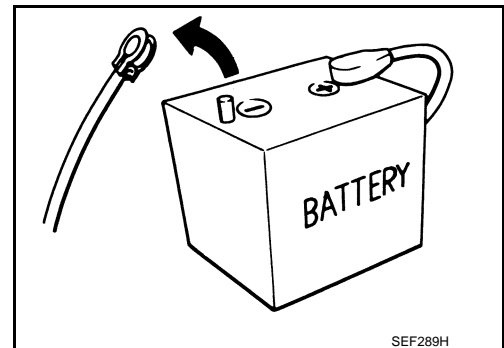
< PRECAUTION >

- 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-93, "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.

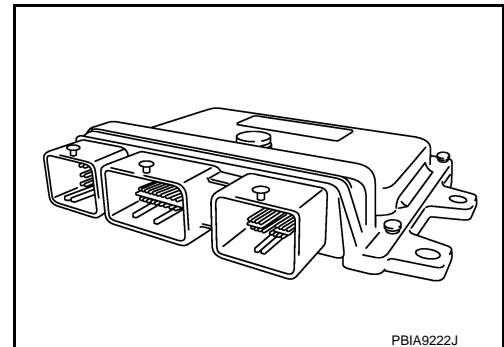
## General Precautions

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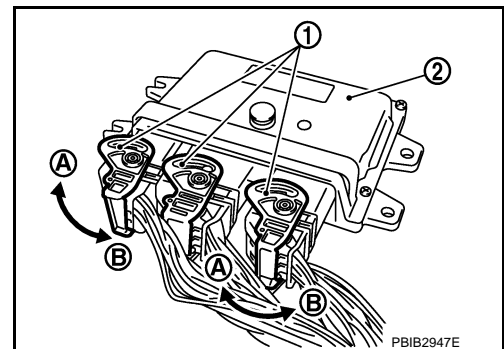
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect negative battery 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. Thus, engine operation can vary slightly in this case. 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 cleared within 24 hours.
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - Freeze frame data
  - 1st trip freeze frame data
  - System readiness test (SRT) codes
  - Test values
- When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.



- 2. ECM
- A. Loosen

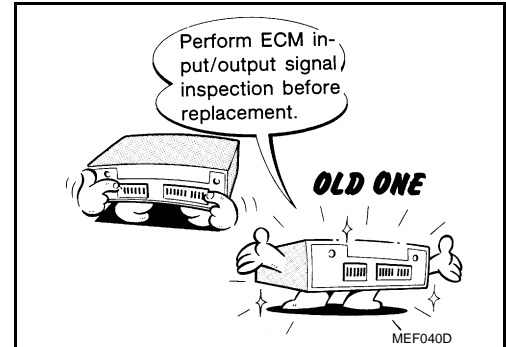
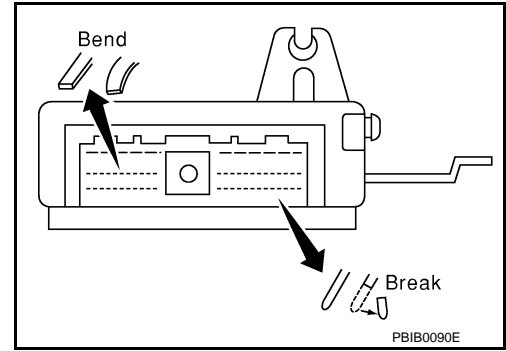


# PRECAUTIONS

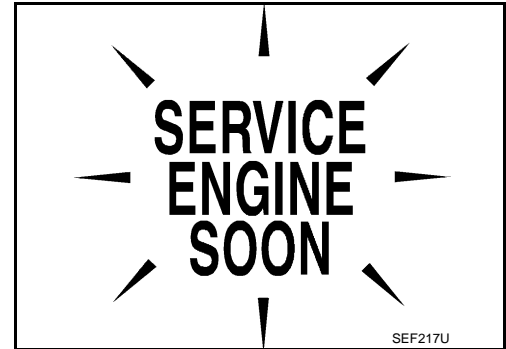
[MR18DE (EXCEPT FOR CALIFORNIA)]

< PRECAUTION >

- 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-439, "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.

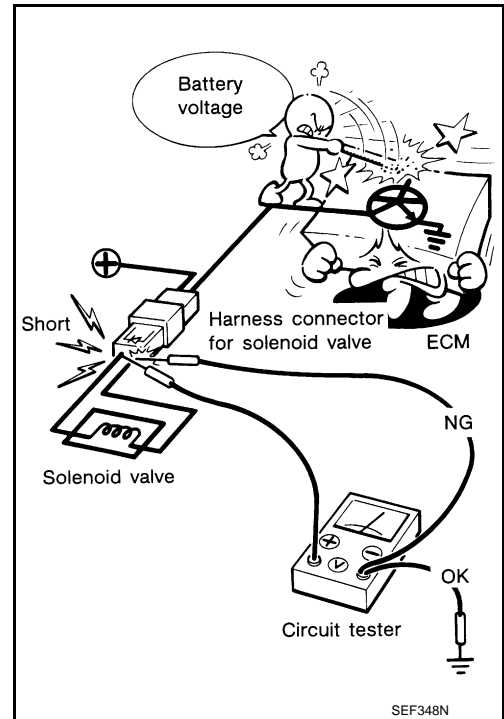


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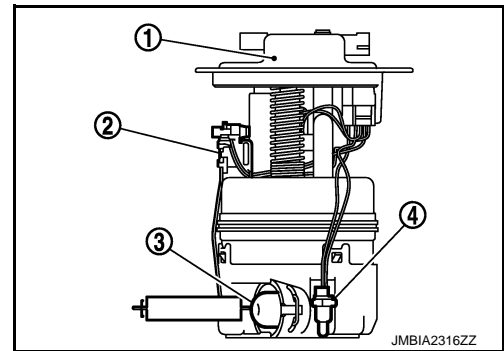
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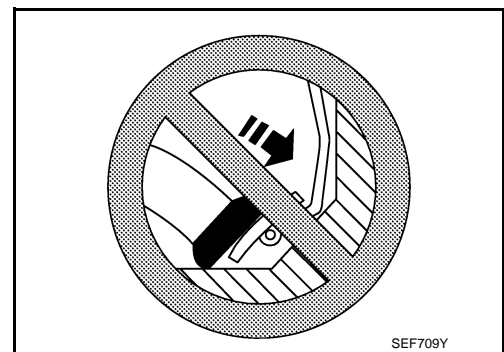
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.
  - Fuel level sensor unit and fuel pump (1)
  - Fuel pressure regulator (2)
  - Fuel level sensor (3)
  - Fuel tank temperature sensor (4)



- 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.



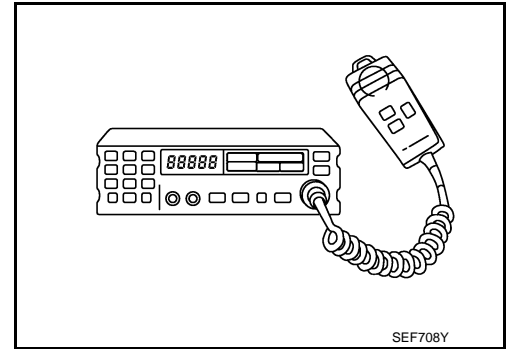
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## PRECAUTIONS

< PRECAUTION >

[MR18DE (EXCEPT FOR CALIFORNIA)]

- 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 >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## PREPARATION

### PREPARATION

#### Special Service Tools

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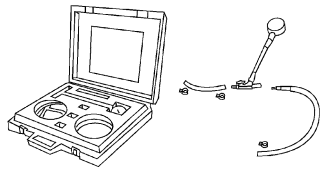
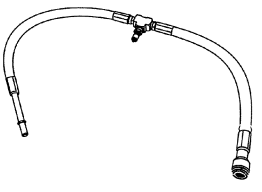
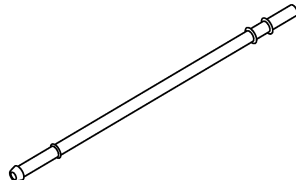
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**NOTE:**

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

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Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge kit  LEC642	Checks fuel pressure
(J-44321-6) Fuel pressure adapter  LBIA0376E	Connects fuel pressure gauge to quick connector type fuel lines.
KV10118400 Fuel tube adapter  PBIB3043E	Measures fuel pressure

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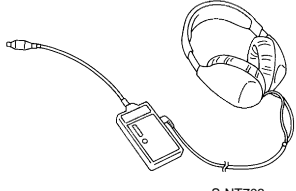
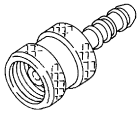
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#### Commercial Service Tools

INFOID:000000006504067

L

Tool name (Kent-Moore No.)	Description
Leak detector i.e.: (J-41416)  S-NT703	Locates the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD)  S-NT704	Applies positive pressure through EVAP service port

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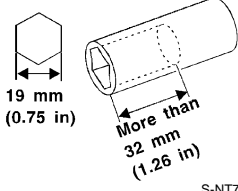
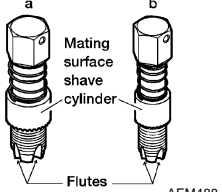

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# PREPARATION

< PREPARATION >

[MR18DE (EXCEPT 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>	Checks fuel tank vacuum relief valve opening pressure
Socket wrench <div style="text-align: center;">  <p>19 mm (0.75 in) More than 32 mm (1.26 in)</p> <p>S-NT705</p> </div>	Removes and installs engine coolant temperature sensor
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;">  <p>a b Mating surface shave cylinder Flutes AEM488</p> </div>	Reconditions the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. <b>a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor</b> <b>b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor</b>
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>	Lubricates oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

## PERIODIC MAINTENANCE

### FUEL PRESSURE

#### Inspection

INFOID:000000006504068

#### FUEL PRESSURE RELEASE

##### ☐ 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 C11 models do not have fuel return system.
- The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.
- Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains seal ability with O-rings inside.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.

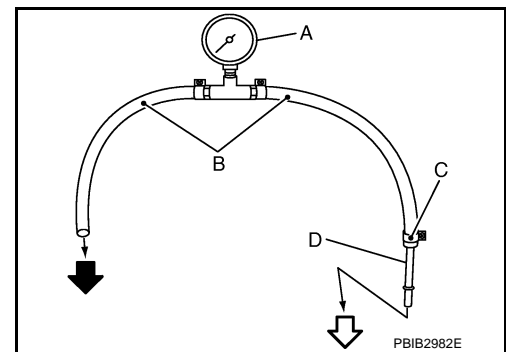
1. Release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.

- ⇐: To quick connector
- ←: To fuel tube (engine side)
- C: Clamp
- Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
- To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
- Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
- Use Pressure Gauge to check fuel pressure.

3. Remove fuel hose. Refer to [EM-36, "Removal and Installation"](#).

- Do not twist or kink fuel hose because it is plastic hose.

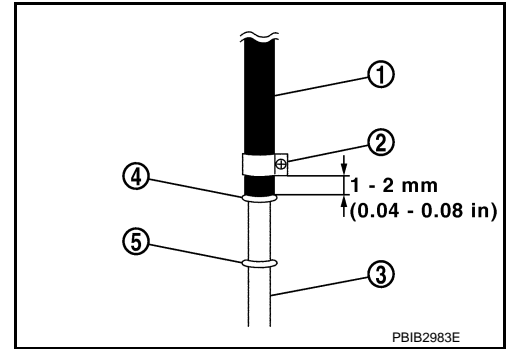


## FUEL PRESSURE

< PERIODIC MAINTENANCE >

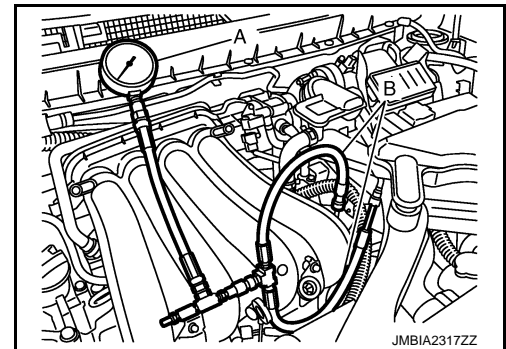
[MR18DE (EXCEPT FOR CALIFORNIA)]

4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
  - No.2 spool (5)
  - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
  - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
  - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
  - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
  - When reconnecting fuel line, always use new clamps.
  - Use a torque driver to tighten clamps.
  - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



### Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg·m, 9 - 13 in·lb)

- Make sure that clamp screw does not contact adjacent parts.
5. Connect fuel tube adapter to quick connector.
    - A: Fuel pressure gauge
    - B: Fuel hose for fuel pressure check
  6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
  7. Turn ignition switch ON and check for fuel leakage.
  8. Start engine and check for fuel leakage.
  9. Read the indication of fuel pressure gauge.
    - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
    - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
  - Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging
  - Fuel pump
  - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.  
If NG, repair or replace.
12. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".



# EVAP LEAK CHECK

< PERIODIC MAINTENANCE >

[MR18DE (EXCEPT FOR CALIFORNIA)]

## EVAP LEAK CHECK

### Inspection

INFOID:000000006504069

#### CAUTION:

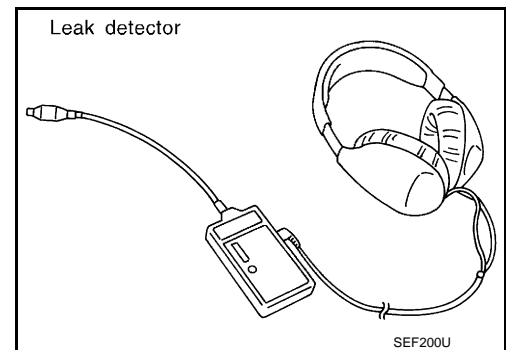
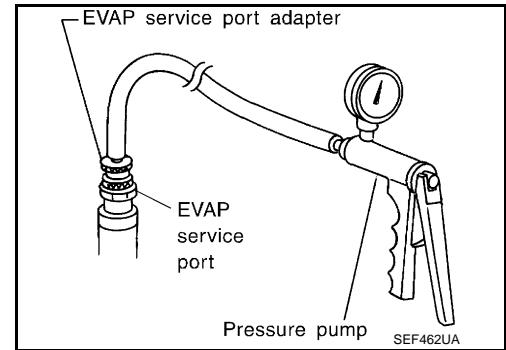
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

#### NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter [commercial service tool: (J-41413-OBDD)] to the EVAP service port may cause a leak.

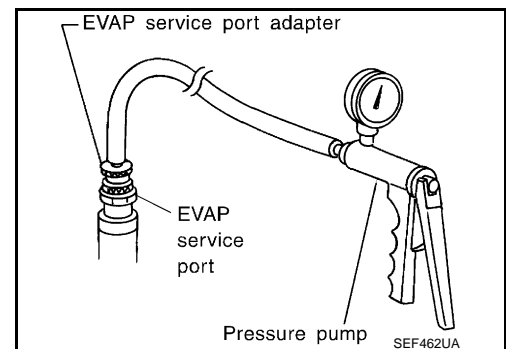
#### Ⓟ WITH CONSULT-III

1. Install EVAP service port adapter [commercial service tool: (J-41413-OBDD)] 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 [commercial service tool: (J-41413-OBDD)] and hose with pressure pump.
7. Locate the leak using a leak detector [commercial service tool: (J-41416)]. Refer to [EC-87. "System Description"](#).



#### ⓧ WITHOUT CONSULT-III

1. Install EVAP service port adapter [commercial service tool: (J-41413-OBDD)] 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/cm<sup>2</sup>, 0.2 to 0.4 psi).
4. Remove EVAP service port adapter [commercial service tool: (J-41413-OBDD)] and hose with pressure pump.



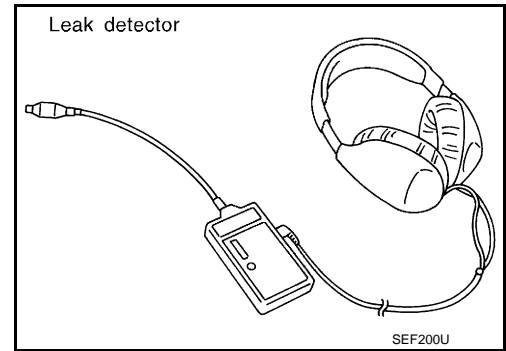
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## EVAP LEAK CHECK

< PERIODIC MAINTENANCE >

[MR18DE (EXCEPT FOR CALIFORNIA)]

5. Locate the leak using a leak detector [commercial service tool: (J-41416)]. Refer to [EC-87, "System Description"](#).



# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR18DE (EXCEPT FOR CALIFORNIA)]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Idle Speed

INFOID:0000000006504073

A

EC

Transmission	Condition	Specification
CVT	No load* (in P or N position)	700 ± 50 rpm
M/T	No load* (in Neutral position)	700 ± 50 rpm

C

\*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

D

E

#### Ignition Timing

INFOID:0000000006504074

Transmission	Condition	Specification
CVT	No load* (in P or N position)	13 ± 5°BTDC
M/T	No load* (in Neutral position)	13 ± 5°BTDC

F

G

\*: Under the following conditions

- A/C switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

H

#### Calculated Load Value

INFOID:0000000006504075

Condition	Specification (Using CONSULT-III or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

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#### Mass Air Flow Sensor

INFOID:0000000006504076

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle	0.9 – 1.3V*
Mass air flow (Using CONSULT-III or GST)	1.0 – 4.0 g/sec at idle* 2.0 – 10.0 g/sec at 2,500 rpm*

L

M

\*: Engine is warmed up to normal operating temperature and running under no load.

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P

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

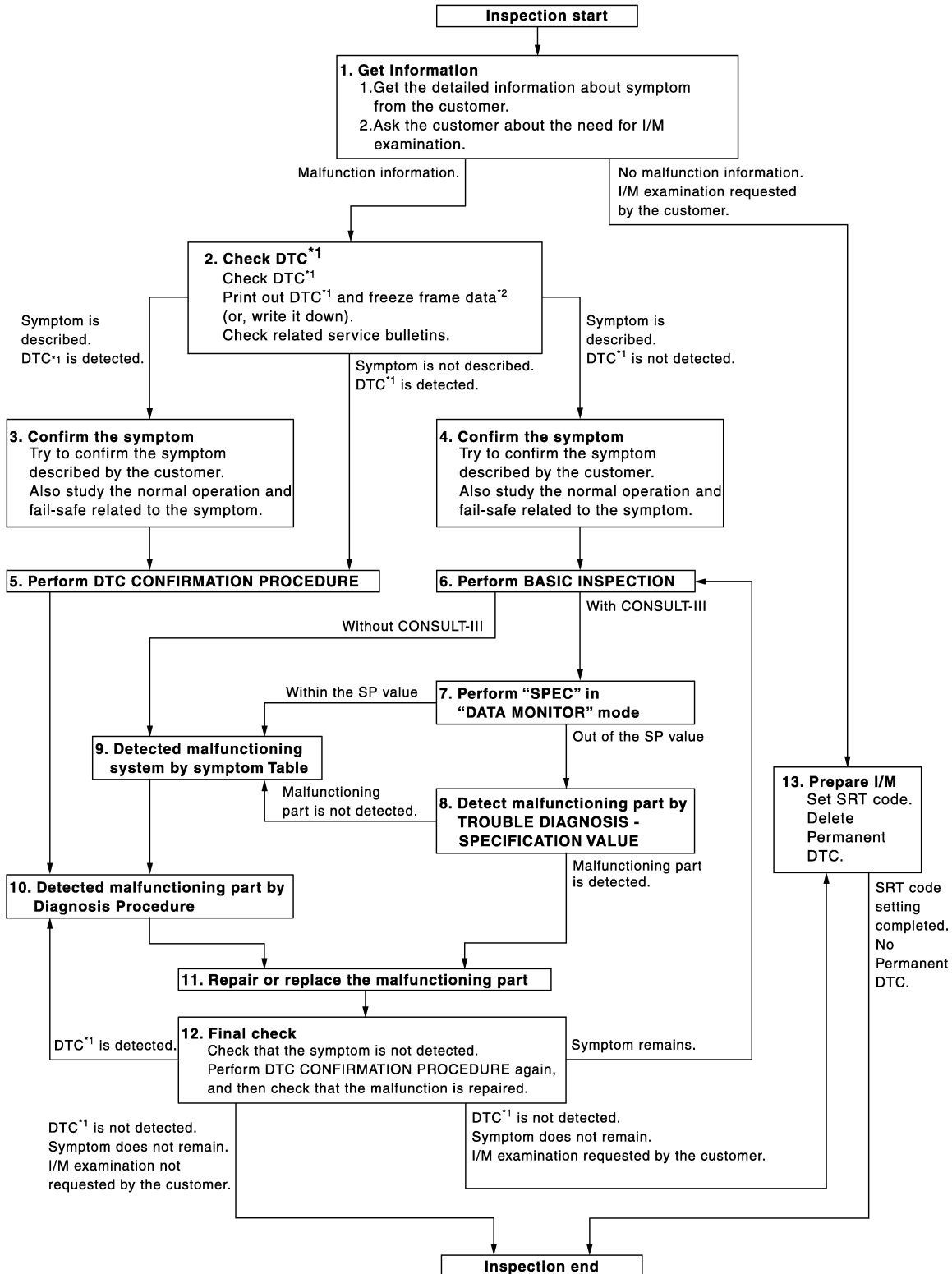
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000006942805

#### OVERALL SEQUENCE



JSBIA0067GB

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

\*1: Include 1st trip DTC.

\*2: Include 1st trip freeze frame data.

## DETAILED FLOW

### 1. GET INFORMATION FOR SYMPTOM

1. 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-495, "Diagnostic Work Sheet"](#).)
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.

No malfunction information, but a request for I/M examination>>GO TO 13.

### 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-591, "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-977, "Symptom Table"](#).)
3. Check related service bulletins for information.

Are any symptoms described and any DTCs 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-981, "Description"](#) and [EC-963, "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-981, "Description"](#) and [EC-963, "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-965, "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?

# DIAGNOSIS AND REPAIR WORK FLOW

[MR18DE (FOR CALIFORNIA)]

< BASIC INSPECTION >

- YES >> GO TO 10.  
NO >> Check according to [GI-41, "Intermittent Incident"](#).

## 6. PERFORM BASIC INSPECTION

Perform [EC-497, "BASIC INSPECTION : Special Repair Requirement"](#).

Do you have CONSULT-III?

- 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", "MAS A/F SE-B2", "B/FUEL SCHDL", "A/F ALPHA-B1", and "A/F ALPHA-B2" are within the SP value using CONSULT-III "SPEC" in "DATA MONITOR" mode. Refer to [EC-611, "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-612, "Diagnosis Procedure"](#).

Is a malfunctioning part detected?

- YES >> GO TO 11.  
NO >> GO TO 9.

## 9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to [EC-977, "Symptom Table"](#) based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

>> 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 [GI-44, "Circuit Inspection"](#).

Is a 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-939, "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-591, "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 completely repaired.

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.

# DIAGNOSIS AND REPAIR WORK FLOW

[MR18DE (FOR CALIFORNIA)]

## < BASIC INSPECTION >

NO-1 >> No request for I/M examination from the customer: Before returning the vehicle to the customer, always erase unnecessary DTC in ECM and TCM (Transmission Control Module). Refer to [EC-591, "Diagnosis Description"](#).

NO-2 >> I/M examination, requested from the customer: GO TO 13.

## 13. PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to [EC-506, "Description"](#).
2. Erase permanent DTCs. Refer to [EC-512, "Description"](#).

>> INSPECTION END

## Diagnostic Work Sheet

INFOID:000000006942806

### DESCRIPTION

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

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

Utilize a diagnostic worksheet like the WORKSHEET SAMPLE below in order to organize all the information for troubleshooting.

Some conditions may cause the MIL to illuminate steady or blink and DTC to be detected. Examples:

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

### KEY POINTS

**WHAT** ..... Vehicle & engine model  
**WHEN** ..... Date, Frequencies  
**WHERE**..... Road conditions  
**HOW** ..... Operating conditions,  
Weather conditions,  
Symptoms

SEF907L





## INSPECTION AND ADJUSTMENT

### BASIC INSPECTION

#### BASIC INSPECTION : Special Repair Requirement

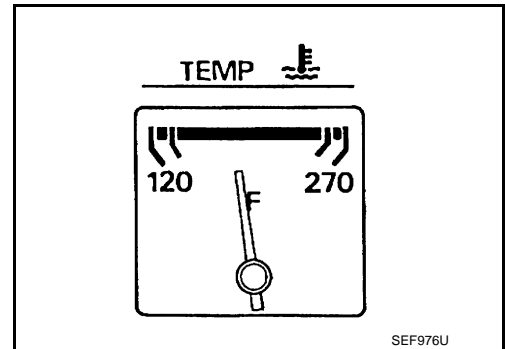
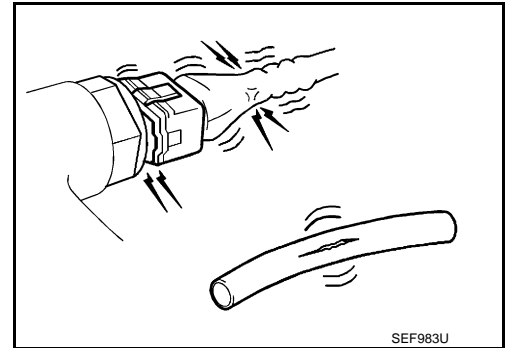
INFOID:000000006942807

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### 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.

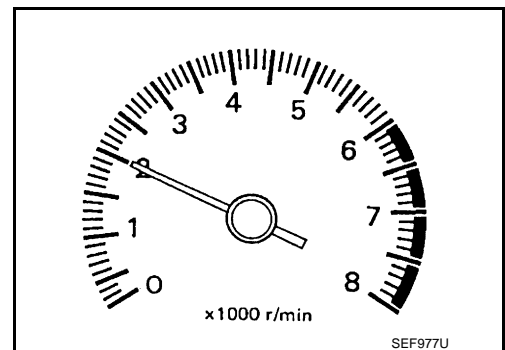


5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

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 IDLE SPEED

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

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# INSPECTION AND ADJUSTMENT

[MR18DE (FOR CALIFORNIA)]

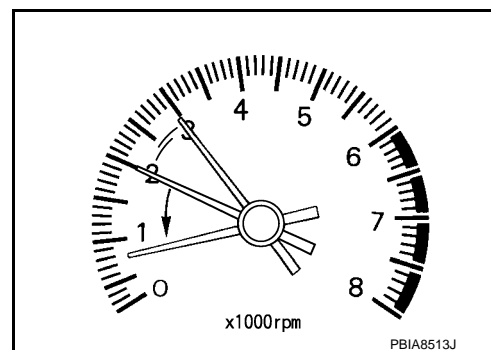
## < BASIC INSPECTION >

- 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-501, "IDLE SPEED : Special Repair Requirement"](#). For specification, refer to [EC-993, "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-502, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

## 5.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 6.

## 6.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-503, "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 IDLE SPEED AGAIN

- Start engine and warm it up to normal operating temperature.
- Check idle speed.  
For procedure, refer to [EC-501, "IDLE SPEED : Special Repair Requirement"](#).  
For specification, refer to [EC-993, "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-740, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-736, "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 rare.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [SEC-9, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#) or [SEC-173, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 4.

## 10.CHECK IGNITION TIMING

- Run engine at idle.

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

2. Check ignition timing with a timing light.  
For procedure, refer to [EC-501, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-993, "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-502, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 12.

## 12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 13.

## 13.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-503, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

Is Idle Air Volume Learning carried out successfully?

- YES >> GO TO 14.  
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

## 14.CHECK IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.  
For procedure, refer to [EC-501, "IDLE SPEED : Special Repair Requirement"](#).  
For specification, refer to [EC-993, "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-501, "IGNITION TIMING : Special Repair Requirement"](#). For specification, refer to [EC-993, "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-44, "Removal and Installation"](#).

Is the inspection result normal?

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

## 17.DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-740, "DTC Logic"](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-736, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 18.  
NO >> Repair or replace. Then GO TO 4.

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# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## 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 rare.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-500. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> GO TO 4.

## 19. INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, perform [EC-500. "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:000000006942808

When replacing ECM, this procedure must be performed.

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:000000006942809

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

Refer to [SEC-9. "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#) or [SEC-173. "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"](#).

>> GO TO 2.

#### 2. PERFORM VIN REGISTRATION

Refer to [EC-501. "VIN REGISTRATION : Special Repair Requirement"](#).

>> GO TO 3.

#### 3. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to [EC-502. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 4.

#### 4. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to [EC-502. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).

>> GO TO 5.

#### 5. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-503. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"](#).

>> END

## IDLE SPEED

### IDLE SPEED : Description

INFOID:000000006942810

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

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## IDLE SPEED : Special Repair Requirement

INFOID:000000006942811

### 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:000000006942812

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

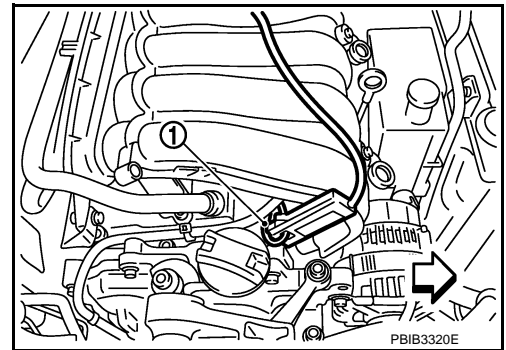
### IGNITION TIMING : Special Repair Requirement

INFOID:000000006942813

### 1.CHECK IGNITION TIMING

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

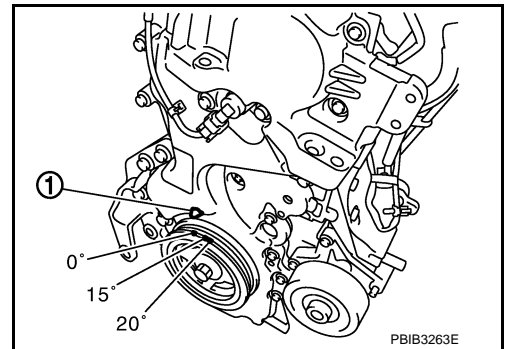
 : Vehicle front



2. Check ignition timing.

1 : Timing indicator

>> INSPECTION END



## VIN REGISTRATION

### VIN REGISTRATION : Description

INFOID:000000006942814

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).

### VIN REGISTRATION : Special Repair Requirement

INFOID:000000006942815

### 1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to [GI-23, "Model Variation"](#).

>> 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.

&gt;&gt; END

**ACCELERATOR PEDAL RELEASED POSITION LEARNING****ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description** INFOID:000000006942816

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:000000006942817**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.

&gt;&gt; END

**THROTTLE VALVE CLOSED POSITION LEARNING****THROTTLE VALVE CLOSED POSITION LEARNING : Description** INFOID:000000006942818

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

**THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement**INFOID:000000006942819**1. START****With CONSULT-III**

1. Turn ignition switch ON.
2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode of "ENGINE" using CONSULT-III.
3. Follow the instructions on the CONSULT-III display.
4. Turn ignition switch OFF and wait at least 10 seconds.  
Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

**Without CONSULT-III**

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.

&gt;&gt; END

**IDLE AIR VOLUME LEARNING**

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## IDLE AIR VOLUME LEARNING : Description

INFOID:000000006942821

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:000000006942821

### 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 12.9 V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- Selector lever: P or N (CVT), Neutral (M/T)
- 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 "FLUID TEMP SE" in "DATA MONITOR" mode of "TRANSMISSION" system indicates less than 0.9 V.
- 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-502, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-502, "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.

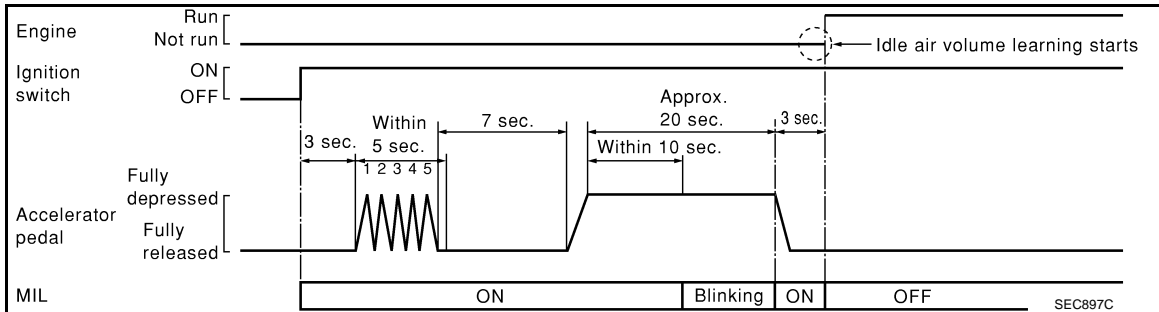
1. Perform Accelerator Pedal Released Position Learning. Refer to [EC-502, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"](#).
2. Perform Throttle Valve Closed Position Learning. Refer to [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
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 >

[MR18DE (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: 700 ± 50 rpm (in P or N position) M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 13 ± 5° BTDC (in P or N position) M/T: 13 ± 5° BTDC (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-611, "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 again:

- Engine stalls.
- Erroneous idle.

>> INSPECTION END

### MIXTURE RATIO SELF-LEARNING VALUE CLEAR

### MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000006942822

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 >

[MR18DE (FOR CALIFORNIA)]

## MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000006942823

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".

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#### 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.

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>> END

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# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## HOW TO SET SRT CODE

### Description

INFOID:000000006952156

### OUTLINE

In order to set all SRTs, the self-diagnoses as in the "SRT ITEM" table must have been performed at least once. Each diagnosis may require actual driving for a long period of time under various conditions.

### SRT ITEM

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

SRT item <sup>*1</sup> (CONSULT-III indication)	Performance Priority <sup>*2</sup>	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
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011

\*1: Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.

\*2: 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.

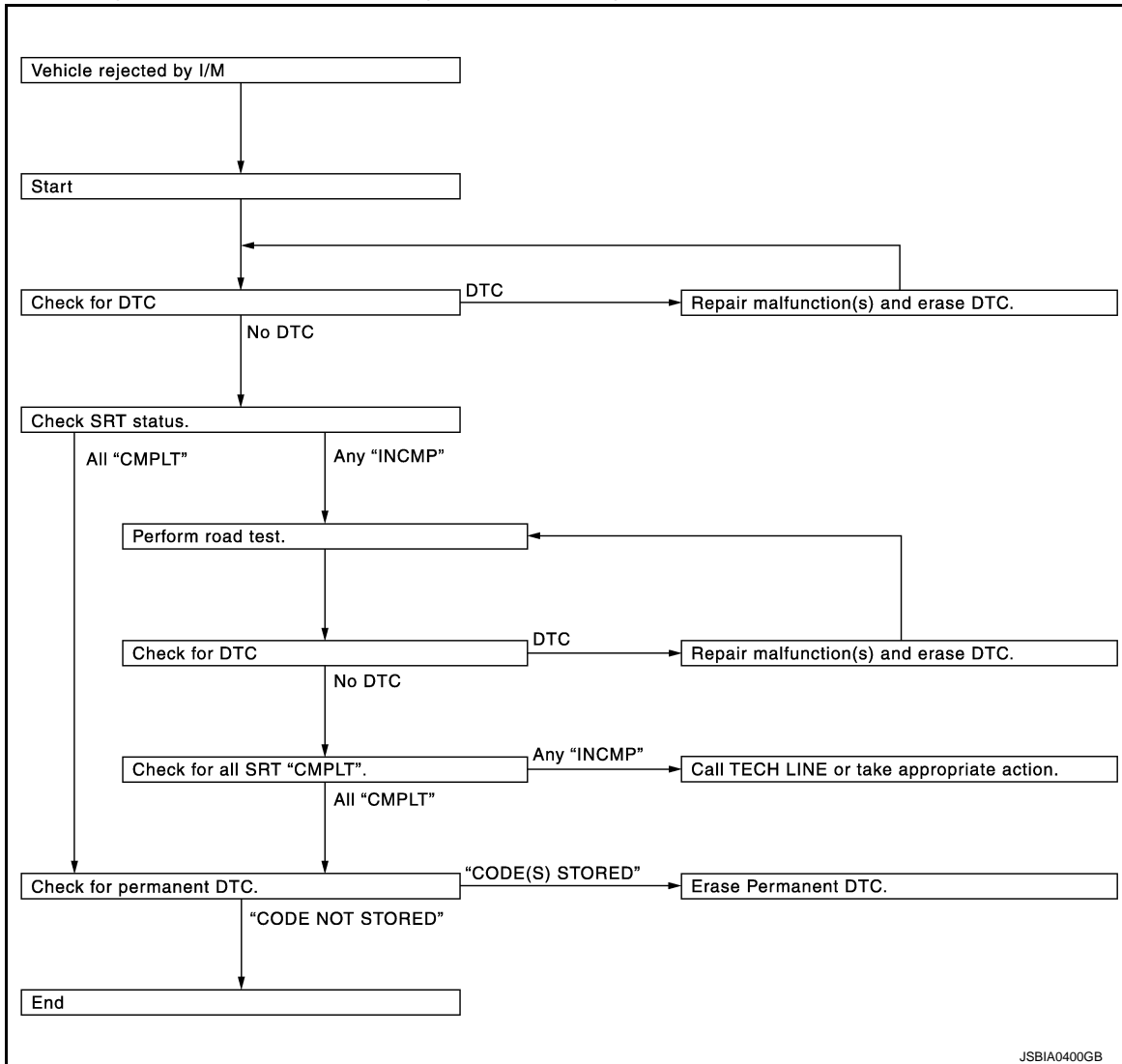
### SRT SERVICE PROCEDURE

# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

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



## SRT Set Driving Pattern

INFOID:000000006952157

**CAUTION:**

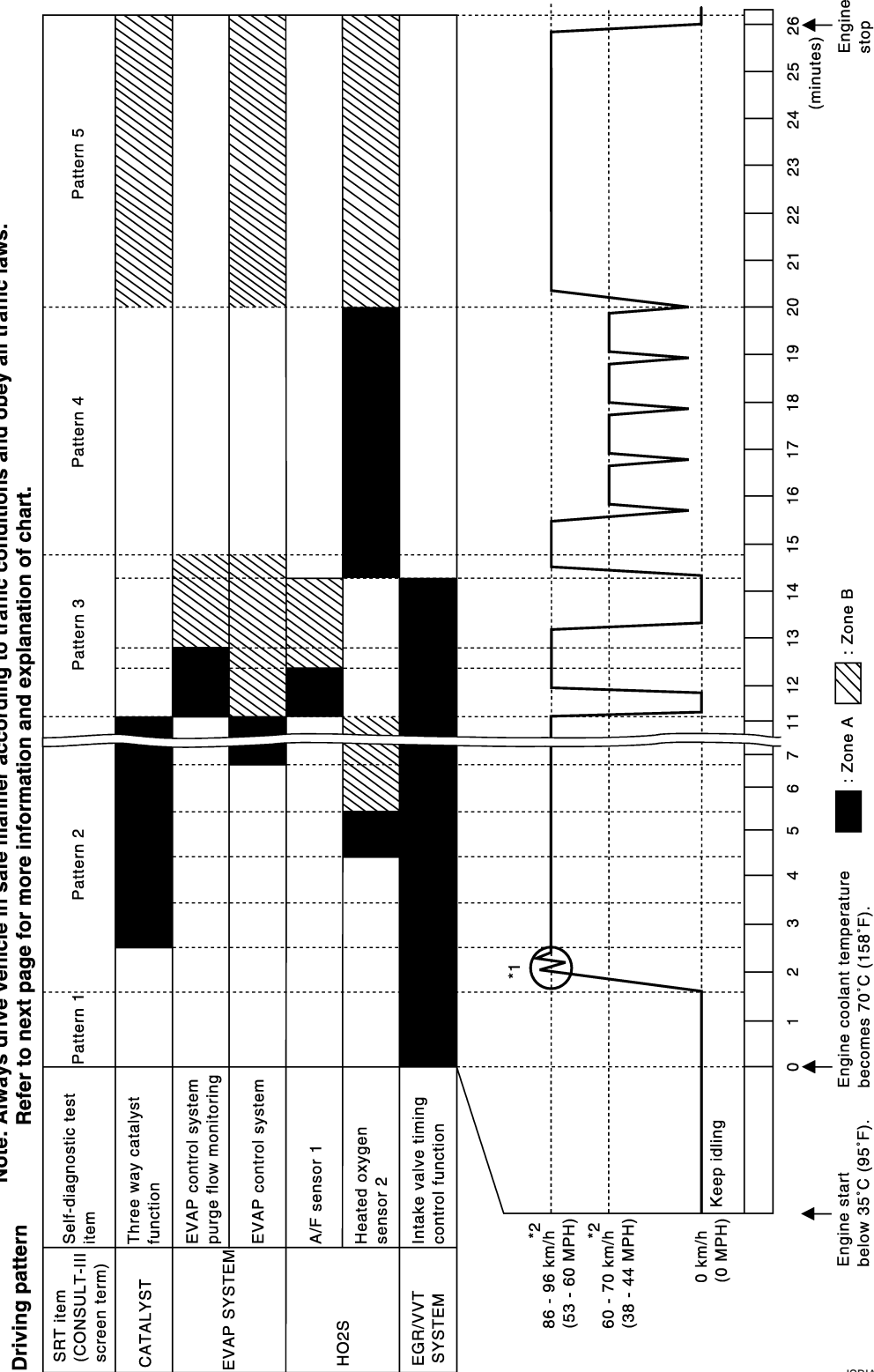
# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

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

**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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\*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.

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
- "Zone A" is the fastest time where required for the diagnosis under normal conditions\*. If the diagnosis is not completed within "Zone A", the diagnosis can still be performed within "Zone B".

# HOW TO SET SRT CODE

[MR18DE (FOR CALIFORNIA)]

## < BASIC INSPECTION >

- \*: Normal conditions
- Sea level
- Flat road
- Ambient air temperature: 20 – 30°C (68 – 86°F)

### NOTE:

Diagnosis is performed as quickly as possible under normal conditions. However, under other conditions, diagnosis may also be performed. [For example: ambient air temperature other than 20 – 30°C (68 – 86°F)]

## Work Procedure

INFOID:000000006952158

### 1. CHECK DTC

Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to [EC-967, "DTC Index"](#).
- NO >> GO TO 2.

### 2. CHECK SRT STATUS

With CONSULT-III

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

Without CONSULT-III

Perform "SRT status" mode with [EC-599, "On Board Diagnosis Function"](#).

With GST

Select Service \$01 with GST.

Is SRT code(s) set?

- YES >> GO TO 11.
- NO-1 >> With CONSULT-III: GO TO 3.
- NO-2 >> Without CONSULT-III: GO TO 4.

### 3. DTC CONFIRMATION PROCEDURE

1. Select "SRT WORK SUPPORT" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.
2. For SRT(s) that is not set, perform the corresponding "DTC CONFIRMATION PROCEDURE" according to the "Performance Priority" in the "SRT ITEM" table. Refer to [EC-506, "Description"](#).
3. Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to [EC-967, "DTC Index"](#).
- NO >> GO TO 10.

### 4. PERFORM ROAD TEST

- Check the "Performance Priority" in the "SRT ITEM" table. Refer to [EC-506, "Description"](#).
- Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to [EC-507, "SRT Set Driving Pattern"](#).

In order to set all SRTs, the SRT set driving pattern must be performed at least once.

>> GO TO 5.

### 5. PATTERN 1

1. Check the vehicle condition;
  - Engine coolant temperature is –10 to 35°C (14 to 95°F).
  - Fuel tank temperature is more than 0°C (32°F).
2. Start the engine.
3. Keep engine idling until the engine coolant temperature is greater than 70°C (158°F)

### NOTE:

ECM terminal voltage is follows;

- Engine coolant temperature
    - –10 to 35°C (14 to 95°F): 3.0 – 4.3 V
    - 70°(158°F): Less than 4.1 V
  - Fuel tank temperature: Less than 1.4 V
- Refer to [EC-939, "Reference Value"](#).

# HOW TO SET SRT CODE

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

>> GO TO 6.

## 6.PATTERN 2

1. Drive the vehicle. And 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.
2. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again

### NOTE:

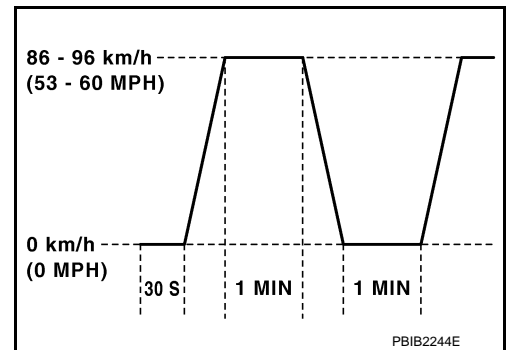
- Checking the vehicle speed with GST is advised.
- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

>> GO TO 7.

## 7.PATTERN 3

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during deceleration of vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).

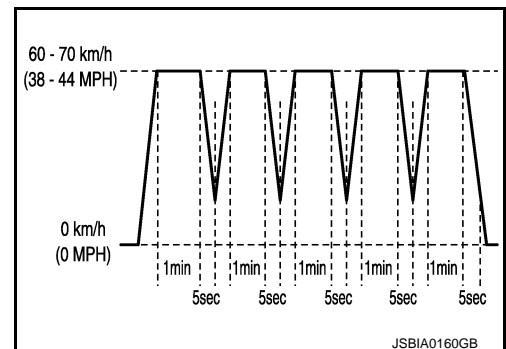
>> GO TO 8.



## 8.PATTERN 4

- Operate vehicle following the driving pattern shown in the figure.
- Drive the vehicle in a proper gear at 60 km/h (38 MPH) and maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.

>> GO TO 9.



## 9.PATTERN 5

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted again.

>> GO TO 10.

## 10.CHECK SRT STATUS

Ⓟ With CONSULT-III

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

ⓧ Without CONSULT-III

Perform "SRT status" mode with [EC-599. "On Board Diagnosis Function"](#).

Ⓢ With GST

Select Service \$01 with GST.

Is SRT(s) set?

YES >> GO TO 11.

NO >> Call TECH LINE or take appropriate action.

## 11.CHECK PERMANENT DTC

# HOW TO SET SRT CODE

[MR18DE (FOR CALIFORNIA)]

< BASIC INSPECTION >

**NOTE:**

Permanent DTC cannot be checked with a tool other than CONSULT-III or GST.

☐ With CONSULT-III

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

Ⓜ With GST

Select Service \$0A with GST.

Is permanent DTC(s) detected?

YES >> Proceed to [EC-512. "Description"](#).

NO >> END

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# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## HOW TO ERASE PERMANENT DTC

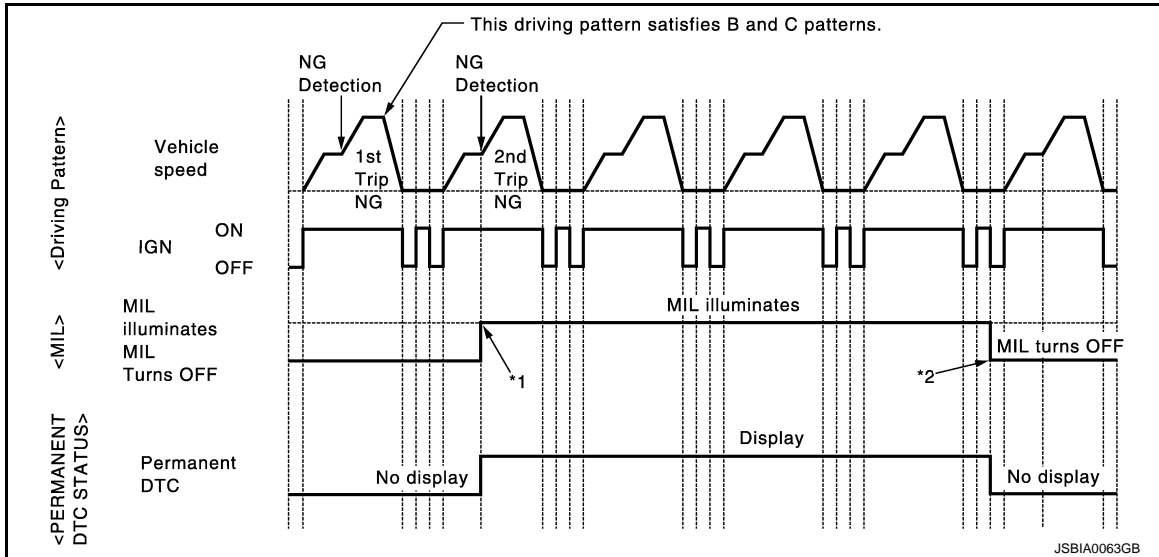
### Description

INFOID:000000006952159

### OUTLINE

When a DTC is stored in ECM

When a DTC is stored in ECM and MIL is ON, a permanent DTC is erased with MIL shutoff if the same malfunction is not detected after performing the driving pattern for MIL shutoff three times in a row.



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

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

When a DTC is not stored in ECM

The erasing method depends on a permanent DTC stored in ECM. Refer to the following table.

**NOTE:**

If the applicable permanent DTC includes multiple groups, perform the procedure of Group B first. If the permanent DTC is not erased, perform the procedure of Group A.

×: Applicable —: Not applicable

Group *	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	×	—	—
B	—	×	×

\*: For group, refer to [EC-967. "DTC Index"](#).

### PERMANENT DTC ITEM

For permanent DTC items, MIL turns ON. Refer to [EC-967. "DTC Index"](#).

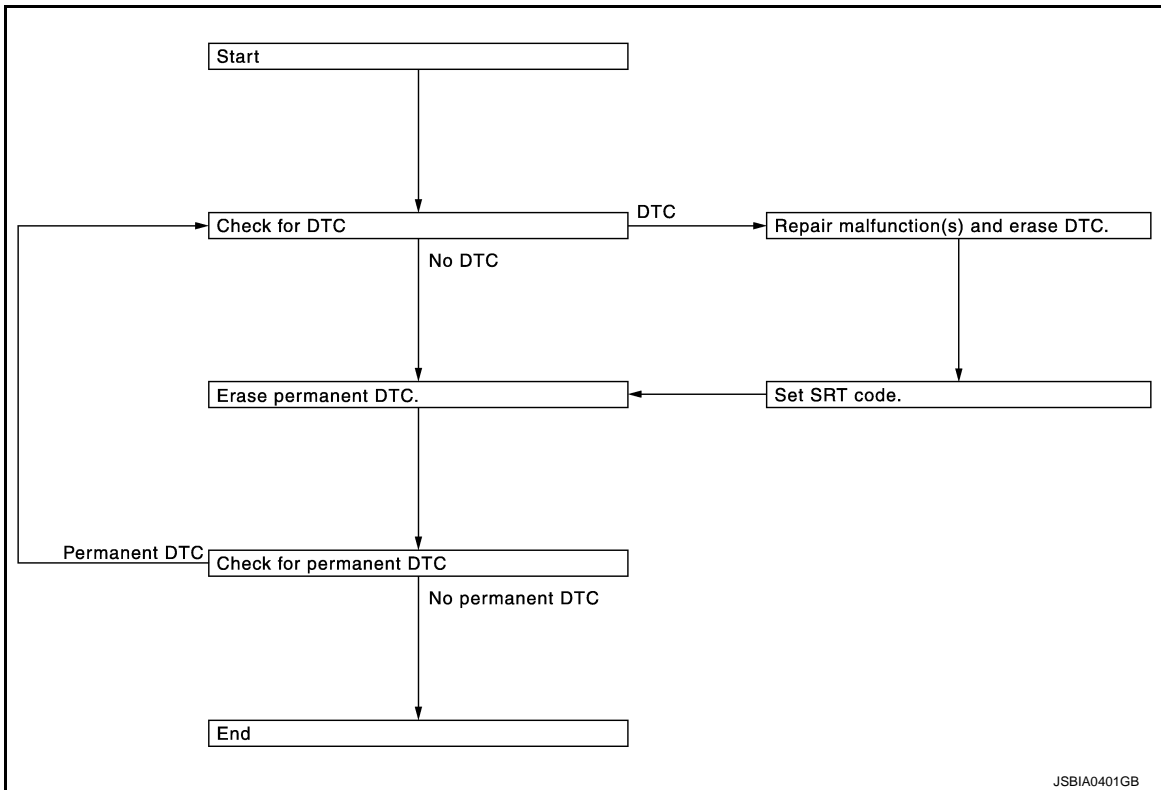


# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

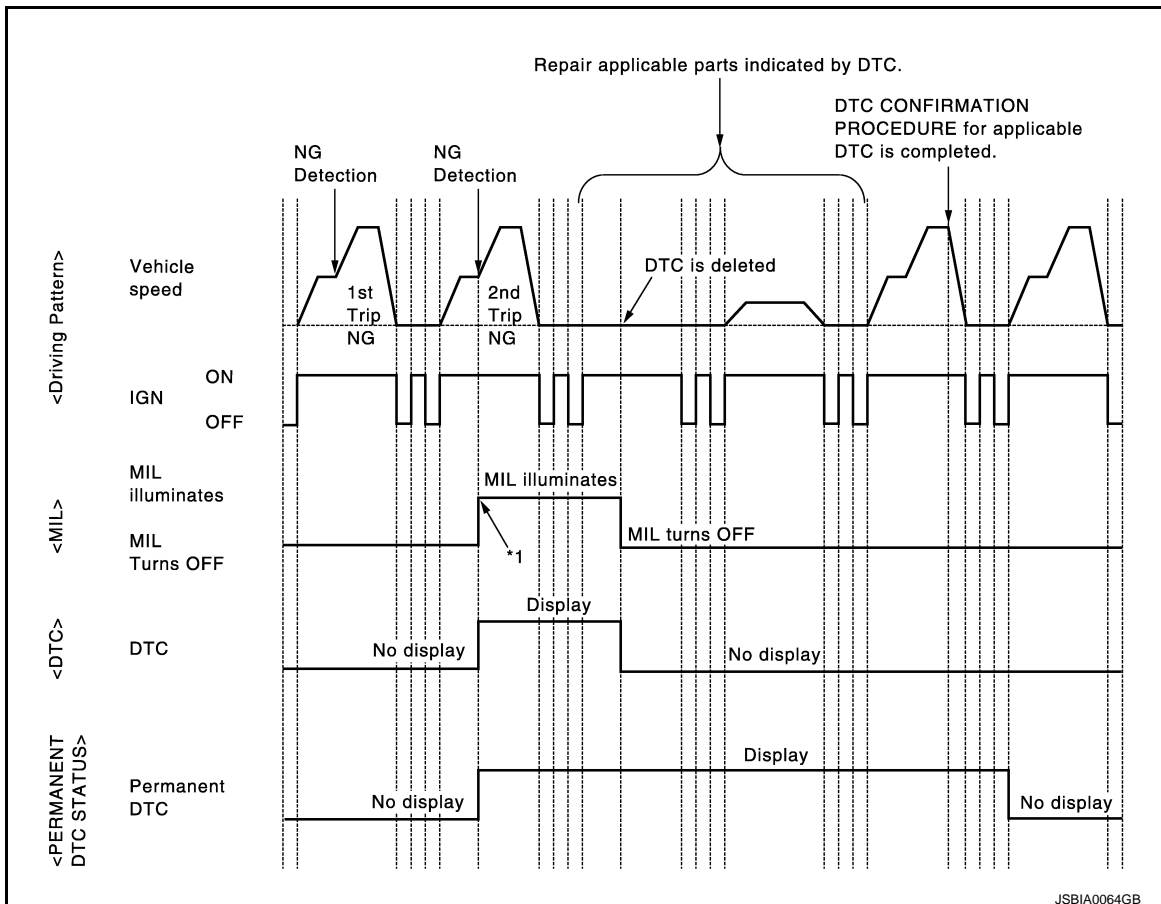
[MR18DE (FOR CALIFORNIA)]

## PERMANENT DTC SERVICE PROCEDURE



### Work Procedure (Group A)

INFOID:000000006952160



# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

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

## 1. CHECK DTC

Check DTC.

Is any DTC detected?

YES-1 >>  With CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-602, "CONSULT-III Function"](#).

YES-2 >>  Without CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-599, "On Board Diagnosis Function"](#).

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 3.

NO >> END

## 3. PERFORM DTC CONFIRMATION PROCEDURE

Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM. Refer to [EC-967, "DTC Index"](#).

>> GO TO 4.

## 4. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

YES >> GO TO 1.

NO >> END

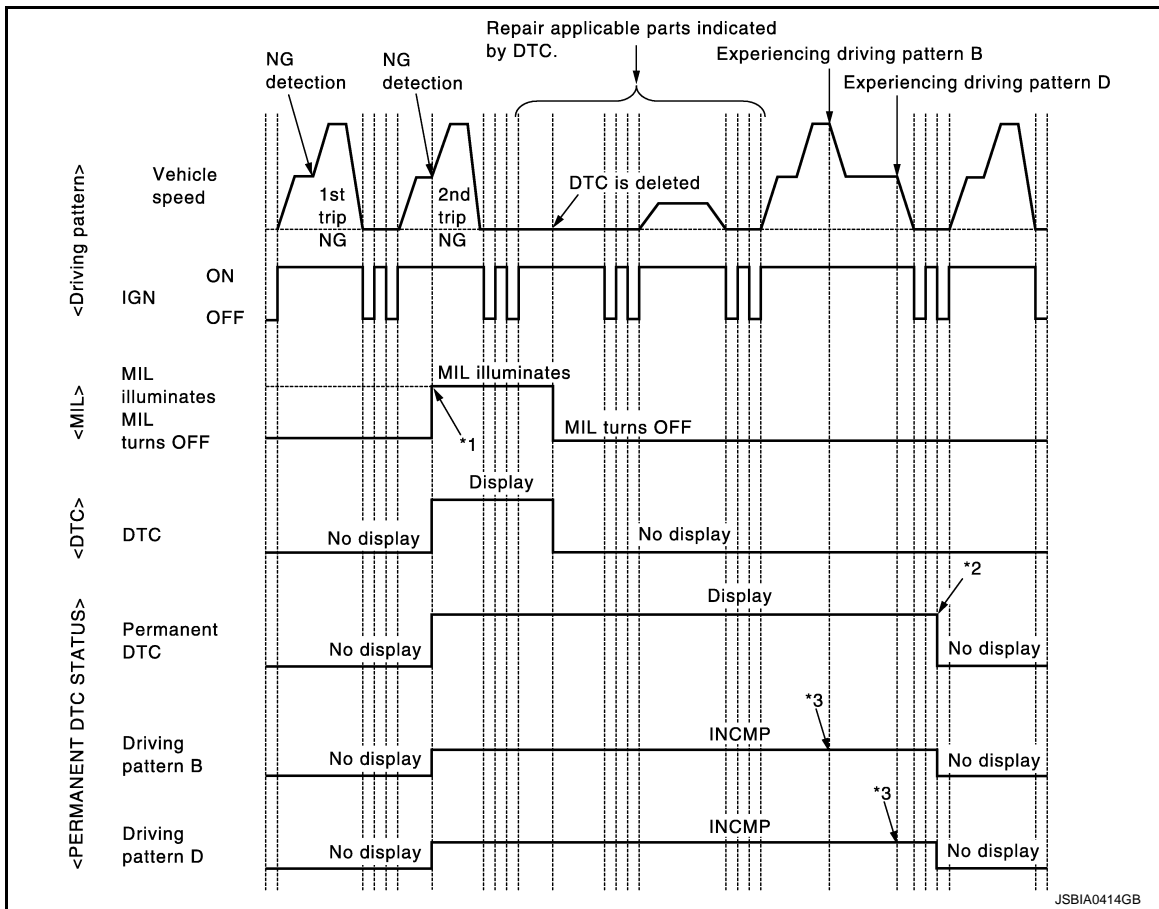
# HOW TO ERASE PERMANENT DTC

< BASIC INSPECTION >

[MR18DE (FOR CALIFORNIA)]

## Work Procedure (Group B)

INFOID:000000006952161



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

\*2: After experiencing driving pattern B and D, permanent DTC is erased.

\*3: Indication does not change unless the ignition switch is turned from ON to OFF twice even after experiencing driving pattern B or D.

### NOTE:

Drive the vehicle according to only driving patterns indicating "INCMP" in driving patterns B and D on the "PERMANENT DTC STATUS" screen.

## 1. CHECK DTC

Check DTC.

Is any DTC detected?

YES-1 >>  With CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-602, "CONSULT-III Function"](#).

YES-2 >>  Without CONSULT-III: Repair malfunction(s) and erase DTC. Refer to [EC-599, "On Board Diagnosis Function"](#).

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

With GST

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

# HOW TO ERASE PERMANENT DTC

[MR18DE (FOR CALIFORNIA)]

< BASIC INSPECTION >

2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

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

## 3. DRIVE DRIVING PATTERN B

### CAUTION:

- Always drive at a safe speed.
- Never erase self-diagnosis results.
- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.

Ⓟ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT-III to drive the vehicle according to driving pattern B. Refer to [EC-602, "CONSULT-III Function"](#), [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

Ⓢ With GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle according to driving pattern B. Refer to [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

>> GO TO 4.

## 4. CHECK PERMANENT DTC

Ⓟ With CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

Ⓢ With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

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

## 5. DRIVE DRIVING PATTERN D

### CAUTION:

- Always drive at a safe speed.
- Never erase self-diagnosis results.
- If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.

1. Drive the vehicle according to driving pattern D. Refer to [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

>> GO TO 6.

## 6. CHECK PERMANENT DTC

Ⓟ With CONSULT-III

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

# HOW TO ERASE PERMANENT DTC

[MR18DE (FOR CALIFORNIA)]

< BASIC INSPECTION >

3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT-III.

 With GST

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

Is any permanent DTC detected?

- YES >> GO TO 1.  
NO >> END

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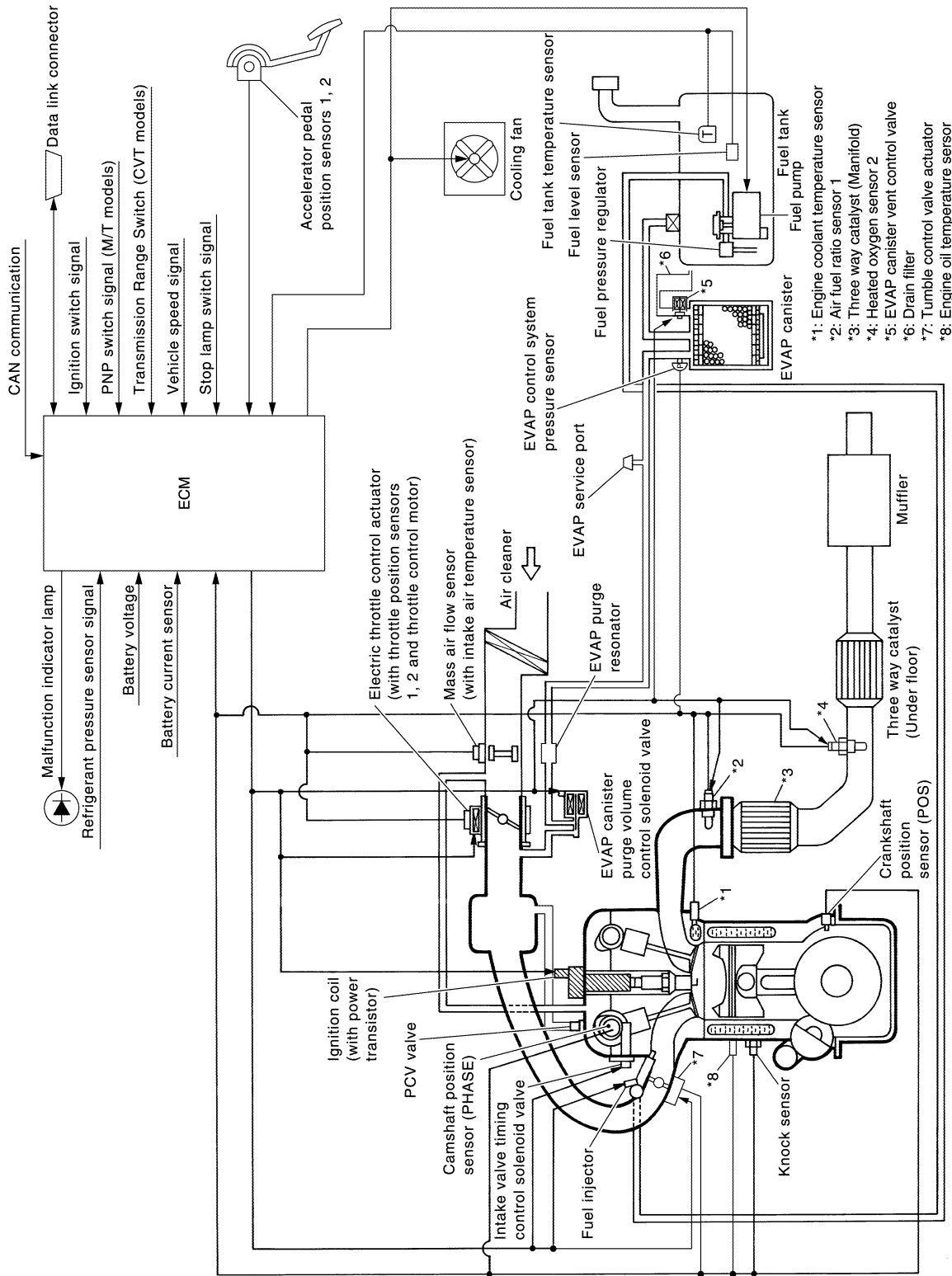
< SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION

## ENGINE CONTROL SYSTEM

### System Diagram

INFOID:000000006942824



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# ENGINE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

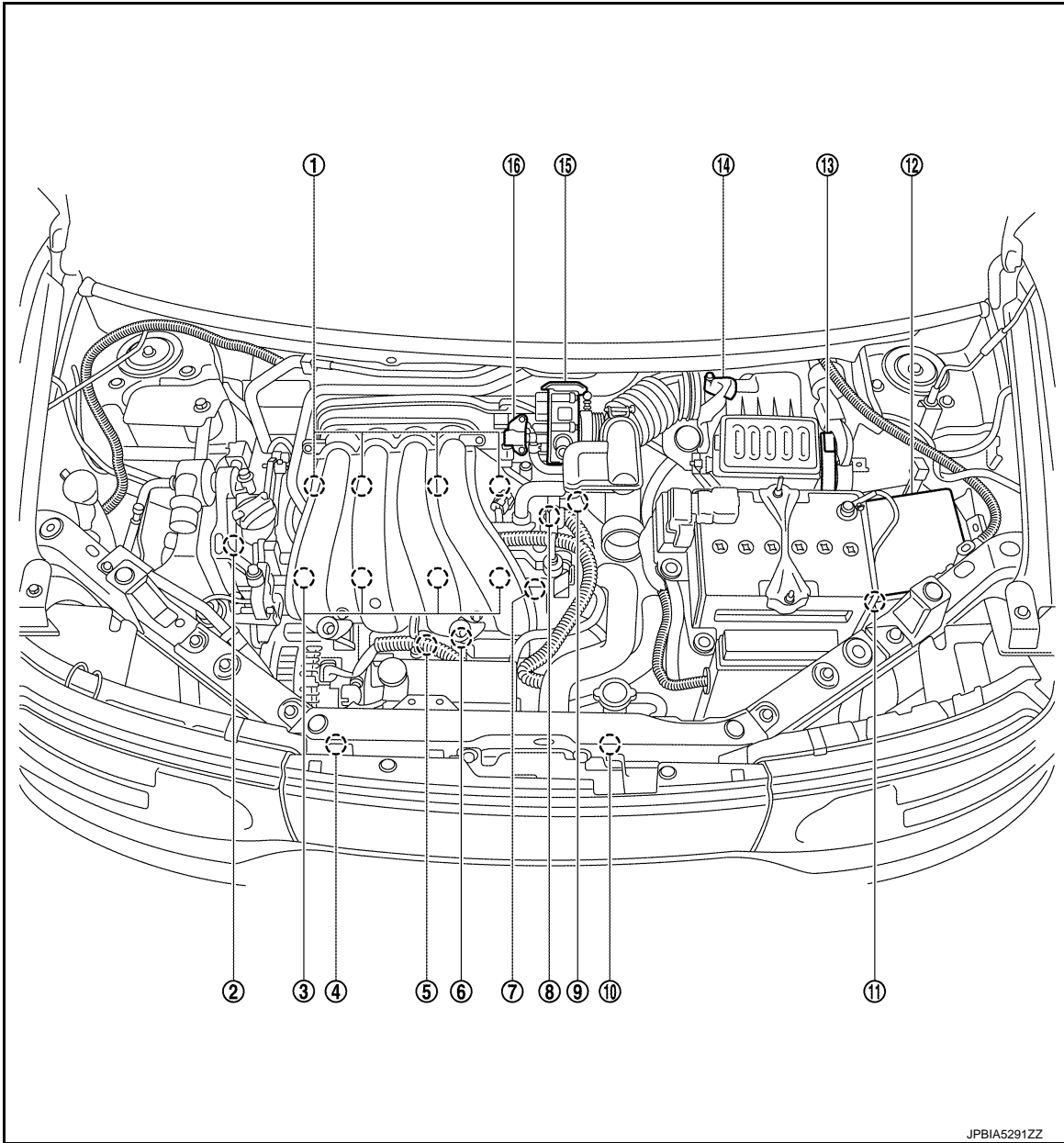
## System Description

INFOID:000000006942825

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

## Component Parts Location

INFOID:000000006942826

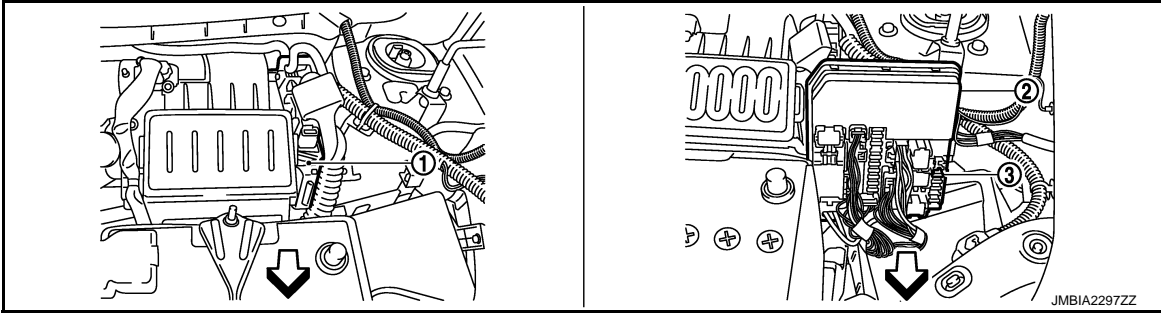


- |   |   |  |
|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

# ENGINE CONTROL SYSTEM

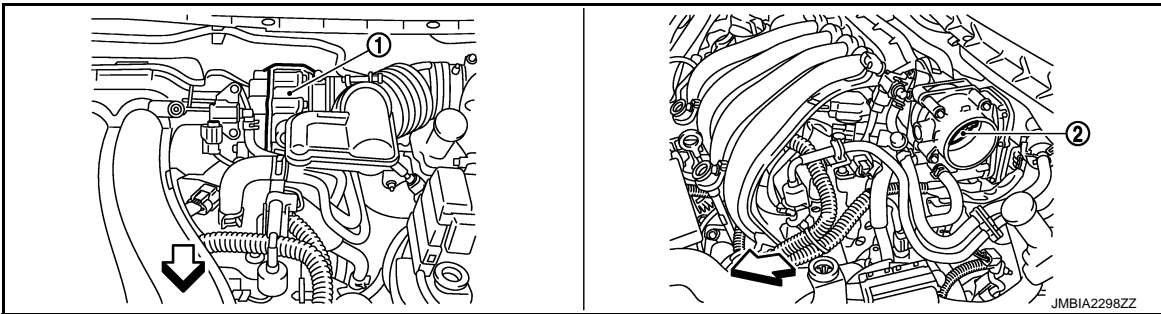
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[MR18DE (FOR CALIFORNIA)]



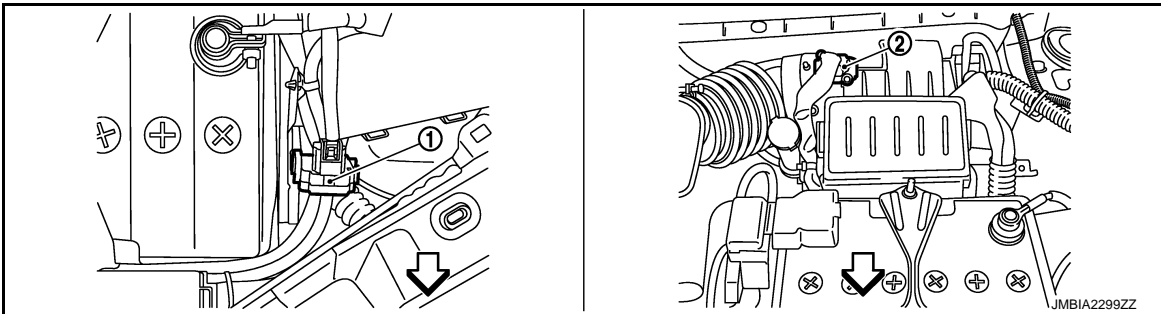
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



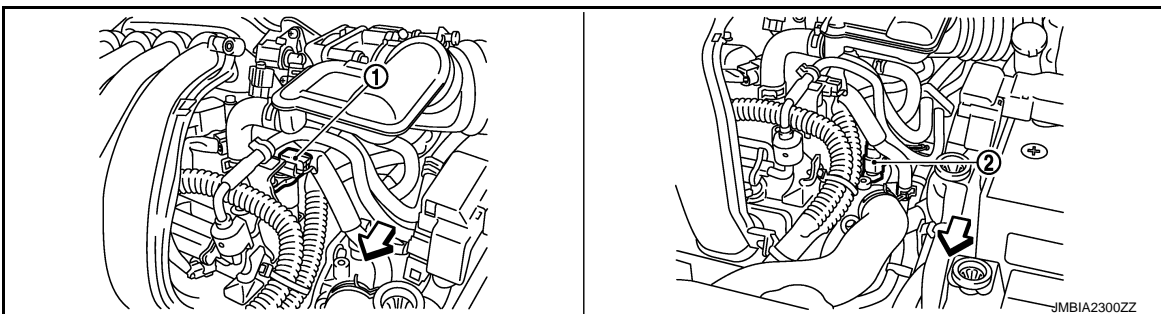
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front





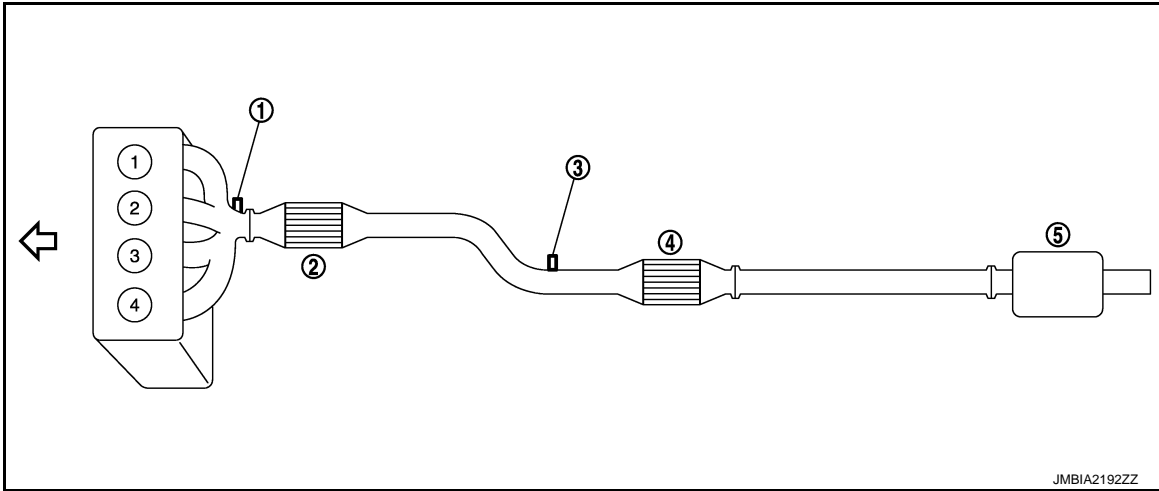
# ENGINE CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

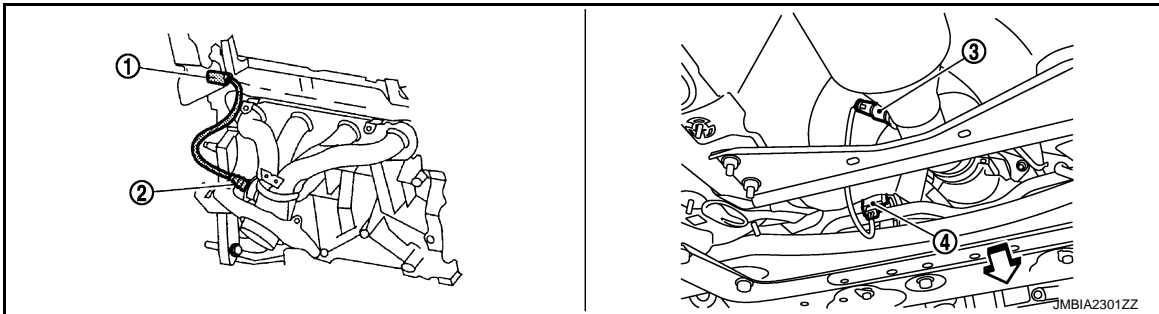
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



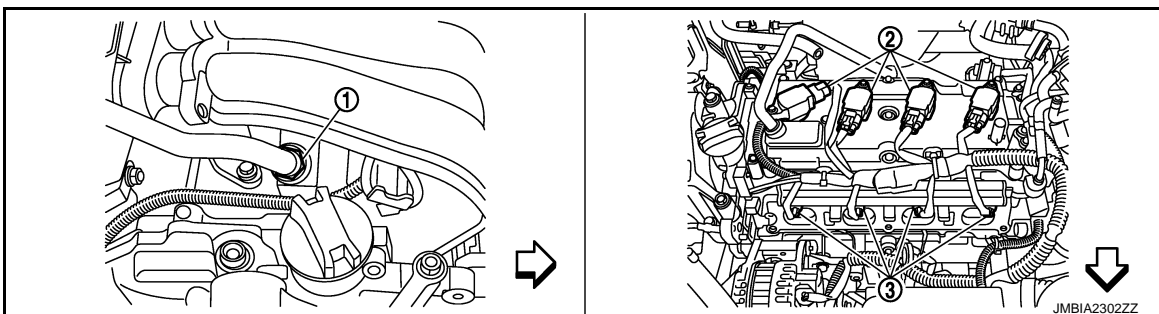
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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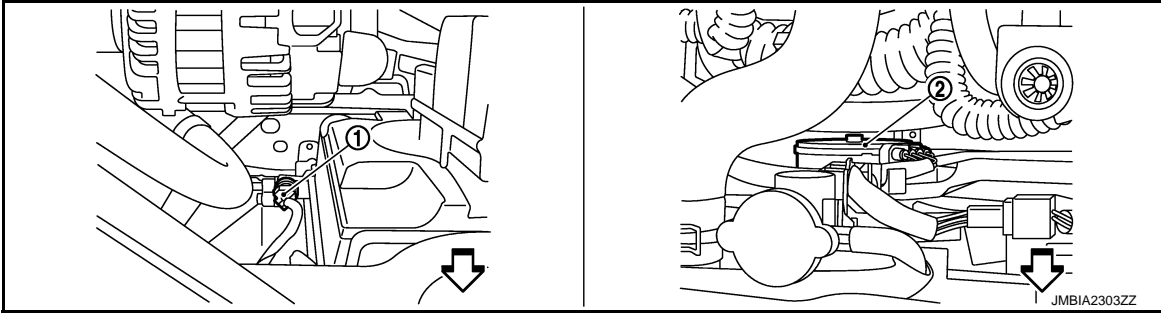
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# ENGINE CONTROL SYSTEM

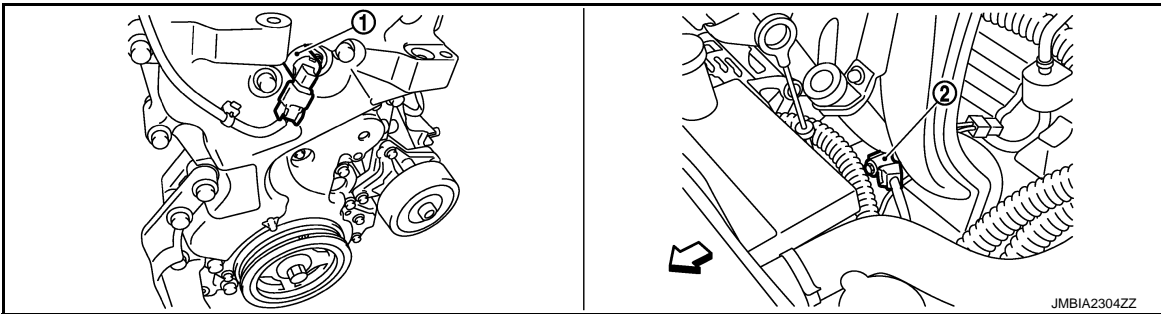
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[MR18DE (FOR CALIFORNIA)]



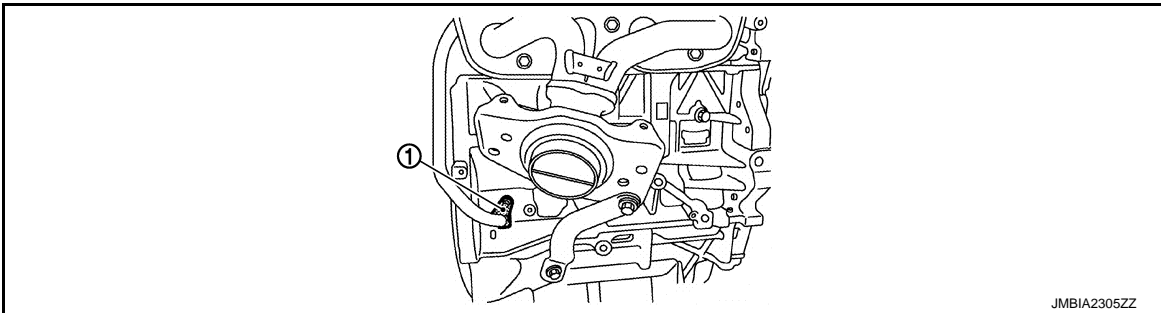
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

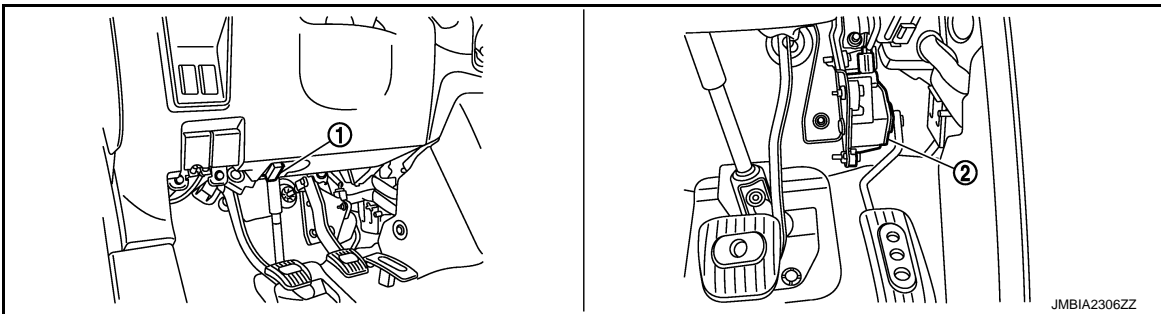


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

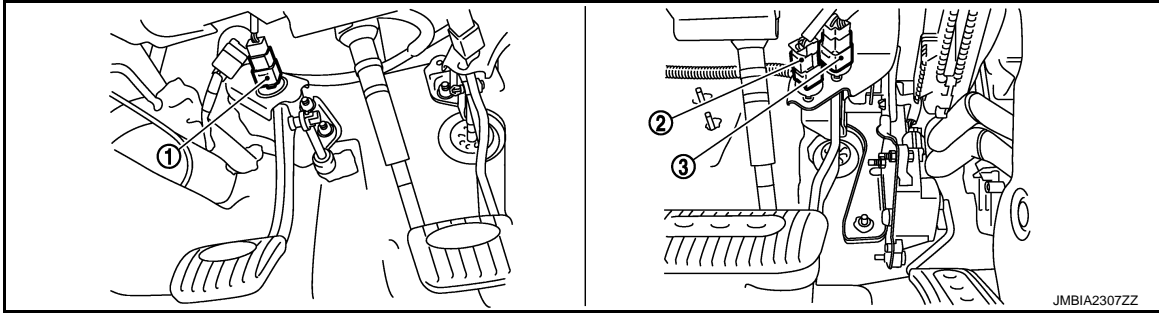


- 1. Data link connector
- 2. Accelerator pedal position sensor

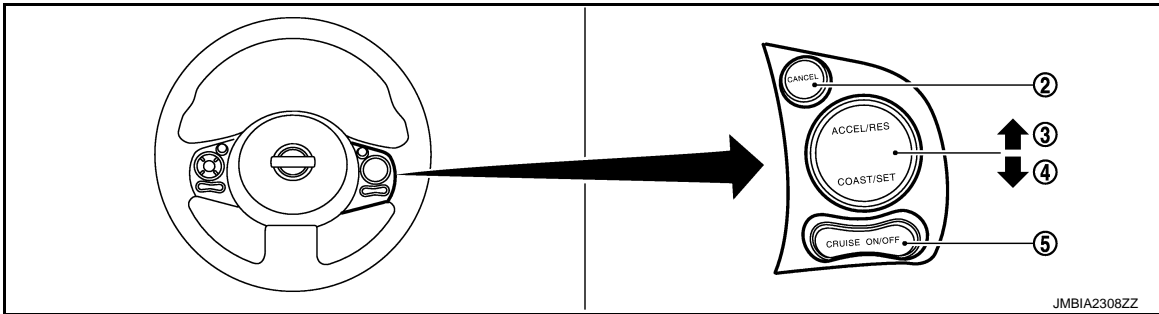
# ENGINE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

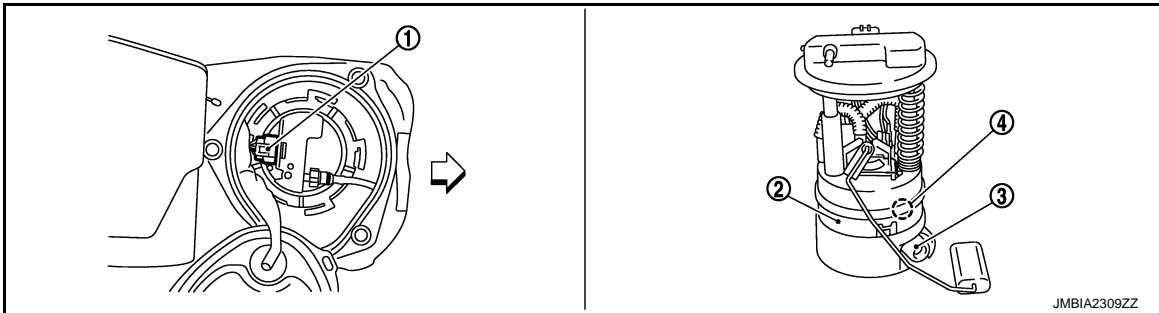
[MR18DE (FOR CALIFORNIA)]



- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch

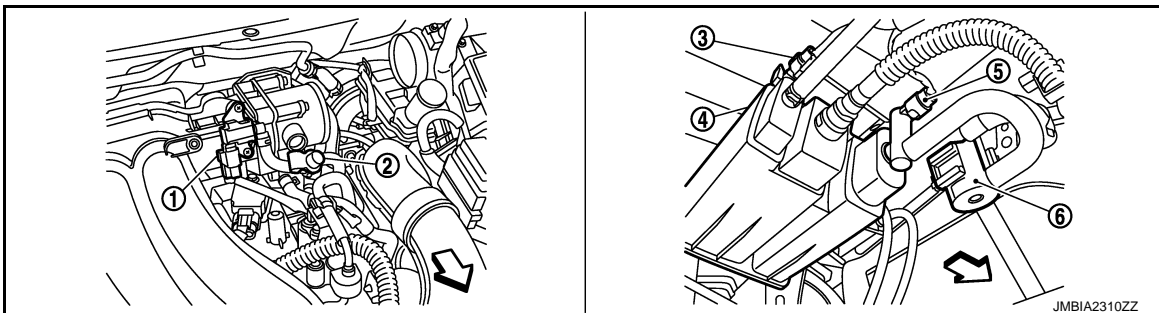


- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



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

↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# ENGINE CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

4. EVAP canister      5. EVAP canister vent control valve      6. Drain filter  
↳ Vehicle front

## Component Description

INFOID:000000006942827

Component	Reference
A/F sensor 1	<a href="#">EC-668, "Description"</a>
A/F sensor 1 heater	<a href="#">EC-629, "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-891, "Description"</a>
ASCD brake switch	<a href="#">EC-858, "Description"</a>
ASCD steering switch	<a href="#">EC-855, "Description"</a>
ASCD vehicle speed sensor	<a href="#">EC-865, "Description"</a>
Battery current sensor	<a href="#">EC-839, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736, "Description"</a>
Cooling fan motor	<a href="#">EC-557, "System Description"</a>
Electric throttle control actuator	<a href="#">EC-889, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652, "Description"</a>
Engine oil temperature sensor	<a href="#">EC-719, "DTC Logic"</a>
EVAP canister purge volume control solenoid valve	<a href="#">EC-762, "Description"</a>
EVAP canister vent control valve	<a href="#">EC-770, "Description"</a>
EVAP control system pressure sensor	<a href="#">EC-778, "Description"</a>
Fuel injector	<a href="#">EC-918, "Description"</a>
Fuel level sensor	<a href="#">EC-804, "Description"</a>
Fuel pump	<a href="#">EC-921, "Description"</a>
Fuel tank temperature sensor	<a href="#">EC-711, "Description"</a>
Heated oxygen sensor 2	<a href="#">EC-678, "Description"</a>
Heated oxygen sensor 2 heater	<a href="#">EC-632, "Description"</a>
Ignition signal	<a href="#">EC-924, "Description"</a>
Intake air temperature sensor	<a href="#">EC-650, "Description"</a>
Intake valve timing control solenoid valve	<a href="#">EC-575, "System Description"</a>
Knock sensor	<a href="#">EC-734, "Description"</a>
Mass air flow sensor	<a href="#">EC-638, "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-826, "Description"</a>
Transmission range switch (CVT models)	
PCV valve	<a href="#">EC-936, "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-937, "Description"</a>
Stop lamp switch	<a href="#">EC-869, "Description"</a>
Tumble control valve	<a href="#">EC-872, "Description"</a>
Tumble control valve position sensor	<a href="#">EC-877, "Description"</a>
Throttle control motor	<a href="#">EC-887, "Description"</a>
Throttle control motor relay	<a href="#">EC-880, "Description"</a>
Throttle position sensor	<a href="#">EC-658, "Description"</a>

# MULTIPOINT FUEL INJECTION SYSTEM

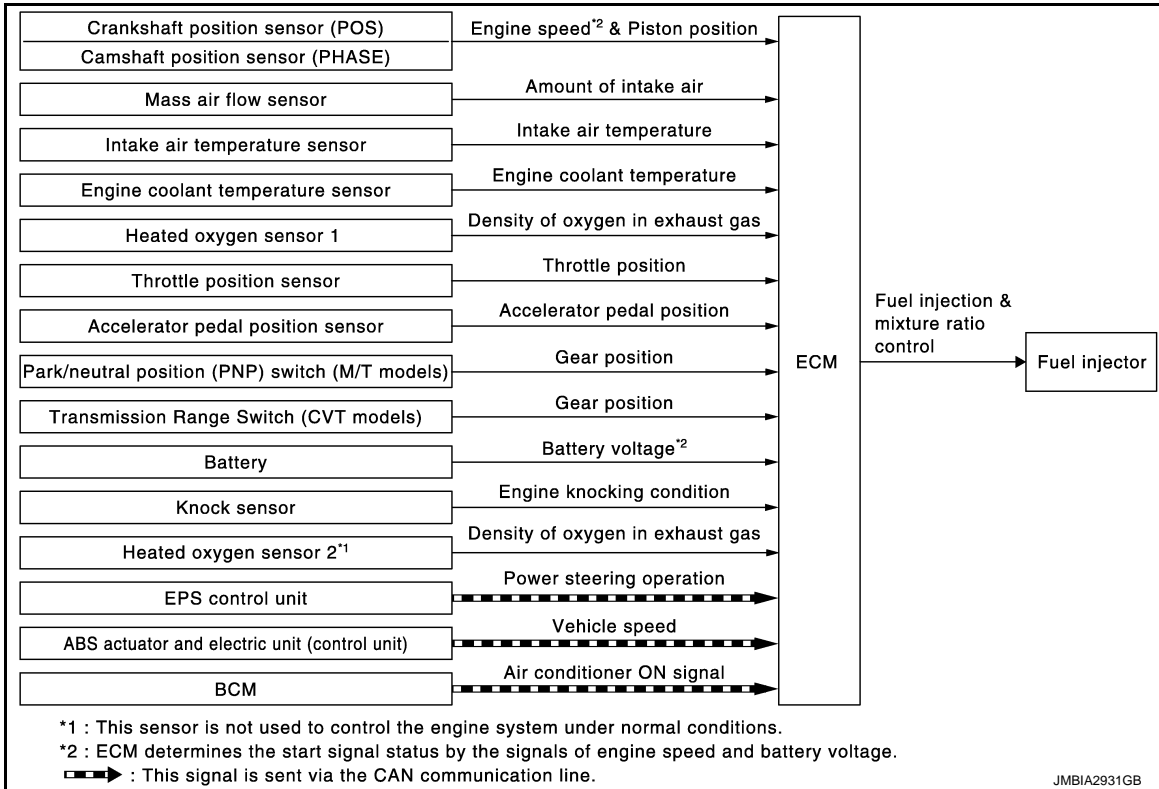
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## MULTIPOINT FUEL INJECTION SYSTEM

### System Diagram

INFOID:000000006942828



### System Description

INFOID:000000006942829

#### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed* <sup>3</sup>	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 (M/T models)	Gear position		
Transmission range switch (CVT models)	Gear position		
Battery	Battery voltage* <sup>3</sup>		
Knock sensor	Engine knocking condition		
Heated oxygen sensor 2* <sup>1</sup>	Density of oxygen in exhaust gas		
EPS control unit	Power steering operation* <sup>2</sup>		
ABS actuator and electric unit (control unit)	Vehicle speed* <sup>2</sup>		
BCM	Air conditioner ON signal* <sup>2</sup>		

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

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

# MULTIPOINT FUEL INJECTION SYSTEM

[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

\*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.

