# SECTION ENGINE CONTROL SYSTEM o

# CONTENTS

#### VQ35DE

BASIC INSPECTION8
DIAGNOSIS AND REPAIR WORKFLOW
INSPECTION AND ADJUSTMENT13
BASIC INSPECTION
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT
IDLE SPEED       18         IDLE SPEED : Description       18         IDLE SPEED : Special Repair Requirement       18
IGNITION TIMING
VIN REGISTRATION
ACCELERATOR PEDAL RELEASED POSITION LEARNING
THROTTLE VALVE CLOSED POSITION LEARN- ING

THROTTLE VALVE CLOSED POSITION LEARNING : Description19 THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement19	F
IDLE AIR VOLUME LEARNING	Н
MIXTURE RATIO SELF-LEARNING VALUE CLEAR	l J
HOW TO SET SRT CODE23Description23SRT Set Driving Pattern24Work Procedure26	K
HOW TO ERASE PERMANENT DTC29Description29Work Procedure (Group A)30Work Procedure (Group B)32	M
SYSTEM DESCRIPTION35	N
ENGINE CONTROL SYSTEM	0
MULTIPORT FUEL INJECTION SYSTEM       43         System Diagram       43         System Description       43         Component Parts Location       46         Component Description       51         ELECTRIC IGNITION SYSTEM       52	Ρ

D

Е

System Diagram	52
System Description	
Component Parts Location	
Component Description	58

#### AIR CONDITIONING CUT CONTROL ...... 59

System Diagram	59
System Description	59
Component Parts Location	
Component Description	65

#### AUTOMATIC SPEED CONTROL DEVICE

(ASCD)	66
System Diagram	66
System Description	
Component Parts Location	67
Component Description	72

## 

System Description 73	
-----------------------	--

COOLING FAN CONTROL	74
System Diagram	74
System Description	74
Component Parts Location	
Component Description	

#### ELECTRONIC CONTROLLED ENGINE

MOUNT	82
System Diagram	82
System Description	
Component Parts Location	
Component Description	90

EVAPORATIVE	EMISSION SYSTEM	91
System Diagram		

, , , , , , , , , , , , , , , , , , , ,	
System Description9	<b>)</b> 1
Component Parts Location9	<b>)</b> 5
Component Description10	)0

<b>INTAKE VALVE TIMING CONTROL</b>	101
System Diagram	101
System Description	101
Component Parts Location	102
Component Description	

FUEL FILLER CAP WARNING SYSTEM	108
System Diagram	108
System Description	108

ON BOARD DIAGNOSTIC (OBD) SYSTEM	118
Diagnosis Description	118
GST (Generic Scan Tool)	118

```
DIAGNOSIS SYSTEM (ECM) ..... 119
```

	119
DIAGNOSIS DESCRIPTION : 1st Trip Detection Logic and Two Trip Detection Logic	119
DIAGNOSIS DESCRIPTION : DTC and Freeze	
Frame Data	119
DIAGNOSIS DESCRIPTION : Counter System	
DIAGNOSIS DESCRIPTION : Driving Pattern DIAGNOSIS DESCRIPTION : System Readiness	
Test (SRT) Code	124
DIAGNOSIS DESCRIPTION : Permanent Diag- nostic Trouble Code (Permanent DTC)	405
DIAGNOSIS DESCRIPTION : Malfunction Indica-	125
tor Lamp (MIL)	126
On Board Diagnosis Function	
CONSULT Function	
DTC/CIRCUIT DIAGNOSIS	140
TROUBLE DIAGNOSIS - SPECIFICATION	
VALUE	140
Description	140
Component Function Check	
Diagnosis Procedure	141
POWER SUPPLY AND GROUND CIRCUIT	148
Diagnosis Procedure	
U0101 CAN COMM CIRCUIT	151
Description	
DTC Logic	
Diagnosis Procedure	151
U0164 CAN COMM CIRCUIT	
Description	
DTC Logic	
Diagnosis Procedure	
U1001 CAN COMM CIRCUIT	
Description	
DTC Logic	153
Diagnosis Procedure	
P0011, P0021 IVT CONTROL	
DTC Logic	
Diagnosis Procedure	
Component Inspection	156
P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER	450
HEATER Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	
P0037, P0038, P0057, P0058 HO2S2 HEAT-	
ER	161
Description	
DTC Logic	161
Diagnosis Procedure	162

Component Inspection ......163

P0075, P0081 IVT CONTROL SOLENOID	
VALVE	
Description	164
DTC Logic	
Diagnosis Procedure	
Component Inspection	
P0101 MAF SENSOR	167
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	169
P0102, P0103 MAF SENSOR	172
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	174
P0111 IAT SENSOR	177
DTC Logic	
Component Function Check	
Diagnosis Procedure	170
Component Increation	170
Component Inspection	178
P0112, P0113 IAT SENSOR	179
Description	179
DTC Logic	
-	
Diagnosis Procedure	
Component Inspection	180
P0116 ECT SENSOR	182
Description	
DTC Logic	
Component Function Check	102
Component Function Check	183
Diagnosis Procedure	
Component Inspection	184
P0117, P0118 ECT SENSOR	185
Description	
•	
DTC Logic	
Diagnosis Procedure	
Component Inspection	186
P0122, P0123 TP SENSOR	188
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	100
	190
Special Repair Requirement	
	190
P0125 ECT SENSOR	190 <b>191</b>
P0125 ECT SENSOR Description	190 <b>191</b> 191
P0125 ECT SENSOR Description DTC Logic	190 <b>191</b> 191 191
P0125 ECT SENSOR Description	190 <b>191</b> 191 191
P0125 ECT SENSOR Description DTC Logic	190 <b>191</b> 191 191 192
P0125 ECT SENSOR Description DTC Logic Diagnosis Procedure Component Inspection	190 <b>191</b> 191 191 192 192
P0125 ECT SENSOR         Description         DTC Logic         Diagnosis Procedure         Component Inspection         P0127 IAT SENSOR	190 <b>191</b> 191 191 192 192 <b>194</b>
P0125 ECT SENSOR         Description         DTC Logic         Diagnosis Procedure         Component Inspection         P0127 IAT SENSOR         Description	190 <b>191</b> 191 192 192 <b>194</b> 194
P0125 ECT SENSOR         Description         DTC Logic         Diagnosis Procedure         Component Inspection         P0127 IAT SENSOR	190 <b>191</b> 191 192 192 <b>194</b> 194

Component Inspection195	
P0128 THERMOSTAT FUNCTION	A
Diagnosis Procedure197 Component Inspection197	EC
P0130, P0150 A/F SENSOR 1	С
Component Function Check201 Diagnosis Procedure201	D
P0131, P0151 A/F SENSOR 1         203           Description         203           DTC Logic         203           Diagnosis Procedure         204	E
P0132, P0152 A/F SENSOR 1	F
Diagnosis Procedure	G
Description	Н
P0138, P0158 HO2S2218Description218DTC Logic218Component Function Check220Diagnosis Procedure221Component Inspection224	J
P0139, P0159 HO2S2227Description227DTC Logic227Component Function Check229Diagnosis Procedure230Component Inspection231	L
P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1	Ν
P0171, P0174 FUEL INJECTION SYSTEMFUNCTION240DTC Logic240Diagnosis Procedure241	O P
P0172, P0175 FUEL INJECTION SYSTEMFUNCTION244DTC Logic244Diagnosis Procedure245	
P0181 FTT SENSOR248	

Description DTC Logic Component Function Check Diagnosis Procedure Component Inspection	248 250 250
P0182, P0183 FTT SENSOR Description DTC Logic Diagnosis Procedure Component Inspection	253 253 253
P0196 EOT SENSOR Description DTC Logic Component Function Check Diagnosis Procedure Component Inspection	256 256 258 259
P0197, P0198 EOT SENSOR Description DTC Logic Diagnosis Procedure Component Inspection	260 260 261
P0222, P0223 TP SENSOR Description DTC Logic Diagnosis Procedure Component Inspection Special Repair Requirement	263 263 263 265
P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE DTC Logic Diagnosis Procedure	<b>. 266</b> 266
P0327, P0328, P0332, P0333 KS Description DTC Logic Diagnosis Procedure Component Inspection	272 272 272
P0335 CKP SENSOR (POS) Description DTC Logic Diagnosis Procedure Component Inspection	275 275 276
P0340, P0345 CMP SENSOR (PHASE) Description DTC Logic Diagnosis Procedure Component Inspection	279 279 280
P0420, P0430 THREE WAY CATALYST FUNCTION DTC Logic	

P0441 EVAP CONTROL SYSTEM	288
DTC Logic	288
Component Function Check	
Diagnosis Procedure	290

#### 

Description	293
DTC Logic	293
Diagnosis Procedure	294
Component Inspection	297

#### P0444, P0445 EVAP CANISTER PURGE

VOLUME CONTROL SOLENOID VALVE	298
Description	298
DTC Logic	298
Diagnosis Procedure	298
Component Inspection	300

#### **P0447 EVAP CANISTER VENT CONTROL**

VALVE	
Description	301
DTC Logic	
Diagnosis Procedure	301
Component Inspection	303

#### P0448 EVAP CANISTER VENT CONTROL

VALVE	305
Description	
DTC Logic	. 305
Diagnosis Procedure	. 306
Component Inspection	. 307

## P0451 EVAP CONTROL SYSTEM PRES-

SURE SENSOR	
Description	309
DTC Logic	309
Diagnosis Procedure	310
Component Inspection	312

#### P0452 EVAP CONTROL SYSTEM PRES-

SURE SENSOR	
Description	313
DTC Logic	
Diagnosis Procedure	
Component Inspection	

#### P0453 EVAP CONTROL SYSTEM PRES-

SURE SENSOR	318
Description	318
DTC Logic	318
Diagnosis Procedure	319
Component Inspection	322
P0456 EVAP CONTROL SYSTEM	324

DTC Logic	324
Diagnosis Procedure	325
Component Inspection	329

P0460 FUEL LEVEL SENSOR ......330

	_
Description	
Diagnosis Procedure	
P0461 FUEL LEVEL SENSOR332	
Description	
DTC Logic	
Component Function Check	
P0462, P0463 FUEL LEVEL SENSOR	
Description	
DTC Logic	
Diagnosis Procedure	
P0500 VSS	
Description	
DTC Logic	
Diagnosis Procedure	
P0506 ISC SYSTEM	
Description	
DTC Logic	
P0507 ISC SYSTEM	
Description	
DTC Logic	
Diagnosis Procedure	
P050A, P050E COLD START CONTROL 342	
Description	
DTC Logic	
Diagnosis Procedure	
P0550 PSP SENSOR	
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	
P0603 ECM POWER SUPPLY	
Description	
DTC Logic	
-	
P0605 ECM	
Description	
Diagnosis Procedure	
P0607 ECM	
Description	
DTC Logic	
Diagnosis Procedure	
P0643 SENSOR POWER SUPPLY	
DTC Logic	
Diagnosis Procedure	
P0850 PNP SWITCH	
Description	

DTC Logic	A
P1148, P1168 CLOSED LOOP CONTROL 358 DTC Logic	EC
P1212 TCS COMMUNICATION LINE	С
P1217 ENGINE OVER TEMPERATURE	D
P1225 TP SENSOR	F
P1226 TP SENSOR	G
P1550 BATTERY CURRENT SENSOR368Description368DTC Logic368Diagnosis Procedure368Component Inspection369	l J
P1551, P1552 BATTERY CURRENT SEN- SOR	K
P1553 BATTERY CURRENT SENSOR	M
P1554 BATTERY CURRENT SENSOR	O
P1564 ASCD STEERING SWITCH380Description380DTC Logic380Diagnosis Procedure380Component Inspection382	

P1572 ASCD BRAKE SWITCH	383
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection (ASCD Brake Switch)	
Component Inspection (Stop Lamp Switch)	
P1574 ASCD VEHICLE SPEED SENSOR	
Description	
DTC Logic	
Diagnosis Procedure	389
P1700 CVT CONTROL SYSTEM	301
Description	
P1715 INPUT SPEED SENSOR (PRIMARY	
SPEED SENSOR)	
Description	
DTC Logic	
Diagnosis Procedure	392
P1800 VIAS CONTROL SOLENOID VALVE 1	394
Description	394
DTC Logic	
Diagnosis Procedure	
Component Inspection	395
P1801 VIAS CONTROL SOLENOID VALVE 2	
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	398
P1805 BRAKE SWITCH	400
Description	400
DTC Logic	400
Diagnosis Procedure	
Component Inspection (Stop Lamp Switch)	401
P2096, P2097, P2098, P2099 A/F SENSOR 1	403
Description	
DTC Logic	
Diagnosis Procedure	
P2100, P2103 THROTTLE CONTROL MO- TOR RELAY	109
Description	
•	
DTC Logic Diagnosis Procedure	
	400
P2101 ELECTRIC THROTTLE CONTROL	
FUNCTION	
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	
Special Repair Requirement	413
P2118 THROTTLE CONTROL MOTOR	. 414
Description	
DTC Logic	
-	

Diagnosis Procedure	
P2119 ELECTRIC THROTTLE CONTROL	
ACTUATOR417	
Description	
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	
P2122, P2123 APP SENSOR419	
Description	
DTC Logic 419	
Diagnosis Procedure	
Component Inspection	
Special Repair Requirement	
P2127, P2128 APP SENSOR422 Description	
DTC Logic	
Component Inspection	
Special Repair Requirement 425	
P2135 TP SENSOR426	
Description 426	
DTC Logic 426	
Diagnosis Procedure 426	
Component Inspection	
Special Repair Requirement 428	
P2138 APP SENSOR429	
Description	
DTC Logic	
Diagnosis Procedure	
Component Inspection	
Special Repair Requirement	
ASCD BRAKE SWITCH433	
Description 433	
Description	
Description	
Description	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435	
Description       433         Component Function Check       433         Diagnosis Procedure       433         Component Inspection (ASCD Brake Switch)       434         ASCD INDICATOR       435         Description       435	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436	
Description         433           Component Function Check         433           Diagnosis Procedure         433           Component Inspection (ASCD Brake Switch)         434           ASCD INDICATOR         435           Description         435           Component Function Check         435           Diagnosis Procedure         435           Component Function Check         435           Diagnosis Procedure         435           COOLING FAN         436           Component Function Check         436	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436Diagnosis Procedure436Diagnosis Procedure436	
Description         433           Component Function Check         433           Diagnosis Procedure         433           Component Inspection (ASCD Brake Switch)         434           ASCD INDICATOR         435           Description         435           Component Function Check         435           Diagnosis Procedure         435           Component Function Check         435           Diagnosis Procedure         435           COOLING FAN         436           Component Function Check         436	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436Component Function Check436Description436Component Function Check436Component Function Check436Component Function Check436Component Function Check436Diagnosis Procedure436Component Inspection (Cooling Fan Motor)439Component Inspection (Cooling Fan Relay)440	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436Component Function Check436Description436Component Function Check436Description436Component Function Check436Diagnosis Procedure436Component Function Check436Diagnosis Procedure436Component Inspection (Cooling Fan Motor)439Component Inspection (Cooling Fan Relay)440ELECTRICAL LOAD SIGNAL441	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436Component Function Check436Description436Component Function Check436Description436Component Function Check436Diagnosis Procedure436Component Inspection (Cooling Fan Motor)439Component Inspection (Cooling Fan Relay)440ELECTRICAL LOAD SIGNAL441Description441	
Description433Component Function Check433Diagnosis Procedure433Component Inspection (ASCD Brake Switch)434ASCD INDICATOR435Description435Component Function Check435Diagnosis Procedure435COOLING FAN436Description436Component Function Check436Description436Component Function Check436Description436Component Function Check436Diagnosis Procedure436Component Function Check436Diagnosis Procedure436Component Inspection (Cooling Fan Motor)439Component Inspection (Cooling Fan Relay)440ELECTRICAL LOAD SIGNAL441	