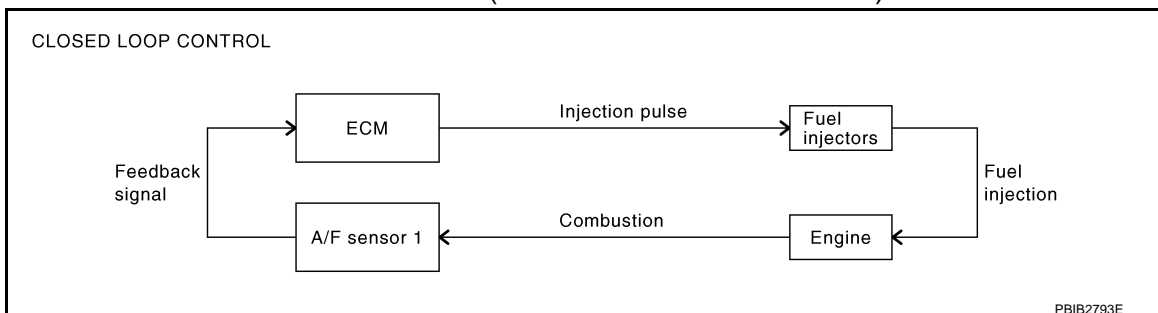
#### <Fuel increase>

- 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 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-668, "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

[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

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

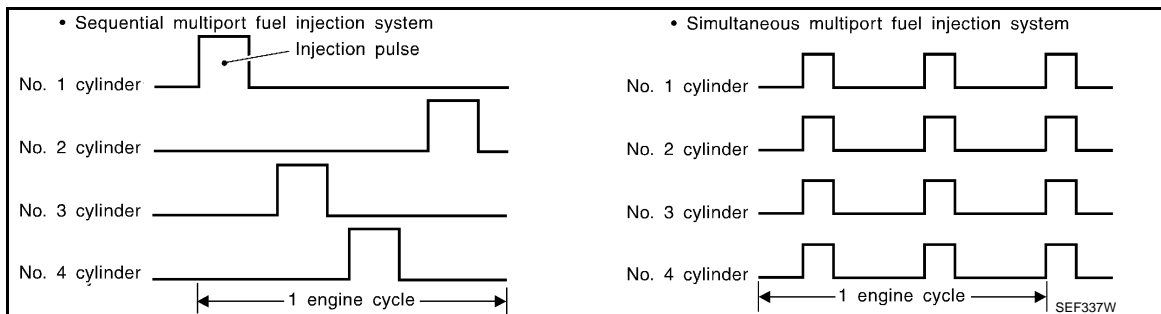
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

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

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

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

## FUEL INJECTION TIMING



Two types of systems are used.

- Sequential Multipoint Fuel Injection System

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

- Simultaneous 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.

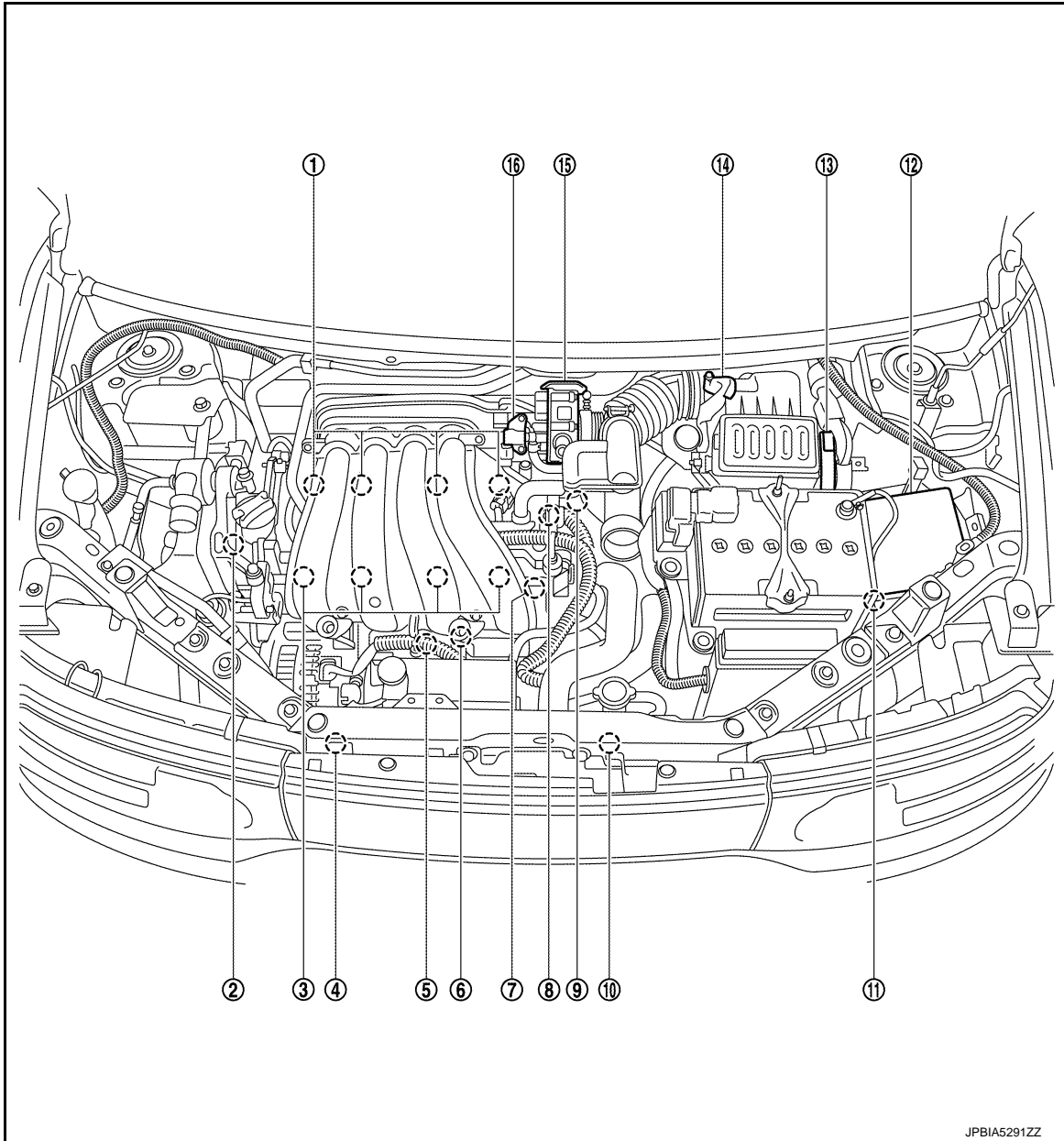
# MULTIPOINT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

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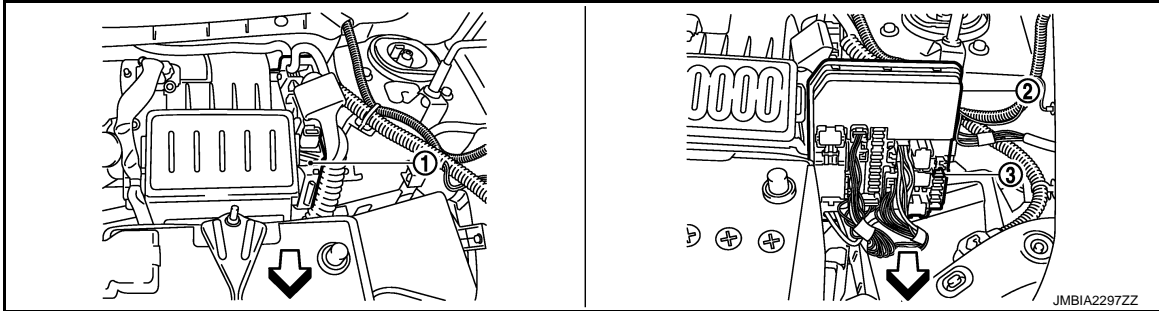
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|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |



# MULTIPOINT FUEL INJECTION SYSTEM

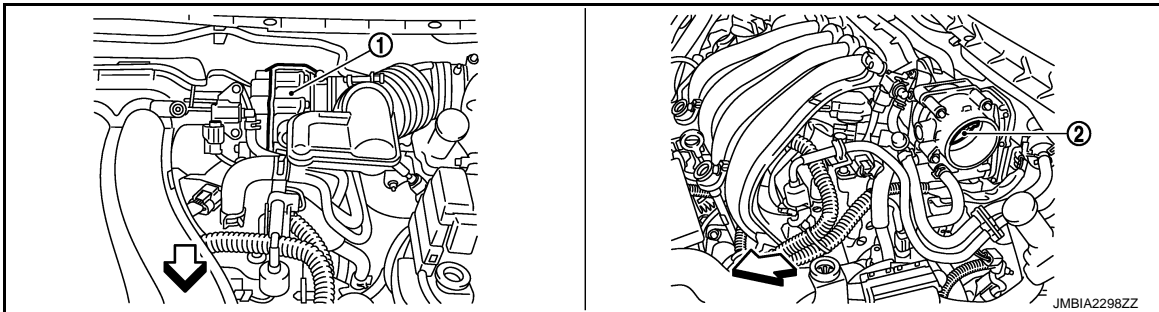
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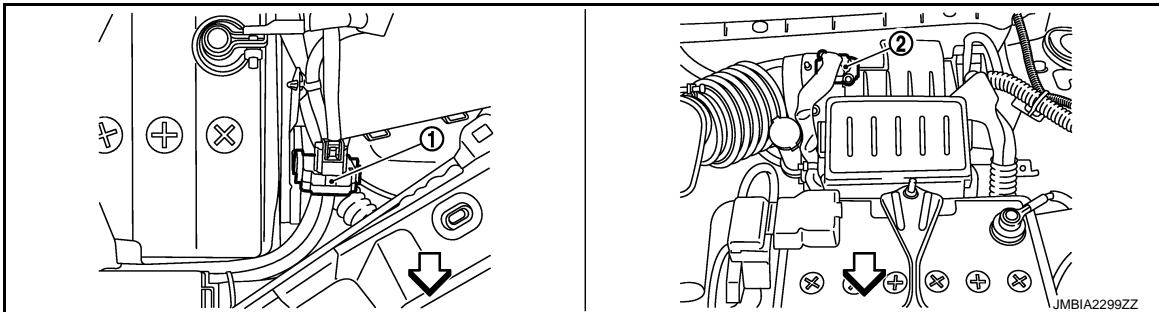
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



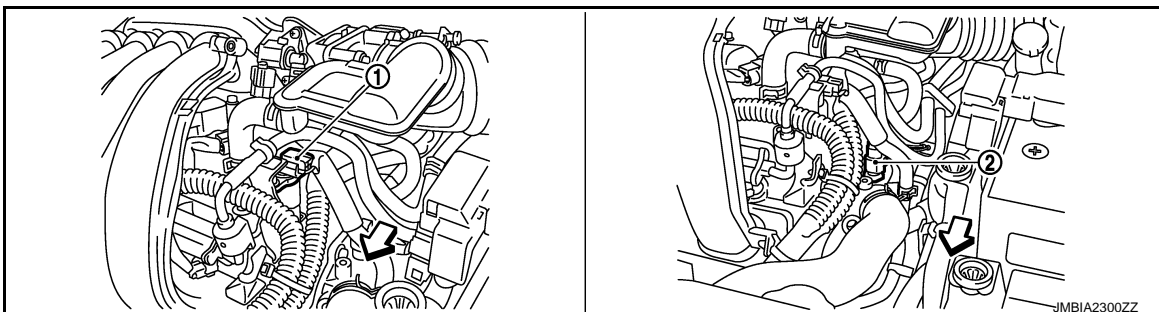
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



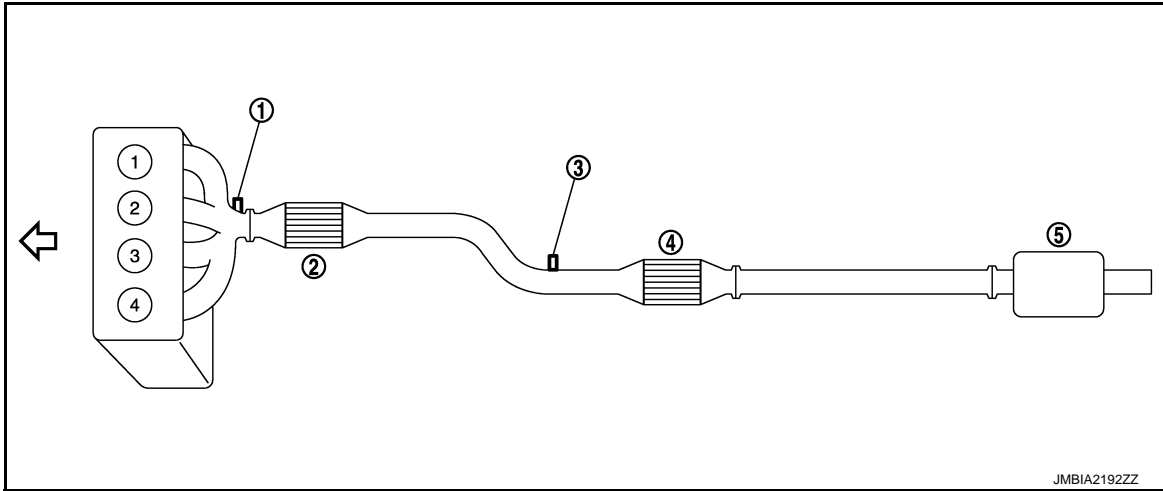
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# MULTIPOINT FUEL INJECTION SYSTEM

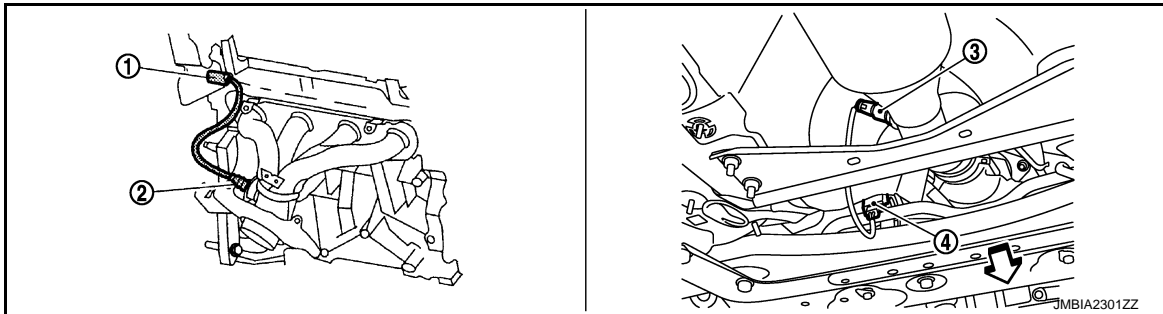
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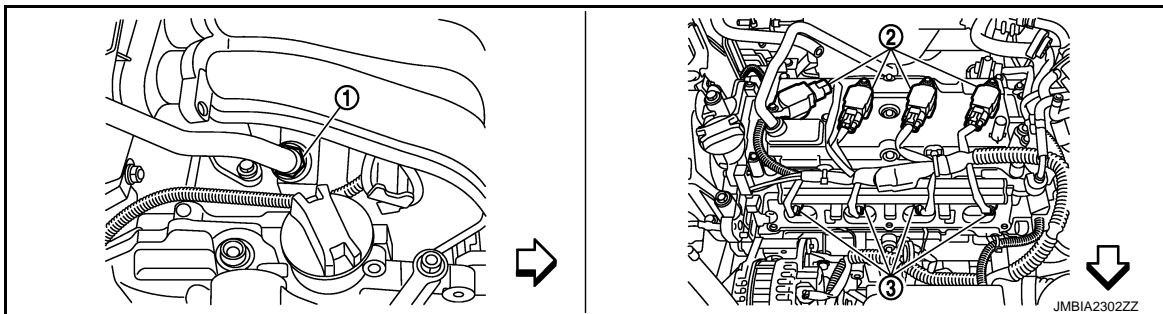
1. Camshaft position sensor (PHASE)
  2. Engine coolant temperature sensor
- ↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1
  2. Three way catalyst (Manifold)
  3. Heated oxygen sensor 2
  4. Three way catalyst (under floor)
  5. Muffler
- ↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
  2. Air fuel ratio (A/F) sensor 1 connector
  3. Heated oxygen sensor 2
  4. Heated oxygen sensor 2 harness connector
- ↶ Vehicle front

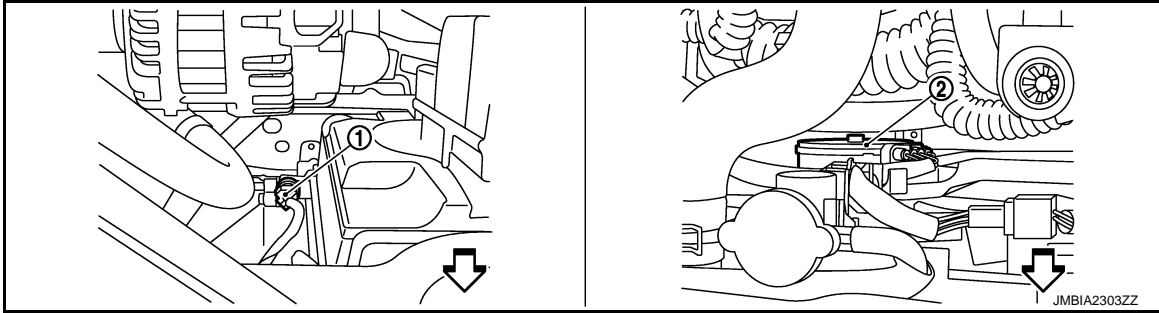


1. PCV valve
  2. Ignition coil (with power transistor)
  3. Fuel injector
- ↶ Vehicle front

# MULTIPOINT FUEL INJECTION SYSTEM

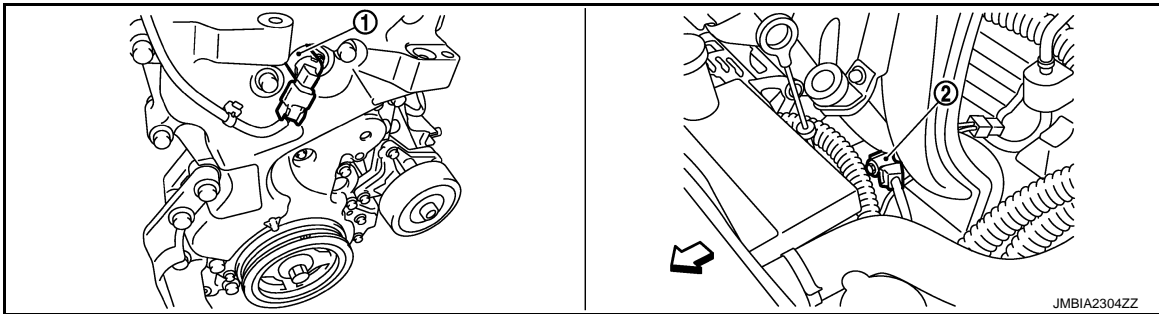
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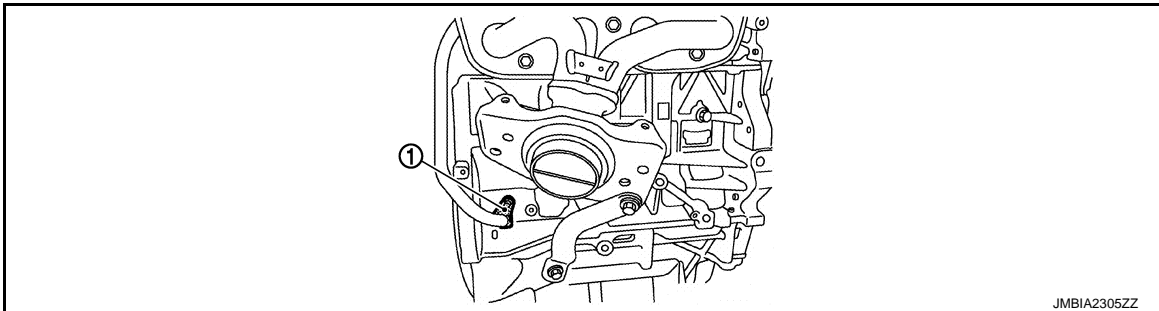
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

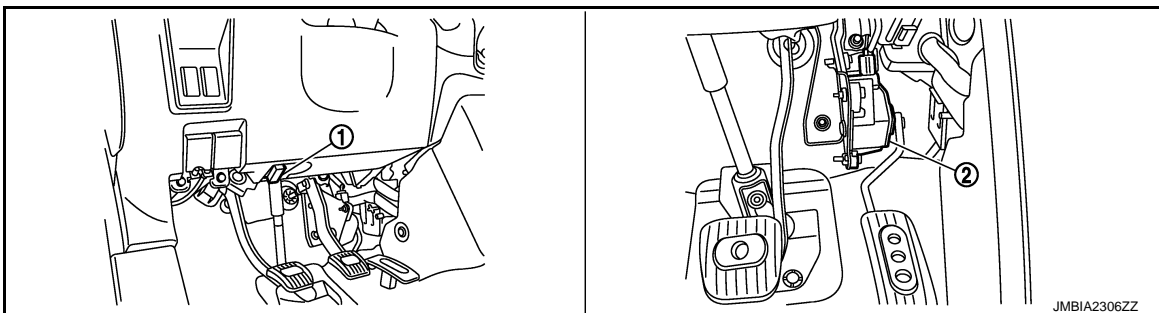


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)



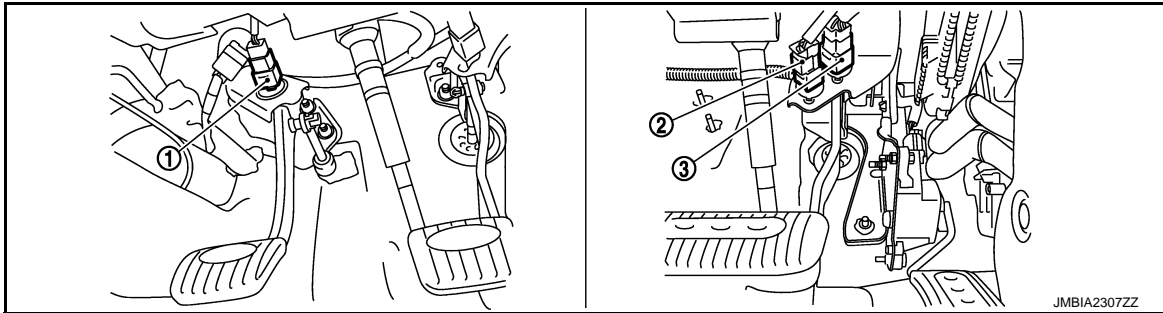
- 1. Data link connector
- 2. Accelerator pedal position sensor

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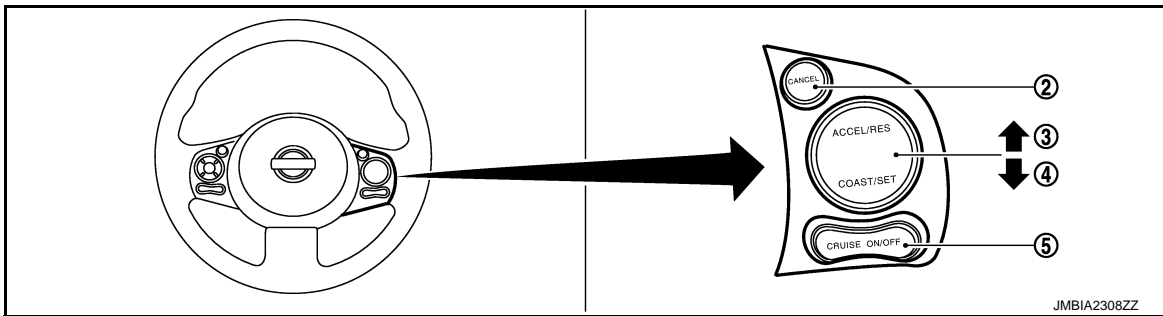
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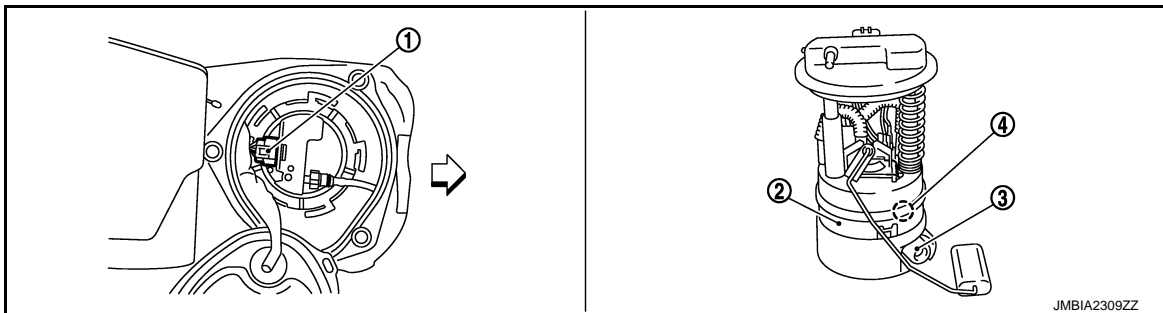
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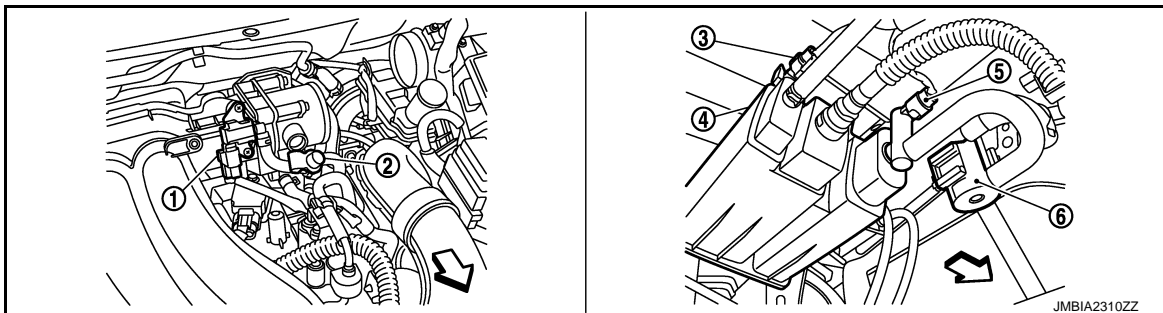
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# MULTIPOINT FUEL INJECTION SYSTEM

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↶ Vehicle front

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## Component Description

INFOID:000000006948271

EC

Component	Reference
A/F sensor 1	<a href="#">EC-668. "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-891. "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736. "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652. "Description"</a>
Fuel injector	<a href="#">EC-918. "Description"</a>
Heated oxygen sensor 2	<a href="#">EC-678. "Description"</a>
Intake air temperature sensor	<a href="#">EC-650. "Description"</a>
Knock sensor	<a href="#">EC-734. "Description"</a>
Mass air flow sensor	<a href="#">EC-638. "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-826. "Description"</a>
Transmission range switch (CVT models)	
Throttle position sensor	<a href="#">EC-658. "Description"</a>

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# ELECTRIC IGNITION SYSTEM

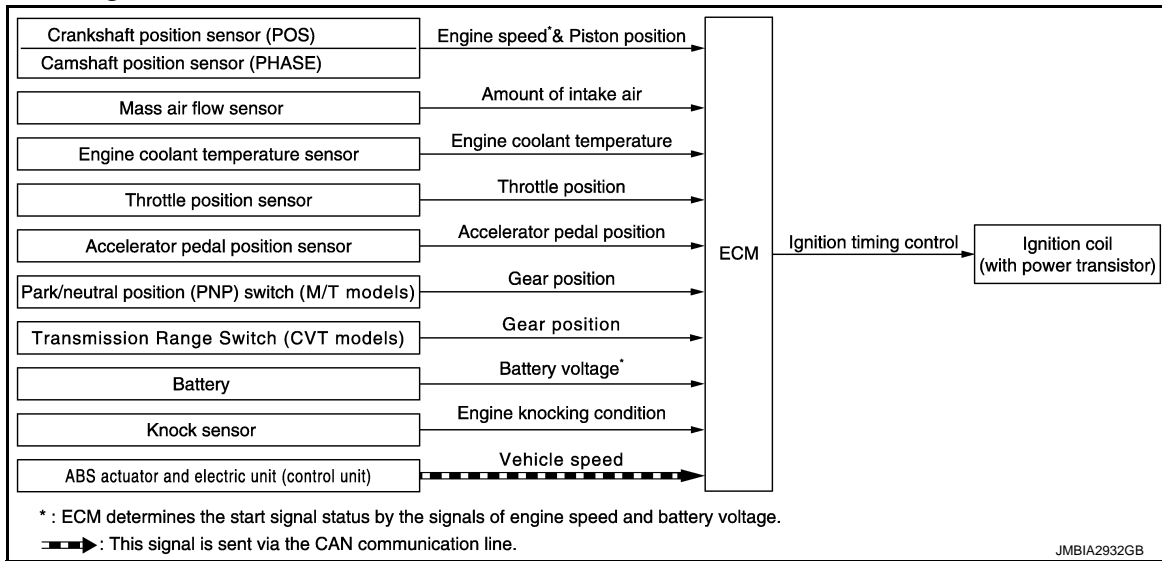
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## ELECTRIC IGNITION SYSTEM

### System Diagram

INFOID:000000006942832



### System Description

INFOID:000000006942833

#### 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 (M/T models)	Gear position		
Transmission range switch (CVT models)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*1		

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

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

#### SYSTEM DESCRIPTION

Ignition order: 1 - 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

# ELECTRIC IGNITION SYSTEM

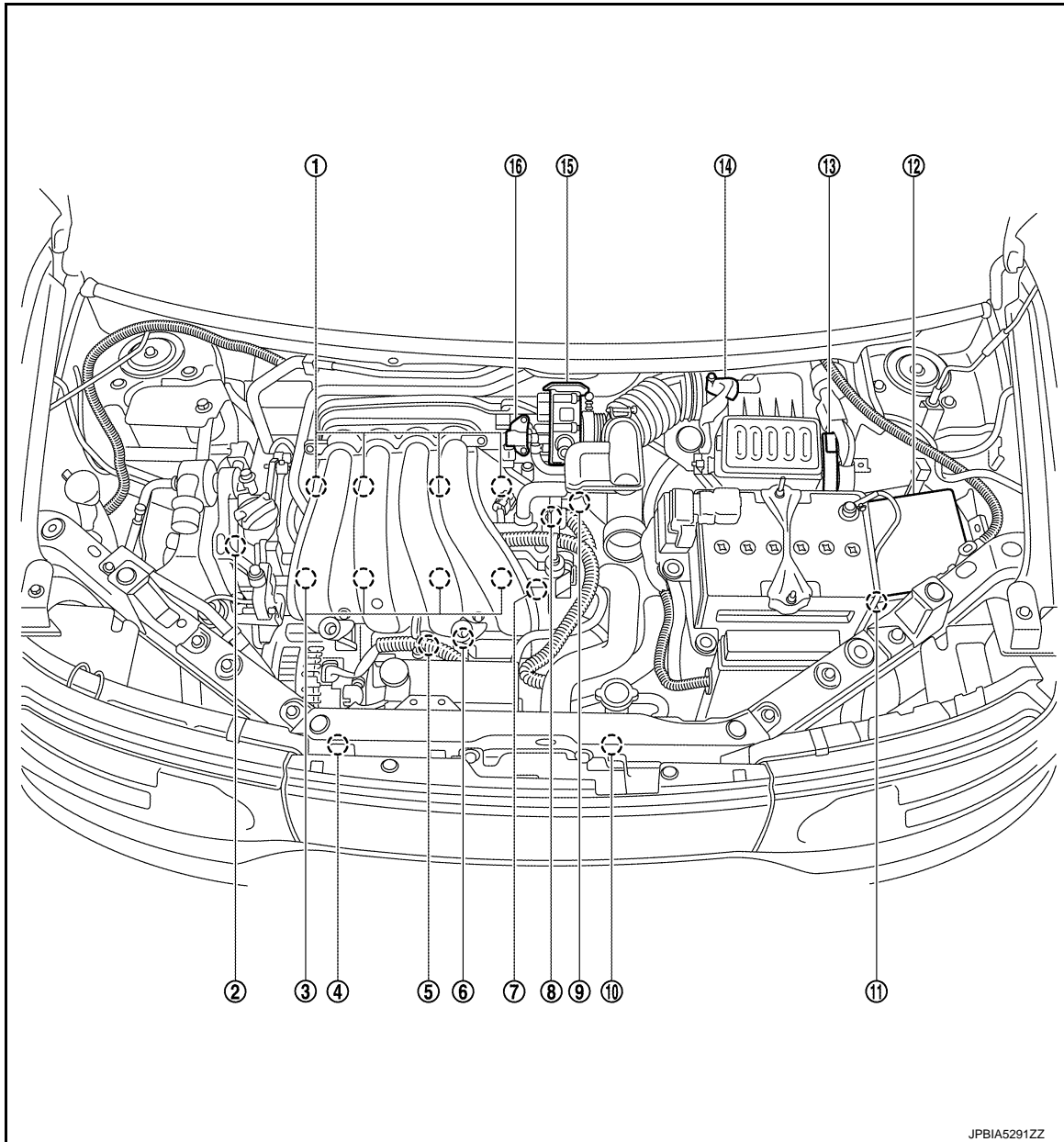
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

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 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:000000006948272

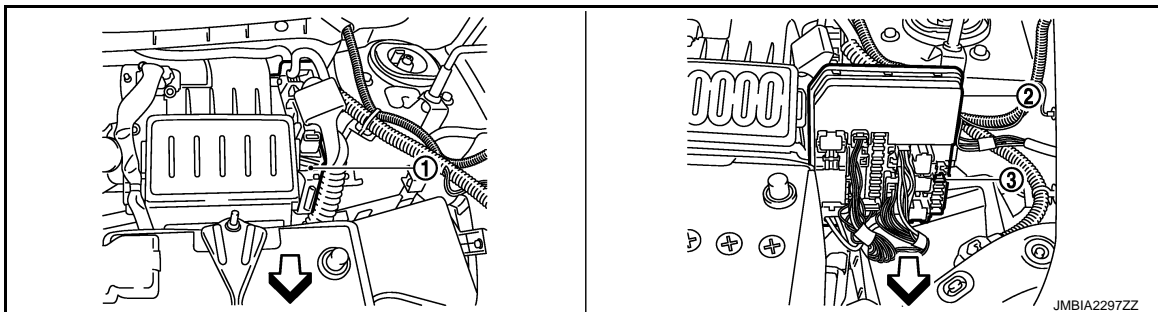


- |   |   |  |
|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

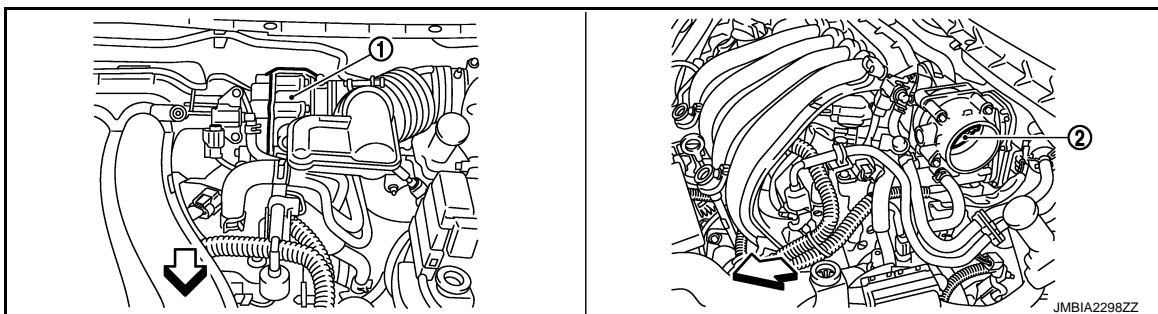
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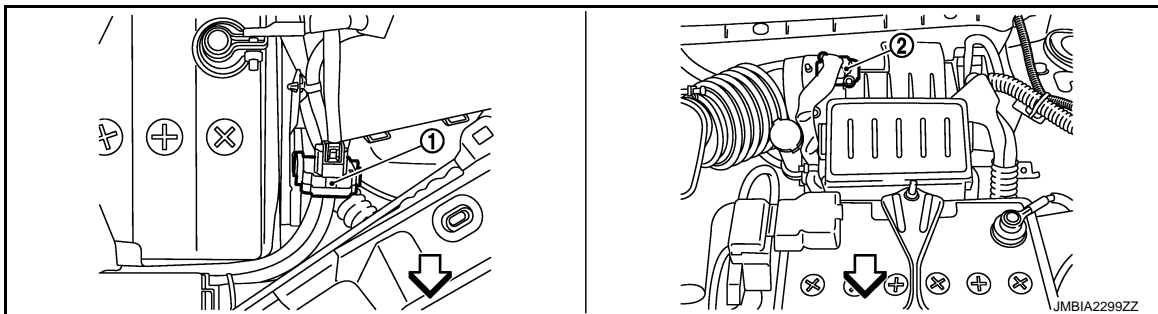
[MR18DE (FOR CALIFORNIA)]



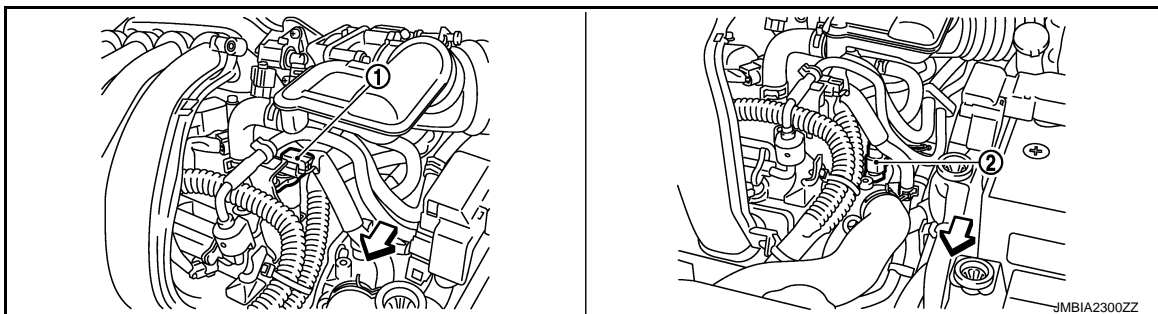
- 1. ECM
  - 2. IPDM E/R
  - 3. Fuel pump fuse (15 A)
- ← Vehicle front



- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
  - 2. Throttle valve
- ← Vehicle front



- 1. Battery current sensor
  - 2. Mass air flow sensor (with Intake air temperature sensor)
- ← Vehicle front





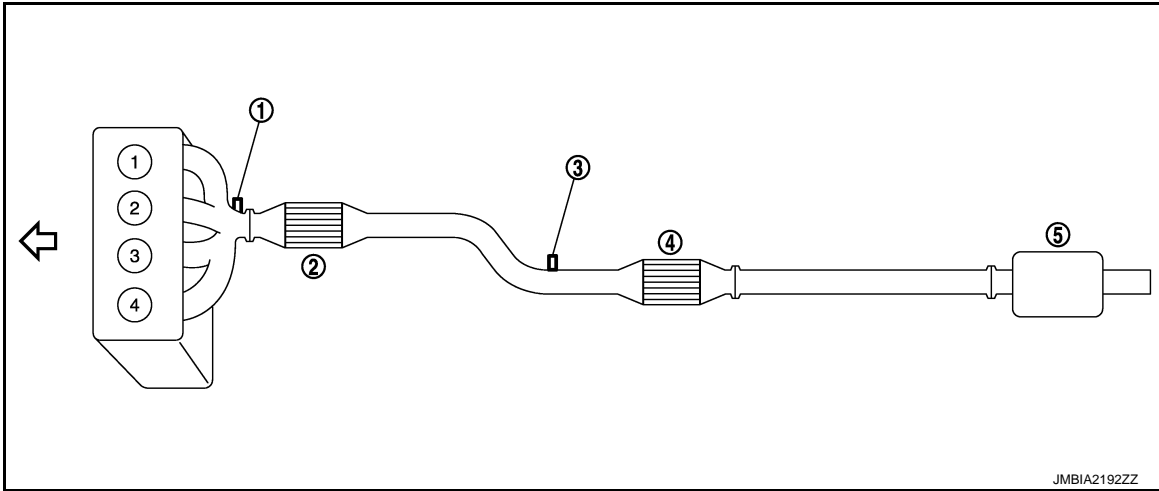
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[MR18DE (FOR CALIFORNIA)]

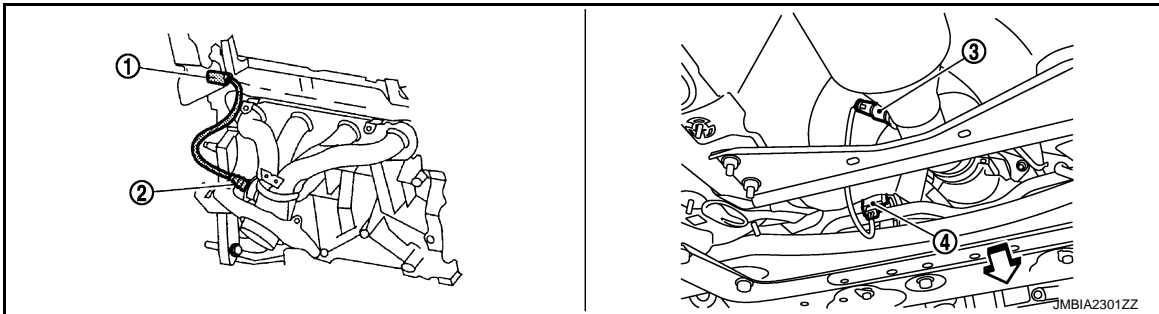
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



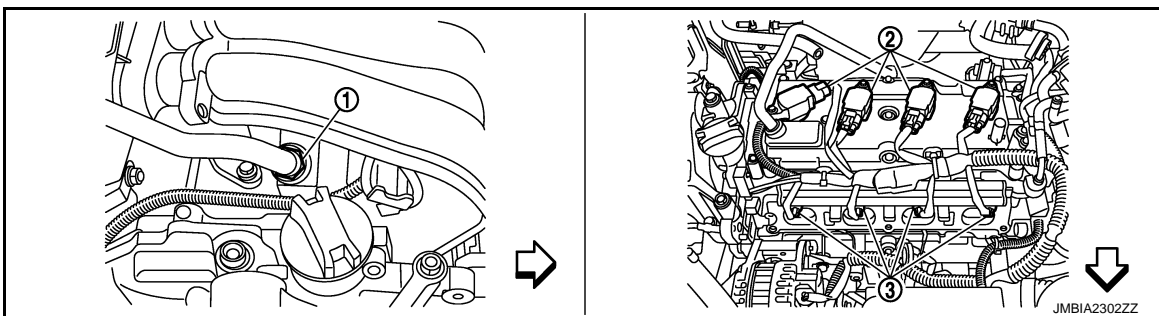
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

← Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

← Vehicle front

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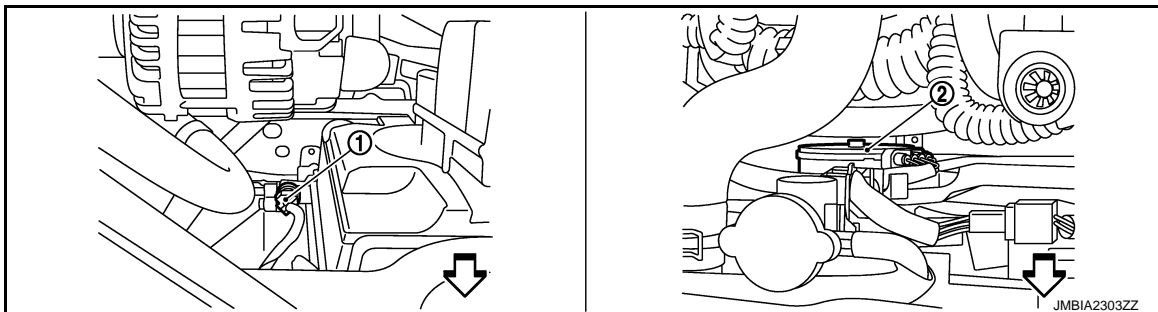
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# ELECTRIC IGNITION SYSTEM

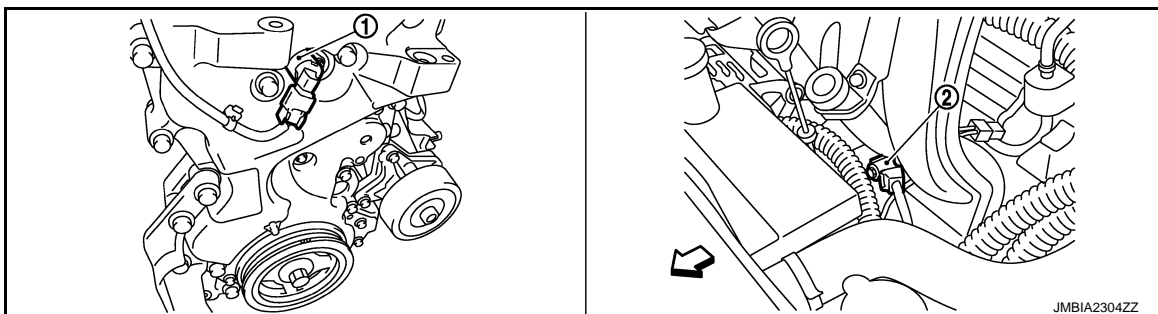
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[MR18DE (FOR CALIFORNIA)]



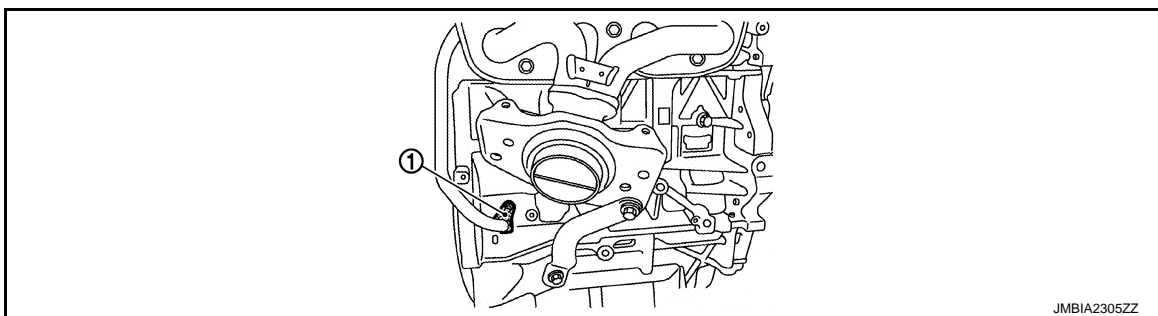
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

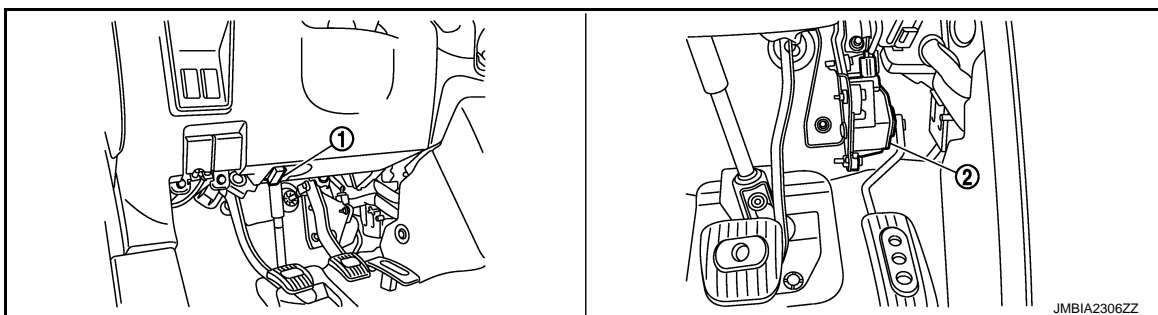


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

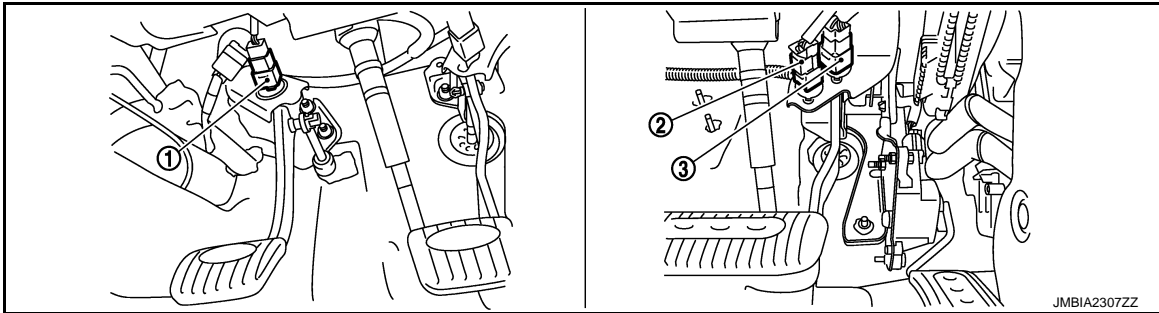


- 1. Data link connector
- 2. Accelerator pedal position sensor

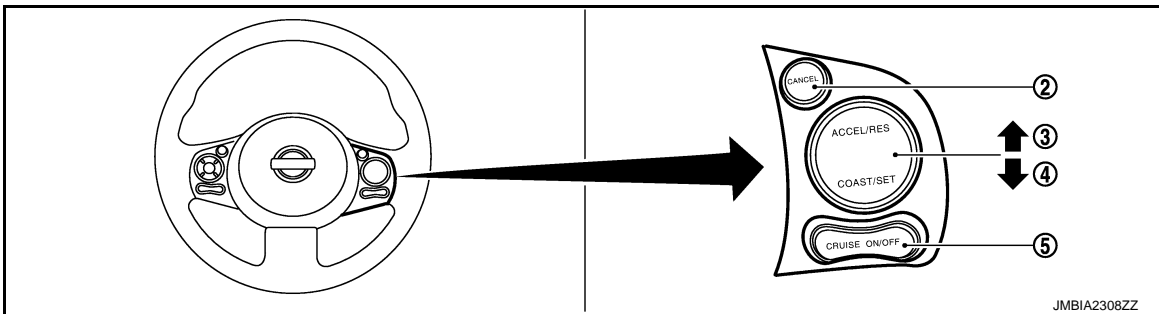
# ELECTRIC IGNITION SYSTEM

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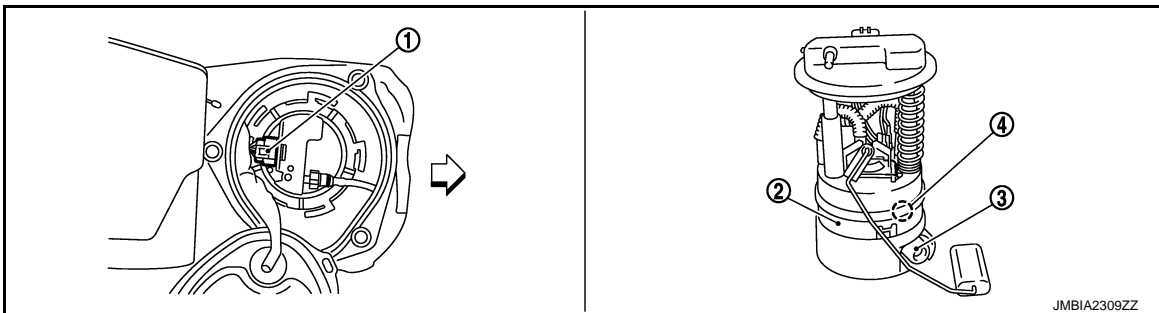
[MR18DE (FOR CALIFORNIA)]



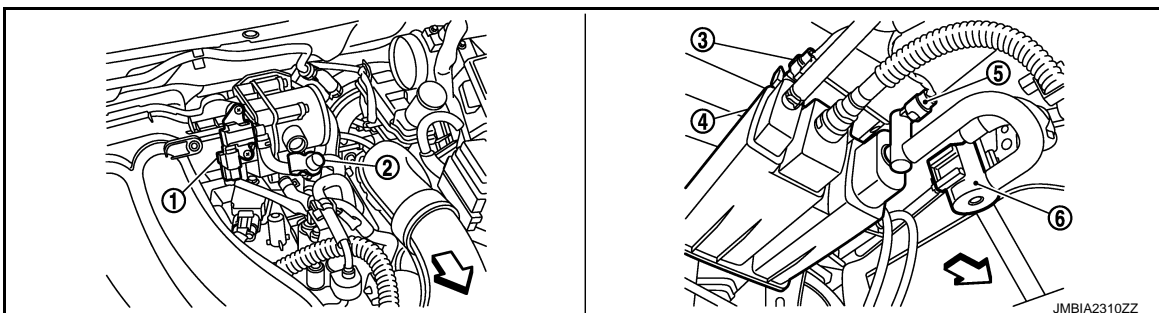
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator harness connector
  - 4. Fuel tank temperature sensor
- ↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# ELECTRIC IGNITION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

4. EVAP canister                      5. EVAP canister vent control valve                      6. Drain filter  
↳ Vehicle front

## Component Description

INFOID:000000006948273

Component	Reference
Accelerator pedal position sensor	<a href="#">EC-891, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652, "Description"</a>
Ignition signal	<a href="#">EC-924, "Description"</a>
Knock sensor	<a href="#">EC-734, "Description"</a>
Mass air flow sensor	<a href="#">EC-638, "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-826, "Description"</a>
Transmission range switch (CVT models)	
Throttle position sensor	<a href="#">EC-658, "Description"</a>
Vehicle speed sensor	<a href="#">EC-810, "EXCEPT FOR M/T MODELS : Description"</a>

# AIR CONDITIONING CUT CONTROL

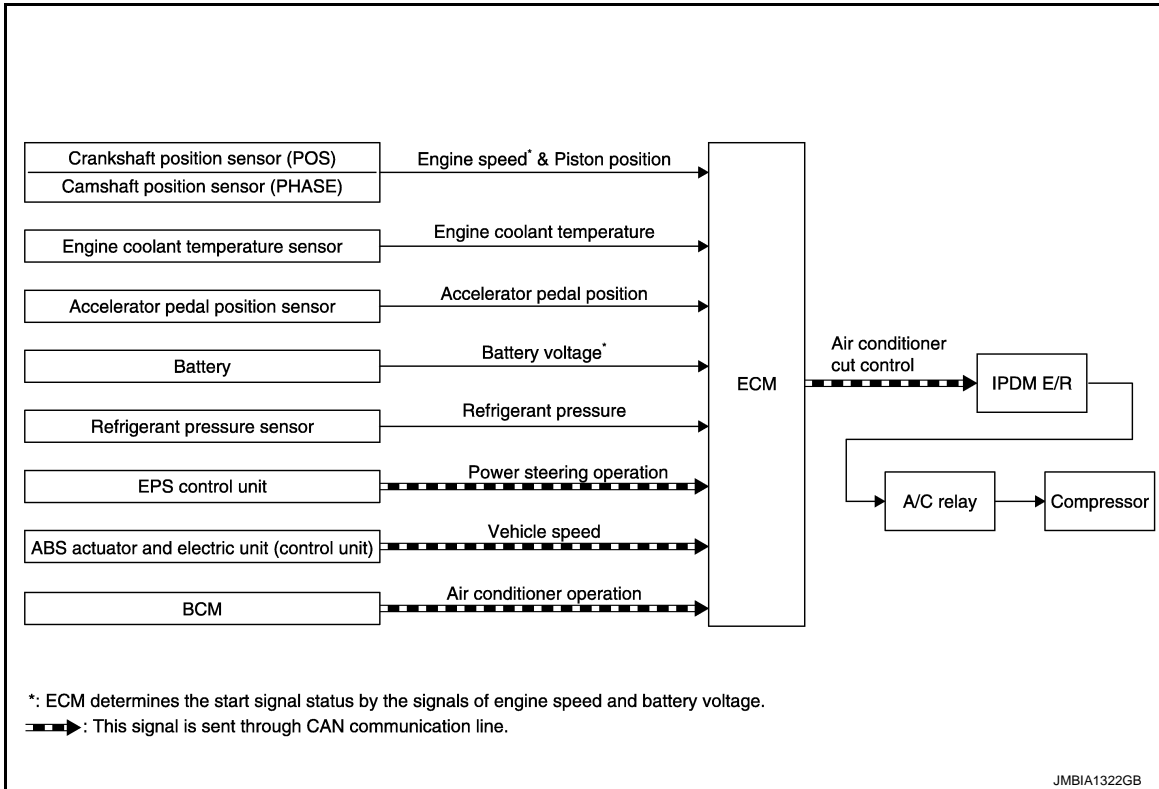
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## AIR CONDITIONING CUT CONTROL

### System Diagram

INFOID:000000006942836



### System Description

INFOID:000000006942837

#### 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		
EPS control unit	Power steering operation		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
BCM	Air conditioner ON signal*1		

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

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

#### SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

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

# AIR CONDITIONING CUT CONTROL

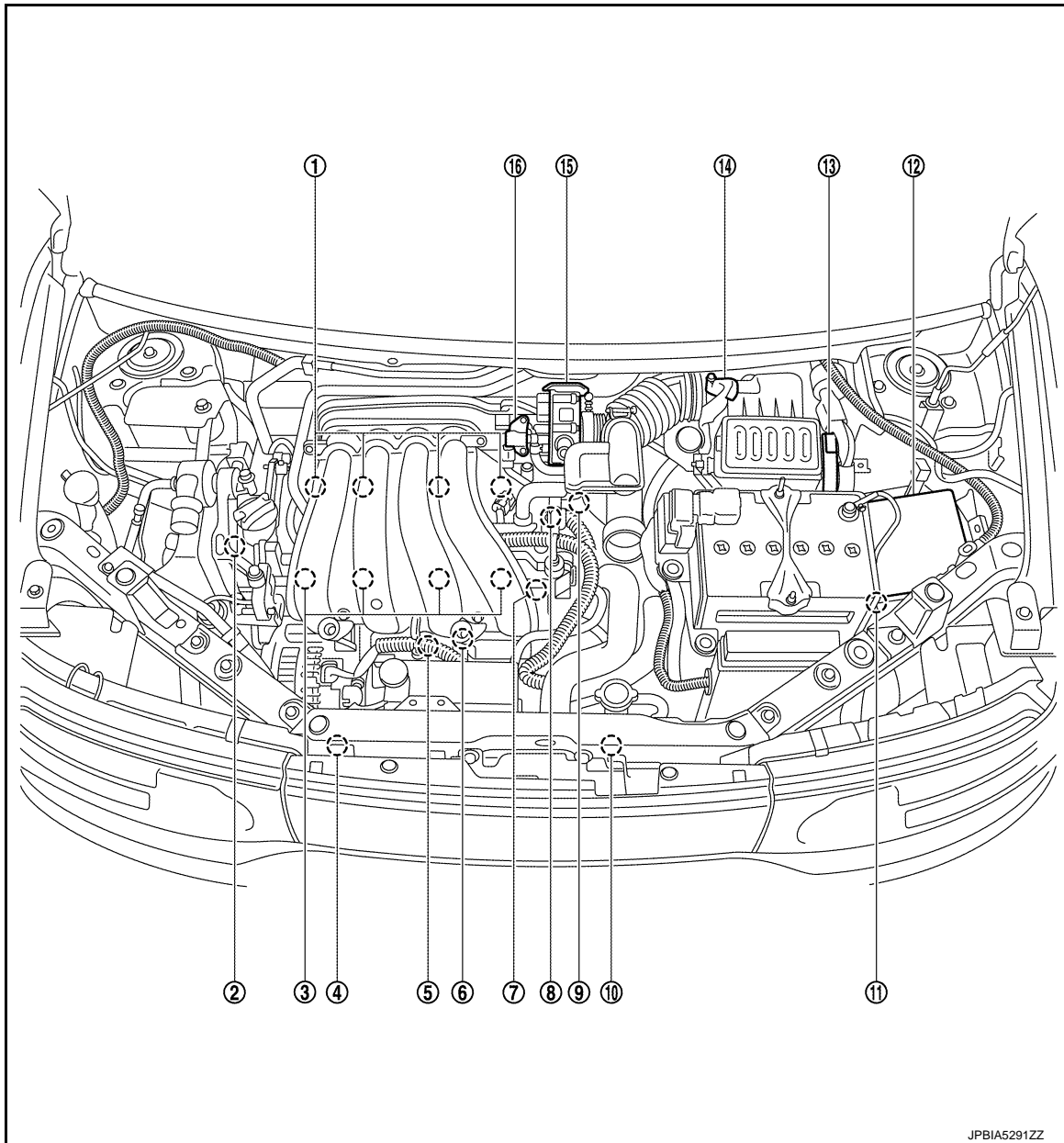
[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

## Component Parts Location

INFOID:000000006948274



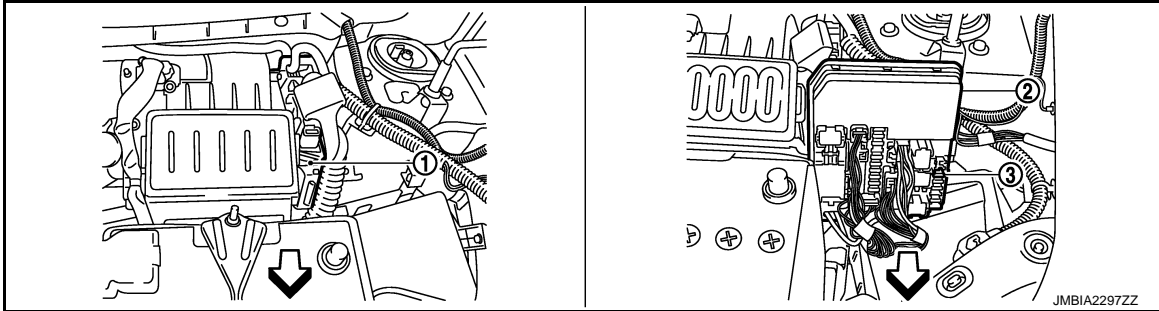
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- |   |   |  |
|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

# AIR CONDITIONING CUT CONTROL

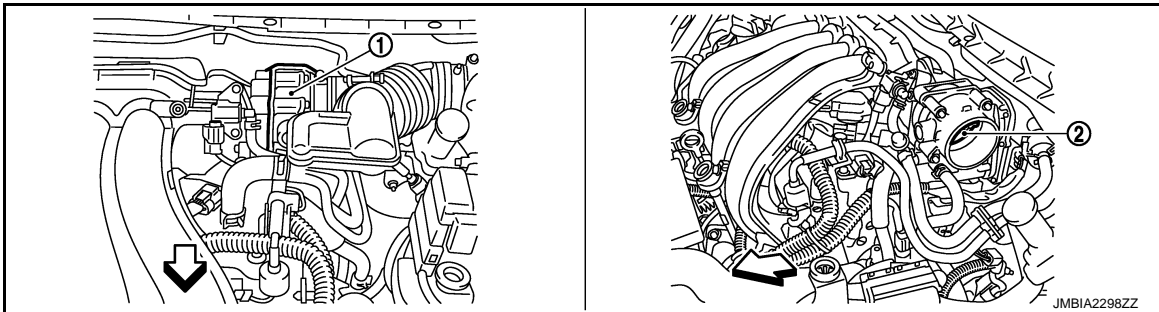
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[MR18DE (FOR CALIFORNIA)]



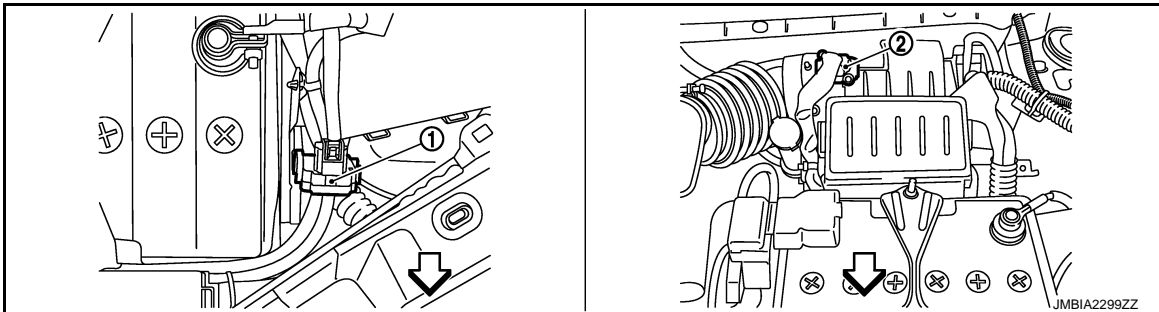
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



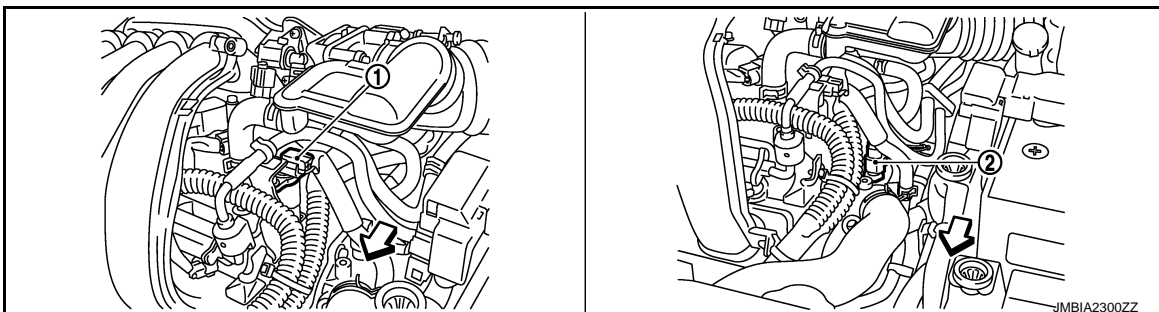
- 1. Electric throttle control actuator  
(with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



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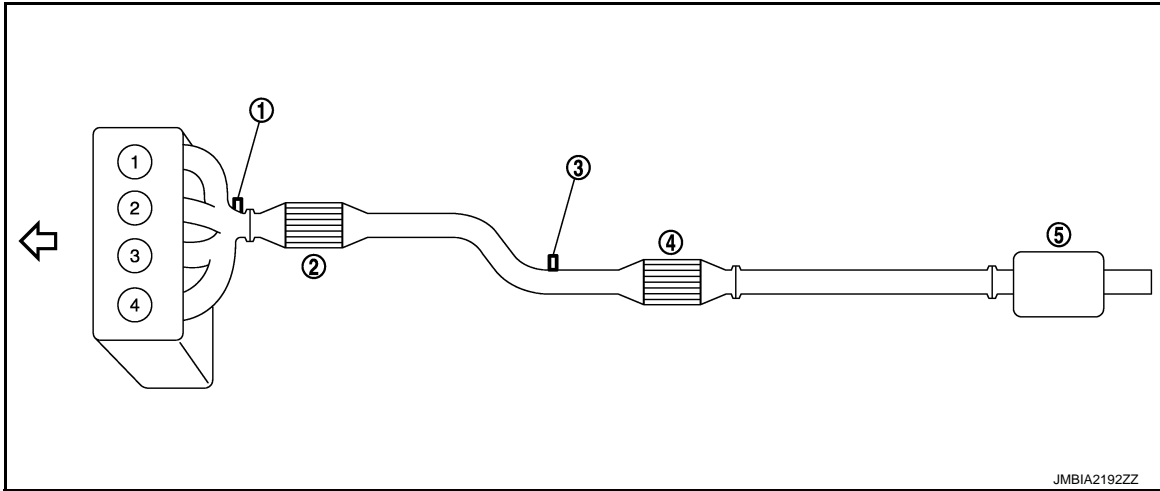
# AIR CONDITIONING CUT CONTROL

[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

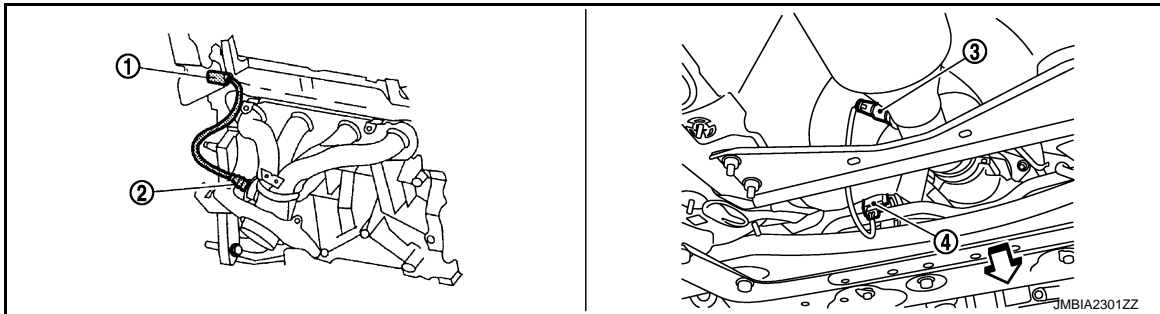
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

↶ Vehicle front



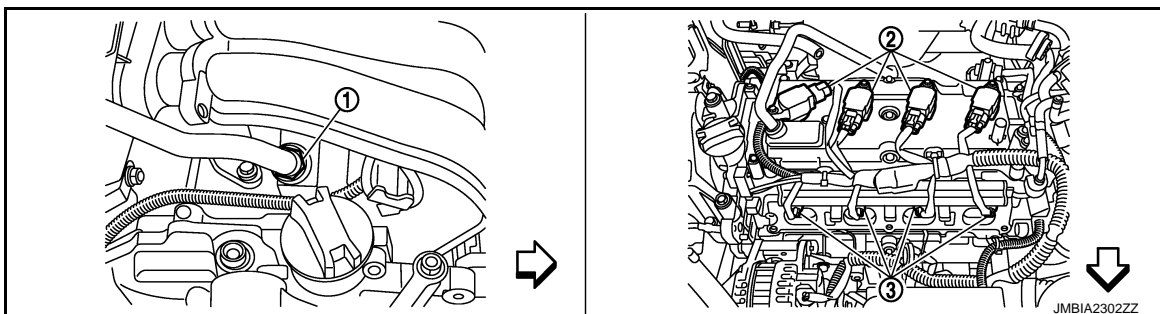
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness connector

↶ Vehicle front



1. PCV valve
2. Ignition coil (with power transistor)
3. Fuel injector

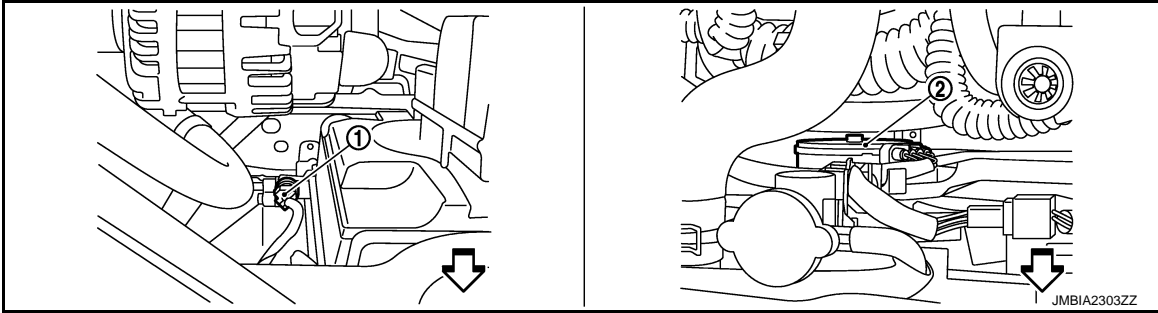
↶ Vehicle front



# AIR CONDITIONING CUT CONTROL

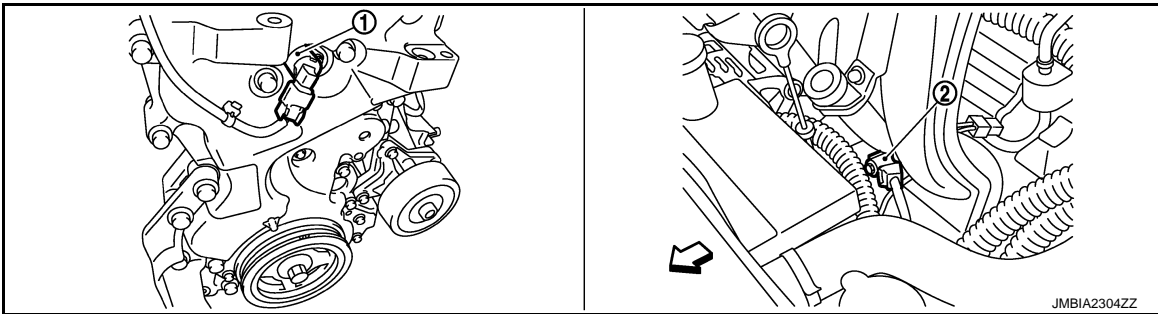
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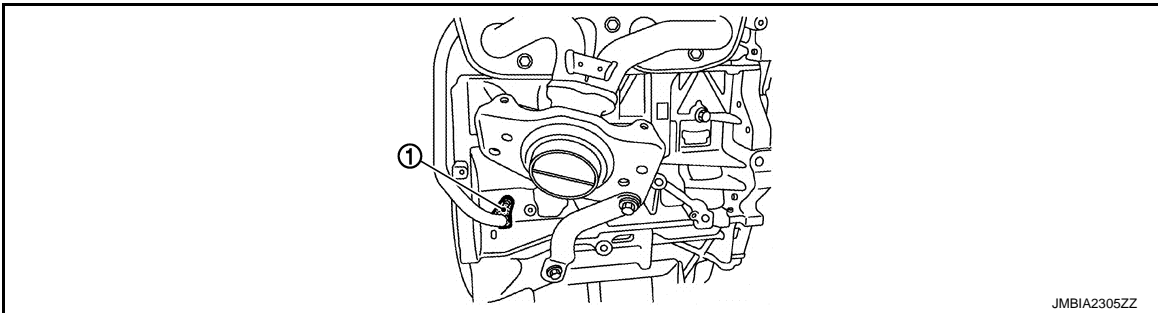
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

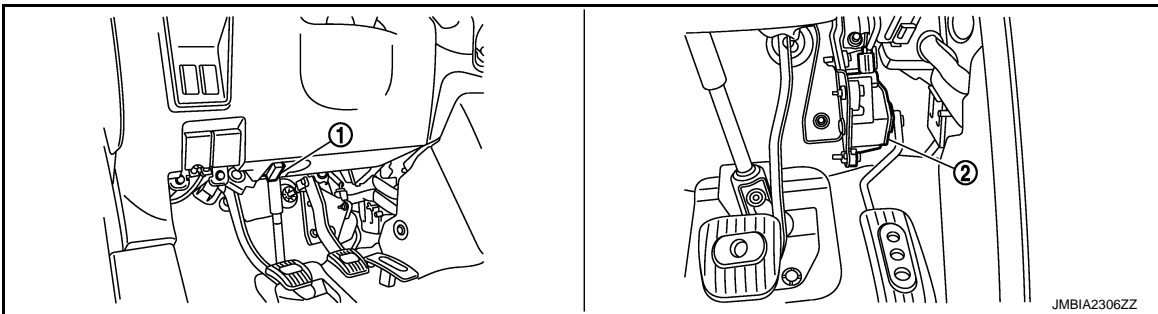


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)



- 1. Data link connector
- 2. Accelerator pedal position sensor

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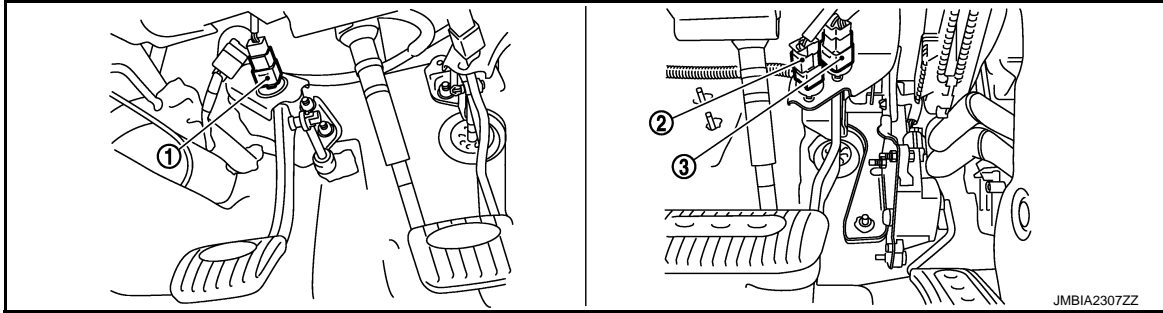
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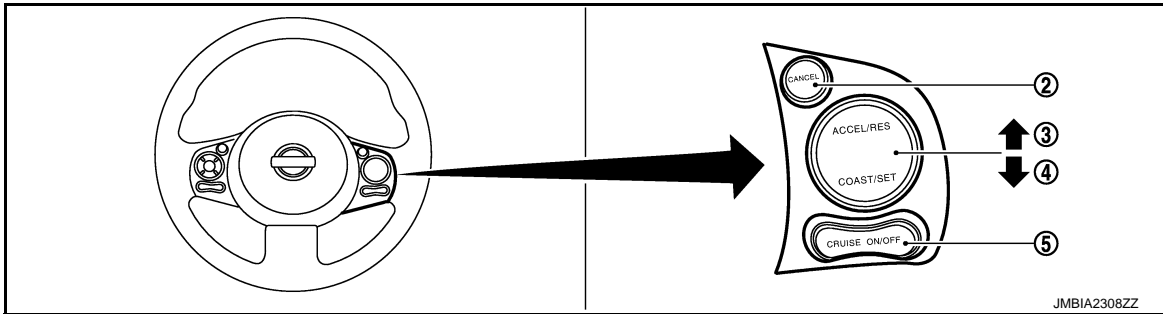
# AIR CONDITIONING CUT CONTROL

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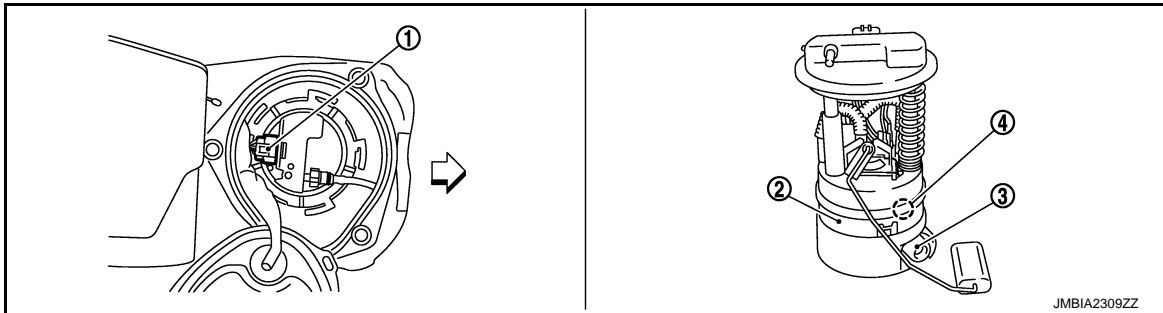
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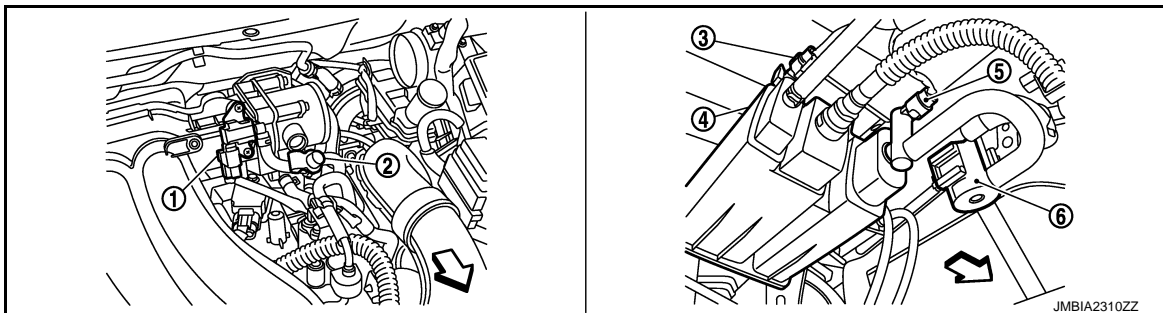
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

# AIR CONDITIONING CUT CONTROL

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↩ Vehicle front

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## Component Description

INFOID:000000006948275

EC

Component	Reference
Accelerator pedal position sensor	<a href="#">EC-891, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652, "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-937, "Description"</a>

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# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

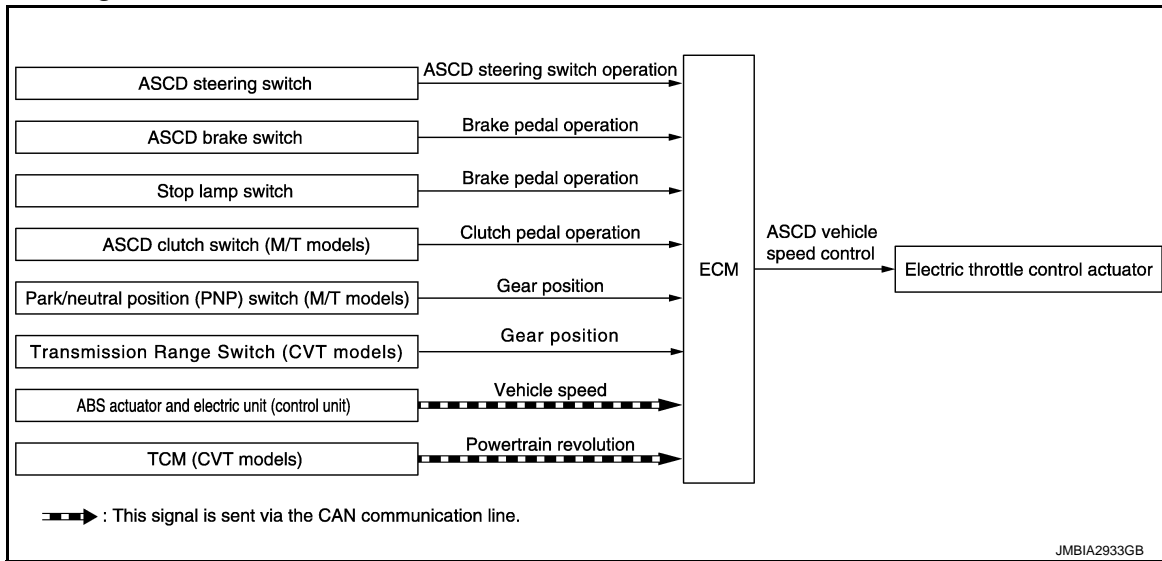
[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

### System Diagram

INFOID:000000006942840



### System Description

INFOID:000000006942841

#### INPUT/OUTPUT SIGNAL CHART

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

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

#### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

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

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

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

#### NOTE:

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

#### SET OPERATION

Press MAIN switch. (The CRUISE 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.

#### ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will maintain the new set speed.

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## CANCEL OPERATION

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 position is changed to N, P, R
- 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 while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

## COAST OPERATION

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

## RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after 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 position is other than P and N (CVT models)
- Vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)

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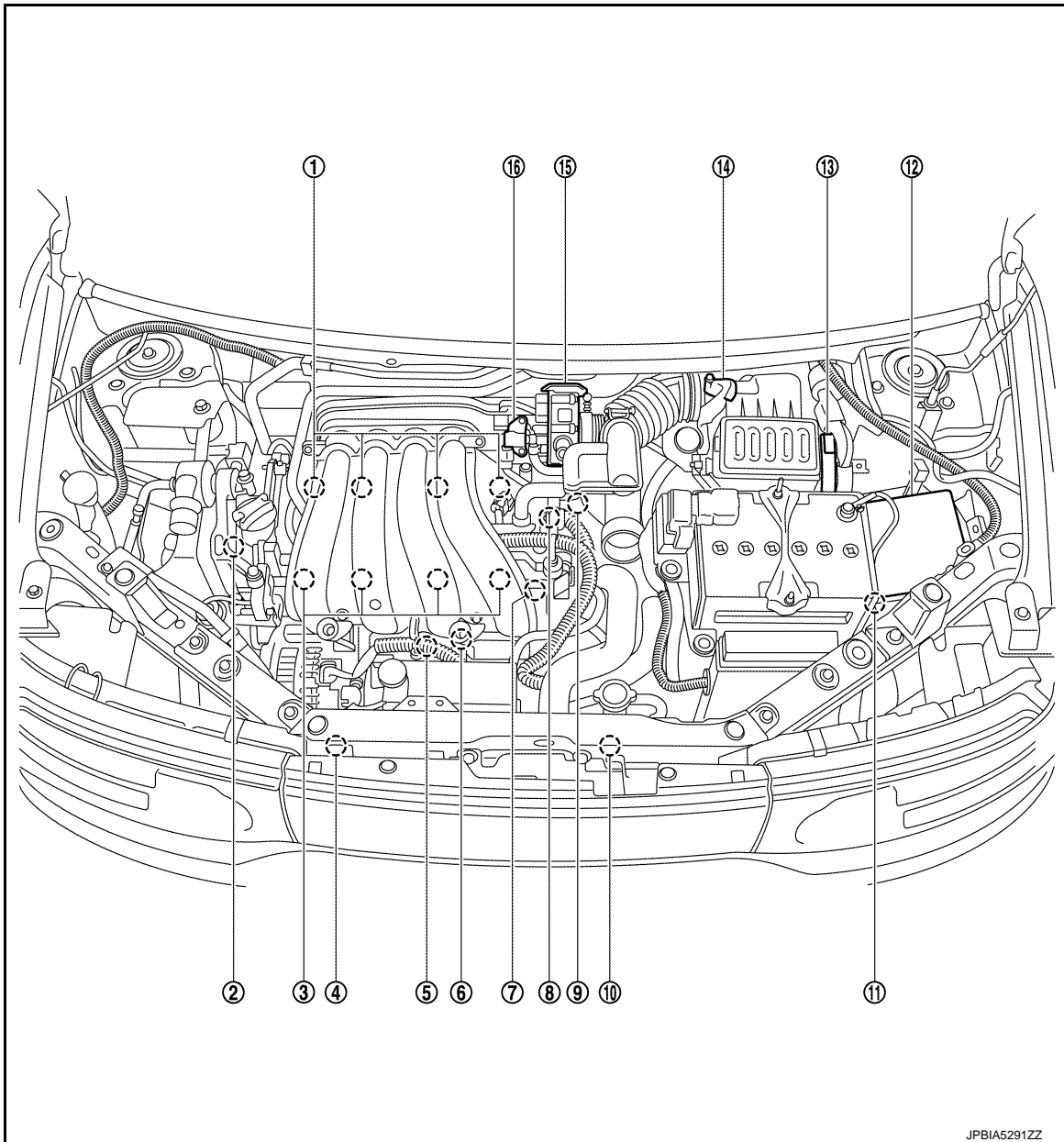
# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

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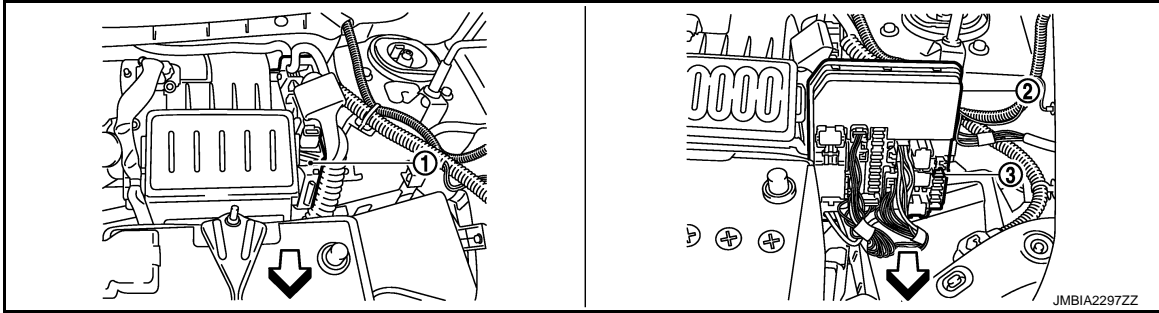
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|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

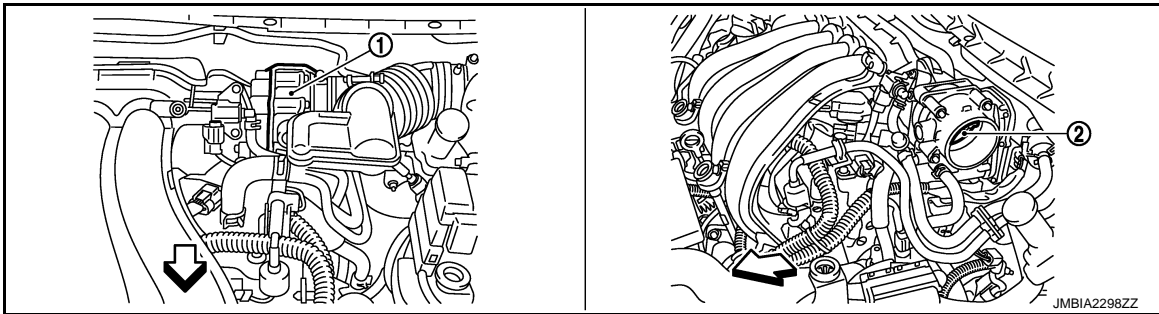
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[MR18DE (FOR CALIFORNIA)]



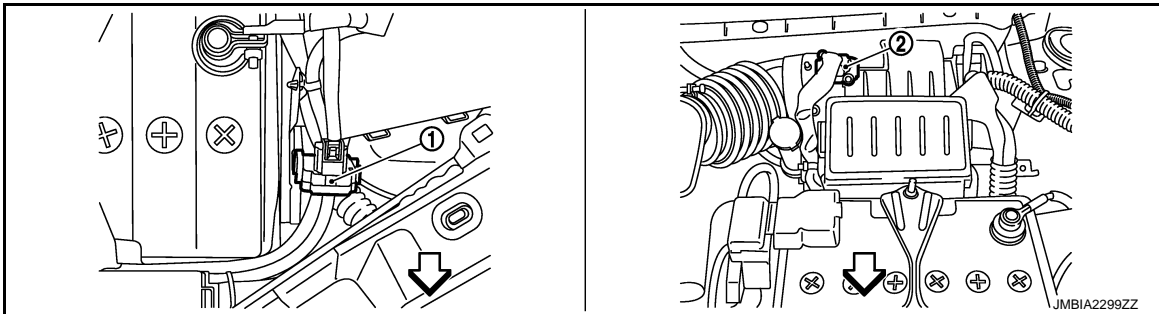
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



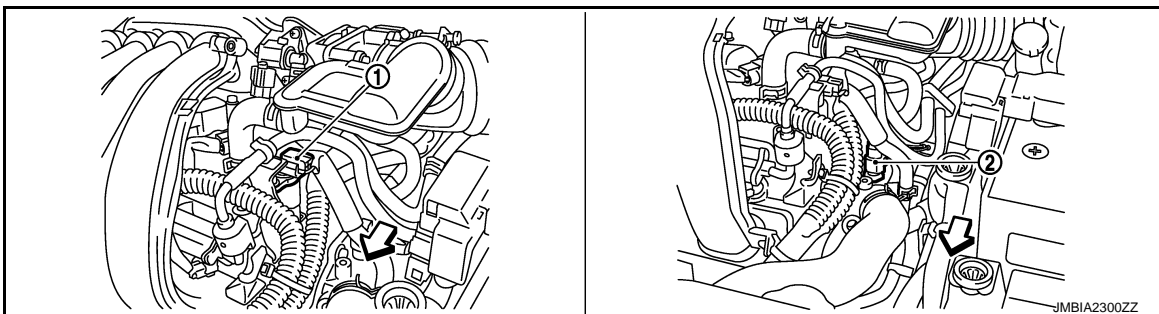
- 1. Electric throttle control actuator  
(with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



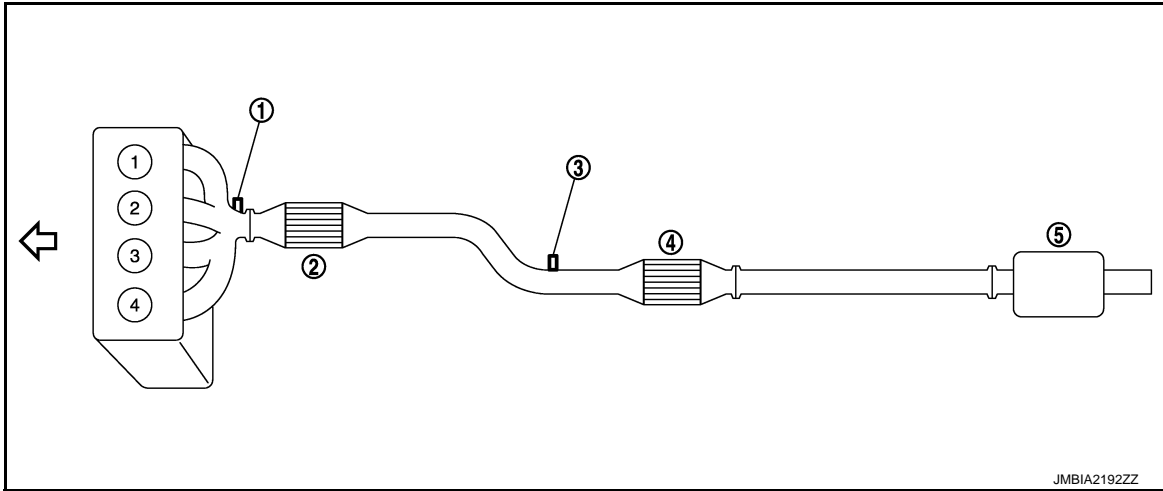
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# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

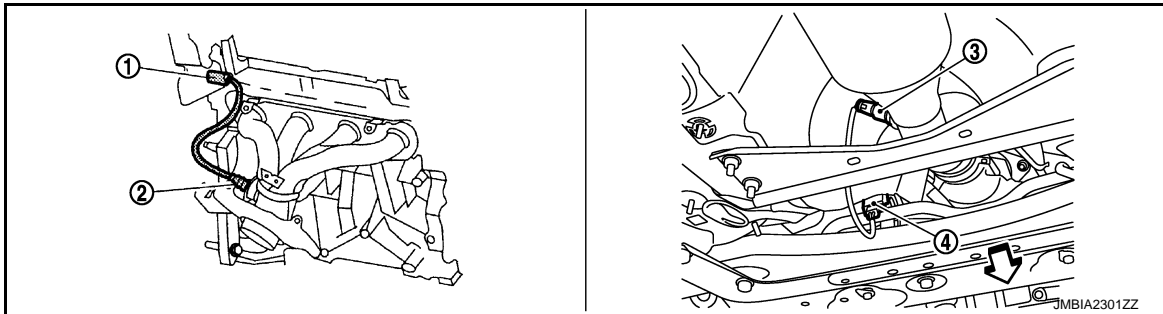
[MR18DE (FOR CALIFORNIA)]

## < SYSTEM DESCRIPTION >

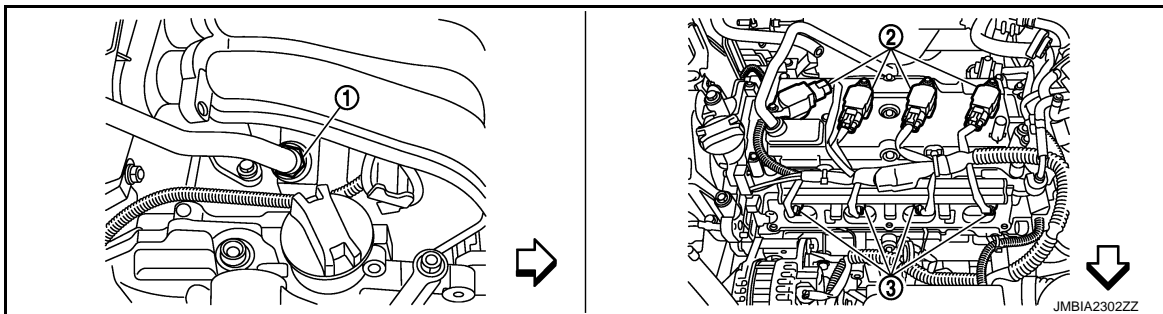
1. Camshaft position sensor (PHASE)
  2. Engine coolant temperature sensor
- ⇐ Vehicle front



1. Air fuel ratio (A/F) sensor 1
  2. Three way catalyst (Manifold)
  3. Heated oxygen sensor 2
  4. Three way catalyst (under floor)
  5. Muffler
- ⇐ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
  2. Air fuel ratio (A/F) sensor 1 connector
  3. Heated oxygen sensor 2
  4. Heated oxygen sensor 2 harness connector
- ⇐ Vehicle front



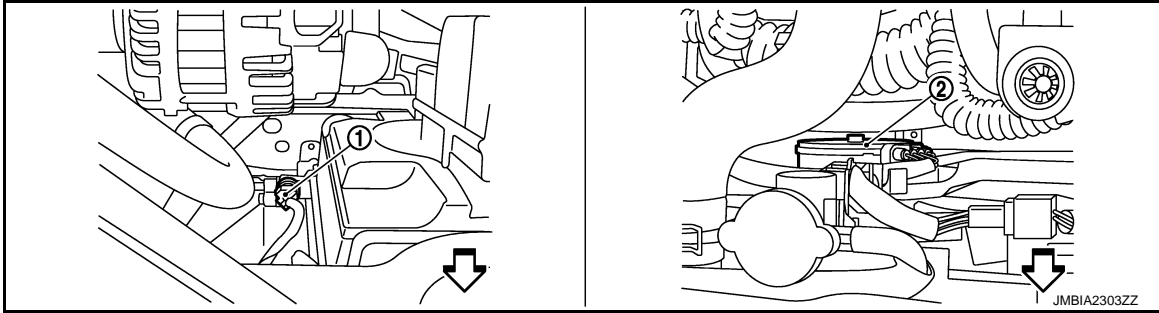
1. PCV valve
  2. Ignition coil (with power transistor)
  3. Fuel injector
- ⇐ Vehicle front



# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

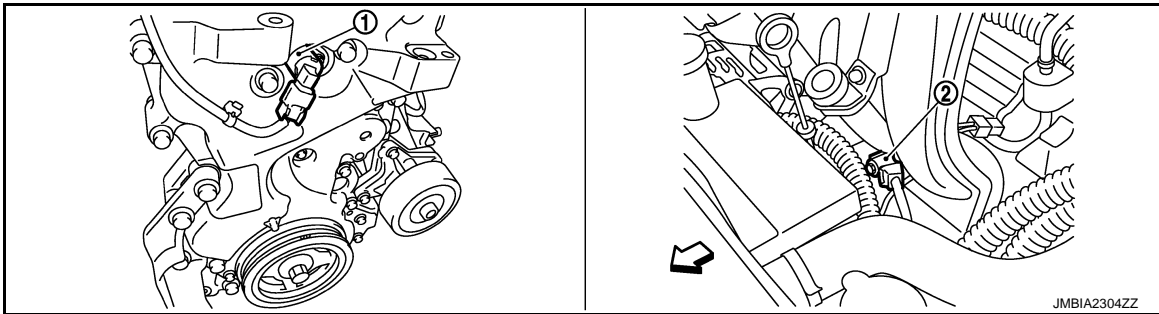
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[MR18DE (FOR CALIFORNIA)]



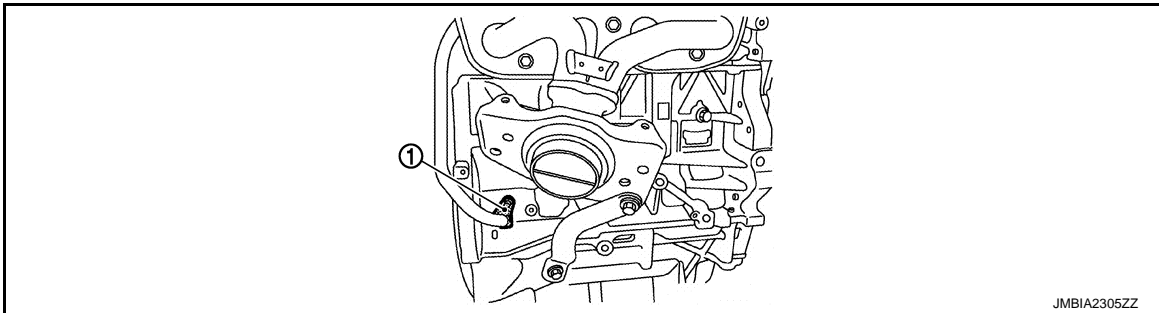
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

← Vehicle front

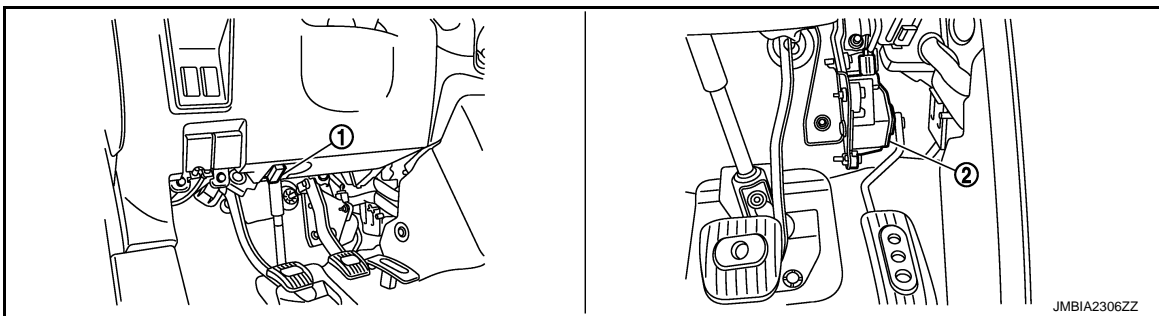


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

← Vehicle front



- 1. Crankshaft position sensor (POS)



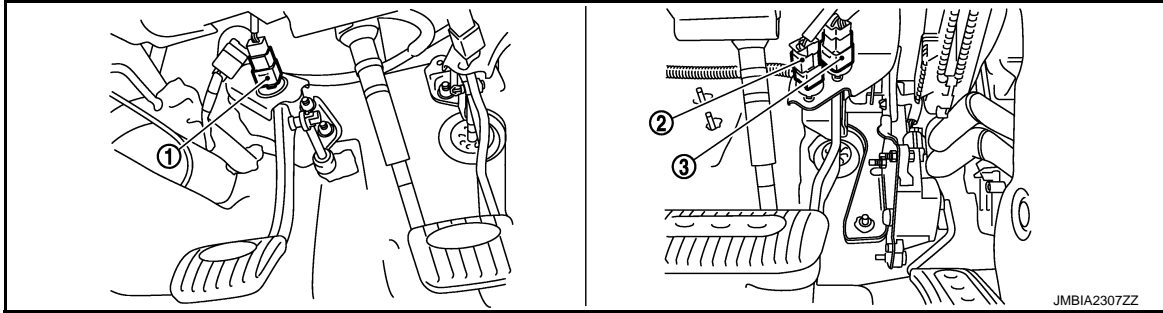
- 1. Data link connector
- 2. Accelerator pedal position sensor

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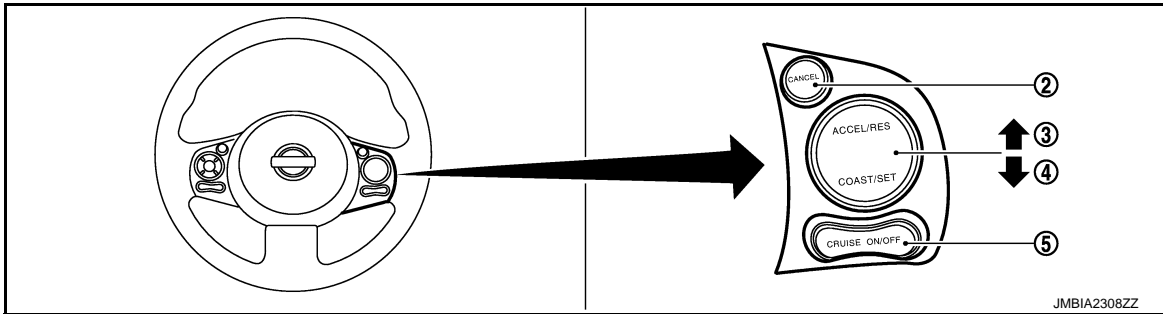
# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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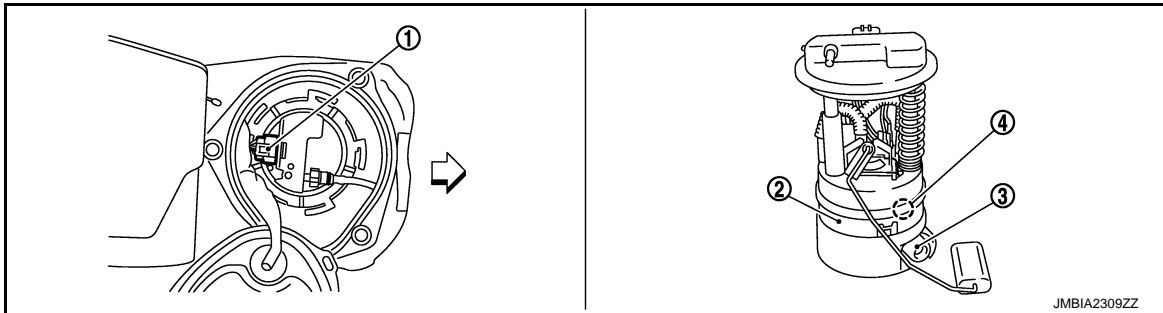
[MR18DE (FOR CALIFORNIA)]



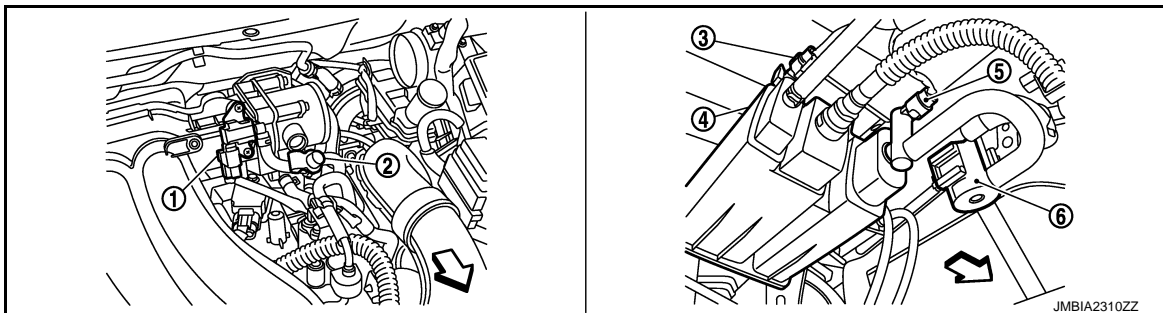
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↩ Vehicle front

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## Component Description

INFOID:000000006948277

EC

Component	Reference
ASCD brake switch	<a href="#">EC-858. "Description"</a>
ASCD steering switch	<a href="#">EC-855. "Description"</a>
Electric throttle control actuator	<a href="#">EC-889. "Description"</a>
Park/neutral position switch (M/T models)	<a href="#">EC-826. "Description"</a>
Transmission range switch (CVT models)	
Stop lamp switch	<a href="#">EC-869. "Description"</a>

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## CAN COMMUNICATION

### System Description

INFOID:000000006942844

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-22, "CAN Communication Signal Chart"](#), about CAN communication for detail.

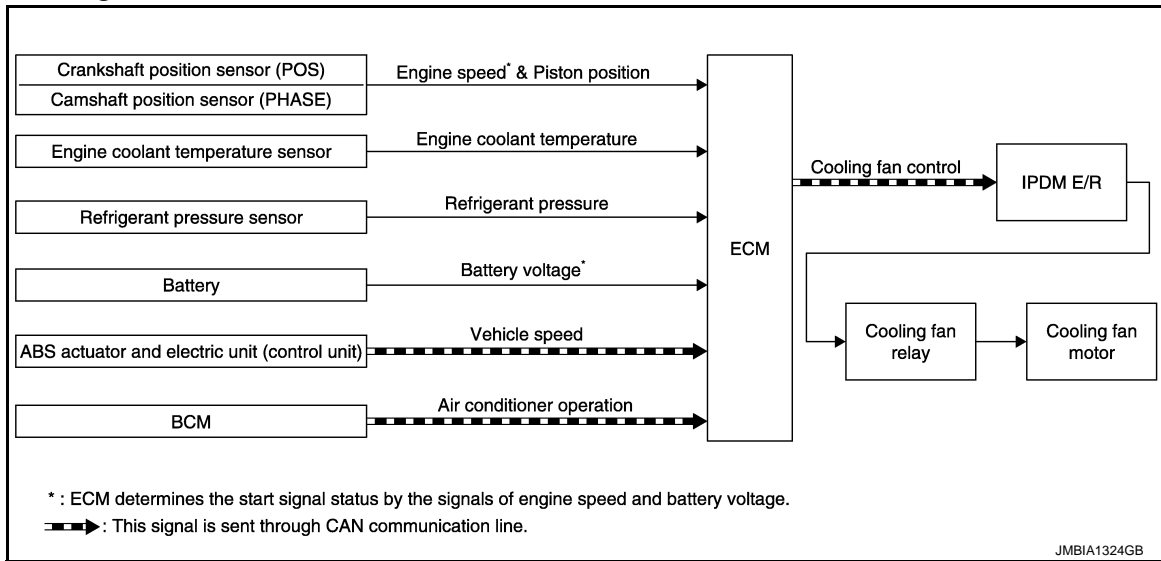
# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## COOLING FAN CONTROL

### System Diagram



### System Description

INFOID:000000006942846

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* <sup>1</sup>	Cooling fan control	IPDM E/R ↓ Cooling fan relay ↓ Cooling fan motor
Battery	Battery voltage* <sup>1</sup>		
ABS actuator and electric unit (control unit)	Vehicle speed* <sup>2</sup>		
Engine coolant temperature sensor	Engine coolant temperature		
BCM	Air conditioner ON signal* <sup>2</sup>		
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 via the CAN communication line.

### SYSTEM DESCRIPTION

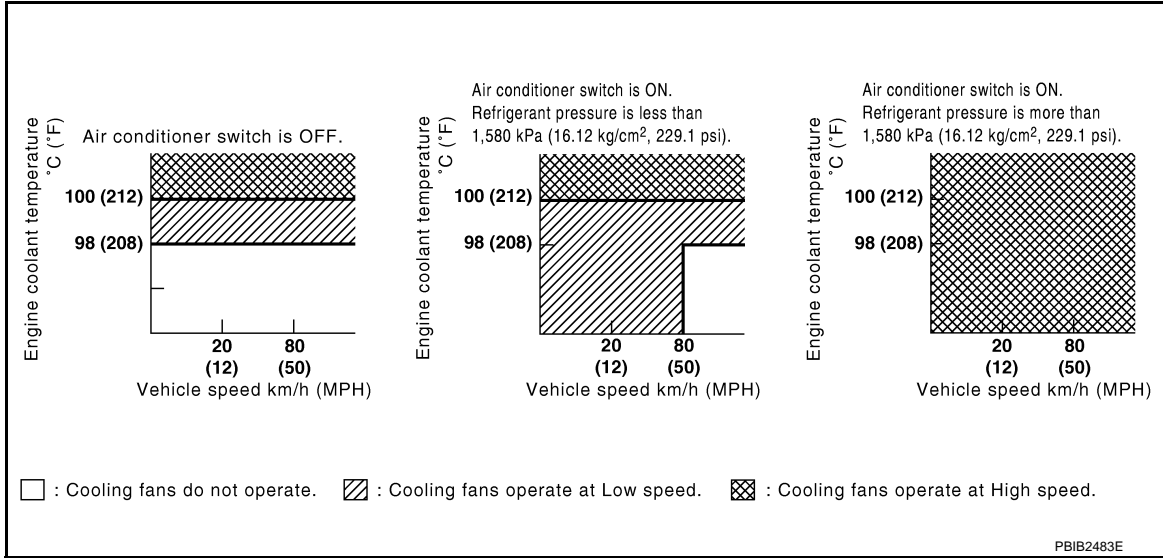
ECM controls cooling fan speed corresponding to vehicle speed, engine coolant temperature, refrigerant pressure, air conditioner ON signal. Then control system has 3-step control [HIGH/LOW/OFF].

# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Cooling Fan Operation



## Cooling Fan Relay Operation

The ECM controls cooling fan relays via the CAN communication line.

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

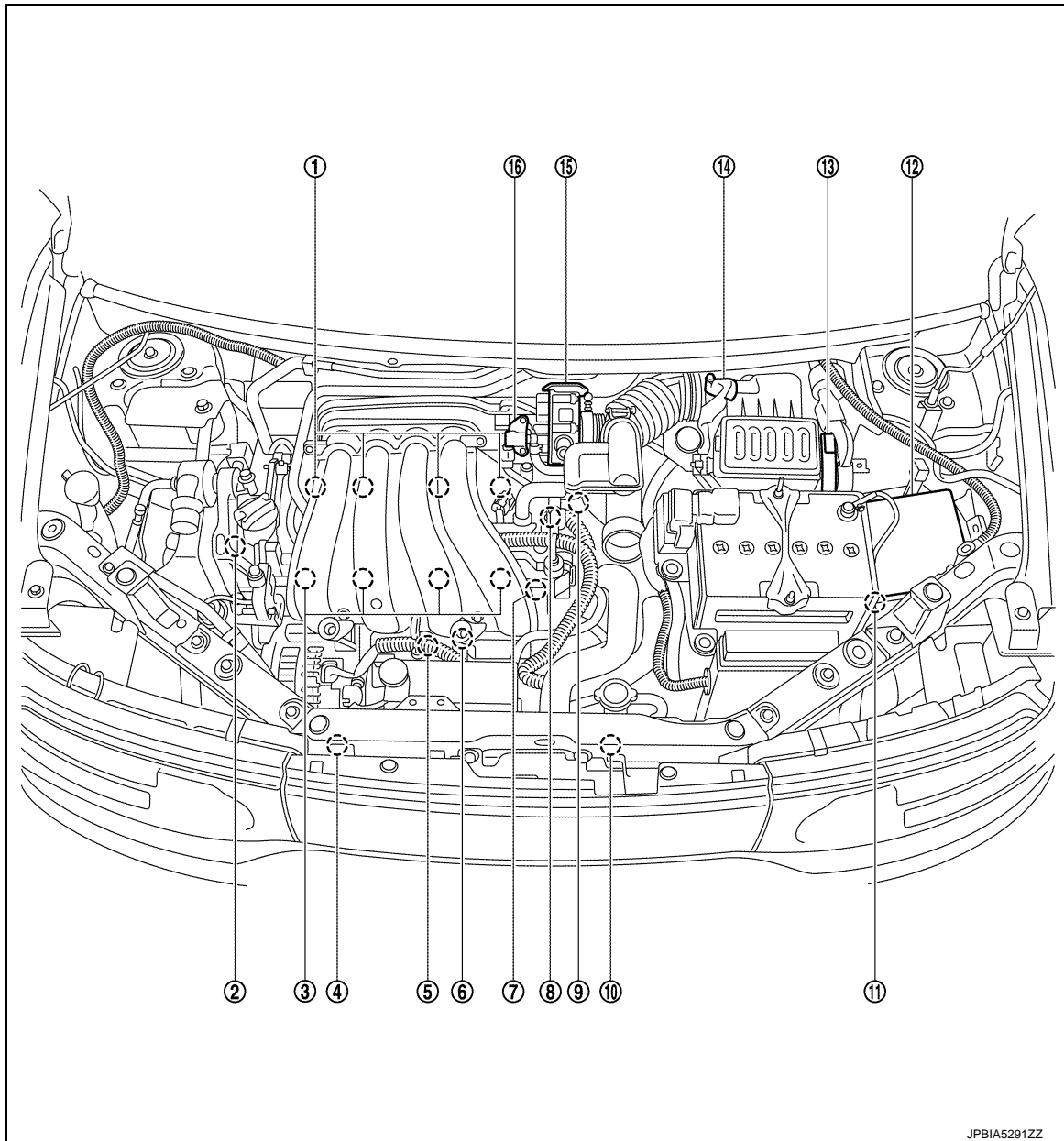
# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

INFOID:000000006948278



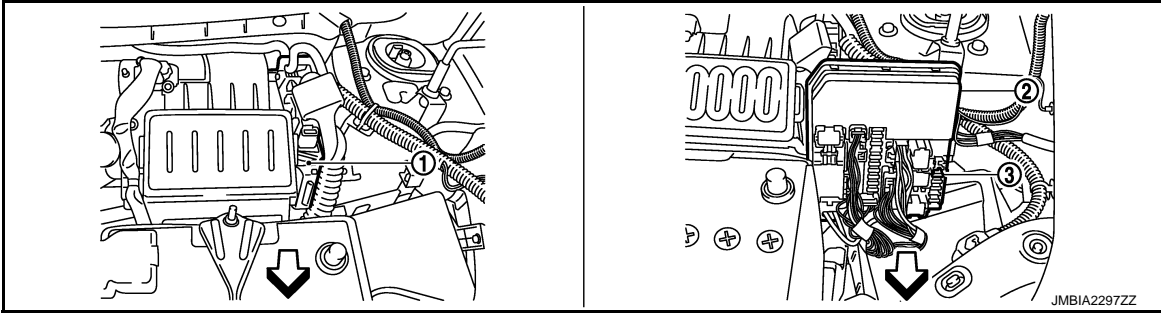
- |   |   |  |
|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

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# COOLING FAN CONTROL

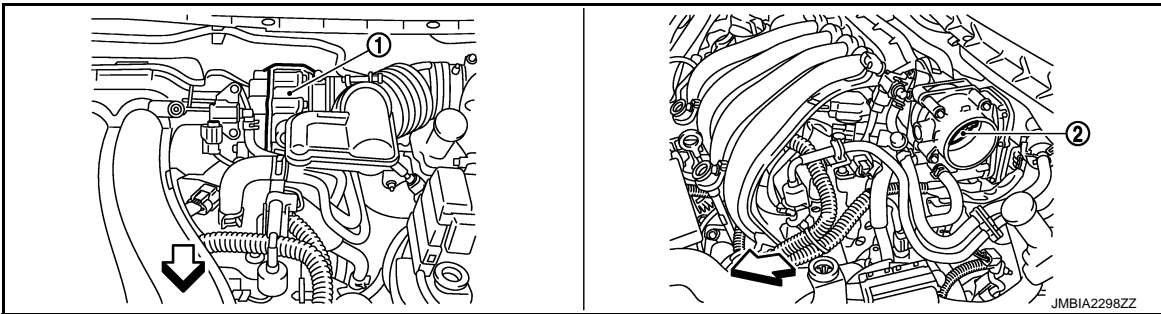
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[MR18DE (FOR CALIFORNIA)]



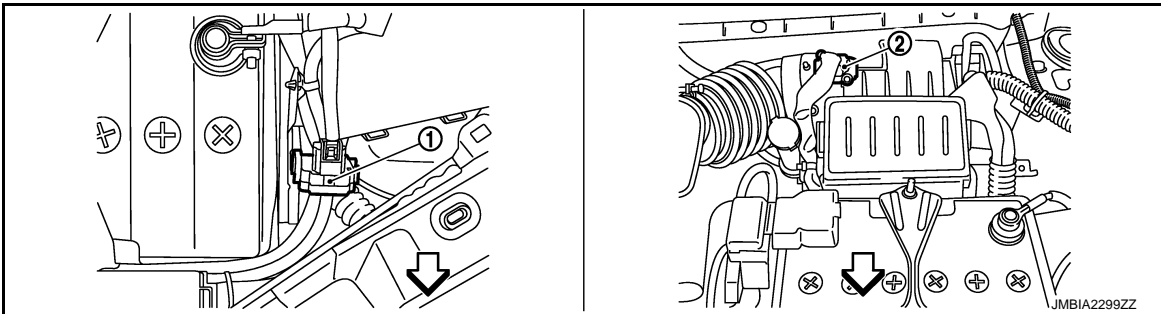
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



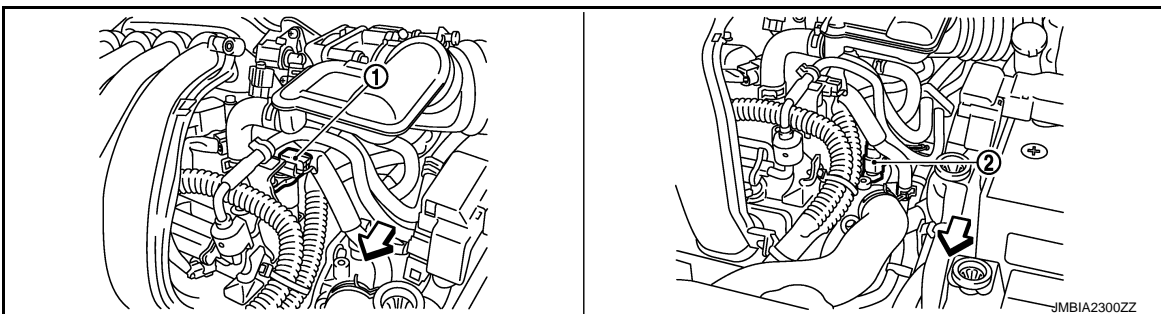
- 1. Electric throttle control actuator
- 2. Throttle valve  
(with built-in position sensor, throttle control motor)

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor  
(with Intake air temperature sensor)

← Vehicle front



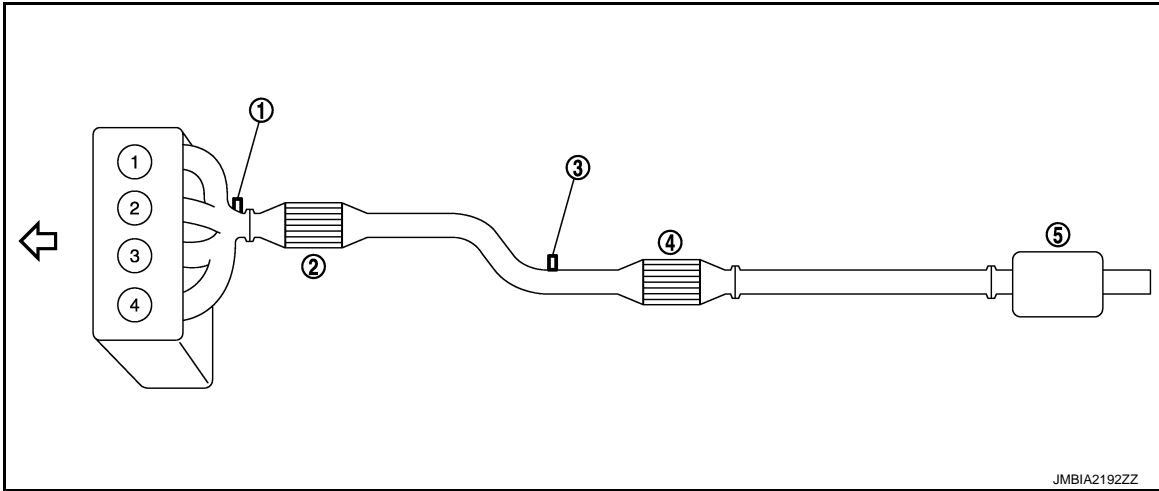


# COOLING FAN CONTROL

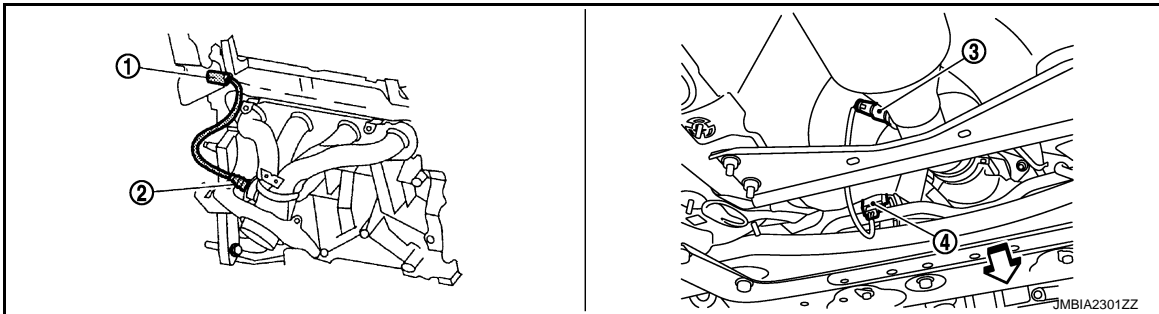
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[MR18DE (FOR CALIFORNIA)]

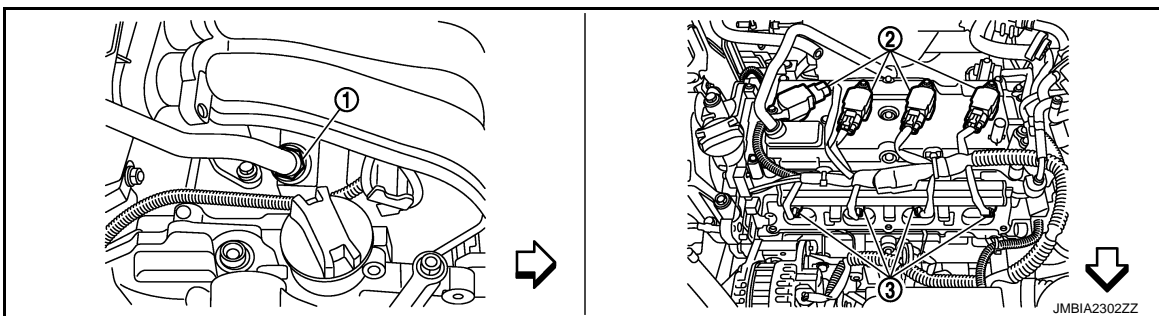
1. Camshaft position sensor (PHASE)
  2. Engine coolant temperature sensor
- ← Vehicle front



1. Air fuel ratio (A/F) sensor 1
  2. Three way catalyst (Manifold)
  3. Heated oxygen sensor 2
  4. Three way catalyst (under floor)
  5. Muffer
- ← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
  2. Air fuel ratio (A/F) sensor 1
  3. Heated oxygen sensor 2
  4. Heated oxygen sensor 2 harness connector
- ← Vehicle front



1. PCV valve
  2. Ignition coil (with power transistor)
  3. Fuel injector
- ← Vehicle front

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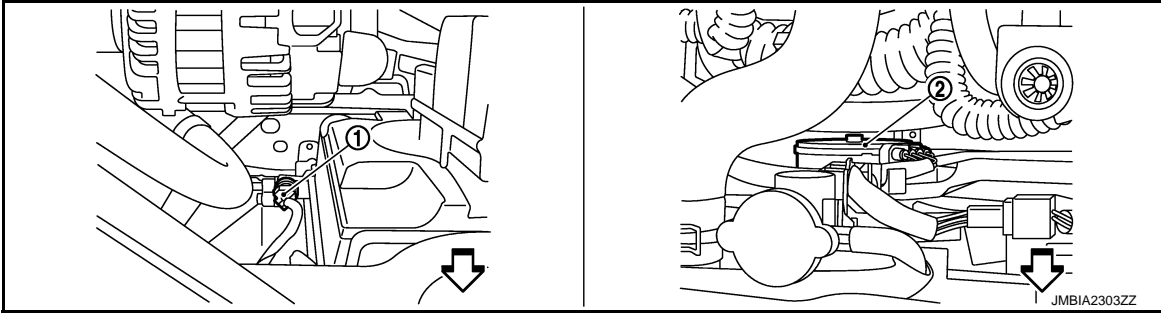
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# COOLING FAN CONTROL

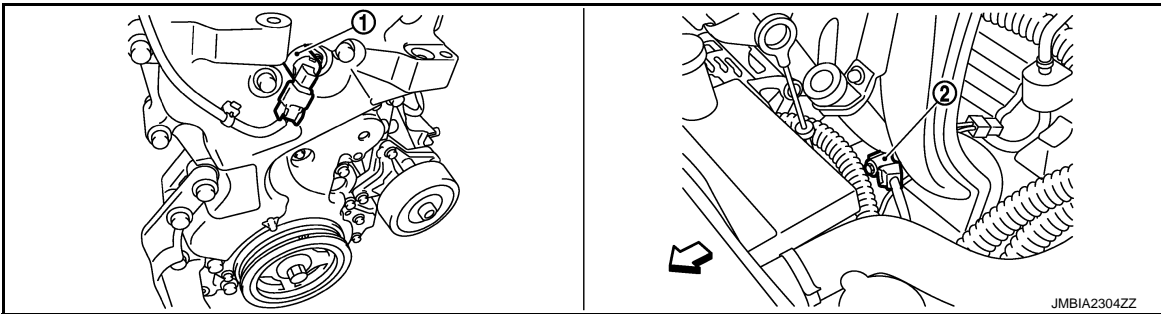
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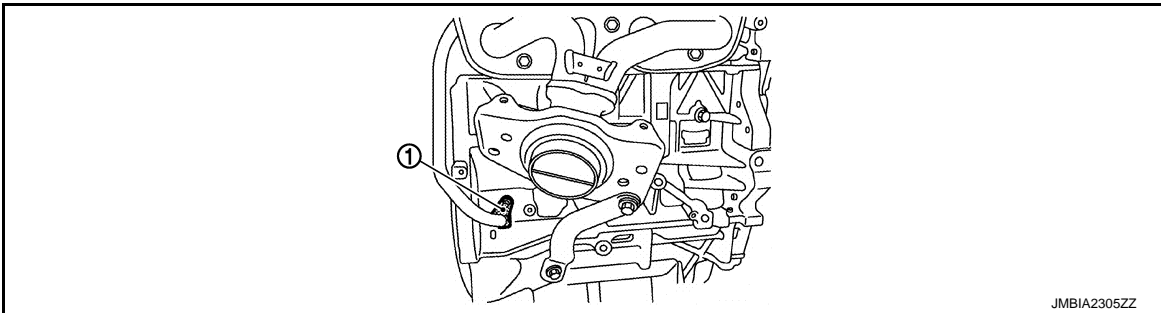
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

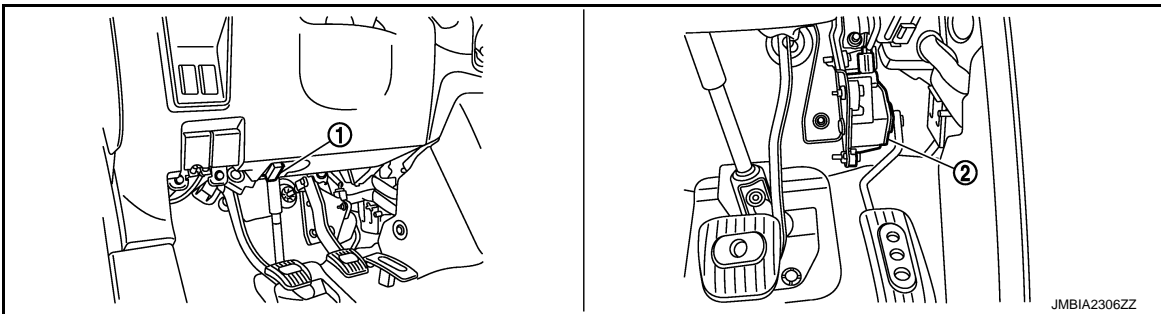


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

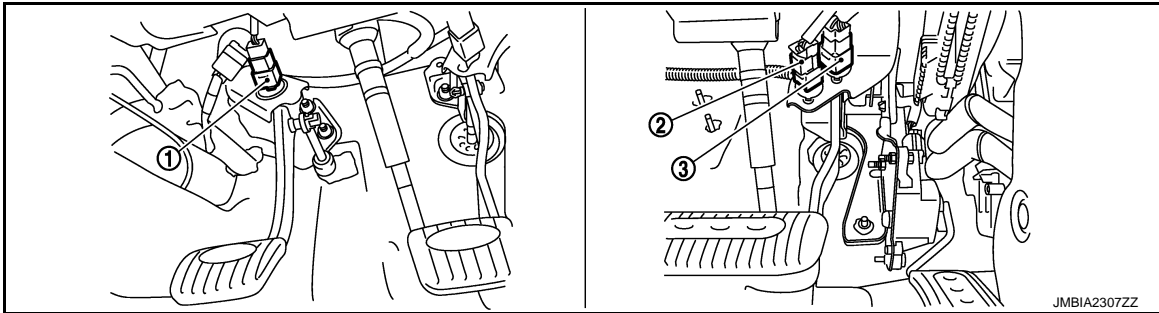


- 1. Data link connector
- 2. Accelerator pedal position sensor

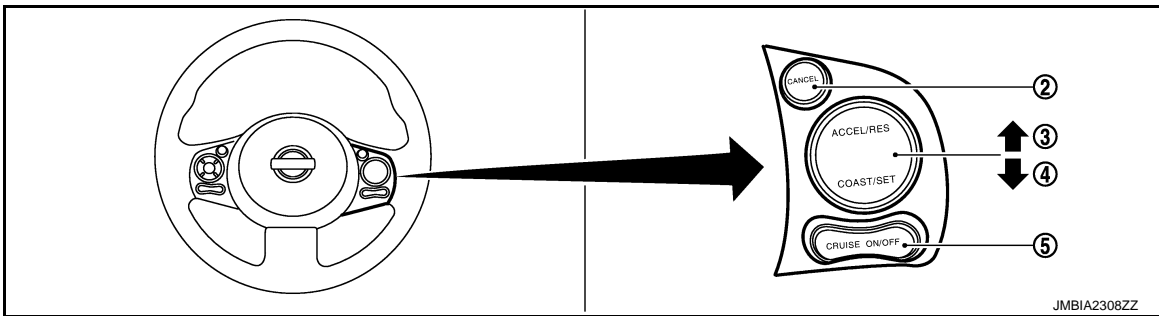
# COOLING FAN CONTROL

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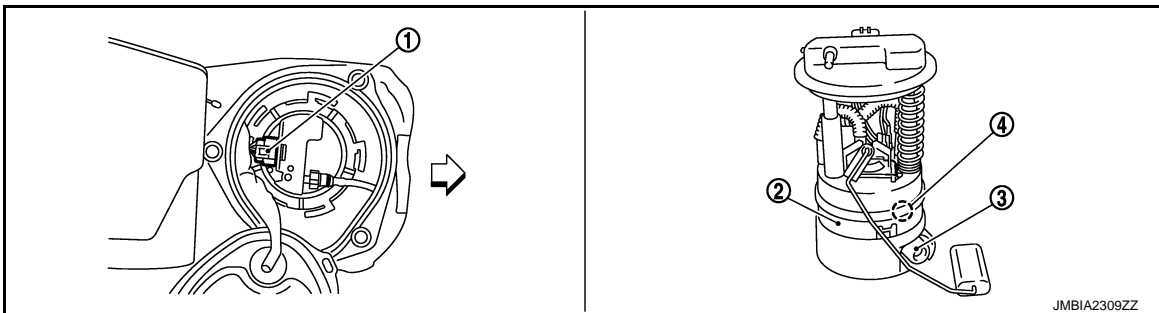
[MR18DE (FOR CALIFORNIA)]



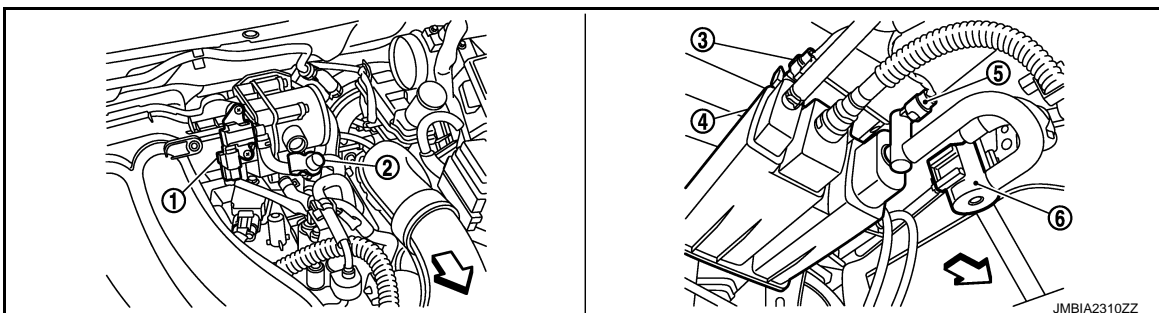
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

4. EVAP canister  
↳ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006948279

Component	Reference
Camshaft position sensor (PHASE)	<a href="#">EC-740. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736. "Description"</a>
Cooling fan motor	<a href="#">EC-557. "System Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652. "Description"</a>
Refrigerant pressure sensor	<a href="#">EC-937. "Description"</a>

# EVAPORATIVE EMISSION SYSTEM

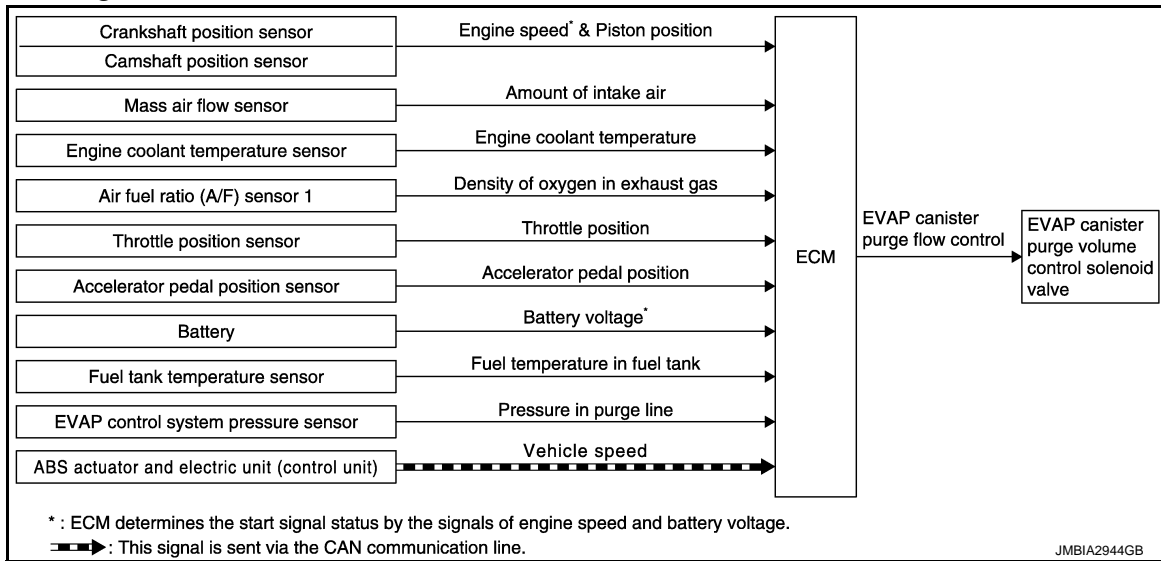
[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## EVAPORATIVE EMISSION SYSTEM

### System Diagram

INFOID:000000006942849



### System Description

INFOID:000000006942850

### INPUT/OUTPUT SIGNAL CHART

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		
ABS actuator and electric unit (control unit)	Vehicle speed*2		

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

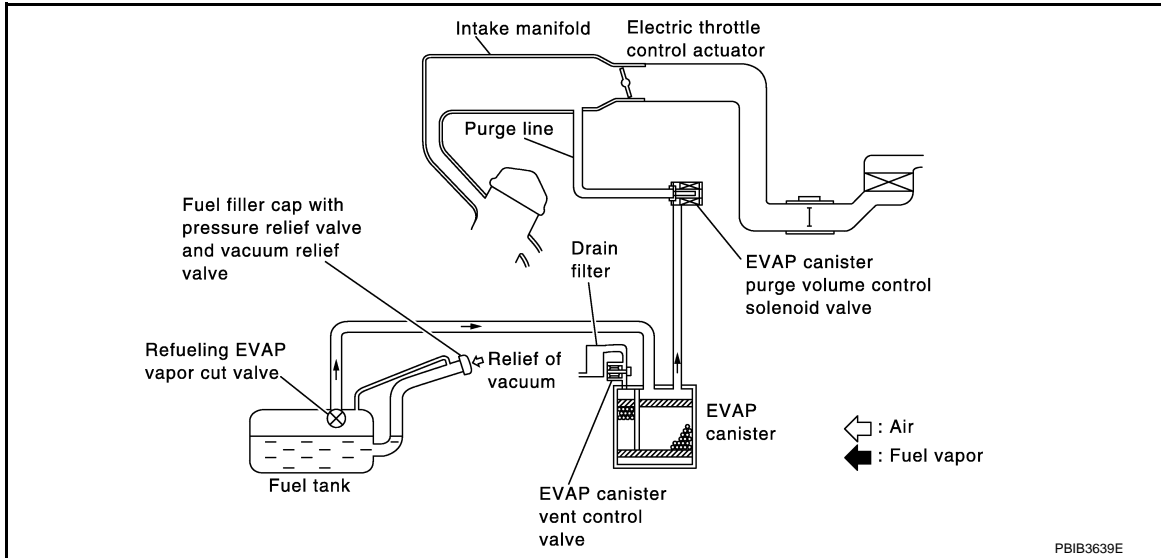
\*2: This signal is sent to the ECM via the CAN communication line.

# EVAPORATIVE EMISSION SYSTEM

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION



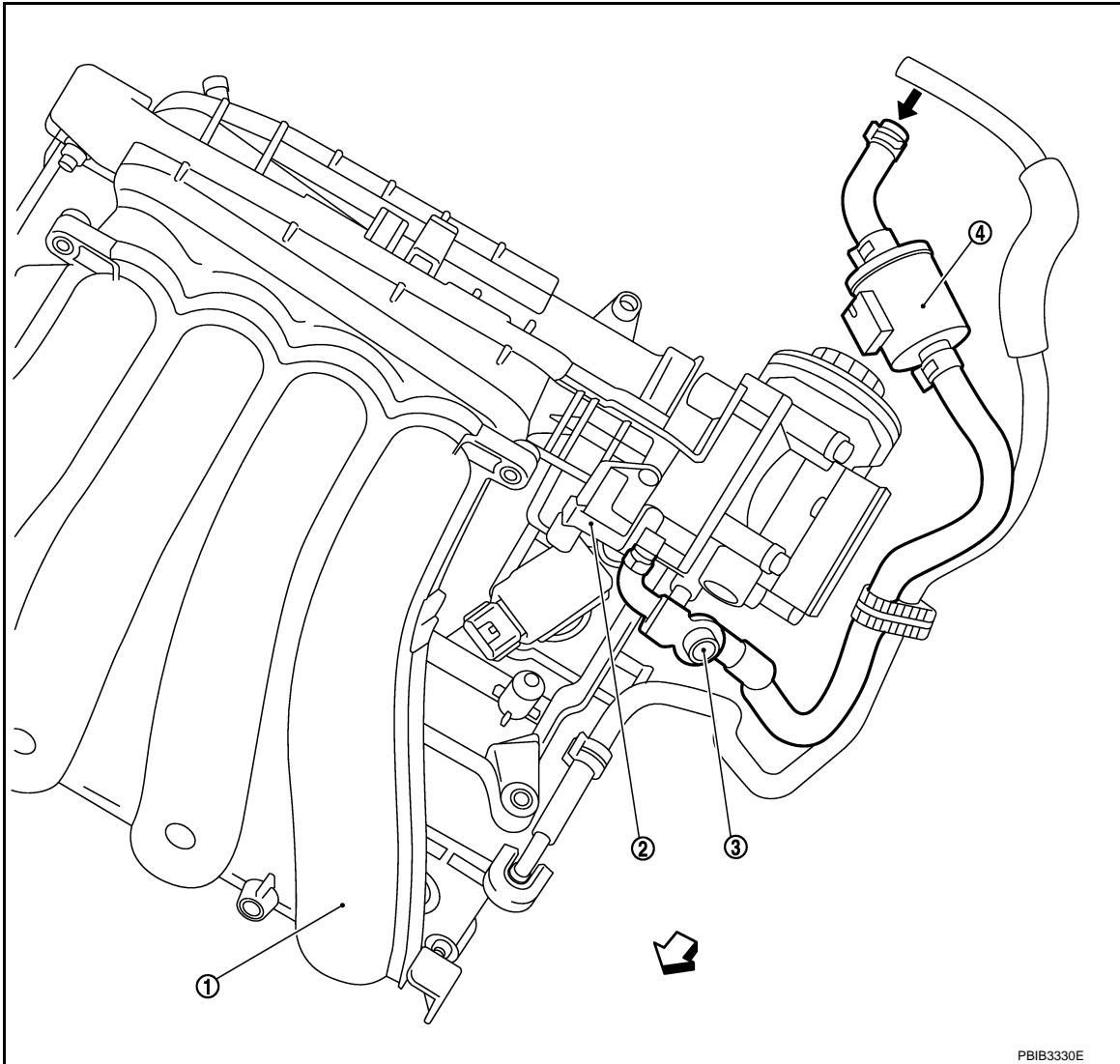
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon 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 LINE DRAWING

# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]



1. Intake manifold collector

2. EVAP canister purge volume control

3. EVAP service port solenoid valve

4. EVAP purge resonator

↔ Vehicle front

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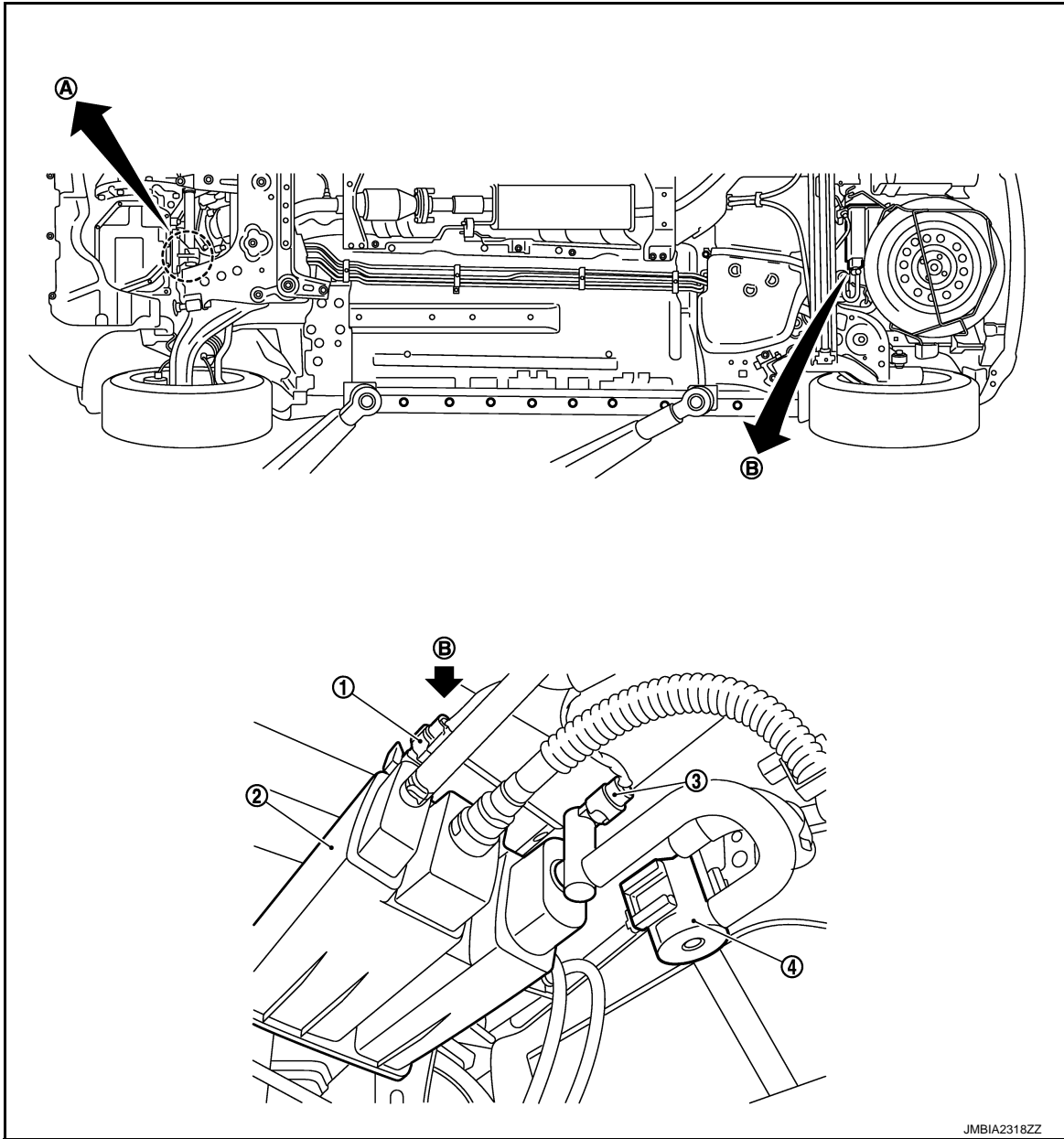
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# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]



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- 1. EVAP control system pressure sensor
- 2. EVAP canister
- 3. EVAP canister vent control valve
- 4. Drain filter
- A. To previous figure

**NOTE:**

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



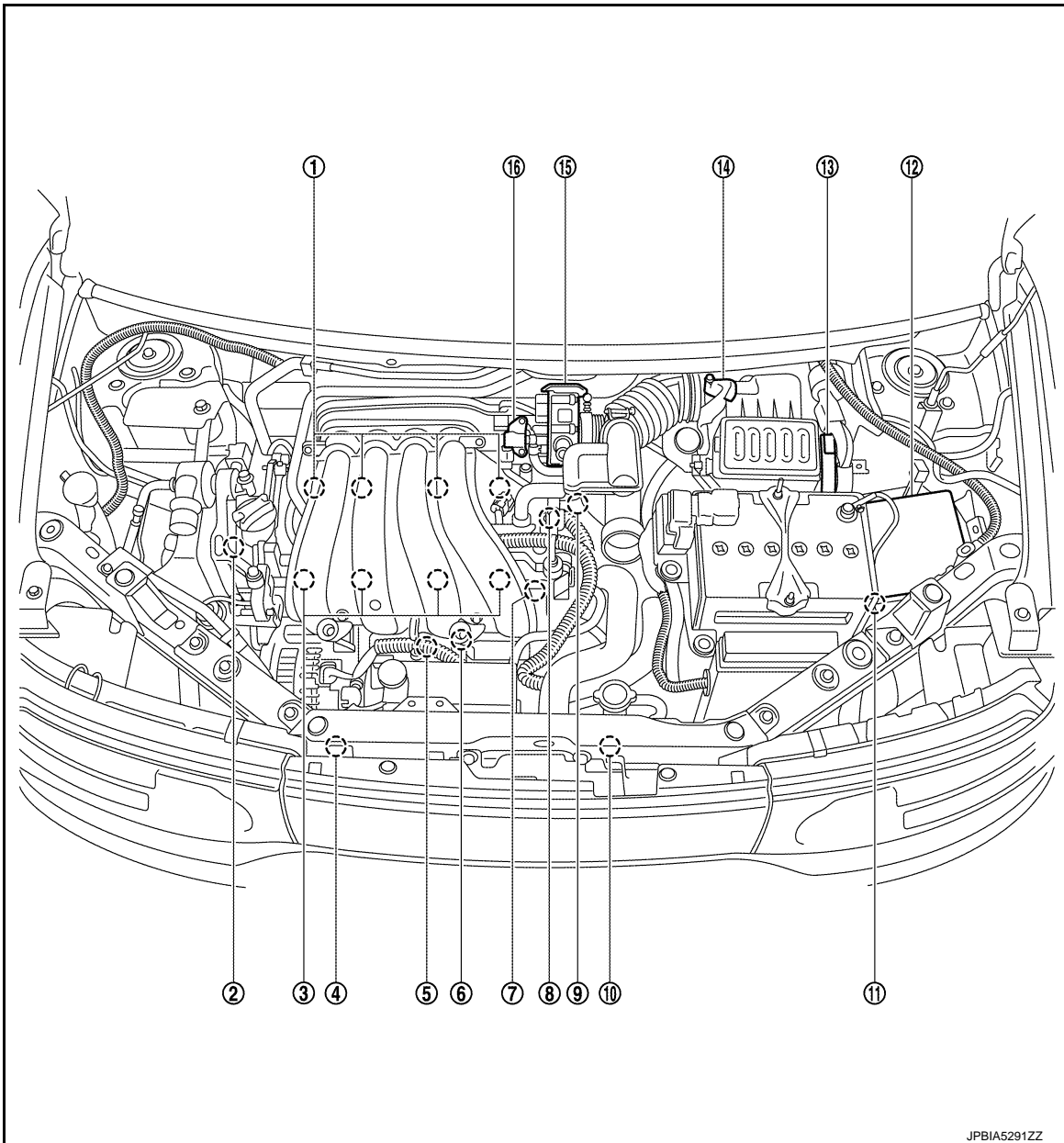
# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

INFOID:000000006948374



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|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

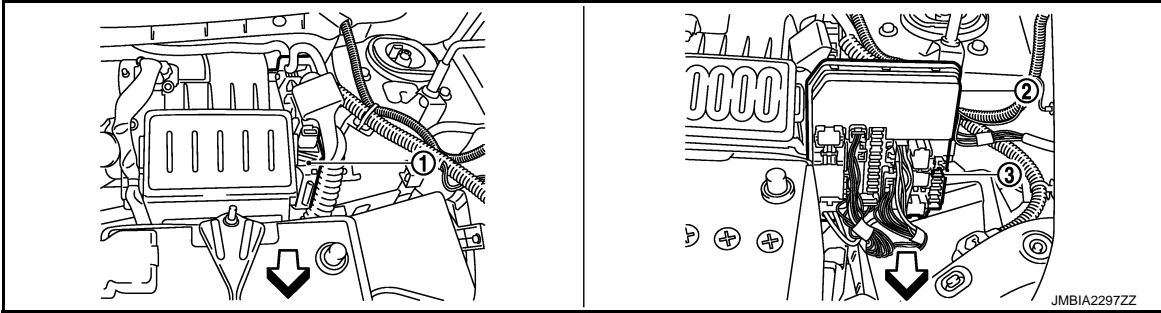
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# EVAPORATIVE EMISSION SYSTEM

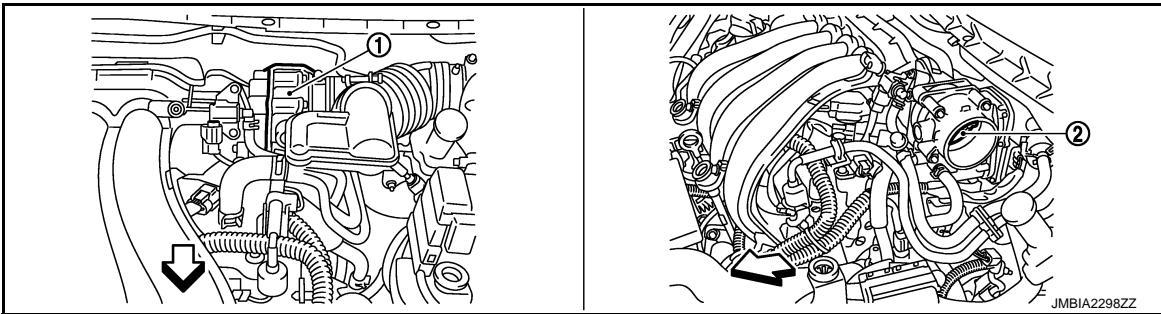
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[MR18DE (FOR CALIFORNIA)]



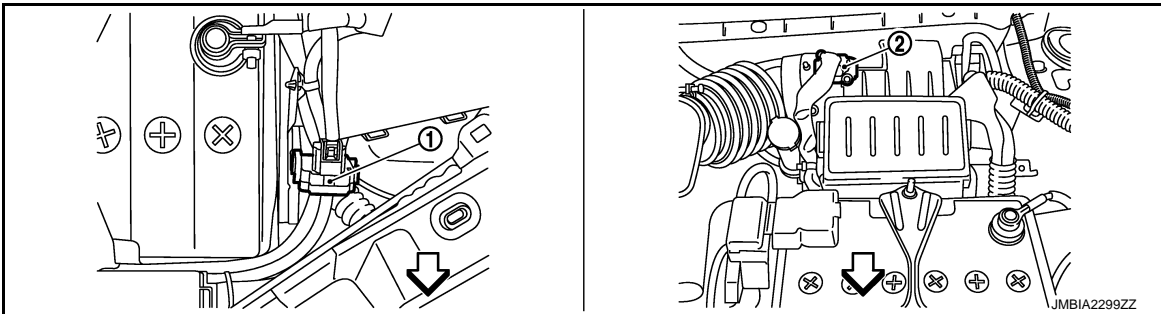
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



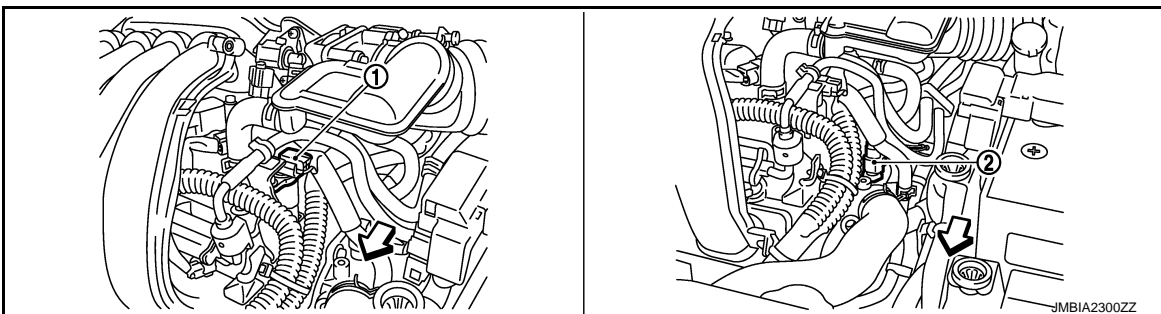
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front

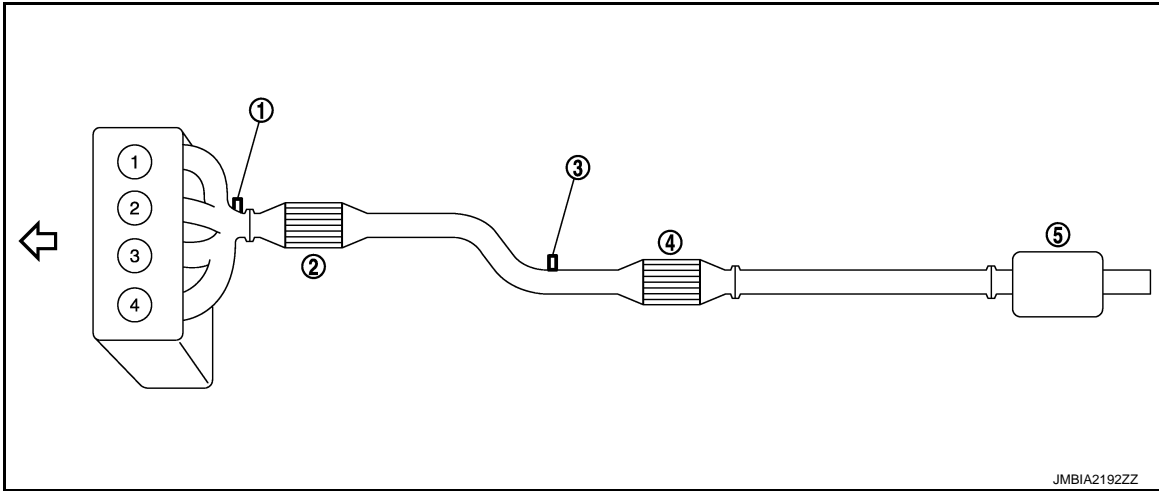


# EVAPORATIVE EMISSION SYSTEM

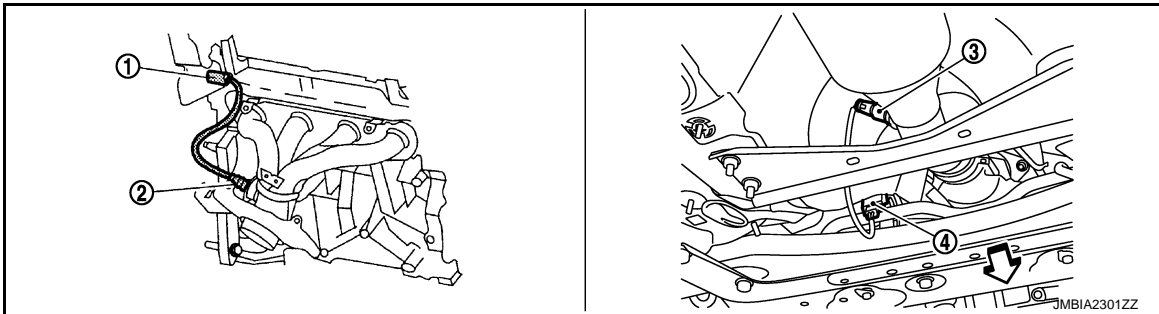
[MR18DE (FOR CALIFORNIA)]

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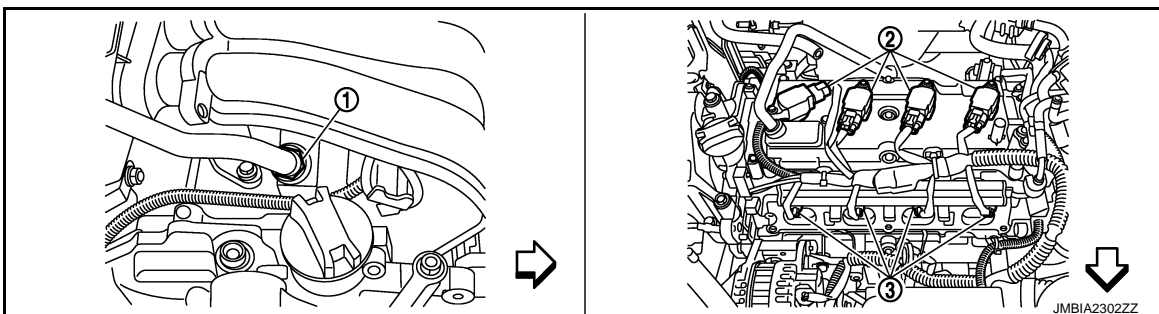
1. Camshaft position sensor (PHASE)
  2. Engine coolant temperature sensor
- ← Vehicle front



1. Air fuel ratio (A/F) sensor 1
  2. Three way catalyst (Manifold)
  3. Heated oxygen sensor 2
  4. Three way catalyst (under floor)
  5. Muffer
- ← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness connector
  2. Air fuel ratio (A/F) sensor 1
  3. Heated oxygen sensor 2
  4. Heated oxygen sensor 2 harness connector
- ← Vehicle front



1. PCV valve
  2. Ignition coil (with power transistor)
  3. Fuel injector
- ← Vehicle front

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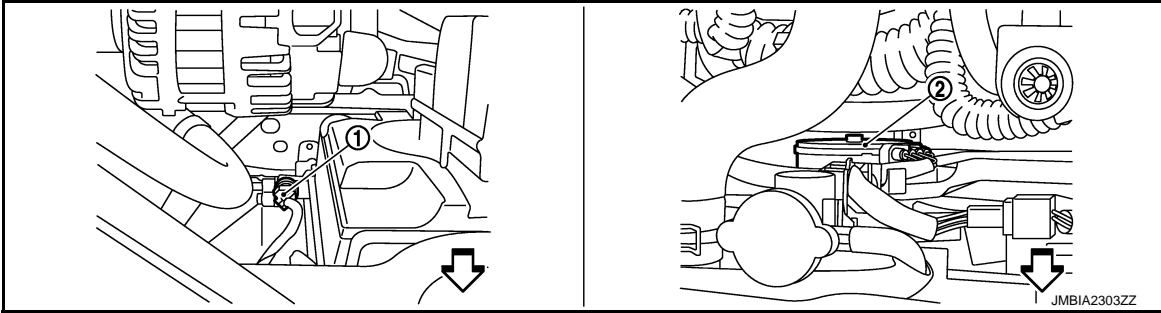
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# EVAPORATIVE EMISSION SYSTEM

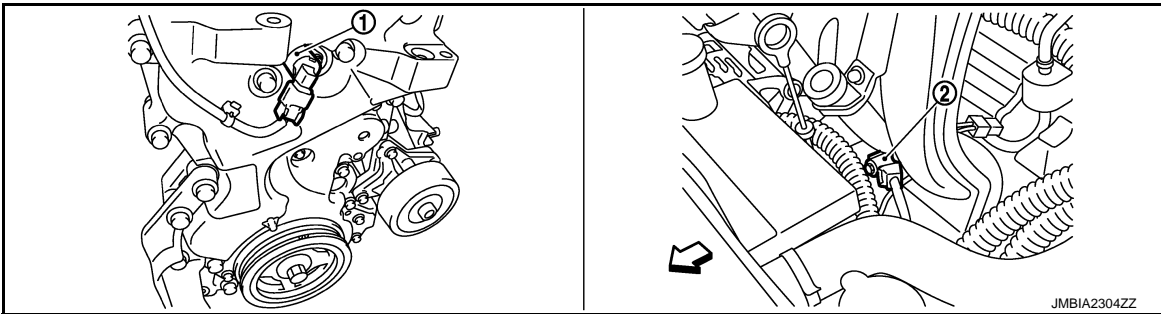
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[MR18DE (FOR CALIFORNIA)]



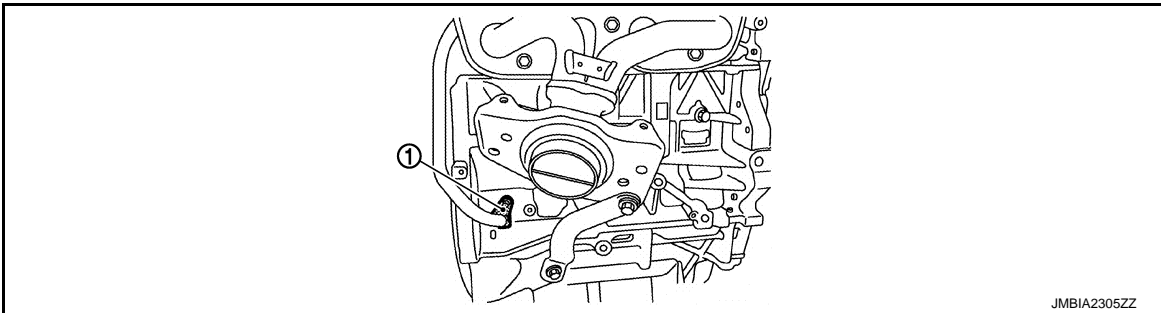
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

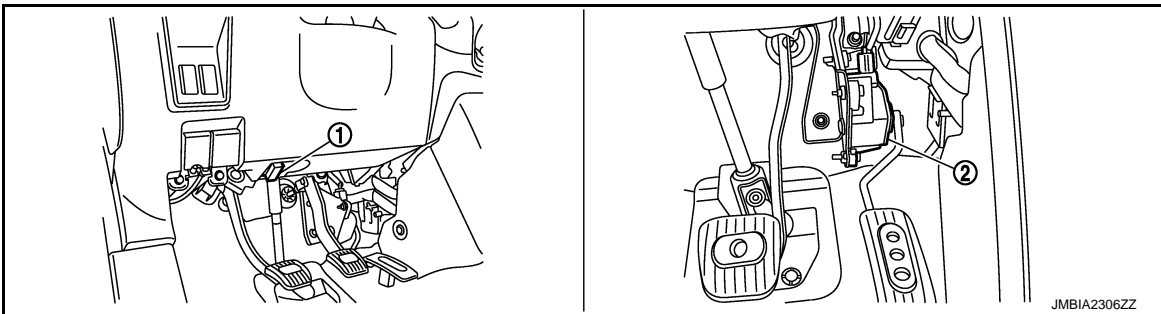


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

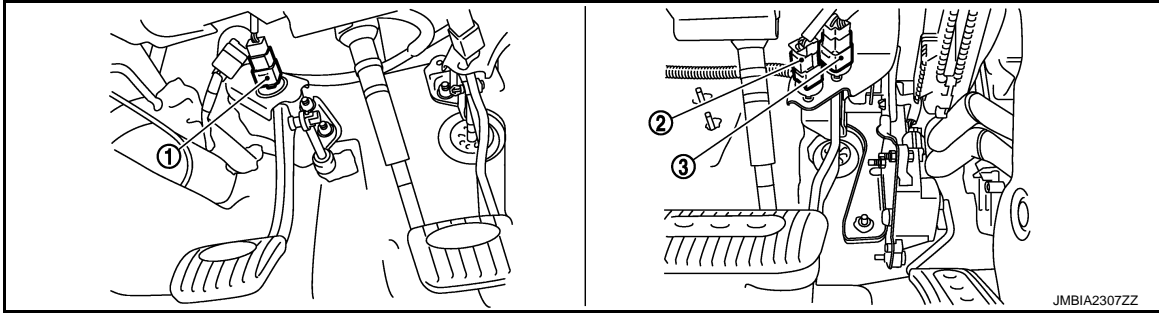


- 1. Data link connector
- 2. Accelerator pedal position sensor

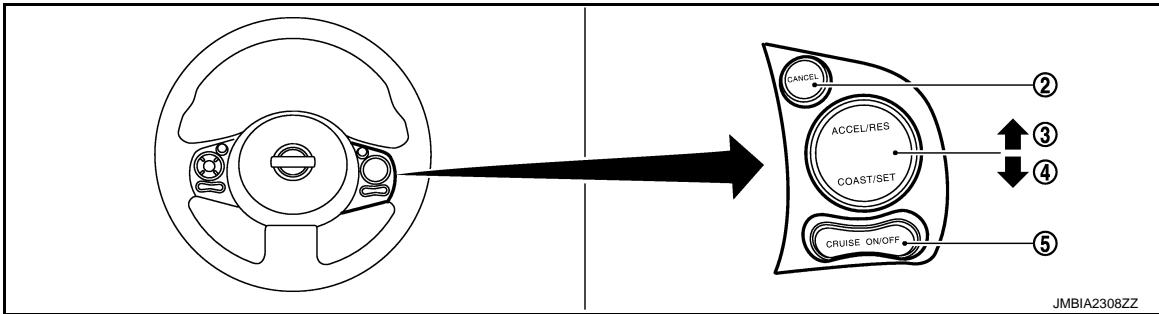
# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

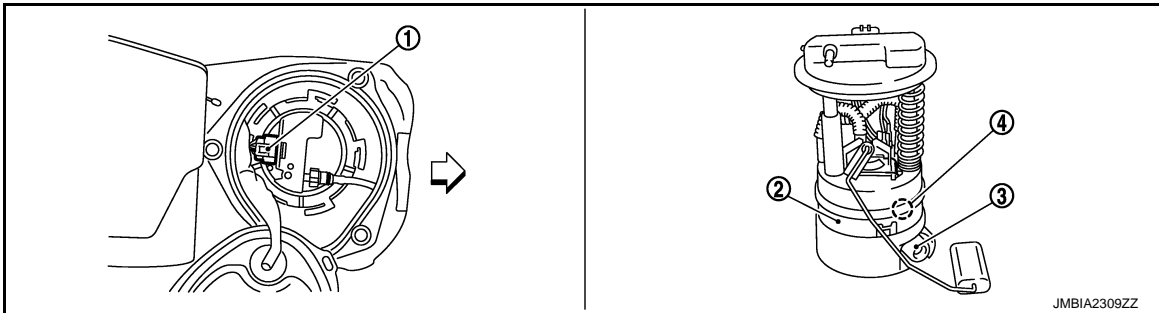
[MR18DE (FOR CALIFORNIA)]



- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch

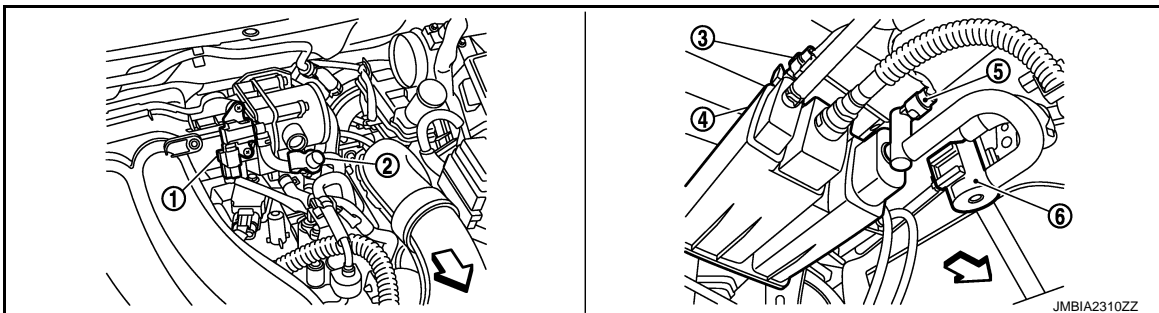


- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



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

↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

4. EVAP canister  
↶ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006948375

Component	Reference
A/F sensor 1	<a href="#">EC-668. "Description"</a>
Accelerator pedal position sensor	<a href="#">EC-891. "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736. "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652. "Description"</a>
EVAP canister purge volume control solenoid valve	<a href="#">EC-762. "Description"</a>
EVAP control system pressure sensor	<a href="#">EC-778. "Description"</a>
Fuel tank temperature sensor	<a href="#">EC-711. "Description"</a>
Mass air flow sensor	<a href="#">EC-638. "Description"</a>
Throttle position sensor	<a href="#">EC-658. "Description"</a>

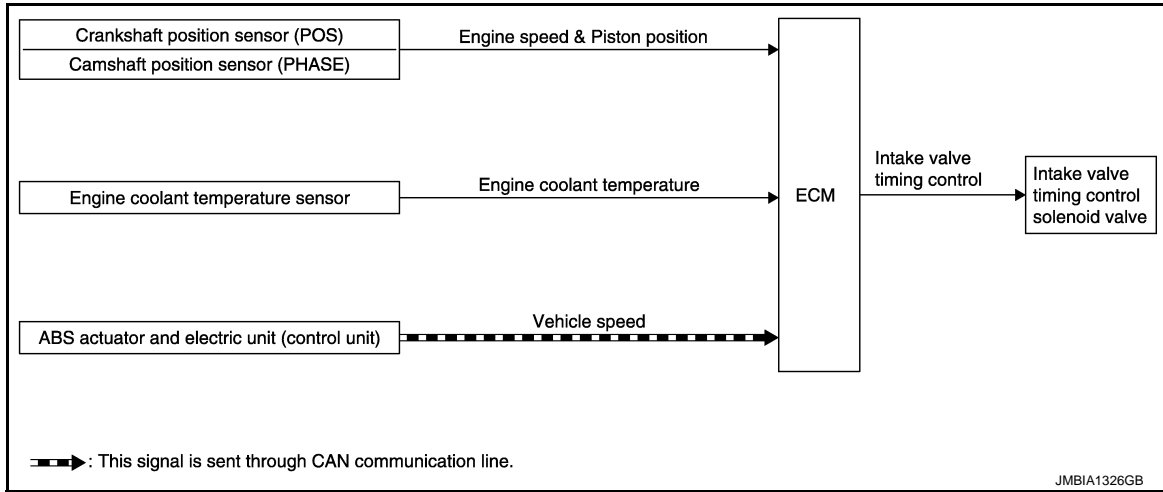
# INTAKE VALVE TIMING CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## INTAKE VALVE TIMING CONTROL

### System Diagram



### System Description

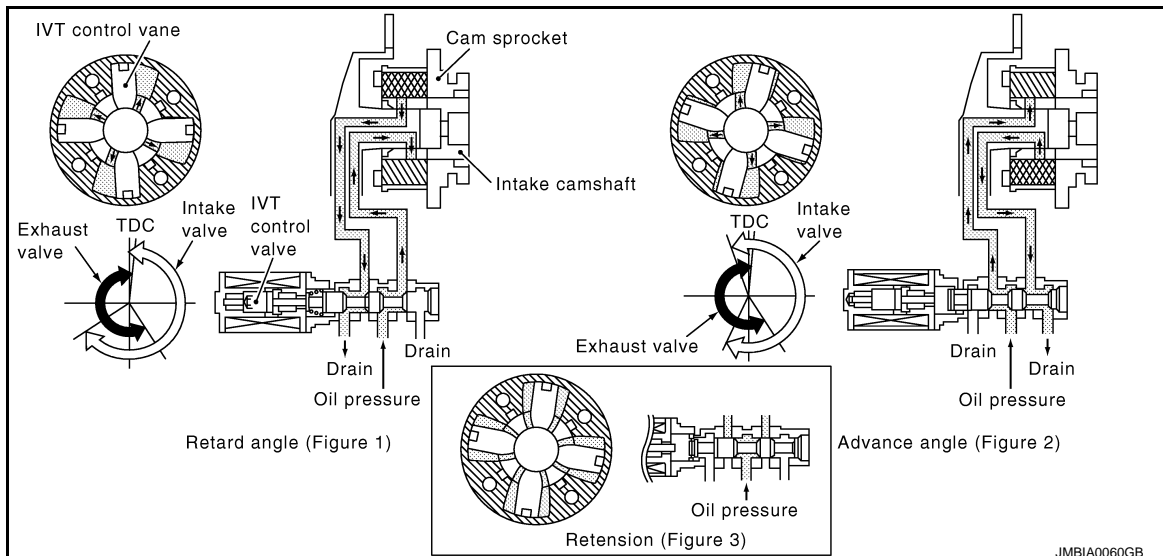
INFOID:000000006942854

### 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		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			

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

### SYSTEM DESCRIPTION



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

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

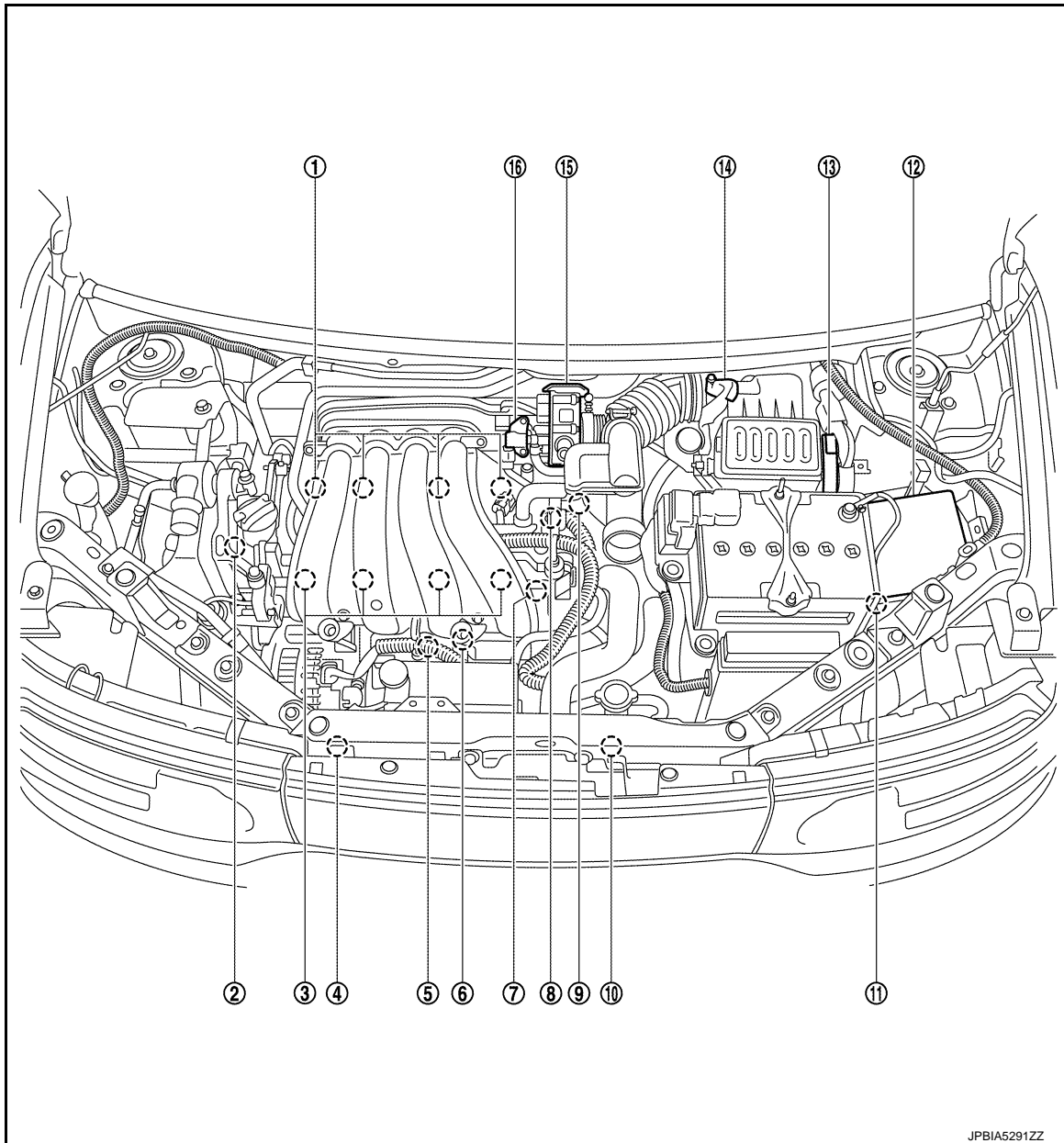
# INTAKE VALVE TIMING CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

INFOID:00000006948376



JPBIA5291ZZ

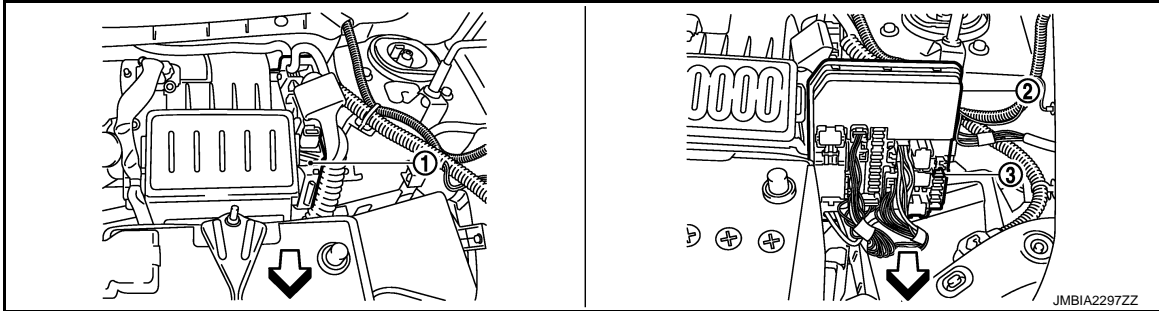
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|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |



# INTAKE VALVE TIMING CONTROL

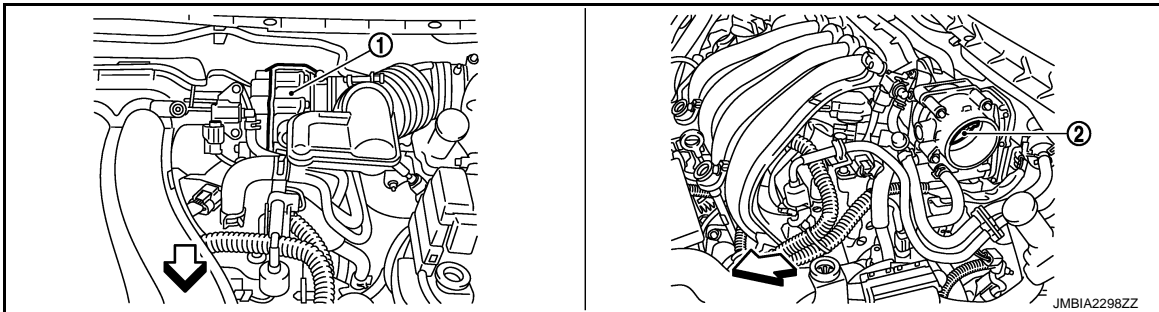
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]



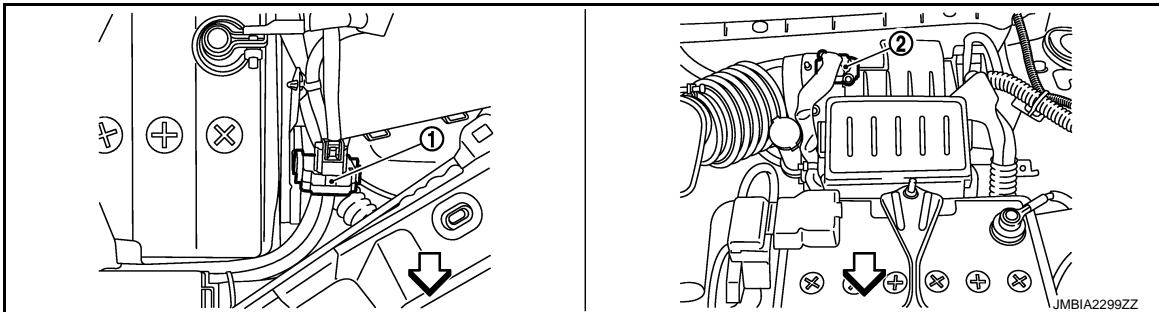
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



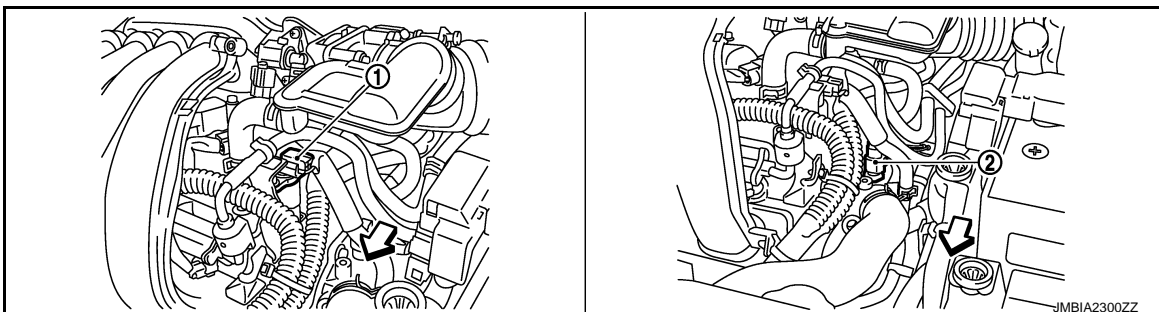
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front



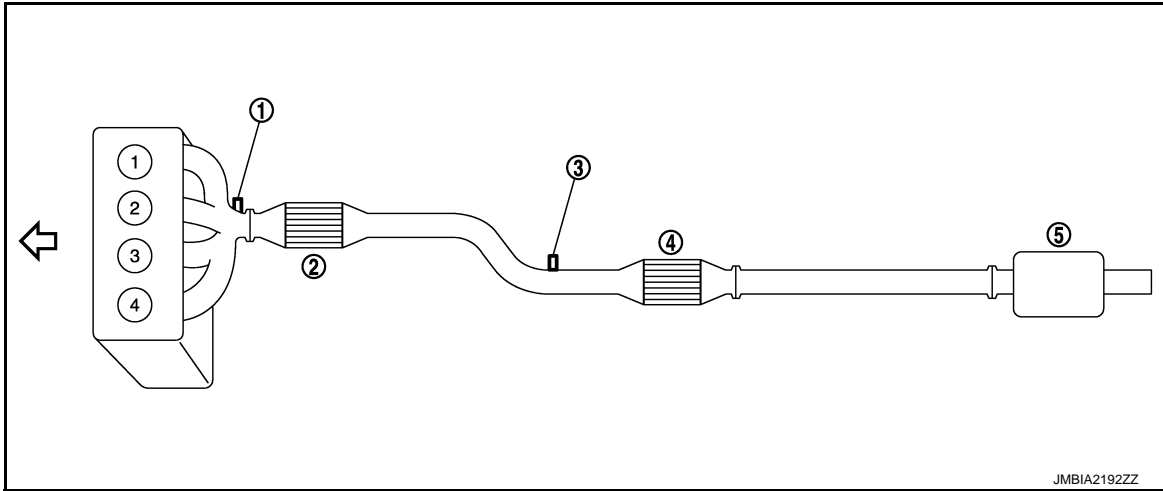
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# INTAKE VALVE TIMING CONTROL

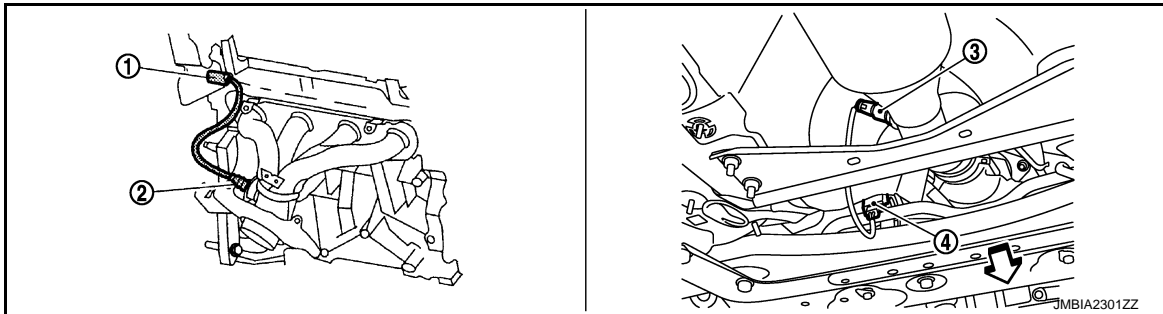
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[MR18DE (FOR CALIFORNIA)]

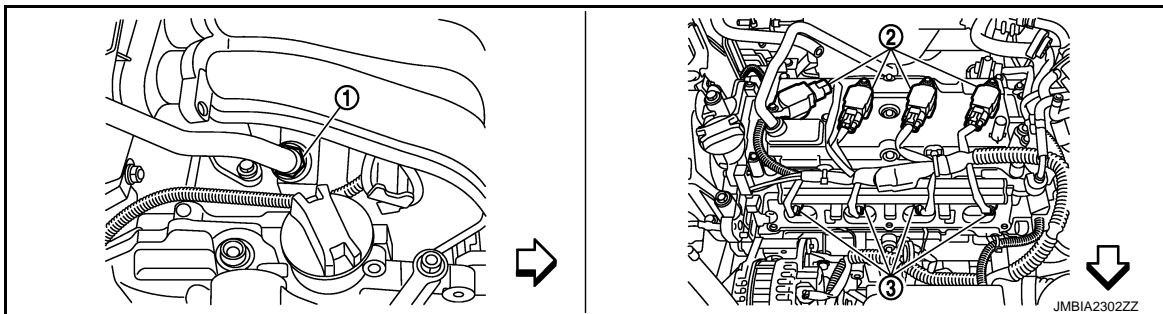
1. Camshaft position sensor (PHASE)
  2. Engine coolant temperature sensor
- ↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1
  2. Three way catalyst (Manifold)
  3. Heated oxygen sensor 2
  4. Three way catalyst (under floor)
  5. Muffler
- ↶ Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
  2. Air fuel ratio (A/F) sensor 1 connector
  3. Heated oxygen sensor 2
  4. Heated oxygen sensor 2 harness connector
- ↶ Vehicle front

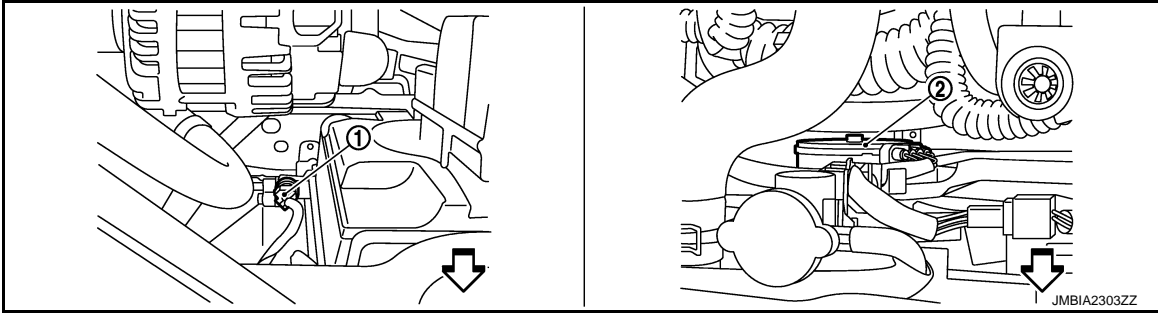


1. PCV valve
  2. Ignition coil (with power transistor)
  3. Fuel injector
- ↶ Vehicle front

# INTAKE VALVE TIMING CONTROL

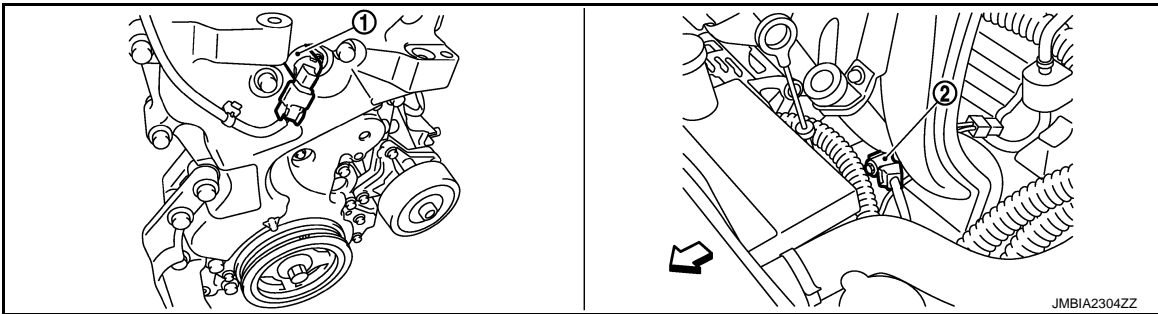
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[MR18DE (FOR CALIFORNIA)]



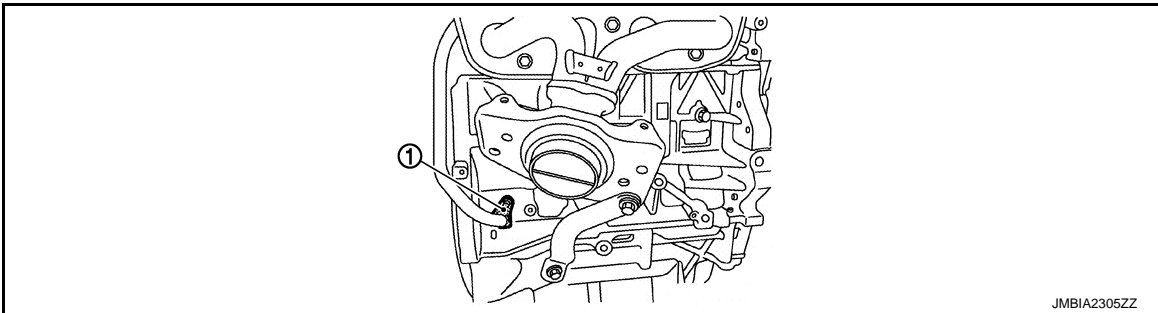
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

← Vehicle front

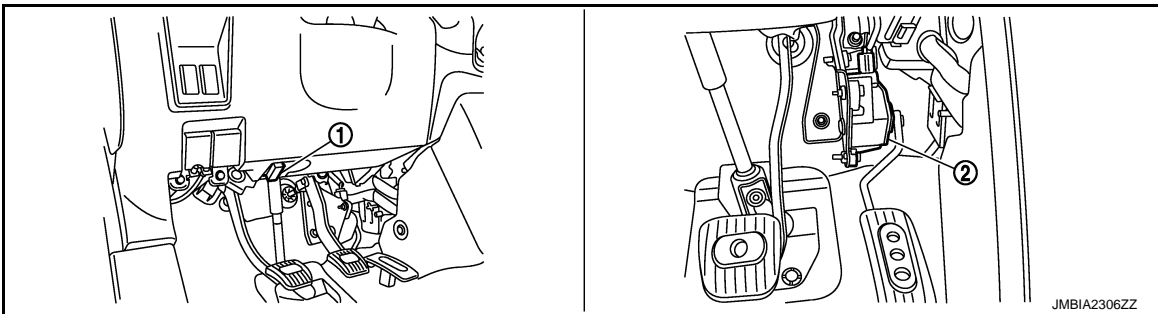


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

← Vehicle front



- 1. Crankshaft position sensor (POS)



- 1. Data link connector
- 2. Accelerator pedal position sensor

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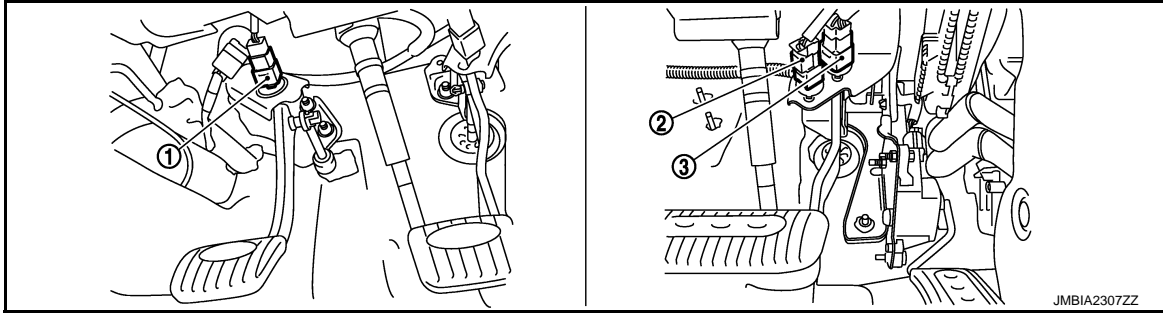
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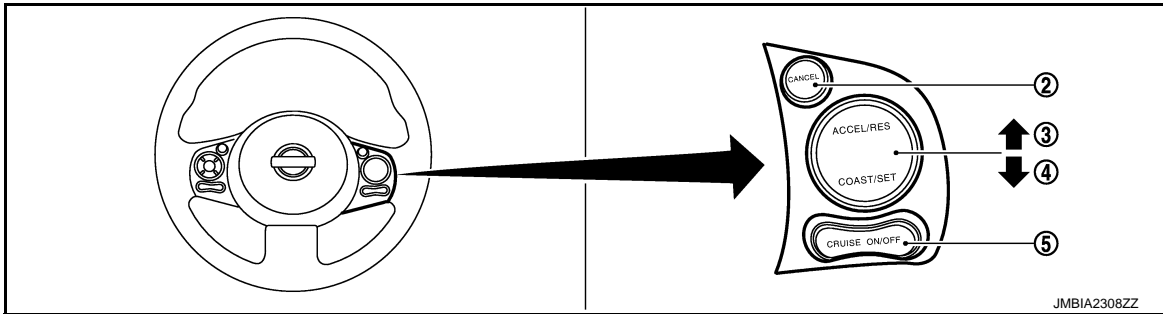
# INTAKE VALVE TIMING CONTROL

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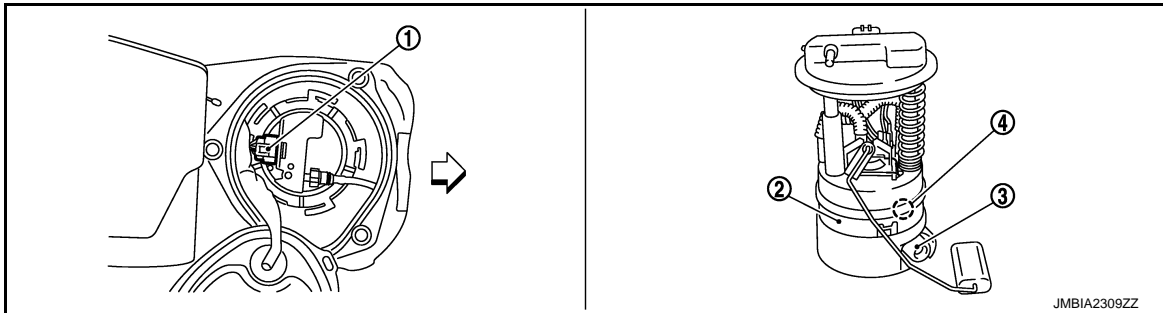
[MR18DE (FOR CALIFORNIA)]



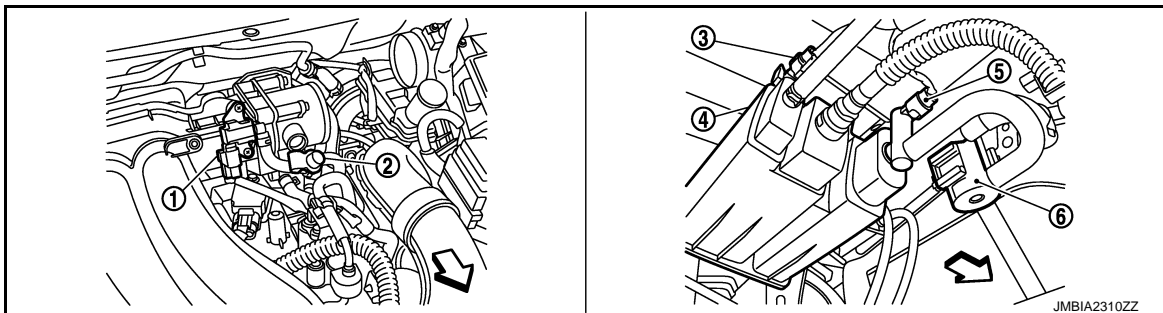
- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch



- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



- 1. Fuel level sensor unit and fuel pump harness connector
  - 2. Fuel level sensor unit and fuel pump
  - 3. Fuel pressure regulator
  - 4. Fuel tank temperature sensor
- ↙ Vehicle front



- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. EVAP control system pressure sensor

# INTAKE VALVE TIMING CONTROL

[MR18DE (FOR CALIFORNIA)]

< SYSTEM DESCRIPTION >

- 4. EVAP canister
  - 5. EVAP canister vent control valve
  - 6. Drain filter
- ↶ Vehicle front

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## Component Description

INFOID:000000006948377

EC

Component	Reference
Camshaft position sensor (PHASE)	<a href="#">EC-740. "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736. "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652. "Description"</a>
Intake valve timing control solenoid valve	<a href="#">EC-575. "System Description"</a>

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# TUMBLE CONTROL VALVE CONTROL

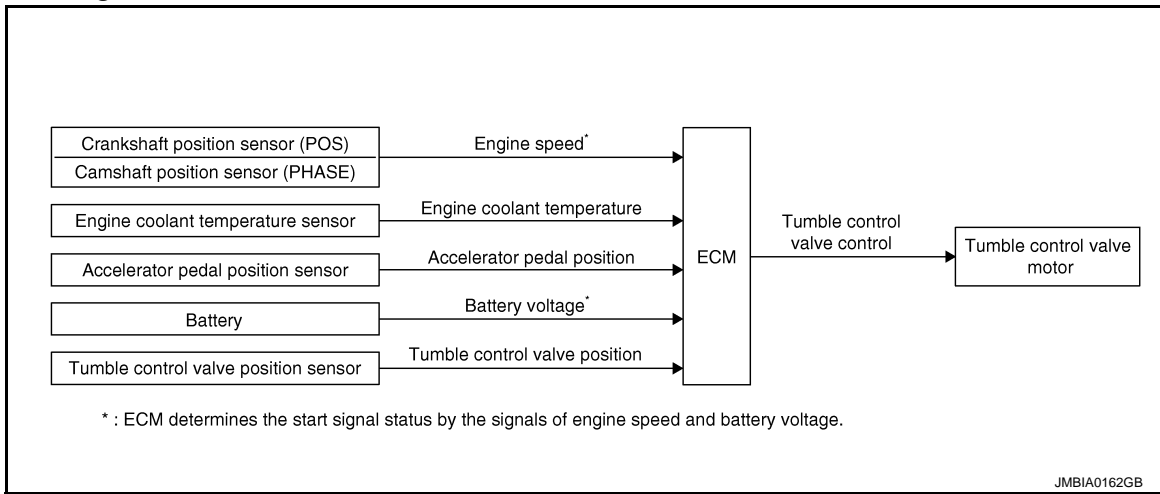
< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## TUMBLE CONTROL VALVE CONTROL

### System Diagram

INFOID:000000006948198



### System Description

INFOID:000000006948199

#### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Cranksaft 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.

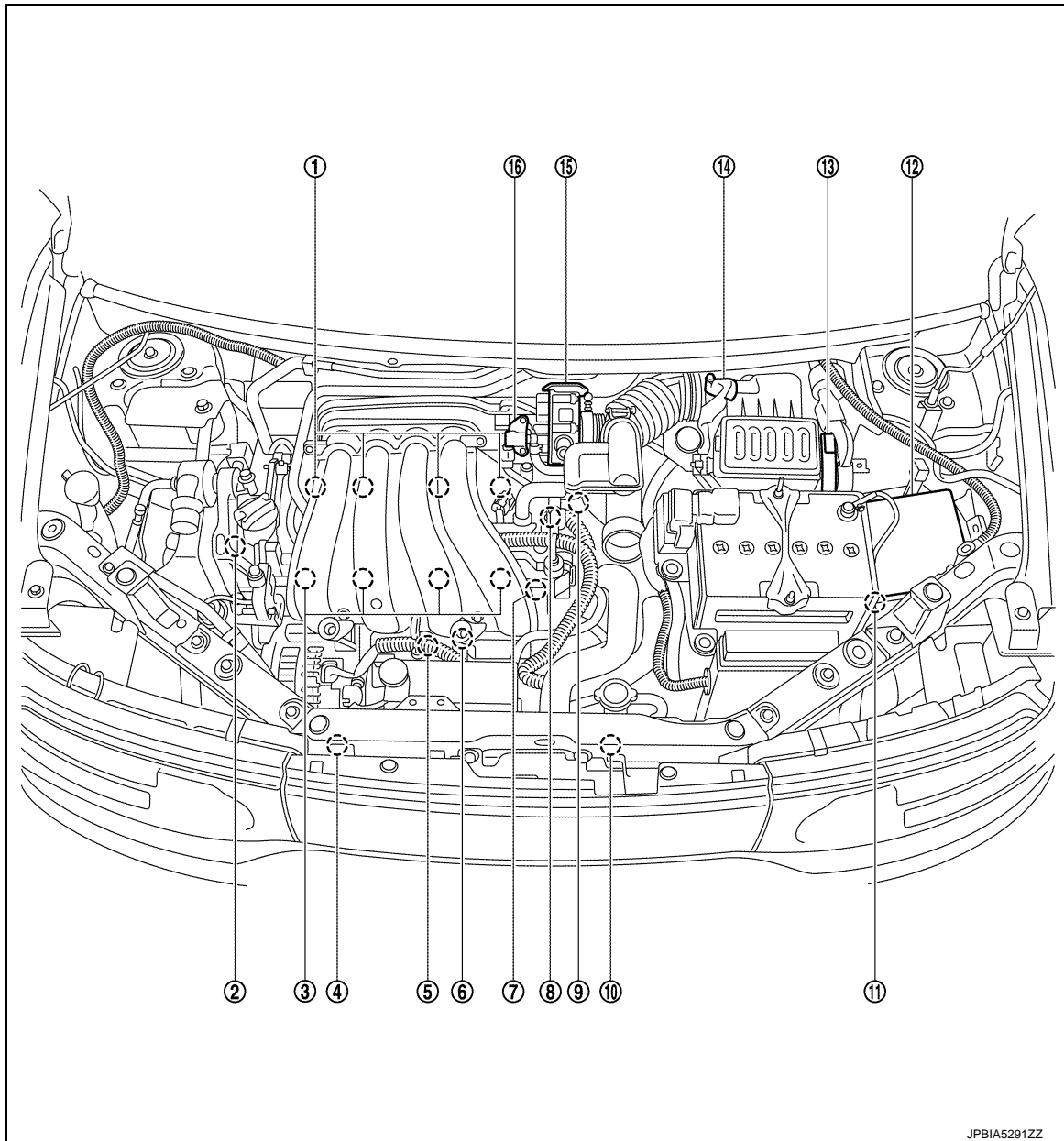
# TUMBLE CONTROL VALVE CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## Component Parts Location

INFOID:000000006948378



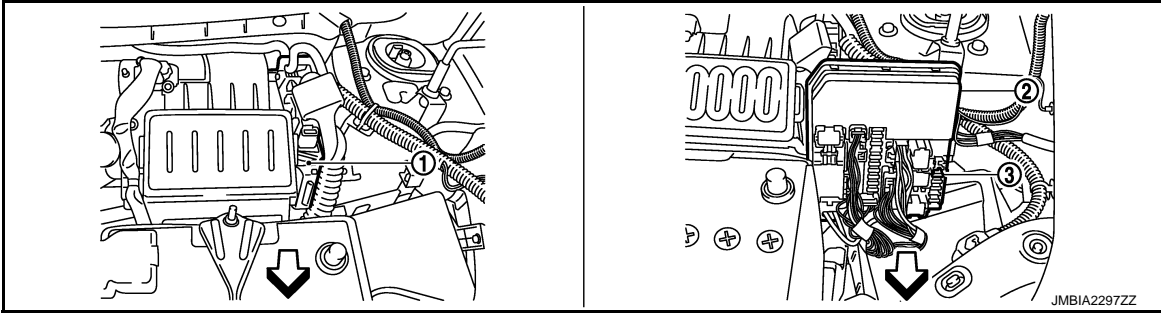
- |   |   |  |
|---|---|--|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve                 | 3. Fuel injector   |
| 4. Refrigerant pressure sensor                          | 5. Knock sensor   | 6. Engine oil temperature sensor   |
| 7. Tumble control valve actuator                        | 8. Camshaft position sensor (PHASE)                           | 9. Engine coolant temperature sensor   |
| 10. Cooling fan motor                                   | 11. Battery current sensor                                    | 12. IPDM E/R   |
| 13. ECM   | 14. Mass air flow sensor (with intake air temperature sensor) | 15. Electric throttle control actuator (with built in throttle position sensor and throttle control motor) |
| 16. EVAP canister purge volume control solenoid valve   |   |  |

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# TUMBLE CONTROL VALVE CONTROL

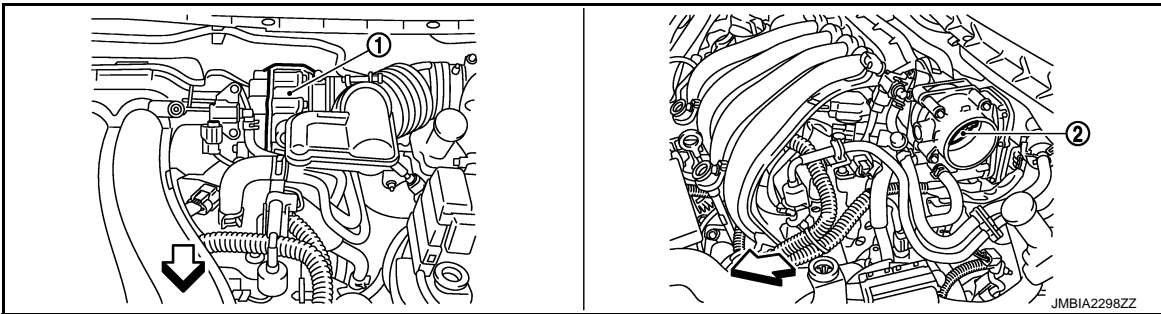
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[MR18DE (FOR CALIFORNIA)]



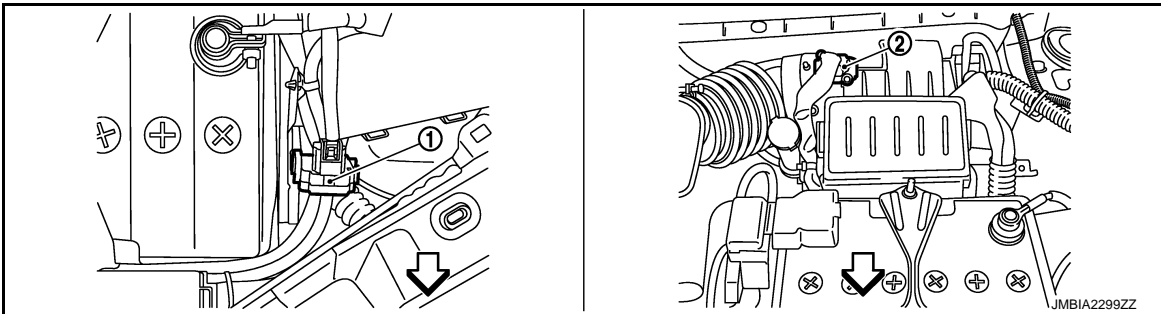
- 1. ECM
- 2. IPDM E/R
- 3. Fuel pump fuse (15 A)

← Vehicle front



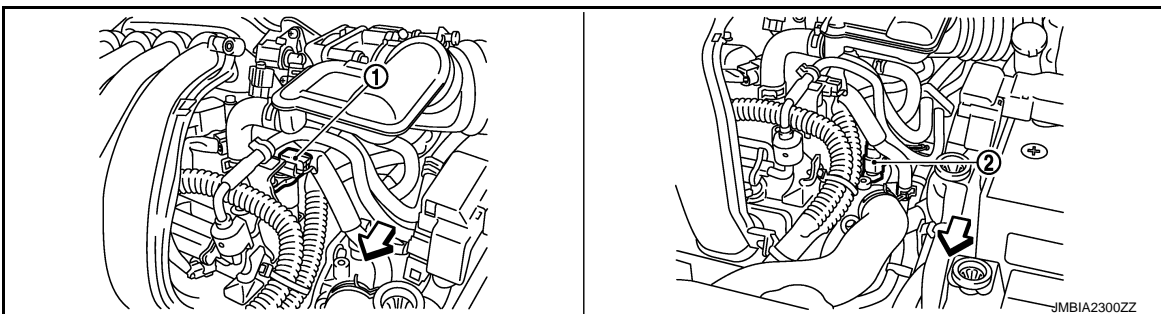
- 1. Electric throttle control actuator (with built-in position sensor, throttle control motor)
- 2. Throttle valve

← Vehicle front



- 1. Battery current sensor
- 2. Mass air flow sensor (with Intake air temperature sensor)

← Vehicle front





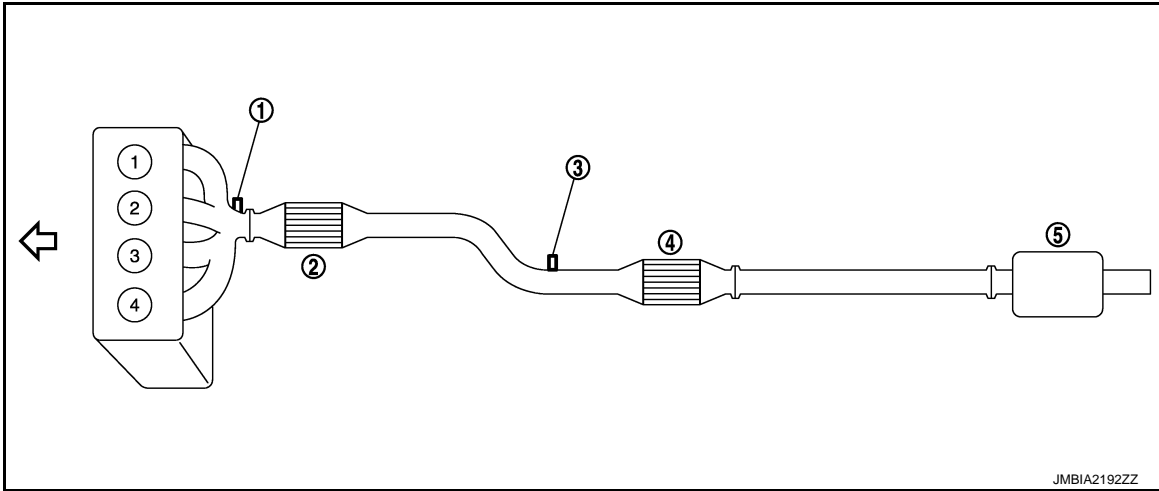
# TUMBLE CONTROL VALVE CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

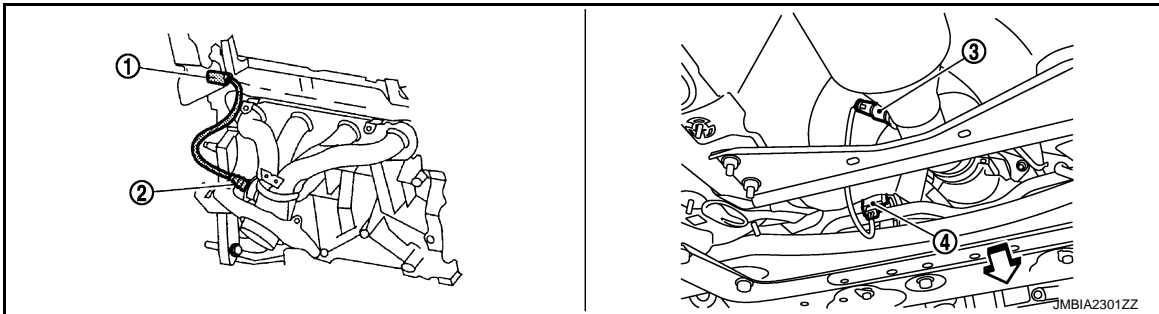
1. Camshaft position sensor (PHASE)
2. Engine coolant temperature sensor

← Vehicle front



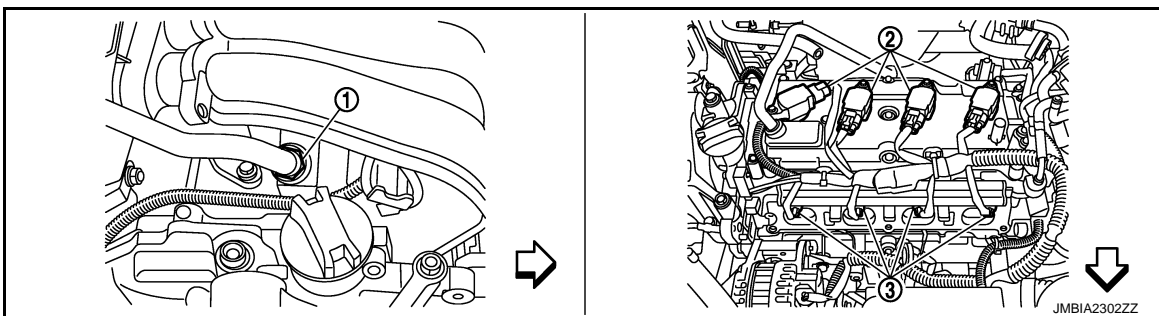
1. Air fuel ratio (A/F) sensor 1
2. Three way catalyst (Manifold)
3. Heated oxygen sensor 2
4. Three way catalyst (under floor)
5. Muffler

← Vehicle front



1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1
3. Heated oxygen sensor 2
4. Heated oxygen sensor 2 harness

← Vehicle front



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

← Vehicle front

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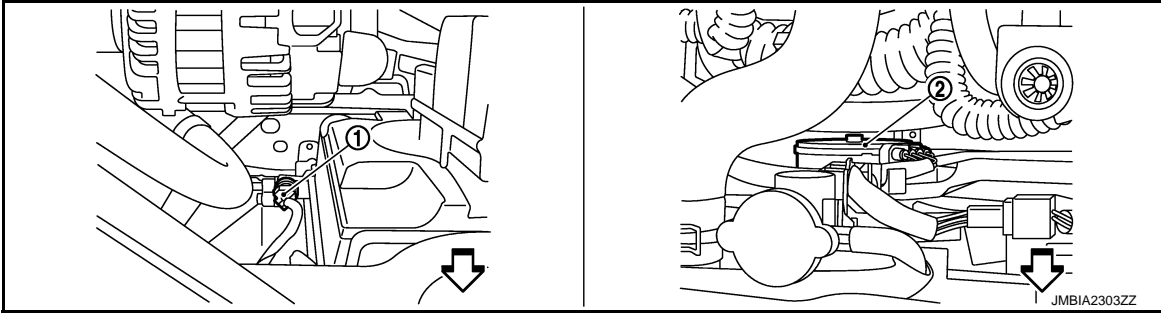
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# TUMBLE CONTROL VALVE CONTROL

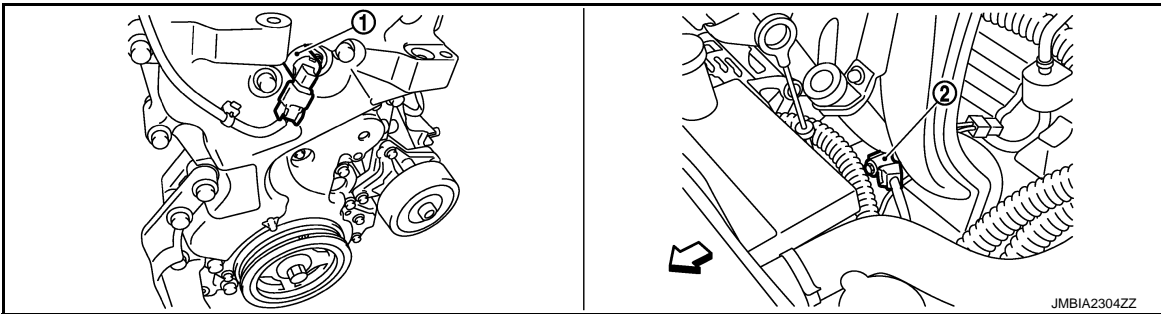
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[MR18DE (FOR CALIFORNIA)]



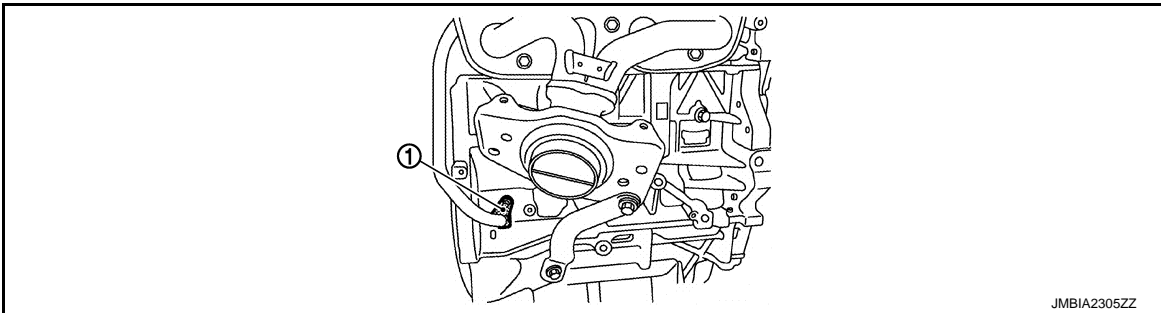
- 1. Refrigerant pressure sensor
- 2. Cooling fan motor

↶ Vehicle front

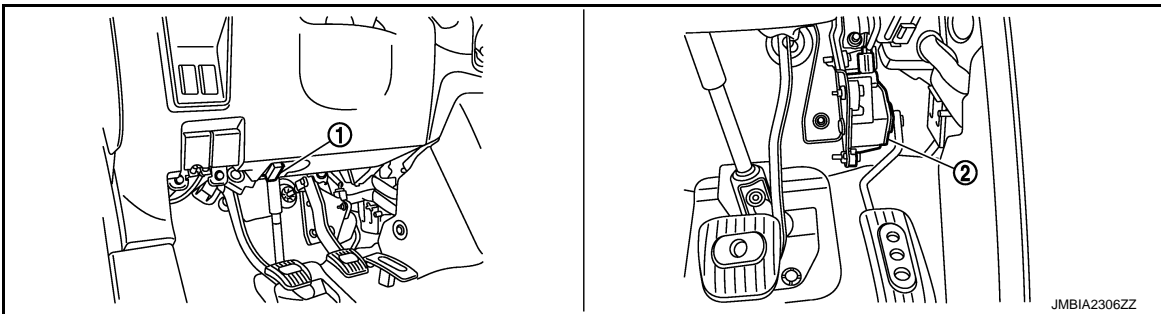


- 1. Intake valve timing control solenoid
- 2. Knock sensor valve

↶ Vehicle front



- 1. Crankshaft position sensor (POS)

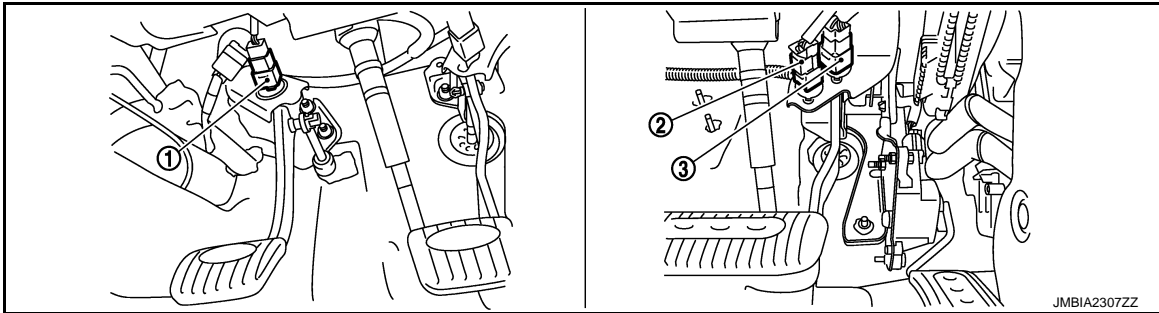


- 1. Data link connector
- 2. Accelerator pedal position sensor

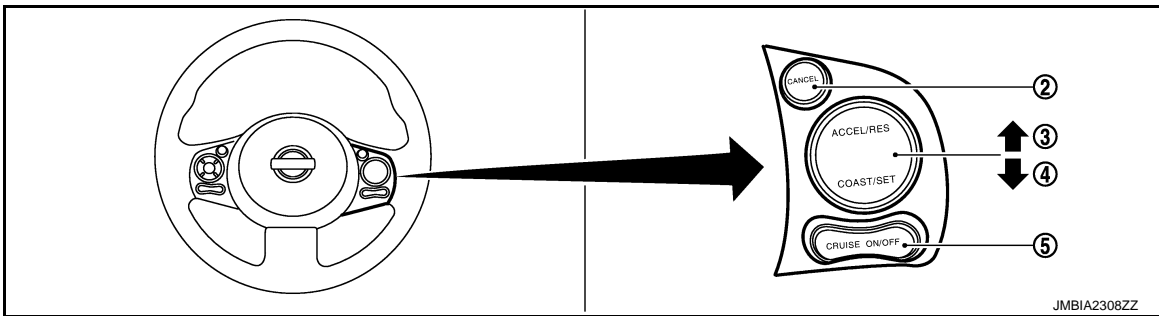
# TUMBLE CONTROL VALVE CONTROL

< SYSTEM DESCRIPTION >

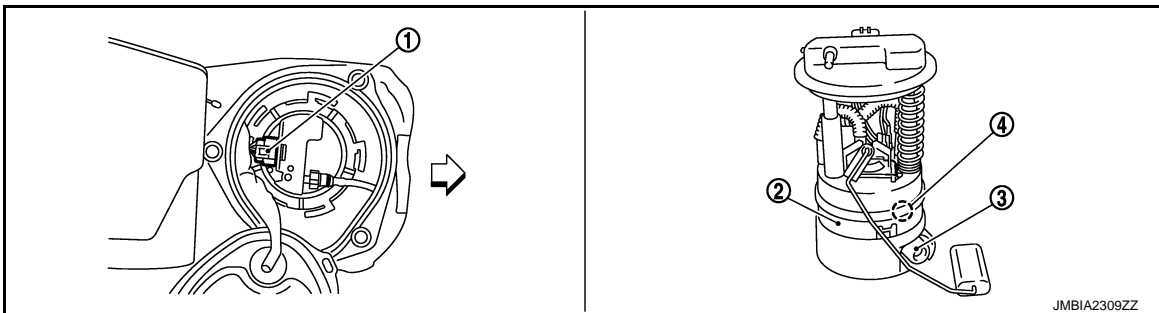
[MR18DE (FOR CALIFORNIA)]



- 1. ASCD clutch switch
- 2. ASCD brake switch
- 3. Stop lamp switch

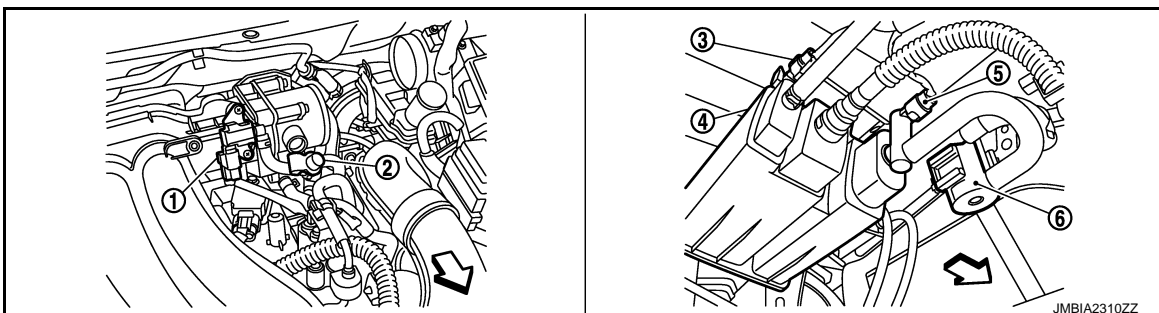


- 1. ASCD steering switch
- 2. CANCEL switch
- 3. RESUME/ACCELERATE switch
- 4. SET/COST switch
- 5. MAIN switch



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

↶ Vehicle front



- 1. EVAP canister purge volume control
- 2. EVAP service port solenoid valve
- 3. EVAP control system pressure sensor

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# TUMBLE CONTROL VALVE CONTROL

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

4. EVAP canister  
↳ Vehicle front
5. EVAP canister vent control valve
6. Drain filter

## Component Description

INFOID:000000006948379

Component	Reference
Accelerator pedal position sensor	<a href="#">EC-891, "Description"</a>
Camshaft position sensor (PHASE)	<a href="#">EC-740, "Description"</a>
Crankshaft position sensor (POS)	<a href="#">EC-736, "Description"</a>
Engine coolant temperature sensor	<a href="#">EC-652, "Description"</a>
Tumble control valve	<a href="#">EC-872, "Description"</a>
Tumble control valve position sensor	<a href="#">EC-877, "Description"</a>

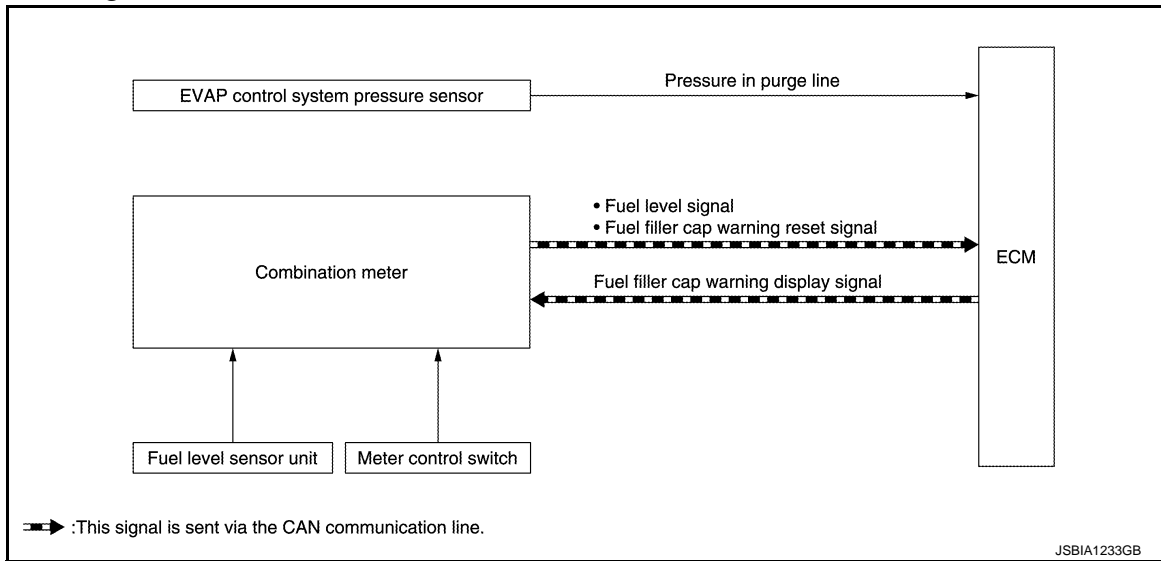
# FUEL FILLER CAP WARNING SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## FUEL FILLER CAP WARNING SYSTEM

### System Diagram



### System Description

INFOID:000000006948218

### INPUT/OUTPUT SIGNAL CHART

#### Input

Unit/Sensor	Input signal to ECM	ECM function
EVAP control system pressure sensor	Pressure in purge line	Fuel filler cap warning control
Combination meter	Fuel level signal*	
	Fuel filler cap warning reset signal*	

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

#### Output

Unit	Output signal	Actuator
ECM	Fuel filler cap warning display signal*	Combination meter

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

### SYSTEM DESCRIPTION

The fuel filler cap warning system alerts the driver to the prevention of the fuel filler being left uncapped and malfunction occurrences after refueling, by turning ON the fuel filler cap warning display on the combination meter.

ECM judges a refueled state, based on a fuel level signal transmitted from the combination meter.

When a very small leak is detected through the EVAP leak diagnosis performed after judging the refueled state, ECM transmits a fuel filler cap warning display signal (request for display ON) to the combination meter via CAN communication.

When receiving the signal, the combination meter turns ON the fuel filler cap warning display.

#### **CAUTION:**

**Check fuel filler cap installation condition when the fuel filler cap warning display turns ON.**

#### Reset Operation

The fuel filler cap warning lamp turns OFF, according to any condition listed below:

- Reset operation is performed by operating the meter control switch on the combination meter. Refer to [MWI-24, "INFORMATION DISPLAY : System Description"](#).
- When the reset operation is performed, the combination meter transmits a fuel filler cap warning reset signal to ECM via CAN communication. ECM transmits a fuel filler cap warning display signal (request for display OFF) to the combination meter via CAN communication. When receiving the signal, the combination meter turns OFF the fuel filler cap warning display.
- EVAP leak diagnosis result is normal.

## FUEL FILLER CAP WARNING SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

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- Fuel refilled.
- DTC erased by using CONSULT-III.

**NOTE:**

MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel filler cap warning display turns ON/OFF.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## ON BOARD DIAGNOSTIC (OBD) SYSTEM

### Diagnosis Description

INFOID:000000006952154

This system is an on board diagnostic system that records exhaust emission-related diagnostic information and detects a sensors/actuator-related malfunction. A malfunction is indicated by the malfunction indicator lamp (MIL) and stored in ECU memory as a DTC. The diagnostic information can be obtained with the diagnostic tool (GST: Generic Scan Tool).

### GST (Generic Scan Tool)

INFOID:000000006952155

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to [GI-49, "Description"](#).

#### NOTE:

Service \$0A is not applied for regions where it is not mandated.

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# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

## DIAGNOSIS SYSTEM (ECM)

### DIAGNOSIS DESCRIPTION

#### DIAGNOSIS DESCRIPTION : 1st Trip Detection Logic and Two Trip Detection Logic

INFOID:000000006952146

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 illuminate at this stage. <1st trip>

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

×: 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	Illuminated	Blinking	Illuminated				
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to <a href="#">EC-967, "DTC Index"</a> .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

#### DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:000000006952147

##### DTC AND 1ST TRIP DTC

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

If a malfunction is detected during the 1st trip, the 1st trip DTC is saved in the ECM memory. The MIL will not 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 saved 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.

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-967, "DTC Index"](#). 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/ISO 15031-5. 1st trip DTC detection occurs without illuminating the MIL and therefore does not warn the driver of a malfunction.

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-492, "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.



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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
2		Except the above items
3	1st trip freeze frame data	

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

## DIAGNOSIS DESCRIPTION : Counter System

INFOID:000000006952148

### 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 turn 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.

### COUNTER SYSTEM CHART

Items	Fuel Injection System	Misfire	Other
MIL (turns OFF)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (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”.

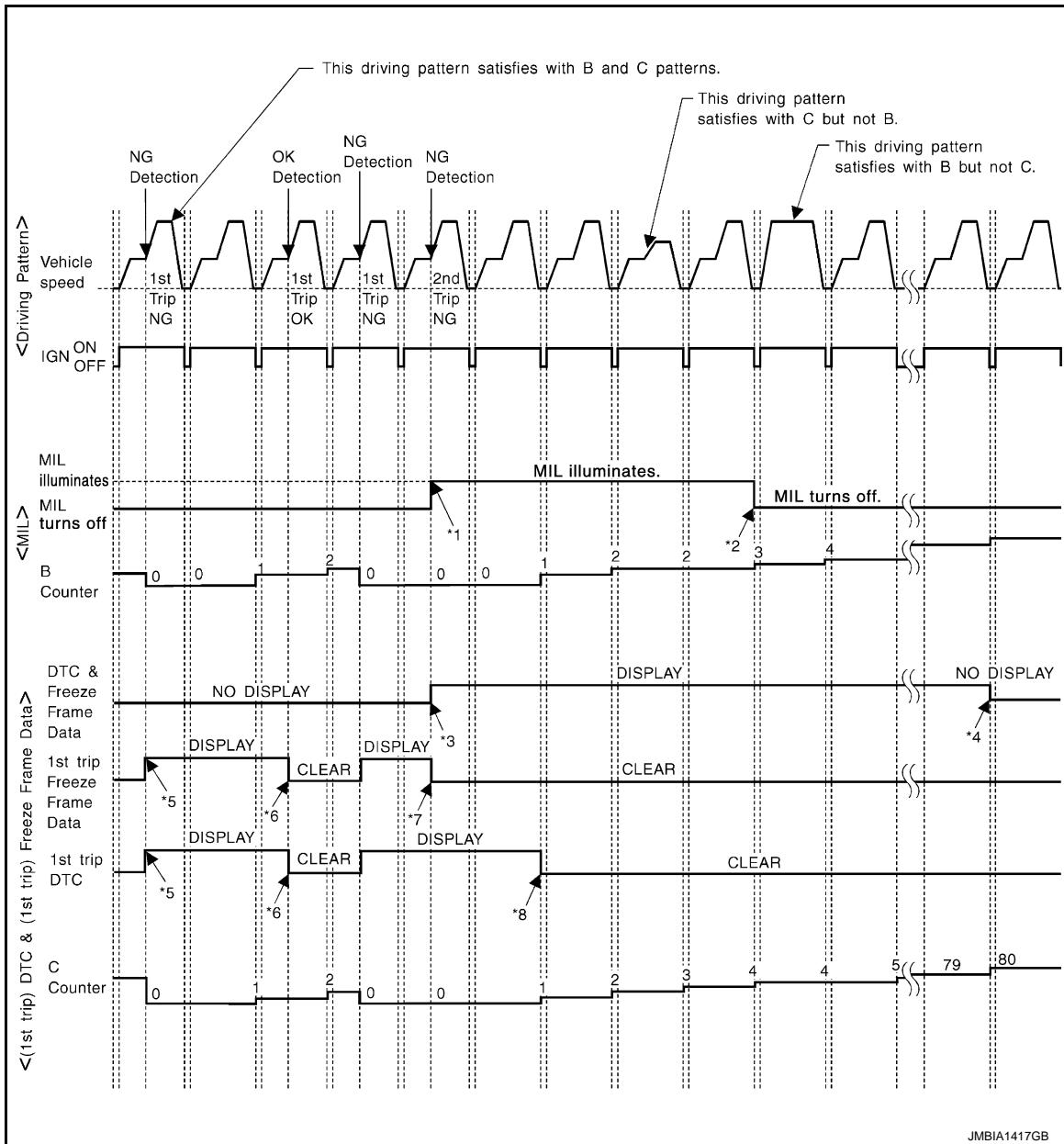
- \*1: Clear timing is at the moment OK is detected.
- \*2: Clear timing is when the same malfunction is detected in the 2nd trip.

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

Refer to [EC-596. "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

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### Driving Pattern C

Refer to [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

Example:

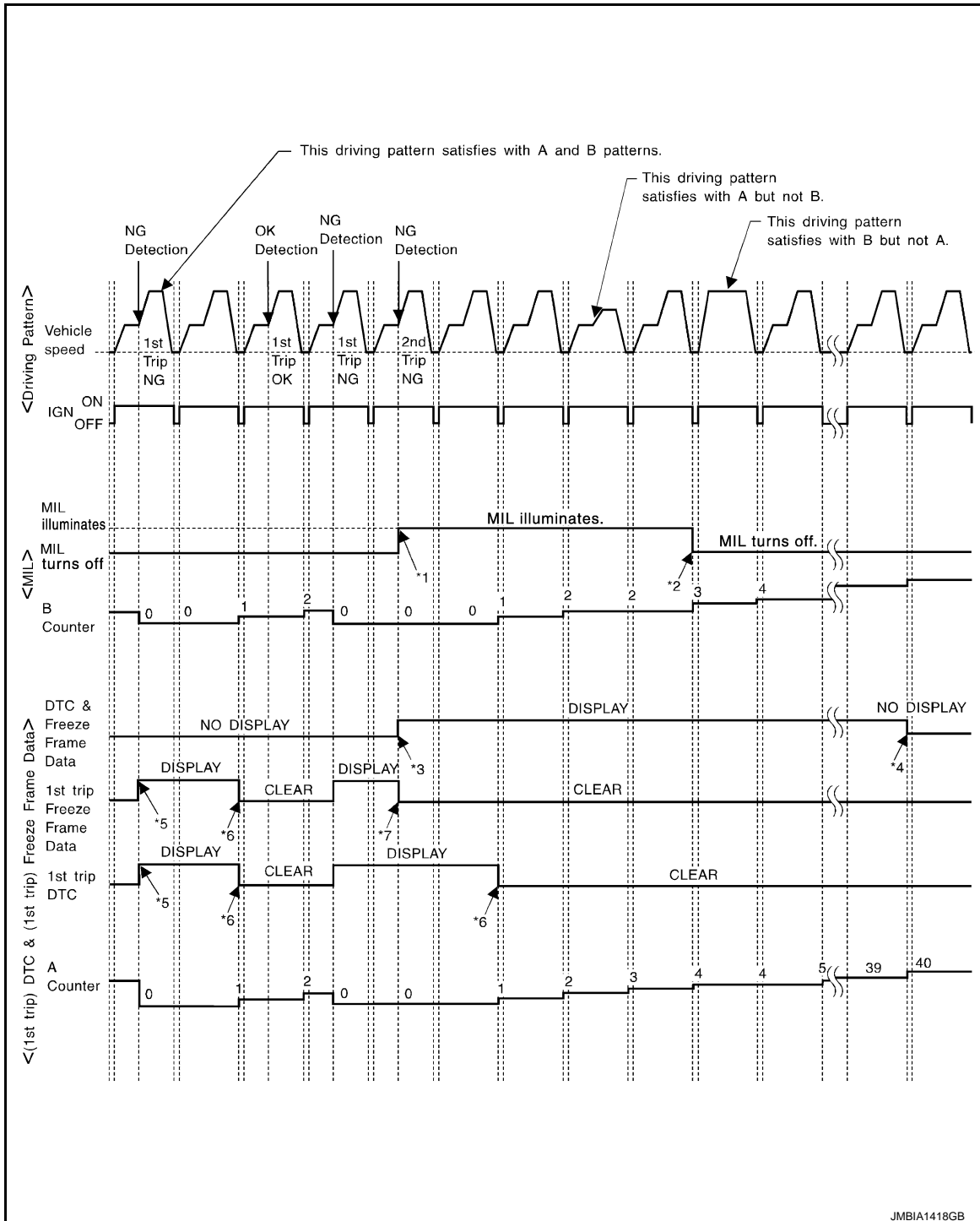
If the stored freeze frame data is as per the following:

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)

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

Driving Pattern A

Refer to [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

Driving Pattern B

Refer to [EC-596, "DIAGNOSIS DESCRIPTION : Driving Pattern"](#).

## DIAGNOSIS DESCRIPTION : Driving Pattern

INFOID:000000006952149

### CAUTION:

**Always drive at a safe speed.**

### DRIVING PATTERN A

Driving pattern A means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature rises by 20°C (36°F) or more after starting the engine.
- Engine coolant temperature reaches 70°C (158°F) or more.
- The ignition switch is turned from ON to OFF.

#### NOTE:

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern A.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern A.

### DRIVING PATTERN B

Driving pattern B means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- Under the closed loop control condition, the following state reaches 12 seconds or more in total: Vehicle speed of 4 km/h (2 MPH) or less with idling condition.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

#### NOTE:

- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

### DRIVING PATTERN C

Driving pattern C means operating vehicle as per the following:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

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Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]

Engine coolant temperature condition:

- When the freeze frame data shows lower than 70°C (158°F), engine coolant temperature should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), engine coolant temperature should be higher than or equal to 70°C (158°F).

### NOTE:

- When the same malfunction is detected regardless of the above vehicle conditions, reset the counter of driving pattern C.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern C.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

## DRIVING PATTERN D

Driving pattern D means a trip satisfying the following conditions.

- The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.
- Idle speed lasts 30 seconds or more.
- A lapse of 600 seconds or more after engine start.

### NOTE:

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern D.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern D.

## DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code

INFOID:0000000006952150

System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979/ISO 15031-5.

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.

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 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.

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Self-diagnosis result		Example							
		Diagnosis	Ignition cycle						
	← ON →		OFF	← 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	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 show OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

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

If one or more SRT related self-diagnoses show 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 the number one (1) for each self-diagnosis (Case 1 & 2) or the number two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

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

**NOTE:**

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

## DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)

INFOID:000000006952152

When emission-related ECU detects a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions), it turns on/blinks MIL to inform the driver that a malfunction has been detected.

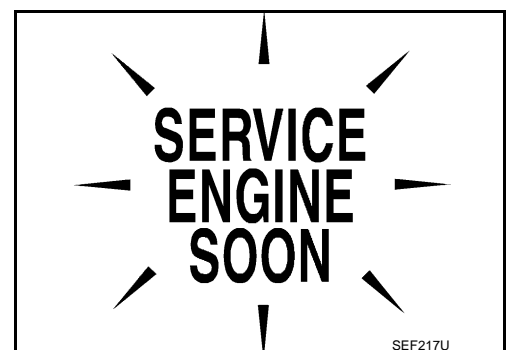
1. The MIL illuminates when ignition switch is turned ON (engine is not running).

**NOTE:**

Check the MIL circuit if MIL does not illuminate. Refer to [EC-929, "Diagnosis Procedure"](#).

2. When the engine is started, the MIL should go off.

**NOTE:**



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If MIL continues to illuminate/blink, perform self-diagnoses and inspect/repair accordingly because an emission-related ECU has detected a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions).

## On Board Diagnosis Function

INFOID:000000006952153

### ON BOARD DIAGNOSIS ITEM

The on board diagnostic system has the following functions.

Diagnostic test mode	Function
Bulb check	MIL can be checked.
SRT status	ECM can read if SRT codes are set.
Malfunction warning	If ECM detects a malfunction, it illuminates or blinks MIL to inform the driver that a malfunction has been detected.
Self-diagnostic results	DTCs or 1st trip DTCs stored in ECM can be read.
Accelerator pedal released position learning	ECM can learn the accelerator pedal released position. Refer to <a href="#">EC-502, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement"</a> .
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to <a href="#">EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"</a> .
Idle air volume learning	ECM can learn the idle air volume. Refer to <a href="#">EC-503, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"</a> .
Mixture ratio self-learning value clear	Mixture ratio self-learning value can be erased. Refer to <a href="#">EC-505, "MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement"</a> .

### BULB CHECK MODE

#### Description

This function allows damage inspection in the MIL bulb (blown, open circuit, etc.).

#### Operation Procedure

1. Turn ignition switch ON.
2. The MIL on the instrument panel should stay ON.  
If it remains OFF, check MIL circuit. Refer to [EC-929, "Diagnosis Procedure"](#).

### SRT STATUS MODE

#### Description

This function allows to read if ECM has completed the self-diagnoses of major emission control systems and components. For SRT, refer to [EC-597, "DIAGNOSIS DESCRIPTION : System Readiness Test \(SRT\) Code"](#).

#### Operation Procedure

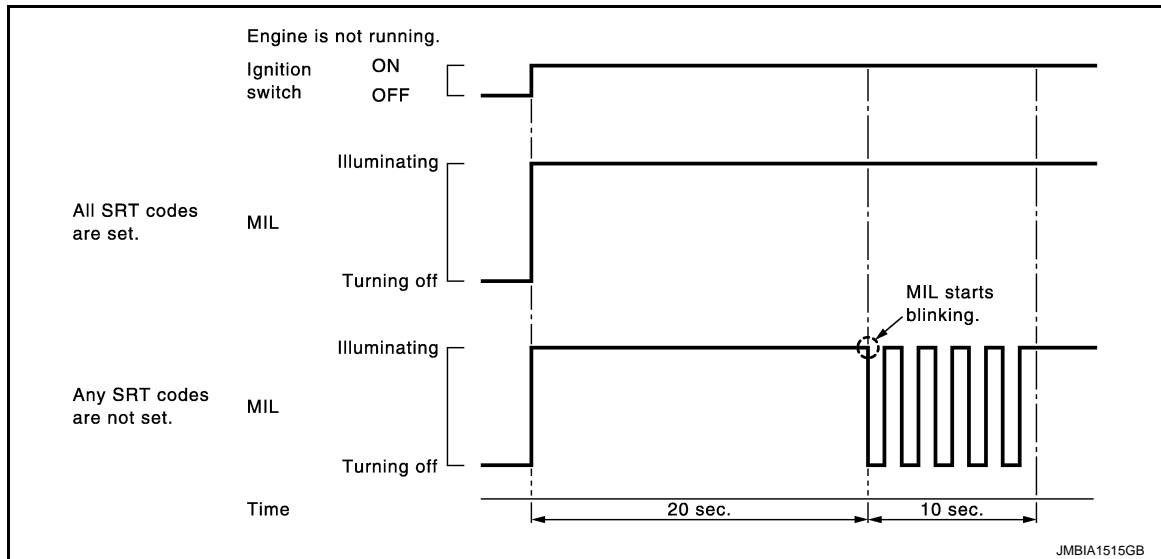
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown blow.
  - ECM continues to illuminate MIL if all SRT codes are set.

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- ECM blinks MIL for about 10 seconds if all SRT codes are not set.



## MALFUNCTION WARNING MODE

### Description

In this function ECM turns on or blinks MIL when it detects a malfunction in the emission control system components and/or the powertrain control components (which affect vehicle emissions) to inform the driver that a malfunction has been detected.

### Operation Procedure

1. Turn ignition switch ON.
2. Check that MIL illuminates.  
If it remains OFF, check MIL circuit. Refer to [EC-929, "Diagnosis Procedure"](#).
3. Start engine and let it idle.
  - For two trip detection logic diagnoses, ECM turns on MIL when it detects the same malfunction twice in the two consecutive driving cycles.
  - For 1st trip detection logic diagnoses, ECM turns on MIL when it detects a malfunction in one driving cycle.
  - ECM blinks MIL when it detects a malfunction that may damage the three way catalyst (misfire).

## SELF-DIAGNOSTIC RESULTS MODE

### Description

This function allows to indicate DTCs or 1st trip DTCs stored in ECM according to the number of times MIL is blinking.

### How to Set Self-diagnostic Results 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.
  - After ignition switch is turned off, ECM is always released from the "self-diagnostic results" mode.
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 depressed for approx. 10 seconds until the MIL starts blinking.

#### NOTE:

Do not release the accelerator pedal for 10 seconds if MIL starts blinking during this period. This blinking is displaying SRT status and is continued for another 10 seconds.

4. Fully release the accelerator pedal.  
ECM has entered to "Self-diagnostic results" mode.



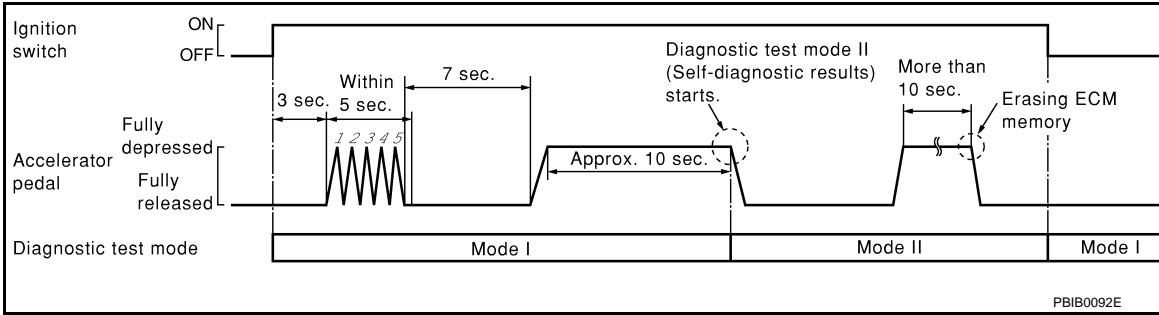
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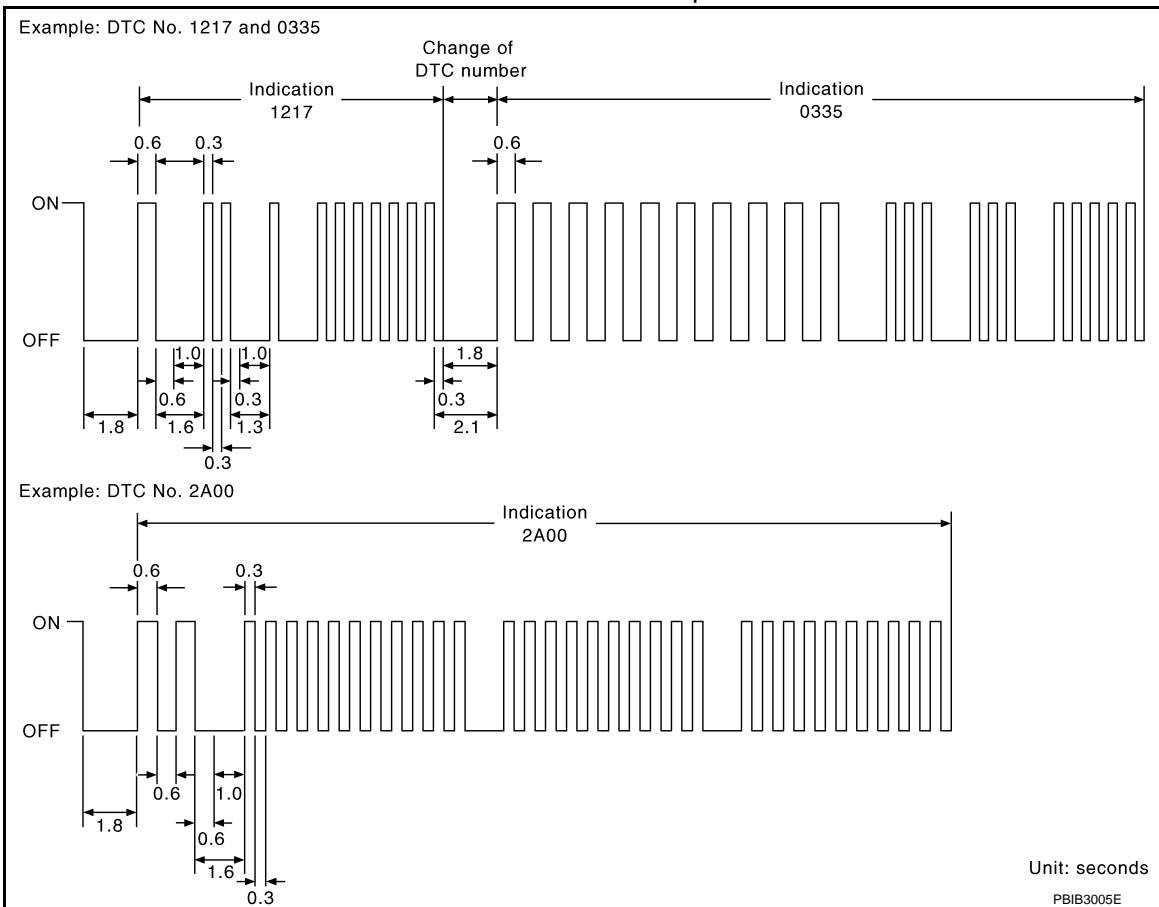
**NOTE:**

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



**How to Read Self-diagnostic Results**

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 "malfunction warning" mode, 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 unidentified 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 per the following.

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-seconds) - OFF (0.6-seconds) cycle.

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

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

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

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In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to [EC-967, "DTC Index"](#).

### How to Erase Self-diagnostic Results

By performing this procedure, ECM memory is erased and the following diagnostic information is erased as well.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

#### NOTE:

Also, if a battery terminal is disconnected, ECM memory is erased and the diagnostic information as listed above is erased. (The amount of time required for erasing may vary from a few seconds to several hours.)

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Set ECM in "self-diagnostic results" mode.
6. The diagnostic information has been erased from the backup memory in the ECM.  
Fully depress the accelerator pedal and keep it depressed for more than 10 seconds.
7. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

## CONSULT-III Function

INFOID:000000006942858

### 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 screen.
Self diagnostic result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/results can be confirmed.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU Identification	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

## WORK SUPPORT MODE

### Work Item

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Work item	Condition	Usage
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> <li>Fuel pump will stop by touching "START" during idling. Crank a few times after engine stalls.</li> </ul>	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> <li>The idle air volume that keeps the engine within the specified range is memorized in ECM.</li> </ul>	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> <li>The coefficient of self-learning control mixture ratio returns to the original coefficient.</li> </ul>	When clearing mixture ratio self-learning value
EVAP SYSTEM CLOSE	Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. <ul style="list-style-type: none"> <li>Ignition switch ON</li> <li>Engine not running</li> <li>Ambient temperature is above 0°C (32°F).</li> <li>No vacuum and no high pressure in EVAP system</li> <li>Fuel tank temp. is more than 0°C (32°F).</li> <li>Within 10 minutes after starting "EVAP system close"</li> <li>When trying to execute "EVAP system close" under the condition except above, CONSULT-III will discontinue it and display appropriate instruction.</li> </ul> <b>NOTE:</b> <b>When starting engine, CONSULT-III may display "Battery voltage is low. Charge battery", even in using charged battery.</b>	When detecting EVAP vapor leak point of EVAP system
VIN REGISTRATION	<ul style="list-style-type: none"> <li>In this mode, VIN is registered in ECM.</li> </ul>	When registering VIN in ECM
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> <li>Idle condition</li> </ul>	When setting target idle speed
TARGET IGN TIM ADJ*	<ul style="list-style-type: none"> <li>Idle condition</li> </ul>	When adjusting target ignition timing
CLSD THL POS LEARN	<ul style="list-style-type: none"> <li>Ignition on and engine stopped.</li> </ul>	When learning the throttle valve closed position

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

## SELF DIAGNOSTIC RESULT MODE

### Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-967, "DTC Index"](#).

### How to Read DTC and 1st Trip DTC

DTCs and 1st trip DTCs related to the malfunction are displayed in "self-diag results".

- When ECM detects a 1st trip DTC, "1t" is displayed for "TIME".
- When ECM has detected a current DTC, "0" is displayed for "TIME".
- If "TIME" is neither "0" nor "1t", the DTC occurred in the past and ECM shows the number of times the vehicle has been driven since the last detection of the DTC.

### How to Erase DTC and 1st Trip DTC

#### 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-967, "DTC Index"](#)), skip step 1.
  - Erase DTC in TCM. Refer to [TM-180, "DTC Index"](#).
  - Select "ENGINE" with CONSULT-III.
  - Select "SELF-DIAG RESULTS".
  - Touch "ERASE". (DTC in ECM will be erased.)

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

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Freeze frame data item*	Description
DTC	<ul style="list-style-type: none"> <li>The engine control component part/control system has a trouble code that is displayed as DTC. (Refer to <a href="#">EC-967, "DTC Index"</a>.)</li> </ul>
FUEL SYS-B1	<ul style="list-style-type: none"> <li>"Fuel injection system status" at the moment a malfunction is detected is displayed.</li> <li>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</li> </ul>
CAL/LD VALUE [%]	<ul style="list-style-type: none"> <li>The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> <li>The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> <li>"Long-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</li> </ul>
S-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> <li>"Short-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> <li>The engine speed at the moment a malfunction is detected is displayed.</li> </ul>
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> <li>The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> <li>The throttle valve opening angle at the moment a malfunction is detected is displayed.</li> </ul>
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> <li>The base fuel schedule at the moment a malfunction is detected is displayed.</li> </ul>
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> <li>The intake air temperature at the moment a malfunction is detected is displayed.</li> </ul>
FUEL SYS-B2	<ul style="list-style-type: none"> <li>These items displayed but are not applicable to this model.</li> </ul>
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	
INT MANI PRES [kPa]	
COMBUST CONDITION	

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

## DATA MONITOR MODE

### Monitored Item

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the engine is running, an abnormal value may be indicated.</li> </ul>
MAS A/F SE-B1	V	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>
B/FUEL SCHDL	ms	<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>
A/F ALPHA-B1	%	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> <li>When engine is running specification range is indicated in "SPEC".</li> </ul>

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Monitored item	Unit	Description	Remarks
COOLAN TEMP/S	°C or °F	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> </ul>
A/F SEN1 (B1)	V	<ul style="list-style-type: none"> <li>The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed.</li> </ul>	
HO2S2 (B1)	V	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 is displayed.</li> </ul>	
HO2S2 MNTR(B1)	RICH/LEAN	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.</li> </ul>	
BATTERY VOLT	V	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>	
ACCEL SEN 1	V	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor signal voltage is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.</li> </ul>
ACCEL SEN 2			
TP SEN 1-B1	V	<ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.</li> </ul>
TP SEN 2-B1			
FUEL T/TMP SE	°C or °F	<ul style="list-style-type: none"> <li>The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.</li> </ul>	
INT/A TEMP SE	°C or °F	<ul style="list-style-type: none"> <li>The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.</li> </ul>	
EVAP SYS PRES	V	<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
FUEL LEVEL SE	V	<ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>	
START SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.</li> </ul>	<ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul>
CLSD THL POS	ON/OFF	<ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch determined by the air conditioner ON signal.</li> </ul>	
P/N POSI SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal (M/T models) or Transmission range switch signal (CVT models).</li> </ul>	
PW/ST SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated.</li> </ul>	
LOAD SIGNAL	ON/OFF	<ul style="list-style-type: none"> <li>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.</li> </ul>	
IGNITION SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch signal.</li> </ul>	
HEATER FAN SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	

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# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Monitored item	Unit	Description	Remarks
BRAKE SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1	msec	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>
IGN TIMING	BTDC	<ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
CAL/LD VALUE	%	<ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current air flow divided by peak air flow.</li> </ul>	
MASS AIRFLOW	g/s	<ul style="list-style-type: none"> <li>Indicates the mass air flow computed by ECM according to the signal voltage of the mass air flow sensor.</li> </ul>	
PURG VOL C/V	%	<ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM(B1)	°CA	<ul style="list-style-type: none"> <li>Indicates [°CA] of intake camshaft advance angle.</li> </ul>	
INT/V SOL(B1)	%	<ul style="list-style-type: none"> <li>The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated.</li> <li>The advance angle becomes larger as the value increases.</li> </ul>	
SWRL CONT S/V	ON/OFF	<ul style="list-style-type: none"> <li>The control condition of the tumble control valve (determined by ECM according to the input signals) is indicated.</li> <li>ON: Closed</li> <li>OFF: Open</li> </ul>	
TMBL POS SEN	V	<ul style="list-style-type: none"> <li>The tumble control valve position sensor signal voltage is displayed.</li> </ul>	
AIR COND RLY	ON/OFF	<ul style="list-style-type: none"> <li>The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.</li> </ul>	
FUEL PUMP RLY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>	
VENT CONT/V	ON/OFF	<ul style="list-style-type: none"> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated.</li> <li>ON: Closed</li> <li>OFF: Open</li> </ul>	
THRTL RELAY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN	HI/LOW/ OFF	<ul style="list-style-type: none"> <li>Indicates the condition of the cooling fan (determined by ECM according to the input signals).</li> <li>HI: High speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>	
HO2S2 HTR (B1)	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.</li> </ul>	
I/P PULLY SPD	rpm	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the input shaft revolution signal.</li> </ul>	
VEHICLE SPEED	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.</li> </ul>	
IDL A/V LEARN	YET/CMPLT	<ul style="list-style-type: none"> <li>Display the condition of Idle Air Volume Learning</li> <li>YET: Idle air volume learning has not been performed yet.</li> <li>CMPLT: Idle air volume learning has already been performed successfully.</li> </ul>	

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Monitored item	Unit	Description	Remarks
TRVL AFTER MIL	km or mile	<ul style="list-style-type: none"> <li>Distance traveled while MIL is activated.</li> </ul>	A
ENG OIL TEMP	°C or °F	<ul style="list-style-type: none"> <li>The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed.</li> </ul>	EC
A/F S1 HTR(B1)	%	<ul style="list-style-type: none"> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>	C
AC PRESS SEN	V	<ul style="list-style-type: none"> <li>The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	D
A/F ADJ-B1	—	<ul style="list-style-type: none"> <li>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.</li> </ul>	E
BUT CUR SEN	mV	<ul style="list-style-type: none"> <li>The signal voltage of battery current sensor is displayed.</li> </ul>	F
ALT DUTY SIG	ON/OFF	<ul style="list-style-type: none"> <li>The control condition of the power generation voltage variable control (determined by ECM according to the input signals) is indicated.</li> <li>ON: Power generation voltage variable control is active.</li> <li>OFF: Power generation voltage variable control is inactive.</li> </ul>	G
ALT DUTY	%	<ul style="list-style-type: none"> <li>Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal.</li> </ul>	H
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.</li> </ul>	I
SET VHCL SPD	km/h or mph	<ul style="list-style-type: none"> <li>The preset vehicle speed is displayed.</li> </ul>	J
MAIN SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>	K
CANCEL SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	L
RESUME/ACC SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from RESUME/ACC switch signal.</li> </ul>	M
SET SW	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from SET switch signal.</li> </ul>	N
BRAKE SW1	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ASCD brake switch signal and ASCD clutch switch signal (M/T models).</li> </ul>	O
BRAKE SW2	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>	P
VHCL SPD CUT	NON/CUT	<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition.</li> <li>NON: Vehicle speed is maintained at the ASCD set speed.</li> <li>CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	P
LO SPEED CUT	NON/CUT	<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition.</li> <li>NON: Vehicle speed is maintained at the ASCD set speed.</li> <li>CUT: Vehicle speed decreased to excessively low and ASCD operation is cut off.</li> </ul>	P
AT OD MONITOR	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CVT O/D according to the input signal from the TCM.</li> </ul>	
AT OD CANCEL	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CVT O/D cancel request signal from the TCM.</li> </ul>	

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Monitored item	Unit	Description	Remarks
CRUISE LAMP	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	
SET LAMP	ON/OFF	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>	
THRTL STK CNT B1*	—	—	
EVAP LEAK DIAG	YET/CMPLT	<ul style="list-style-type: none"> <li>Indicates the condition of EVAP leak diagnosis. YET: EVAP leak diagnosis has not been performed yet. CMPLT: EVAP leak diagnosis has been performed successfully.</li> </ul>	
EVAP DIAG READY	ON/OFF	<ul style="list-style-type: none"> <li>Indicates the ready condition of EVAP leak diagnosis. ON: Diagnosis has been ready condition. OFF: Diagnosis has not been ready condition.</li> </ul>	
HO2 S2 DIAG1 (B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P0139 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
HO2 S2 DIAG2 (B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P0139 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG2(B1)	INCMP/CM-PLT	<ul style="list-style-type: none"> <li>Indicates DTC P014C or P014D self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG3(B1)	ABSNT/PRSNT	<ul style="list-style-type: none"> <li>Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. ABSNT: The vehicle condition is not within the diagnosis range. PRSNT: The vehicle condition is within the diagnosis range.</li> </ul>	

\*: The item is indicated, but not used.