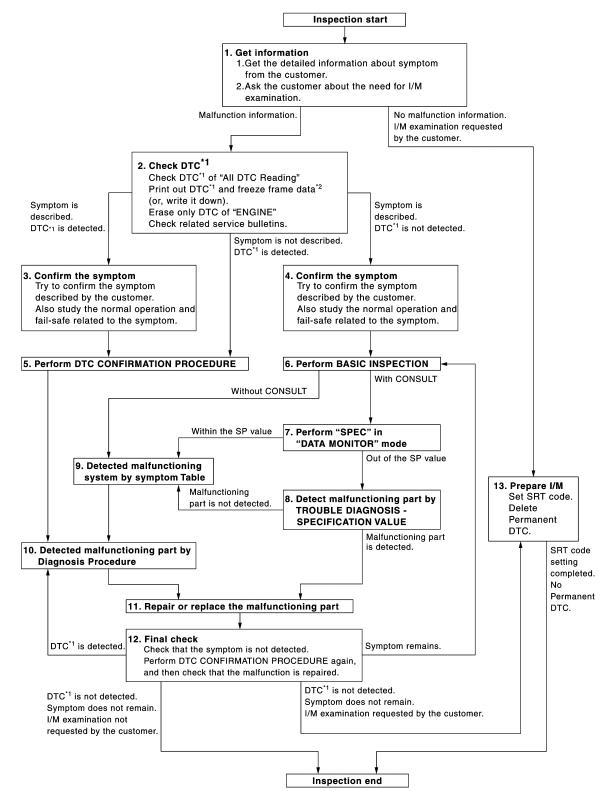
ELECTRONIC CONTROLLED ENGINE
MOUNT
Description
Component Function Check
Diagnosis Procedure
Component Inspection444
FUEL INJECTOR446
Description
Component Function Check 446
Diagnosis Procedure
Component Inspection448
FUEL PUMP
Description449
Component Function Check 449
Diagnosis Procedure449
Component Inspection (Fuel Pump)452
Component Inspection (Condenser)452
IGNITION SIGNAL453
Description453
Component Function Check 453
Diagnosis Procedure453
Component Inspection (Ignition Coil with Power
Transistor) 456
Component Inspection (Condenser)457
MALFUNCTION INDICATOR LAMP458
Description458
Component Function Check 458
Diagnosis Procedure458
ON BOARD REFUELING VAPOR RECOV-
ERY (ORVR)459
Description459
Component Function Check 459
Diagnosis Procedure 459
Component Inspection462
POSITIVE CRANKCASE VENTILATION 464
Description464
Component Inspection 464
REFRIGERANT PRESSURE SENSOR
Description
Component Function Check 465
Diagnosis Procedure 465
VARIABLE INDUCTION AIR SYSTEM
Description
Component Function Check
Diagnosis Procedure
ECU DIAGNOSIS INFORMATION
ECM
Reference Value

Wiring Diagram—ENGINE CONTROL SYS-	
TEM—	A
Fail-safe	
DTC Inspection Priority Chart505	
DTC Index507	EC
Test Value and Test Limit511	
SYMPTOM DIAGNOSIS	0
ENGINE CONTROL SYSTEM SYMPTOMS 519 Symptom Table	C
NORMAL OPERATING CONDITION	D
Description	
PRECAUTION	Е
PRECAUTIONS	
FOR USA AND CANADA524	F
FOR USA AND CANADA : Precaution for Supple-	
mental Restraint System (SRS) "AIR BAG" and	
"SEAT BELT PRE-TENSIONER"	
SEAT BELT FRE-TENSIONER	G
FOR MEXICO524	
FOR MEXICO : Precaution for Supplemental Re-	
straint System (SRS) "AIR BAG" and "SEAT BELT	Н
PRE-TENSIONER"	
Precautions For Xenon Headlamp Service	
Precaution for Procedure without Cowl Top Cover.525	
•	
Precautions for Removing of Battery Terminal525	
On Board Diagnostic (OBD) System of Engine	
and CVT	J
General Precautions526	0
PREPARATION	
FREFARATION	12
PREPARATION	K
Special Service Tools	
Commercial Service Tools	
	L
PERIODIC MAINTENANCE532	
FUEL PRESSURE	р. л.
Inspection	M
•	
EVAP LEAK CHECK	N
·	
SERVICE DATA AND SPECIFICATIONS (SDS)	0
	0
SERVICE DATA AND SPECIFICATIONS	
(SDS)	
Idle Speed536	Ρ
Ignition Timing536	
Calculated Load Value	
Mass Air Flow Sensor	

## BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

**OVERALL SEQUENCE** 



JSBIA0123GB

INFOID:000000009719797

< BASIC INSPECTION >

*1: Include 1st trip DTC. *2: Include 1st trip freeze frame data.	А
DETAILED FLOW	
1.GET INFORMATION FOR SYMPTOM	EC
<ol> <li>Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to <u>EC-11, "Diagnostic</u> <u>Work Sheet"</u>.)</li> </ol>	С
2. Ask if the customer requests I/M examination.	
Malfunction information obtained + CO TO 2	D
Malfunction information, obtained>>GO TO 2. No Malfunction information, but a request for I/M examination>>GO TO 13.	
2. CHECK DTC	E
<ol> <li>Check DTC of "All DTC Reading".</li> <li>Perform the following procedure if DTC is displayed.</li> </ol>	
<ul> <li>Record DTC and freeze frame data. (Print them out with CONSULT or GST.)</li> <li>Erase only DTC of "ENGINE".</li> </ul>	F
With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in <u>EC-129</u> , "CONSULT Function".	
Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in <u>EC-126, "On Board Diagnosis</u> <u>Function"</u> .	G
- Turn ignition switch OFF.	
<ul> <li>Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to <u>EC-519, "Symptom Table"</u>.)</li> <li>Check related service bulletins for information.</li> </ul>	Η
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	J
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 <u>EC-523</u> , " <u>Description</u> " and " <u>Descr</u>	K
503, "Fail-safe". Diagnosis Work Sheet is useful to verify the incident.	
Verify relation between the symptom and the condition when the symptom is detected.	
	L
>> GO TO 5.	
4.CONFIRM THE SYMPTOM	N
Try to confirm the symptom described by the customer.	IV
Also study the normal operation and fail-safe related to the symptom. Refer to EC-523, "Description" and EC-	
<u>503. "Fail-safe"</u> . Dia magin Mark Chapt in vanful te varifu the incident	Ν
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.	С
5. PERFORM DTC CONFIRMATION PROCEDURE	
Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is	F
detected again.	
If two or more DTCs are detected, refer to EC-505. "DTC Inspection Priority Chart" and determine trouble	
diagnosis order.	

#### NOTE:

• Freeze frame data is useful if the DTC is not detected.

## DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

 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 CONFIR-MATION PROCEDURE.

#### Is DTC detected?

- YES >> GO TO 10.
- NO >> Check according to <u>GI-44, "Intermittent Incident"</u>.

**Ó.**PERFORM BASIC INSPECTION

Perform EC-13, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT?

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

NO >> 00 10 : 7

7.PERFORM SPEC IN DATA MONITOR MODE

#### With CONSULT

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 "SPEC" in "DATA MONITOR" mode of "ENGINE". Refer to <u>EC-140</u>, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.

NO >> GO TO 8.

f 8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-141, "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 <u>EC-519</u>, "<u>Symptom Table</u>" 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 <u>GI-47, "Circuit Inspection"</u>.

Is a malfunctioning part detected?

YES >> GO TO 11.

NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CON-SULT. Refer to <u>EC-472, "Reference Value"</u>.

## **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.
- Check DTC. If DTC is displayed, erase it.
   With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in <u>EC-129</u>, "<u>CONSULT Function</u>".
   Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in <u>EC-126</u>, "<u>On Board Diagnosis Function</u>".

>> GO TO 12.

## DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

[VQ35DE]

#### 12.FINAL CHECK А 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 EC that the symptom is not detected. Is DTC detected and does symptom remain? YES-1 >> DTC is detected: GO TO 10. YES-2 >> Symptom remains: GO TO 6. NO-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 (🕅 With CONSULT: Refer to "How to Read DTC and 1st Trip DTC" in EC-129, "CONSULT Function", 🛞 Without CONSULT: Refer to "How to D Read Self-diagnostic Results" in EC-126, "On Board Diagnosis Function"). NO-2 >> I/M examination, requested from the customer: GO TO 13. **13.**PREPARE FOR I/M EXAMINATION Ε 1. Set SRT codes. Refer to EC-24, "SRT Set Driving Pattern". Erase permanent DTCs. Refer to <u>EC-129, "CONSULT Function"</u>. F >> INSPECTION END. Diagnostic Work Sheet INFOID:000000009719798 DESCRIPTION Н There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trou-**KEY POINTS** bleshooting faster and more accurate. In general, each customer feels differently about symptoms. It is WHAT ..... Vehicle & engine model important to fully understand the symptoms or conditions for a cus-WHEN ..... Date, Frequencies tomer complaint. WHERE..... Road conditions Utilize a diagnostic worksheet like the WORKSHEET SAMPLE HOW ..... Operating conditions, below in order to organize all the information for troubleshooting. Weather conditions, Some conditions may cause the MIL to illuminate or blink, and DTC Symptoms to be detected. Examples: • Vehicle ran out of fuel, which caused the engine to misfire. Κ SEE9071 · Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere. L

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## DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

Customer nan	ne MR/MS	Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date	dent Date In Service Date		In Service Date
Fuel and fuel filler cap          Vehicle ran out of fuel causing misfire         Fuel filler cap was left off or incorrectly screw		/ screwed on.	
	☐ Startability	Impossible to start No combust     Partial combustion affected by th     Partial combustion NOT affected     Possible but hard to start Other	nottle position I by throttle position
Symptoms	🗌 Idling	☐ No fast idle   ☐ Unstable   ☐ H ☐ Others [	ligh idle 🛛 Low idle ]
	Driveability	Stumble Surge Knock Intake backfire Exhaust backfi Others [	Lack of power re ]
	Engine stall	At the time of start       While idling         While accelerating       While dece         Just after stopping       While loadi	lerating
Incident occur	rence	Just after delivery     In the morning     At night	] In the daytime
Frequency		All the time Under certain conc	litions 🗌 Sometimes
Weather cond	itions	Not affected	
	Weather	Fine     Raining     Snowing	Others [ ]
	Temperature	🗌 Hot 🗌 Warm 🗌 Cool 🗌	] Cold 🗌 Humid <sup>°</sup> F
Engine conditi	ions	Cold During warm-up	After warm-up
Road conditio	ad conditions		
Driving conditi	<ul> <li>Not affected</li> <li>At starting</li> <li>While idling</li> <li>At racing</li> <li>While accelerating</li> <li>While cruising</li> </ul>		

Not turned on

Turned on

MTBL0017

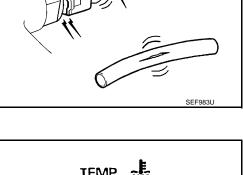
Malfunction indicator lamp

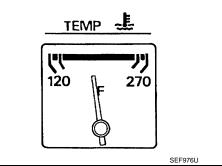
## INSPECTION AND ADJUSTMENT BASIC INSPECTION

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

## **1.**INSPECTION START

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

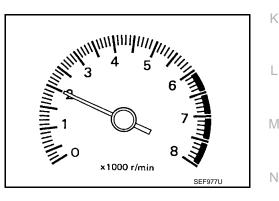




- 5. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.
- 6. Check that no DTC is displayed with CONSULT or GST.

#### Are any DTCs detected?

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



## 2.REPAIR OR REPLACE

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

#### >> GO TO 3

**3.**CHECK TARGET IDLE SPEED

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

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[VQ35DE]

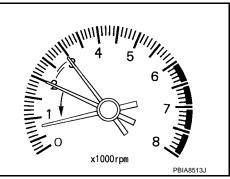
INFOID:000000009719799

< BASIC INSPECTION >

- 2. Rev engine (2,000 to 3,000 rpm) 2 or 3 times under no load, then run engine at idle speed for approximately 1 minute.
- Check idle speed.
   For procedure, refer to <u>EC-18, "IDLE SPEED : Special Repair</u> <u>Requirement"</u>.
   For specification, refer to <u>EC-536, "Idle Speed"</u>.
- Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 4.



[VQ35DE]

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- 1. Stop engine.
- Perform <u>EC-19</u>, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 5.

**5.** PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 6.

**6.**PERFORM IDLE AIR VOLUME LEARNING

Perform EC-20, "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

1. Start engine and warm it up to normal operating temperature.

 Check idle speed. For procedure, refer to <u>EC-18, "IDLE SPEED : Special Repair Requirement"</u>. For specification, refer to <u>EC-536, "Idle Speed"</u>.

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 <u>EC-280, "Diagnosis Procedure"</u>.
- Check crankshaft position sensor (POS) and circuit. Refer to EC-276. "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.

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

#### **9.**CHECK ECM FUNCTION

- 1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, although this is rare.)
- 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>SEC-8, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement"</u>.

>> GO TO 4.

**10.**CHECK IGNITION TIMING

- 1. Run engine at idle.
- 2. Check ignition timing with a timing light.