**NOTE:**

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

## ACTIVE TEST MODE

Test Item

Test item	Condition	Judgment	Check item (Remedy)
FUEL INJECTION	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Fuel injector</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>
IGNITION TIMING	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Perform Idle Air Volume Learning.</li> </ul>
POWER BALANCE	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch OFF</li> <li>Selector lever: P or N position (CVT), Neutral position (M/T)</li> <li>Cut off each fuel injector signal one at a time using CONSULT-III.</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Compression</li> <li>Fuel injector</li> <li>Power transistor</li> <li>Spark plug</li> <li>Ignition coil</li> </ul>



# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Test item	Condition	Judgment	Check item (Remedy)
COOLING FAN*	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Turn the cooling fan "LOW", "HI" and "OFF" using CONSULT-III.</li> </ul>	Cooling fan moves and stops.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>IPDM E/R (Cooling fan relay)</li> <li>Cooling fan motor</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the engine coolant temperature using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>
FUEL PUMP RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound.</li> </ul>	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Fuel pump relay</li> </ul>
PURG VOL CONT/V	<ul style="list-style-type: none"> <li>Engine: After warming up, run engine at 1,500 rpm.</li> <li>Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III.</li> </ul>	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Solenoid valve</li> </ul>
FUEL/T TEMP SEN	<ul style="list-style-type: none"> <li>Change the fuel tank temperature using CONSULT-III.</li> </ul>		
VENT CONTROL/V	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn solenoid valve "ON" and "OFF" using the CONSULT-III and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Solenoid valve</li> </ul>
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change intake valve timing using CONSULT-III.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Intake valve timing control solenoid valve</li> </ul>
ALTERNATOR DUTY	<ul style="list-style-type: none"> <li>Engine: idle.</li> <li>Change duty ratio using CONSULT-III.</li> </ul>	Battery voltage charges.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>IPDM E/R</li> <li>Alternator</li> </ul>
TUMBLE CONTROL VALVE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Turn tumble control valve "ON" and "OFF" with CONSULT-III and listen to operating sound.</li> </ul>	Tumble control valve motor makes an operating sound.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Tumble control valve motor</li> </ul>

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

## DTC & SRT CONFIRMATION MODE

### SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

### PERMANENT DTC STATUS Mode

#### How to display permanent DTC status

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.

#### NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).


#### CAUTION:

# DIAGNOSIS SYSTEM (ECM)

< SYSTEM DESCRIPTION >

[MR18DE (FOR CALIFORNIA)]

Since the “PERMANENT DTC STATUS” screen displays the previous trip information, repeat the following twice to update the information: “Ignition switch OFF”, “Wait for more than 10 seconds” and “Ignition switch ON”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS		
<p><b>CAUTION:</b> Turn ignition switch from ON to OFF twice to update the information on the status screen.</p>		
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP
<p>The previous trip information is displayed. </p>		

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**NOTE:**

This mode is not used in regions that permanent DTCs are not regulated by law.

**SRT WORK SUPPORT Mode**

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

**PERMANENT DTC WORK SUPPORT Mode**

This mode enables a technician to drive a vehicle to complete the driving pattern that is required for erasing permanent DTC.

**NOTE:**

This mode is not used in regions that permanent DTCs are not regulated by law.

**DTC WORK SUPPORT Mode**

Test mode	Test item	Corresponding DTC No.	Reference page
EVAPORATIVE SYSTEM	EVP SML LEAK P0442/P1442*	P0455	<a href="#">EC-792</a>
	EVP V/S LEAK P0456/P1456*	P0442	<a href="#">EC-755</a>
		P0456	<a href="#">EC-798</a>
	PURG VOL CN/V P1444	P0443	<a href="#">EC-762</a>
	PURG FLOW P0441	P0441	<a href="#">EC-749</a>
A/F SEN1	A/F SEN1 (B1) P1278/P1279	—	—
	A/F SEN1 (B1) P1276	P0130	<a href="#">EC-668</a>
HO2S2	HO2S2 (B1) P1146	P0138	<a href="#">EC-684</a>
	HO2S2 (B1) P1147	P0137	<a href="#">EC-678</a>
	HO2S2 (B1) P139	P0139	<a href="#">EC-692</a>

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

## DTC/CIRCUIT DIAGNOSIS

### TROUBLE DIAGNOSIS - SPECIFICATION VALUE

#### Description

INFOID:000000006942860

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:000000006942861

#### 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/cm<sup>2</sup>, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up
  - 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-497. "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-612. "Diagnosis Procedure"](#).

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

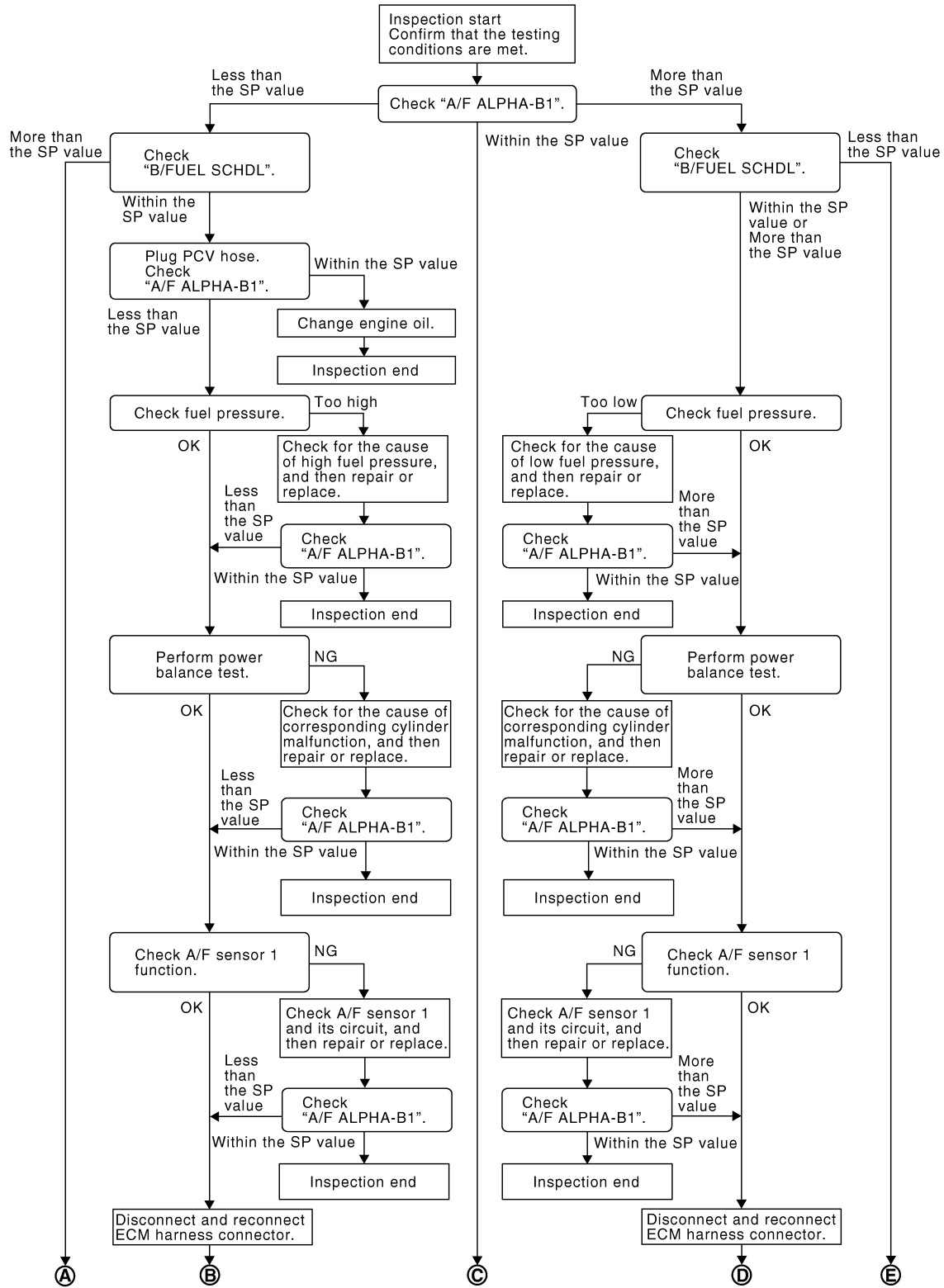
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## Diagnosis Procedure

INFOID:000000006942862

### OVERALL SEQUENCE

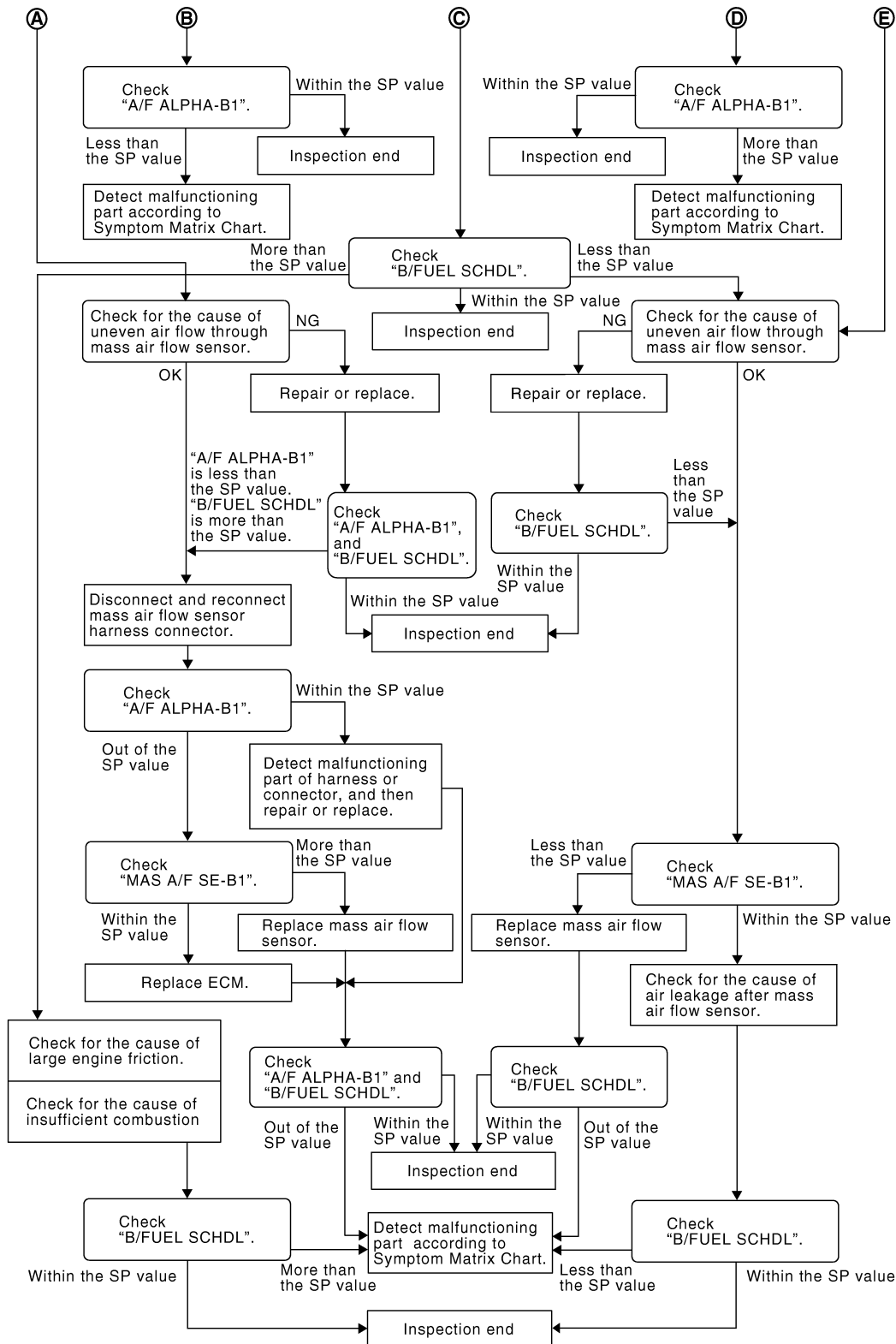


PBIB2318E

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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-611, "Component Function Check"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

**NOTE:**

Check "A/F ALPHA-B1" for approximately 1 minute because it 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-989, "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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT 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-924, "Component Function Check".](#))
2. Fuel injector and its circuit (Refer to [EC-918, "Component Function Check".](#))
3. Intake air leakage
4. Low compression pressure (Refer to [EM-21, "Inspection".](#))

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-668, "DTC Logic".](#)
- For DTC P0131, refer to [EC-672, "DTC Logic".](#)
- For DTC P0132, refer to [EC-675, "DTC Logic".](#)
- For DTC P014C, P014D, P015A, P015B, refer to [EC-698, "DTC Logic".](#)
- For DTC P2A00, refer to [EC-905, "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 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

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect ECM harness connector.
3. 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-977, "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 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.
3. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.



## TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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-638, "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. Perform [EC-500, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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- 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 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-977. "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-977. "Symptom Table"](#).

# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## POWER SUPPLY AND GROUND CIRCUIT

### Diagnosis Procedure

INFOID:000000006978696

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

#### 2. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT

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

ECM		Ground	Continuity
Connector	Terminal		
F7	11	Ground	Existed
E16	107		
	108		
	109		
	112		

3. Also check harness for 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 F1, E8
- Harness for open or short between ECM and ground

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

#### 4. CHECK ECM POWER SUPPLY CIRCUIT-I

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

ECM		Ground	Voltage
Connector	Terminal		
E16	93	Ground	Battery voltage

Is the inspection result normal?

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

#### 5. DETECT MALFUNCTIONING PART

Check the following.

- 15 A fuse (No. 62)
- Harness for open or short between ECM and fuse

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

# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 6. CHECK ECM POWER SUPPLY CIRCUIT-II

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

ECM		Ground	Voltage
Connector	Terminal		
E16	105	Ground	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

Is the inspection result normal?

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

## 7. CHECK ECM POWER SUPPLY CIRCUIT-III

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

IPDM E/R		Ground	Voltage
Connector	Terminal		
E14	44	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> Replace IPDM E/R. Refer to [PCS-34. "Removal and Installation"](#) (With I-KEY) or [PCS-64. "Removal and Installation"](#) (Without I-KEY).

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## 9. CHECK ECM POWER SUPPLY CIRCUIT-IV

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

ECM		Ground	Voltage
Connector	Terminal		
F7	32	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 13.  
NO >> GO TO 10.

## 10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E14.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	32	E14	40	Existed

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

Is the inspection result normal?

# POWER SUPPLY AND GROUND CIRCUIT

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 12.
- NO >> GO TO 11.

## 11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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 FUSE

1. Disconnect 20 A fuse (No. 43) from IPDM E/R.
2. Check 20 A fuse.

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Replace 20 A fuse.

## 13. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E14.
3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E16	105	E14	43	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.

- Harness connectors E8, F1
- 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.

## 15. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY) or [PCS-64, "Removal and Installation"](#) (Without I-KEY) .
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

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# U0101 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## U0101 CAN COMM CIRCUIT

### Description

INFOID:000000006942864

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:000000006942865

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101	Lost communication with TCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.	<ul style="list-style-type: none"><li>CAN communication line between TCM and ECM (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> [EC-622, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006942866

Perform the trouble diagnosis for CAN communication system. Refer to [LAN-13, "Trouble Diagnosis Flow Chart"](#).

# U0140 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## U0140 CAN COMM CIRCUIT

### Description

INFOID:000000006952394

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:000000006942868

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0140	Lost communication with BCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) with BCM for 2 seconds or more.	<ul style="list-style-type: none"><li>CAN communication line between BCM and ECM (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

YES >> [EC-623, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006952396

Perform the trouble diagnosis for CAN communication system. Refer to [LAN-13, "Trouble Diagnosis Flow Chart"](#).

# U1001 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## U1001 CAN COMM CIRCUIT

### Description

INFOID:000000006952395

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:000000006942871

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission related diagnosis) for 2 seconds or more.	<ul style="list-style-type: none"><li>• Harness or connectors (CAN communication line is open or shorted)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

- YES >> [EC-624, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006952397

Perform the trouble diagnosis for CAN communication system. Refer to [LAN-13, "Trouble Diagnosis Flow Chart"](#).



P0011 IVT CONTROL

DTC Logic

INFOID:000000006942873

DTC DETECTION LOGIC

**NOTE:**

If DTC P0011 is displayed with DTC P0075, first perform the trouble diagnosis for [EC-824, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC 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"> <li>• Crankshaft position sensor (POS)</li> <li>• Camshaft position sensor (PHASE)</li> <li>• Intake valve control solenoid valve</li> <li>• Accumulation of debris to the signal pick-up portion of the camshaft</li> <li>• Timing chain installation</li> <li>• Foreign matter caught in the oil groove for intake valve timing control</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V 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 normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 4.2 msec
Selector lever	P or N position (CVT) Neutral position (M/T)

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-626, "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.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)

< DTC/CIRCUIT DIAGNOSIS >

Selector lever	1st or 2nd position
Driving location	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-626, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

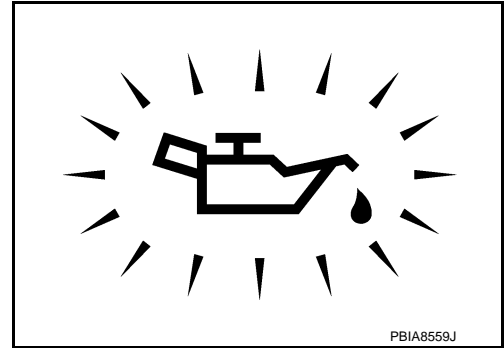
INFOID:000000006942874

### 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-13, "Inspection"](#).
- NO >> GO TO 2.



### 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-627, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-739, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).

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

Refer to [EC-742, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

### 5. CHECK CAMSHAFT (INTAKE)

Check the following.

# P0011 IVT CONTROL

[MR18DE (FOR CALIFORNIA)]

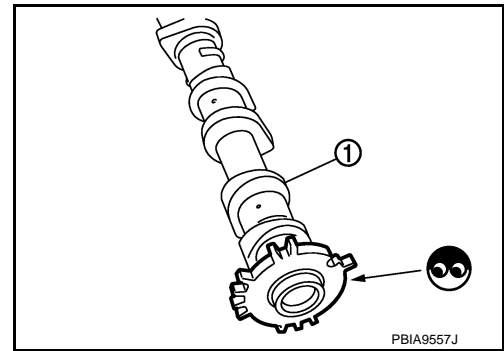
## < DTC/CIRCUIT DIAGNOSIS >

- 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. Refer to [EM-54, "Exploded View"](#).



## 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-44, "Removal and Installation"](#).

NO >> GO TO 7.

## 7. CHECK LUBRICATION CIRCUIT

Refer to [LU-7, "Inspection"](#), "INSPECTION AFTER INSTALLATION".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean lubrication line.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942875

## 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 per the following.

Terminals	Resistance
1 and 2	6.7 - 7.7 $\Omega$ [at 20°C (68°F)]
1 or 2 and ground	$\infty \Omega$ (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

## 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).
2. Provide 12 V 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.

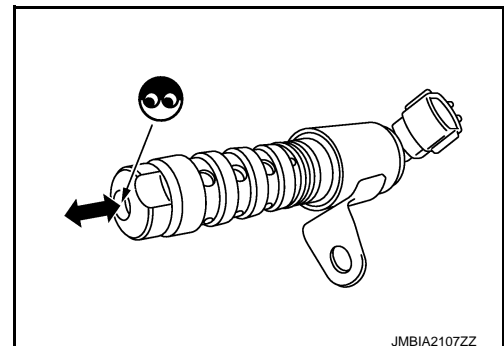
### CAUTION:

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

### NOTE:

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

Is the inspection result normal?



## P0011 IVT CONTROL

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

# P0031, P0032 A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0031, P0032 A/F SENSOR 1 HEATER

### Description

INFOID:000000006942876

### 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:000000006942877

### 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"><li>• Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)</li><li>• A/F sensor 1 heater</li></ul>
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"><li>• Harness or connectors (The A/F sensor 1 heater circuit is shorted.)</li><li>• A/F sensor 1 heater</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Go to [EC-629, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006942878

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F51	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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	
F51	3	F7	8	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

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

Refer to [EC-631, "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. Refer to [EM-30, "Exploded View"](#).

#### **CAUTION:**

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

>> INSPECTION END

### 7. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "Intermittent Incident"](#).

>> Repair or replace.

# P0031, P0032 A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

INFOID:000000006942879

## Component Inspection

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

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.
3. Check resistance between A/F sensor 1 terminals as per the following.

Terminals	Resistance
3 and 4	1.8 - 2.44 $\Omega$ [at 20°C (68°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 air fuel ratio (A/F) sensor 1. Refer to [EM-30, "Exploded View"](#).

#### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

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# P0037, P0038 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0037, P0038 HO2S2 HEATER

### Description

INFOID:000000006942880

### 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	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"><li>• Engine: After warming up</li><li>• Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li></ul>	ON

### DTC Logic

INFOID:000000006942881

### 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"><li>• Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li><li>• Heated oxygen sensor 2 heater</li></ul>
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"><li>• Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li><li>• Heated oxygen sensor 2 heater</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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 11 V 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 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?



# P0037, P0038 HO2S2 HEATER

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Go to [EC-633, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

A

## Diagnosis Procedure

INFOID:000000006942882

### 1. CHECK GROUND CONNECTION

EC

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

C

Is the inspection result normal?

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

D

### 2. CHECK HO2S2 POWER SUPPLY CIRCUIT

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

E

HO2S2		Ground	Voltage
Connector	Terminal		
F49	2	Ground	Battery voltage

F

Is the inspection result normal?

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

G

H

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R connector E15
- 15 A fuse (No. 61)
- Harness for open or short between heated oxygen sensor 2 and fuse

I

J

>> 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

K

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

L

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F49	3	F7	5	Existed

M

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

N

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.

O

### 5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-634, "Component Inspection"](#).

P

Is the inspection result normal?

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

### 6. REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to [EX-5, "Exploded View"](#).

**CAUTION:**

## P0037, P0038 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

- 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

### 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

### Component Inspection

INFOID:000000006942883

### 1. CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 (HO2S2) harness connector.
3. Check resistance between HO2S2 terminals as per the following.

Terminals	Resistance
2 and 3	3.3 - 4.4 $\Omega$ [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. Refer to [EX-5, "Exploded View"](#).

#### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

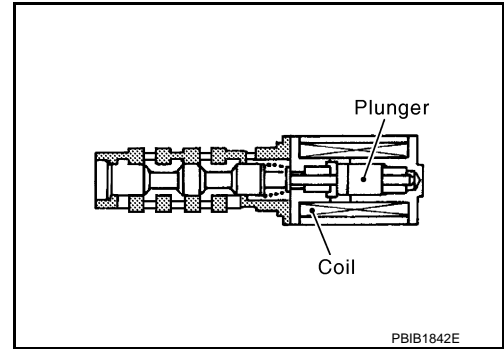
[MR18DE (FOR CALIFORNIA)]

## P0075 IVT CONTROL SOLENOID VALVE

### Description

INFOID:000000006942884

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:000000006942885

#### 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"> <li>• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)</li> <li>• Intake valve timing control solenoid valve</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-635, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006942886

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

1. Turn ignition switch OFF.
2. Disconnect intake valve timing (IVT) 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		
F41	1	Ground	Battery voltage

Is the inspection result normal?

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

##### 2. DETECT MALFUNCTIONING PART

# P0075 IVT CONTROL SOLENOID VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Check the following.

- Harness connectors E8, F1
- IPDM E/R connector E14
- Harness for open or short between IVT control solenoid valve and IPDM E/R

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

### 3. 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 IVT control solenoid valve harness connector and ECM harness connector.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F41	2	F8	73	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 VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-636, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 5. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952355

### 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 per the following.

Terminals	Resistance
1 and 2	6.7 - 7.7 $\Omega$ [at 20°C (68°F)]
1 or 2 and ground	$\infty \Omega$ (Continuity should not exist)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

### 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).

## P0075 IVT CONTROL SOLENOID VALVE

[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

2. Provide 12 V 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 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.**

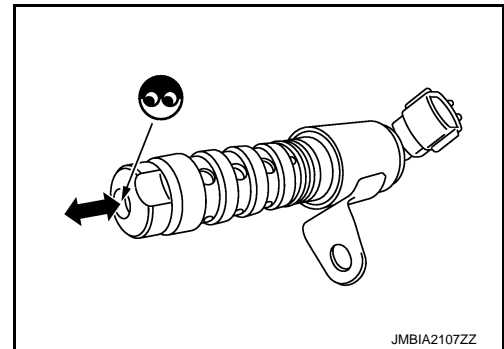
**NOTE:**

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to [EM-43, "Exploded View"](#).



A

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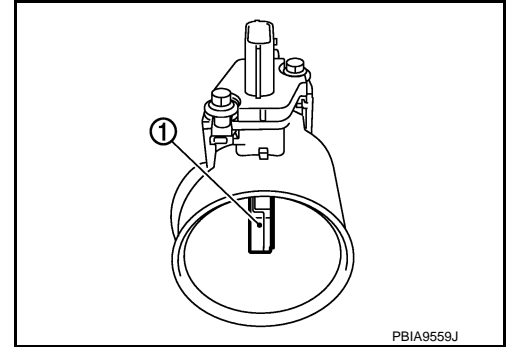
## P0101 MAF SENSOR

### Description

INFOID:000000006947753

The mass air flow (MAF) 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 MAF 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:000000006947754

#### DTC DETECTION LOGIC

**NOTE:**

If DTC P0101 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0101	MAF SEN/CIRCUIT-B1 [Mass air flow (MAF) sensor circuit range/performance]	<ul style="list-style-type: none"> <li>A high voltage from the sensor is sent to ECM under light load driving condition.</li> <li>A low voltage from the sensor is sent to ECM under heavy load driving condition.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Intake air leaks</li> <li>MAF sensor</li> <li>EVAP control system pressure sensor</li> <li>Intake air temperature sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and warm it up to normal operating temperature.
- Drive the vehicle for at least 5 seconds under the following conditions:

**CAUTION:**

**Always drive vehicle at safe speed.**

Selector lever	Suitable position
Vehicle speed	40 km/h (25 MPH) or more

**NOTE:**

- The gear must be fixed while driving the vehicle.
  - Keep the accelerator pedal as steady as possible during cruising.
- Check 1st trip DTC.

**Is 1st trip DTC detected?**

- YES >> Proceed to [EC-639. "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

# P0101 MAF SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006947755

## Diagnosis Procedure

### 1. 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 2.

NO >> Reconnect the parts.

### 2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

### 3. CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY CIRCUIT

1. Disconnect 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		
F4	5	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 E8, F1
- 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.

### 5. 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	
F4	4	F8	52	Existed

4. 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 MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

# P0101 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

MAF sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F4	3	F8	45	Existed

2. 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 INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor. Refer to [EC-649, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace MAF sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

## 8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 9. CHECK MAF SENSOR

Check MAF sensor. Refer to [EC-640, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace MAF sensor. Refer to [EM-24, "Exploded View"](#).

## 10. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942892

### 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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.



# P0101 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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 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 the following.
  - Crushed air ducts
  - Malfunctioning seal of air cleaner element
  - Uneven dirt of air cleaner element
  - Improper specification of intake air system parts

Is the inspection result normal?

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

## 3. CHECK MASS AIR FLOW SENSOR-II

### With CONSULT-III

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

Monitor item	Condition	MAS A/F SE-B1
MAS A/F SE-B1	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. Refer to [EM-24, "Exploded View"](#).

# P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

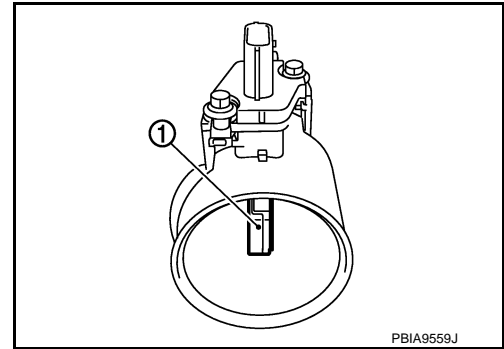
## P0102, P0103 MAF SENSOR

### Description

INFOID:000000006952404

The mass air flow (MAF) 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 MAF 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:000000006942894

#### 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"><li>• Harness or connectors (The sensor circuit is open or shorted.)</li><li>• Intake air leaks</li><li>• Mass air flow sensor</li></ul>
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"><li>• Harness or connectors (The sensor circuit is open or shorted.)</li><li>• Mass air flow sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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-644, "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-644, "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-644, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

# P0102, P0103 MAF SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:00000006942895

## Diagnosis Procedure

### 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 E38. Refer to [GI-44, "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		
F4	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

### 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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	
F4	4	F8	52	Existed

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

Is the inspection result normal?

# P0102, P0103 MAF SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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	
F4	3	F8	45	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-645, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor. Refer to [EM-24, "Exploded View"](#).

### 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952357

### 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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 2.

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

- Turn ignition switch OFF.
- Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
  - Crushed air ducts
  - Malfunctioning seal of air cleaner element
  - Uneven dirt of air cleaner element
  - Improper specification of intake air system parts

Is the inspection result normal?

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

## 3.CHECK MASS AIR FLOW SENSOR-II

 **With CONSULT-III**

- Repair or replace malfunctioning part.
- Start engine and warm it up to normal operating temperature.
- Connect CONSULT-III and select "DATA MONITOR" mode.
- 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

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

 **Without CONSULT-III**

- Repair or replace malfunctioning part.
- Start engine and warm it up to normal operating temperature.
- Check the voltage between ECM harness connector and ground.

# P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. 0.4 V
	Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
	Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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			
F8	45 (MAF sensor signal)	Ground	Ignition switch ON (Engine stopped.)	Approx. 0.4 V
			Idle (Engine is warmed-up to normal operating temperature.)	0.7 - 1.1 V
			2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7 V
			Idle to about 4,000 rpm	0.7 - 1.1 V to Approx. 2.4 V*

\*: 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. Refer to [EM-24, "Exploded View"](#).

# P0111 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0111 IAT SENSOR

### DTC Logic

INFOID:000000006947748

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0111	IAT SENSOR 1 B1 [Intake air temperature (IAT) sensor circuit range/perfor- mance]	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"><li>• Harness or connectors (High or low resistance in the IAT sensor circuit)</li><li>• IAT sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.INSPECTION START

##### Is it necessary to erase permanent DTC?

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

#### 2.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-649, "Component Function Check"](#).

##### **NOTE:**

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

##### Is the inspection result normal?

YES >> INSPECTION END  
NO >> Proceed to [EC-649, "Diagnosis Procedure"](#).

#### 3.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

##### **TESTING CONDITION:**

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 4.

#### 4.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

##### **NOTE:**

Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

##### **CAUTION:**

**Never turn ignition switch ON during soaking.**

##### **NOTE:**

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

##### **CAUTION:**

**Never turn ignition switch OFF during idling.**



# P0111 IAT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-649, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Component Function Check

INFOID:000000006947749

### 1.CHECK INTAKE AIR TEMPERATURE (IAT) 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.

Terminals	Condition	Resistance (kΩ)
1 and 2	Temperature [°C (°F)]	25 (77) 1.800 – 2.200

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Proceed to [EC-649, "Diagnosis Procedure"](#).

### 2.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-649, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006947750

### 1.CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

Check intake air temperature sensor. Refer to [EC-649, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

### 2.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006947752

### 1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as per the following.

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).

# P0112, P0113 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

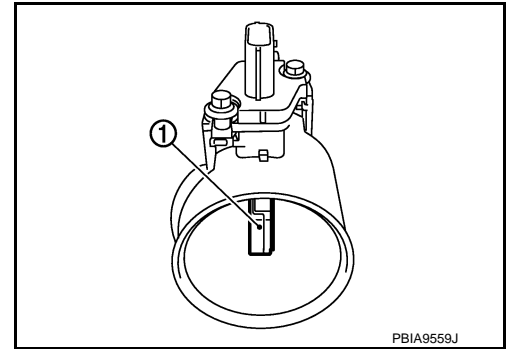
## P0112, P0113 IAT SENSOR

### Description

INFOID:000000006942897

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.

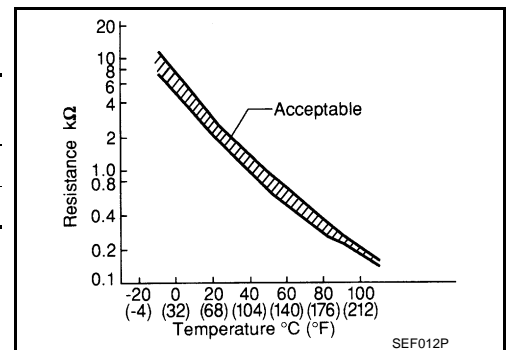
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



### <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 46 (Intake air temperature sensor) and ground.



### DTC Logic

INFOID:000000006942898

### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Intake air temperature sensor</li> </ul>
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-650, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006942899

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

# P0112, P0113 IAT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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		
F4	5	Ground	Approx. 5 V

Is the inspection result normal?

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

### 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	
F4	4	F8	52	Existed

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

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

### 4.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-649. "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-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952358

### 1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as per the following.

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

Is the inspection result normal?

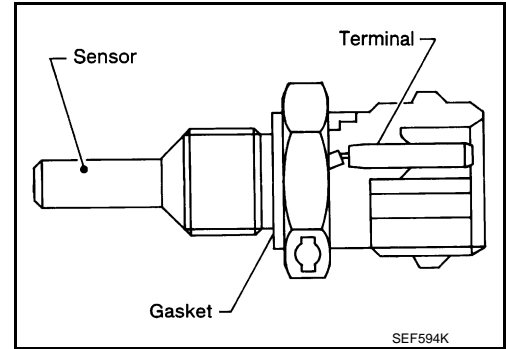
- YES >> INSPECTION END
- NO >> Replace mass air flow sensor (with intake air temperature sensor).

P0116 ECT SENSOR

Description

INFOID:000000006942905

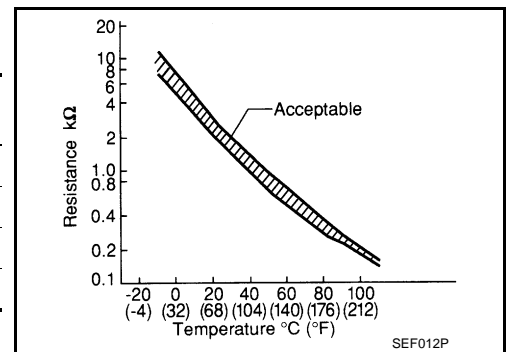
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



DTC Logic

INFOID:000000006947891

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0116	ECT SEN/CIRC [Engine coolant temperature (ECT) sensor circuit range/performance]	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"> <li>• Harness or connectors (High or low resistance in the ECT sensor circuit)</li> <li>• ECT sensor</li> </ul>

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Is it necessary to erase permanent DTC?

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

2.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-653, "Component Function Check"](#).

**NOTE:**

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

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-654, "Diagnosis Procedure"](#).

< DTC/CIRCUIT DIAGNOSIS >

3. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

**TESTING CONDITION:**

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

**NOTE:**

Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

**CAUTION:**

**Never turn ignition switch ON during soaking.**

**NOTE:**

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

**CAUTION:**

**Never turn ignition switch OFF during idling.**

5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-654, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

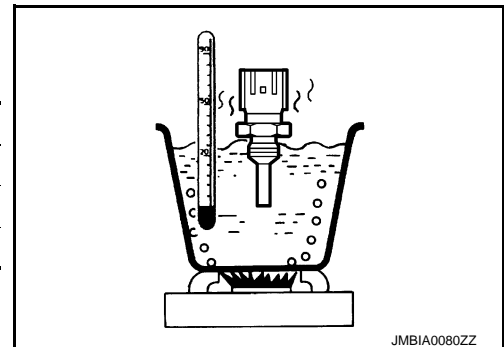
Component Function Check

INFOID:000000006947892

1. CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect ECT sensor harness connector.
3. Remove ECT sensor. Refer to [CO-24, "Exploded View"](#).
4. Check resistance between ECT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (kΩ)	
1 and 2	Temperature [°C (°F)]	20 (68)	2.37 - 2.63
		50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260



Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Proceed to [EC-654, "Diagnosis Procedure"](#).

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Proceed to [EC-654, "Diagnosis Procedure"](#).

# P0116 ECT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006947893

## Diagnosis Procedure

### 1. CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Check ECT sensor. Refer to [EC-654, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace ECT sensor. Refer to [CO-24, "Exploded View"](#).

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942908

### 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. Refer to [CO-24, "Exploded View"](#).
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. Refer to [CO-24, "Exploded View"](#).

# P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

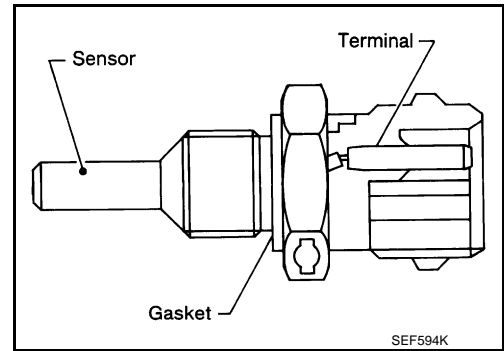
[MR18DE (FOR CALIFORNIA)]

## P0117, P0118 ECT SENSOR

### Description

INFOID:000000006952405

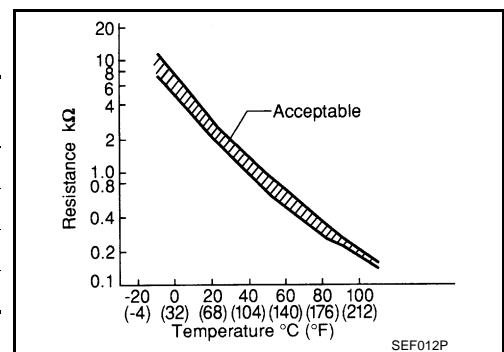
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



### DTC Logic

INFOID:000000006942906

#### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Engine coolant temperature sensor</li> </ul>
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-655, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006942907

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

# P0117, P0118 ECT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

2. Check ground connection E38. Refer to [GI-44, "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		
F28	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F28	2	F8	44	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

### 4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-654, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

### 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952359

### 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. Refer to [CO-24, "Exploded View"](#).
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



# P0117, P0118 ECT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

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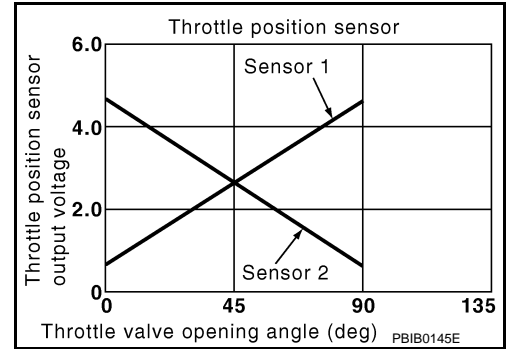
P0122, P0123 TP SENSOR

Description

INFOID:000000006942909

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

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



DTC Logic

INFOID:000000006942910

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-824, "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"> <li>Harness or connectors (TP sensor 2 circuit is open or shorted.)</li> </ul>
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"> <li>Electric throttle control actuator (TP sensor 2)</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Go to [EC-658, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006942911

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit 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	
F29	3	F8	34	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-660. "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 [EM-26. "Exploded View"](#).

>> INSPECTION END

### 7.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

# P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006942912

### 1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-502. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
			Fully de- pressed	Less than 4.75V	
	34 (TP sensor 2 signal)		Fully released	Less than 4.75V	
			Fully de- pressed	More than 0.36V	

Is the inspection result normal?

YES >> INSPECTION END

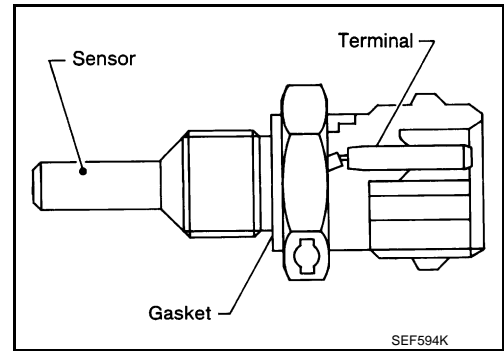
NO >> Replace electric throttle control actuator. Refer to [EM-26. "Exploded View"](#).

P0125 ECT SENSOR

Description

INFOID:000000006942914

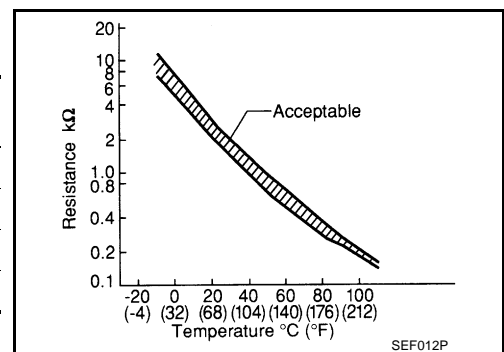
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The 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 38 (Engine coolant temperature sensor) and ground.



DTC Logic

INFOID:000000006942915

DTC DETECTION LOGIC

NOTE:

- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to [EC-652, "DTC Logic"](#).
- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-655, "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"> <li>• Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>• Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul style="list-style-type: none"> <li>• Harness or connectors (High resistance in the circuit)</li> <li>• Engine coolant temperature sensor</li> <li>• Thermostat</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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).

With GST

< DTC/CIRCUIT DIAGNOSIS >

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" indication 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-662, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006942916

**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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-662, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

**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-22, "Removal and Installation"](#).

**4.**CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

Component Inspection

INFOID:000000006952360

**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. Refer to [CO-24, "Exploded View"](#).
4. Check resistance between engine coolant temperature sensor terminals by heating with hot water as shown in the figure.

# P0125 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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. Refer to [CO-24, "Exploded View"](#).

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# P0127 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

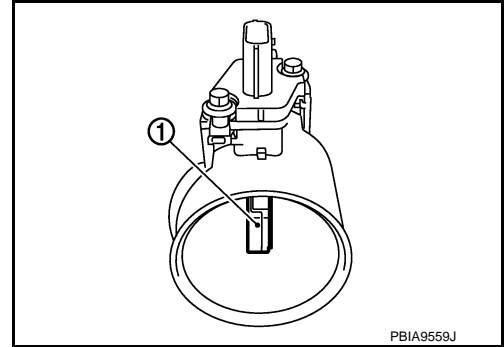
## P0127 IAT SENSOR

### Description

INFOID:000000006942918

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.

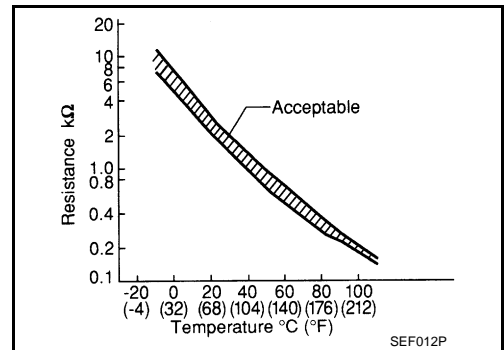
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



### <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 46 (Intake air temperature sensor) and ground.



### DTC Logic

INFOID:000000006942919

### 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"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Intake air temperature sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

**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

##### ④ With CONSULT-III

1. Wait until engine coolant temperature is less than 96°C (205°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 96°C (205°F), turn ignition switch OFF and cool down engine.

#### NOTE:

Perform the following steps before engine coolant temperature is above 96°C (205°F).



# P0127 IAT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.

**CAUTION:**

**Always drive vehicle at a safe speed.**

6. Check 1st trip DTC.

 **With GST**

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-665, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942920

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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-665, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-24, "Exploded View"](#).

### 3.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942921

### 1.CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector.
3. Check resistance between mass air flow sensor terminals as per the following.

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). Refer to [EM-24, "Exploded View"](#).

# P0128 THERMOSTAT FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0128 THERMOSTAT FUNCTION

### DTC Logic

INFOID:000000006956896

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to [EC-728, "DTC 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"><li>• Thermostat</li><li>• Leakage from sealing portion of thermostat</li><li>• Engine coolant temperature sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

- For best results, perform at ambient temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) or higher.
- For best results, perform at engine coolant temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ).
- 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  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ), go to following step.  
If it is above  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ), cool down the engine to less than  $52^{\circ}\text{C}$  ( $126^{\circ}\text{F}$ ). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56km/h (35MPH)
---------------	--------------------------

##### CAUTION:

Always drive vehicle at a safe speed.

##### NOTE:

If "COOLAN TEMP/S" indication increases to more than  $71^{\circ}\text{C}$  ( $160^{\circ}\text{F}$ ) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.

###### With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-666, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006942923

##### 1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-667, "Component Inspection"](#).

# P0128 THERMOSTAT FUNCTION

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

## 2.CHECK THERMOSTAT

Refer to [CO-23, "Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace thermostat. Refer to [CO-22, "Removal and Installation"](#).

## Component Inspection

INFOID:000000006942924

## 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. Refer to [CO-24, "Exploded View"](#).
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

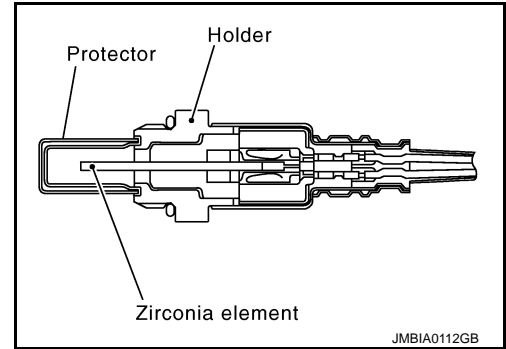
NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

P0130 A/F SENSOR 1

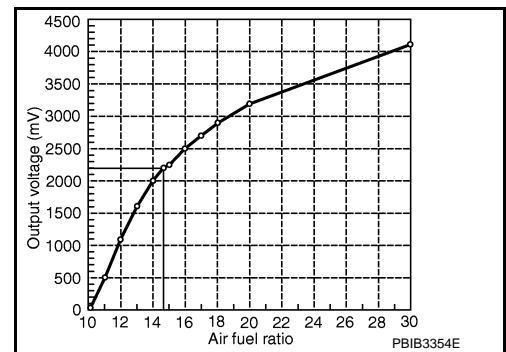
Description

INFOID:000000006942925

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006942926

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. 2.2 V.	<ul style="list-style-type: none"> <li>• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> <li>• A/F sensor 1</li> </ul>
		B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

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 11 V 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-670, "Diagnosis Procedure"](#).

< DTC/CIRCUIT DIAGNOSIS >

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

Does the indication fluctuates around 2.2 V?

- YES >> GO TO 4.
- NO >> Go to [EC-670. "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	1,000 - 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?

- YES >> INSPECTION END
- NO >> Go to [EC-670. "Diagnosis Procedure"](#).

**7. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B**

Perform Component Function Check. Refer to [EC-669. "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-670. "Diagnosis Procedure"](#).

**Component Function Check**

INFOID:000000006942927

**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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Shift the selector lever to the D position (CVT) or 1st position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

**CAUTION:**

**Always drive vehicle at a safe speed.**

**NOTE:**

Never apply brake during releasing the accelerator pedal.

- Repeat steps 2 to 3 for five times.
- Stop the vehicle and turn ignition switch OFF.
- Wait at least 10 seconds and restart engine.
- Repeat steps 2 to 3 for five times.
- Stop the vehicle.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-670, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942928

### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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

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

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F51	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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

- Turn ignition switch OFF.
- 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	
F51	1	F8	49	Existed
	2		53	

# P0130 A/F SENSOR 1

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41. "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. Refer to [EM-30. "Exploded View"](#).

### **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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

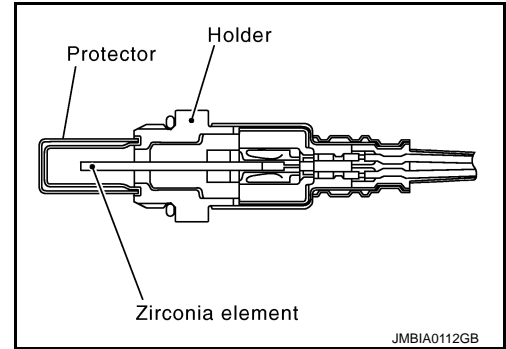
>> INSPECTION END

P0131 A/F SENSOR 1

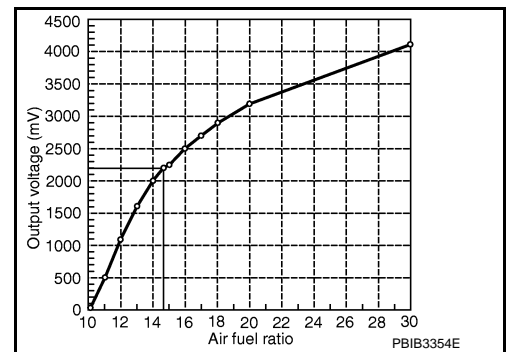
Description

INFOID:000000006942929

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006942930

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. CHECK A/F SENSOR FUNCTION

① 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.

② With GST

Follow the procedure "With CONSULT-III" above.

Is the indication constantly approx. 0 V?



# P0131 A/F SENSOR 1

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- YES >> Go to [EC-673. "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-673. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942931

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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		
F51	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

# P0131 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41. "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. Refer to [EM-30. "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

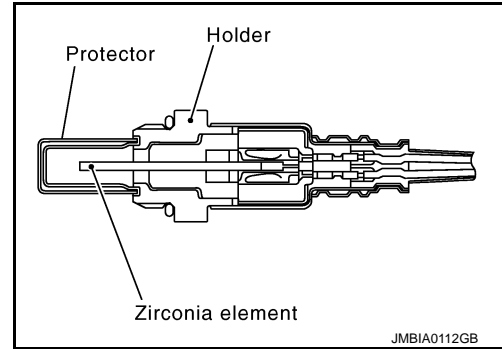
>> INSPECTION END

P0132 A/F SENSOR 1

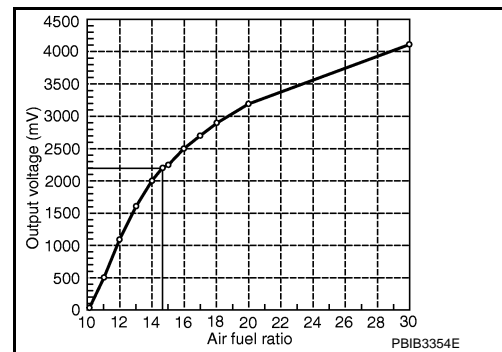
Description

INFOID:000000006942932

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006942933

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V 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. 5 V?

# P0132 A/F SENSOR 1

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- YES >> Go to [EC-676, "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-676, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942934

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F51	4	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 E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

# P0132 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-41, "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. Refer to [EM-30, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

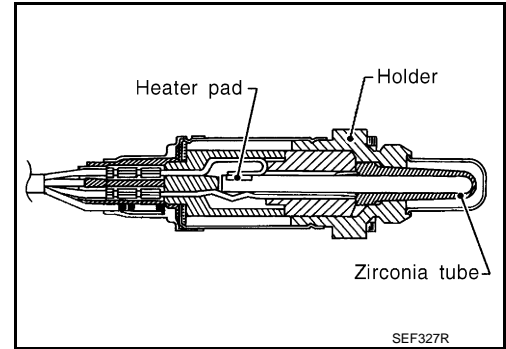
>> INSPECTION END

P0137 HO2S2

Description

INFOID:000000006942935

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

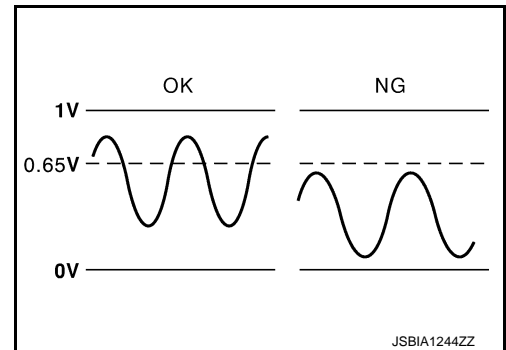


DTC Logic

INFOID:000000006942936

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"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel pressure</li> <li>• Fuel injector</li> <li>• Intake air leaks</li> </ul>

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

< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to 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 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Follow 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-680. "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-679. "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-680. "Diagnosis Procedure"](#).

**Component Function Check**

INFOID:000000006942937

**1.PERFORM COMPONENT FUNCTION CHECK-I**

**⊗ Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.65 V 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.

< DTC/CIRCUIT DIAGNOSIS >

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.65 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.65 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-680. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006942938

**1.CHECK GROUND CONNECTION**

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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-505. "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-703. "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 (HO2S2) 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	
F49	1	F8	59	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.



< DTC/CIRCUIT DIAGNOSIS >

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F49	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F49	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-681. "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. Refer to [EX-5. "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

**7.CHECK INTERMITTENT INCIDENT**

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

**Component Inspection**

INFOID:000000006942939

**1.INSPECTION START**

Do you have CONSULT-III?

Do you have CONSULT-III?

YES >> GO TO 2.

NO >> GO TO 3.

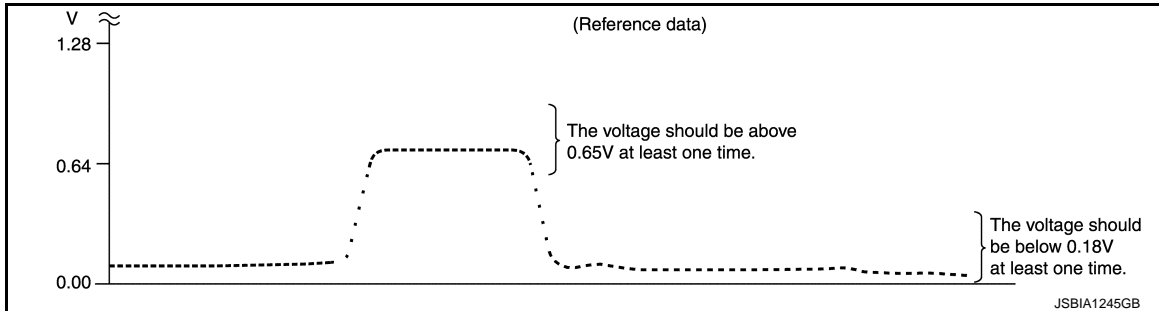
**2.CHECK HEATED OXYGEN SENSOR 2**

**Ⓜ With CONSULT-III**

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.

< DTC/CIRCUIT DIAGNOSIS >

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 0.65 V at least once when the "FUEL INJECTION" is + 25%.  
 "HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

**3.CHECK HEATED OXYGEN SENSOR 2-I**

**⊗ Without CONSULT-III**

1. Start engine and warm it up to 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			
F8	50 (HO2S2 signal)	Ground	Revvng up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

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

**4.CHECK HEATED OXYGEN SENSOR 2-II**

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 5.

**5.CHECK HEATED OXYGEN SENSOR 2-III**

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V 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. Refer to [EX-5. "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

E

F

>> INSPECTION END

G

H

I

J

K

L

M

N

O

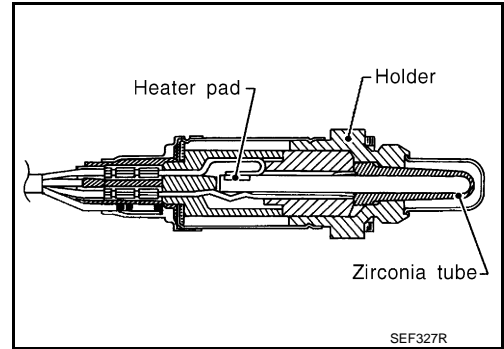
P

P0138 HO2S2

Description

INFOID:000000006942940

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



DTC Logic

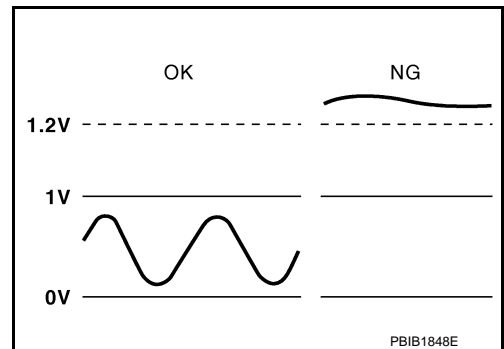
INFOID:000000006942941

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.

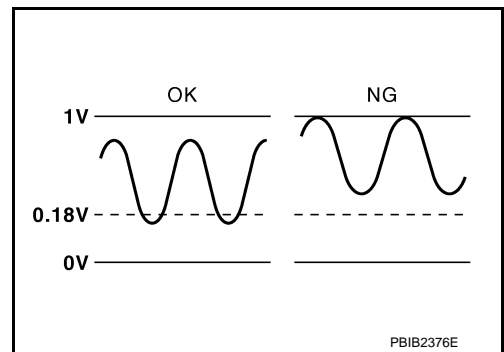
**MALFUNCTION A**

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"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> </ul>
		B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel pressure</li> <li>• Fuel injector</li> </ul>

&lt; DTC/CIRCUIT DIAGNOSIS &gt;

**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.

&gt;&gt; GO TO 2.

**2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A**

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 2 minutes.
5. Check 1st trip DTC.

Is 1st trip DTC detected?YES >> Go to [EC-686, "Diagnosis Procedure"](#).

NO-1 &gt;&gt; With CONSULT-III: GO TO 3.

NO-2 &gt;&gt; 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 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" indication is more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Follow 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 &gt;&gt; INSPECTION END

NG >> Go to [EC-686, "Diagnosis Procedure"](#).

CAN NOT BE DIAGNOSED&gt;&gt;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.

&gt;&gt; GO TO 3.

**5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B**Perform component function check. Refer to [EC-686, "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 &gt;&gt; INSPECTION END

NO >> Go to [EC-686, "Diagnosis Procedure"](#).**Component Function Check**

INFOID:000000006942942

**1. PERFORM COMPONENT FUNCTION CHECK-I**

< DTC/CIRCUIT DIAGNOSIS >

⊗ Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Revvng up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.18 V 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			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.18 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-686, "Diagnosis Procedure"](#).

**Diagnosis Procedure**

INFOID:000000006942943

**1.INSPECTION START**

Confirm the detected malfunction (A or B). Refer to [EC-684, "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 E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

**3.CHECK HO2S2 CONNECTOR FOR WATER**

< DTC/CIRCUIT DIAGNOSIS >

1. Disconnect heated oxygen sensor 2 harness connector.
2. Check connectors for water.

**Water should not exist.**

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

**4.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F49	1	F8	59	Existed

3. 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 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	
F49	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F49	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	Ground	Not existed

3. Also check harness for 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 HEATED OXYGEN SENSOR 2**

Refer to [EC-689, "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. Refer to [EX-5, "Exploded View"](#).

**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.

< DTC/CIRCUIT DIAGNOSIS >

- Before installing new sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

8.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

9.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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-505. "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-707. "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	
F49	1	F8	59	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	
F49	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F49	4	Ground	Not existed



ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-689, "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. Refer to [EX-5, "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

### 15.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952406

### 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 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.

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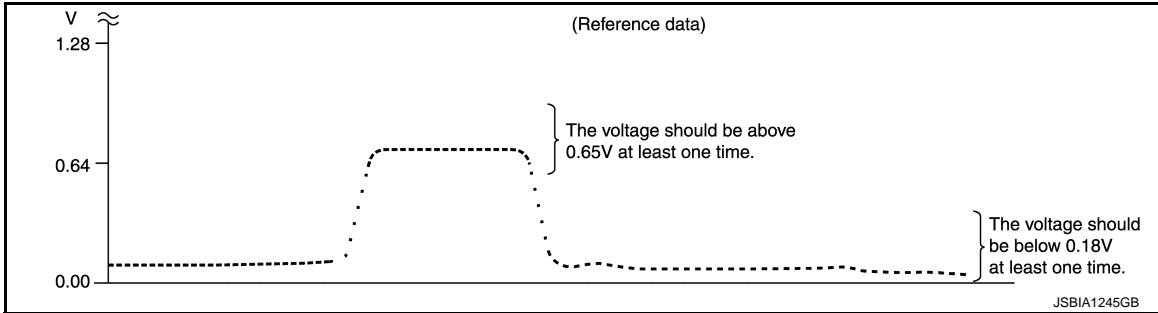
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< DTC/CIRCUIT DIAGNOSIS >

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



"HO2S2 (B1)" should be above 0.65 V at least once when the "FUEL INJECTION" is + 25%.  
 "HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 6.

**3.CHECK HEATED OXYGEN SENSOR 2-I**

⊗ Without CONSULT-III

1. Start engine and warm it up to 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			
F8	50 (HO2S2 signal)	Ground	Revvng up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

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

**4.CHECK HEATED OXYGEN SENSOR 2-II**

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 5.

**5.CHECK HEATED OXYGEN SENSOR 2-III**

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

A  
EC

Is the inspection result normal?

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- YES >> INSPECTION END
- NO >> GO TO 6.

**6. REPLACE HEATED OXYGEN SENSOR 2**

D

Replace heated oxygen sensor 2. Refer to [EX-5. "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

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>> INSPECTION END

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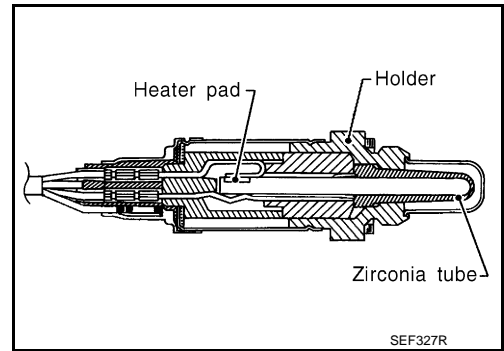
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P0139 HO2S2

Description

INFOID:000000006942945

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

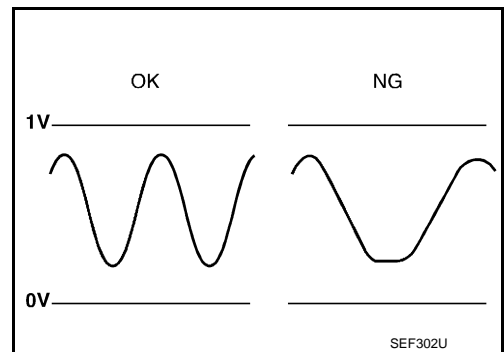


DTC Logic

INFOID:000000006942946

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 1 causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139	Heated oxygen sensor 2 (bank 1) circuit slow re- sponse	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted)</li> <li>• Heated oxygen sensor 2</li> <li>• Fuel system</li> <li>• EVAP system</li> <li>• Intake air system</li> </ul>

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 perform the following procedure before conducting the next test.

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

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**

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 1 minute.
8. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
9. Drive the vehicle in a proper at 60 km/h (38MPH) and maintain the speed.

**CAUTION:**

**Always drive vehicle at a safe speed.**

10. Release the accelerator pedal fully at least 5 seconds.

**CAUTION:**

- **Enable engine brake.**
- **Always drive carefully.**
- **Never apply brake when releasing the accelerator pedal.**

11. Repeat step 9 and 10 at least 8 times.
12. Check the following item of "DATA MONITOR".

Data monitor item	Status
HO2 S2 DIAG1 (B1)	CMPLT
HO2 S2 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

YES >> GO TO 6.

NO-1: "CMPLT" is not displayed on DIAG 1>>Perform DTC confirmation procedure again.

NO-2: "CMPLT" is not displayed on DIAG 2>>GO TO 4.

**4.PERFORM DTC WORK SUPPORT**

1. Open engine hood.
2. Select "HO2S2 (B1) P0139" in "DTC WORK SUPPORT" mode with CONSULT-III.
3. Start engine and follow the instruction of CONSULT-III display.

**NOTE:**

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

Is "COMPLETED" displayed on CONSULT-III screen?

YES >> GO TO 6.

NO >> GO TO 5.

**5.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.

**6.PERFORM SELF-DIAGNOSIS**

**With CONSULT-III**

Perform ECM self-diagnosis.

Is DTC "P0139" detected?

YES >> Proceed to [EC-694, "Diagnosis Procedure"](#).

NO >> INSPECTION END

**7.PERFORM COMPONENT FUNCTION CHECK**

Perform component function check. Refer to [EC-694, "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.

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< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-694, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000006942947

1.PERFORM COMPONENT FUNCTION CHECK-I

Without 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. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.8 V 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			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.8 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.8 V at least once during this procedure.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-694, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006942948

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

< DTC/CIRCUIT DIAGNOSIS >

**2. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE**

1. Clear the mixture ratio self-learning value. Refer to [EC-505, "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-703, "DTC Logic"](#) or [EC-707, "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	
F49	1	F8	59	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	
F49	4	F8	50	Existed

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

HO2S2		Ground	Continuity
Connector	Terminal		
F49	4	Ground	Not existed

ECM		Ground	Continuity
Connector	Terminal		
F8	50	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-696, "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. Refer to [EX-5, "Exploded View"](#).

&lt; DTC/CIRCUIT DIAGNOSIS &gt;

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

&gt;&gt; INSPECTION END

**7.CHECK INTERMITTENT INCIDENT**Refer to [GI-41, "Intermittent Incident"](#).

&gt;&gt; INSPECTION END

**Component Inspection**

INFOID:000000006952412

**1.INSPECTION START**

Do you have CONSULT-III?

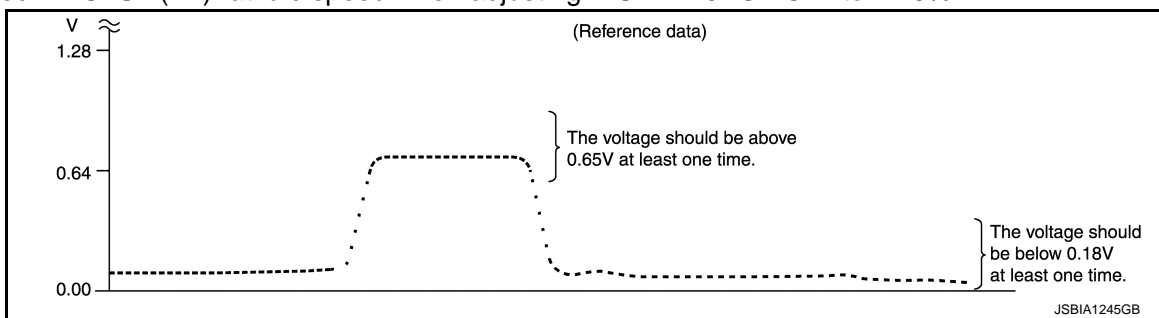
Do you have CONSULT-III?

YES &gt;&gt; GO TO 2.

NO &gt;&gt; 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 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 0.65 V at least once when the "FUEL INJECTION" is + 25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%.

Is the inspection result normal?

YES &gt;&gt; INSPECTION END

NO &gt;&gt; GO TO 6.

**3.CHECK HEATED OXYGEN SENSOR 2-I****Without 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. Check the voltage between ECM harness connector and ground under the following condition.



ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (HO2S2 signal)	Ground	Reving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.

A  
EC

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			
F8	50 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V 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			
F8	50 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.65 V at least once during this procedure. The voltage should be below 0.18 V 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. Refer to [EX-5. "Exploded View"](#).

**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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

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# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

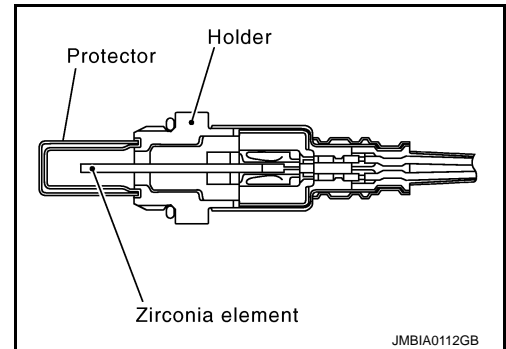
[MR18DE (FOR CALIFORNIA)]

## P014C, P014D, P015A, P015B, A/F SENSOR 1

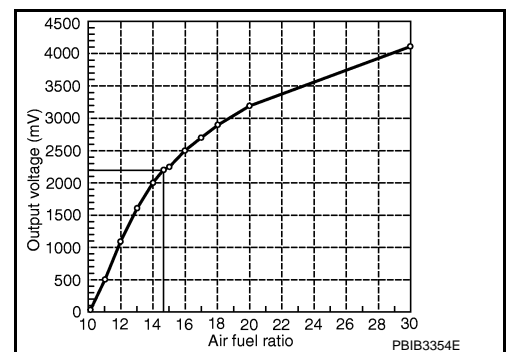
### Description

INFOID:000000006947921

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



### DTC Logic

INFOID:000000006947922

#### DTC DETECTION LOGIC

To judge malfunctions, 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
P014C	Air fuel ratio (A/F) sensor 1 (bank 1) circuit slow response	<ul style="list-style-type: none"> <li>The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> <li>A/F sensor 1</li> </ul>
P014D			
P015A	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed response		
P015B			

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

##### TESTING CONDITION:

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

Do you have CONSULT-III?

- YES >> GO TO 2.
- NO >> GO TO 6.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE-1

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
6. Let engine idle for 1 minute.
7. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for about 1 minute.
9. Check the items status of "DATA MONITOR" as follows.

### NOTE:

If "PRCNT" changed to "ABSN", refer to [EC-611, "Component Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG3 (B1)	PRCNT

Is "PRCNT" displayed on CONSULT-III screen?

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

## 3.PERFORM DTC CONFIRMATION PROCEDURE-2

### With CONSULT-III

Perform DTC confirmation procedure-1 again.

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.  
NO >> Refer to [EC-611, "Component Function Check"](#).

## 4.PERFORM DTC CONFIRMATION PROCEDURE-2

### With CONSULT-III

1. Wait for about 20 seconds at idle.
2. Check the items status of "DATA MONITOR" as follows.

### NOTE:

If "CMPLT" changed to "INCM", refer to [EC-611, "Component Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG1 (B1)	CMPLT
A/F SEN1 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

- YES >> GO TO 5.  
NO >> Refer to [EC-611, "Component Function Check"](#).

## 5.PERFORM SELF-DIAGNOSIS

### With CONSULT-III

Check the "SELF-DIAG RESULT".

Is any DTC detected?

- YES >> Proceed to [EC-612, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## 6.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 8.  
NO >> GO TO 7.

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 7. 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.

## 8. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds.
7. Fully release accelerator pedal and then let engine idle for about 1 minute.
8. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to [EC-612, "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006947923

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

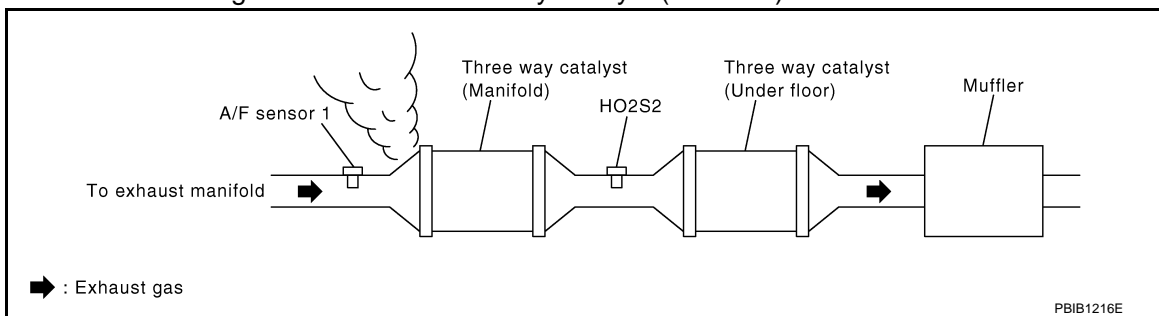
### 2. RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to [EM-30, "Exploded View"](#).

>> 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.

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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-505. "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-703. "DTC Logic"](#) or [EC-707. "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.
3. Check the voltage between A/F sensor 1 harness connector and ground.

A/F sensor 1		Ground	Voltage
Connector	Terminal		
F51	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E15
- 15 A fuse (No. 61)
- 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	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

# P014C, P014D, P015A, P015B, A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

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ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-631, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

## 10.CHECK MASS AIR FLOW SENSOR

Refer to [EC-640, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace mass air flow sensor. Refer to [EM-24, "Exploded View"](#).

## 11.CHECK PCV VALVE

Refer to [EC-936, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace PCV valve. Refer to [EM-41, "Exploded View"](#).

## 12.CHECK INTERMITTENT INCIDENT

Perform [GI-41, "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. Refer to [EM-30, "Exploded View"](#).

### 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 Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

>> INSPECTION END

# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0171 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000006942953

#### 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 injection 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"><li>Fuel injection system does not operate properly.</li><li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li></ul>	<ul style="list-style-type: none"><li>Intake air leaks</li><li>A/F sensor 1</li><li>Fuel injector</li><li>Exhaust gas leaks</li><li>Incorrect fuel pressure</li><li>Lack of fuel</li><li>Mass air flow sensor</li><li>Incorrect PCV hose connection</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 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-505, "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.

**NOTE:**

**When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.**

Does engine start?

- YES >> Go to [EC-704, "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 5 minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-704, "Diagnosis Procedure"](#).  
NO >> GO TO 5.

# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 5. PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine.
3. Maintain the following conditions for at least 10 consecutive minutes.  
Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
---------------	-----------------------------

**CAUTION:**

**Always drive vehicle at a safe speed.**

4. Check 1st trip DTC.

Is 1st trip DTC detected?

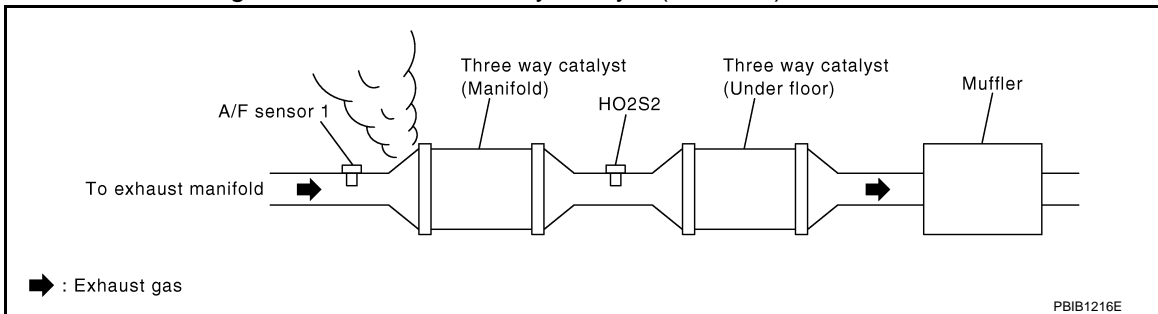
- YES >> Go to [EC-704, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006942954

#### 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

1. Listen for an intake air leak after the mass air flow sensor.
2. 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

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	
F51	1	F8	49	Existed
	2		53	

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



# P0171 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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. Check fuel pressure. Refer to [EC-989, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).

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-993, "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-993, "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-638, "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.

A

EC

C

D

E

F

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H

I

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P

# P0171 FUEL INJECTION SYSTEM FUNCTION

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

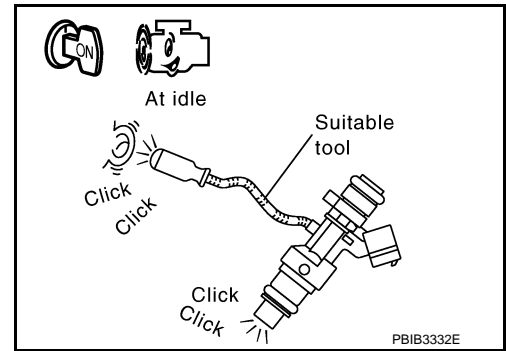
2. Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-918, "Component Function Check"](#).



## 8. CHECK FUEL INJECTOR

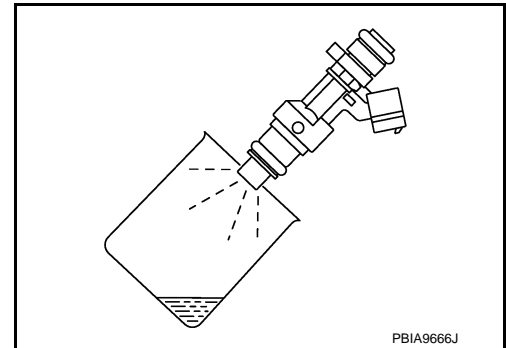
1. Turn ignition switch OFF.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all fuel injector harness connectors.
4. Remove fuel tube assembly. Refer to [EM-36, "Removal and Installation"](#).  
Keep fuel hose and all fuel injectors connected to fuel tube.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. 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. Refer to [EM-36, "Exploded View"](#).



## 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0172 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000006942955

#### 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"><li>Fuel injection system does not operate properly.</li><li>The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li></ul>	<ul style="list-style-type: none"><li>A/F sensor 1</li><li>Fuel injector</li><li>Exhaust gas leaks</li><li>Incorrect fuel pressure</li><li>Mass air flow sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to [EC-505. "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.

#### NOTE:

**When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.**

Does engine start?

- YES >> Go to [EC-708. "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 5 minutes.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-708. "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.

# P0172 FUEL INJECTION SYSTEM FUNCTION

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Maintain the following conditions for at least 10 consecutive minutes.  
Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
---------------	-----------------------------

### CAUTION:

**Always drive vehicle at a safe speed.**

- Check 1st trip DTC.

Is 1st trip DTC detected?

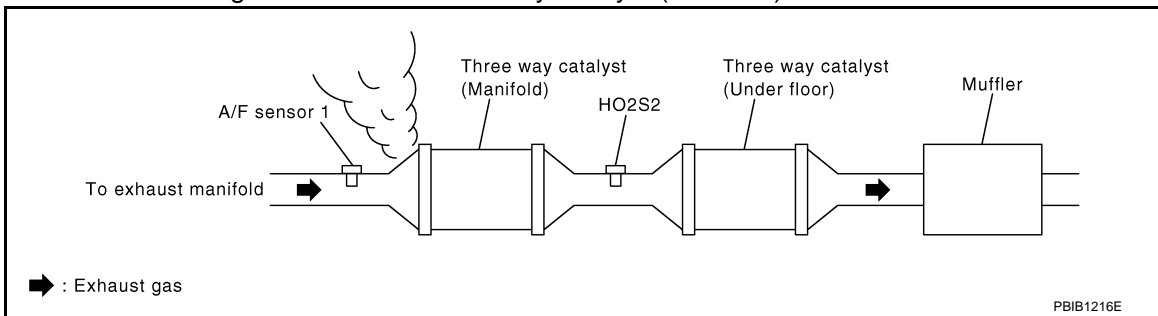
- YES >> Go to [EC-708, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942956

### 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.

Is 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	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

# P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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. Check fuel pressure. Refer to [EC-989, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).

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-993, "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-993, "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-638, "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.

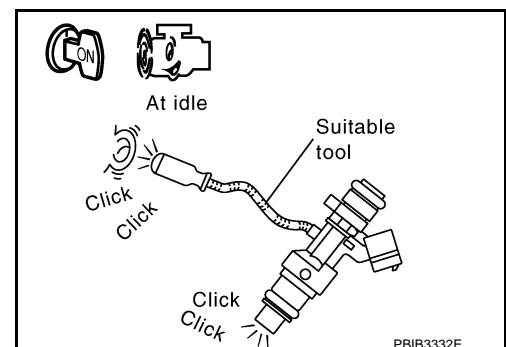
2. Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 8.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-918, "Component Function Check"](#).



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## P0172 FUEL INJECTION SYSTEM FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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### 8. CHECK FUEL INJECTOR

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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.
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.

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. Refer to [EM-36. "Exploded View"](#).

### 9. CHECK INTERMITTENT INCIDENT

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Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

P0181 FTT SENSOR

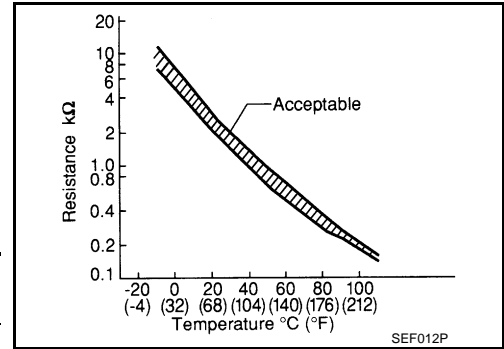
Description

INFOID:000000006952416

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 43 (Fuel tank temperature sensor) and ground.

DTC Logic

INFOID:000000006947896

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition		Possible cause
P0181	FTT SENSOR [Fuel tank temperature (FTT) sensor circuit range/performance]	A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from ECT sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>• Harness or connectors (The FTT sensor circuit is open or shorted)</li> <li>• FTT sensor</li> <li>• Combination meter</li> </ul>
		B)	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, EOT sensor, and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"> <li>• Harness or connectors (High or low resistance in the FTT sensor circuit)</li> <li>• FTT sensor</li> </ul>

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

Is it necessary to erase permanent DTC?

- YES >> GO TO 7.
- NO >> GO TO 2.

2. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-I

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

# P0181 FTT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Proceed to [EC-713. "Diagnosis Procedure"](#).  
NO >> GO TO 4.

## 4. 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 5.

## 5. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-II

 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 >> Proceed to [EC-713. "Diagnosis Procedure"](#).  
NO >> GO TO 6.

## 6. PERFORM COMPONENT FUNCTION CHECK (FOR MALFUNCTION B)

Perform component function check. Refer to [EC-713. "Component Function Check"](#).

### NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to [EC-713. "Diagnosis Procedure"](#).

## 7. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

### TESTING CONDITION:

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 8.

## 8. PERFORM DTC CONFIRMATION PROCEDURE B

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

### NOTE:

Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

### CAUTION:

**Never turn ignition switch ON during soaking.**

### NOTE:

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

### CAUTION:

**Never turn ignition switch OFF during idling.**



# P0181 FTT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-713, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Component Function Check

INFOID:000000006947897

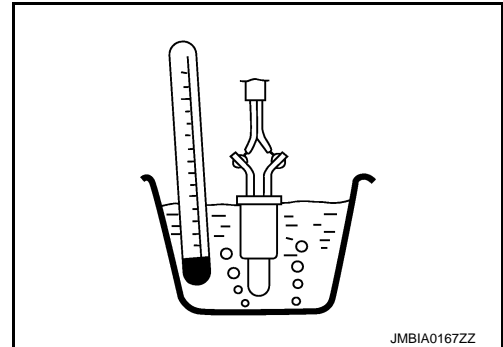
### 1. CHECK FUEL TANK TEMPERATURE (FTT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Remove fuel level sensor unit. Refer to [FL-5, "Removal and Installation"](#).
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 (kΩ)	
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 – 2.7
		50 (122)	0.79 – 0.90

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Proceed to [EC-713, "Diagnosis Procedure"](#).



### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to [EC-713, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006947898

### 1. INSPECTION START

Confirm the detected malfunction (A or B). Refer to [EC-711, "DTC Logic"](#).

Which malfunction is detected?

- A >> GO TO 2.
- B >> GO TO 7.

### 2. CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Proceed to [EC-713, "Component Function Check"](#).

### 3. CHECK FUEL TANK TEMPERATURE (FTT) 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 (V)
Connector	Terminal		
B40	4	Ground	Approx. 5

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 4.

# P0181 FTT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM and fuel level sensor unit and fuel pump
- Loose or poor connection for each connector and harness

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

## 5. CHECK FTT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination meter harness connector.
3. Check the continuity between fuel level sensor unit and fuel pump harness connector and combination meter harness connector.

Fuel level sensor unit and fuel pump		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
B40	5	M34	24	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 for open or short between fuel level sensor unit and fuel pump and combination meter
- Loose or poor connection for each connector and harness

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

## 7. CHECK FTT SENSOR

Check FTT sensor. Refer to [EC-714, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace fuel level sensor unit and fuel pump. Refer to [FL-5, "Exploded View"](#).

## 8. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942960

### 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

# P0181 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

NO >> Replace "fuel level sensor unit and fuel pump". Refer to [FL-5. "Exploded View"](#).

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

O

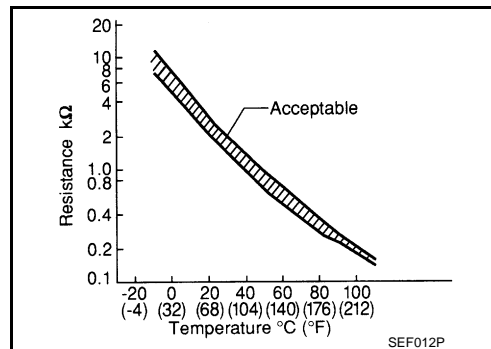
P

P0182, P0183 FTT SENSOR

Description

INFOID:000000006942961

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 43 (Fuel tank temperature sensor) and ground.

DTC Logic

INFOID:000000006942962

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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Fuel tank temperature sensor</li> </ul>
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-716, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006942963

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-41, "Intermittent Incident"](#).

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.

# P0182, P0183 FTT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Fuel level sensor unit and fuel pump		Ground	Voltage
Connector	Terminal		
B40	4	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 combination meter 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		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
B40	5	M34	24	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 M79, B4
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter

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

## 6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-717, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

## 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952415

## 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.

## P0182, P0183 FTT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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

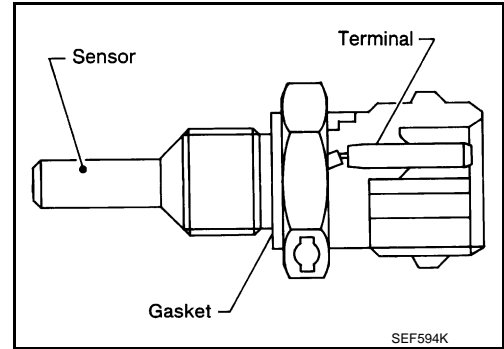
NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

P0196 EOT SENSOR

Component Description

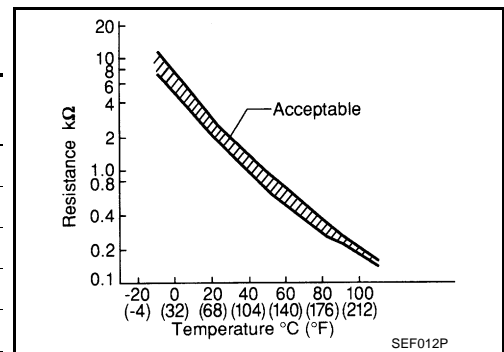
INFOID:000000006952418

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



<Reference data>

Engine 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
110 (230)	0.6	0.143 - 0.153
150 (302)	0.3	0.050 - 0.065



\*: This data is reference values and is measured between ECM terminal 27 (Engine oil 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:000000006947902

DTC DETECTION LOGIC

**NOTE:**

If DTC P0196 is displayed with DTC P0197 or P0198, first perform the trouble diagnosis for DTC P0197 or P0198. Refer to [EC-723, "DTC Logic"](#).

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition		Possible cause
P0196	EOT SENSOR [Engine oil temperature (EOT) sensor circuit range/performance]	A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from EOT sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>• Harness or connectors (The EOT sensor circuit is open or shorted)</li> <li>• EOT sensor</li> </ul>
		B)	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the signal voltage of the EOT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul style="list-style-type: none"> <li>• Harness or connectors (High or low resistance in the EOT sensor circuit)</li> <li>• EOT sensor</li> </ul>

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

# P0196 EOT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is it necessary to erase permanent DTC?

- YES >> GO TO 6.
- NO >> GO TO 2.

## 2. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

**TESTING CONDITION:**

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

>> GO TO 3.

## 3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-I

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and let it idle for 5 minutes and 10 seconds.
6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-722, "Diagnosis Procedure"](#).
- NO >> GO TO 4.

## 4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-II

Ⓜ With CONSULT-III

1. Select "DATA MONITOR" mode with CONSULT-III.
2. Check that "COOLAN TEMP/S" indicates above 80°C (176°F).  
If it is above 80°C (176°F), go to the following steps.  
If it is below 80°C (176°F), warm engine up until "COOLAN TEMP/S" indicates more than 80°C (176°F).  
Then perform the following steps.
3. Turn ignition switch OFF and soak the vehicle in a cool place.
4. Turn ignition switch ON.

**NOTE:**

**Do not turn ignition switch OFF until step 8.**

5. Select "DATA MONITOR" mode with CONSULT-III.
6. Check the following.

COOLAN TEMP/S	Below 40°C (104°F)
INT/A TEMP SE	Below 40°C (104°F)
Difference between "COOLAN TEMP/S" and "INT/A TEMP SE"	Within 6°C (11°F)

If they are within the specified range, perform the following steps.

If they are out of the specified range, soak the vehicle to meet the above conditions. Then perform the following steps.

**NOTE:**

• **Do not turn ignition switch OFF.**

• **If it is supposed to need a long period of time, do not deplete the battery.**

7. Start engine and let it idle for 5 minutes.
8. Check 1st trip DTC.

Ⓜ With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-722, "Diagnosis Procedure"](#).
- NO >> GO TO 5.

## 5. PERFORM COMPONENT FUNCTION CHECK (FOR MALFUNCTION B)



# P0196 EOT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Perform component function check. Refer to [EC-721, "Component Function Check"](#).

### NOTE:

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

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC-722, "Diagnosis Procedure"](#).

## 6. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

### TESTING CONDITION:

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 7.

## 7. PERFORM DTC CONFIRMATION PROCEDURE B

1. Start engine and let it idle for 60 minutes.
2. Move the vehicle to a cool place.

### NOTE:

Cool the vehicle in an environment of ambient air temperature between  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) and  $35^{\circ}\text{C}$  ( $95^{\circ}\text{F}$ ).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

### CAUTION:

Never turn ignition switch ON during soaking.

### NOTE:

The vehicle must be cooled with the hood open.

4. Start engine and let it idle for 5 minutes or more.

### CAUTION:

Never turn ignition switch OFF during idling.

5. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Proceed to [EC-722, "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Component Function Check

INFOID:000000006947903

### 1. CHECK ENGINE OIL TEMPERATURE (EOT) SENSOR

1. Turn ignition switch OFF.
2. Disconnect EOT sensor harness connector.
3. Remove EOT sensor. Refer to [EM-87, "Exploded View"](#).
4. Check resistance between EOT sensor terminals by heating with hot water as shown in the figure.

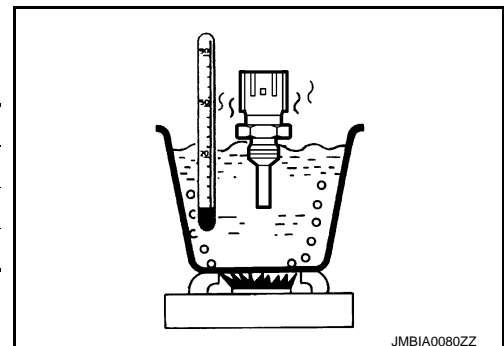
Terminals	Condition	Resistance (k $\Omega$ )	
1 and 2	Temperature [ $^{\circ}\text{C}$ ( $^{\circ}\text{F}$ )]	20 (68)	2.37 - 2.63
		50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to [EC-722, "Diagnosis Procedure"](#).

### 2. CHECK INTERMITTENT INCIDENT



# P0196 EOT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EC-722, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006947904

### 1. CHECK ENGINE OIL TEMPERATURE (EOT) SENSOR

Check EOT sensor. Refer to [EC-722, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace EOT sensor. Refer to [EM-87, "Exploded View"](#).

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006947905

### 1. CHECK ENGINE OIL TEMPERATURE (EOT) SENSOR

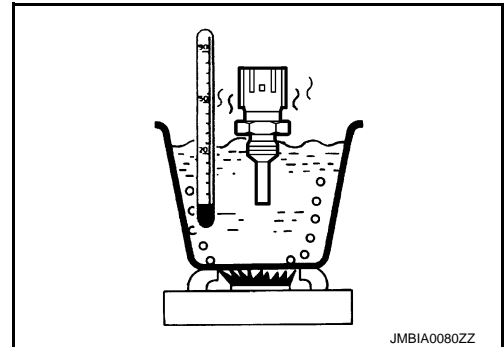
1. Turn ignition switch OFF.
2. Disconnect EOT sensor harness connector.
3. Remove EOT sensor. Refer to [EM-87, "Exploded View"](#).
4. Check resistance between EOT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (kΩ)	
1 and 2	Temperature [°C (°F)]	20 (68)	2.37 - 2.63
		50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EOT sensor. Refer to [EM-87, "Exploded View"](#).



# P0197, P0198 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0197, P0198 EOT SENSOR

### DTC Logic

INFOID:000000006948195

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC Detecting Condition	Possible Cause
P0197	EOT SEN/CIRC (Engine oil temperature sensor circuit low input)	An excessively low voltage from the engine oil temperature sensor is sent to ECM.	<ul style="list-style-type: none"> <li>• Harness or connectors (EOT sensor circuit is open or shorted.)</li> <li>• Engine oil temperature sensor</li> </ul>
P0198	EOT SEN/CIRC (Engine oil temperature sensor circuit high input)	An excessively high voltage from the engine oil temperature sensor is sent to ECM.	

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

- YES >> Proceed to [EC-723, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006948196

#### 1. CHECK ENGINE OIL TEMPERATURE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect engine oil temperature (EOT) sensor harness connector.
3. Turn ignition switch ON.
4. Check the voltage between EOT sensor harness connector and ground.

+		-	Voltage (Approx.)
EOT sensor			
Connector	Terminal		
F48	1	Ground	5 V

Is the inspection result normal?

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

#### 2. CHECK ENGINE OIL TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

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

# P0197, P0198 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

+		-		Continuity
EOT sensor		ECM		
Connector	Terminal	Connector	Terminal	
F48	1	F7	27	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

## 3.CHECK EOT SENSOR GROUND CIRCUIT

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

+		-		Continuity
EOT sensor		ECM		
Connector	Terminal	Connector	Terminal	
F48	2	F7	12	Existed

4. Also check harness for short to power.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair or replace error-detected parts.

## 4.CHECK ENGINE OIL TEMPERATURE SENSOR

Check the engine oil temperature sensor. Refer to [EC-724, "Component Inspection"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
- NO >> Replace engine oil temperature sensor. Refer to [EM-33, "Exploded View"](#).

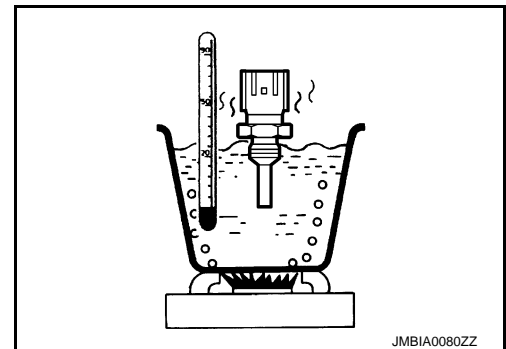
## Component Inspection

INFOID:000000006948197

### 1.CHECK ENGINE OIL TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect engine oil temperature sensor harness connector.
3. Remove engine oil temperature sensor. Refer to [EM-87, "Exploded View"](#).
4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

Engine oil temperature sensor		Condition	Resistance (kΩ)	
+	-			
Terminal				
1	2	Temperature [°C (°F)]	20 (68)	2.37 - 2.63
			50 (122)	0.68 - 1.00
			90 (194)	0.236 - 0.260



Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace engine oil temperature sensor. Refer to [EM-87, "Exploded View"](#).

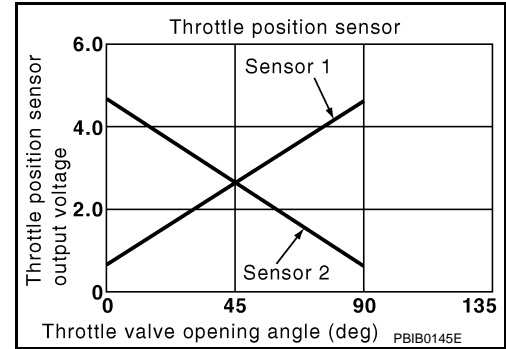
P0222, P0223 TP SENSOR

Description

INFOID:000000006952425

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

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



DTC Logic

INFOID:000000006942966

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-740, "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"> <li>Harness or connectors (TP sensor 1 circuit is open or shorted.)</li> <li>Electric throttle control actuator (TP sensor 1)</li> </ul>
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 8 V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Go to [EC-725, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006942967

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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.

## P0222, P0223 TP SENSOR

[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit 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	
F29	1	F8	33	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-727, "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 [EM-26, "Exploded View"](#).

>> INSPECTION END

### 7. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## Component Inspection

INFOID:000000006952426

### 1. CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
				Fully de- pressed	Less than 4.75V
	34 (TP sensor 2 signal)			Fully released	Less than 4.75V
				Fully de- pressed	More than 0.36V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

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# P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0300, P0301, P0302, P0303, P0304 MISFIRE

### DTC Logic

INFOID:000000006942970

#### 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, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.  
When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.  
When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.  
If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.  
When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.  
If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
- Two Trip Detection Logic (Exhaust quality deterioration)**  
For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only 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 cylinders misfire.	<ul style="list-style-type: none"><li>• Improper spark plug</li><li>• Insufficient compression</li><li>• Incorrect fuel pressure</li><li>• The fuel injector circuit is open or shorted</li><li>• Fuel injector</li><li>• Intake air leak</li><li>• The ignition signal circuit is open or shorted</li><li>• Lack of fuel</li><li>• Signal plate</li><li>• A/F sensor 1</li><li>• Incorrect PCV hose connection</li></ul>
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-729, "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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT 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)
Base fuel schedule	Base fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), 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-729, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942971

### 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

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

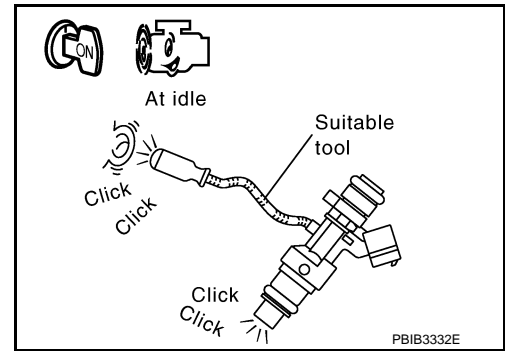
- Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to [EC-919. "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:

- During the operation, always stay 0.5 m (19.7 in) away from the spark plug and the ignition coil within. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV 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

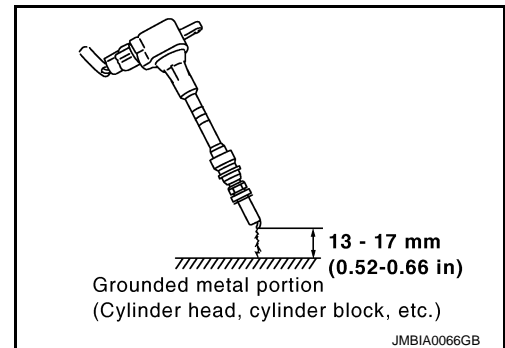
- Turn ignition switch OFF.
- Disconnect spark plug and connect a known-good spark plug.
- Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

**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-924. "Component Function Check"](#).



# P0300, P0301, P0302, P0303, P0304 MISFIRE

[MR18DE (FOR CALIFORNIA)]

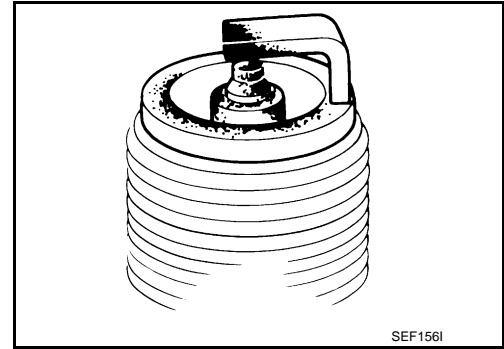
< DTC/CIRCUIT DIAGNOSIS >

## 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 [EM-114, "Spark Plug"](#).
- NO >> Repair or clean spark plug. Refer to [EM-41, "Exploded View"](#). 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 [EM-114, "Spark Plug"](#).

## 9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-21, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

## 10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Check fuel pressure. Refer to [EC-989, "Inspection"](#).

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". Refer to [FL-5, "Exploded View"](#).
- NO >> Repair or replace.

## 12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-497, "BASIC INSPECTION : Special Repair Requirement"](#). For specification, refer to [EC-993, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Follow the [EC-497, "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.
3. Disconnect ECM harness connector.
4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

# P0300, P0301, P0302, P0303, P0304 MISFIRE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

A/F sensor 1		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-631, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace A/F sensor 1. Refer to [EM-30, "Exploded View"](#).

## 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-993, "Mass Air Flow Sensor"](#).

 **With GST**

Check mass air flow sensor signal in Service \$01 with GST.

For specification, refer to [EC-993, "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-638, "DTC Logic"](#).

## 16.CHECK SYMPTOM TABLE

Check items on the rough idle symptom in [EC-977, "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 "How to Erase DTC and 1st Trip DTC" in [EC-602, "CONSULT-III Function"](#).

>> GO TO 18.

**P0300, P0301, P0302, P0303, P0304 MISFIRE**

< DTC/CIRCUIT DIAGNOSIS >

**[MR18DE (FOR CALIFORNIA)]**

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**18.CHECK INTERMITTENT INCIDENT**

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Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

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P0327, P0328 KS

Description

INFOID:000000006942972

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:000000006942973

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"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Knock sensor</li> </ul>
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 10 V 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-734, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006942974

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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.
2. Disconnect ECM harness connector.
3. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F12	2	F8	40	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.

< DTC/CIRCUIT 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	
F12	1	F8	37	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-735. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace knock sensor.

**5.CHECK INTERMITTENT INCIDENT**

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

**Component Inspection**

INFOID:000000006942975

**1.CHECK KNOCK SENSOR**

1. Turn ignition switch OFF.
2. Disconnect knock sensor harness connector.
3. Check resistance between knock sensor terminals as per the following.

**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. Refer to [EM-87. "Exploded View"](#).

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# P0335 CKP SENSOR (POS)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## P0335 CKP SENSOR (POS)

### Description

INFOID:000000006942976

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.

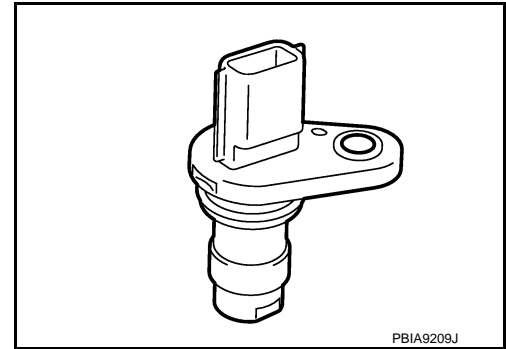
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

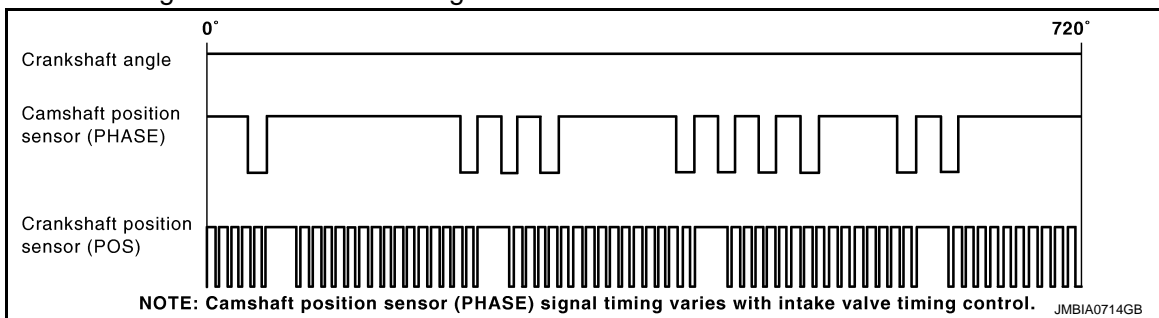
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



PBIA9209J



JMBIA0714GB

### DTC Logic

INFOID:000000006942977

#### 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"> <li>The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>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.) (Battery current sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li> <li>Crankshaft position sensor (POS)</li> <li>Refrigerant pressure sensor</li> <li>Accelerator pedal position sensor</li> <li>EVAP control system pressure sensor</li> <li>Signal plate</li> <li>Battery current sensor</li> <li>Tumble control valve position sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.**



# P0335 CKP SENSOR (POS)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2.

## 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-737, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942978

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F20	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3.CHECK 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	
F20	1	F8	75	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 4.CHECK CKP SENSOR POWER SUPPLY CIRCUIT

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

# P0335 CKP SENSOR (POS)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	69	Tumble control valve actuator	F22	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-780, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> 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	
F20	2	F8	62	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.

# P0335 CKP SENSOR (POS)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

CKP sensor (POS)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F20	3	F8	61	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-739, "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?

YES >> GO TO 12.

NO >> Replace the signal plate.

## 12.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942979

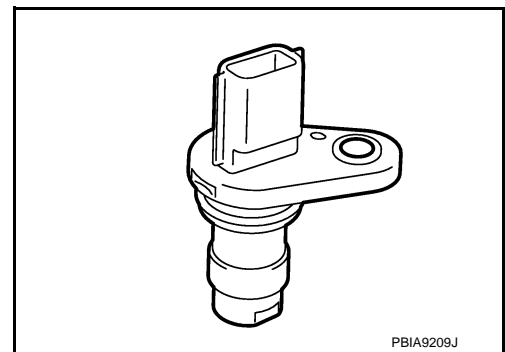
### 1.CHECK CRANKSHAFT POSITION SENSOR (POS)-I

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. Refer to [EM-87, "Exploded View"](#).
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).



### 2.CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as per the following.

Terminals (Polarity)	Resistance [ $\Omega$ at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace crankshaft position sensor (POS). Refer to [EM-87, "Exploded View"](#).

# P0340 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0340 CMP SENSOR (PHASE)

### Description

INFOID:000000006942980

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.

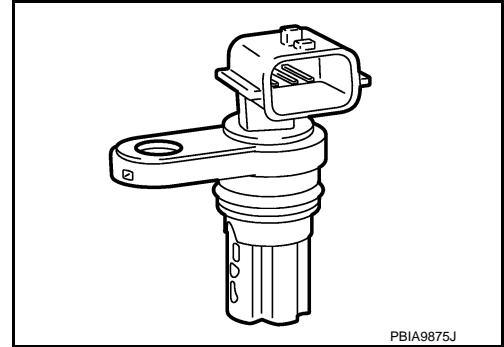
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

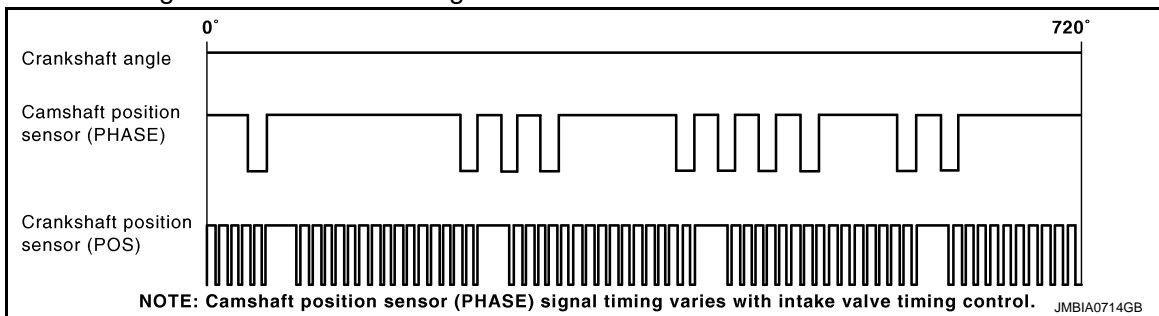
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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.



PBIA9875J



### DTC Logic

INFOID:000000006942981

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-824, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> <li>The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> <li>The cylinder No. signal is not sent to ECM during engine running.</li> <li>The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> <li>Camshaft (INT)</li> <li>Starter motor</li> <li>Starting system circuit</li> <li>Dead (Weak) battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V 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 CMP SENSOR (PHASE)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is 1st trip DTC detected?

- YES >> Go to [EC-741, "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-741, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942982

### 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-2, "Work Flow"](#)).

### 2.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
F26	1	Ground	Approx. 5 V

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	
F26	2	F8	63	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.

# P0340 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F26	3	F8	65	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-742. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54. "Exploded View"](#).

## 7. CHECK CAMSHAFT (INT)

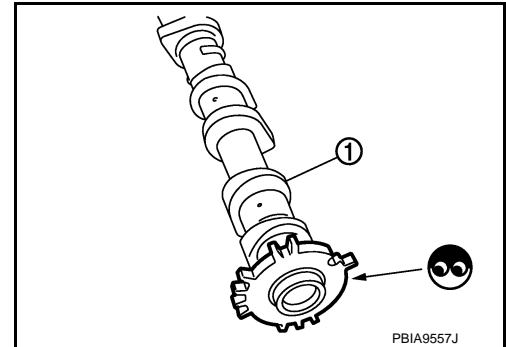
Check the following.

- 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. Refer to [EM-54. "Exploded View"](#).



## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942983

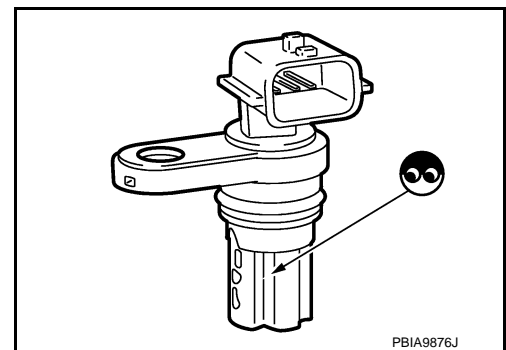
### 1. CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

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. Refer to [EM-54. "Exploded View"](#).
5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54. "Exploded View"](#).



### 2. CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as per the following.

# P0340 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Terminals (Polarity)	Resistance [ $\Omega$ at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	

A

EC

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

C

D

E

F

G

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P

# P0420 THREE WAY CATALYST FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0420 THREE WAY CATALYST FUNCTION

### DTC Logic

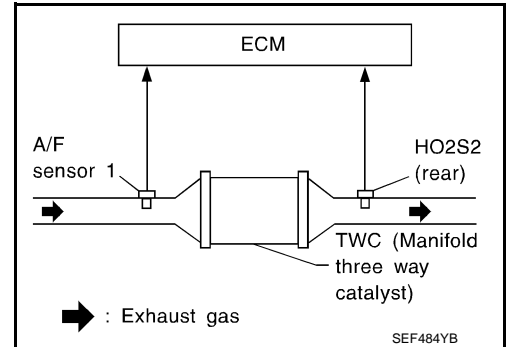
INFOID:000000006942984

#### 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"> <li>Three way catalyst (manifold) does not operate properly.</li> <li>Three way catalyst (manifold) does not have enough oxygen storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Three way catalyst (manifold)</li> <li>Exhaust tube</li> <li>Intake air leaks</li> <li>Fuel injector</li> <li>Fuel injector leaks</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul>

#### 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 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" indication is more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 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

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT 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-745. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## 7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-745. "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-745. "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006942985

## 1.PERFORM COMPONENT FUNCTION CHECK

### Without 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. Open engine hood.
6. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F8	50 (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-745. "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006942986

## 1.CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

# P0420 THREE WAY CATALYST FUNCTION

[MR18DE (FOR CALIFORNIA)]

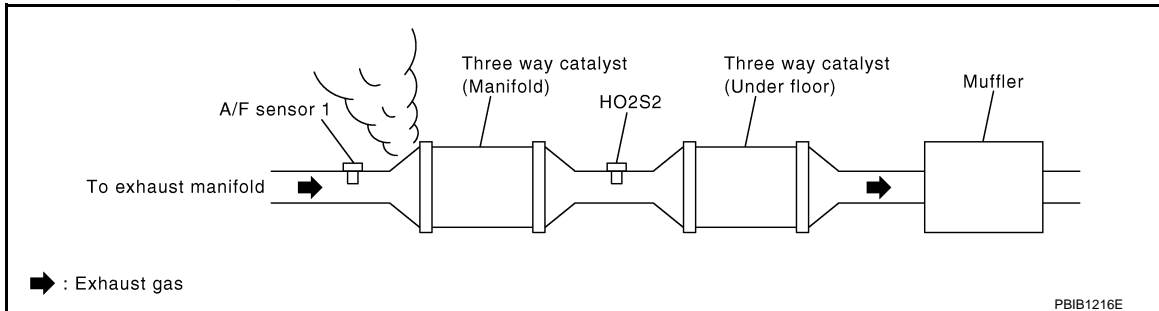
< DTC/CIRCUIT DIAGNOSIS >

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 IDLE SPEED AND IGNITION TIMING

For procedure, refer to [EC-501, "IGNITION TIMING : Special Repair Requirement"](#).  
For specification, refer to [EC-993, "Idle Speed"](#) and [EC-993, "Ignition Timing"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Follow the instruction of [EC-497, "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		
F7	25	Ground	Battery voltage
	29		
	30		
	31		

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Perform [EC-918, "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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT 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:

- During the operation, always stay 0.5 m (19.7 in) away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV 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?

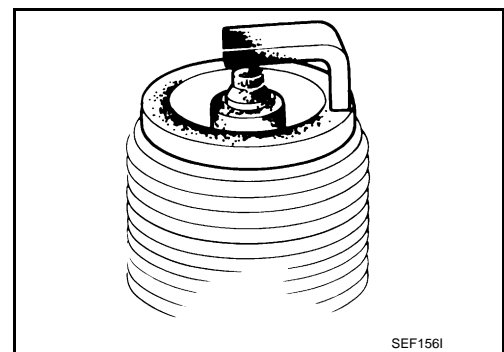
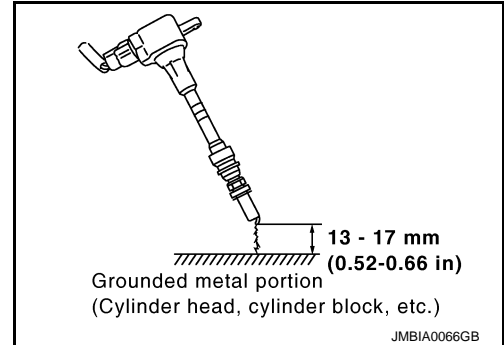
- YES >> GO TO 8.  
NO >> Check ignition coil, power transistor and their circuits. Refer to [EC-924. "Diagnosis Procedure"](#).

## 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 [EM-114. "Spark Plug"](#).  
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

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT 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 [EM-114, "Spark Plug"](#).

### 10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF. Refer to [EM-36, "Removal and Installation"](#).
2. Remove fuel injector assembly.  
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. Refer to [EM-36, "Exploded View"](#).

### 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace three way catalyst assembly. Refer to [EX-5, "Exploded View"](#).

NO >> Repair or replace harness or connector

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0441 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006942987

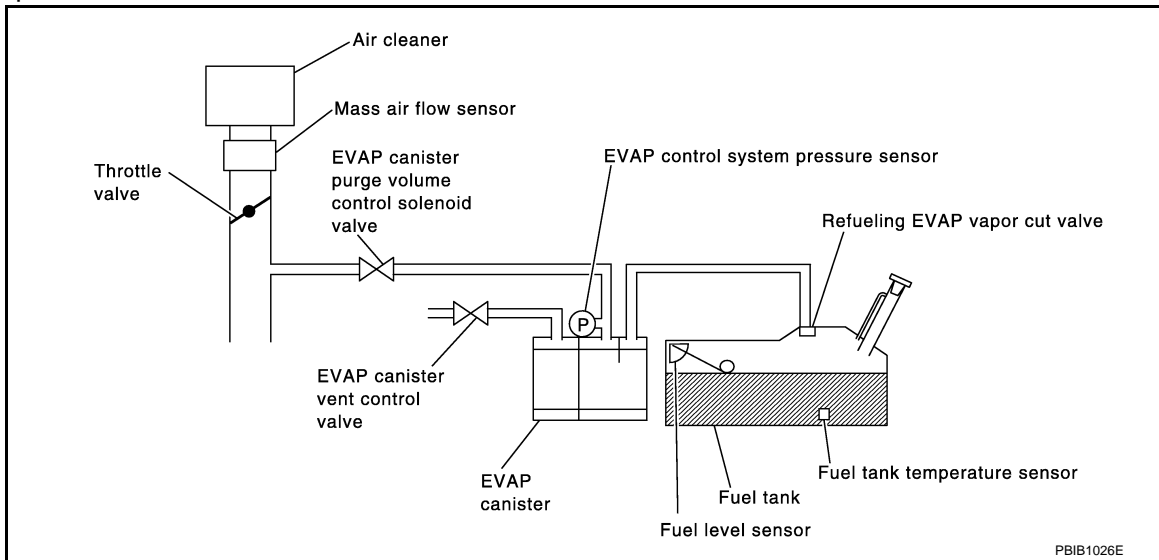
#### DTC DETECTION LOGIC

**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"> <li>• EVAP canister purge volume control solenoid valve stuck closed</li> <li>• EVAP control system pressure sensor and the circuit</li> <li>• Loose, disconnected or improper connection of rubber tube</li> <li>• Blocked rubber tube</li> <li>• Cracked EVAP canister</li> <li>• EVAP canister purge volume control solenoid valve circuit</li> <li>• Accelerator pedal position sensor</li> <li>• Blocked purge port</li> <li>• EVAP canister vent control valve</li> <li>• Drain filter</li> </ul>

#### 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.

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 3.

### 3. PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. 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.

NO >> 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-751, "Diagnosis Procedure"](#).

### 6. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-750, "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-751, "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006942988

### 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 and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

5. Set voltmeter probes to ECM harness connector and ground.

ECM		Ground
Connector	Terminal	
F8	42 (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
Selector lever	Any position other than P, N or R

8. Verify that EVAP control system pressure sensor value stays 0.1 V 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-751, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006942989

### 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. Refer to [FL-14, "Exploded View"](#).

### 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-565, "System Description"](#).  
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 C/V" opening and check vacuum existence.

PURG VOL C/V	Vacuum
100%	Existed
0%	Not existed

Is the inspection result normal?

- YES >> GO TO 7.  
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.

## P0441 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

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-565, "System Description"](#).
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

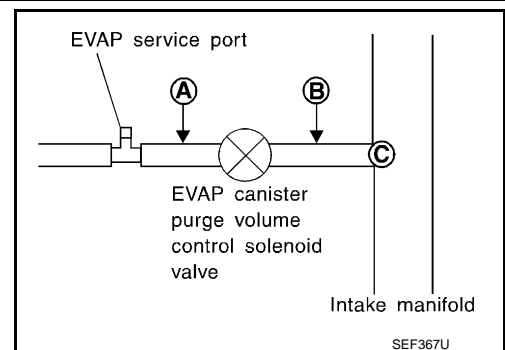
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.  
Refer to [EC-565, "System Description"](#).

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair it.

### 5.CHECK EVAP PURGE HOSE AND PURGE PORT

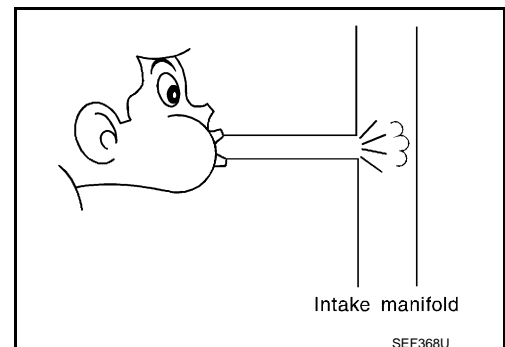
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



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.



# P0441 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## 7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-765, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

## 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. Refer to [FL-14, "Exploded View"](#).

## 9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-781, "DTC Logic"](#) for DTC P0452, [EC-786, "DTC Logic"](#) for DTC P0453.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 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 DRAIN FILTER

Refer to [EC-754, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace drain filter. [EC-565, "System Description"](#)

## 12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-772, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).

## 13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-991, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace it.

## 14. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

## 15. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> INSPECTION END

## Component Inspection (Drain filter)

INFOID:000000006942990

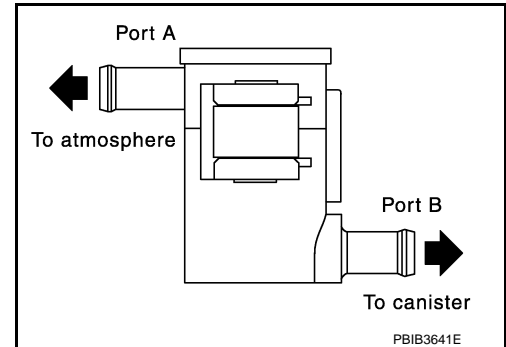
### 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).



# P0442 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0442 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006942991

#### DTC DETECTION LOGIC

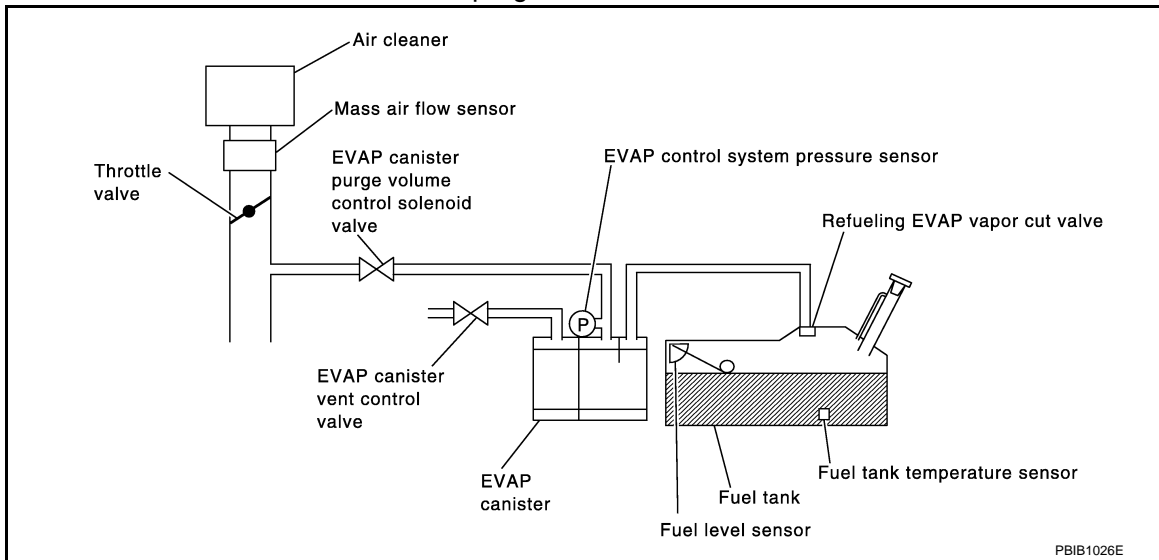
**NOTE:**

If DTC P0442 is displayed with DTC P0456, first perform the trouble diagnosis for DTC P0456. Refer to [EC-798, "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"> <li>• Incorrect fuel tank vacuum relief valve</li> <li>• Incorrect fuel filler cap used</li> <li>• Fuel filler cap remains open or fails to close.</li> <li>• Foreign matter caught in fuel filler cap.</li> <li>• Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>• Foreign matter caught in EVAP canister vent control valve.</li> <li>• EVAP canister or fuel tank leaks</li> <li>• EVAP purge line (pipe and rubber tube) leaks</li> <li>• EVAP purge line rubber tube bent</li> <li>• Loose or disconnected rubber tube</li> <li>• EVAP canister vent control valve and the circuit</li> <li>• EVAP canister purge volume control solenoid valve and the circuit</li> <li>• Fuel tank temperature sensor</li> <li>• O-ring of EVAP canister vent control valve is missing or damaged</li> <li>• EVAP canister is saturated with water</li> <li>• EVAP control system pressure sensor</li> <li>• Fuel level sensor and the circuit</li> <li>• Refueling EVAP vapor cut valve</li> <li>• ORVR system leaks</li> <li>• Drain filter</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

# P0442 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- 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

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 "EVP 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 the CONSULT-III screen, go to [EC-497, "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

- OK >> INSPECTION END
- NG >> Go to [EC-756, "Diagnosis Procedure"](#).

### 3. PERFORM COMPONENT FUNCTION CHECK

#### With GST

#### NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-507, "SRT Set Driving Pattern"](#) 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-751, "Diagnosis Procedure"](#).
- YES-2 >> P0442: Go to [EC-756, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942992

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

# P0442 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

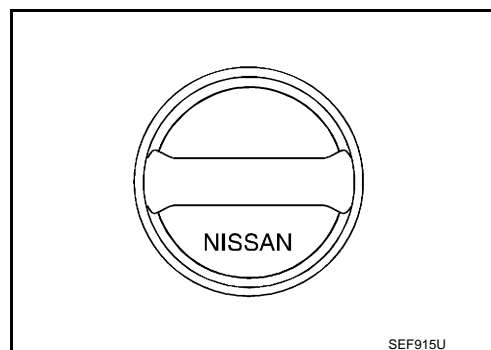
< DTC/CIRCUIT DIAGNOSIS >

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-760, "Component Inspection \(Fuel filler cap\)"](#).

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-991, "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

## 6. CHECK DRAIN FILTER

Refer to [EC-760, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).

## 7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.

Refer to [FL-14, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-772, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Exploded View"](#).

## 8. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

# P0442 EVAP CONTROL SYSTEM

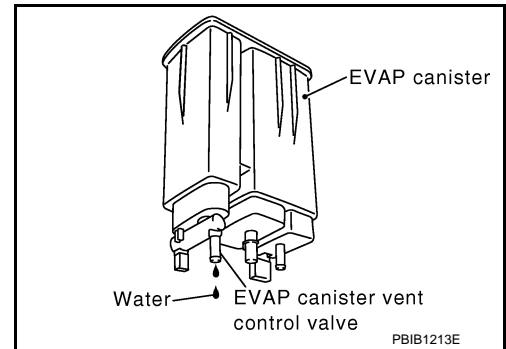
[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

2. Does water drain from the EVAP canister?

Does water drain from the EVAP canister?

- YES >> GO TO 9.
- NO-1 >> With CONSULT-III: GO TO 11.
- NO-2 >> Without CONSULT-III: GO TO 12.



## 9. 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 1.9 kg (4.2 lb).**

Is the inspection result normal?

- YES-1 >> With CONSULT-III: GO TO 11.
- YES-2 >> Without CONSULT-III: GO TO 12.
- NO >> GO TO 10.

## 10. 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. Refer to [FL-14, "Exploded View"](#).

## 11. 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 C/V" opening to 100%.
5. Check vacuum hose for vacuum.

**Vacuum should exist.**

Is the inspection result normal?

- YES >> GO TO 14.
- NO >> GO TO 13.

## 12. 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 13.

## 13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-565, "System Description"](#).

Is the inspection result normal?

# P0442 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 14.  
NO >> Repair or reconnect the hose.

## 14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-765, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

## 15. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-714, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

## 16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-778, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 17. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-565, "System Description"](#).

Is the inspection result normal?

- YES >> GO TO 18.  
NO >> Repair or reconnect the hose.

## 18. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 19.

## 19. 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-930, "Description"](#).

Is the inspection result normal?

- YES >> GO TO 20.  
NO >> Repair or replace hoses and tubes.

## 20. CHECK RECIRCULATION LINE

Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

Is the inspection result normal?

- YES >> GO TO 21.  
NO >> Repair or replace hose, tube or fuel filler tube.

## 21. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-933, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 22.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## 22. CHECK FUEL LEVEL SENSOR

Refer to [MWI-42, "Component Function Check"](#).

Is the inspection result normal?

- YES >> GO TO 23.

# P0442 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

## 23.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

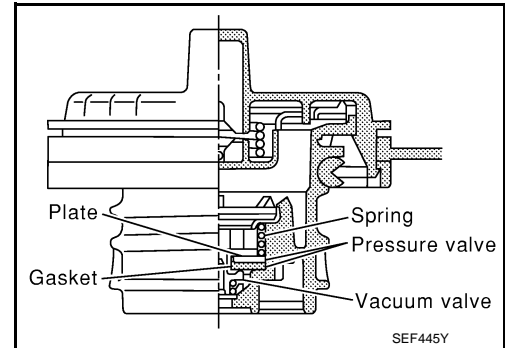
>> INSPECTION END

### Component Inspection (Fuel filler cap)

INFOID:000000006942993

#### 1.CHECK FUEL FILLER CAP

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
5. Check valve opening pressure and vacuum.

**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

#### 2.REPLACE FUEL FILLER CAP

Replace fuel filler cap.

**CAUTION:**

**Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.**

>> INSPECTION END

### Component Inspection (Drain filter)

INFOID:000000006952427

#### 1.CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.



# P0442 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

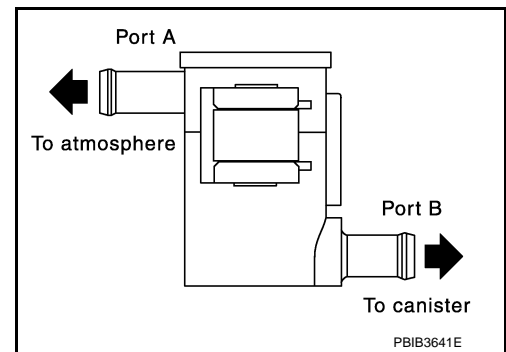
## < DTC/CIRCUIT DIAGNOSIS >

4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).



A

EC

C

D

E

F

G

H

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P

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

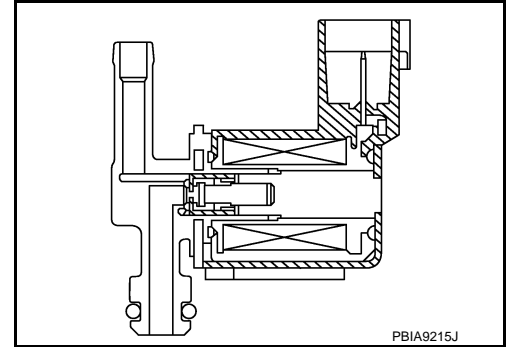
[MR18DE (FOR CALIFORNIA)]

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Description

INFOID:000000006942995

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### DTC Logic

INFOID:000000006942996

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0443	EVAP canister purge volume control solenoid valve	A	The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"><li>• EVAP control system pressure sensor</li><li>• EVAP canister purge volume control solenoid valve (The valve is stuck open.)</li><li>• EVAP canister vent control valve</li><li>• EVAP canister</li><li>• Hoses (Hoses are connected incorrectly or clogged.)</li></ul>
		B	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

### 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 CONFIRMATION PROCEDURE when the fuel is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

#### Do you have CONSULT-III

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

#### 2. PERFORM DTC CONFIRMATION PROCEDURE A

##### Ⓜ With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that the following condition are met.  
FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to [EC-763, "Diagnosis Procedure"](#).  
NO >> GO TO 3.

#### 3. PERFORM DTC CONFIRMATION PROCEDURE B

##### Ⓜ With CONSULT-III

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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-763. "Diagnosis Procedure"](#).

## 4.PERFORM DTC CONFIRMATION PROCEDURE A

### With GST

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

ECM		Ground	Voltage (V)
Connector	Terminal		
F8	43 (Fuel tank temperature sensor signal)	Ground	3.1 - 4.0

3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-763. "Diagnosis Procedure"](#).  
NO >> GO TO 5.

## 5.PERFORM DTC CONFIRMATION PROCEDURE

### 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 detected?

- YES >> Go to [EC-763. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006942997

## 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		
F32	1	Ground	Battery voltage

Is the inspection result normal?

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

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E14
- 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	
F32	2	F7	9	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.

**Water should not exist.**

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "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. Refer to [FL-14, "Exploded View"](#).

## 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-765, "Component Inspection"](#).

Is the inspection result normal?

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 8.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [FL-14, "Exploded View"](#).

## 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-772, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).

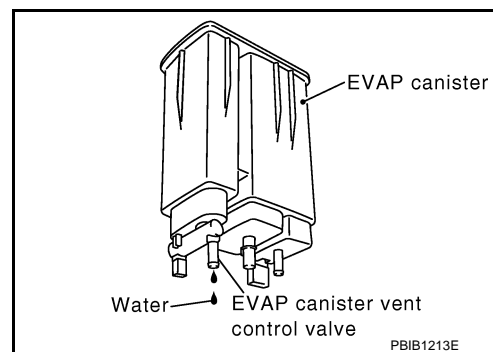
## 10. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

YES >> GO TO 11.

NO >> GO TO 13.



## 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 1.9 kg (4.2 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. Refer to [FL-14, "Exploded View"](#).

## 13. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006942998

## 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.

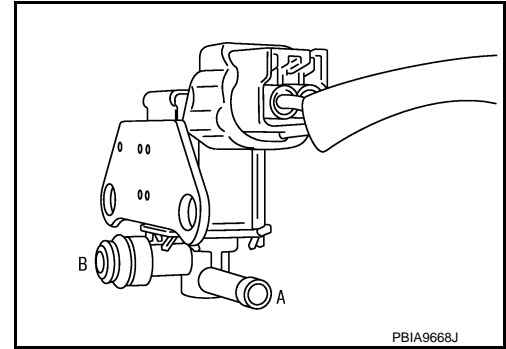
# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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 C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed

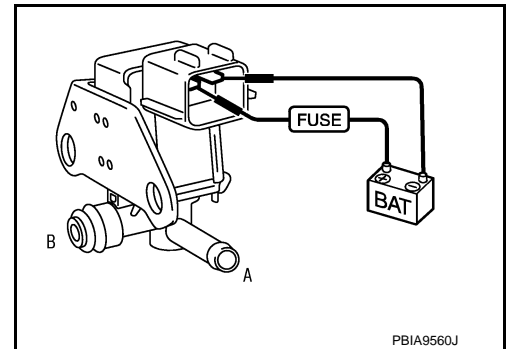


PBIA9668J

### ⊗ 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)
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed



PBIA9560J

### Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

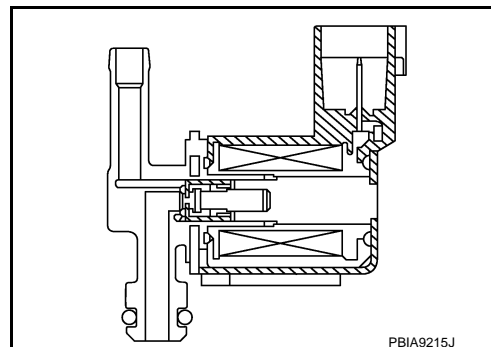
[MR18DE (FOR CALIFORNIA)]

## P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Description

INFOID:000000006952429

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### DTC Logic

INFOID:000000006943000

### 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"> <li>Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>
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"> <li>Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control solenoid valve</li> </ul>

### 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 11 V at idle.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for at least 13 seconds.
- Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-767. "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943001

#### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister purge volume control solenoid valve harness connector.
- Turn ignition switch ON.
- Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F32	1	Ground	Battery voltage

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 E14
- Harness connectors E8, F1
- 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	
F32	2	F7	9	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-769, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

## 6. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END



# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## Component Inspection

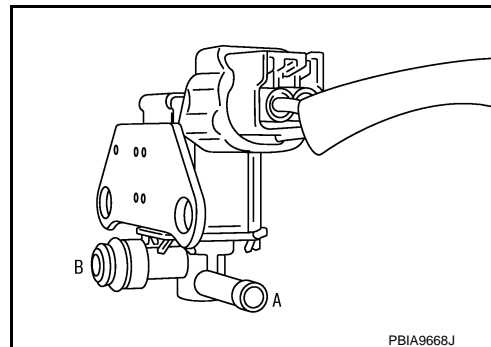
INFOID:000000006952428

### 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 C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

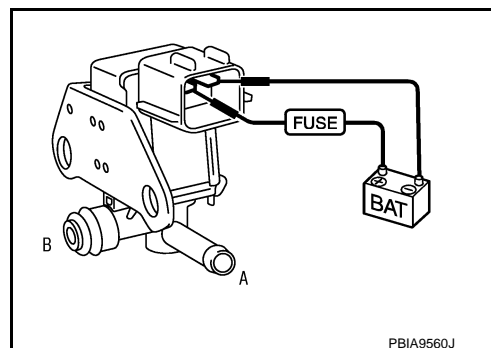
Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed



#### ☒ 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)
12 V direct current supply between terminals 1 and 2	Existed
No supply	Not existed



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

# P0447 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0447 EVAP CANISTER VENT CONTROL VALVE

### Description

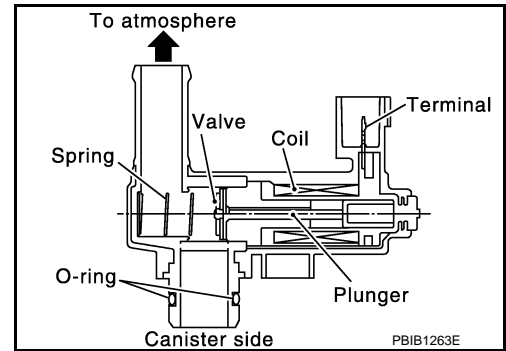
INFOID:000000006943003

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:000000006943004

### 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"><li>• Harness or connectors (The valve circuit is open or shorted.)</li><li>• EVAP canister vent control valve</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

**Before performing the following procedure, confirm battery voltage is more than 11 V 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-770, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943005

#### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (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		
B20	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 E8, F1
- Harness connectors E105, M77
- Harness connectors B1, M18
- 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	
B20	2	F7	28	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 E8, F1
- Harness connectors E105, M77
- Harness connectors M79, B4
- 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?

# P0447 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 8.
- NO >> Clean the rubber tube using an air blower.

### 8.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-772. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace EVAP canister vent control valve. Refer to [FL-14. "Exploded View"](#).

### 9.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

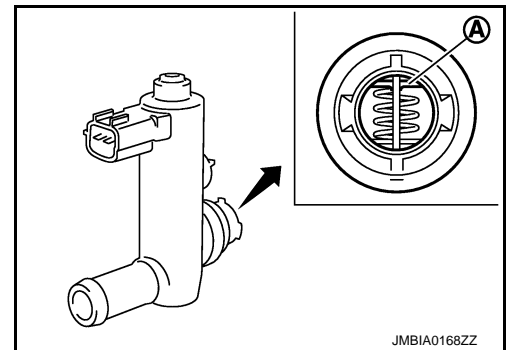
INFOID:000000006943006

### 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 (A) of EVAP canister vent control valve for being rusted.

Is it rusted?

- YES >> Replace EVAP canister vent control valve. Refer to [FL-14. "Exploded View"](#).
- 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.**

VENT CONT/V condition	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.

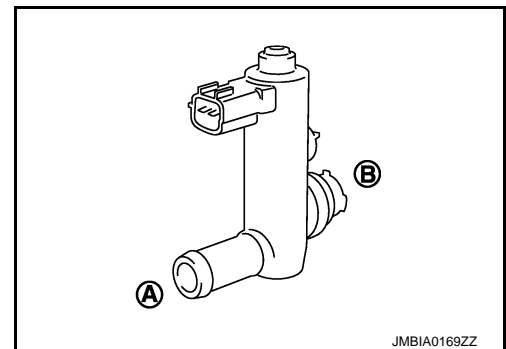
**Make sure new O-ring is installed properly.**

Condition	Air passage continuity between (A) and (B)
12 V 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. Refer to [FL-14. "Exploded View"](#).



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# P0447 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## 3. CHECK EVAP CANISTER VENT CONTROL VALVE-III

### ☑ 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.**

VENT CONT/V condition	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.**

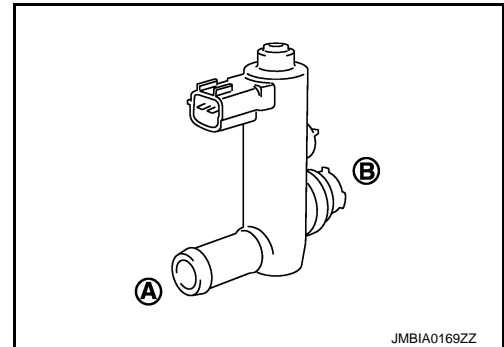
Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).



A  
EC  
C  
D  
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P

# P0448 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0448 EVAP CANISTER VENT CONTROL VALVE

### Description

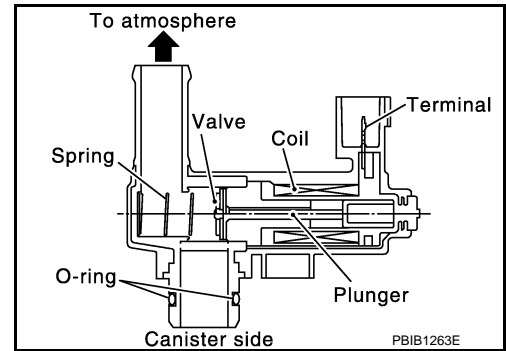
INFOID:000000006952431

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:000000006943008

### 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"><li>• EVAP canister vent control valve</li><li>• EVAP control system pressure sensor and the circuit</li><li>• Blocked rubber tube to EVAP canister vent control valve</li><li>• EVAP canister is saturated with water</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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

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.

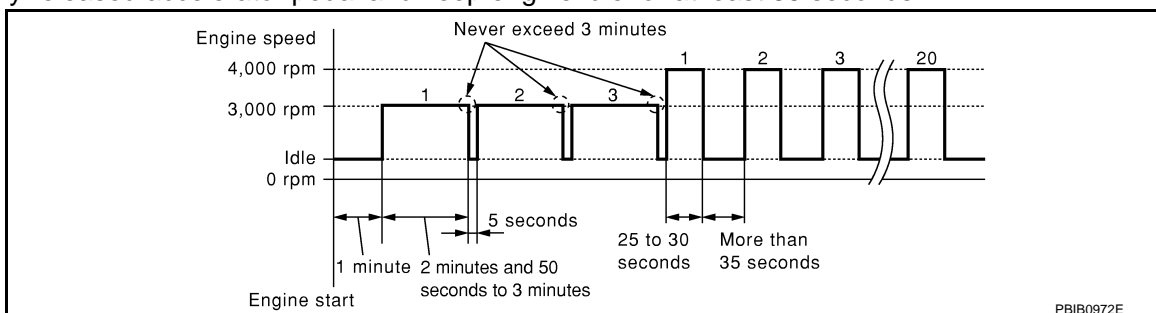
- Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. Repeat next procedure 20 times.
    - Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

# P0448 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT 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-775, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943009

### 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-776, "Component Inspection"](#).

#### Is the inspection result normal?

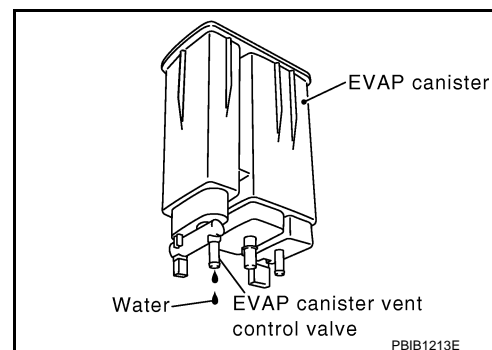
- YES >> GO TO 3.
- NO >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).

### 3. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

#### Does water drain from 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 1.9 kg (4.2 lb).**

#### Is the inspection result normal?

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

### 5. DETECT MALFUNCTIONING PART

# P0448 EVAP CANISTER VENT CONTROL VALVE

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT 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. Refer to [FL-14, "Exploded View"](#).

## 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. Refer to [FL-14, "Exploded View"](#).

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952430

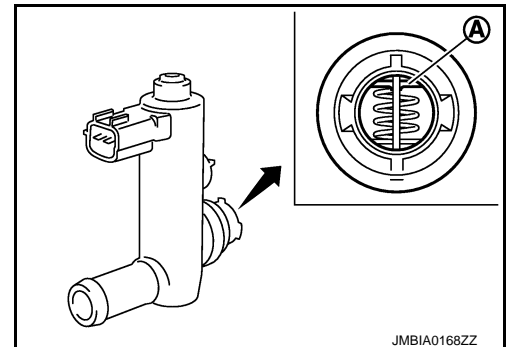
### 1. CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Turn ignition switch OFF.
2. Remove EVAP canister vent control valve from EVAP canister.
3. Check portion (A) of EVAP canister vent control valve for being rusted.

Is it rusted?

YES >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).

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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

4. Check air passage continuity and operation delay time.  
**Make sure new O-ring is installed properly.**

VENT CONT/V condition	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)
12 V 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. Refer to [FL-14. "Exploded View"](#).

## 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.**

VENT CONT/V condition	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.**

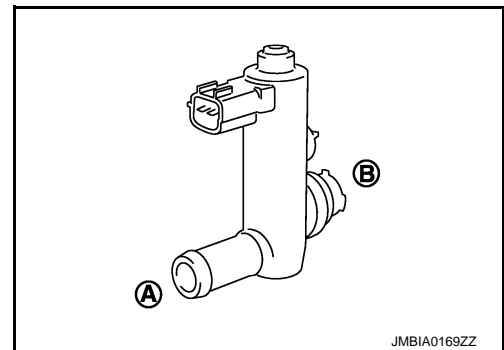
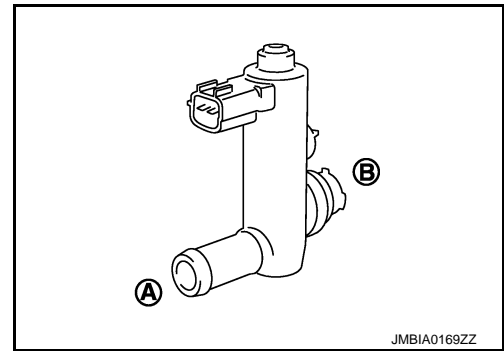
Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	Not existed
OFF	Existed

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to [FL-14. "Exploded View"](#).



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# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

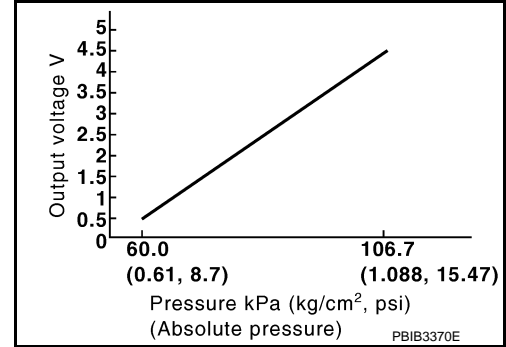
[MR18DE (FOR CALIFORNIA)]

## P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006943011

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:000000006943012

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• Battery current sensor</li> <li>• Tumble control valve position sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> 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-779, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006943013

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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		
B21	3	Ground	Approx. 5 V

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
F8	69	Tumble control valve actuator	F22	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
	71	Battery current sensor	F53	1
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842. "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-739. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937. "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876. "Component Inspection"](#).)

Is the inspection result normal?

# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 6.  
NO >> Replace malfunctioning component.

## 6. CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

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

## 7. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

## 9. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006943014

## 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 <sup>2</sup> , psi)]	
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

### CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

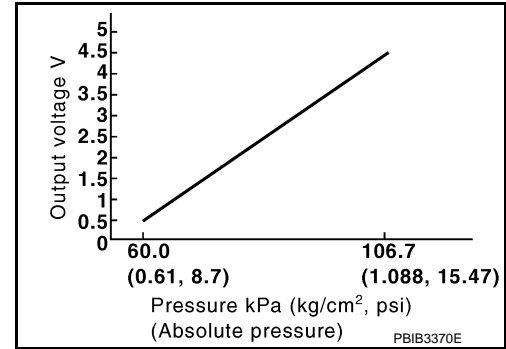
[MR18DE (FOR CALIFORNIA)]

## P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006952433

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:000000006943016

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• Battery current sensor</li> <li>• Tumble control valve position sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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" indication is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.

##### With GST

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes to ECM harness connector and ground as per the following.

ECM		Ground
Connector	Terminal	
F8	43 (Fuel tank temperature sensor signal)	Ground

3. Make sure that the voltage is less than 4.2 V.
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-782, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943017

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
B21	3	Ground	Approx. 5 V

#### 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.

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
B21	3	F8	76	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

## 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 CIRCUIT

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-739, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

## 8.CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

## 9.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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	
B21	1	F8	51	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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	
B21	2	F8	42	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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-780. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14. "Exploded View"](#).

## 15. CHECK INTERMITTENT INCIDENT



# P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952432

A

EC

### 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 [Applied vacuum kPa (kg/cm <sup>2</sup> , psi)]	Voltage
Connector	Terminal		
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14. "Exploded View"](#).

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# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

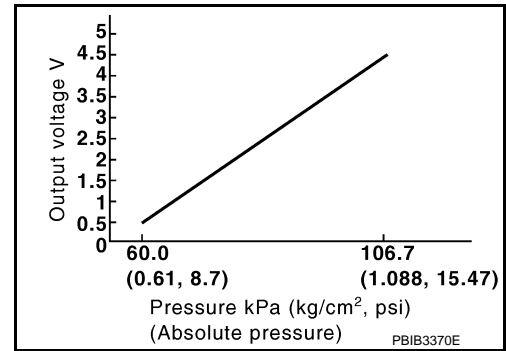
[MR18DE (FOR CALIFORNIA)]

## P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

### Description

INFOID:000000006952434

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:000000006943020

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• EVAP canister vent control valve</li> <li>• EVAP canister</li> <li>• Rubber hose from EVAP canister vent control valve to vehicle frame</li> <li>• Battery current sensor</li> <li>• Tumble control valve position sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

**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" indication is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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 per the following.

ECM		Ground
Connector	Terminal	
F8	43 (Fuel tank temperature sensor signal)	Ground

3. Make sure that the voltage is less than 4.2 V.
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-787, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943021

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
B21	3	Ground	Approx. 5 V

### 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.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
B21	3	F8	76	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

## 5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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 CIRCUIT

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-739, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning component.

## 8.CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

## 9.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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	
B21	1	F8	51	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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	
B21	2	F8	42	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 B4, M79
- Harness connectors M77, E105
- Harness connectors E8, F1
- 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.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## 15. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-772, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace EVAP canister vent control valve. Refer to [FL-14, "Exploded View"](#).

## 16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

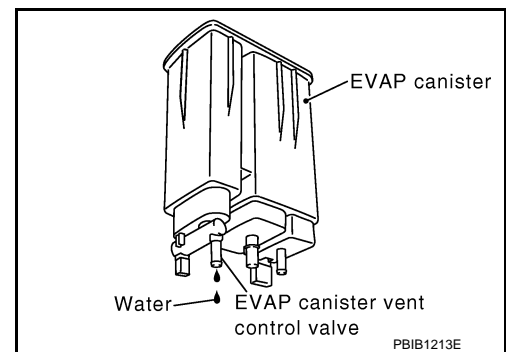
## 17. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Does water drain from 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 1.9 kg (4.2 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. Refer to [FL-14, "Exploded View"](#).

## 20. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952435

### 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.

# P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Condition	Voltage
Connector	Terminal	[Applied vacuum kPa (kg/cm <sup>2</sup> , psi)]	
F8	42 (EVAP control system pressure sensor signal)	Not applied	1.8 - 4.8 V
		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

A

EC

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# P0455 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

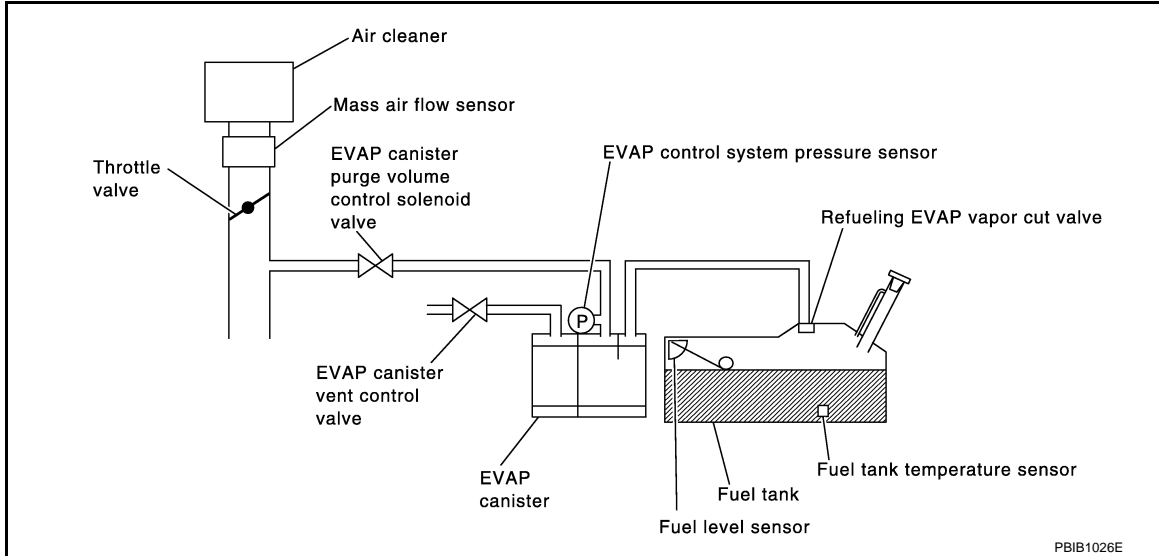
## P0455 EVAP CONTROL SYSTEM

### DTC Logic

INFOID:000000006943023

#### 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"> <li>Fuel filler cap remains open or fails to close.</li> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent control valve.</li> <li>EVAP canister or fuel tank leaks</li> <li>EVAP purge line (pipe and rubber tube) leaks</li> <li>EVAP purge line rubber tube bent.</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister vent control valve and the circuit</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister vent control valve is missing or damaged.</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leaks</li> <li>Drain filter</li> </ul>

#### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may 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



# P0455 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## CAUTION:

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 - 30°C (32 - 86°F)**
6. Select "EVP 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-497. "BASIC INSPECTION : Special Repair Requirement"](#).

Which is displayed on CONSULT-III screen?

OK >> INSPECTION END

NG >> GO TO 3.

## 3.CHECK DTC

Check DTC.

Which DTC is detected?

P0455 >> Go to [EC-793. "Diagnosis Procedure"](#).

P0442 >> Go to [EC-756. "Diagnosis Procedure"](#).

## 4.PERFORM DTC CONFIRMATION PROCEDURE

### With GST

### NOTE:

Be sure to read the explanation of DRIVING PATTERN in [EC-507. "SRT Set Driving Pattern"](#) 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-793. "Diagnosis Procedure"](#).

YES-2 >> P0442: Go to [EC-756. "Diagnosis Procedure"](#).

YES-3 >> P0441: Go to [EC-751. "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943024

## 1.CHECK FUEL FILLER CAP DESIGN

# P0455 EVAP CONTROL SYSTEM

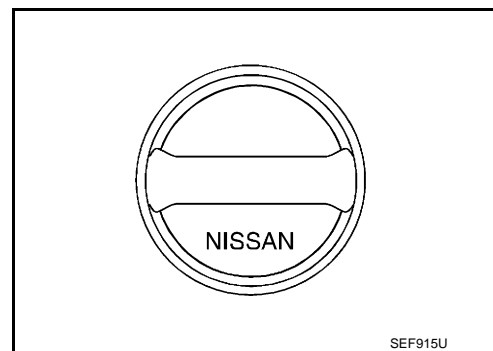
[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT 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. 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-796. "Component Inspection \(Fuel filler cap\)".](#)

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-565. "System Description".](#)

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 DRAIN FILTER

Refer to [EC-797. "Component Inspection \(Drain filter\)".](#)

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> Replace drain filter. Refer to [EC-565. "System Description".](#)

## 8.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly.  
Refer to [FL-14. "Exploded View".](#)
- EVAP canister vent control valve.  
Refer to [EC-772. "Component Inspection".](#)

# P0455 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Exploded View"](#).

## 9. CHECK FOR EVAP LEAK

Refer to [EC-991, "Inspection"](#).

Is there any leak in EVAP line?

YES >> Repair or replace.

NO-1 >> With CONSULT-III: GO TO 10.

NO-2 >> Without CONSULT-III: GO TO 11.

## 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 C/V" opening to 100%.
5. Check vacuum hose for vacuum.

**Vacuum should exist.**

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

## 11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**Without CONSULT-III**

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-565, "System Description"](#).

Is the inspection result normal?

YES-1 >> With CONSULT-III: GO TO 13.

YES-2 >> Without CONSULT-III: GO TO 14.

NO >> Repair or reconnect the hose.

## 13. 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 15.

NO >> GO TO 14.

## 14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-765, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

## P0455 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

### 15. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-714, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

### 16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

### 17. 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-930, "Description"](#).

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace hoses and tubes.

### 18. CHECK RECIRCULATION LINE

Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

Is the inspection result normal?

YES >> GO TO 19.

NO >> Repair or replace hose, tube or fuel filler tube.

### 19. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-933, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

YES >> GO TO 20.

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

### 20. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

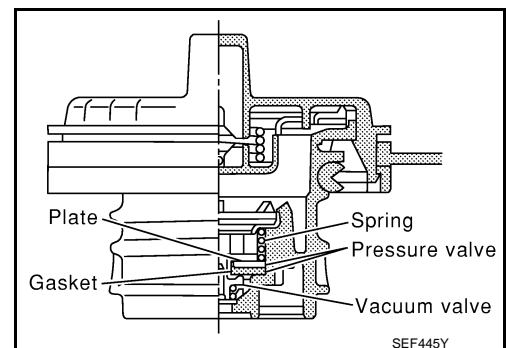
>> INSPECTION END

## Component Inspection (Fuel filler cap)

INFOID:000000006952436

### 1. CHECK FUEL FILLER CAP

1. Turn ignition switch OFF.
2. Remove fuel filler cap.
3. Wipe clean valve housing.



# P0455 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
5. Check valve opening pressure and vacuum.

**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

## 2. REPLACE FUEL FILLER CAP

Replace fuel filler cap.

### CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END

## Component Inspection (Drain filter)

INFOID:000000006952437

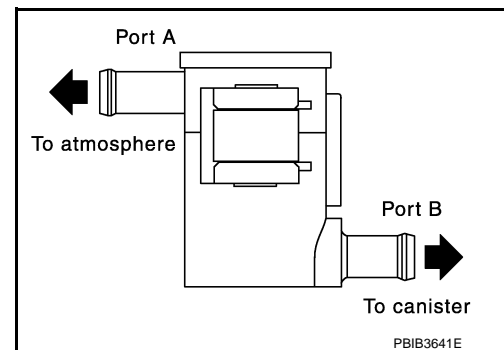
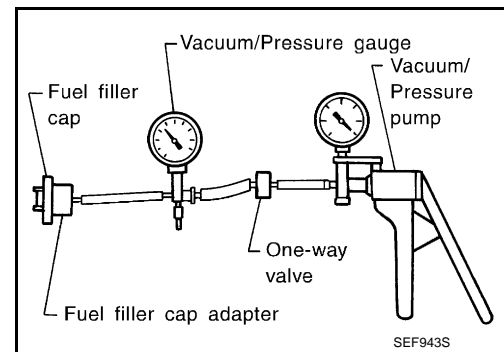
### 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace drain filter. Refer to [EC-565. "System Description"](#).



# P0456 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0456 EVAP CONTROL SYSTEM

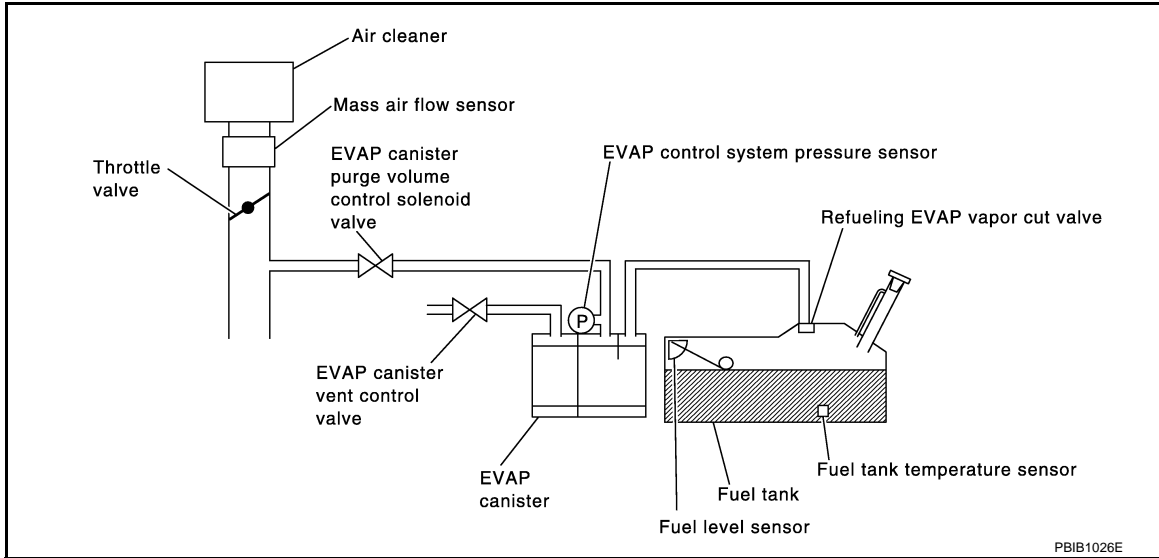
### DTC Logic

INFOID:000000006947913

### DTC DETECTION LOGIC

This diagnosis detects leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the negative pressure caused by decrease of fuel temperature in the fuel tank after turning ignition switch OFF.

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 leak	<ul style="list-style-type: none"> <li>• EVAP system has a leak.</li> <li>• EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect fuel tank vacuum relief valve</li> <li>• Incorrect fuel filler cap used</li> <li>• Fuel filler cap remains open or fails to close.</li> <li>• Foreign matter caught in fuel filler cap.</li> <li>• Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>• Foreign matter caught in EVAP canister vent control valve.</li> <li>• EVAP canister or fuel tank leaks</li> <li>• EVAP purge line (pipe and rubber tube) leaks</li> <li>• EVAP purge line rubber tube bent</li> <li>• Loose or disconnected rubber tube</li> <li>• EVAP canister vent control valve and the circuit</li> <li>• EVAP canister purge volume control solenoid valve and the circuit</li> <li>• Fuel tank temperature sensor</li> <li>• O-ring of EVAP canister vent control valve is missing or damaged</li> <li>• EVAP canister is saturated with water</li> <li>• EVAP control system pressure sensor</li> <li>• Refueling EVAP vapor cut valve</li> <li>• ORVR system leaks</li> <li>• Fuel level sensor and the circuit</li> <li>• Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may 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

# P0456 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 1. PRECONDITIONING

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

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

Do you have CONSULT-III?

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

## 2. PERFORM DTC CONFIRMATION PROCEDURE-I

 **With CONSULT-III**

1. Turn ignition switch ON and select "EVAP DIAG READY" in "DATA MONITOR" mode with CONSULT-III.
2. Start engine and wait at idle until "OFF" of "EVAP DIAG READY" changes to "ON".

**NOTE:**

**It will take at most 2 hours until "OFF" of "EVAP DIAG READY" changes to "ON".**

3. Turn ignition switch OFF and wait at least 90 minutes.

**NOTE:**

**Never turn ignition switch ON during 90 minutes.**

4. Turn ignition switch ON and select "EVAP LEAK DIAG" in "DATA MONITOR" mode with CONSULT-III.
5. Check that "EVAP LEAK DIAG" indication.

Which is displayed on CONSULT-III?

- CMPLT >> GO TO 3.  
YET >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 1.

## 3. PERFORM DTC CONFIRMATION PROCEDURE-II

Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-799, "Diagnosis Procedure"](#).  
NO >> INSPECTION END.

## 4. PERFORM DTC CONFIRMATION PROCEDURE

 **With GST**

1. Start engine and wait engine idle for at least 2 hours.
2. Turn ignition switch OFF and wait at least 90 minutes.

**NOTE:**

**Never turn ignition switch ON during 90 minutes.**

3. Turn ignition switch ON.
4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-799, "Diagnosis Procedure"](#).  
NO >> INSPECTION END.

## Diagnosis Procedure

INFOID:000000006947914

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

# P0456 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

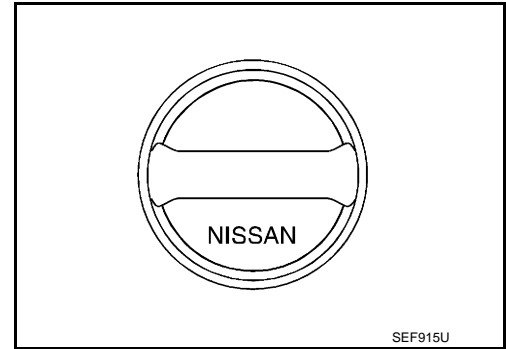
< DTC/CIRCUIT DIAGNOSIS >

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-803, "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-991, "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 [FL-14, "Exploded View"](#).

- EVAP canister vent control valve.

Refer to [EC-776, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Exploded View"](#).

## 7.CHECK IF EVAP CANISTER SATURATED WITH WATER



# P0456 EVAP CONTROL SYSTEM

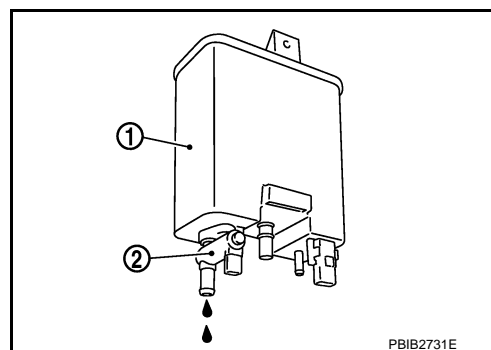
[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Remove EVAP canister (1) with EVAP canister vent control valve (2) 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 assembly with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

**The weight should be less than 2.2 kg (4.9 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. Refer to [FL-14, "Exploded View"](#).

## 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 and let it idle.
3. Select "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-565, "System Diagram"](#).

### Is the inspection result normal?

## P0456 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 13.  
NO >> Repair or reconnect the hose.

### 13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-765, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 14.  
NO >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-26, "Exploded View"](#).

### 14.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-714, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

### 15.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-780, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Exploded View"](#).

### 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-565, "System Description"](#).

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-930, "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 fuel filler 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 fuel filler tube.

### 20.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-933, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 21.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

### 21.CHECK FUEL LEVEL SENSOR

Refer to [MWI-43, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 22.

# P0456 EVAP CONTROL SYSTEM

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel level sensor unit. Refer to [FL-5, "Exploded View"](#).

## 22.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

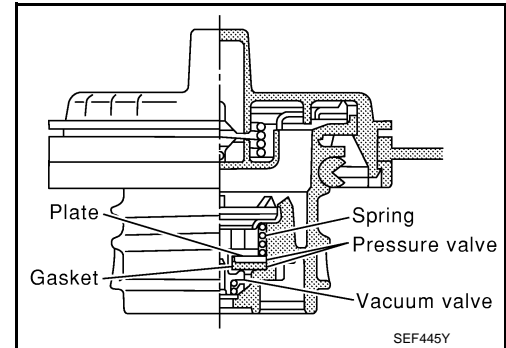
>> INSPECTION END

## Component Inspection

INFOID:000000006947915

### 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.

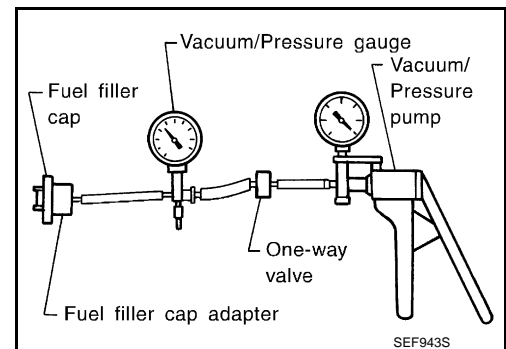
**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END

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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0460 FUEL LEVEL SENSOR

### Description

INFOID:000000006943032

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006943033

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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-804, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943034

#### 1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to [MWI-42, "Component Function Check"](#)

#### 2. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0461 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0461 FUEL LEVEL SENSOR

### Description

INFOID:000000006952439

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006943036

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P0461 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-805, "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-806, "Diagnosis Procedure"](#).

#### Component Function Check

INFOID:000000006943037

##### 1. PRECONDITIONING

##### WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-2, "General Precautions"](#).

##### 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:

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.

# P0461 FUEL LEVEL SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

2. Release fuel pressure from fuel line, refer to [EC-989, "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 0.03 V during step 7 to 10 and 10 to 12.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-806, "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-989, "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-806, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006943038

### 1.CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to [MWI-42, "Component Function Check"](#)

### 2.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0462, P0463 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0462, P0463 FUEL LEVEL SENSOR

### Description

INFOID:000000006952440

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000006943040

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P0462 or P0463 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Harness or connectors (The CAN communication line is open or shorted)</li></ul>
P0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"><li>• Harness or connectors (The sensor circuit is open or shorted)</li><li>• Combination meter</li><li>• Fuel level sensor</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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 11 V and 16 V 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-807, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006943041

##### 1. CHECK COMBINATION METER FUNCTION

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Refer to [MWI-42, "Component Function Check"](#)

##### 2. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

**P0462, P0463 FUEL LEVEL SENSOR**

< DTC/CIRCUIT DIAGNOSIS >

**[MR18DE (FOR CALIFORNIA)]**

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>> INSPECTION END



P0500 VSS

M/T MODELS

M/T MODELS : Description

INFOID:000000006956897

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” via the CAN communication line. The combination meter then sends a signal to the ECM via the CAN communication line.

M/T MODELS : DTC Logic

INFOID:000000006956898

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The vehicle speed signal sent to ECM is almost 0 km/h (0 MPH) even when vehicle is being driven.	<ul style="list-style-type: none"> <li>• Harness or connectors (The CAN communication line is open or shorted)</li> <li>• Harness or connectors (The vehicle speed signal circuit is open or shorted)</li> <li>• Wheel sensor</li> <li>• Combination meter</li> <li>• ABS actuator and electric unit (control unit)</li> </ul>

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

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 SIGNAL

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 4.
- NO >> Go to [EC-810, "M/T MODELS : Diagnosis Procedure"](#).

4.PERFORM DTC CONFIRMATION PROCEDURE

1. Select “DATA MONITOR” mode with CONSULT-III.
2. Warm engine up to normal operating temperature.
3. Maintain the following conditions for at least 50 consecutive seconds.

**CAUTION:**

**Always drive vehicle at a safe speed.**

< DTC/CIRCUIT DIAGNOSIS >

ENG SPEED	2,200 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.0 - 31.8 msec
Selector lever	Except Neutral position
PW/ST SIGNAL	OFF

4. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-810, "M/T MODELS : Diagnosis Procedure"](#).
- NO >> INSPECTION END

**5.PERFORM COMPONENT FUNCTION CHECK**

Perform component function check. Refer to [EC-810, "M/T MODELS : Component Function Check"](#). Use component function check to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-810, "M/T MODELS : Diagnosis Procedure"](#).

**M/T MODELS : Component Function Check**

INFOID:000000006956899

**1.PERFORM COMPONENT FUNCTION CHECK**

 **With GST**

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed signal in Service \$01 with GST.  
The vehicle speed signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-810, "M/T MODELS : Diagnosis Procedure"](#).

**M/T MODELS : Diagnosis Procedure**

INFOID:000000006956900

**1.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"**

Refer to [BRC-23, "CONSULT-III Function"](#).

Is the inspection result normal?

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

**2.CHECK COMBINATION METER**

Refer to [MWI-30, "CONSULT-III Function \(METER/M&A\)"](#).

>> INSPECTION END

**EXCEPT FOR M/T MODELS**

**EXCEPT FOR M/T MODELS : Description**

INFOID:000000006947906

ECM receives vehicle speed signals from two different paths via CAN communication line: One is from the ABS actuator and electric unit (control unit) via the combination unit and the other is from TCM.

**EXCEPT FOR M/T MODELS : DTC Logic**

INFOID:000000006947907

**DTC DETECTION LOGIC**

**NOTE:**

# P0500 VSS

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823. "DTC Logic"](#).

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0500	VEH SPEED SEN/CIRC (Vehicle speed sensor)	At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a output speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	<ul style="list-style-type: none"><li>• Harness or connector (The CAN communication line is open or shorted.)</li><li>• Combination meter</li><li>• ABS actuator and electric unit (control unit)</li><li>• Wheel sensor</li><li>• TCM</li><li>• Output speed sensor</li></ul>

## DTC CONFIRMATION PROCEDURE

### 1. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 10 V or more at idle.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. Drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more.

#### 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.

4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to [EC-811. "EXCEPT FOR M/T MODELS : Diagnosis Procedure"](#)  
NO >> INSPECTION END

## EXCEPT FOR M/T MODELS : Diagnosis Procedure

INFOID:000000006947908

### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-97. "CONSULT-III Function \(TRANSMISSION\)"](#).

#### 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)

Check DTC with ABS actuator and electric unit (control unit). Refer to [BRC-23. "CONSULT-III Function"](#).

#### Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Perform trouble shooting relevant to DTC indicated.

### 3. CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to [MWI-30. "CONSULT-III Function \(METER/M&A\)"](#).

< DTC/CIRCUIT DIAGNOSIS >

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Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble shooting relevant to DTC indicated.

#### 4.CHECK OUTPUT SPEED SENSOR

---

Check output speed sensor. Refer to [TM-115, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace or replace error-detected parts.

#### 5.CHECK WHEEL SENSOR

---

Check wheel sensor. Refer to [BRC-41, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).

NO >> Replace or replace error-detected parts.

P0506 ISC SYSTEM

Description

INFOID:000000006943046

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:000000006943047

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"> <li>• Electric throttle control actuator</li> <li>• Intake air leak</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform **EC-503, "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 11 V 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-813, "Diagnosis Procedure"**.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006943048

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.
2. Replace ECM.

## P0506 ISC SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

3. Perform [EC-500, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0507 ISC SYSTEM

Description

INFOID:000000006943049

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:000000006943050

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"> <li>• Electric throttle control actuator</li> <li>• Intake air leak</li> <li>• PCV system</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

If the target idle speed is out of the specified value, perform [EC-503, "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 11 V 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-815, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006943051

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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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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. Perform EC-500. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END



# P050A, P050B, P050E COLD START CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P050A, P050B, P050E COLD START CONTROL

### Description

INFOID:000000006947910

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

### DTC Logic

INFOID:000000006947911

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P050A, P050B or P050E is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up condition.	<ul style="list-style-type: none"><li>• Lack of intake air volume</li><li>• Fuel injection system</li><li>• ECM</li></ul>
P050B	Cold start ignition timing performance	ECM does not control ignition timing properly when engine is started with pre-warming up condition.	
P050E	Cold start engine exhaust temperature too low	The temperature of the catalyst inlet does not rise to the proper temperature when the engine is started with pre-warming up condition.	

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

##### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

###### 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 the indication of "COOLAN TEMP/S".

###### With GST

Follow the procedure "With CONSULT-III" above.

Is the value of "COOLAN TEMP/S" between 15°C (59°F) and 36°C (97°F)?

YES >> GO TO 3.

NO-1 [If it is below 15°C (59°F)]>>Warm up the engine until the value of "COOLAN TEMP/S" reaches 15°C (59°F) or more. Retry from step 1.

NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.

##### 3. PERFORM DTC CONFIRMATION PROCEDURE-II

###### With CONSULT-III

1. Set the select lever in N range.
2. Start the engine and warm up in idle with the value of "COOLAN TEMP/S" between 15°C (59°F) and 40°C (104°F) for more than 15 seconds.
3. Check 1st trip DTC.

# P050A, P050B, P050E COLD START CONTROL

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## With GST

Follow the procedure "With CONSULT-III" above.

Is 1st trip DTC detected?

- YES >> Go to [EC-818, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006947912

### 1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-503, "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
- Clogging of throttle body

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-703, "DTC Logic"](#).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Go to [EC-704, "Diagnosis Procedure"](#) for DTC P0171.

### 4. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC Confirmation Procedure.  
See [EC-817, "DTC Logic"](#).

Is the 1st trip DTC P050A, P050B or P050E displayed again?

- YES >> GO TO 5.
- NO >> INSPECTION END

### 5. REPLACE ECM

1. Replace ECM.
2. Perform [EC-500, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

# P0603 ECM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

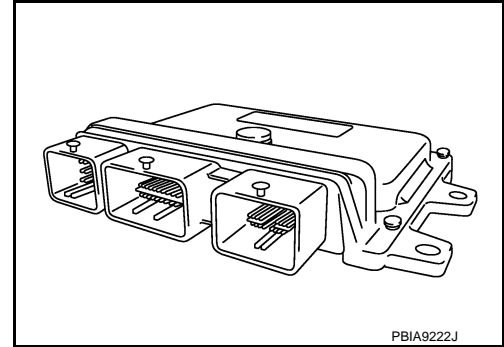
[MR18DE (FOR CALIFORNIA)]

## P0603 ECM POWER SUPPLY

### Description

INFOID:000000006948192

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:000000006948193

#### 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"> <li>Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]</li> <li>ECM</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Turn ignition switch OFF and wait at least 5 minutes
3. Turn ignition switch ON and wait at least 10 seconds.
4. Repeat steps 2 and 3 for five times.
5. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-819. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006948194

##### 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		
F8	66	Ground	Battery voltage

# P0603 ECM POWER SUPPLY

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

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

## 2. DETECT MALFUNCTIONING PART

Check the following.

- 20 A fuse (No. 43)
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

## 3. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "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-819. "DTC Logic"](#).

 **With GST**

1. Turn ignition switch ON.
2. Select Service \$04 with GST.
3. **Perform DTC CONFIRMATION PROCEDURE.**  
See [EC-819. "DTC Logic"](#).

Is the 1st trip DTC P0603 displayed again?

- YES >> GO TO 5.
- NO >> INSPECTION END

## 5. REPLACE ECM

1. Replace ECM.
2. Perform [EC-500. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

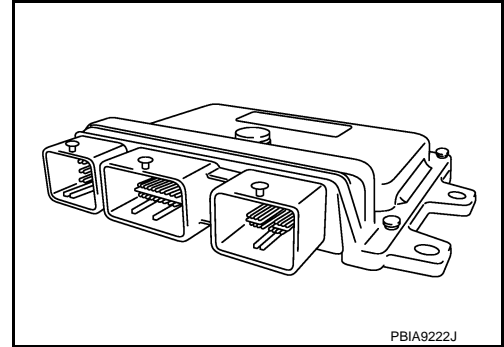
>> INSPECTION END

P0605 ECM

Description

INFOID:000000006943052

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:000000006943053

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-822, "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-822, "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-822, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006943054

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase 1st trip DTC. Refer to "How to Erase DTC and 1st Trip DTC" in [EC-602, "CONSULT-III Function"](#).
3. Perform DTC CONFIRMATION PROCEDURE. Refer to [EC-821, "DTC Logic"](#).

Is the 1st trip DTC P0605 displayed again?

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

2.REPLACE ECM

1. Replace ECM.
2. Perform [EC-500, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

P0607 ECM

Description

INFOID:000000006943055

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:000000006943056

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"> <li>ECM</li> </ul>

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON.
2. Check DTC.

Is DTC detected?

- YES >> Go to [EC-823. "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006943057

1.INSPECTION START

1. Turn ignition switch ON.
2. Erase DTC. Refer to "How to Erase DTC and 1st Trip DTC" in [EC-602. "CONSULT-III Function"](#).
3. Perform DTC CONFIRMATION PROCEDURE. Refer to [EC-823. "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. Perform [EC-500. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement"](#).