< BASIC INSPECTION >	VQ35DE]
For procedure, refer to EC-18, "IGNITION TIMING : Special Repair Requirement".	
For specification, refer to EC-536, "Ignition Timing".	/
Is the inspection result normal?	
YES >> GO TO 19. NO >> GO TO 11.	E
11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING	
1. Stop engine.	
2. Perform EC-19. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair	r Require-
<u>ment"</u> .	
>> GO TO 12.	[
12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	
Perform EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement	nt".
	<u> </u>
>> GO TO 13.	
13. PERFORM IDLE AIR VOLUME LEARNING	I
Perform EC-20, "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.	
· · · · · · · · · · · · · · · · · · ·	ŀ
14.CHECK IDLE SPEED AGAIN	
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Check idle speed.</li> </ol>	
For procedure, refer to EC-18, "IDLE SPEED : Special Repair Requirement".	
For specification, refer to EC-536. "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 <u>EC-18, "IGNITION TIMING : Special Repair Requirement"</u> . For specification, refer to <u>EC-536, "Ignition Timing"</u> .	1
Is the inspection result normal?	
YES >> GO TO 19.	,
NO >> GO TO 16.	Γ
16. CHECK TIMING CHAIN INSTALLATION	
Check timing chain installation. Refer to EM-94, "Disassembly and Assembly".	1
Is the inspection result normal?	
YES >> GO TO 17. NO >> Repair the timing chain installation. Then GO TO 4.	(
17. DETECT MALFUNCTIONING PART	
<ul> <li>Check the following.</li> <li>Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-280, "Diagnosis Procedure"</u>.</li> </ul>	F
<ul> <li>Check crankshaft position sensor (POS) and circuit. Refer to <u>EC-276, "Diagnosis Procedure"</u>.</li> </ul>	
Is the inspection result normal?	
YES >> GO TO 18.	
NO >> Repair or replace malfunctioning part. Then GO TO 4.	

18. CHECK ECM FUNCTION

#### < BASIC INSPECTION >

- Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, 1. although this is rare.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to 2. EC-16, "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-16, "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:000000009719800

When replacing ECM, the following procedure must be performed. (For details, refer to EC-16, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement" )

#### PROGRAMMING OPERATION

#### NOTE:

After replacing with a blank ECM, programming is required to write ECM information. Be sure to follow the procedure to perform the programming.

#### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement INFOID:000000009719801

## **1.**SAVE ECM DATA

#### (P)With CONSULT

- 1. Turn ignition switch OFF.
- Reconnect all harness connectors disconnected. 2.
- Turn ignition switch ON. 3.
- Select "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT. 4.
- 5. Follow the instruction of CONSULT display.

#### NOTE:

- Necessary data in ECM is copied and saved to CONSULT.
- Go to Step 2 regardless of with or without success in saving data.

#### >> GO TO 2.

#### 2.CHECK ECM PART NUMBER

Check ECM part number to see whether it is blank ECM or not. NOTE:

Part number of blank ECM is 23703 - XXXXX.

Check part number when ordering ECM or the one included in the label on the container box.

#### Is the ECM a blank ECM?

YES >> GO TO 3. NO >> GO TO 5.

3.save ecm part number

Read out the part number from the old ECM and save the number, following the programming instructions. Refer to CONSULT Operation Manual.

#### NOTE:

- The ECM part number is saved in CONSULT.
- Even when ECM part number is not saved in CONSULT, go to 4.

>> GO TO 4.

[VQ35DE] < BASIC INSPECTION > **4.**PERFORM ECM PROGRAMMING After replacing ECM, perform the ECM programming. Refer to CONSULT Operation Manual. NOTE: • During programming, maintain the following conditions: EC - Ignition switch: ON - Electric load: OFF - Brake pedal: Not depressed Battery voltage: 12 - 13.5 V (Be sure to check the value of battery voltage by selecting "BATTERY VOLT" in "Data monitor" of CONSULT.) >> GO TO 6. D **5.**REPLACE ECM Replace ECM. Е >> GO TO 6.  $\mathbf{6}$ . PERFORM INITIALIZATION OF IVIS (NATS) SYSTEM AND REGISTRATION OF ALL IVIS (NATS) IGNI-F TION KEY IDS Refer to SEC-8, "ECM RECOMMUNICATING FUNCTION : Special Repair Requirement". >> GO TO 7. 7.CHECK ECM DATA STATUS Н Check if the data is successfully copied from the ECM at Step 1 (before replacement) and saved in CONSULT. Is the data saved successfully? YES >> GO TO 8. NO >> GO TO 9. 8.WRITE ECM DATA With CONSULT 1. Select "WRITING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT. 2. Follow the instruction of CONSULT display. Κ NOTE: The data saved by "SAVING DATA FOR REPLC CPU" is written to ECM. >> GO TO 10. 9. PERFORM VIN REGISTRATION M Refer to EC-19, "VIN REGISTRATION : Special Repair Requirement". >> GO TO 10. Ν 10. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING Refer to EC-19. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement". >> GO TO 11. 11.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING Ρ Refer to EC-19. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

< BASIC INSPECTION >

#### >> END **IDLE SPEED**

#### **IDLE SPEED** : Description

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

## IDLE SPEED : Special Repair Requirement

**1.**CHECK IDLE SPEED

#### (P)With CONSULT

Check idle speed in "DATA MONITOR" mode with CONSULT. With GST

Check idle speed with Service \$01 of GST.

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

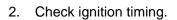
## **IGNITION TIMING : Description**

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

**IGNITION TIMING : Special Repair Requirement** 

## **1.**CHECK IGNITION TIMING

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



>> INSPECTION END

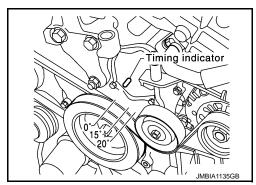
## VIN REGISTRATION

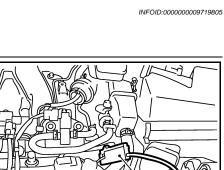
## VIN REGISTRATION : Description

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

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

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**2014 MURANO** 

INFOID:000000009719806

[VQ35DE]

INFOID:000000009719802

INFOID:000000009719803

INFOID:000000009719804

## VIN REGISTRATION : Special Repair Requirement

INFOID:000000009719807

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#### 1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-24, "Information About Identification or Model Code".

#### >> GO TO 2.

< BASIC INSPECTION >

2. PERFORM VIN REGISTRATION

#### With CONSULT

- 1. Turn ignition switch ON with engine stopped.
- 2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
- 3. Follow the instructions on the CONSULT display.

## >> END ACCELERATOR PEDAL RELEASED POSITION LEARNING ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOL:00000009719808

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

## ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

## 1.START

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

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

## THROTTLE VALVE CLOSED POSITION LEARNING : Description

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

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:000000009719811

INFOID:000000009719810

## 1.START

#### WITH CONSULT

- 1. Turn ignition switch ON.
- 2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode.
- 3. Follow the instructions on the CONSULT display.
- 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**

1. Start the engine. **NOTE:** 

Coolant temperature is less than 25°C (77°F) before engine starts.

2. Warm up the engine.

## IDLE AIR VOLUME LEARNING : Description

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

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

IDLE AIR VOLUME LEARNING : Special Repair Requirement

## 1.PRECONDITIONING

Check 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)

IDLE AIR VOLUME LEARNING

- Engine coolant temperature: 70 100°C (158 212°F)
- Selector lever position: P or N
- Electric load switch: OFF

   (Air conditioner, head lamp, rear window defogger)
   On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the head lamp will not illuminate.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- With CONSULT: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V.
- Without CONSULT: Drive vehicle for 10 minutes.

Will CONSULT be used?

- YES >> GO TO 2. NO >> GO TO 3.
- 2. PERFORM IDLE AIR VOLUME LEARNING

#### With CONSULT

- Perform <u>EC-19</u>, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
- 2. Perform EC-19, "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 screen?

YES >> GO TO 4. NO >> GO TO 5.

 $\mathbf{3.}$  Perform idle air volume learning

## Without CONSULT

#### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- 1. Perform <u>EC-19, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Require-</u> ment".

## **INSPECTION AND ADJUSTMENT**

# Warm up the engine until "COOLAN TEMP/S" on "DATA MONITOR" of CONSULT reaches more than 65°C (149°F).

Turn ignition switch OFF and wait at least 10 seconds.

 Turn igr NOTE:

NOTE:

< BASIC INSPECTION >

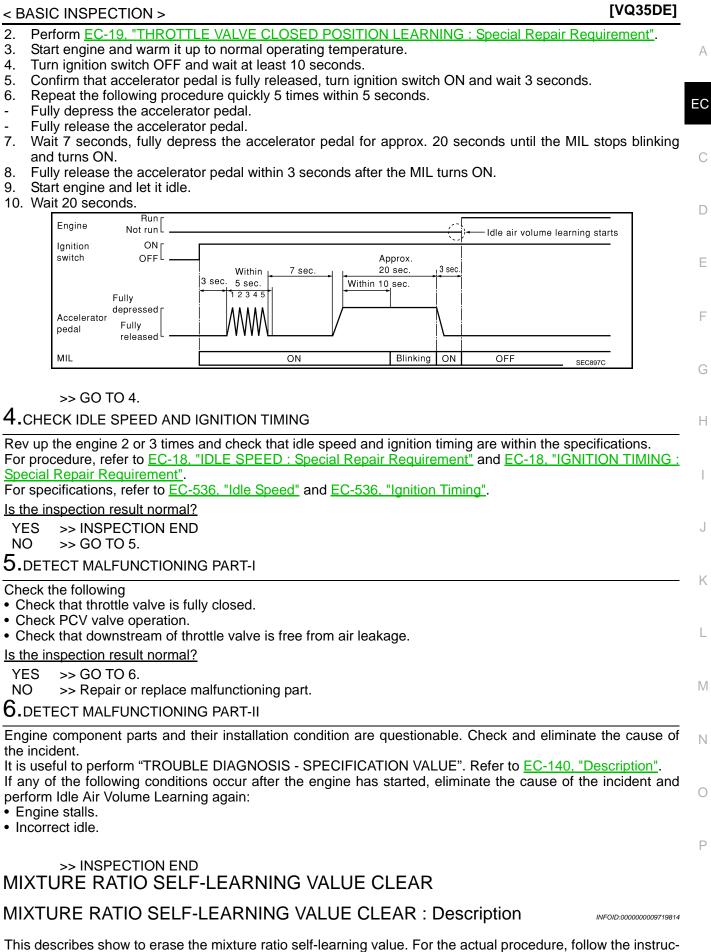
>> END

Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

## A MONITOR" of CONSULT rea

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Revision: 2013 August

tions in "Diagnosis Procedure".

2014 MURANO

< BASIC INSPECTION >

[VQ35DE]

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

## 1.START

With CONSULT

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

#### With GST

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

>> END

#### < BASIC INSPECTION >

## HOW TO SET SRT CODE

## Description

INFOID:000000009719816

[VQ35DE]

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

OUTLINE

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

SRT item <sup>*1</sup> (CONSULT indication)	Performance Priority <sup>*2</sup>	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	1	Three way catalyst function	P0420, P0430
EVAP SYSTEM	1	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0456
HO2S	1	Air fuel ratio (A/F) sensor 1	P014C, P014D,P014E, P014F,P015A, P015B,P015C, P015D
		Heated oxygen sensor 2	P0137, P0157
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
EGR/VVT SYSTEM	2	Intake value timing control function	P0011, P0021

\*1: Though displayed on the CONSULT 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.

#### SRT SERVICE PROCEDURE

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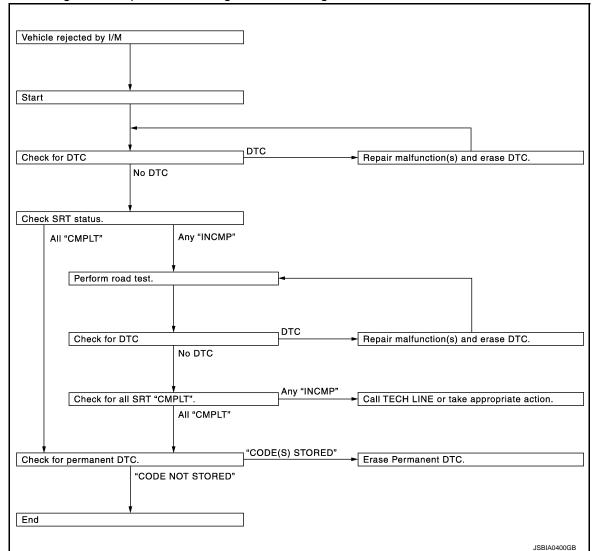
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#### < BASIC INSPECTION >

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.



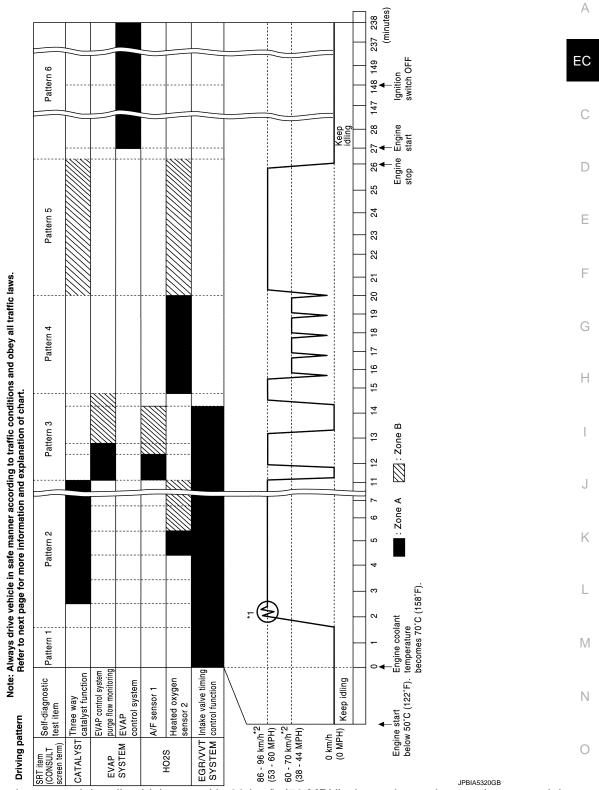
## SRT Set Driving Pattern

**CAUTION:** 

INFOID:000000009719817

#### < BASIC INSPECTION >

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



\*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".

< 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  $20 - 30^{\circ}C$  ( $68 - 86^{\circ}F$ )]

#### Work Procedure

INFOID:000000009719818

1. СНЕСК DTC

Check DTC.

Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to EC-507, "DTC Index".

NO >> GO TO 2.

2. CHECK SRT STATUS

#### With CONSULT

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

Without CONSULT

Perform "SRT status" mode with EC-126, "On Board Diagnosis Function".