>> INSPECTION END

# P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0643 SENSOR POWER SUPPLY

### DTC Logic

INFOID:000000006943058

### 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"><li>• Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.]</li><li>• Accelerator pedal position sensor</li><li>• Throttle position sensor</li><li>• Camshaft position sensor (PHASE)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-824, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943059

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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		
E110	4	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 7.  
NO >> GO TO 3.

#### 3. CHECK SENSOR POWER SUPPLY CIRCUITS

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



# P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	72	Electric throttle control actuator	F29	2
	78	CMP sensor (PHASE)	F26	1
E16	106	APP sensor	E110	4

Is the inspection result normal?

YES >> GO TO 4.

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

## 4.CHECK COMPONENTS

Check the following.

- Camshaft position sensor (PHASE) (Refer to [EC-742, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace camshaft position sensor (PHASE). Refer to [EM-54, "Exploded View"](#).

## 5.CHECK TP SENSOR

Refer to [EC-660, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 6.

## 6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

>> INSPECTION END

## 7.CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

## 8.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 9.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P0850 PNP SWITCH

### Description

INFOID:000000006943060

For CVT models, transmission range switch is turn ON when the selector lever is P or N.  
For M/T models, park/neutral position (PNP) range switch is ON when the selector lever is Neutral position.  
ECM detects the position because the continuity of the line (the ON) exists.

### DTC Logic

INFOID:000000006943061

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850	Park/neutral position switch	For CVT models, the signal of transmission range switch is not changed in the process of engine starting and driving. For M/T models, 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"><li>• Harness or connectors [The transmission range switch circuit is open or shorted.(CVT models)] [The park/neutral position (PNP) switch circuit is open or shorted.(M/T models)]</li><li>• Transmission range switch (CVT models)</li><li>• Park/neutral position (PNP) switch (M/T models)</li></ul>

### 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.

Selector lever position	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-827. "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 60 consecutive seconds.

##### **CAUTION:**

**Always drive vehicle at a safe speed.**

# P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ENG SPEED	1,200 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.5 - 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-827, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## 5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-827, "Component Function Check"](#).

### NOTE:

Use component function check the overall function of the transmission range switch circuit (CVT models) or the park/neutral position (PNP) switch circuit (M/T models). During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-827, "Diagnosis Procedure"](#).

## Component Function Check

INFOID:000000006943062

### 1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.
2. Check the voltage between ECM harness connector and ground under the following conditions.

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	14 (PNP signal)	Ground	P or N (CVT) Neutral (M/T)	Approx. 0 V
			Except above	Battery voltage

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-827, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006943063

### 1.CHECK TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T) POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect transmission range switch (CVT) or park/neutral position (PNP) switch (M/T) harness connector.
3. Turn ignition switch ON.
4. Check the voltage between transmission range switch (CVT) or PNP switch (M/T) harness connector and ground.

CVT models

Transmission range switch		Ground	Voltage
Connector	Terminal		
F21	1	Ground	Battery voltage

# P0850 PNP SWITCH

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

M/T models

PNP switch (M/T)		Ground	Voltage
Connector	Terminal		
F23	2	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 E8, F1
- Harness connectors E105, M77 (M/T)
- IPDM E/R harness connector E14 (CVT)
- 10 A fuse (No. 3) (M/T)
- 10 A fuse (No. 56) (CVT)
- Harness for open or short between PNP switch and fuse (M/T)

Is the inspection result normal?

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

## 3.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 transmission range switch (CVT) or PNP switch (M/T) harness connector and ECM harness connector.

CVT models

Transmission range switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F21	2	F7	14	Existed

M/T models

PNP switch		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F23	3	F7	14	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 TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T)

Refer to [TM-108. "Component Inspection \(Transmission Range Switch\)"](#) (CVT) or [TM-8. "PARK/NEUTRAL POSITION \(PNP\) SWITCH : Component Inspection"](#) (M/T).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace transmission range switch (CVT). Refer to [TM-229. "Exploded View"](#). or PNP switch (M/T). Refer to [TM-22. "Removal and Installation"](#).

## 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

# P1148 CLOSED LOOP CONTROL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1148 CLOSED LOOP CONTROL

### DTC Logic

INFOID:000000006943064

### 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"><li>• Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li><li>• A/F sensor 1</li><li>• A/F sensor 1 heater</li></ul>
		The closed loop control function for bank 2 does not operate even when vehicle is driving in the specified condition.	

### Diagnosis Procedure

INFOID:000000006955675

DTC P1148 is displayed with DTC for A/F sensor1.  
When the DTC is detected, perform the trouble diagnosis of DTC corresponding to A/F sensor1.  
Refer to [EC-967, "DTC Index"](#).

# P1212 TCS COMMUNICATION LINE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1212 TCS COMMUNICATION LINE

### Description

INFOID:000000006943065

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:000000006943066

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-624, "DTC Logic"](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Harness or connectors (The CAN communication line is open or shorted.)</li><li>• ABS actuator and electric unit (control unit)</li><li>• Dead (Weak) battery</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

##### 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-830, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943067

Perform the trouble diagnosis for TCS. Refer to [GI-37, "Work Flow"](#).

##### NOTE:

If DTC P1212 is displayed with DTC UXXXX and/or P0607, perform the following trouble diagnosis.

- Trouble diagnosis for DTC UXXXX, Refer to [EC-967, "DTC Index"](#).
- Trouble diagnosis for DTC P0607, Refer to [EC-823, "DTC Logic"](#).

# P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1217 ENGINE OVER TEMPERATURE

### DTC Logic

INFOID:000000006943068

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Cooling fan does not operate properly (Overheat).</li><li>• Cooling fan system does not operate properly (Overheat).</li><li>• Engine coolant was not added to the system using the proper filling method.</li><li>• Engine coolant is not within the specified range.</li></ul>	<ul style="list-style-type: none"><li>• Harness or connectors (The cooling fan circuit is open or shorted.)</li><li>• IPDM E/R (Cooling fan relay-1)</li><li>• Cooling fan relays-2 and -3</li><li>• Cooling fan motor</li><li>• Radiator hose</li><li>• Radiator</li><li>• Radiator cap</li><li>• Reservoir tank</li><li>• Water pump</li><li>• Thermostat</li><li>• Water control valve</li></ul>

##### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [CO-9, "Draining"](#). Also, replace the engine oil. Refer to [LU-8, "Refilling"](#).

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-11, "Anti-Freeze Coolant Mixture Ratio"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

#### DTC CONFIRMATION PROCEDURE

##### 1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-831, "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-832, "Diagnosis Procedure"](#).

#### Component Function Check

INFOID:000000006943069

##### 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

[MR18DE (FOR CALIFORNIA)]

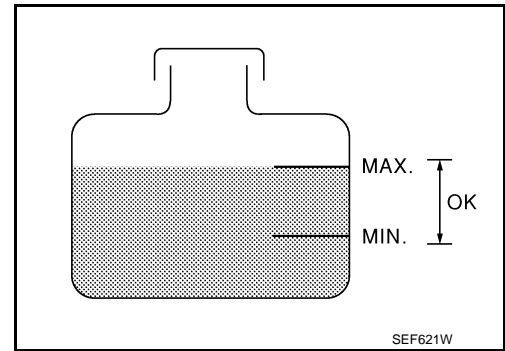
## < DTC/CIRCUIT DIAGNOSIS >

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-832, "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-832, "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 motor operates at each speed (LOW/HI).

### Without CONSULT-III

Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#).

Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Go to [EC-832, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006943070

## 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 motor operates at each speed (LOW/HI).

### Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#).
2. Make sure that cooling fan motor operates at each speed (Low/High).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Go to [EC-914, "Diagnosis Procedure"](#).

## 2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to [CO-9, "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 (Refer to [CO-25, "Inspection"](#).)
- Radiator (Refer to [CO-17, "Inspection"](#).)
- Water pump (Refer to [CO-20, "Inspection"](#).)



# P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> Repair or replace malfunctioning part.

## 4. CHECK RADIATOR CAP

Check radiator cap. Refer to [CO-13, "RADIATOR CAP : Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap. Refer to [CO-15, "Exploded View"](#).

## 5. CHECK THERMOSTAT

Check thermostat. Refer to [CO-23, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat. Refer to [CO-22, "Removal and Installation"](#).

## 6. CHECK WATER CONTROL VALVE

Check water control valve. Refer to [CO-26, "Water Control Valve"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace water control valve. Refer to [CO-24, "Exploded View"](#).

## 7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-654, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace engine coolant temperature sensor. Refer to [CO-24, "Exploded View"](#).

## 8. 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"> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No blocking	—
	2	<ul style="list-style-type: none"> <li>Coolant mixture</li> </ul>	<ul style="list-style-type: none"> <li>Coolant tester</li> </ul>	<a href="#">MA-11, "Anti-Freeze Coolant Mixture Ratio"</a>	
	3	<ul style="list-style-type: none"> <li>Coolant level</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Coolant up to MAX level in reservoir tank and radiator filler neck	<a href="#">CO-9, "Inspection"</a>
	4	<ul style="list-style-type: none"> <li>Radiator cap</li> </ul>	<ul style="list-style-type: none"> <li>Pressure tester</li> </ul>	<a href="#">CO-13, "RADIATOR CAP : Inspection"</a>	
ON*2	5	<ul style="list-style-type: none"> <li>Coolant leaks</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No leaks	<a href="#">CO-9, "Inspection"</a>
ON*2	6	<ul style="list-style-type: none"> <li>Thermostat</li> </ul>	<ul style="list-style-type: none"> <li>Touch the upper and lower radiator hoses</li> </ul>	Both hoses should be hot	<a href="#">CO-23, "Inspection"</a>
ON*1	7	<ul style="list-style-type: none"> <li>Cooling fan motor</li> </ul>	<ul style="list-style-type: none"> <li>CONSULT-III</li> </ul>	Operating	<a href="#">EC-914, "Component Function Check"</a>
OFF	8	<ul style="list-style-type: none"> <li>Combustion gas leak</li> </ul>	<ul style="list-style-type: none"> <li>Color checker chemical tester 4 Gas analyzer</li> </ul>	Negative	—
ON*3	9	<ul style="list-style-type: none"> <li>Coolant temperature gauge</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> <li>Coolant overflow to reservoir tank</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	No overflow during driving and idling	<a href="#">CO-9, "Inspection"</a>
OFF*4	10	<ul style="list-style-type: none"> <li>Coolant return from reservoir tank to radiator</li> </ul>	<ul style="list-style-type: none"> <li>Visual</li> </ul>	Should be initial level in reservoir tank	<a href="#">CO-9, "Inspection"</a>

# P1217 ENGINE OVER TEMPERATURE

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Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	11	<ul style="list-style-type: none"><li>• Cylinder head</li></ul>	<ul style="list-style-type: none"><li>• Straight gauge feeler gauge</li></ul>	0.1 mm (0.004 in) Maximum distortion (warping)	<a href="#">EM-68, "Disassembly and Assembly"</a>
	12	<ul style="list-style-type: none"><li>• Cylinder block and pistons</li></ul>	<ul style="list-style-type: none"><li>• Visual</li></ul>	No scuffing on cylinder walls or piston	<a href="#">EM-96, "Inspection"</a>

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-4, "Troubleshooting Chart"](#).

>> INSPECTION END

# P1225 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

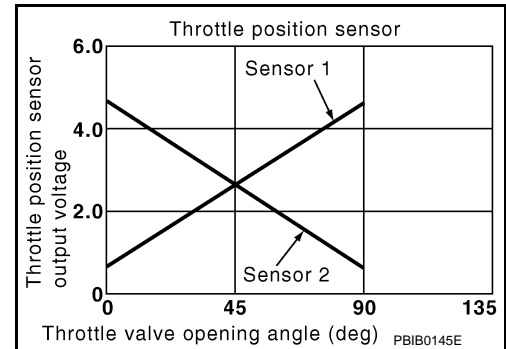
## P1225 TP SENSOR

### Description

INFOID:000000006952442

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

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



### DTC Logic

INFOID:000000006943072

#### 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 10 V 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-835, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006943073

##### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

## P1225 TP SENSOR

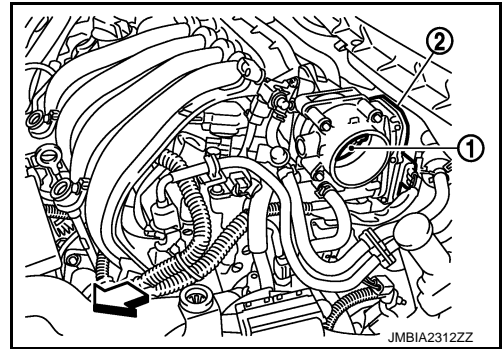
[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

#### Is the inspection result normal?

- YES >> Replace electric throttle control actuator. Refer to [EM-26. "Exploded View"](#).
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, then perform throttle valve closed position learning. Refer to [EC-502. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



# P1226 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

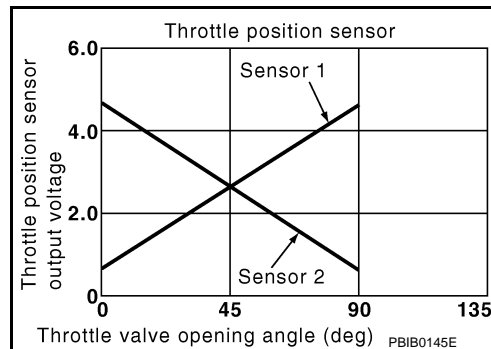
## P1226 TP SENSOR

### Description

INFOID:000000006952443

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

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



### DTC Logic

INFOID:000000006943076

#### 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 10 V 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-837, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006943077

##### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

## P1226 TP SENSOR

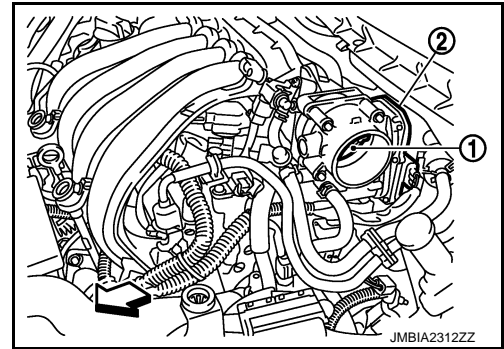
[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

#### Is the inspection result normal?

- YES >> Replace electric throttle control actuator. Refer to [EM-26. "Exploded View"](#).
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, then perform throttle valve closed position learning. Refer to [EC-502. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



# P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1550 BATTERY CURRENT SENSOR

### Description

INFOID:000000006943082

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006943083

### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• EVAP control system pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li><li>• Tumble control valve position sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.
2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to [EC-840. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

INFOID:00000006943084

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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-739. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-780. "Component Inspection"](#).)



# P1550 BATTERY CURRENT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 8.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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9.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	
F53	3	F8	57	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-842, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

INFOID:000000006943085

## Component Inspection

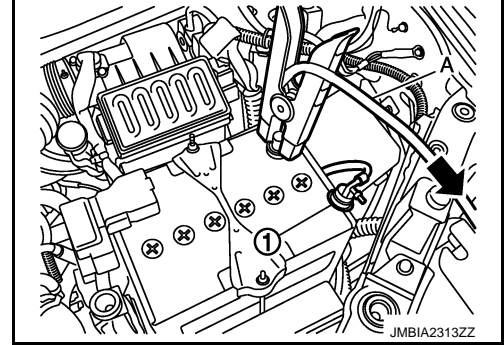
### 1. CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



ECM			Voltage
Connector	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3. "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1551, P1552 BATTERY CURRENT SENSOR

### Description

INFOID:000000006952377

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006943087

#### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li><li>• Tumble control valve position sensor</li></ul>
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 perform the following before conducting the next test.

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

#### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON**

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to [EC-844. "Diagnosis Procedure"](#).

# P1551, P1552 BATTERY CURRENT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006952381

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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.

# P1551, P1552 BATTERY CURRENT SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Crankshaft position sensor (POS) (Refer to [EC-739, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-790, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

### Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-904, "Component Inspection"](#).

### Is the inspection result normal?

- YES >> GO TO 11.  
NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 8.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	
F53	2	F8	64	Existed

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

### Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9.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	
F53	3	F8	57	Existed

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

### Is the inspection result normal?

- YES >> GO TO 10.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-854, "Component Inspection"](#).

### Is the inspection result normal?

- YES >> GO TO 11.  
NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

INFOID:000000006952382

## Component Inspection

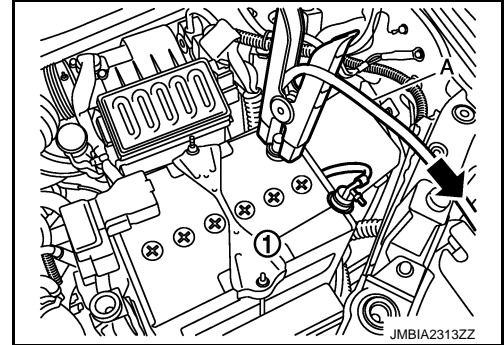
### 1. CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



ECM			Voltage
Connector	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3. "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1553 BATTERY CURRENT SENSOR

### Description

INFOID:000000006952379

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006943091

### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li><li>• Tumble control valve position sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.
2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to [EC-848. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## Diagnosis Procedure

INFOID:000000006952383

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 3.

### 3. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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-739. "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-790. "Component Inspection"](#).)



# P1553 BATTERY CURRENT SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-904, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 8.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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 9.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	
F53	3	F8	57	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-854, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

# P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

INFOID:000000006952384

## Component Inspection

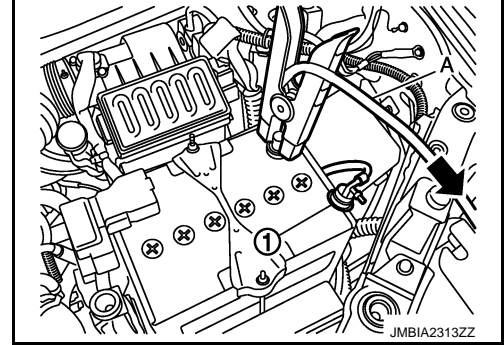
### 1. CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



ECM			Voltage
Connector	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3. "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1554 BATTERY CURRENT SENSOR

### Description

INFOID:000000006952380

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 [PCS-68. "System Description"](#).

#### CAUTION:

**Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.**

### DTC Logic

INFOID:000000006943095

### DTC DETECTION 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"><li>• Harness or connectors (Battery current sensor circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Power steering pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li><li>• Battery current sensor</li><li>• Crankshaft position sensor (POS)</li><li>• Power steering pressure sensor</li><li>• Accelerator pedal position sensor</li><li>• Refrigerant pressure sensor</li><li>• Tumble control valve position sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-851. "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-852. "Diagnosis Procedure"](#).

### Component Function Check

INFOID:000000006943096

#### 1.PRECONDITIONING

#### TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> 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 2,300 mV at least once.

### Without CONSULT-III

1. Start engine and let it idle.
2. Check the voltage between ECM harness connector and ground.

ECM			Voltage
Connector	+	-	
	Terminal	Terminal	
F8	58 (Battery current sensor signal)	68	Above 2.3 V at least once

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-852, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000006952385

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "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-I

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		
F53	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

### 3.CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT-II

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	
F53	1	F8	71	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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-739, "Component Inspection"](#).)
- EVAP control system pressure sensor (Refer to [EC-790, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-904, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 8.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	
F53	2	F8	64	Existed

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

Is the inspection result normal?

YES >> GO TO 9.

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

## 9.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.

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Battery current sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F53	3	F8	57	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

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

## 10.CHECK BATTERY CURRENT SENSOR

Refer to [EC-854, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace battery negative cable assembly.

## 11.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952386

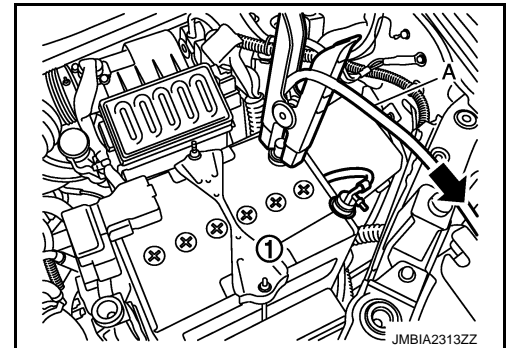
### 1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.
4. Install jumper cable (A) between battery negative terminal and body ground.

1 : Battery negative terminal

← : To body ground

5. Turn ignition switch ON.
6. Check the voltage between ECM harness connector and ground.



Connector	ECM		Voltage
	+	-	
	Terminal	Terminal	
F8	57 (Battery current sensor signal)	64	Approx. 2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

# P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1564 ASCD STEERING SWITCH

### Description

INFOID:000000006943099

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-548, "System Description"](#) for the ASCD function.

### DTC Logic

INFOID:000000006943100

### DTC DETECTION LOGIC

#### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-821, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	<ul style="list-style-type: none"><li>An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li><li>ECM detects that input signal from the ASCD steering switch is out of the specified range.</li><li>ECM detects that the ASCD steering switch is stuck ON.</li></ul>	<ul style="list-style-type: none"><li>Harness or connectors (The switch circuit is open or shorted.)</li><li>ASCD steering switch</li><li>ECM</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> 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-855, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943101

#### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in [GI-44, "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

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- 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 terminals.

ECM			Condition	Voltage
Connector	+	-		
	Terminal	Terminal		
E16	94 (ASCD steering switch signal)	95	MAIN switch: Pressed	Approx. 0V
			CANCEL 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 M352.
- Check the continuity between combination switch and ECM harness connector.

Combination switch	ECM		Continuity
	Connector	Terminal	
Terminal			
16	E16	95	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 M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch



# P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> 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 ECM harness connector and combination switch.

combination switch Terminal	ECM		Continuity
	Connector	Terminal	
13	E16	94	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M77, E105
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

## 7. CHECK ASCD STEERING SWITCH

Refer to [EC-857, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch. Refer to [ST-8, "Exploded View"](#).

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006943102

### 1. CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the continuity between combination switch harness connector terminals under following conditions.

Combination switch		Condition	Resistance
Connector	Terminals		
M302	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. Refer to [ST-8, "Exploded View"](#).

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1572 ASCD BRAKE SWITCH

### Description

INFOID:000000006943103

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-548, "System Description"](#) for the ASCD function.

### DTC Logic

INFOID:000000006943104

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-821, "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"><li>• Harness or connectors (The stop lamp switch circuit is shorted.)</li><li>• Harness or connectors (The ASCD brake switch circuit is shorted.)</li><li>• Harness or connectors (The ASCD clutch switch circuit is shorted.)</li><li>• Stop lamp switch</li><li>• ASCD brake switch</li><li>• ASCD clutch switch</li><li>• Incorrect stop lamp switch installation</li><li>• Incorrect ASCD brake switch installation</li><li>• Incorrect ASCD clutch switch installation</li><li>• ECM</li></ul>
		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

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator is displayed in combination meter.
3. 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.**

Vehicle speed	More than 30 km/h (19 mph)
Selector lever	Suitable position

4. Check DTC.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Is DTC detected?

- YES >> Go to [EC-859, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

## 3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

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.**

Vehicle speed	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 DTC.

Is DTC detected?

- YES >> Go to [EC-859, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943105

### 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 terminals.

Connector	ECM		Condition	Voltage	
	+	-			
	Terminal	Terminal			
E16	100 (ASCD brake switch signal)	108	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.
- NO >> GO TO 3.

### 2.CHECK OVERALL FUNCTION-II

 **With CONSULT-III**

Select "BRAKE SW2" and check indication in "DATA MONITOR" mode with CONSULT-III.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal	Slightly depressed	ON
		Fully released	OFF

**⊗ Without CONSULT-III**

Check the voltage between ECM harness connector terminals.

ECM			Condition	Voltage	
Connector	+	-			
		Terminal	Terminal		
E16	99 (Stop lamp switch signal)	108	Brake pedal	Slightly depressed	Battery voltage
			Fully released	Approx. 0V	

Is the inspection result normal?

- YES >> GO TO 16.
- NO >> GO TO 11.

### 3. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-I

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		
E112	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 9.
- NO-1 >> CVT models: GO TO 4.
- NO-2 >> M/T models: GO TO 5.

### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10 A fuse (No. 2)
- 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 CLUTCH SWITCH POWER SUPPLY 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	Voltage
Connector	Terminal		
E111	3	Ground	Battery voltage

Is the inspection result normal?

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

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10 A fuse (No. 2)
- Harness for open or short between ASCD clutch switch and fuse

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

## 7. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD clutch switch harness connector and ASCD brake switch harness connector.

ASCD clutch switch		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E111	4	E112	1	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 ground or short to power in harness or connectors.

## 8. CHECK ASCD CLUTCH SWITCH

Refer to [EC-863. "Component Inspection \(ASCD Clutch Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace ASCD clutch switch. Refer to [CL-10. "Exploded View".](#)

## 9. 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	
E112	2	E16	100	Existed

4. 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-862. "Component Inspection \(ASCD Brake Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace ASCD brake switch. Refer to [BR-17. "Exploded View".](#)

## 11. 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Stop lamp switch		Ground	Voltage
Connector	Terminal		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

## 12.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77
- 10A fuse (No.9)
- 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.

## 13.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	
E16	99	E114 (M/T) E115 (CVT)	2	Existed

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

Is the inspection result normal?

YES >> GO TO 15.

NG >> GO TO 14.

## 14.DETECT MALFUNCTIONING PART

Check the following.

- 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.

## 15.CHECK STOP LAMP SWITCH

Refer to [EC-863, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

## 16.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (ASCD Brake Switch)

INFOID:000000006943106

### 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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-18, "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. Refer to [BR-17, "Exploded View"](#).

## Component Inspection (ASCD Clutch Switch)

INFOID:000000006943107

### 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-11, "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. Refer to [CL-10, "Exploded View"](#).

## Component Inspection (Stop Lamp Switch)

INFOID:000000006952389

### 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.

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly de-pressed	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-18, "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 de-pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).



# P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1574 ASCD VEHICLE SPEED SENSOR

### Description

INFOID:000000006943109

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-548, "System Description"](#) for ASCD functions.

### DTC Logic

INFOID:000000006943110

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1574 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-624, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-809, "M/T MODELS : DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-821, "DTC Logic"](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "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"><li>• Harness or connectors (The CAN communication line is open or shorted.)</li><li>• ABS actuator and electric unit (control unit)</li><li>• TCM</li><li>• ECM</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-865, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943111

#### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-96, "Diagnosis Description"](#).

Is DTC detected?

NO >> GO TO 2.

YES >> Perform trouble shooting relevant to DTC indicated.

## P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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### 2. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

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Refer to [BRC-23. "CONSULT-III Function"](#).

Is DTC detected?

NO >> INSPECTION END

YES >> Perform trouble shooting relevant to DTC indicated.

# P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1715 INPUT SPEED SENSOR

### Description

INFOID:000000006943112

ECM receives input shaft revolution signal from TCM via the CAN communication line. ECM uses this signal for engine control.

EC

### DTC Logic

INFOID:000000006943113

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P1715 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to [EC-736, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0340, first perform the trouble diagnosis for DTC P0340. Refer to [EC-740, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-821, "DTC Logic"](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-823, "DTC Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (TCM output)	Input shaft revolution signal is different from the theoretical value calculated by ECM from output shaft revolution signal and engine rpm signal.	<ul style="list-style-type: none"><li>• Harness or connectors (The CAN communication line is open or shorted)</li><li>• Harness or connectors (Primary speed sensor circuit is open or shorted)</li><li>• TCM</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> 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-867, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943114

##### 1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [TM-97, "CONSULT-III Function \(TRANSMISSION\)"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

##### 2. REPLACE TCM

Replace TCM. Refer to [TM-217, "Exploded View"](#).

# P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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>> INSPECTION END

# P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P1805 BRAKE SWITCH

### Description

INFOID:000000006943115

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:000000006943116

### 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"> <li>Harness or connectors (Stop lamp switch circuit is open or shorted.)</li> <li>Stop lamp switch</li> </ul>

### 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.
- Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-869, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943117

#### 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 the inspection result normal?

- 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		
E114 (M/T) E115 (CVT)	1	Ground	Battery voltage

Is the inspection result normal?

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

#### 3. DETECT MALFUNCTIONING PART

Check the following.

# P1805 BRAKE SWITCH

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Harness connectors E105, M77
- 10 A fuse (No. 9)
- 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	
E16	99	E114 (M/T) E115 (CVT)	2	Existed

3. 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 STOP LAMP SWITCH

Refer to [EC-870, "Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

### 6. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (Stop Lamp Switch)

INFOID:000000006943118

### 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-18, "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?

# P1805 BRAKE SWITCH

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-17, "Exploded View"](#).

A

EC

C

D

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P

# P2004 TUMBLE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2004 TUMBLE CONTROL VALVE

### Description

INFOID:000000006952134

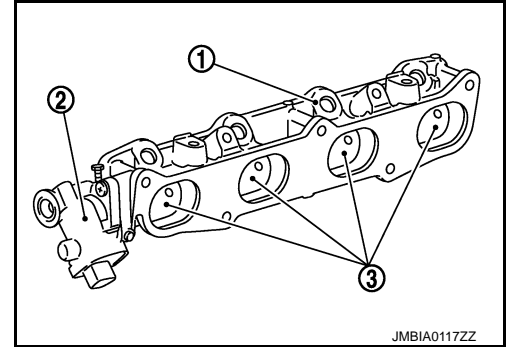
Tumble control valve (3) is installed in the intake manifold adapter (1).

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.



### DTC Logic

INFOID:000000006952135

### 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"> <li>• Harness or connectors (Tumble control valve motor circuit is open or shorted.) (Tumble control valve position sensor circuit is open or shorted.) (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.) (Battery current sensor circuit is shorted.)</li> <li>• Tumble control valve actuator (Tumble control valve motor) (Tumble control valve position sensor)</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• Battery current sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.
- Always perform the test at a temperature above 0°C (32°F)

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

Ⓟ With CONSULT-III



# P2004 TUMBLE CONTROL VALVE

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that "COOLAN TEMP/S" indicates between 5°C (41°F) to 45°C (113°F).  
If not, cool engine down or warm engine up until "COOLAN TEMP/S" indicates between 5°C (41°F) to 56°C (133°F). Then go to the following steps.
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-873, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006952136

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44, "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			
F7	3	Ground	Ignition switch OFF	Approx. 0 V
			Ignition switch ON	Battery voltage

#### Is the inspection result normal?

- YES >> GO TO 5.  
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	
E14	44	F7	3	Existed

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

#### Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit.  
NO >> GO TO 4.

### 4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- 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.

# P2004 TUMBLE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 5. 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.

Tumble control valve actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F22	4	F7	6	Not existed
			7	Existed
	5		6	Existed
			7	Not existed

4. 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 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		
F22	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 7.

## 7. 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	
F22	1	F8	69	Existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit.

## 8. CHECK SENSOR POWER SUPPLY CIRCUIT

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

# P2004 TUMBLE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

Is the inspection result normal?

YES >> GO TO 9.

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

## 9.CHECK COMPONENT

Check the following.

- Battery current sensor (Refer to [EC-842, "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-739, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning components.

## 10.CHECK APP SENSOR

Refer to [EC-904, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 11.

## 11.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 12.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	
F22	2	F8	47	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 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.

# P2004 TUMBLE CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Tumble control valve actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F22	3	F8	35	Existed

2. Also check harness for short to ground and 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 TUMBLE CONTROL VALVE

Refer to [EC-876. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace intake manifold adapter. Refer to [EM-26. "Exploded View"](#).

## 15.CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace intake manifold adapter. Refer to [EM-26. "Exploded View"](#).

NO >> Repair or replace harness or connectors.

## Component Inspection

INFOID:000000006952137

## 1.CHECK TUMBLE CONTROL VALVE

### With CONSULT-III

1. Turn ignition switch OFF.
2. Remove intake manifold adapter. Refer to [EM-27. "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-27. "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:

Never apply 12 V 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. Refer to [EM-26. "Exploded View"](#).

# P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2014 TUMBLE CONTROL VALVE POSITION SENSOR

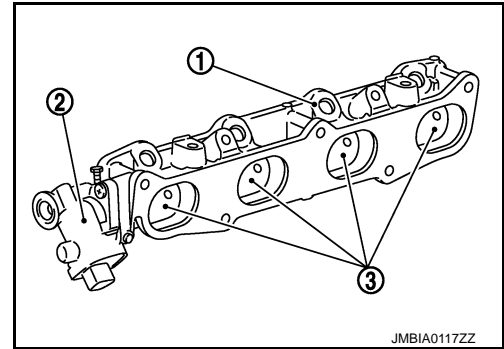
### Description

INFOID:000000006952138

Tumble control valve position sensor is built into the tumble control valve actuator (2).

- Intake manifold adapter (1)
- Tumble control valve (2)

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:000000006952139

### 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"> <li>• Harness or connectors (Tumble control valve position sensor circuit is shorted.) (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.) (Battery current sensor circuit is shorted.)</li> <li>• Tumble control valve position sensor</li> <li>• EVAP control system pressure sensor</li> <li>• Crankshaft position sensor (POS)</li> <li>• Accelerator pedal position sensor</li> <li>• Refrigerant pressure sensor</li> <li>• Battery current sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V 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-878, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

# P2014 TUMBLE CONTROL VALVE POSITION SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006952140

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to Ground Inspection in [GI-44. "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		
F22	1	Ground	Approx. 5 V

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	
F22	1	F8	69	Existed

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair open circuit.

### 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

Is the inspection result normal?

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

### 5. CHECK COMPONENT

Check the following.

- Battery current sensor (Refer to [EC-842. "Component Inspection"](#).)

# P2014 TUMBLE CONTROL VALVE POSITION SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- Crankshaft position sensor (POS) (Refer to [EC-739. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [EC-937. "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876. "Component Inspection"](#).)

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace malfunctioning components.

## 6.CHECK APP SENSOR

Refer to [EC-904. "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> GO TO 7.

## 7.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3. "Removal and Installation"](#).

>> 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	
F22	2	F8	47	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	
F22	3	F8	35	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-41. "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace intake manifold adapter. Refer to [EM-26. "Exploded View"](#).  
NO >> Repair or replace harness or connectors.

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2100, P2103 THROTTLE CONTROL MOTOR RELAY

### Description

INFOID:000000006943119

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:000000006943120

### 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"><li>• Harness or connectors (Throttle control motor relay circuit is open)</li><li>• Throttle control motor relay</li></ul>
P2103	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	<ul style="list-style-type: none"><li>• Harness or connectors (Throttle control motor relay circuit is shorted)</li><li>• Throttle control motor relay</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

#### TESTING CONDITION:

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

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-880, "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-880, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943121

#### 1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

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



# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Voltage
Connector	Terminal		
F7	15	Ground	Battery voltage

## OK or NG

- OK >> GO TO 5.
- NG >> GO TO 2.

## 2.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

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

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	15	E15	57	Existed

4. 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 E8, F1
- 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.

## 4.CHECK FUSE

1. Disconnect 15 A fuse (No. 64) from IPDM E/R.
2. Check 15 A fuse for blown.

### Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace 15 A fuse.

## 5.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

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

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch: OFF	Approximately 0 V
			Ignition switch: ON	Battery voltage

## OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.

## 6.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	2	E15	54	Existed

5. 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 E8, F1
- 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.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY), [PCS-64, "Removal and Installation"](#) (Without I-KEY).
- NO >> Repair or replace harness or connectors.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### Description

INFOID:000000006943122

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. ECM controls the throttle valve opening angle in response to driving condition via the throttle control motor.

### DTC Logic

INFOID:000000006943123

#### DTC DETECTION LOGIC

##### NOTE:

- If DTC P2101 is displayed with DTC P2100, first perform the trouble diagnosis for DTC P2100. Refer to [EC-880, "DTC Logic"](#).
- If DTC P2101 is displayed with DTC P2119, first perform the trouble diagnosis for DTC P2119. Refer to [EC-889, "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"><li>• Harness or connectors (Throttle control motor circuit is open or shorted)</li><li>• Electric throttle control actuator</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Go to [EC-883, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006943124

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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 under the following conditions.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Ground	Condition	Voltage
Connector	Terminal			
F7	2	Ground	Ignition switch: OFF	Approx. 0 V
			Ignition switch: ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 3.

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

IPDM E/R		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E15	57	F7	15	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 E8, F8
- 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.

## 5. 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	
E15	54	F7	2	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 E8, F1
- 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.

## 7. CHECK FUSE

1. Disconnect 15 A fuse (No. 64) from IPDM E/R.
2. Check 15 A fuse for blown.

Is the inspection result normal?

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 8.  
NO >> Replace 15 A fuse.

## 8.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY), [PCS-64, "Removal and Installation"](#) (Without I-KEY).  
NO >> Repair or replace harness or connectors.

## 9.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.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

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

Is the inspection result normal?

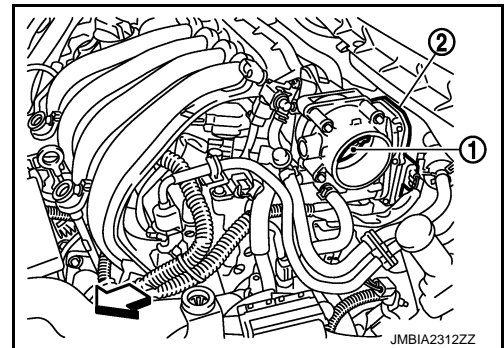
- YES >> GO TO 10.  
NO >> Repair or replace.

## 10.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

- YES >> GO TO 11.  
NO >> Remove the foreign matter and clean the electric throttle control actuator inside, then perform throttle valve closed position learning. Refer to [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#)..



## 11.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-886, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 12.  
NO >> GO TO 13.

## 12.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> GO TO 13.  
NO >> Repair or replace harness or connectors.

## 13.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> INSPECTION END

## Component Inspection

INFOID:000000006943125

### 1. CHECK THROTTLE CONTROL MOTOR

---

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Check the resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 $\Omega$ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

### 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

---

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

>> INSPECTION END

# P2118 THROTTLE CONTROL MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2118 THROTTLE CONTROL MOTOR

### Description

INFOID:000000006943127

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. ECM controls the throttle valve opening angle in response to driving conditions via the throttle control motor.

### DTC Logic

INFOID:000000006943128

### 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"> <li>Harness or connectors (Throttle control motor circuit is shorted.)</li> <li>Electric throttle control actuator (Throttle control motor)</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> 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-887, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943129

#### 1. CHECK GROUND CONNECTION

- Turn ignition switch OFF.
- Check ground connection E38. Refer to [GI-44, "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	
F29	5	F7	1	Not existed
			4	Existed
	6		1	Existed
			4	Not existed

# P2118 THROTTLE CONTROL MOTOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT 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-888, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 5.

## 4.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connectors.

## 5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006943130

## 1.CHECK THROTTLE CONTROL MOTOR

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Check the resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 $\Omega$ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

## 2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

>> INSPECTION END



# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### Description

INFOID:000000006943132

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 feeds the voltage signal to the ECM. The ECM judges the current opening angle of the throttle valve and controls the throttle valve opening angle in response to driving conditions via the throttle control motor.

### DTC Logic

INFOID:000000006943133

### 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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set selector 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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
7. Set selector 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-889. "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 selector lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
3. Set selector lever to 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-889. "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943134

#### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[MR18DE (FOR CALIFORNIA)]

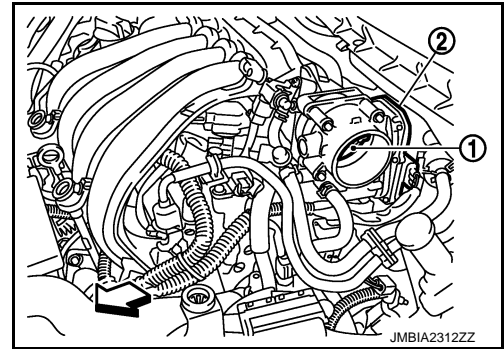
< DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.
  - Electric throttle control actuator (2)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Remove the foreign matter and clean the electric throttle control actuator inside, then perform throttle valve closed position learning. Refer to [EC-502, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).



## 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26, "Exploded View"](#).

>> INSPECTION END

# P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2122, P2123 APP SENSOR

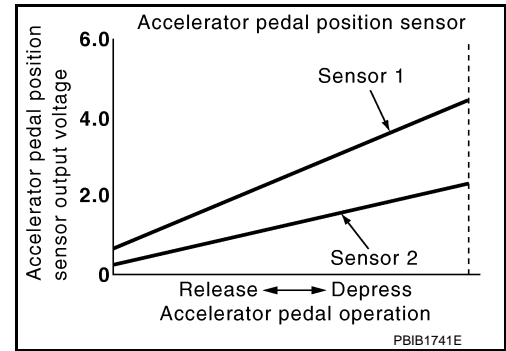
### Description

INFOID:000000006943136

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

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

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



### DTC Logic

INFOID:000000006943137

#### 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-824, "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.	• Harness or connectors (APP sensor 1 circuit is open or shorted.)
P2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	• Accelerator pedal position sensor (APP 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 8 V at idle.

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

##### Is DTC detected?

- YES >> Go to [EC-891, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943138

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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.

## P2122, P2123 APP SENSOR

[MR18DE (FOR CALIFORNIA)]

### < DTC/CIRCUIT DIAGNOSIS >

- Turn ignition switch ON.
- Check the voltage between APP sensor harness connector and ground.

APP sensor		Ground	Voltage
Connector	Terminal		
E110	4	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	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 APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	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 APP SENSOR

Refer to [EC-892, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

### 6.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

### 7.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006943139

### 1.CHECK ACCELERATOR PEDAL POSITION SENSOR

# P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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

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

Is the inspection result normal?

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

## 2. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3. "Removal and Installation"](#).

>> INSPECTION END

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O  
P

# P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## P2127, P2128 APP SENSOR

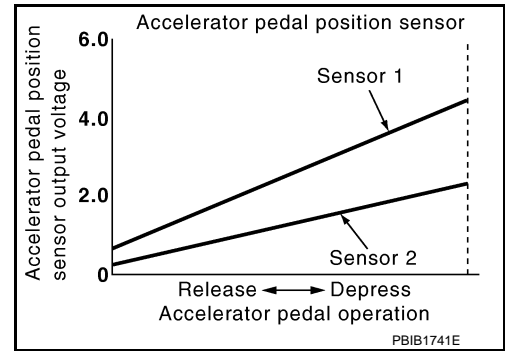
### Description

INFOID:000000006943141

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

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

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



### DTC Logic

INFOID:000000006943142

### 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"> <li>• 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.) (Battery current sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.)</li> <li>• Accelerator pedal position sensor (APP sensor 2)</li> <li>• Crankshaft position sensor (POS)</li> <li>• Refrigerant pressure sensor</li> <li>• EVAP control system pressure sensor</li> <li>• Battery current sensor</li> <li>• Tumble control valve position sensor</li> </ul>
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 8 V at idle.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> Go to [EC-895. "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

# P2127, P2128 APP SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006943143

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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		
E110	5	Ground	Approx. 5 V

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	
E110	5	E16	102	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 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
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842. "Component Inspection"](#).)
- Crankshaft position sensor (POS) (Refer to [EC-739. "Component Inspection"](#).)

# P2127, P2128 APP SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure"](#).)
- Tumble control valve (Refer to [EC-876, "Component Inspection"](#).)

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	
E110	1	E16	104	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	
E110	6	E16	103	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

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 10.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952392

## 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

## 2.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

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# P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

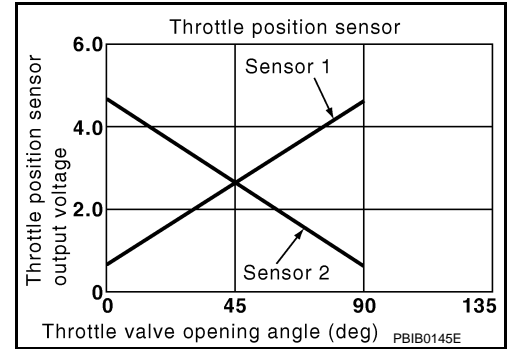
## P2135 TP SENSOR

### Description

INFOID:000000006943146

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

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



### DTC Logic

INFOID:000000006943147

#### DTC DETECTION LOGIC

##### NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-824, "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"><li>• Harness or connector (TP sensor 1 or 2 circuit is open or shorted.)</li><li>• Electric throttle control actuator (TP sensor 1 or 2)</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

##### TESTING CONDITION:

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

>> GO TO 2.

##### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-898, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006943148

##### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "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

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

# P2135 TP SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle control actuator		Ground	Voltage
Connector	Terminal		
F29	2	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### 3.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	
F29	4	F8	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

### 4.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	
F29	1	F8	33	Existed
	3		34	

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-899, "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 [EM-26, "Exploded View"](#).

>> INSPECTION END

### 7.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006943149

### 1.CHECK THROTTLE POSITION SENSOR

# P2135 TP SENSOR

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Perform [EC-502. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"](#).
4. Turn ignition switch ON.
5. Set selector 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				
F8	33 (TP sensor 1 signal)	Ground	Accelerator pedal	Fully released	More than 0.36V
			Fully de- pressed	Less than 4.75V	
	Accelerator pedal		Fully released	Less than 4.75V	
			Fully de- pressed	More than 0.36V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

## 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to [EM-26. "Exploded View"](#).

>> INSPECTION END

P2138 APP SENSOR

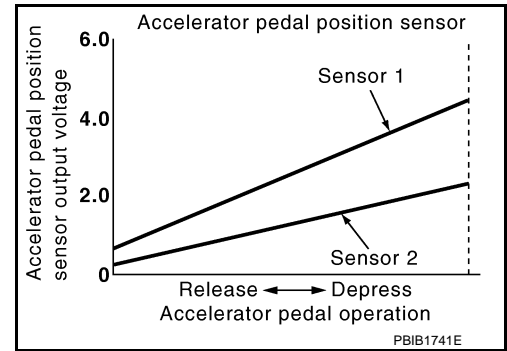
Description

INFOID:000000006943151

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

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

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



DTC Logic

INFOID:000000006943152

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-824, "DTC Logic"](#).

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

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to [EC-902, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

# P2138 APP SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000006943153

## Diagnosis Procedure

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44. "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		
E110	4	Ground	Approx. 5 V

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

APP sensor		Ground	Voltage
Connector	Terminal		
E110	5	Ground	Approx. 5 V

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	
E110	4	E16	106	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 SENSOR POWER SUPPLY CIRCUIT

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

# P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
F8	69	Tumble control valve actuator	F22	1
	71	Battery current sensor	F53	1
	74	Refrigerant pressure sensor	E49	3
	75	CKP sensor (POS)	F20	1
	76	EVAP control system pressure sensor	B21	3
E16	102	APP sensor	E110	5

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.

- Battery current sensor (Refer to [EC-842, "Component Inspection".](#))
- Crankshaft position sensor (POS) (Refer to [EC-739, "Component Inspection".](#))
- Refrigerant pressure sensor (Refer to [EC-937, "Diagnosis Procedure".](#))
- Tumble control valve (Refer to [EC-876, "Component Inspection".](#))

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

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

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E16	111	Existed
	1		104	

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

Is the inspection result normal?

YES >> GO TO 8.

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

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

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	
E110	3	E16	110	Existed
	6		103	

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

Is the inspection result normal?

YES >> GO TO 9.

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

## 9.CHECK APP SENSOR

# P2138 APP SENSOR

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

Refer to [EC-904, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> GO TO 10.

## 10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

## 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection

INFOID:000000006952393

## 1. CHECK ACCELERATOR PEDAL POSITION SENSOR

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

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

Is the inspection result normal?

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

## 2. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-3, "Removal and Installation"](#).

>> INSPECTION END

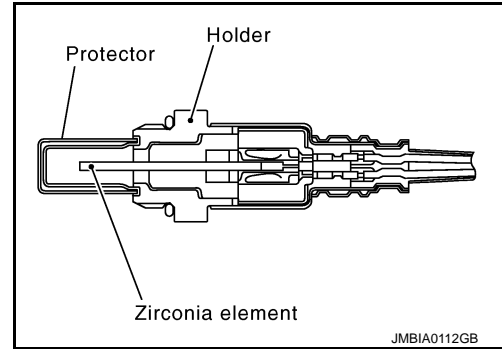


P2A00 A/F SENSOR 1

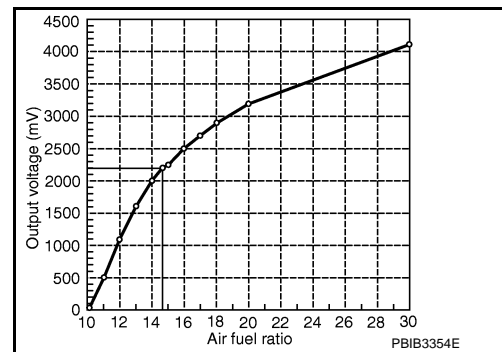
Description

INFOID:000000006943156

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.



Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of about 800°C (1,472°F).



DTC Logic

INFOID:000000006943157

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"> <li>The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.</li> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.</li> </ul>	<ul style="list-style-type: none"> <li>A/F sensor 1</li> <li>A/F sensor 1 heater</li> <li>Fuel pressure</li> <li>Fuel injector</li> <li>Intake air leaks</li> </ul>

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear the mixture ratio self-learning value. Refer to [EC-505, "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.

# P2A00 A/F SENSOR 1

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

6. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to [EC-906, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006943158

### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E38. Refer to [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

### 2. CHECK HARNESS CONNECTOR

1. Disconnect A/F sensor 1 harness connector.
2. Check harness connector for water.

**Water should not exit.**

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace harness connector.

### 3. RETIGHTEN A/F SENSOR 1

1. Loosen and retighten the A/F sensor 1. Refer to [EM-30, "Exploded View"](#).

>> GO TO 4.

### 4. CHECK FOR INTAKE AIR LEAK

1. Reconnect A/F sensor 1 harness connector.
2. Start engine and run it at idle.
3. Listen for an intake air leak after the mass air flow sensor.

Is intake air leak detected?

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

### 5. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to [EC-505, "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-703, "DTC Logic"](#) or [EC-707, "DTC Logic"](#).
- NO >> GO TO 6.

### 6. CHECK 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		
F51	4	Ground	Battery voltage

Is the inspection result normal?

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

< DTC/CIRCUIT DIAGNOSIS >

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E15
- 10 A fuse (No. 61)
- 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	
F51	1	F8	49	Existed
	2		53	

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

A/F sensor 1		Ground	Continuity
Connector	Terminal		
F51	1	Ground	Not existed
	2		

ECM		Ground	Continuity
Connector	Terminal		
F8	49	Ground	Not existed
	53		

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-631, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "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. Refer to [EM-30, "Exploded View"](#).

**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.

## P2A00 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

- Before installing new sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved Anti-seize Lubricant (commercial service tool).

Do you have CONSULT-III?

YES >> GO TO 12.

NO >> GO TO 13.

### 12.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.

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-505, "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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## ASCD BRAKE SWITCH

### Description

INFOID:000000006943159

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-548, "System Description"](#) for the ASCD function.

### Component Function Check

INFOID:000000006943160

#### 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 terminals.

Connector	ECM		Condition	Voltage	
	+	-			
	Terminal	Terminal			
E16	100 (ASCD brake switch signal)	108	Brake pedal (CVT)	Slightly depressed	Approx. 0 V
			Brake pedal and clutch pedal (M/T)	Fully released	Battery voltage

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Go to [EC-909, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943161

#### 1. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-I

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		
E112	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.  
 NO-1 >> CVT models: GO TO 2.  
 NO-2 >> M/T models: GO TO 3.

#### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E105, M77

# ASCD BRAKE SWITCH

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

- 10 A fuse (No. 2)
- 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.

### 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY 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	Voltage
Connector	Terminal		
E111	3	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 E105, M77
- 10 A fuse (No. 2)
- Harness for open or short between ASCD clutch switch and fuse

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

### 5. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD clutch switch harness connector and ASCD brake switch harness connector.

ASCD clutch switch		ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	
E111	4	E112	1	Existed

4. 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 ASCD CLUTCH SWITCH

Refer to [EC-911, "Component Inspection \(ASCD Clutch Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Replace ASCD clutch switch. Refer to [CL-10, "Exploded View"](#).

### 7. 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	
E112	2	E16	100	Existed

# ASCD BRAKE SWITCH

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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 ASCD BRAKE SWITCH

Refer to [EC-911, "Component Inspection \(ASCD Brake Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace ASCD brake switch. Refer to [BR-17, "Exploded View"](#).

## 9.CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (ASCD Brake Switch)

INFOID:000000006952387

### 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-18, "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. Refer to [BR-17, "Exploded View"](#).

## Component Inspection (ASCD Clutch Switch)

INFOID:000000006952388

### 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

# ASCD BRAKE SWITCH

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

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-11, "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 de-pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch. Refer to [CL-10, "Exploded View"](#).



## ASC D INDICATOR

### Description

INFOID:000000006943164

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-548. "System Description"](#) for the ASC D function.

### Component Function Check

INFOID:000000006943165

#### 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"> <li>• Ignition switch: ON</li> </ul>	<ul style="list-style-type: none"> <li>• MAIN switch: Pressed at the 1st time → at the 2nd time</li> </ul>	ON → OFF
SET LAMP	<ul style="list-style-type: none"> <li>• MAIN switch: ON</li> <li>• When vehicle speed: Between 40 km/h (25 MPH) and 190 km/h (118 MPH) (For the Middle East), 40 km/h (25 MPH) and 160 km/h (100 MPH) (Except for the Middle East)</li> </ul>	<ul style="list-style-type: none"> <li>• ASC D: Operating</li> </ul>	ON
		<ul style="list-style-type: none"> <li>• ASC D: Not operating</li> </ul>	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-913. "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943166

#### 1. CHECK DTC

Check that DTC U1001 is not displayed.

Is DTC detected?

NO >> GO TO 2.

YES >> Perform trouble diagnosis for DTC U1001. Refer to [EC-624. "DTC Logic"](#).

#### 2. CHECK COMBINATION METER OPERATION

Refer to [MWI-6. "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check combination meter circuit. Refer to [MWI-6. "METER SYSTEM : System Diagram"](#).

#### 3. CHECK INTERMITTENT INCIDENT

Refer to [GI-41. "Intermittent Incident"](#).

>> INSPECTION END

COOLING FAN

Description

INFOID:000000006943167

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 3-step control [HIGH/LOW/OFF].

COOLING FAN MOTOR

Models without A/C

The cooling fan operates at each speed when the current flows in the cooling fan motor as per the following.

Cooling fan Speed	Cooling fan motor terminals	
	(+)	(-)
Low (LOW)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4

Models with A/C

The cooling fan operates at high (HI) speed when the current flows, and operates at low (LOW) speed when cooling fan motor and the resistor are circuited in series.

Component Function Check

INFOID:000000006943168

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. Touch "LOW" and "Hi" on the CONSULT-III screen.
4. Check that cooling fan operates at each speed.

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PCS-11, "Diagnosis Description"](#) or [PCS-41, "Diagnosis Description"](#).
2. Check that cooling fan operates at each speed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Refer to [EC-914, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006943169

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.
2. Check ground connection E21. Refer to Ground Inspection in [GI-44, "Circuit Inspection"](#).

Is the inspection result normal?

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

2. CHECK COOLING FAN MOTOR CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check the continuity between IPDM E/R harness connector and cooling fan motor harness connector.

# COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

IPDM E/R		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	
E10	5	E62	1	Existed
	7		2	
E11	10		3	

3. Check the continuity between cooling fan motor harness connector and ground.

Cooling fan motor		Ground	Continuity
Connector	Terminal		
E62	4	Ground	Existed

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

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground

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

### 4. CHECK COOLING FAN MOTOR

Refer to [EC-915, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace cooling fan motor. Refer to [CO-18, "Exploded View"](#).

### 5. CHECK INTERMITTENT INCIDENT

Perform [GI-41, "Intermittent Incident"](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-Key) or [PCS-64, "Removal and Installation"](#) (Without I-Key).
- NG >> Repair or replace harness or connector.

## Component Inspection

INFOID:000000006943170

### COOLING FAN MOTOR

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
		2	3
	High	1 and 2	3 and 4

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.

# ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## ELECTRICAL LOAD SIGNAL

### Description

INFOID:000000006943171

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication line.

### Component Function Check

INFOID:000000006943172

#### 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-916, "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-916, "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-916, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943173

#### 1. INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to [EC-916, "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-3, "Work Flow"](#).

# ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

>> INSPECTION END

A

## 3.CHECK HEADLAMP SYSTEM

Refer to [EXL-5. "Work Flow"](#).

EC

>> INSPECTION END

## 4.CHECK HEATER FAN CONTROL SYSTEM

Refer to [HA-3. "Work Flow"](#).

C

>> INSPECTION END

D

E

F

G

H

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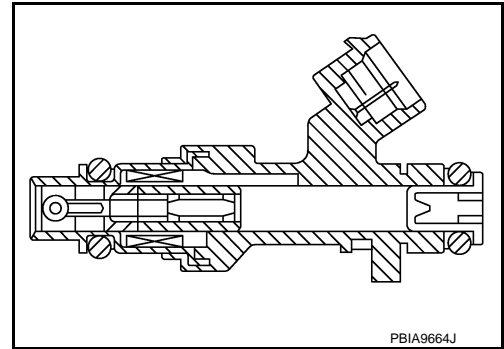
P

## FUEL INJECTOR

### Description

INFOID:000000006943174

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:000000006943175

#### 1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to [EC-918, "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

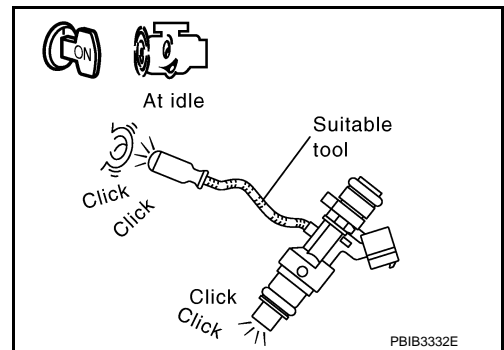
1. Let engine idle.
2. Listen to each fuel injector operating sound.

**Clicking noise should be heard.**

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to [EC-918, "Diagnosis Procedure"](#).



### Diagnosis Procedure

INFOID:000000006943176

#### 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

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

Fuel injector			Ground	Voltage
Cylinder	Connector	Terminal		
1	F37	1	Ground	Battery voltage
2	F38	1		
3	F39	1		
4	F40	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 E15
- 15 A fuse (No. 62)
- 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	F37	2	F7	31	Existed
2	F38	2		30	
3	F39	2		29	
4	F40	2		25	

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-919, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace malfunctioning fuel injector.

## 5. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY), [PCS-64, "Removal and Installation"](#) (Without I-KEY).
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

## Component Inspection

INFOID:000000006943177

## 1. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.

## FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

3. Check resistance between fuel injector terminals as per the following.

Terminals	Resistance
1 and 2	11.1 - 14.5 $\Omega$ [at 10 - 60°C (50 - 140°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector. Refer to [EM-36, "Exploded View"](#).



# FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## FUEL PUMP

### Description

INFOID:000000006943178

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 start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
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:000000006943179

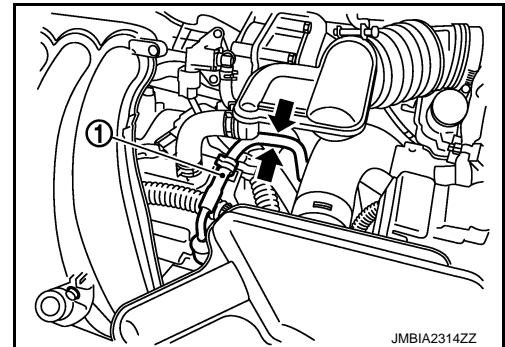
#### 1.CHECK FUEL PUMP FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose (1) with two fingers.

**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-921, "Diagnosis Procedure"](#).



### Diagnosis Procedure

INFOID:000000006943180

#### 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		
F7	23	Ground	Battery voltage

Is the inspection result normal?

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

#### 2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

# FUEL PUMP

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E13.
3. Turn ignition switch ON.
4. Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		Ground	Voltage
Connector	Terminal		
E13	31	Ground	Battery voltage

Is the inspection result normal?

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

### 3.DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E8, F1
- 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.

### 4.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect "fuel level sensor unit and fuel pump" harness connector.
4. Turn ignition switch ON.
5. 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		
B40	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.

Is the inspection result normal?

- YES >> GO TO 8.  
NO >> GO TO 5.

### 5.CHECK FUSE

1. Turn ignition switch OFF.
2. Disconnect 15 A fuse (No. 60) from IPDM E/R.
3. Check 15 A fuse.

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace 15 A fuse.

### 6.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E15.
2. Check the 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	
E15	55	B40	1	Existed

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

Is the inspection result normal?

- YES >> GO TO 10.  
NO >> GO TO 7.

# FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M18
- Harness connectors M77, E105
- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

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

## 8. 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		
B40	3	Ground	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

## 9. CHECK FUEL PUMP

Refer to [EC-923, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Exploded View"](#).

## 10. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to [PCS-34, "Removal and Installation"](#) (With I-KEY), [PCS-64, "Removal and Installation"](#) (Without I-KEY).

NO >> Repair or replace harness or connectors.

## Component Inspection

INFOID:000000006943181

### 1. CHECK FUEL PUMP

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check resistance between “fuel level sensor unit and fuel pump” terminals as per the following.

Terminals	Resistance
1 and 3	0.2 - 5.0 Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-5, "Removal and Installation"](#).

## IGNITION SIGNAL

### Description

INFOID:000000006943182

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:000000006943183

#### 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-924, "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.

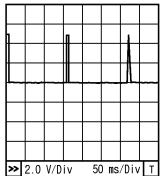
Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to [EC-924, "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		
F7	17	Ground	
	18		
	21		
	22		

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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-924, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943184

#### 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		
E16	105	Ground	Battery voltage

# IGNITION SIGNAL

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to [EC-619, "Diagnosis Procedure"](#).

### 2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect Condenser harness connector.
3. Turn ignition switch ON.
4. Check the voltage between condenser harness connector and ground.

Condenser		Ground	Voltage
Connector	Terminal		
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

### 3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E14.
3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Condenser		Continuity
Connector	Terminal	Connector	Terminal	
E14	44	F13	1	Existed

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

Is the inspection result normal?

YES >> Go to [EC-619, "Diagnosis Procedure"](#).

NO >> GO TO 4.

### 4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F1
- IPDM E/R harness connector E14
- Harness for open or short between IPDM E/R and condenser

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

### 5.CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check the continuity between Condenser harness connector and ground.

Condenser		Ground	Continuity
Connector	Terminal		
F13	2	Ground	Existed

3. Also check harness for 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 CONDENSER

Refer to [EC-928, "Component Inspection \(Condenser\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

# IGNITION SIGNAL

[MR18DE (FOR CALIFORNIA)]

## < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace condenser.

### 7. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

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

Ignition coil			Ground	Voltage
Cylinder	Connector	Terminal		
1	F33	3	Ground	Battery voltage
2	F34	3		
3	F35	3		
4	F36	3		

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 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	F33	2	Ground	Existed
2	F34	2		
3	F35	2		
4	F36	2		

3. 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 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	F33	1	F7	17	Existed
2	F34	1		18	
3	F35	1		22	
4	F36	1		21	

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 IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-927, "Component Inspection \(Ignition Coil with Power Transistor\)"](#).

Is the inspection result normal?

YES >> GO TO 11.

# IGNITION SIGNAL

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace malfunctioning ignition coil with power transistor. Refer to [EM-41, "Exploded View"](#).

## 11. CHECK INTERMITTENT INCIDENT

Refer to [GI-41, "Intermittent Incident"](#).

>> INSPECTION END

## Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000006943185

### 1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as per the following.

Terminals	Resistance [ $\Omega$ at 25°C (77°F)]
1 and 2	Except 0 or $\infty$
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. Refer to [EM-41, "Exploded View"](#).

### 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. Refer to [EM-41, "Exploded View"](#).
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.**

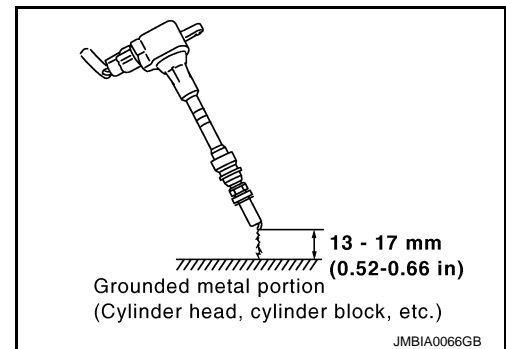
#### CAUTION:

- During the operation, always stay 0.5 cm (19.7 in) away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV 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

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace malfunctioning ignition coil with power transistor. Refer to [EM-41, "Exploded View"](#).

## Component Inspection (Condenser)

INFOID:000000006943186

### 1. CHECK CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals as per the following.

Terminals	Resistance
1 and 2	Above 1 M $\Omega$ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace Condenser.



# MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## MALFUNCTION INDICATOR LAMP

### Description

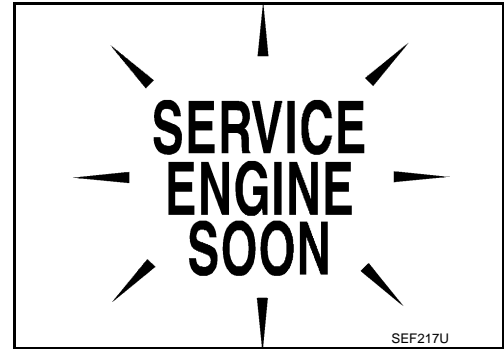
INFOID:000000006943187

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-598, "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp \(MIL\)"](#).



### Component Function Check

INFOID:000000006943188

#### 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-929, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943189

#### 1. CHECK DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Perform trouble diagnosis for DTC UXXXX.

#### 2. CHECK DTC WITH METER

Refer to [MWI-30, "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-41, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace combination meter. Refer to [MWI-97, "Exploded View"](#).  
NO >> Repair or replace.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

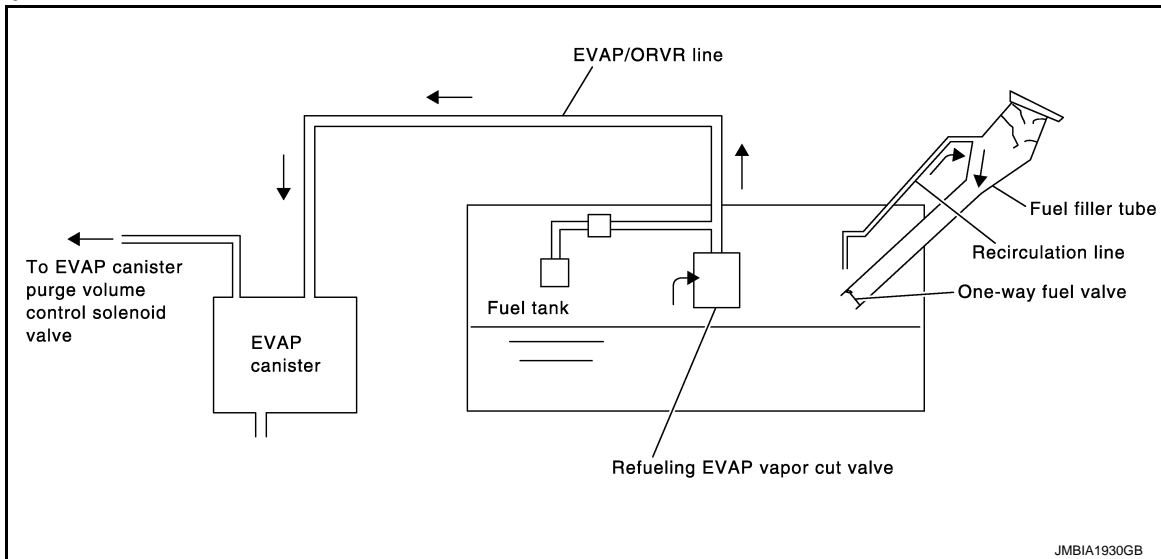
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### Description

INFOID:000000006943190



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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 CO<sub>2</sub> 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-989, "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:000000006943191

#### 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-930, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006943192

#### 1. INSPECTION START

Check whether the following symptoms are present.

A: Fuel odor from EVAP canister is strong.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT 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 8.

## 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 1.9 kg (4.2 lb).**

Is the inspection result normal?

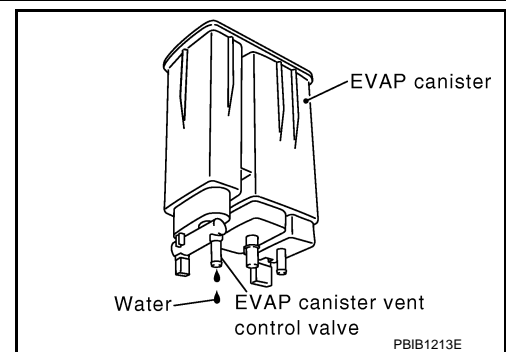
- YES >> GO TO 3.
- NO >> GO TO 4.

## 3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

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



## 4.REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Exploded View"](#).

>> GO TO 5.

## 5.CHECK DRAIN FILTER

Refer to [EC-797, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

- OK >> GO TO 6.
- NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).

## 6.DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 7.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-933, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## 8.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 1.9 kg (4.2 lb).**

Is the inspection result normal?

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

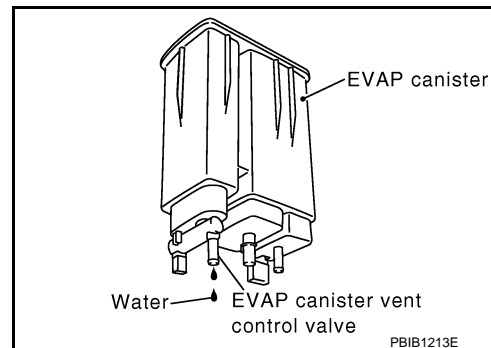
- YES >> GO TO 9.  
NO >> GO TO 10.

## 9. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 10.  
NO >> GO TO 13.



## 10. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Exploded View"](#).

>> GO TO 11.

## 11. CHECK DRAIN FILTER

Refer to [EC-797, "Component Inspection \(Drain filter\)"](#).

Is the inspection result normal?

- OK >> GO TO 12.  
NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).

## 12. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 13. 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 14.  
NO >> Repair or replace hoses and tubes.

## 14. CHECK RECIRCULATION LINE

Check recirculation line for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace fuel filler tube.

## 15. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-933, "Component Inspection \(Refueling EVAP vapor cut valve\)"](#).

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## 16. CHECK FUEL FILLER TUBE

Check fuel filler tube and hose connected to the fuel tank for clogging, dents and cracks.

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> Replace fuel filler tube.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR18DE (FOR CALIFORNIA)]

< DTC/CIRCUIT DIAGNOSIS >

## 17. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace one-way fuel valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## 18. CHECK ONE-WAY FUEL VALVE-II

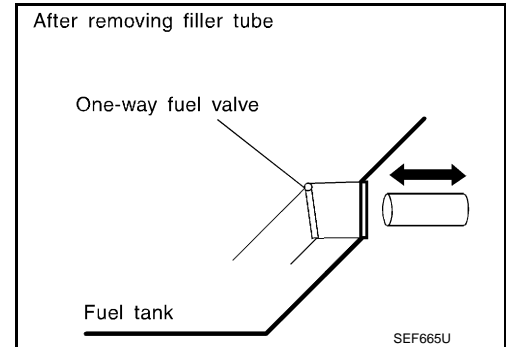
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as per the following.  
When a stick is inserted, the valve should open, when removing stick it should close.

**Do not drop any material into the tank.**

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to [FL-9, "Exploded View"](#).



## Component Inspection (Refueling EVAP vapor cut valve)

INFOID:000000006943193

### 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-9, "Removal and Installation"](#).
2. Drain fuel from the tank as per the following:
  - Remove fuel feed hose located on the fuel gauge retainer.
  - Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
  - Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
3. Check refueling EVAP vapor cut valve for being stuck to close as per the following.  
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
  - Connect vacuum pump to hose end.
  - Remove fuel gauge retainer with fuel gauge unit. Refer to [FL-5, "Exploded View"](#).

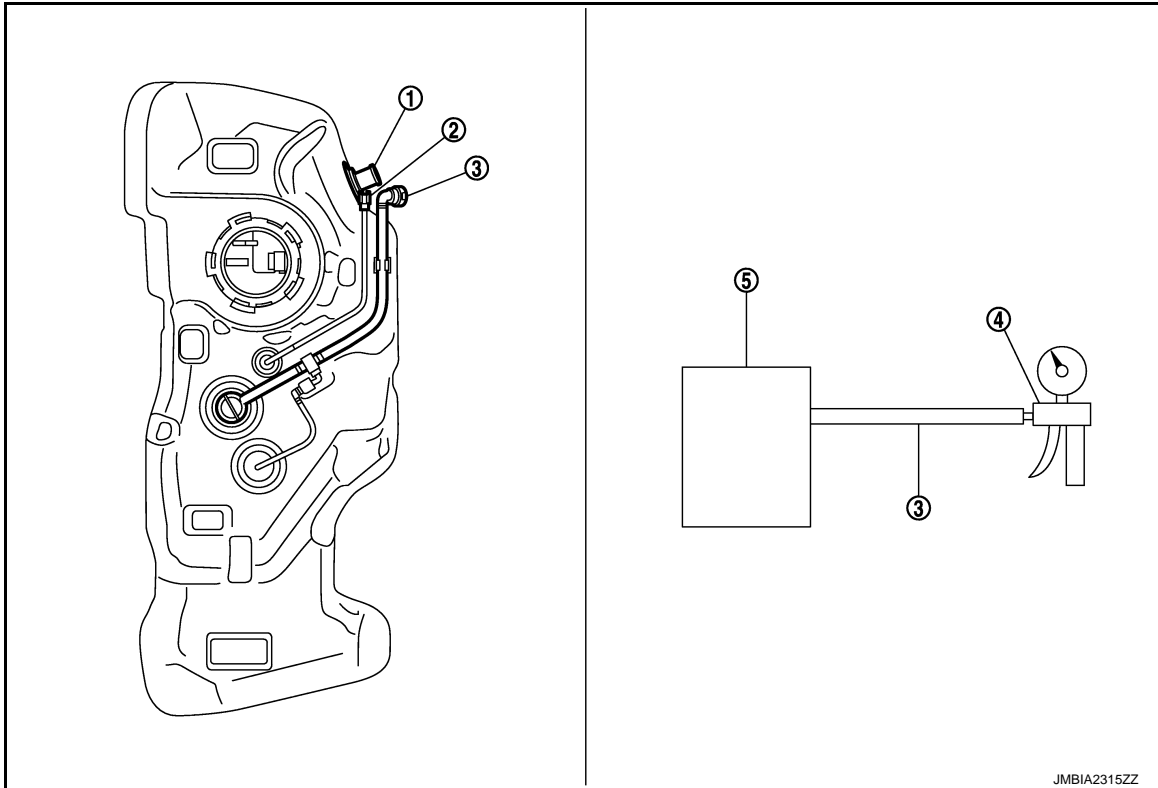
**Always replace O-ring with new one.**

  - Put fuel tank upside down.
  - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]



- |                               |                       |                   |
|-------------------------------|-----------------------|-------------------|
| 1. Filler tube                | 2. Recirculation line | 3. EVAP/ORVR line |
| 4. Vacuum/pressure handy pump | 5. Fuel tank          |                   |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## 3. CHECK REFUELING EVAP VAPOR CUT VALVE

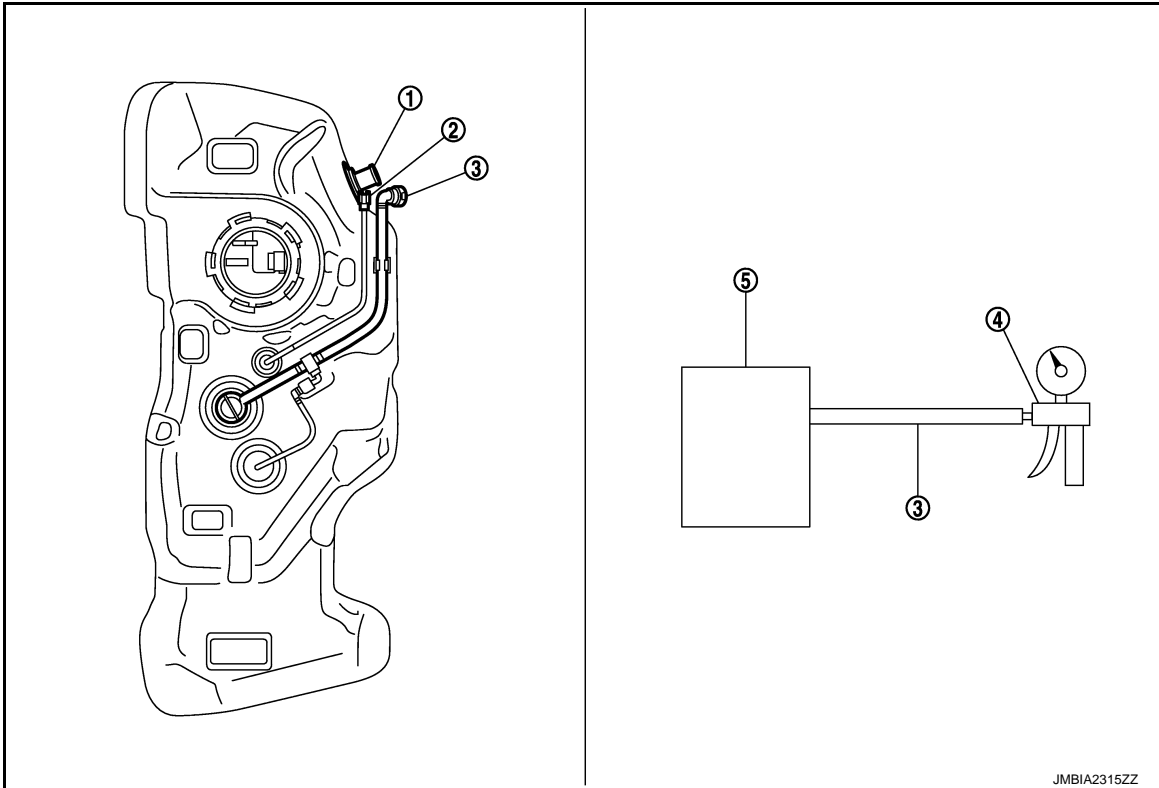
⊗ **Without CONSULT-III**

1. Remove fuel tank. Refer to [FL-9, "Removal and Installation"](#).
  2. Drain fuel from the tank as per the following:
    - Remove fuel gauge retainer.
    - Drain fuel from the tank using a handy pump into a fuel container.
  3. Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
  4. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
    - Connect vacuum pump to hose end.
    - Remove fuel gauge retainer with fuel gauge unit. Refer to [FL-5, "Exploded View"](#).
- Always replace O-ring with new one.**
- Put fuel tank upside down.
  - Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]



1. Filler tube
2. Recirculation line
3. EVAP/ORVR line
4. Vacuum/pressure handy pump
5. Fuel tank

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-9, "Exploded View"](#).

## Component Inspection (Drain filter)

INFOID:000000006952447

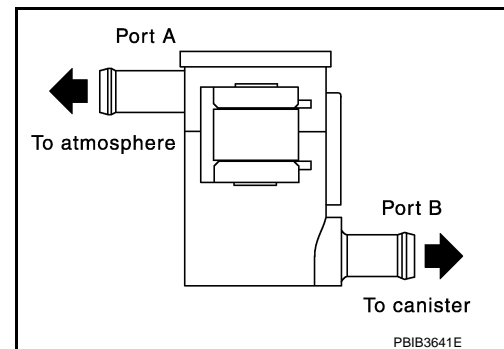
### 1. CHECK DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace drain filter. Refer to [EC-565, "System Description"](#).



# POSITIVE CRANKCASE VENTILATION

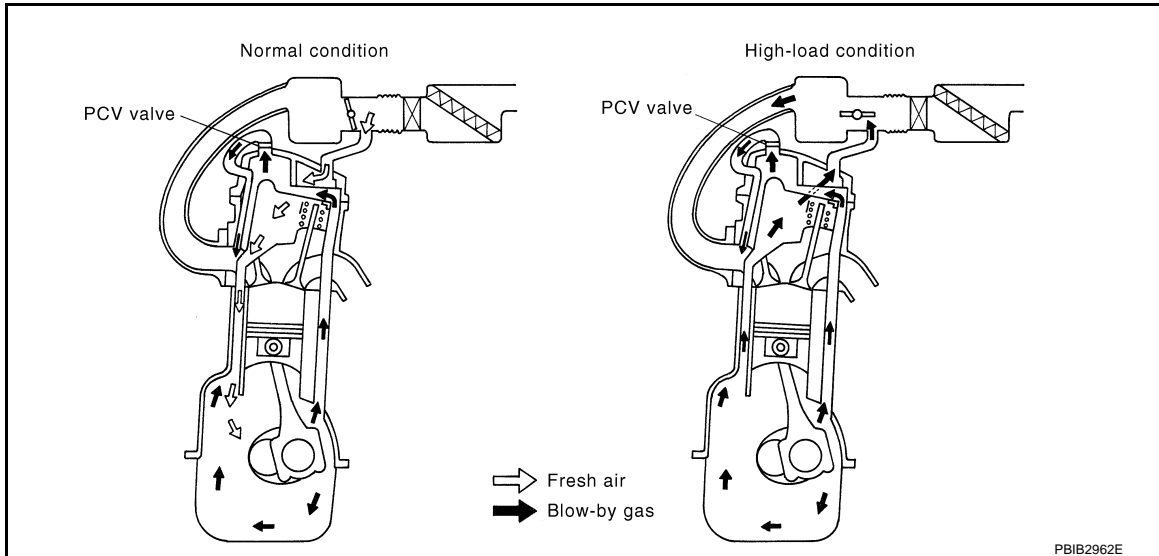
< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## POSITIVE CRANKCASE VENTILATION

### Description

INFOID:000000006943195



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

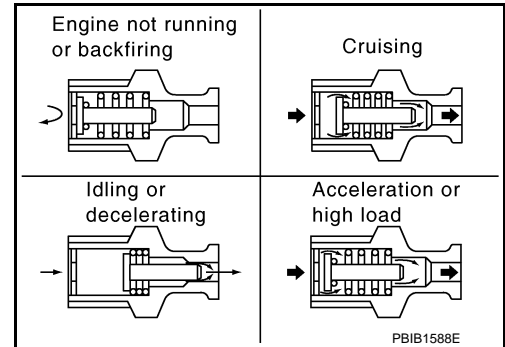
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



### Component Inspection

INFOID:000000006943196

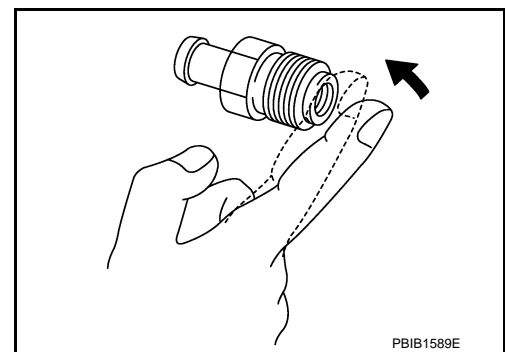
#### 1. CHECK PCV VALVE

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. Refer to [EM-41. "Exploded View"](#).





# REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

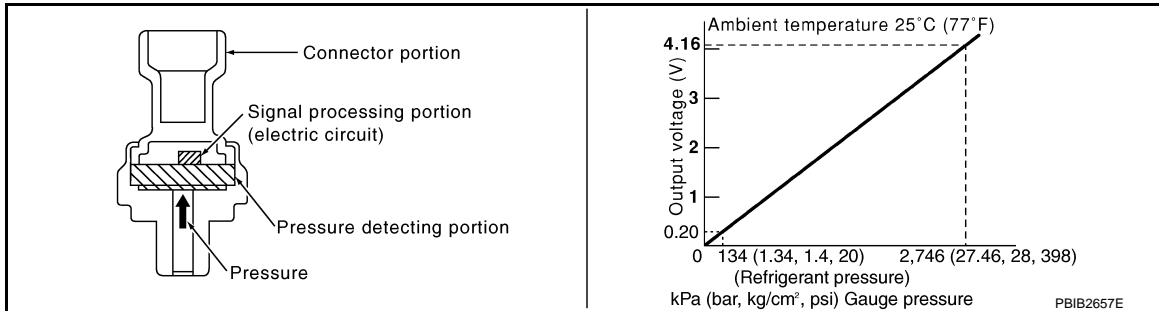
[MR18DE (FOR CALIFORNIA)]

## REFRIGERANT PRESSURE SENSOR

### Description

INFOID:000000006943197

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:000000006943198

#### 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		
F8	41 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

- YES >> INSPECTION END  
 NO >> Go to [EC-937, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006943199

#### 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 E38. Refer to [GI-44, "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		
E49	3	Ground	Approx. 5 V

Is the inspection result normal?

- YES >> GO TO 4.

# REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

NO >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E8
- 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	
E49	1	F8	48	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 E8, F1
- 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	
E49	2	F8	41	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 E8, F1
- 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-41, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor. Refer to [HAC-145, "Exploded View"](#).

NO >> Repair or replace.

# ECU DIAGNOSIS INFORMATION

## ECM

### Reference Value

INFOID:000000006943200

#### 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 <a href="#">EC-612, "Diagnosis Procedure"</a> .		
B/FUEL SCHDL	See <a href="#">EC-612, "Diagnosis Procedure"</a> .		
A/F ALPHA-B1	See <a href="#">EC-612, "Diagnosis Procedure"</a> .		
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158F)
A/F SEN1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	• Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.		0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)	- 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		
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 - 14 V
ACCEL SEN 1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*1	• Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9 V
		Accelerator pedal: Fully depressed	3.9 - 4.8 V
TP SEN 1-B1	• Ignition switch: ON (Engine stopped) • Selector lever position: D (CVT) or 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
TP SEN 2-B1*1	• Ignition switch: ON (Engine stopped) • Selector lever position: D (CVT) or 1st (M/T)	Accelerator pedal: Fully released	More than 0.36 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
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 position: P or N (CVT) or Neutral (M/T)	ON
		Selector lever position: Except above	OFF

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Monitor Item	Condition	Values/Status	
PW/ST SIGNAL	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>	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"> <li>Ignition switch: ON → OFF → ON</li> </ul>		ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Heater fan switch: ON	ON
		Heater fan switch: OFF	OFF
BRAKE SW	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	8 - 18°BTDC
		2,000 rpm	25 - 45°BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	10 - 35%
		2,500 rpm	10 - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	1.0 - 4.0 g/s
		2,500 rpm	2.0 - 10.0 g/s
PURG VOL C/V	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	0%
		2,000 rpm	0 - 50%
INT/V TIM (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	-5 - 5°CA
		2,000 rpm	Approx. 0 - 40°CA
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Selector lever position: P or N (CVT) or Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	0 - 2%
		2,000 rpm	Approx. 0 - 90%
SWRL CONT S/V	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Engine coolant temperature: Between 5°C (41°F) and 40°C (104°F)</li> </ul>	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
TMBL POS SEN	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Engine coolant temperature: Between 5°C (41°F) and 60°C (140°F)</li> </ul>	Accelerator pedal: Fully released	Less than 1.2 V
		Accelerator pedal: Slightly depressed	More than 2.9 V

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Monitor Item	Condition		Values/Status	
AIR COND RLY	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Air conditioner switch: OFF	OFF	A
		Air conditioner switch: ON (Compressor operates)	ON	EC
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>For 1 second after turning ignition switch: ON</li> <li>Engine running or cranking</li> </ul>		ON	
	<ul style="list-style-type: none"> <li>Except above</li> </ul>		OFF	C
THRTL RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		ON	
COOLING FAN	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> <li>Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 98°C (208°F) or less	OFF	D
		Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW	E
		Engine coolant temperature is 100°C (212°F) or more	HIGH	
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>Engine speed: Below 3,600 rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul> </li> </ul>		ON	F
VEHICLE SPEED	<ul style="list-style-type: none"> <li>Turn drive wheels and compare CONSULT-III value with the speedometer indication.</li> </ul>		Almost the same speed as the speedometer indication	G
IDL A/V LEARN	<ul style="list-style-type: none"> <li>Engine: running</li> </ul>	Idle air volume learning has not been performed yet.	YET	H
		Idle air volume learning has already been performed successfully.	CMPLT	
TRVL AFTER MIL	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 miles)	I
ENG OIL TEMP	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul>		More than 70°C (158F)	
A/F S1 HTR (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine (More than 140 seconds after starting engine)</li> </ul>		4 - 100%	J
AC PRESS SEN	<ul style="list-style-type: none"> <li>Engine: Idle</li> <li>Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>		1.0 - 4.0 V	
EVAP SYS PRES	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Approx 1.8 - 4.8 V	K
VENT CONT/V	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		OFF	
I/P PULLY SPD	<ul style="list-style-type: none"> <li>Vehicle speed: More than 20 km/h (12MPH)</li> </ul>		Almost the same speed as the tachometer indication.	L
A/F ADJ-B1	<ul style="list-style-type: none"> <li>Engine: Running</li> </ul>		-0.330 - 0.330	
FUEL T/TMP SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Indicates fuel tank temperature.	M
INT/A TEMP SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Indicates intake air temperature.	N
FUEL LEVEL SE	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> </ul>		Depending on fuel level of fuel tank.	
BAT CUR SEN	<ul style="list-style-type: none"> <li>Engine speed: Idle</li> <li>Battery: Fuel charged*2</li> <li>Selector lever: P or N (CVT), Neutral (M/T)</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>		Approx 2,600 - 3,500 mV	O
ALT DUTY	<ul style="list-style-type: none"> <li>Engine: Idle</li> </ul>		0 - 80%	P
ALT DUTY SIG	<ul style="list-style-type: none"> <li>Power generation voltage variable control: Operating</li> </ul>		ON	
	<ul style="list-style-type: none"> <li>Power generation voltage variable control: Not operating</li> </ul>		OFF	
VHCL SPEED SE	<ul style="list-style-type: none"> <li>Turn drive wheels and compare CONSULT-III value with the speedometer indication.</li> </ul>		Almost the same speed as the speedometer indication.	