With GST

Select Service \$01 with GST.

#### Is SRT code(s) set?

- YES >> GO TO 12.
- NO-1 >> With CONSULT: GO TO 3.
- NO-2 >> Without CONSULT: GO TO 4.

**3.** DTC CONFIRMATION PROCEDURE

1. Select "SRT WORK SUPPORT" in "DTC & SRT CONFIRMATION" mode with CONSULT.

- 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 <u>EC-23, "Description"</u>.
- 3. Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to EC-507. "DTC Index".
- NO >> GO TO 11.

#### **4.**PERFORM ROAD TEST

- Check the "Performance Priority" in the "SRT ITEM" table. Refer to EC-23, "Description".
- Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to <u>EC-24, "SRT Set Driving</u> <u>Pattern"</u>.

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-472, "Reference Value".

< BASIC INSPECTION >

#### А >> 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 EC 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. D >> GO TO 7. 7.PATTERN 3 Е • Operate vehicle following the driving pattern shown in the figure. Release the accelerator pedal during deceleration of vehicle speed 86 - 96 km/h from 90 km/h (56 MPH) to 0 km/h (0 MPH). (53 - 60 MPH) >> GO TO 8. 0 km/h (0 MPH) 30 S **1 MIN** 1 MIN Н PBIB2244E 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 main-60 - 70 km/h tain the speed. (38 - 44 MPH) - Release the accelerator pedal fully at least 5 seconds. - Repeat the above two steps at least 5 times. >> GO TO 9. Κ 0 km/h (0 MPH) 1min 1min 1min i 1min i 1min 5sec 5sec 5sec 5sec 5sec JSBIA0160GE 9. PATTERN 5 M • The accelerator pedal must be held very steady during steady-state driving. If the accelerator pedal is moved, the test must be conducted again. Ν >> GO TO 10. 10. PATTERN 6 1. Start the engine and wait at least 2 hours. Turn ignition OFF and wait at least 90 minutes. 2. Ρ >> GO TO 11. 11.CHECK SRT STATUS With CONSULT Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT. Without CONSULT Perform "SRT status" mode with EC-126, "On Board Diagnosis Function".

Revision: 2013 August

## EC-27

[VQ35DE]

< BASIC INSPECTION >

With GST
 Select Service \$01 with GST.
 <u>Is SRT(s) set?</u>
 YES >> GO TO 12.
 NO >> Call TECH LINE or take appropriate action.
 12.CHECK PERMANENT DTC

NOTE:

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

With CONSULT

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

With GST

Select Service \$0A with GST.

Is permanent DTC(s) detected?

YES >> Proceed to <u>EC-29, "Description"</u>. NO >> END

#### < BASIC INSPECTION >

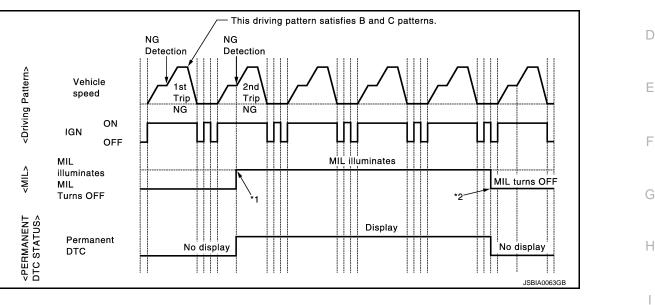
## HOW TO ERASE PERMANENT DTC

#### Description

#### 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 raw.



\*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:

Κ 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.

L	Deference	pattern	Driving	Perform "DTC CONFIRMATION PROCEDURE"	<b>O r</b> own <sup>*</sup>	
	- Reference	D	В	for applicable DTCs.	Group <sup>*</sup>	
$\mathbb{M}$	EC-30, "Work Proce- dure (Group A)"	_	—	×	А	
N	EC-32, "Work Proce- dure (Group B)"	×	×	_	В	

\*: For group, refer to EC-507, "DTC Index".

#### PERMANENT DTC ITEM

For permanent DTC items, MIL turns ON. Refer to EC-507, "DTC Index".

Ρ

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EC

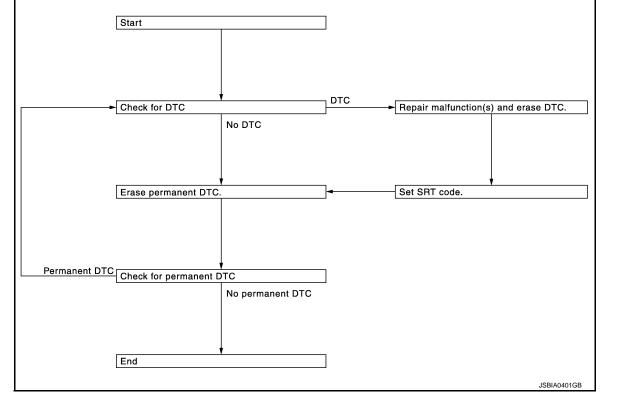
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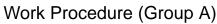
×: Applicable —: Not applicable

#### < BASIC INSPECTION >

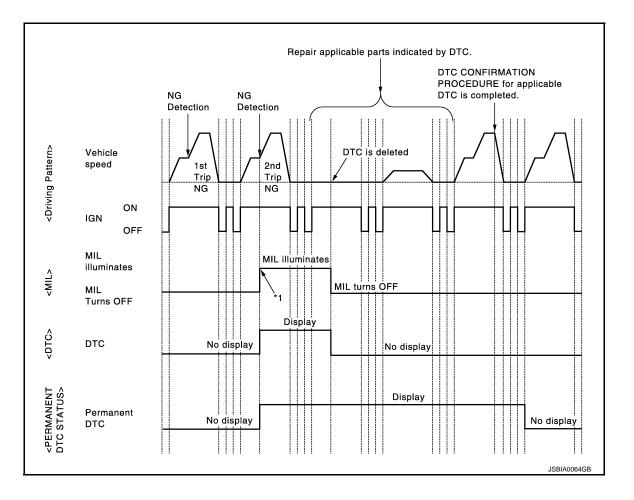
#### [VQ35DE]

PERMANENT DTC SERVICE PROCEDURE





INFOID:000000009719820



#### < BASIC INSPECTION >

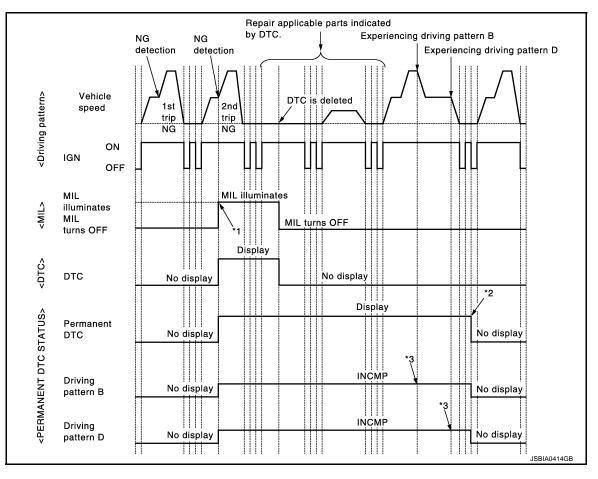
*1: When the same malfunction is de- tected in two consecutive trips, MIL will illuminate.	A
1.снеск отс	EC
Check DTC.	-
<u>Is any DTC detected?</u> YES >> Repair malfunction(s) and erase DTC. <u>EC-126, "On Board Diagnosis Function"</u> or <u>EC-129, "CON-</u>	С
SULT Function". NO >> GO TO 2.	1
2. CHECK PERMANENT DTC	D
	-
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	E
3. Turn ignition switch OFF and wait at least 10 seconds.	
<ol> <li>Turn ignition switch ON.</li> <li>Select "PERMANENT DTC STATUS" mode with CONSULT.</li> </ol>	F
With GST	
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	G
3. Turn ignition switch OFF and wait at least 10 seconds.	
<ol> <li>Turn ignition switch ON.</li> <li>Select Service \$0A with GST.</li> </ol>	Н
Is any permanent DTC detected?	
YES >> GO TO 3. NO >> END	
<b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE	I
Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM. Refer to EC-507, "DTC Index".	J
>> GO TO 4.	K
4.CHECK PERMANENT DTC	N
<ul> <li>With CONSULT</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ul>	L
2. Turn ignition switch ON.	
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	M
5. Select "PERMANENT DTC STATUS" mode with CONSULT.	IVI
With GST 1. Turn ignition switch OFF and wait at least 10 seconds.	
2. Turn ignition switch ON.	Ν
4. Turn ignition switch ON.	
5. Select Service \$0A with GST.	0
<u>Is any permanent DTC detected?</u> YES >> GO TO 1.	
NO >> END	Ρ

#### < BASIC INSPECTION >

## Work Procedure (Group B)

INFOID:000000009719821

[VQ35DE]



- \*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.
- \*2: After experiencing driving pattern B \*3: and D, permanent DTC is erased.

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 >> Repair malfunction(s) and erase DTC. Refer to <u>EC-126</u>, "<u>On Board Diagnosis Function</u>" or <u>EC-129</u>, "<u>CONSULT Function</u>".

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT

- 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.

#### 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.

<ul> <li>3. DRIVE DRIVING PATTERN B</li> <li>CAUTION: <ul> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul> </li> </ul>
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         1. Start engine and warm it up to normal operating temperature.         2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-
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 1. Start engine and warm it up to normal operating temperature. 2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-
NO       >> END         3.DRIVE DRIVING PATTERN B       C         CAUTION:       •         • Always drive at a safe speed.       C         • 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.       D         @With CONSULT       1. Start engine and warm it up to normal operating temperature.       D         2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-       E
<ul> <li>3. DRIVE DRIVING PATTERN B</li> <li>CAUTION: <ul> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul> </li> </ul>
CAUTION: <ul> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul>
<ul> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul>
<ul> <li>Never erase self-diagnosis results.</li> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul>
<ul> <li>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.</li> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul>
<ul> <li>With CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv-</li> </ul>
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv- E</li> </ol>
2. Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driv- $_{ ext{E}}$
ing pattern B. Refer to EC-129, "CONSULT Function", EC-123, "DIAGNOSIS DESCRIPTION : Driving
<u>Pattern"</u> . @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-123, "DIAGNOSIS DESCRIPTION : Driving
Pattern".
G
>> GO TO 4.
4.CHECK PERMANENT DTC
1. Turn ignition switch OFF and wait at least 10 seconds.
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" mode with CONSULT.
With GST
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.
Is any permanent DTC detected?
YES >> GO TO 5.
5. DRIVE DRIVING PATTERN D
CAUTION:
<ul> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> </ul>
<ul> <li>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.</li> </ul>
Drive the vehicle according to driving pattern D. Refer to <u>EC-123, "DIAGNOSIS DESCRIPTION : Driving Pat-</u> tern".
>> GO TO 6.
6. CHECK PERMANENT DTC

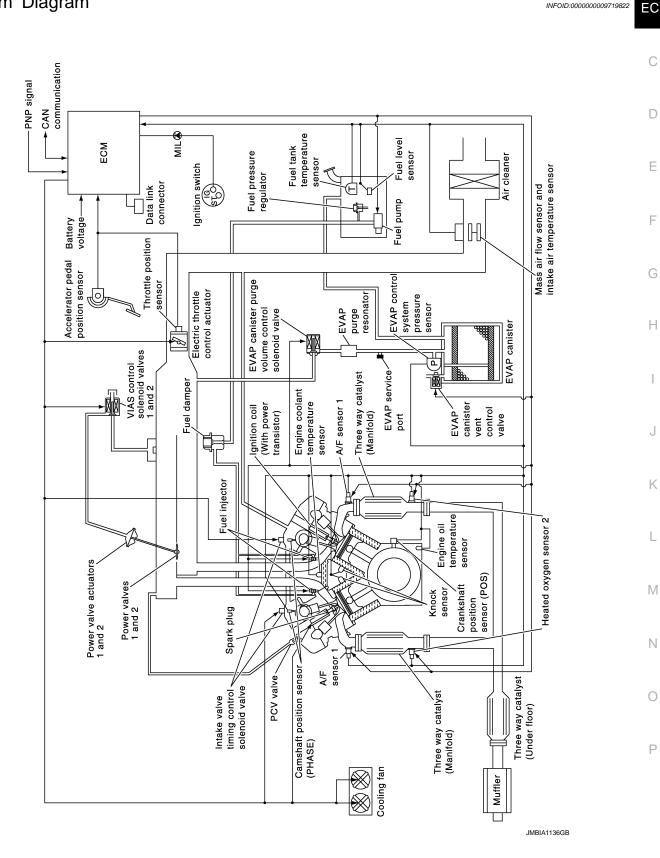
- With CONSULT
  Turn ignition switch OFF and wait at least 10 seconds.
  Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.

< BASIC INSPECTION >

- Select "PERMANENT DTC STATUS" mode with CONSULT. 5.
- With GST1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 3.
- 4.
- 5. Select Service \$0A with GST.
- Is any permanent DTC detected?
- YES >> GO TO 1.
- NO >> END

## SYSTEM DESCRIPTION ENGINE CONTROL SYSTEM

## System Diagram



INFOID:000000009719822

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< SYSTEM DESCRIPTION >

## System Description

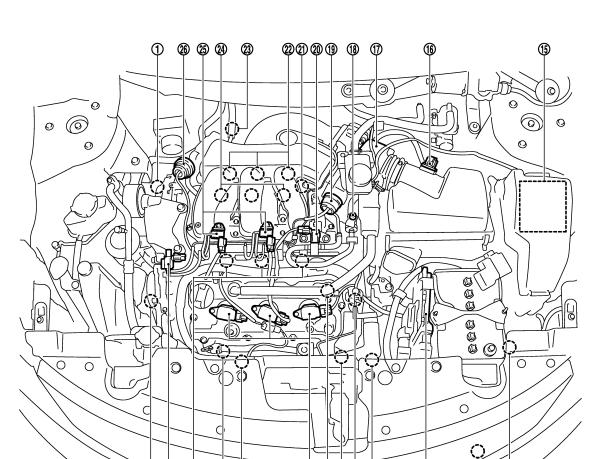
ECM performs various controls such as fuel injection control and ignition timing control.