# ECM

## < ECU DIAGNOSIS INFORMATION >

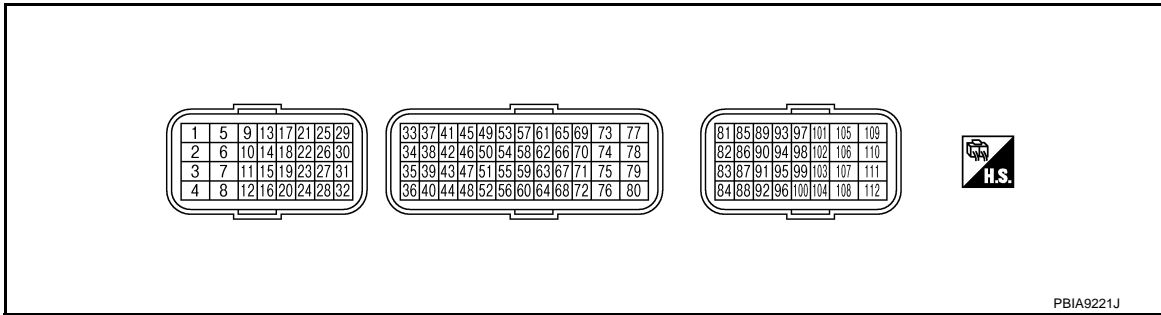
**[MR18DE (FOR CALIFORNIA)]**

Monitor Item	Condition		Values/Status
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	• Ignition switch: ON	MAIN switch: pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: pressed	ON
		CANCEL switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: pressed	ON
		SET/COAST switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: pressed	ON
		RESUME/ACCELERATE 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 • Vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF
THRTL STK CNT B1	<b>NOTE:</b> The item is indicated, but not used.		—
EVAP LEAK DIAG	Ignition switch: ON		Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON		Indicates the ready condition of EVAP leak diagnosis.
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.		INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.		CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.		INCMP
	DTC P0139 self-diagnosis (slow response) is complete.		CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNT

\*: 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.

\*: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

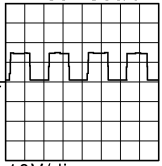
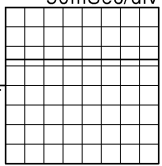
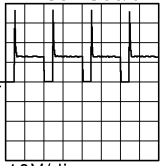
- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
1 (P)	108 (B)	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	3.2 V★ 1mSec/div  5V/div JMBIA0324GB
2 (SB)	108 (B)	Throttle control motor re- lay power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
3 (V)	108 (B)	Tumble control valve mo- tor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4 (L)	108 (B)	Throttle control motor (Close)	Output	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	1.8 V★ 5mSec/div  5V/div JMBIA0326GB
5 (G)	59 (O)	Heated oxygen sensor 2 heater	Output	[Engine is running] • Engine speed: Below 3,600 rpm af- ter 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	10 V★ 50mSec/div  10V/div JMBIA0325GB
				[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14 V)

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

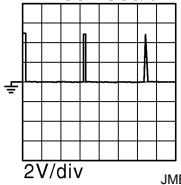
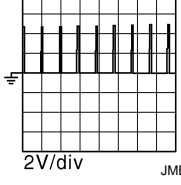
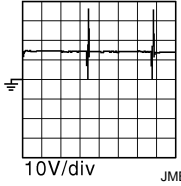
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
6 (W)	108 (B)	Tumble control valve motor (Close)	Output	[Ignition switch: OFF → ON] • For a few seconds after turning ignition switch ON	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
				[Ignition switch: ON → OFF] • For a few seconds after turning ignition switch OFF	0 V ↓ 1.5 - 2.0 V ↓ 0 V
7 (R)	108 (B)	Tumble control valve motor (Open)	Output	[Ignition switch: OFF → ON] • For a few seconds after turning ignition switch ON	0 V ↓ 0.5 V ↓ 0 V
				[Ignition switch: ON → OFF] • For a few seconds after turning ignition switch OFF	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
8 (G)	53 (LG)	A/F sensor 1 heater	Output	[Engine is running] • Warm-up condition • Engine speed: Idle speed (More than 140 seconds after starting engine)	2.9 - 8.8 V★ 50mSec/div  10V/div <small>JMBIA0325GB</small>
9 (P)	108 (B)	EVAP canister purge volume control solenoid valve	Output	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div  10V/div <small>JMBIA0327GB</small>
				[Engine is running] • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.)	10 V★ 50mSec/div  10V/div <small>JMBIA0328GB</small>
11 (B)	—	ECM ground	—	—	—
12 (GR)	—	Sensor ground (Engine oil temperature sensor)	—	—	—



# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
14 (L)	108 (B)	PNP signal	Input	[Ignition switch: ON] • Selector lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: ON] • Selector lever: Except above	0 V
15 (Y)	108 (B)	Throttle control motor re- lay	Output	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: ON]	0 - 1.0 V
17 (R)	108 (B)	Ignition signal No. 1	Output	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	0 - 0.3 V★ 50mSec/div  2V/div JMBIA0329GB
18 (LG)		Ignition signal No. 2			
21 (G)		Ignition signal No. 4			
22 (SB)		Ignition signal No. 3			0.2 - 0.5 V★ 50mSec/div  2V/div JMBIA0330GB
23 (GR)	108 (B)	Fuel pump relay	Output	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
25 (V)	108 (B)	Fuel injector No. 4	Output	[Engine is running] • Warm-up condition • Idle speed <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div  10V/div JMBIA0331GB
29 (Y)		Fuel injector No. 3			
30 (O)		Fuel injector No. 2			
31 (L)		Fuel injector No. 1			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm
27 (R)	12 (GR)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine oil temperature.
28 (SB)	108 (B)	EVAP canister vent con- trol valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
32 (P)	108 (B)	ECM relay (Self shut-off)	Output	[Engine is running] [Ignition switch: OFF] • A few seconds after turning ignition switch OFF	0 - 1.0 V
				[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
33 (LG)	36 (Y)	Throttle position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
				[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34 (R)	36 (Y)	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
				[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
35 (V)	47 (LG)	Tumble control valve position sensor	Input	[Ignition switch: OFF → ON] • For a few seconds after turning ignition switch ON	0 V ↓ 0.7 V
				[Ignition switch: ON → OFF] • For a few seconds after turning ignition switch OFF	0.7 V ↓ 3.5 V ↓ 0 V
36 (Y)	—	Sensor ground (Throttle position sensor)	—	—	—
37 (W)	40 (—)	Knock sensor	Input	[Engine is running] • Idle speed	2.5 V
38 (BR)	44 (GR)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.
40 (—)	—	Sensor ground (Knock sensor)	—	—	—
41 (GR)	48 (BR)	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
42 (V)	51 (Y)	EVAP control system pressure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V
43 (P)	108 (B)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.
44 (GR)	—	Sensor ground (Engine coolant temperature sensor)	—	—	—

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

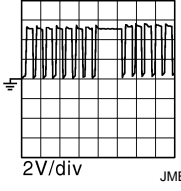
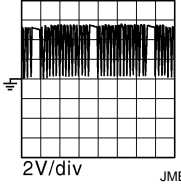
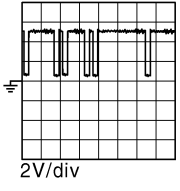
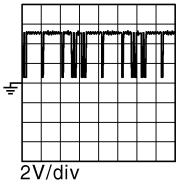
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
45 (G)	52 (R)	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.7 - 1.1 V
				[Engine is running] • Warm-up condition • Engine speed : 2,500 rpm	1.3 - 1.7 V
46 (L)	55 (P)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.
47 (LG)	—	Sensor ground (Tumble control valve position sensor)	—	—	—
48 (BR)	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
49 (V)	53 (LG)	A/F sensor 1	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
50 (W)	59 (O)	Heated oxygen sensor 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 - 1.0 V
51 (Y)	—	Sensor ground (EVAP control system pressure sensor)	—	—	—
52 (R)	—	Sensor ground (Mass air flow sensor)	—	—	—
53 (LG)	—	Sensor ground (A/F sensor 1)	—	—	—
55 (P)	—	Sensor ground (Intake air temperature sensor)	—	—	—
57 (GR)	64 (SB)	Battery current sensor	Input	[Engine is running] • Battery: Fully charged *1 • Idle speed	2.6 - 3.5 V
59 (O)	—	Sensor ground (Heated oxygen sensor 2)	—	—	—

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< ECU DIAGNOSIS INFORMATION >

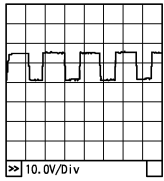
[MR18DE (FOR CALIFORNIA)]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
61 (W)	62 (B)	Crankshaft position sensor (POS)	Input	[Engine is running] <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	4.0 V★ 5mSec/div  2V/div JMBIA0333GB
				[Engine is running] <ul style="list-style-type: none"> <li>• Engine speed: 2,000 rpm</li> </ul>	4.0 V★ 5mSec/div  2V/div JMBIA0334GB
62 (B)	—	Sensor ground [Crankshaft position sensor (POS)]	—	—	—
63 (L)	—	Sensor ground [Camshaft position sensor (PHASE)]	—	—	—
64 (SB)	—	Sensor ground (Battery current sensor)	—	—	—
65 (Y)	63 (L)	Camshaft position sensor (PHASE)	Input	[Engine is running] <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul> <b>NOTE:</b> The pulse cycle changes depending on rpm at idle	0 - 5.0★ 20mSec/div  2V/div JMBIA0045GB
				[Engine is running] <ul style="list-style-type: none"> <li>• Engine speed is 2,000 rpm</li> </ul>	0 - 5.0★ 20mSec/div  2V/div JMBIA0046GB
66 (L)	108 (B)	Power supply for ECM (Back-up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
69 (SB)	47 (LG)	Sensor power supply (Tumble control valve position sensor)	—	[Ignition switch: ON]	5 V
71 (Y)	64 (SB)	Sensor power supply [Battery current sensor]	—	[Ignition switch: ON]	5 V
72 (O)	36 (Y)	Sensor power supply (Throttle position sensor)	—	[Ignition switch: ON]	5 V

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
73 (P)	108 (B)	Intake valve timing control solenoid valve	Output	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Warm-up condition • When revving engine up to 2,000rpm Quickly	7 - 10 V★  PBI4937J
74 (W)	108 (B)	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V
75 (R)	62 (B)	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5 V
76 (LG)	51 (Y)	Sensor power supply [EVAP control system pressure sensor]	—	[Ignition switch: ON]	5 V
78 (G)	63 (L)	Sensor power supply [Camshaft position sensor (PHASE)]	—	[Ignition switch: ON]	5 V
83 (P)	108 (B)	CAN communication line	Input/ Output	—	—
84 (L)	108 (B)	CAN communication line	Input/ Output	—	—
88 (LG)	108 (B)	Data link connector	Input/ Output	—	—
93 (L)	108 (B)	Ignition switch	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
94 (SB)	95 (BR) <sup>*2</sup> (B) <sup>*3</sup>	ASCDC steering switch	Input	[Ignition switch: ON] • ASCDC steering switch: OFF	4 V
				[Ignition switch: ON] • MAIN switch: Pressed	0 V
				[Ignition switch: ON] • CANCEL switch: Pressed	1 V
				[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3 V
				[Ignition switch: ON] • SET/COAST switch: Pressed	2 V
95 (BR) <sup>*2</sup> (B) <sup>*3</sup>	—	Sensor ground (ASCDC steering switch)	—	—	—
99 (W)	108 (B)	Stop lamp switch	Input	[Ignition switch: OFF] • Brake pedal: Fully released	0 V
				[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
100 (SB)	108 (B)	ASCD brake switch	Input	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Slightly depressed (M/T)	0 V
				[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and/or clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)
102 (O)	108 (B)	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5 V
103 (G)	104 (R)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104 (R)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—
105 (G)	108 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
106 (V)	108 (B)	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5 V
107 (B)	—	ECM ground	—	—	—
108 (B)	—	ECM ground	—	—	—
109 (B)	—	ECM ground	—	—	—
110 (BR)	111 (Y)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111 (Y)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—
112 (B)	—	ECM ground	—	—	—

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

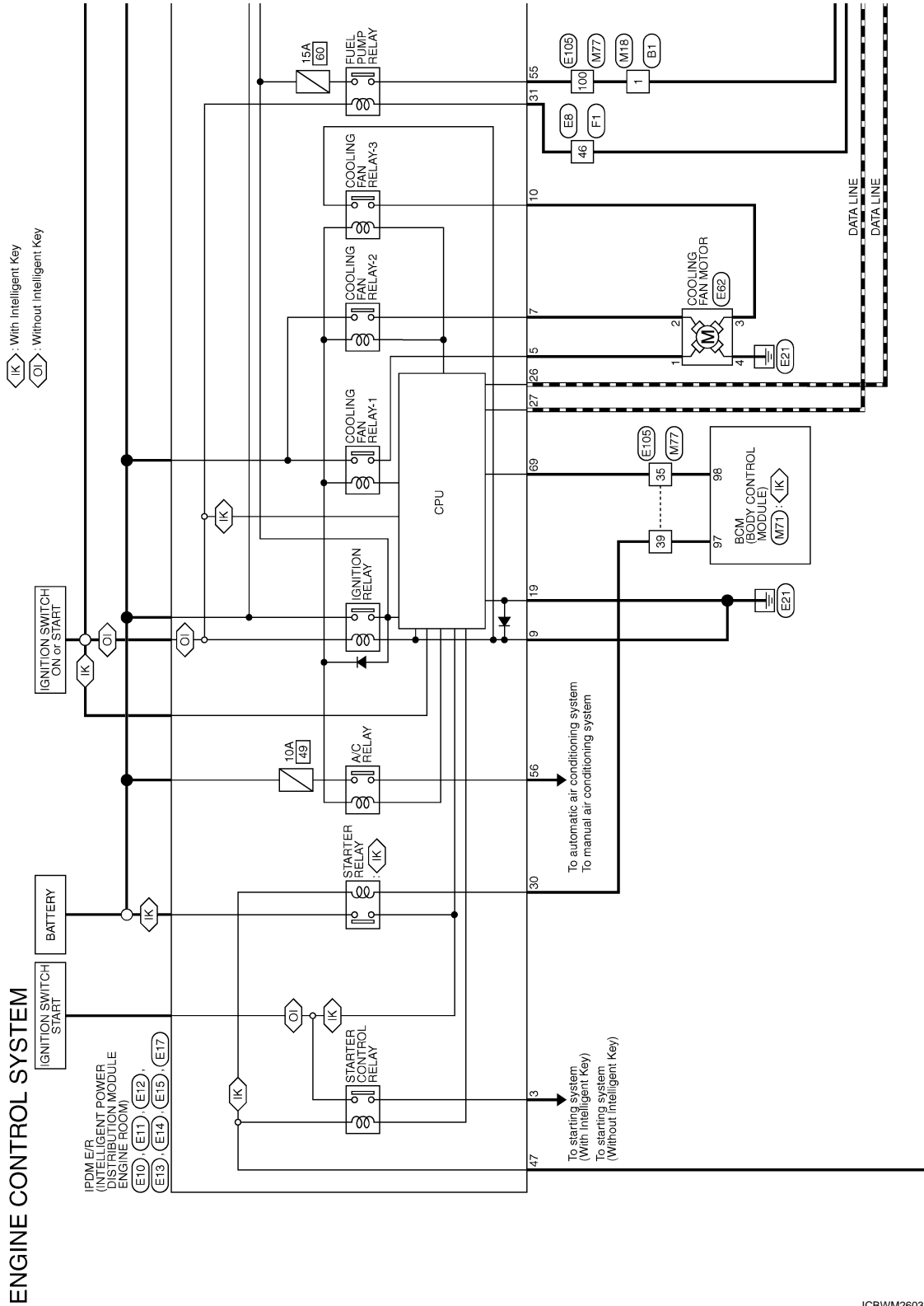
\*1: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to [PG-3, "How to Handle Battery"](#).

\*2: CVT models

\*3: M/T models

Wiring Diagram — ENGINE CONTROL SYSTEM —

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2010/10/14

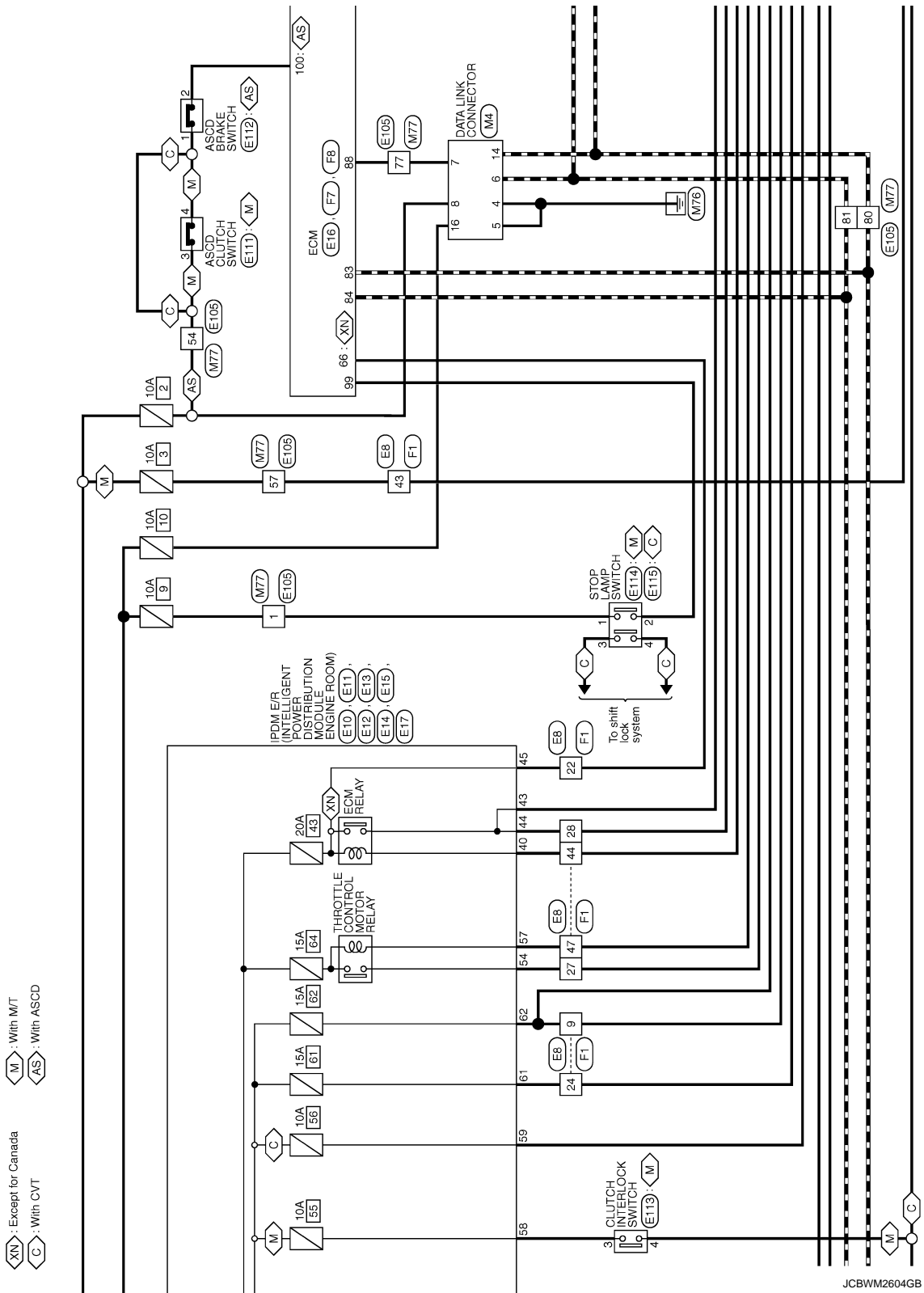
JCBWM2603GB

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< ECU DIAGNOSIS INFORMATION >

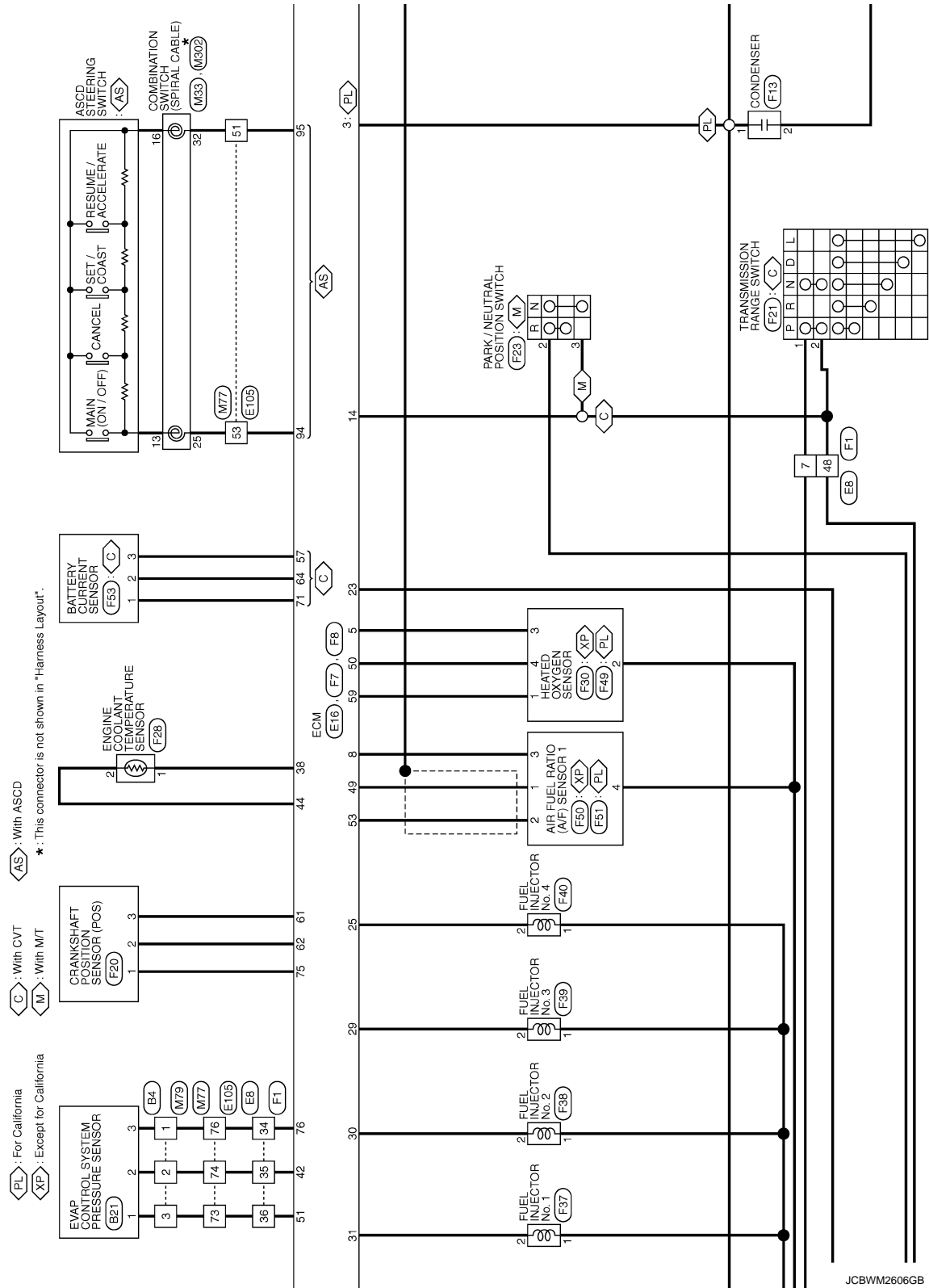
[MR18DE (FOR CALIFORNIA)]



JCBWM2604GB







JCBWM2606GB

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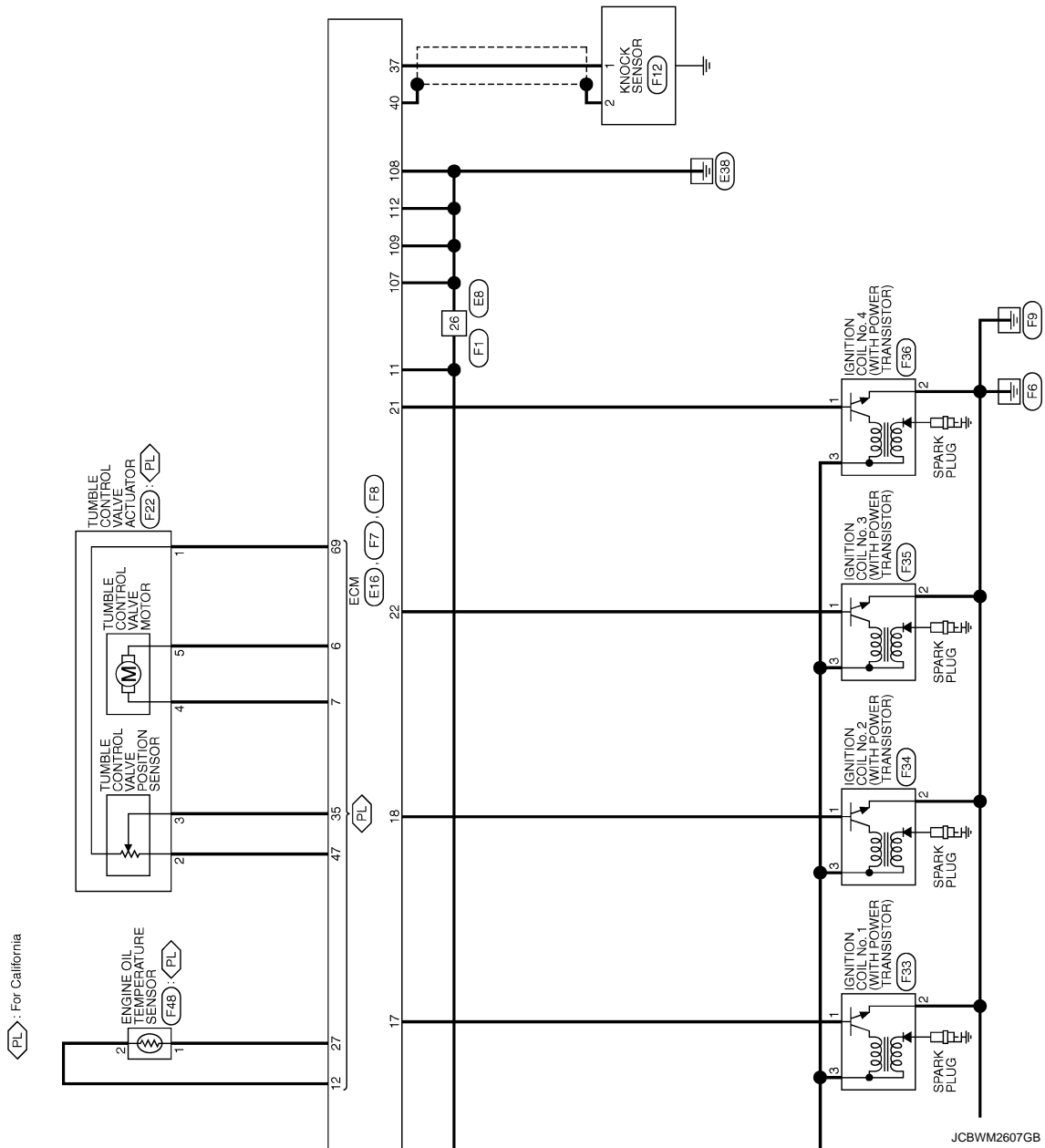
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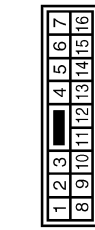
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ENGINE CONTROL SYSTEM

Connector No.	B1
Connector Name	WIRE TO WIRE
Connector Type	HS16MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
3	V	-
4	L	-
5	Y	-
6	W	-
7	LG	-
8	GR	-
9	SB	-
10	W	-
11	G	-
12	V	-
13	BR	-
15	R	-
16	GR	-

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	HS24MW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	V	-
3	O	-
4	P	-
5	W	-
8	SB	-
9	GR	-
10	SB	-

11	G	-
12	SB	-
13	L	-
15	R	-
16	GR	-
17	BR	-
18	L	-
20	LG	-
22	Y	-
23	BR	-
24	O	-

Connector No.	B20
Connector Name	EVAP CANISTER VENT CONTROL VALVE
Connector Type	EG2FB-RS



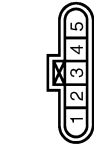
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	L	-

Connector No.	B21
Connector Name	EVAP CONTROL SYSTEM PRESSURE SENSOR
Connector Type	EG3FGY-RS



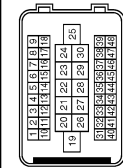
Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	V	-
3	W	-

Connector No.	B40
Connector Name	FUEL LEVEL SENSOR UNIT AND FUEL PUMP
Connector Type	EG5FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	BR	-
3	B	-
4	P	-
5	L	-

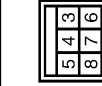
Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAA38MB-RS10-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	LG	-
3	Y	-
4	W	-
7	Y	-
8	SB	-
9	L	-
10	V	-
11	P	-
12	BR	-
13	LG	-
14	Y	-
15	SB	-
16	L	-
17	W	-
18	O	-
21	G	-

22	Y	-
23	SB	-
24	W	-
25	BR	-
26	B	-
26	B/Y	- [For California]
27	GR	-
28	P	-
29	V	-
30	G	-
31	G	-
32	O	-
33	W	-
34	Y	-
35	V	-
36	P	-
37	LG	-
39	SB	-
40	GR	-
41	O	-
42	V	-
43	R	- [With CVT]
43	LG	- [With M/T]
44	R	-
46	W	-
47	G	-
48	BR	-

Connector No.	E10
Connector Name	IPDM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	M06FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	BR	-
4	P	-
5	LG	-
6	SB	-
7	Y	-
8	V	-

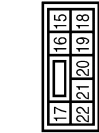
ENGINE CONTROL SYSTEM

Connector No.	E11
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	MD08FB-LC



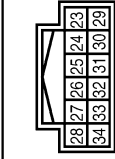
Terminal No.	Color of Wire	Signal Name [Specification]
9	B/W	-
10	L	-
13	W	-

Connector No.	E12
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS08FBF-CS



Terminal No.	Color of Wire	Signal Name [Specification]
18	Y	-
19	B/W	-
21	W	-
22	V	-

Connector No.	E13
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH12FV-NH



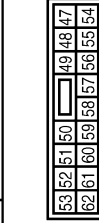
Terminal No.	Color of Wire	Signal Name [Specification]
24	LC	-
23	L	-
26	P	-
27	L	-
28	P	-
30	SB	-
31	W	-
33	O	-
34	R	-

Connector No.	E14
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FBR-CS



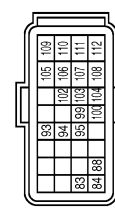
Terminal No.	Color of Wire	Signal Name [Specification]
36	Y	-
37	V	-
38	G	-
39	V	-
40	R	-
41	SB	-
43	G	-
44	P	-
45	Y	-
46	O	-

Connector No.	E15
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FV-CS



Terminal No.	Color of Wire	Signal Name [Specification]
47	BR	-
48	W	-
50	GR	-
51	R	-
52	P	-
54	GR	-
55	P	-
56	SB	-
57	G	-
58	R	- [With CVT]
58	Y	- [With M/T]
59	Y	-
60	V	-
61	W	-
62	L	-

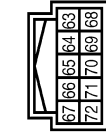
Connector No.	E16
Connector Name	ECM
Connector Type	RH12AFB-RZB-L-RH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H
88	LG	K LINE
83	L	IGNSW
94	SB	ASCDSW
95	BR	GND-ASCDSW [With M/T]
95	B	GND-ASCDSW [With M/T]
99	W	BRAKE
100	SB	BNCSW
102	O	AVCC-APS 2
103	G	APS 2
104	R	GND-APS 2
105	G	VER
106	V	AVCC-APS 1
107	B	GND
108	B	GND
108	B	GND
110	BR	APS 1
111	Y	GND-APS 1

Terminal No.	112	B	GND
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Connector No.	E17
Connector Name	IPW/E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH10FB-NH



Terminal No.	Color of Wire	Signal Name [Specification]
64	R	-
66	L	-
69	Y	-

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	G	-
3	W	-

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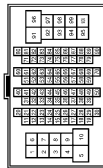
ENGINE CONTROL SYSTEM

Connector No.	E02
Connector Name	COOLING FAN MOTOR
Connector Type	RS04FGY-PR



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	Y	-
3	L	-
4	B/W	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS1F-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-
3	SB	-
4	G	-
5	P	-
6	L	- [With NAV]
7	Y	- [Without NAV]
8	O	-
9	W	-
10	SB	-
31	V	-
32	R	-
33	GR	-
34	P	-
35	Y	-
36	BR	-
38	SB	-

44	R	-
45	V	-
46	P	-
48	L	-
51	BR	- [With CVT]
51	B	- [With M/T]
53	SB	-
54	W	- [With CVT]
54	O	- [With M/T]
57	LG	-
59	L	-
60	O	-
61	G	-
62	W	-
63	L	-
67	GR	- [With CVT]
67	V	- [With M/T]
69	P	-
70	SHIELD	-
71	GR	-
72	LG	-
73	P	-
74	V	-
76	Y	-
77	LG	-
78	O	-
79	G	-
80	P	-
81	L	-
82	W	-
83	BR	-
84	B	-
87	GR	-
91	W	-
92	Y	-
93	Y	-
94	R	-
95	Y	-
96	LG	-
97	R	-
98	SB	-
99	G	-
100	P	-

Connector No.	E110
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RM08FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	Y	-
3	BR	-
4	V	-
5	O	-
6	G	-

Connector No.	E111
Connector Name	ASCD CLUTCH SWITCH
Connector Type	M02FV-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	O	-
4	R	-

Connector No.	E112
Connector Name	ASCD BRAKE SWITCH
Connector Type	M02FER-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With CVT]
1	R	- [With M/T]
2	SB	-

Connector No.	E113
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Type	M04FV-LC



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-
4	BR	-

Connector No.	E114
Connector Name	STOP LAMP SWITCH
Connector Type	M02FB-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-

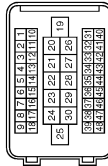
ENGINE CONTROL SYSTEM

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	MD4FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	W	-
3	O	-
4	G	-

Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SAX3WPE-RS1D-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	LG	-
3	R	-
4	Y	-
7	V	-
8	G	-
9	SB	-
10	L	-
11	Y	-
12	GR	-
13	BR	-
14	G	-
15	W	-
16	Y	-
17	P	-
18	BR	-
21	G	-
22	L	-

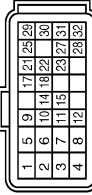
23	W	-
24	R	-
25	B	-
26	B	-
27	SB	-
28	V	-
29	V	-
30	BR	-
31	GR	-
32	BR	-
33	W	-
34	LG	-
35	V	-
36	Y	-
37	SB	-
37	W	- [For California]
37	G	- [Except for California]
39	G	-
40	P	-
41	O	-
42	G	-
43	R	-
44	P	-
46	GR	-
47	Y	-
48	BR	-

Connector No.	F4
Connector Name	MASS AIR FLOW SENSOR
Connector Type	RH00FE



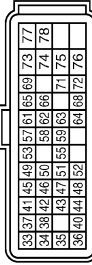
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	G	-
4	R	-
5	BR	-

Connector No.	F7
Connector Name	ECM
Connector Type	RR24FGY-RZ8-R-RH



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	MOTOR 1
2	SB	VMGT
3	V	VSCV
4	L	MOTOR 2
5	G	CPHR
8	W	SCV
9	R	SCV 2
7	R	AF HEATER GND
8	G	EVAP
9	P	GND
11	B	GND
12	GR	GND
14	L	NEUT-H
15	Y	MOTRLY
17	R	IGN#1
18	LG	IGN#2
21	G	IGN#4
22	SB	IGN#3
23	GR	FPR
25	V	INJ#4
27	R	TO
28	SB	GDSV [For California]
28	W	GDSV [Except for California]
28	Y	INJ#3
30	O	INJ#2
31	L	INJ#1
32	P	SSOFF

Connector No.	F8
Connector Name	ECM
Connector Type	RH40FER-RZ8-L-RH



Terminal No.	Color of Wire	Signal Name [Specification]
33	LG	TPS 1
34	R	TPS 2
35	V	SCVPOS
36	Y	GND-TPS
37	W	KHK
38	BR	TW
40	SHIELD	GND-NK
41	GR	PDPRES
42	V	FTPRES
43	P	TF
44	GR	GND-TW
45	G	OA+
46	L	TA
47	LG	GND-SCVPOS
48	BR	GND-PDPRES
49	V	AF+
50	W	OZSR
51	Y	GND-FTPRES
52	R	OA-
53	LG	AF-
55	P	GND-TA
57	GR	CURSEN
59	O	GND-OZSR
61	W	POS
62	B	GND-POS
63	L	GND-PHASE
64	SB	GND-CURSEN
65	Y	PHASE
66	L	BATT
69	SB	AVCC-SCVPOS
71	Y	AVCC-CURSEN
72	O	AVCC-TPS
73	P	CVTC
74	W	AVCC-PDPRES
75	R	AVCC-POS
76	LG	AVCC-FTPRES
78	G	AVCC-PHASE

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ENGINE CONTROL SYSTEM

Connector No.	F12		
Connector Name	KNOCK SENSOR		
Connector Type	BS02FB-ANY		



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	
2	SHIELD	

Connector No.	F13		
Connector Name	CONDENSER		
Connector Type	IM02FW-LC		



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	B	

Connector No.	F20		
Connector Name	CRANKSHAFT POSITION SENSOR (POS)		
Connector Type	RH03FB		



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	
2	B	

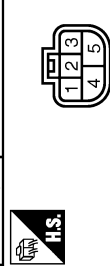
Connector No.	3	W	
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Connector No.	F21		
Connector Name	TRANSMISSION RANGE SWITCH		
Connector Type	RK03FG		



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	BR	
3	R	
4	GR	
5	SB	
6	W	
7	Y	
8	G	

Connector No.	F22		
Connector Name	TUMBLE CONTROL VALVE ACTUATOR		
Connector Type	HS03FGY		



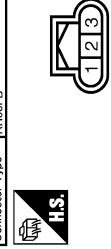
Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	VDD
2	LG	GND
3	V	OUT
4	R	OPEN
5	W	CLOSE

Connector No.	F23		
Connector Name	PARK / NEUTRAL POSITION SWITCH		
Connector Type	FEA03FG		



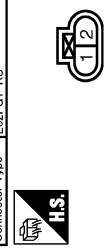
Terminal No.	Color of Wire	Signal Name [Specification]
1	G	
2	R	
3	L	

Connector No.	F26		
Connector Name	GAMSHAFT POSITION SENSOR (PHASE)		
Connector Type	RH03FB		



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	
2	L	
3	Y	

Connector No.	F28		
Connector Name	ENGINE COOLANT TEMPERATURE SENSOR		
Connector Type	ED0FY-RS		



Terminal No.	Color of Wire	Signal Name [Specification]
1		
2		

Connector No.	1	BR	
Connector No.	2	GR	

Connector No.	F29		
Connector Name	ELECTRIC THROTTLE CONTROL ACTUATOR		
Connector Type	HS03FB		



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	
2	O	
3	R	
4	Y	
5	L	
6	P	

Connector No.	F30		
Connector Name	HEATED OXYGEN SENSOR		
Connector Type	AFZ04FB-P		



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	
2	R	
3	G	
4	W	



ENGINE CONTROL SYSTEM

Connector No.	F32
Connector Name	BYPASS VALVE VOLUME CONTROL SOLENOID VALVE
Connector Type	EO3FGY-RS-LGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	P	-

Connector No.	F33
Connector Name	IGNITION COIL No. 1 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	B	-
3	V	-

Connector No.	F34
Connector Name	IGNITION COIL No. 2 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-

Terminal No.	2	B	-
Terminal No.	3	V	-

Connector No.	F35
Connector Name	IGNITION COIL No. 3 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	B	-
3	V	-

Connector No.	F36
Connector Name	IGNITION COIL No. 4 (WITH POWER TRANSISTOR)
Connector Type	EO3FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	B	-
3	V	-

Connector No.	F37
Connector Name	FUEL INJECTOR No. 1
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	L	-

Connector No.	F38
Connector Name	FUEL INJECTOR No. 2
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	O	-

Connector No.	F39
Connector Name	FUEL INJECTOR No. 3
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	Y	-

Connector No.	F40
Connector Name	FUEL INJECTOR No. 4
Connector Type	HS02FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	-
2	V	-

Connector No.	F41
Connector Name	RETARD VALVE TRIMMING CONTROL SOLENOID VALVE
Connector Type	EO2FG-RS-LGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-

Connector No.	F48
Connector Name	ENGINE OIL TEMPERATURE SENSOR
Connector Type	EO2FGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	GR	-

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ENGINE CONTROL SYSTEM

Connector No.	F48
Connector Name	HEATED OXYGEN SENSOR
Connector Type	AFZ04FGY-P



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-
3	G	-
4	W	-

Connector No.	F50
Connector Name	AIR FUEL RATIO (A/F) SENSOR 1
Connector Type	RH4MD3Y-BR



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	LG	-
3	G	-
4	R	-

Connector No.	F51
Connector Name	AIR FUEL RATIO (A/F) SENSOR 1
Connector Type	AFZ04FBR



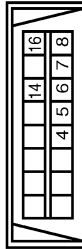
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	LG	-
3	G	-
4	R	-

Connector No.	F53
Connector Name	BATTERY CURRENT SENSOR
Connector Type	RH03FE



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	SB	-
3	GR	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD18FW



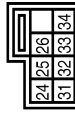
Terminal No.	Color of Wire	Signal Name [Specification]
4	B	-
5	B	-
6	L	-
7	GR/R	-
8	O	-
14	P	-
16	LG/R	-

Connector No.	M18
Connector Name	WIRE TO WIRE
Connector Type	HS18FW-GS



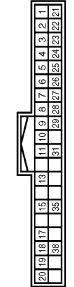
Terminal No.	Color of Wire	Signal Name [Specification]
1	G/R	-
3	L/W	-
4	L	-
5	Y	-
6	L/B	-
7	LG	-
8	GR	-
9	SB	-
10	W/L	-
11	G	-
12	V	-
13	L	-
15	L	-
16	GR	-

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY-1V



Terminal No.	Color of Wire	Signal Name [Specification]
24	W/L	-
25	R/L	-
26	B/R	-
31	GR/B	- [With NAVI] - [Without NAVI]
32	B/W	-
33	L/G	-
34	R/B	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH

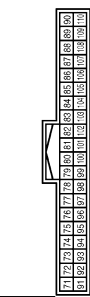


Terminal No.	Color of Wire	Signal Name [Specification]
1	L	GAN-H
2	P	GAN-L
3	V	VEHICLE SPEED SIGNAL (2-PULSE)
4	L	VEHICLE SPEED SIGNAL (8-PULSE)
6	BR/Y	FUEL LEVEL SENSOR SIGNAL
7	R/G	AIR BAG SIGNAL
8	P	OVERDRIVE CONTROL SWITCH SIGNAL
9	O	SEAT BELT BUZZLE SWITCH SIGNAL (DRIVER SIDE)
10	SB	PARKING BRAKE SWITCH SIGNAL
11	G/R	BRAKE FLUID LEVEL SWITCH SIGNAL
13	B/R	ILLUMINATION CONTROL SIGNAL
15	L/Y	ACC POWER SUPPLY
17	G	WASHER LEVEL SWITCH SIGNAL
18	R/Y	SECURITY SIGNAL
19	V/W	AMBIENT SENSOR SIGNAL
20	R/W	AMBIENT SENSOR GROUND
21	B	GROUND
22	B	GROUND
23	B	GROUND
24	V	FUEL LEVEL SENSOR GROUND
25	B	YDC GROUND
27	LG	BATTERY POWER SUPPLY
28	GR	IGNITION SIGNAL
29	BR	PASSENGER SEAT BELT WARNING SIGNAL
31	R	A/C AUTO AMP CONNECTION REGULATION SIGNAL
35	BR	ENGINE COOLANT TEMPERATURE SIGNAL
38	GR	ALTERNATOR SIGNAL

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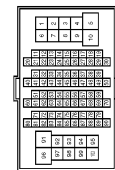
ENGINE CONTROL SYSTEM

Connector No.	M71
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH6FPV-NH



Terminal No.	Color of Wire	Signal Name [Specification]
75	SB	DRIVER DOOR REQUEST SW
76	L/O	PUSH SW
78	LG	DRIVER DOOR ANT+
78	V	DRIVER DOOR ANT-
80	BR/Y	PASSENGER DOOR ANT+
80	L/Y	PASSENGER DOOR ANT-
82	W/B	BACK DOOR ANT+
83	B/W	BACK DOOR ANT-
84	Y/G	ROOM ANT+
85	Y/L	ROOM ANT-
86	P	LUGGAGE ROOM ANT+
87	L	LUGGAGE ROOM ANT-
90	W/L	PUSH-BUTTON IGNITION SW ILL POWER
91	Y	ACC/ON IND
92	BR/R	PUSH-BUTTON IGNITION SW ILL GND
93	GR/W	F-KEY WARN BUZZER
96	BR/W	ACC RELAY COIT
97	L/R	STARTER RELAY COIT
98	BR	IGN RELAY (PDM/E/R) COIT
98	W/R	IGN RELAY COIT
100	G	PASSENGER DOOR REQUEST SW
102	G	SHIFT N/P
104	Y/R	CVT SHIFT SELECTOR POWER SUPPLY
105	B/O	STOP LAMP SW 2
106	Y/B	BLOWER FAN MOTOR RELAY COIT

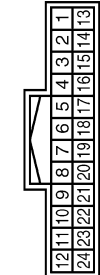
Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH6FPV-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	B/O	
2	R	
3	G/R	
4	G/B	
5	L	
6	L	
7	W/R	
8	G/W	
9	Y/L	
10	W	
31	GR/L	
32	L/B	
33	R/Y	
34	SB	
35	BR	
36	G	
39	L/R	
44	G/O	
45	LG/R	
46	GR/W	
48	L/O	
51	B/W	
53	R/L	
54	O	
57	GR	
58	V	
60	R/W	
61	V/W	
62	W/L	
63	W/B	
67	Y/R	
68	LG	
70	SHIELD	
71	P/B	
72	R/G	
73	R	
74	L/Y	
76	W/G	

Terminal No.	Color of Wire	Signal Name [Specification]
77	GR/R	
78	O	
78	LG	
80	P	
81	L	
82	GR	
83	G/R	
84	B	
87	G	
91	R	
92	O	
93	Y	
94	R/B	
95	L/W	
96	Y	
97	L	
98	BR/W	
99	W	
100	G/R	

Connector No.	M79
Connector Name	WIRE TO WIRE
Connector Type	TH64FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W/G	
2	L/Y	
3	R	
4	P/B	
5	W	
8	SB	
9	L/G	
10	GR/B	
11	G/B	
12	G/R	
13	R/G	
15	R/L	
16	GR/R	
17	BR/Y	
18	V	
20	GR/L	
22	L	

Connector No.	M82
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY



Terminal No.	Color of Wire	Signal Name [Specification]
13	R	
14	Y	
15	P	
16	B	
17	W	
18	G	
19	P	
20	R	

Fail Safe

NON DTC RELATED ITEM

JCBWM2615GB

INFOID:000000006943202

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Detected items	Engine operating condition in fail-safe mode	Remarks
Malfunction indicator lamp circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut	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.

## 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.								
P0101 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 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 engine starting</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 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)									
More than approx. 4 minutes 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.								
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does not function.								
P0500	Vehicle speed sensor	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.								
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 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 INFORMATION >

[MR18DE (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.

A

EC

C

D

E

F

## DTC Inspection Priority Chart

INFOID:000000006943203

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

G

H

I

J

K

L

M

N

O

P

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> <li>• U0101 U0140 U1001 CAN communication line</li> <li>• P0101 P0102 P0103 Mass air flow sensor</li> <li>• P0111 P0112 P0113 P0127 Intake air temperature sensor</li> <li>• P0116 P0117 P0118 P0125 Engine coolant temperature sensor</li> <li>• P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor</li> <li>• P0128 Thermostat function</li> <li>• P0196 P0197 P0198 Engine oil temperature sensor</li> <li>• P0181 P0182 P0183 Fuel tank temperature sensor</li> <li>• P0327 P0328 Knock sensor</li> <li>• P0335 Crankshaft position sensor (POS)</li> <li>• P0340 Camshaft position sensor (PHASE)</li> <li>• P0460 P0461 P0462 P0463 Fuel level sensor</li> <li>• P0500 Vehicle speed sensor</li> <li>• P0603 P0605 P607 ECM</li> <li>• P0643 Sensor power supply</li> <li>• P0705 Transmission range switch</li> <li>• P0850 Park/neutral position (PNP) switch</li> <li>• P1550 P1551P1552 P1553 P1554 Battery current sensor</li> <li>• P1610 - P1615 NATS</li> <li>• P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> </ul>
2	<ul style="list-style-type: none"> <li>• P0031 P0032 Air fuel ratio (A/F) sensor 1 heater</li> <li>• P0037 P0038 Heated oxygen sensor 2 heater</li> <li>• P0075 Intake valve timing control solenoid valve</li> <li>• P0130 P0131 P0132 P014C P014D P015A P015B P2A00 Air fuel ratio (A/F) sensor 1</li> <li>• P0137 P0138 P0139 Heated oxygen sensor 2</li> <li>• P0441 EVAP control system purge flow monitoring</li> <li>• P0443 P0444 P0445 EVAP canister purge volume control solenoid valve</li> <li>• P0447 P0448 EVAP canister vent control valve</li> <li>• P0451 P0452 P0453 EVAP control system pressure sensor</li> <li>• P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches</li> <li>• P1217 Engine over temperature (OVERHEAT)</li> <li>• P1805 Brake switch</li> <li>• P2004 P2014 Tumble control valve</li> <li>• P2100 P2103 Throttle control motor relay</li> <li>• P2101 Electric throttle control function</li> <li>• P2118 Throttle control motor</li> </ul>
3	<ul style="list-style-type: none"> <li>• P0011 Intake valve timing control</li> <li>• P0171 P0172 Fuel injection system function</li> <li>• P0300 - P0304 Misfire</li> <li>• P0420 Three way catalyst function</li> <li>• P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> <li>• P0455 EVAP control system (GROSS LEAK)</li> <li>• P0506 P0507 Idle speed control system</li> <li>• P050A P050B P050E Cold start control</li> <li>• P1148 Closed loop control</li> <li>• P1212 TCS communication line</li> <li>• P1564 ASCD steering switch</li> <li>• P1572 ASCD brake switch</li> <li>• P1574 ASCD vehicle speed sensor</li> <li>• P1715 Input speed sensor</li> <li>• P2119 Electric throttle control actuator</li> </ul>

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

INFOID:000000006943204

## DTC Index

×:Applicable —: Not applicable

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page	EC
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>							
U0101	0101 <sup>*5</sup>	LOST COMM (TCM)	—	1	×	B	<a href="#">EC-622</a>	C
U0140	0140 <sup>*5</sup>	LOST COMM (BCM)	—	1	×	B	<a href="#">EC-623</a>	
U1001	1001 <sup>*5</sup>	CAN COMM CIRCUIT	—	2	—	—	<a href="#">EC-624</a>	D
<b>P0000</b>	<b>0000</b>	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	—	<b>Flashing<sup>*8</sup></b>	—	—	
P0011	0011	INT/ TIM CONT-B1	×	2	×	B	<a href="#">EC-625</a>	E
P0031	0031	A/F SEN1 HTR (B1)	—	2	×	B	<a href="#">EC-629</a>	
P0032	0032	A/F SEN1 HTR (B1)	—	2	×	B	<a href="#">EC-629</a>	F
P0037	0037	HO2S2 HTR (B1)	—	2	×	B	<a href="#">EC-632</a>	
P0038	0038	HO2S2 HTR (B1)	—	2	×	B	<a href="#">EC-632</a>	
P0075	0075	INT/ TIM V/CIR-B1	—	2	×	B	<a href="#">EC-635</a>	G
P0101	0101	MAF SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-638</a>	
P0102	0102	MAF SEN/CIRCUIT-B1	—	1	×	B	<a href="#">EC-643</a>	H
P0103	0103	MAF SEN/CIRCUIT-B1	—	1	×	B	<a href="#">EC-643</a>	
P0111	0111	IAT SENSOR 1 B1	—	2	×	A	<a href="#">EC-648</a>	
P0112	0112	IAT SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-650</a>	I
P0113	0113	IAT SEN/CIRCUIT-B1	—	2	×	B	<a href="#">EC-650</a>	
P0116	0116	ECT SEN/CIRC	—	2	×	A	<a href="#">EC-652</a>	J
P0117	0117	ECT SEN/CIRC	—	1	×	B	<a href="#">EC-655</a>	
P0118	0118	ECT SEN/CIRC	—	1	×	B	<a href="#">EC-655</a>	
P0122	0122	TP SEN 2/CIRC-B1	—	1	×	B	<a href="#">EC-658</a>	K
P0123	0123	TP SEN 2/CIRC-B1	—	1	×	B	<a href="#">EC-658</a>	
P0125	0125	ECT SENSOR	—	2	×	B	<a href="#">EC-661</a>	L
P0127	0127	IAT SENSOR-B1	—	2	×	B	<a href="#">EC-664</a>	
P0128	0128	THERMSTAT FNCTN	—	2	×	B	<a href="#">EC-666</a>	
P0130	0130	A/F SENSOR1 (B1)	—	2	×	A	<a href="#">EC-668</a>	M
P0131	0131	A/F SENSOR1 (B1)	—	2	×	B	<a href="#">EC-672</a>	
P0132	0132	A/F SENSOR1 (B1)	—	2	×	B	<a href="#">EC-675</a>	
P0137	0137	HO2S2 (B1)	×	2	×	A	<a href="#">EC-678</a>	N
P0138	0138	HO2S2 (B1)	×	2	×	A	<a href="#">EC-684</a>	
P0139	0139	HO2S2 (B1)	×	2	×	A	<a href="#">EC-692</a>	O
P014C	014C	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-698</a>	
P014D	014D	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-698</a>	
P015A	015A	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-698</a>	P
P015B	015B	A/F SENSOR1 (B1)	×	2	×	A	<a href="#">EC-698</a>	
P0171	0171	FUEL SYS-LEAN-B1	—	2	×	B	<a href="#">EC-703</a>	
P0172	0172	FUEL SYS-RICH-B1	—	2	×	B	<a href="#">EC-707</a>	
P0181	0181	FTT SENSOR	—	2	×	A and B	<a href="#">EC-711</a>	
P0182	0182	FTT SEN/CIRCUIT	—	2	×	B	<a href="#">EC-716</a>	

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>						
P0183	0183	FTT SEN/CIRCUIT	—	2	×	B	<a href="#">EC-716</a>
P0196	0196	EOT SEN/CIRC	—	2	×	A and B	<a href="#">EC-719</a>
P0197	0197	EOT SEN/CIRC	—	2	×	B	<a href="#">EC-723</a>
P0198	0198	EOT SEN/CIRC	—	2	×	B	<a href="#">EC-723</a>
P0222	0222	TP SEN 1/CIRC-B1	—	1	×	B	<a href="#">EC-725</a>
P0223	0223	TP SEN 1/CIRC-B1	—	1	×	B	<a href="#">EC-725</a>
P0300	0300	MULTI CYL MISFIRE	—	1 or 2	×	B	<a href="#">EC-728</a>
P0301	0301	CYL 1 MISFIRE	—	1 or 2	×	B	<a href="#">EC-728</a>
P0302	0302	CYL 2 MISFIRE	—	1 or 2	×	B	<a href="#">EC-728</a>
P0303	0303	CYL 3 MISFIRE	—	1 or 2	×	B	<a href="#">EC-728</a>
P0304	0304	CYL 4 MISFIRE	—	1 or 2	×	B	<a href="#">EC-728</a>
P0327	0327	KNOCK SEN/CIRC-B1	—	2	—	—	<a href="#">EC-734</a>
P0328	0328	KNOCK SEN/CIRC-B1	—	2	—	—	<a href="#">EC-734</a>
P0335	0335	CKP SEN/CIRCUIT	—	2	×	B	<a href="#">EC-736</a>
P0340	0340	CMP SEN/CIRC-B1	—	2	×	B	<a href="#">EC-740</a>
P0420	0420	TW CATALYST SYS-B1	×	2	×	A	<a href="#">EC-744</a>
P0441	0441	EVAP PURG FLOW/MON	×	2	×	A	<a href="#">EC-749</a>
P0442	0442	EVAP SMALL LEAK	×	2	×	A	<a href="#">EC-755</a>
P0443	0443	PURG VOLUME CONT/V	—	2	×	A	<a href="#">EC-762</a>
P0444	0444	PURG VOLUME CONT/V	—	2	×	B	<a href="#">EC-767</a>
P0445	0445	PURG VOLUME CONT/V	—	2	×	B	<a href="#">EC-767</a>
P0447	0447	VENT CONTROL VALVE	—	2	×	B	<a href="#">EC-770</a>
P0448	0448	VENT CONTROL VALVE	—	2	×	B	<a href="#">EC-774</a>
P0451	0451	EVAP SYS PRES SEN	—	2	×	A	<a href="#">EC-778</a>
P0452	0452	EVAP SYS PRES SEN	—	2	×	B	<a href="#">EC-781</a>
P0453	0453	EVAP SYS PRES SEN	—	2	×	B	<a href="#">EC-786</a>
P0455	0455	EVAP GROSS LEAK	—	2	×	A	<a href="#">EC-792</a>
P0456	0456	EVAP VERY SML LEAK	× <sup>*7</sup>	2	×	A	<a href="#">EC-798</a>
P0460	0460	FUEL LEV SEN SLOSH	—	2	×	A	<a href="#">EC-804</a>
P0461	0461	FUEL LEVEL SENSOR	—	2	×	B	<a href="#">EC-805</a>
P0462	0462	FUEL LEVL SEN/CIRC	—	2	×	B	<a href="#">EC-807</a>
P0463	0463	FUEL LEVL SEN/CIRC	—	2	×	B	<a href="#">EC-807</a>
P0500	0500	VEHICLE SPEED SEN A <sup>*6</sup>	—	2	×	B	<a href="#">EC-809 (M/T)</a> <a href="#">EC-810 (CVT)</a>
P0506	0506	ISC SYSTEM	—	2	×	B	<a href="#">EC-813</a>
P0507	0507	ISC SYSTEM	—	2	×	B	<a href="#">EC-815</a>
P050A	050A	COLD START CONTROL	—	2	×	A	<a href="#">EC-817</a>
P050B	050B	COLD START CONTROL	—	2	×	A	<a href="#">EC-817</a>
P050E	050E	COLD START CONTROL	—	2	×	A	<a href="#">EC-817</a>
P0603	0603	ECM BACK UP/CIRCUIT	—	2	×	B	<a href="#">EC-819</a>
P0605	0605	ECM	—	1 or 2	× or —	B	<a href="#">EC-821</a>
P0607	0607	ECM	—	1 (CVT) 2 (M/T)	× (CVT) — (M/T)	B	<a href="#">EC-823</a>



# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

DTC <sup>*1</sup>		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Reference page	
CONSULT-III GST <sup>*2</sup>	ECM <sup>*3</sup>							
P0643	0643	SENSOR POWER/CIRC	—	1	×	B	<a href="#">EC-824</a>	EC
P0705	0705	T/M RANGE SENSOR A	—	2	×	B	<a href="#">TM-106</a>	
P0710	0710	FLUID TEMP SENSOR A <sup>*9</sup>	—	1	×	B	<a href="#">TM-109</a>	
P0715	0715	INPUT SPEED SENSOR A	—	2	×	B	<a href="#">TM-112</a>	C
P0720	0720	OUTPUT SPEED SENSOR <sup>*6</sup>	—	2	×	B	<a href="#">TM-115</a>	
P0740	0740	TORQUE CONVERTER	—	2	×	B	<a href="#">TM-119</a>	D
P0744	0744	TORQUE CONVERTER	—	2	×	B	<a href="#">TM-122</a>	
P0745	0745	PC SOLENOID A	—	2	×	B	<a href="#">TM-125</a>	
P0746	0746	PC SOLENOID A	—	1	×	B	<a href="#">TM-127</a>	E
P0776	0776	PC SOLENOID B	—	2	×	B	<a href="#">TM-129</a>	
P0778	0778	PC SOLENOID B	—	2	×	B	<a href="#">TM-131</a>	F
P0840	0840	FLUID PRESS SEN/SW A	—	2	×	B	<a href="#">TM-133</a>	
P0850	0850	P-N POS SW/CIRCUIT	—	2	×	B	<a href="#">EC-826</a>	
P1148	1148	CLOSED LOOP-B1	—	1	×	A	<a href="#">EC-829</a>	G
P1212	1212	TCS/CIRC	—	2	—	—	<a href="#">EC-830</a>	
P1217	1217	ENG OVER TEMP	—	1	×	B	<a href="#">EC-831</a>	H
P1225	1225	CTP LEARNING-B1	—	2	—	—	<a href="#">EC-835</a>	
P1226	1226	CTP LEARNING-B1	—	2	—	—	<a href="#">EC-837</a>	
P1550	1550	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-839</a>	I
P1551	1551	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-843</a>	
P1552	1552	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-843</a>	J
P1553	1553	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-847</a>	
P1554	1554	BAT CURRENT SENSOR	—	2	—	—	<a href="#">EC-851</a>	
P1564	1564	ASCD SW	—	1	—	—	<a href="#">EC-855</a>	K
P1572	1572	ASCD BRAKE SW	—	1	—	—	<a href="#">EC-858</a>	
P1574	1574	ASCD VHL SPD SEN	—	1	—	—	<a href="#">EC-865</a>	
P1610	1610	LOCK MODE	—	2	—	—	<a href="#">SEC-33</a>	L
P1611	1611	ID DISCORD, IMMU-ECM	—	2	—	—	<a href="#">SEC-34</a>	
P1612	1612	CHAIN OF ECM-IMMU	—	2	—	—	<a href="#">SEC-36</a>	M
P1614	1614	CHAIN OF IMMU-KEY	—	2	—	—	<a href="#">SEC-6</a>	
P1615	1615	DIFFERENCE OF KEY	—	2	—	—	<a href="#">SEC-6</a>	
P1715	1715	IN PULY SPEED	—	2	—	—	<a href="#">EC-867</a>	N
P1740	1740	SLCT SOLENOID	—	2	×	B	<a href="#">TM-148</a>	
P1777	1777	STEP MOTOR	—	1	×	B	<a href="#">TM-151</a>	O
P1778	1778	STEP MOTOR	—	2	×	B	<a href="#">TM-154</a>	
P1805	1805	BRAKE SW/CIRCUIT	—	2	—	—	<a href="#">EC-869</a>	
P2004	2004	TUMBLE CONT/V	—	2	×	B	<a href="#">EC-872</a>	P
P2014	2014	TUMBLE POS SEN	—	2	×	B	<a href="#">EC-877</a>	
P2100	2100	ETC MOT PWR-B1	—	1	×	B	<a href="#">EC-880</a>	
P2101	2101	ETC FNCTN/CIRC-B1	—	1	×	B	<a href="#">EC-883</a>	
P2103	2103	ETC MOT PWR	—	1	×	B	<a href="#">EC-880</a>	
P2118	2118	ETC MOT-B1	—	1	×	B	<a href="#">EC-887</a>	

DTC*1		Items (CONSULT-III screen terms)	SRT code	Trip	MIL	Permanent DTC group*4	Reference page
CONSULT-III GST*2	ECM*3						
P2119	2119	ETC ACTR-B1	—	1	×	B	<a href="#">EC-889</a>
P2122	2122	APP SEN 1/CIRC	—	1	×	B	<a href="#">EC-891</a>
P2123	2123	APP SEN 1/CIRC	—	1	×	B	<a href="#">EC-891</a>
P2127	2127	APP SEN 2/CIRC	—	1	×	B	<a href="#">EC-894</a>
P2128	2128	APP SEN 2/CIRC	—	1	×	B	<a href="#">EC-894</a>
P2135	2135	TP SENSOR-B1	—	1	×	B	<a href="#">EC-898</a>
P2138	2138	APP SENSOR	—	1	×	B	<a href="#">EC-901</a>
P2A00	2A00	A/F SENSOR1 (B1)	—	2	×	A	<a href="#">EC-905</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: This number is prescribed by SAE J2012/ISO 15031-6.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*4: Refer to [EC-512. "Description"](#), "PERMANENT DTC".

\*5: The troubleshooting for this DTC needs CONSULT-III.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

\*7: SRT code will not be set if the self-diagnostic result is NG.

\*8: When the ECM is in the mode that displays SRT status, MIL may flash. For the details, refer to [EC-506. "Description"](#).

\*9: When erasing this DTC, always use CONSULT-III or GST.

## Test Value and Test Limit

INFOID:000000006948216

The following is the information specified in Service \$06 of SAE J1979/ISO 15031-5.

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. (e.g., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)

# ECM

< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

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
			P014C	8DH	04H	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1
			P014C	8EH	04H	O2 Sensor Slow Response - Rich to Lean Bank 1 Sensor 1
			P014D	8FH	84H	O2 Sensor Slow Response - Lean to Rich Bank 1 Sensor 1
			P014D	90H	84H	O2 Sensor Slow Response - Lean to Rich Bank 1 Sensor 1
			P015A	91H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1
			P015A	92H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1
	P015B	93H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1		
	P015B	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1		
	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
	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

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[MR18DE (FOR CALIFORNIA)]

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
			P014E	8DH	04H	O2 Sensor Slow Response - Rich to Lean Bank 2 Sensor 1
			P014E	8EH	04H	O2 Sensor Slow Response - Rich to Lean Bank 2 Sensor 1
			P014F	8FH	84H	O2 Sensor Slow Response - Lean to Rich Bank 2 Sensor 1
			P014F	90H	84H	O2 Sensor Slow Response - Lean to Rich Bank 2 Sensor 1
			P015C	91H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 2 Sensor 1
			P015C	92H	01H	O2 Sensor Delayed Response - Rich to Lean Bank 2 Sensor 1
			P015D	93H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1
	P015D	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1		
	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

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATALYST	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
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
VVT SYSTEM	35H	VVT Monitor (Bank1)	P0011	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0014	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0011	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	36H	VVT Monitor (Bank2)	P0021	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
			P0024	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)
			P0021	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)

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[MR18DE (FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
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 0.04 inch)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			P0456	81H	FDH	Maximum internal pressure of EVAP system during monitoring
			P0456	82H	FDH	Internal pressure of EVAP system at the end of 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 heater (Bank 1)	Low Input:P0037 High Input:P0038	80H	0CH	Converted value of Heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (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 heater (Bank 2)	Low Input:P0057 High Input:P0058	80H	0CH	Converted value of Heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (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
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

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< ECU DIAGNOSIS INFORMATION >

[MR18DE (FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple Cylinder Misfires	P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder
			P0305	84H	24H	Misfiring counter at 1000 revolution of the fifth cylinder
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder
			P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			P0302	8AH	24H	Misfiring counter at 200 revolution of the second cylinder
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder
			P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders

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**[MR18DE (FOR CALIFORNIA)]**

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 >

[MR18DE (FOR CALIFORNIA)]

## SYMPTOM DIAGNOSIS

### ENGINE CONTROL SYSTEM SYMPTOMS

#### Symptom Table

INFOID:000000006943208

#### 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	<a href="#">EC-921</a>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-989</a>
	Fuel injector circuit	1	1	2	3	2		2	2			2			<a href="#">EC-918</a>
	Evaporative emission system	3	3	4	4	4	4	4	4	4	4	4			<a href="#">EC-565</a>
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4	4	4	1		<a href="#">EC-936</a>
	Incorrect idle speed adjustment						1	1	1	1		1			<a href="#">EC-501</a>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<a href="#">EC-883</a> <a href="#">EC-887</a>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<a href="#">EC-501</a>
	Ignition circuit	1	1	2	2	2		2	2			2			<a href="#">EC-924</a>
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			<a href="#">EC-619</a>
Mass air flow sensor circuit		1			2										<a href="#">EC-638</a> <a href="#">EC-643</a>
Engine coolant temperature sensor circuit					3										
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			<a href="#">EC-668</a> <a href="#">EC-672</a> <a href="#">EC-675</a> <a href="#">EC-698</a> <a href="#">EC-905</a>
Throttle position sensor circuit							2			2					<a href="#">EC-658</a> <a href="#">EC-725</a> <a href="#">EC-835</a> <a href="#">EC-837</a> <a href="#">EC-898</a>
Accelerator pedal position sensor circuit				3	2	1									<a href="#">EC-891</a> <a href="#">EC-894</a> <a href="#">EC-901</a>
Knock sensor circuit				2								3			<a href="#">EC-734</a>

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# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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												<a href="#">EC-736</a>
Camshaft position sensor (PHASE) circuit	3	2												<a href="#">EC-740</a>
Vehicle speed signal circuit		2	3		3						3			<a href="#">EC-809</a>
ECM	2	2	3	3	3	3	3	3	3	3	3			<a href="#">EC-821</a> <a href="#">EC-823</a>
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			<a href="#">EC-625</a>
transmission range switch circuit			3		3		3	3			3			<a href="#">EC-826</a>
PNP switch circuit			3		3		3	3			3			<a href="#">EC-826</a>
Refrigerant pressure sensor circuit		2				3			3		4			<a href="#">EC-937</a>
Electrical load signal circuit							3							<a href="#">EC-916</a>
Tumble control valve motor					4	4								<a href="#">EC-872</a>
Tumble control valve position sensor					4	4								<a href="#">EC-877</a>
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<a href="#">HAC-131</a> <a href="#">HAC-211</a>
ABS actuator and electric unit (control unit)			4											<a href="#">BRC-96</a>

1 - 6: The numbers refer to the order of inspection.

(continued on next table)

## SYSTEM — ENGINE MECHANICAL & OTHER

# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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	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												<a href="#">FL-13</a>					
	Fuel piping			5	5	5		5	5			5			<a href="#">FL-4</a>					
	Vapor lock	5														—				
	Valve deposit																—			
	Poor fuel (Heavy weight gasoline, Low octane)			5	5	5	5		5	5			5				—			
Air	Air duct	5	5	5	5	5	5	5	5	5	5	5	5	5	5	<a href="#">EM-15</a>				
	Air cleaner																			
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)																			
	Electric throttle control actuator																			
	Air leakage from intake manifold/Collector/Gasket																			
Cranking	Battery	1	1	1		1		1	1						1	<a href="#">PG-3</a>				
	Generator circuit															<a href="#">CHG-5</a>				
	Starter circuit	3										1				<a href="#">STR-2</a>				
	Signal plate	6														<a href="#">EM-87</a>				
	Transmission range switch	4														<a href="#">TM-106 (CVT)</a>				
	PNP switch	4														<a href="#">TM-8 (M/T)</a>				
Engine	Cylinder head	5	5	5	5	5	5	5	5	5	5	5	5	5	5	<a href="#">EM-66</a>				
	Cylinder head gasket																4		3	
	Cylinder block	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	<a href="#">EM-87</a>			
	Piston																			4
	Piston ring																			
	Connecting rod																			
	Bearing																			
	Crankshaft																			

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# ENGINE CONTROL SYSTEM SYMPTOMS

< SYMPTOM DIAGNOSIS >

[MR18DE (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		A A	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														<a href="#">EM-43</a>
	Camshaft														<a href="#">EM-54</a>
	Intake valve timing control	5	5	5	5	5		5	5			5			<a href="#">EM-43</a>
	Intake valve												3		<a href="#">EM-66</a>
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			<a href="#">EM-30</a> <a href="#">EX-4</a>
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<a href="#">EM-33</a> <a href="#">LU-7</a> <a href="#">LU-11</a>
	Oil level (Low)/Filthy oil														<a href="#">LU-7</a>
Cooling	Radiator/Hose/Radiator filler cap														<a href="#">CO-13</a> <a href="#">CO-13</a>
	Thermostat									5					<a href="#">CO-22</a>
	Water pump														<a href="#">CO-20</a>
	Water gallery	5	5	5	5	5		5	5		4	5			<a href="#">CO-2</a>
	Cooling fan														<a href="#">EC-914</a>
	Coolant level (Low)/Contaminated coolant										5				<a href="#">CO-2</a>
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												<a href="#">SEC-15</a>

1 - 6: The numbers refer to the order of inspection.

# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[MR18DE (FOR CALIFORNIA)]

## NORMAL OPERATING CONDITION

### Description

INFOID:000000006943209

#### FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,500 rpm under no load (for example, the selector lever position is neutral and engine speed is over 2,500 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 2,000 rpm, then fuel cut will be cancelled.

**NOTE:**

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, [EC-525](#), "[System Description](#)".

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## PRECAUTION

### PRECAUTIONS

#### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000008180414

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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

**WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never 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 WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

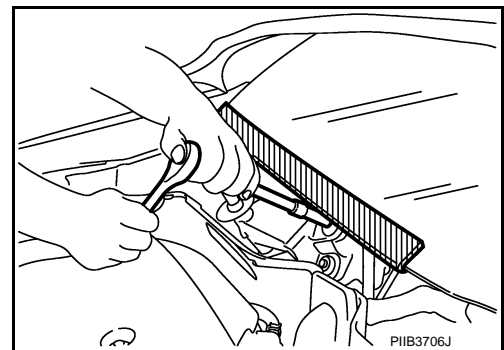
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### Precaution for Procedure without Cowl Top Cover

INFOID:000000008180415

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



#### On Board Diagnosis (OBD) System of Engine and CVT

INFOID:000000006943212

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.)

# PRECAUTIONS

[MR18DE (FOR CALIFORNIA)]

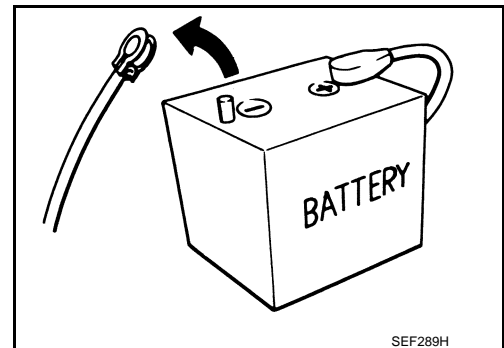
## < PRECAUTION >

- 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-93, "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.

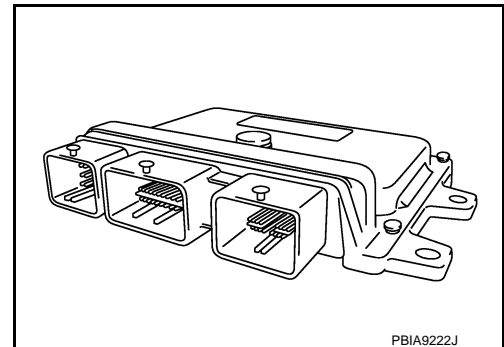
## General Precautions

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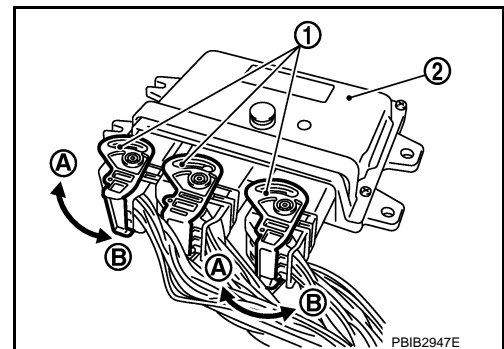
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect negative battery 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. Thus, engine operation can vary slightly in this case. 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 cleared within 24 hours.
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - Freeze frame data
  - 1st trip freeze frame data
  - System readiness test (SRT) codes
  - Test values
- When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.



- 2. ECM
- A. Loosen

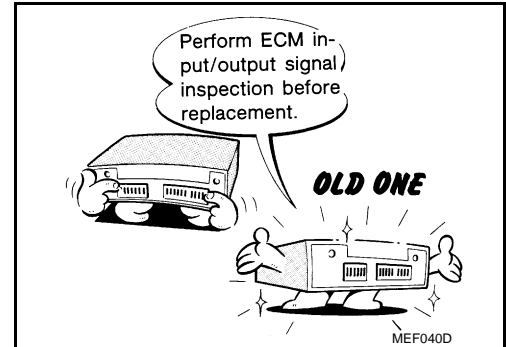
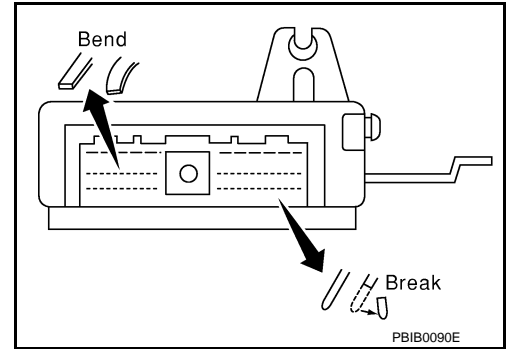


# PRECAUTIONS

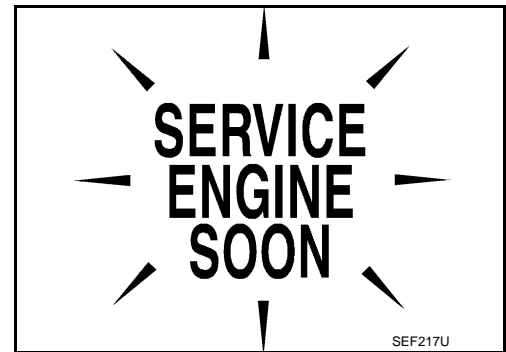
## < PRECAUTION >

[MR18DE (FOR CALIFORNIA)]

- 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-939, "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.



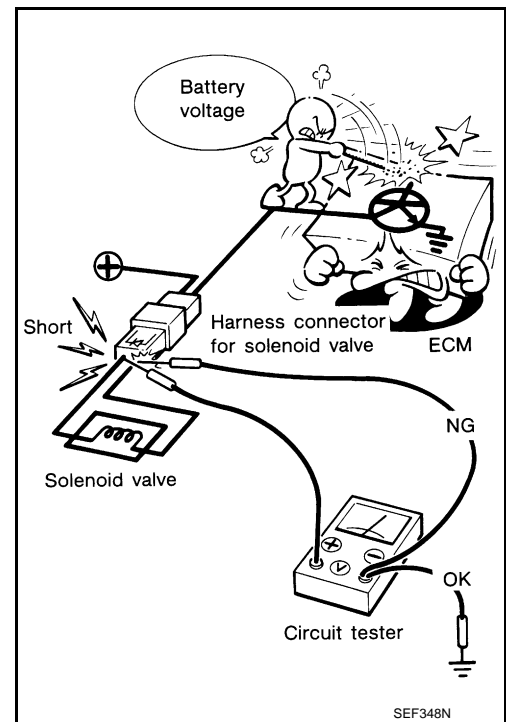


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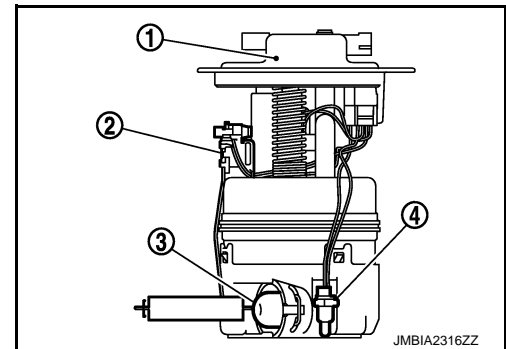
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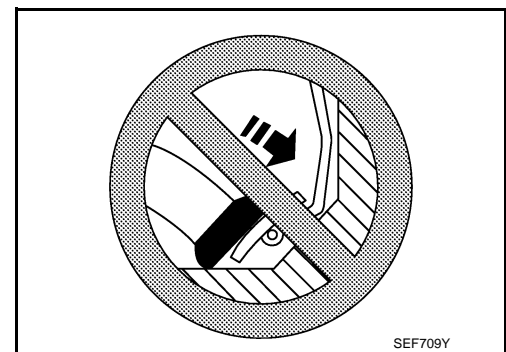
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.
  - Fuel level sensor unit and fuel pump (1)
  - Fuel pressure regulator (2)
  - Fuel level sensor (3)
  - Fuel tank temperature sensor (4)



- 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.



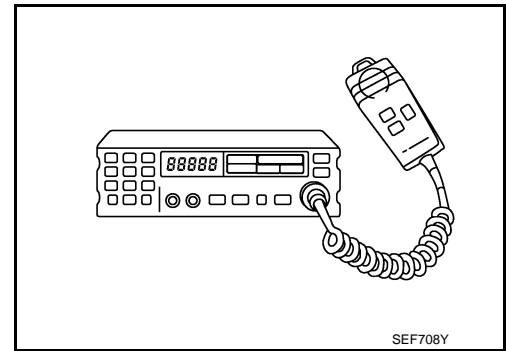
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## PRECAUTIONS

[MR18DE (FOR CALIFORNIA)]

### < 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

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[MR18DE (FOR CALIFORNIA)]

## PREPARATION

### PREPARATION

#### Special Service Tools

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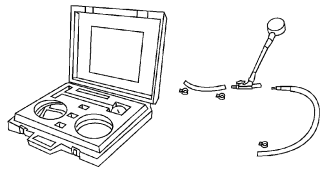
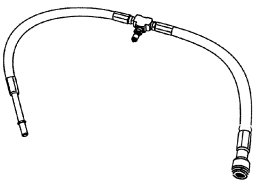
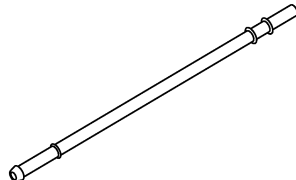
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**NOTE:**

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

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Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge kit  LEC642	Checks fuel pressure
(J-44321-6) Fuel pressure adapter  LBIA0376E	Connects fuel pressure gauge to quick connector type fuel lines.
KV10118400 Fuel tube adapter  PBIB3043E	Measures fuel pressure

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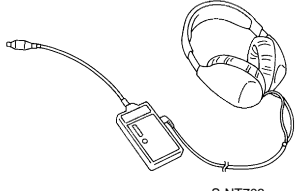
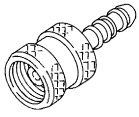
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#### Commercial Service Tools

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Tool name (Kent-Moore No.)	Description
Leak detector i.e.: (J-41416)  S-NT703	Locates the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD)  S-NT704	Applies positive pressure through EVAP service port

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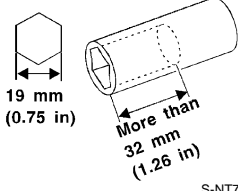
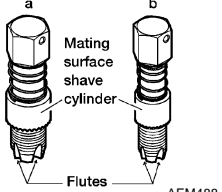

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# PREPARATION

< PREPARATION >

[MR18DE (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>	Checks fuel tank vacuum relief valve opening pressure
Socket wrench <div style="text-align: center;">  <p>S-NT705</p> </div>	Removes and installs 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>	Reconditions the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. <b>a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor</b> <b>b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor</b>
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>	Lubricates oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

## PERIODIC MAINTENANCE

### FUEL PRESSURE

#### Inspection

INFOID:000000006943216

#### FUEL PRESSURE RELEASE

##### ☐ 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 C11 models do not have fuel return system.
- The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.
- Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains seal ability with O-rings inside.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.

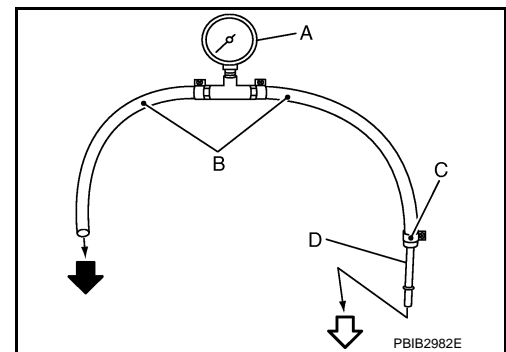
1. Release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.

- ⇐: To quick connector
- ←: To fuel tube (engine side)
- C: Clamp
- Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
- To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
- Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
- Use Pressure Gauge to check fuel pressure.

3. Remove fuel hose. Refer to [EM-36, "Removal and Installation"](#).

- Do not twist or kink fuel hose because it is plastic hose.

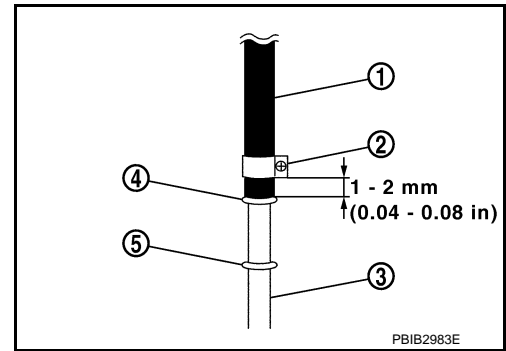


# FUEL PRESSURE

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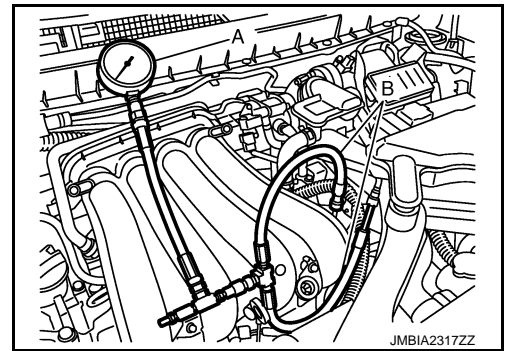
[MR18DE (FOR CALIFORNIA)]

4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.
  - No.2 spool (5)
  - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
  - Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
  - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
  - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
  - When reconnecting fuel line, always use new clamps.
  - Use a torque driver to tighten clamps.
  - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



### **Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg·m, 9 - 13 in·lb)**

- Make sure that clamp screw does not contact adjacent parts.
5. Connect fuel tube adapter to quick connector.
    - A: Fuel pressure gauge
    - B: Fuel hose for fuel pressure check
  6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
  7. Turn ignition switch ON and check for fuel leakage.
  8. Start engine and check for fuel leakage.
  9. Read the indication of fuel pressure gauge.
    - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
    - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



### **At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)**

10. If result is unsatisfactory, go to next step.
11. Check the following.
  - Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging
  - Fuel pump
  - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.  
If NG, repair or replace.
12. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

# EVAP LEAK CHECK

< PERIODIC MAINTENANCE >

[MR18DE (FOR CALIFORNIA)]

## EVAP LEAK CHECK

### Inspection

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#### CAUTION:

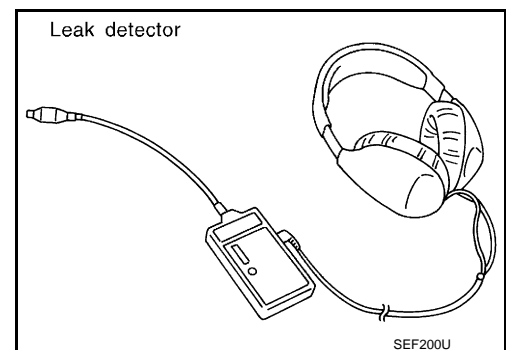
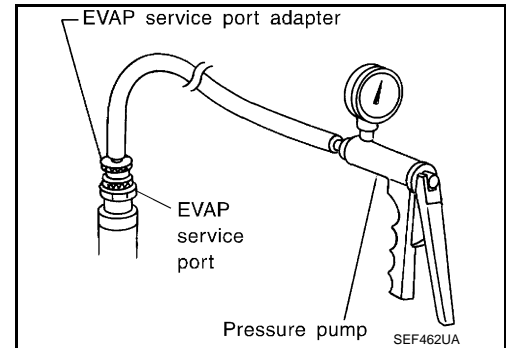
- Do not use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

#### NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter [commercial service tool: (J-41413-OBDD)] to the EVAP service port may cause a leak.

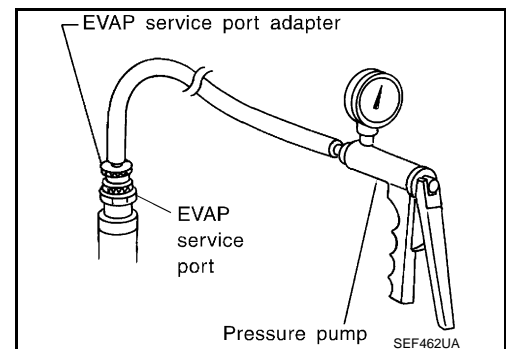
#### Ⓟ WITH CONSULT-III

1. Install EVAP service port adapter [commercial service tool: (J-41413-OBDD)] 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 [commercial service tool: (J-41413-OBDD)] and hose with pressure pump.
7. Locate the leak using a leak detector [commercial service tool: (J-41416)]. Refer to [EC-565. "System Description"](#).



#### ⓧ WITHOUT CONSULT-III

1. Install EVAP service port adapter [commercial service tool: (J-41413-OBDD)] 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/cm<sup>2</sup>, 0.2 to 0.4 psi).
4. Remove EVAP service port adapter [commercial service tool: (J-41413-OBDD)] and hose with pressure pump.



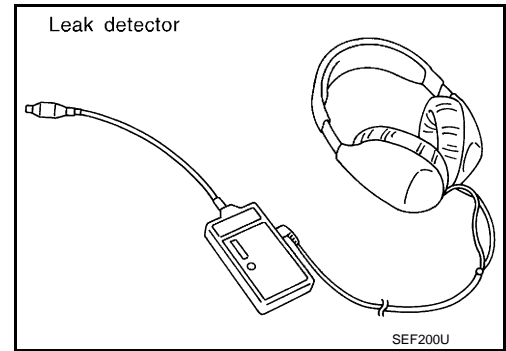
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## EVAP LEAK CHECK

< PERIODIC MAINTENANCE >

[MR18DE (FOR CALIFORNIA)]

5. Locate the leak using a leak detector [commercial service tool: (J-41416)]. Refer to [EC-565, "System Description"](#).





# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR18DE (FOR CALIFORNIA)]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Idle Speed

INFOID:000000006943221

Transmission	Condition	Specification
CVT	No load* (in P or N position)	700 ± 50 rpm
M/T	No load* (in Neutral position)	700 ± 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:000000006943222

Transmission	Condition	Specification
CVT	No load* (in P or N position)	13 ± 5°BTDC
M/T	No load* (in Neutral position)	13 ± 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:000000006943223

Condition	Specification (Using CONSULT-III or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

#### Mass Air Flow Sensor

INFOID:000000006943224

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle	0.9 – 1.3V*
Mass air flow (Using CONSULT-III or GST)	1.0 – 4.0 g/sec at idle* 2.0 – 10.0 g/sec at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and running under no load.