#### Component Parts Location

INFOID:000000009719824

[VQ35DE]

INFOID:000000009719823



Intake valve timing control solenoid 1. valve (bank 1)

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

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**(5)** 

Intake valve timing control solenoid 2. valve (bank 2)

⑦ ⑧⑨⑩ ⑪

- A/F sensor 1 (bank 2) 5.
- Camshaft position sensor (PHASE) 9. 8. (bank 2)
- 11. Cooling fan motor-1
- 14. Battery current sensor
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) solenoid valve
- 23. A/F sensor 1 (bank 1)

Electronic controlled engine mount 3. control solenoid valve

JMBIA1108ZZ

6. Cooling fan motor-2

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- Crankshaft position sensor (POS)
- 12. ECM

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

#### < SYSTEM DESCRIPTION >

### [VQ35DE]

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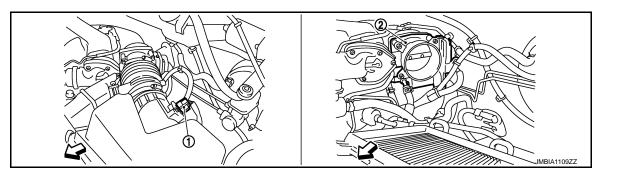
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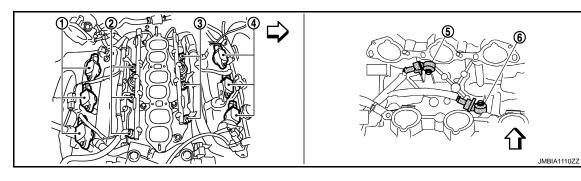
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- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front

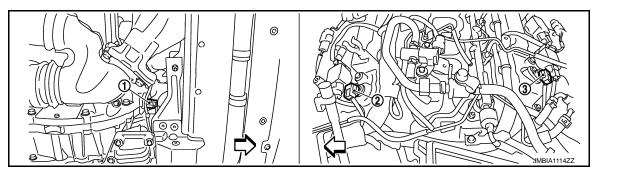


- Ignition coil (with power transistor) 1. and spark plug (bank 1)
- 2. Fuel injector (bank 1)
  - Knock sensor (bank 2)
- 3. Fuel injector (bank 2)

Camshaft position sensor (PHASE)

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

: Vehicle front



Camshaft position sensor (PHASE)

3.

(bank 2)

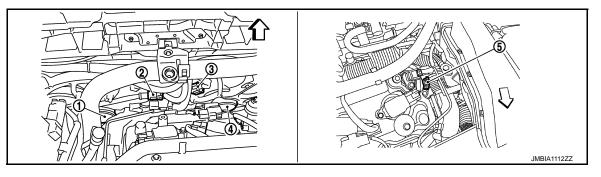
Crankshaft position sensor (POS) 1.

2.

(bank 1)

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### < SYSTEM DESCRIPTION >



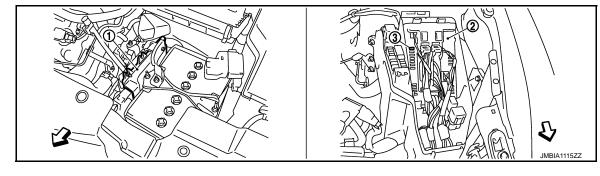
- 1. Cooling fan motor-1
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

3.

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

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

∠ : Vehicle front



1. ECM

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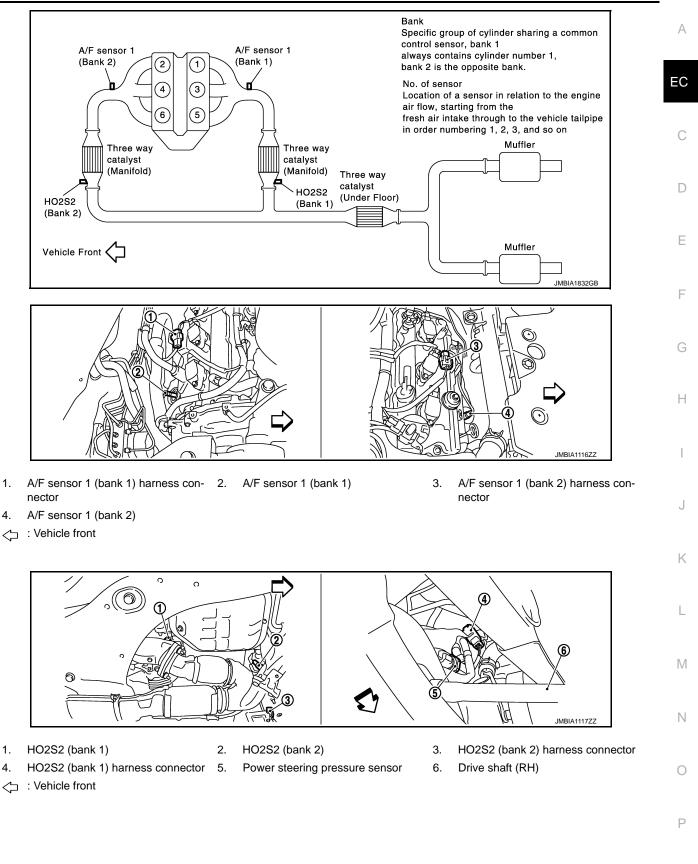
: Vehicle front

2. IPDM E/R

3. Fuel pump fuse

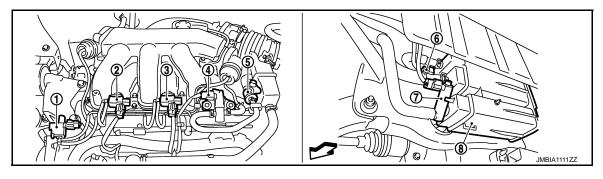
#### < SYSTEM DESCRIPTION >

#### [VQ35DE]



#### < SYSTEM DESCRIPTION >

### [VQ35DE]



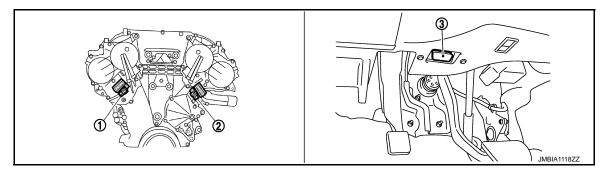
VIAS control solenoid valve 1

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

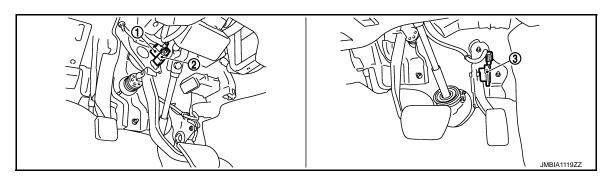
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

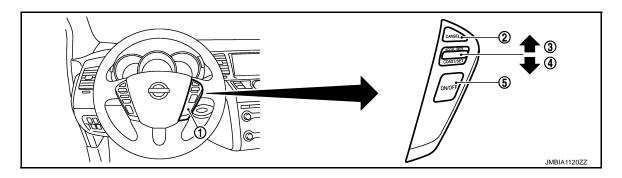
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



### < SYSTEM DESCRIPTION >

### [VQ35DE]

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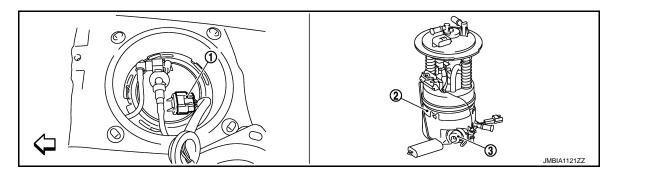
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3.

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

**RESUME/ACCELERATE** switch



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

## **Component Description**

INFOID:000000009719825

Component	Reference	
A/F sensor 1	EC-199, "Description"	
A/F sensor 1 heater	EC-158, "Description"	
Accelerator pedal position sensor	EC-419, "Description"	
ASCD brake switch	EC-383. "Description"	
ASCD steering switch	EC-380, "Description"	
Battery current sensor	EC-368, "Description"	
Camshaft position sensor (PHASE)	EC-279, "Description"	
Cooling fan motor	EC-436. "Description"	
Crankshaft position sensor (POS)	EC-275, "Description"	
Electric throttle control actuator	EC-417, "Description"	
Electronic controlled engine mount	EC-443, "Description"	
Engine coolant temperature sensor	EC-182, "Description"	
Engine oil temperature sensor	EC-256, "Description"	
EVAP canister purge volume control solenoid valve	EC-293. "Description"	
EVAP canister vent control valve	EC-301, "Description"	
EVAP control system pressure sensor	EC-309, "Description"	
Fuel injector	EC-446, "Description"	
Fuel level sensor	EC-330, "Description"	
Fuel pump	EC-449, "Description"	
Fuel tank temperature sensor	EC-248, "Description"	
Heated oxygen sensor 2	EC-211, "Description"	
Heated oxygen sensor 2 heater	EC-161, "Description"	
Ignition coil with power transistor	EC-453, "Description"	
Intake air temperature sensor	EC-179, "Description"	
Intake valve timing control solenoid valve	EC-164, "Description"	
Knock sensor	EC-272, "Description"	
Mass air flow sensor	EC-167, "Description"	

Revision: 2013 August

2014 MURANO

### < SYSTEM DESCRIPTION >

Component	Reference
PCV valve	EC-464, "Description"
Power steering pressure sensor	EC-344, "Description"
Power valves 1 and 2	EC-468. "Description"
Refrigerant pressure sensor	EC-465, "Description"
Stop lamp switch	EC-400, "Description"
ТСМ	EC-355, "Description"
Throttle control motor	EC-414, "Description"
Throttle control motor relay	EC-408, "Description"
Throttle position sensor	EC-188, "Description"
VIAS control solenoid valve 1	EC-394, "Description"
VIAS control solenoid valve 2	EC-397, "Description"

### < SYSTEM DESCRIPTION >

# MULTIPORT FUEL INJECTION SYSTEM

### System Diag

n Diagram				INFOID:000	0000009719826
Crankshaft position sensor (POS)	Engine speed <sup>*2</sup> & Piston position				
Camshaft position sensor (PHASE)		•			
Mass air flow sensor	Amount of intake air	•			
Intake air temperature sensor	Intake air temperature	•			
Engine coolant temperature sensor	Engine coolant temperature	•			
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas	•			
Throttle position sensor	Throttle position	•			
Accelerator pedal position sensor	Accelerator pedal position	•	Fuel injection & mixture ratio		
ТСМ	Gear position	▶ ЕСМ	control	Fuel injector	
Battery	Battery voltage <sup>*2</sup>	•			
Knock sensor	Engine knocking condition				
	Power steering operation				
Power steering pressure sensor	Density of oxygen in exhaust gas				
Heated oxygen sensor 2 <sup>*1</sup>	VDC/TCS operation command	•			
ABS actuator and electric unit (control unit)					
Combination meter	Vehicle speed				
ВСМ	Air conditioner operation				

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

\*2 : ECM determines the start signal status by the signals of engine speed and battery voltage. : This signal is sent via the CAN communication line.

## System Description

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

BCM

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	Engine speed* <sup>3</sup>			
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	Fuel injection		
ТСМ	Gear position	& mixture ratio	Fuel injector	
Battery	Battery voltage*3	- control		
Knock sensor	Engine knocking condition			
Power steering pressure sensor	Power steering operation			
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas			
ABS actuator and electric unit (control unit)	VDC/TCS operation command*2			
Combination meter	Vehicle speed*2			
BCM	Air conditioner operation* <sup>2</sup>			

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

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

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#### < SYSTEM DESCRIPTION >

[VQ35DE]

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

#### SYSTEM DESCRIPTION

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

#### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

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

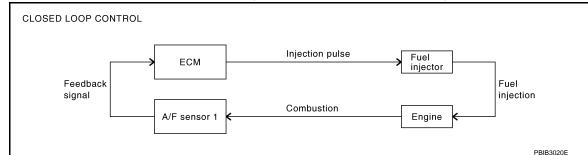
#### <Fuel increase>

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

<Fuel decrease>

- During deceleration
- During high engine speed operation

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



The mixture ratio feedback system provides the best air-fuel mixture ratio for drive ability and emission control. The three way catalyst (manifold) can better reduce CO, HC and NOx emissions. This system uses A/F sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about A/F sensor 1, refer to <u>EC-199</u>, "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
- 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

### **EC-44**

#### < 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

• Sequential multiport fuel injection system	• Simultaneous multiport fuel injection system
No. 1 cylinder No. 2 cylinder No. 3 cylinder No. 4 cylinder No. 5 cylinder No. 6 cylinder 1 engine cycle	No. 1 cylinder

Two types of systems are used.

- Sequential Multiport Fuel Injection System Fuel is injected into each cylinder during each engine cycle according to the ignition order. This system is used when the engine is running.
- Simultaneous Multiport Fuel Injection System
  Fuel is injected simultaneously into all six cylinders twice each engine cycle. In other words, pulse signals of
  the same width are simultaneously transmitted from the ECM.
  The six injectors will then receive the signals 2 times for each engine cycle.
  This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

#### FUEL SHUT-OFF

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

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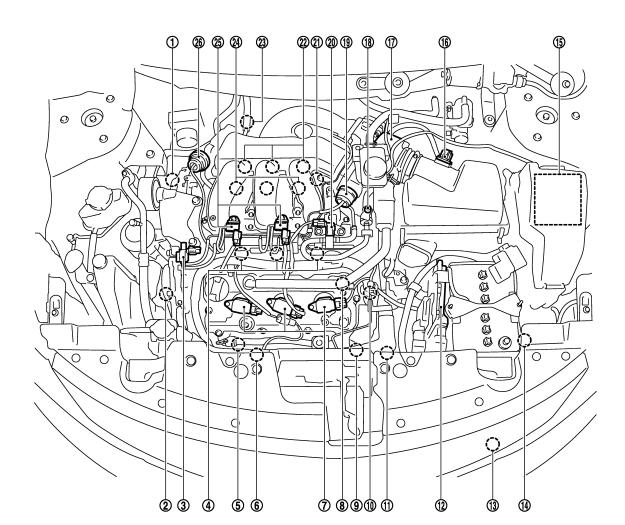
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#### < SYSTEM DESCRIPTION >

**Component Parts Location** 

INFOID:000000009719828

[VQ35DE]



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

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

3. Electronic controlled engine mount control solenoid valve

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

### < SYSTEM DESCRIPTION >

#### [VQ35DE]

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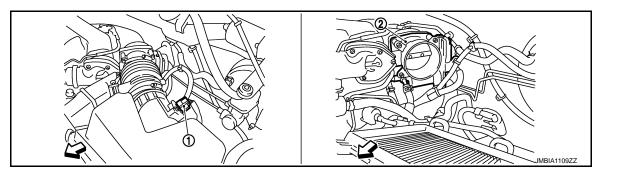
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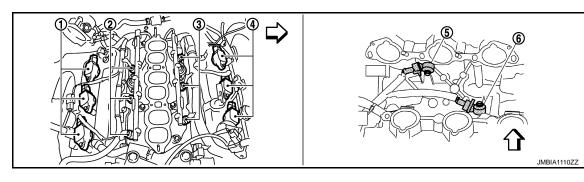
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- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



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

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(bank 1)

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

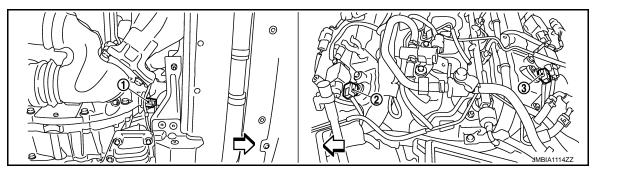
Camshaft position sensor (PHASE)

3.

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(bank 2)

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



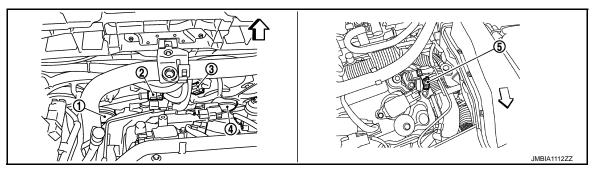
Camshaft position sensor (PHASE)

- Crankshaft position sensor (POS) 1.

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### < SYSTEM DESCRIPTION >

[VQ35DE]



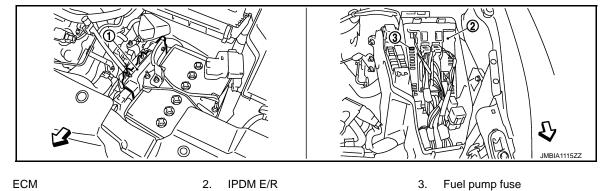
- Cooling fan motor-1 1.
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

3.

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

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

: Vehicle front



ECM 1.

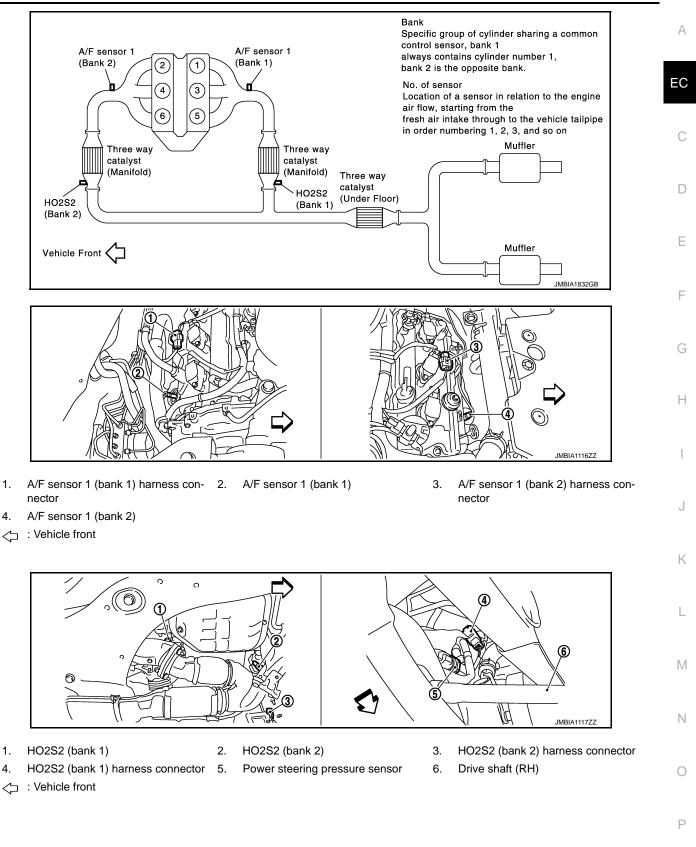
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: Vehicle front

2. IPDM E/R

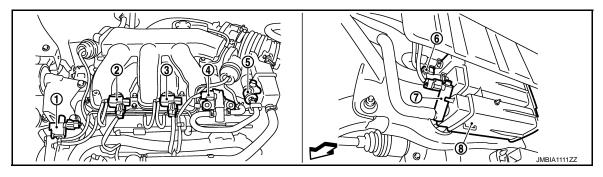
#### < SYSTEM DESCRIPTION >





#### < SYSTEM DESCRIPTION >

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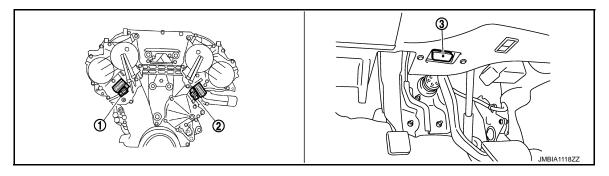
VIAS control solenoid valve 1

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

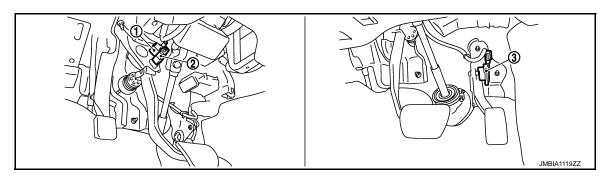
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

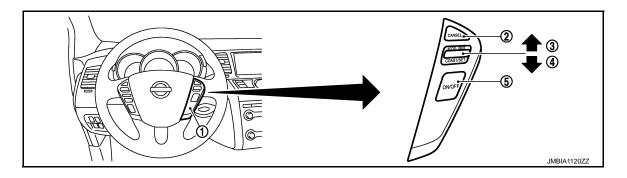
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



### < SYSTEM DESCRIPTION >

ASCD steering switch

SET/COAST switch

1.

4.

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- 3. RESUME/ACCELERATE switch

CANSEL switch

MAIN switch

2.

5.

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

## **Component Description**

Component	Reference	
A/F sensor 1	EC-199, "Description"	
Accelerator pedal position sensor	EC-419, "Description"	
Camshaft position sensor (PHASE)	EC-279, "Description"	
Crankshaft position sensor (POS)	EC-275, "Description"	
Engine coolant temperature sensor	EC-182, "Description"	
Fuel injector	EC-446, "Description"	
Heated oxygen sensor 2	EC-211, "Description"	
Intake air temperature sensor	EC-179, "Description"	
Knock sensor	EC-272, "Description"	
Mass air flow sensor	EC-167, "Description"	
Power steering pressure sensor	EC-344, "Description"	
ТСМ	EC-355. "Description"	
Throttle position sensor	EC-188, "Description"	

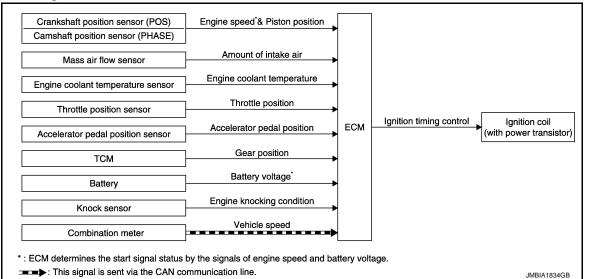
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### < SYSTEM DESCRIPTION >

## ELECTRIC IGNITION SYSTEM

### System Diagram



### System Description

INFOID:000000009719831

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2		Ignition coil (with power transistor)
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature	Ignition timing	
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position	control	
ТСМ	Gear position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Combination meter	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 - 2 - 3 - 4 - 5 - 6

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

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

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

At starting

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

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

## EC-52

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#### < SYSTEM DESCRIPTION >

#### [VQ35DE]

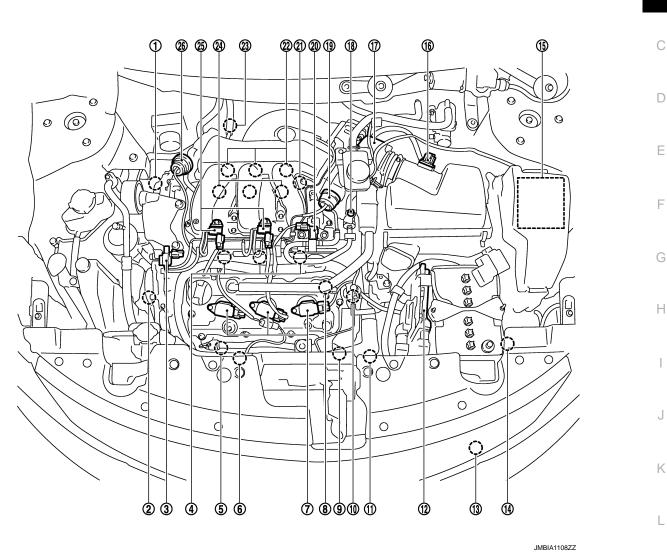
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operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

### Component Parts Location



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

- Intake valve timing control solenoid 3. valve (bank 2)
- 5. A/F sensor 1 (bank 2)

2.

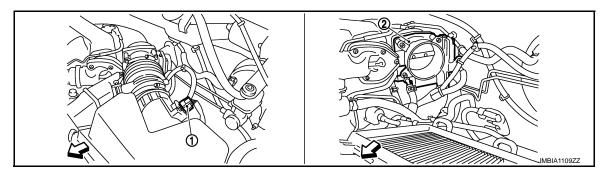
8.

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

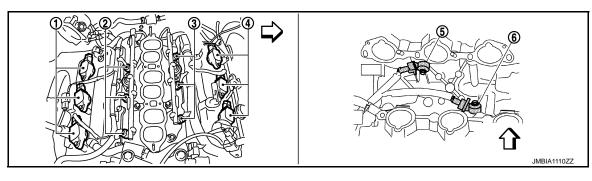
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### < SYSTEM DESCRIPTION >



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



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

Ignition coil (with power transistor)

2. Fuel injector (bank 1)

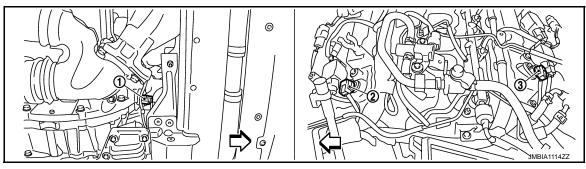
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- Knock sensor (bank 2)
- 3. Fuel injector (bank 2)
- 6. Knock sensor (bank 1)

and spark plug (bank 2)

4.

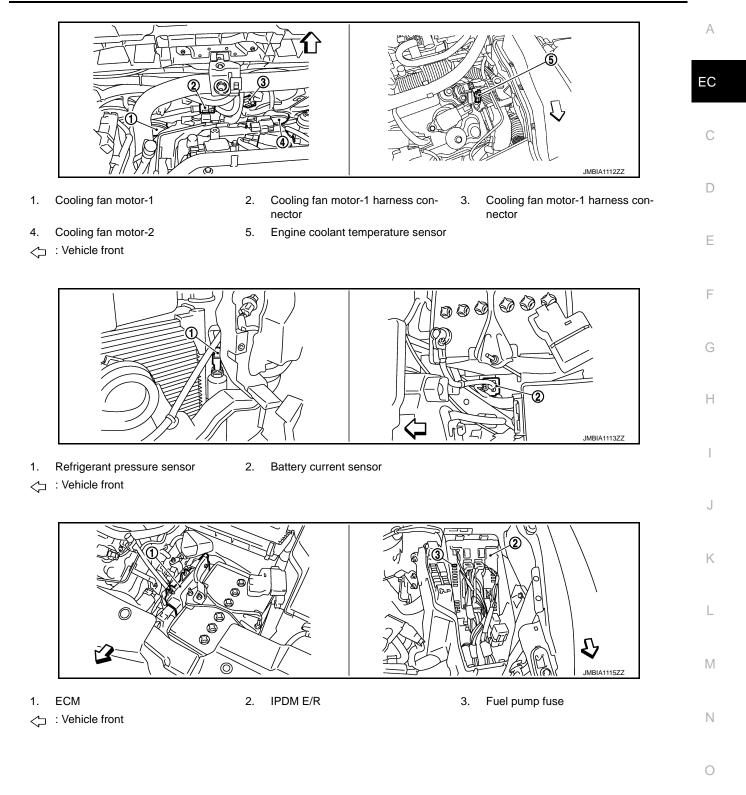


- 1. Crankshaft position sensor (POS)
- Camshaft position sensor (PHASE) 3. (bank 1)
  - Camshaft position sensor (PHASE) (bank 2)

 $\triangleleft$  : Vehicle front

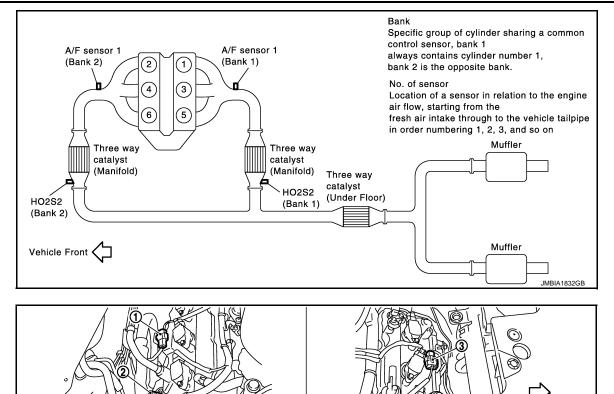
### < SYSTEM DESCRIPTION >

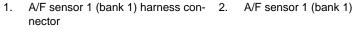
### [VQ35DE]



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#### < SYSTEM DESCRIPTION >

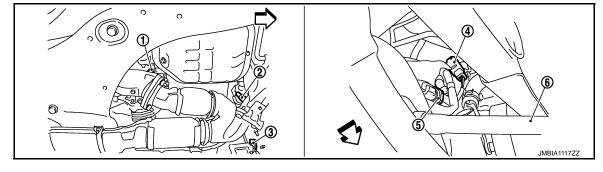




- A/F sensor 1 (bank 2) 4.
- : Vehicle front

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

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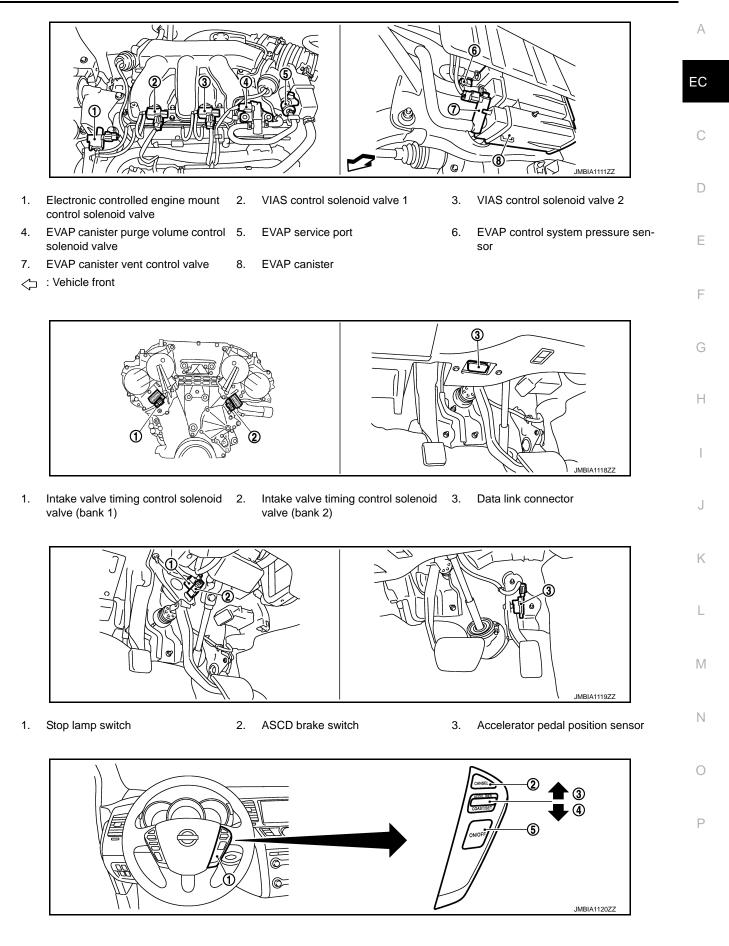
- HO2S2 (bank 1) 1.
  - 2. HO2S2 (bank 1) harness connector 5.
- HO2S2 (bank 2) Power steering pressure sensor
- HO2S2 (bank 2) harness connector 3.
- 6. Drive shaft (RH)

: Vehicle front

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#### < SYSTEM DESCRIPTION >

### [VQ35DE]



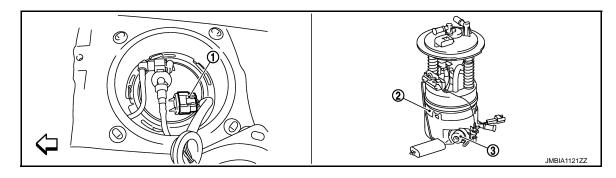
### < SYSTEM DESCRIPTION >

### [VQ35DE]

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

5.

3. **RESUME/ACCELERATE** switch



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

## **Component Description**

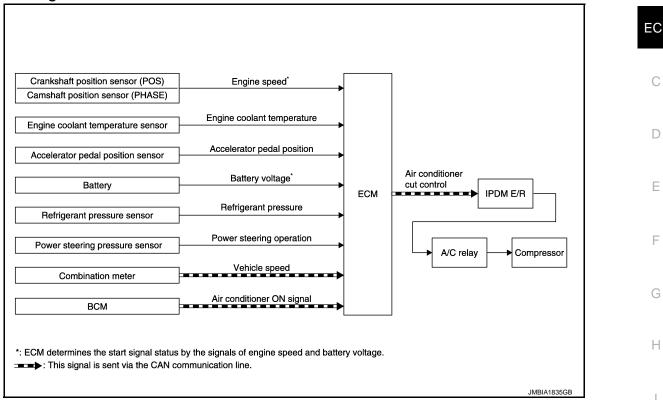
INFOID:000000009719833

Component	Reference
Accelerator pedal position sensor	EC-419. "Description"
Camshaft position sensor (PHASE)	EC-279, "Description"
Crankshaft position sensor (POS)	EC-275, "Description"
Engine coolant temperature sensor	EC-182, "Description"
Ignition signal	EC-453, "Description"
Knock sensor	EC-272, "Description"
Mass air flow sensor	EC-167, "Description"
ТСМ	EC-355, "Description"
Throttle position sensor	EC-188, "Description"

### < SYSTEM DESCRIPTION >

## AIR CONDITIONING CUT CONTROL

### System Diagram



## System Description

#### INFOID:000000009719835

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

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

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

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

#### SYSTEM DESCRIPTION

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

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



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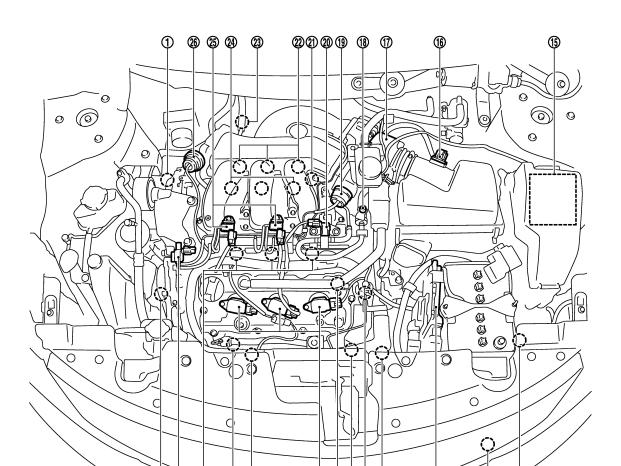
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#### < SYSTEM DESCRIPTION >

**Component Parts Location** 

[VQ35DE] INFOID:000000009719836



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

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Intake valve timing control solenoid 2. valve (bank 2)

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

3. Electronic controlled engine mount control solenoid valve

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(14)

Cooling fan motor-2 6.

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- 9. Crankshaft position sensor (POS)
- 12. ECM

12

- 15. IPDM E/R
- 18. EVAP service port
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) (bank 1)
  - 24. Fuel injector (bank 1)

## < SYSTEM DESCRIPTION >

### [VQ35DE]

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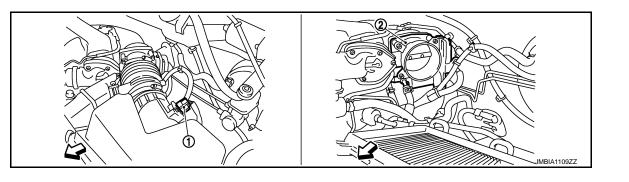
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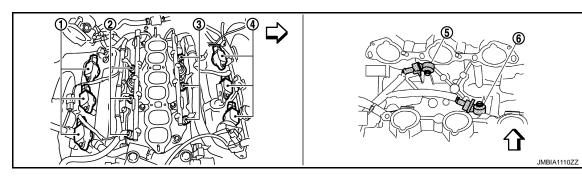
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front



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

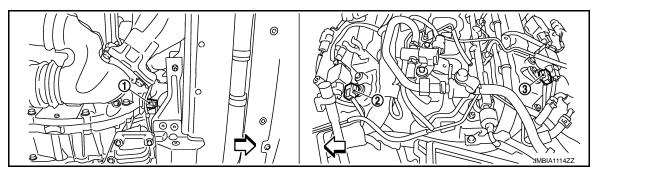
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2.

(bank 1)

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

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



Camshaft position sensor (PHASE)

3.

(bank 2)

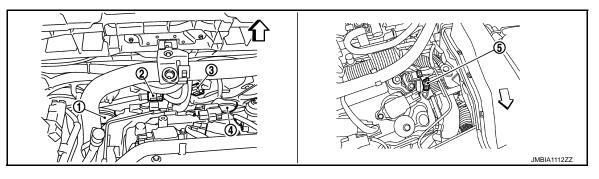
- 1. Crankshaft position sensor (POS)
- ∠ : Vehicle front

Camshaft position sensor (PHASE)

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### < SYSTEM DESCRIPTION >



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

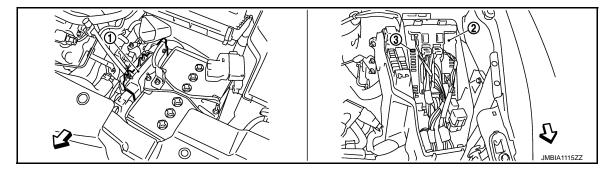
3.

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

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

∠ : Vehicle front

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1. ECM

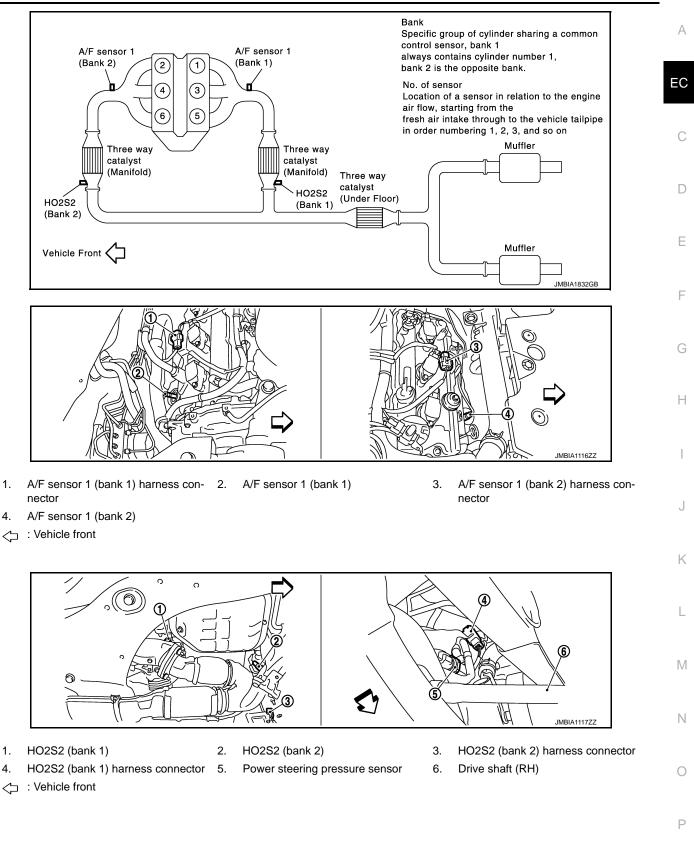
⟨→ : Vehicle front

2. IPDM E/R

3. Fuel pump fuse

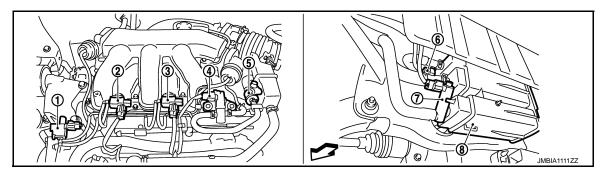
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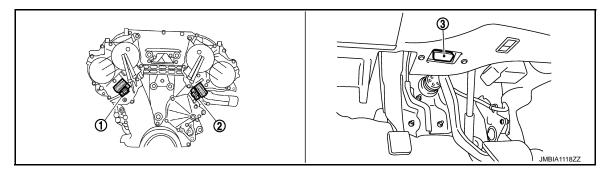
VIAS control solenoid valve 1

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

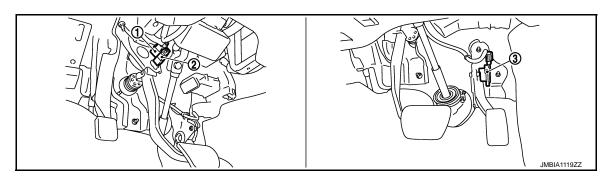
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

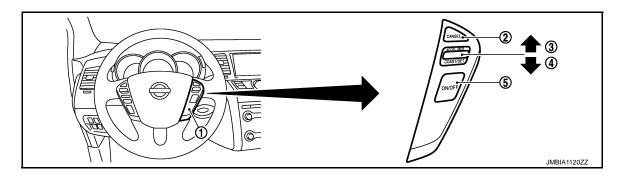
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



CANSEL switch

MAIN switch

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### < SYSTEM DESCRIPTION >

ASCD steering switch

SET/COAST switch

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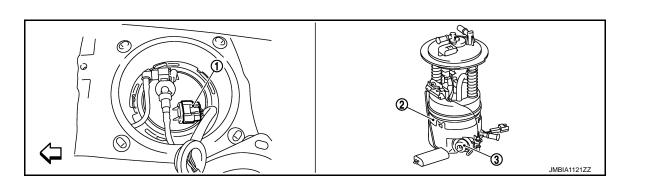
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3. RESUME/ACCELERATE switch



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

## **Component Description**

INFOID:000000009719837

Component	Reference	
Accelerator pedal position sensor	EC-419, "Description"	
Camshaft position sensor (PHASE)	EC-279, "Description"	
Crankshaft position sensor (POS)	EC-275, "Description"	
Engine coolant temperature sensor	EC-182, "Description"	
Power steering pressure sensor	EC-344, "Description"	
Refrigerant pressure sensor	EC-465, "Description"	

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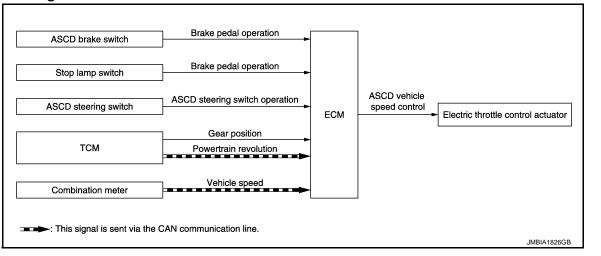
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### < SYSTEM DESCRIPTION >

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

### System Diagram



## System Description

INFOID:000000009719839

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
ASCD brake switch	Brake pedal operation			
Stop lamp switch	Brake pedal operation			
ASCD steering switch	ASCD steering switch operation	ASCD steering switch operation		
7014	Gear position	ASCD vehicle speed control	actuator	
ТСМ	Powertrain revolution*			
Combination meter Vehicle speed*				

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

### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

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

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

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

#### NOTE:

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

#### SET OPERATION

Press MAIN switch. (The CRUISE on combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET/COAST switch.

### ACCELERATE OPERATION

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

#### CANCEL OPERATION

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

- CANCEL switch is pressed
- More than 2 switches on ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed

INFOID:000000009719838

#### < SYSTEM DESCRIPTION >

- Selector lever position changed to N, P or R
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated
- CVT control system has a malfunction. Refer to <u>EC-391. "Description"</u>.

• Engine coolant temperature is slightly higher than the normal operating temperature

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

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

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

#### COAST OPERATION

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

#### **RESUME OPERATION**

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

- Brake pedal is released
- Selector lever position is other than P and N

• Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

### Component Parts Location

INFOID:000000009719840

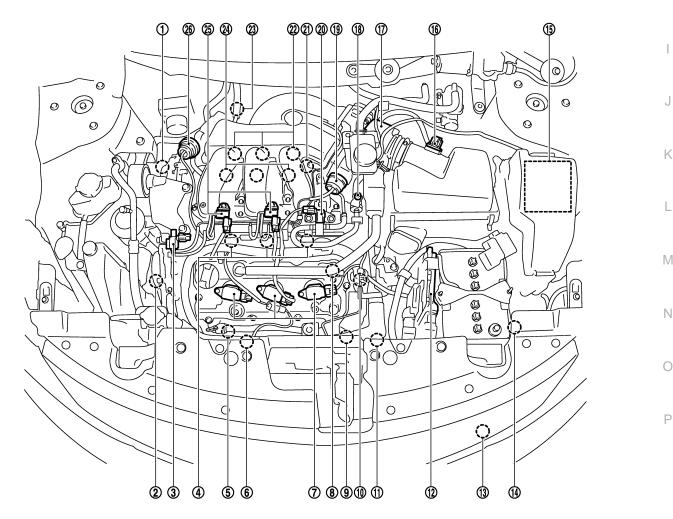
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Revision: 2013 August

2014 MURANO

#### < SYSTEM DESCRIPTION >

[VQ35DE]

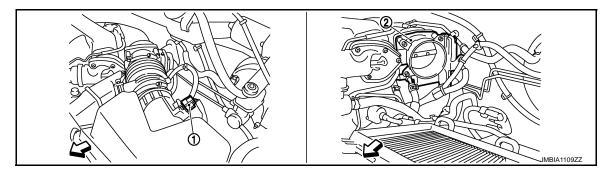
- 1. Intake valve timing control solenoid valve (bank 1)
- 4. Fuel injector (bank 2)
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor (with intake air 17. Electric throttle control actuator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

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

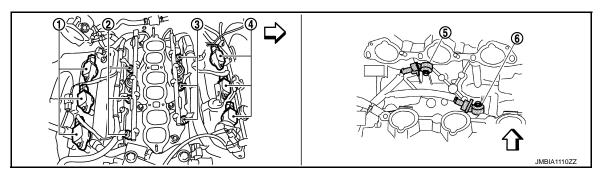
- 3. Electronic controlled engine mount control solenoid valve
- 6. Cooling fan motor-2
  - Crankshaft position sensor (POS)
- 12. ECM

9.

- 15. IPDM E/R
- 18. EVAP service port
- (bank 1)
- 24. Fuel injector (bank 1)
- 25. VIAS control solenoid valve 1 and 2 26. Power valve actuator 1



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



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

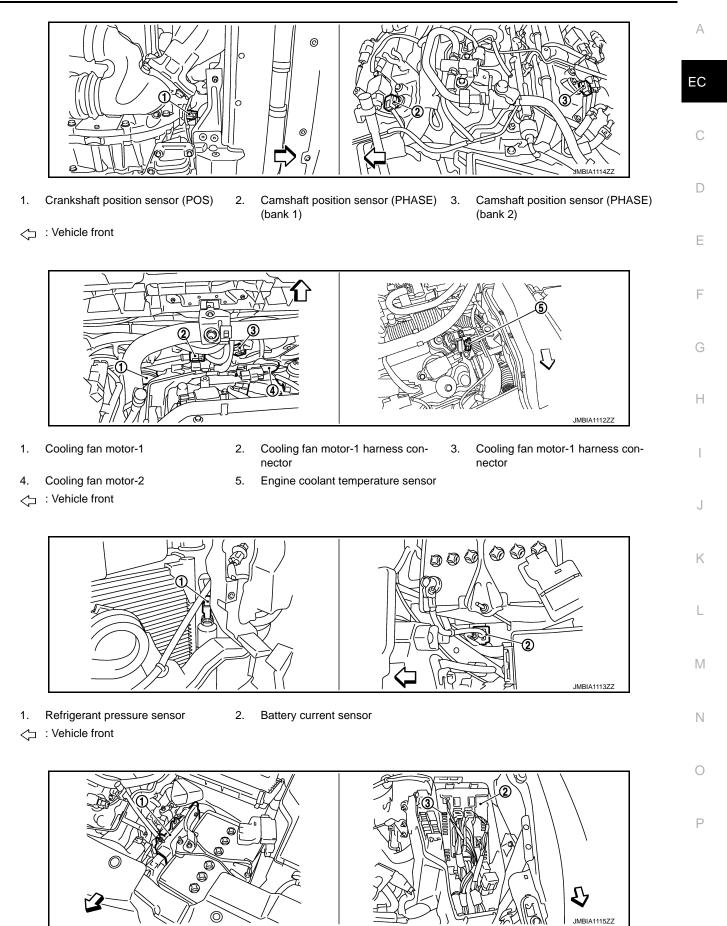
5.

- 3. Fuel injector (bank 2)
- Knock sensor (bank 1) 6.

: Vehicle front  $\triangleleft$ 

### < SYSTEM DESCRIPTION >

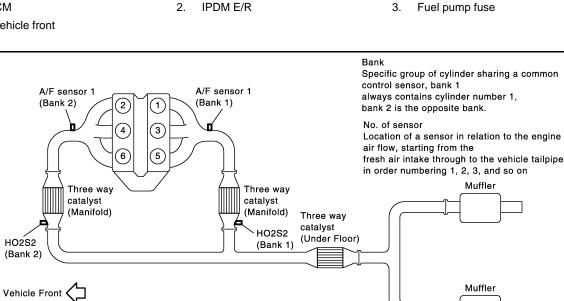
[VQ35DE]

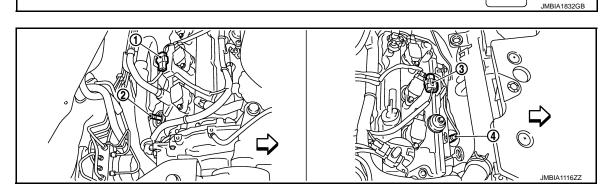


#### < SYSTEM DESCRIPTION >

[VQ35DE]

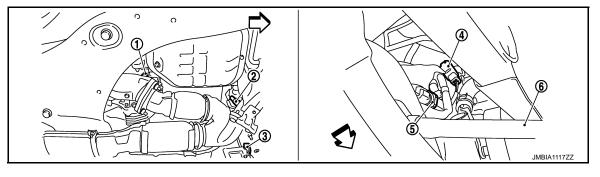
- 1. ECM
- : Vehicle front





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

A/F sensor 1 (bank 2) harness con-3. nector



1. HO2S2 (bank 1) HO2S2 (bank 2)

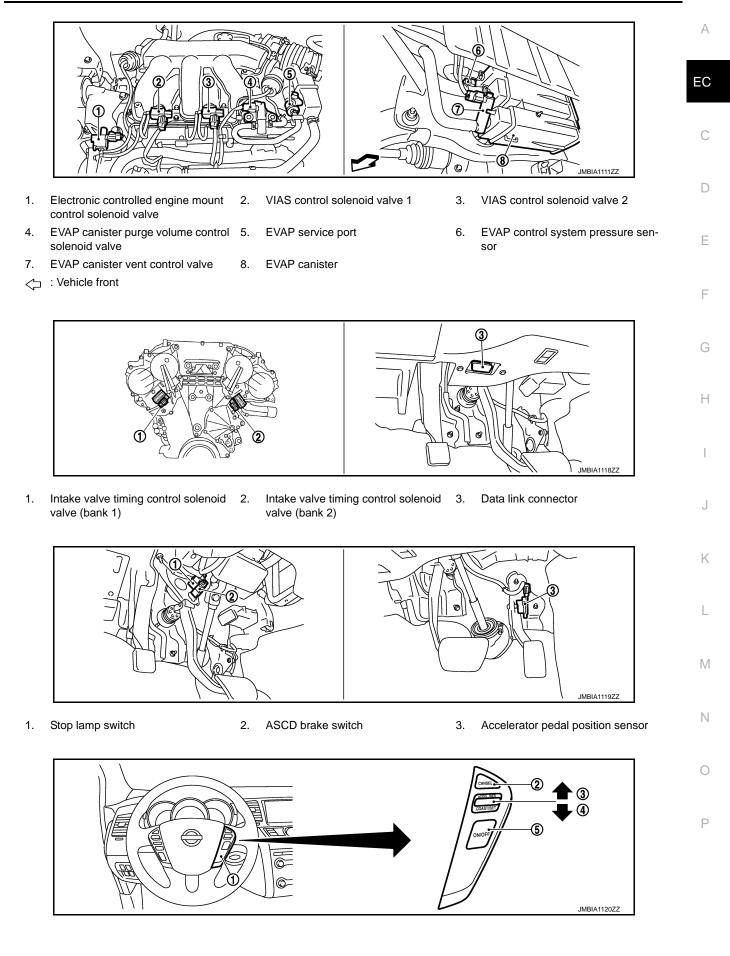
2.

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

: Vehicle front

#### < SYSTEM DESCRIPTION >

[VQ35DE]



### < SYSTEM DESCRIPTION >

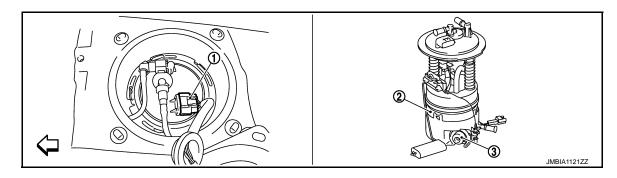
[VQ35DE]

- ASCD steering switch
   SET/COAST switch
- 2. CANSEL switch

MAIN switch

5.

3. RESUME/ACCELERATE switch



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

## **Component Description**

INFOID:000000009719841

Component	Reference
ASCD brake switch	EC-383, "Description"
ASCD indicator	EC-435, "Description"
ASCD steering switch	EC-380, "Description"
Electric throttle control actuator	EC-417, "Description"
Stop lamp switch	EC-400, "Description"

# CAN COMMUNICATION

### System Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle mul-EC tiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-29, "CAN Communication Signal Chart", about CAN communication for detail.

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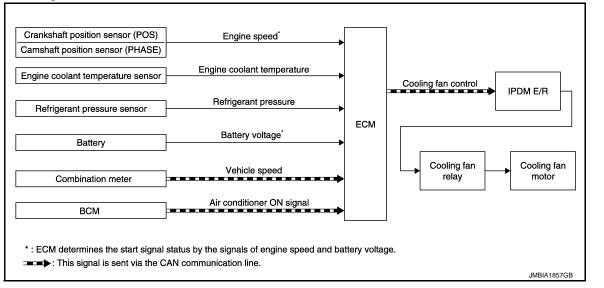
[VQ35DE]

INFOID:000000009719842

### < SYSTEM DESCRIPTION >

# COOLING FAN CONTROL

## System Diagram



# System Description

INFOID:000000009719844

## 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> Piston position			
Engine coolant temperature sensor	Engine coolant temperature		IPDM E/R ↓ Cooling fan relay	
Refrigerant pressure sensor	Refrigerant pressure	Cooling fan		
Battery	Battery voltage*1			
Combination meter	Vehicle speed*2		Cooling fan motor	
BCM	Air conditioner ON signal* <sup>2</sup>			

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

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

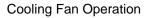
#### SYSTEM DESCRIPTION

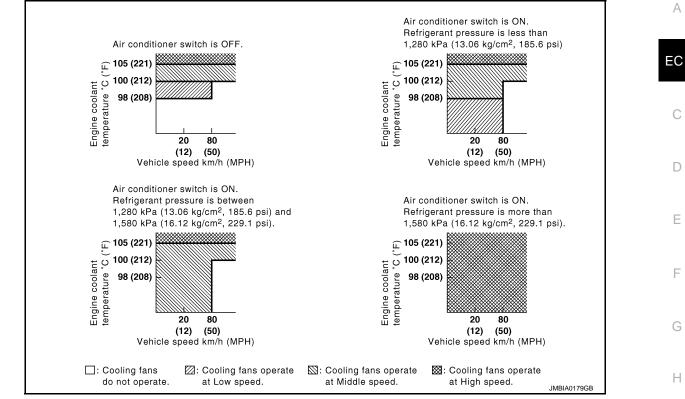
The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

INFOID:000000009719843

### < SYSTEM DESCRIPTION >

#### [VQ35DE]





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

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

Capling for around	Cooling fan relay			
Cooling fan speed	1	2	3	
Stop (OFF)	OFF	OFF	OFF	
Low (LOW)	ON	OFF	OFF	
Middle (MID)	OFF	ON	OFF	
High (HI)	OFF	ON	ON	

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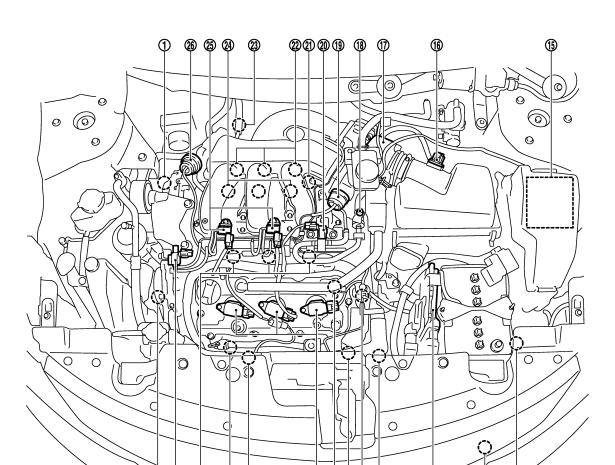
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#### < SYSTEM DESCRIPTION >

### **Component Parts Location**

[VQ35DE] INFOID:000000009719845



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

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Intake valve timing control solenoid 2. valve (bank 2)

(7)

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

Electronic controlled engine mount control solenoid valve

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(14)

Cooling fan motor-2 6.

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- 9. Crankshaft position sensor (POS)
- 12. ECM

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

### < SYSTEM DESCRIPTION >

### [VQ35DE]

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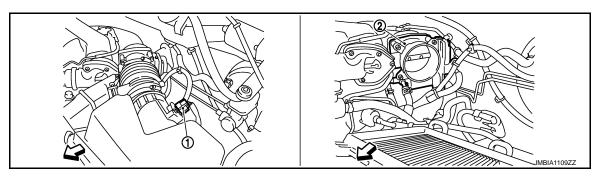
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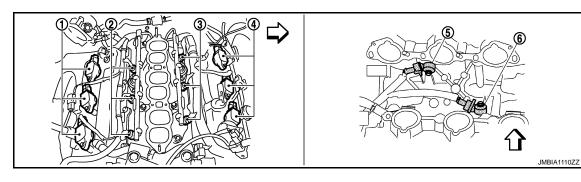
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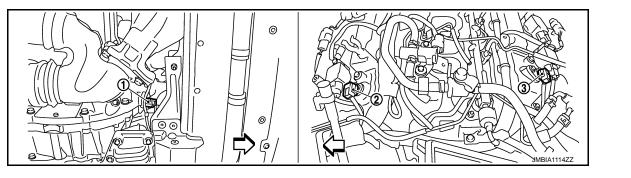
- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



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

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

: Vehicle front

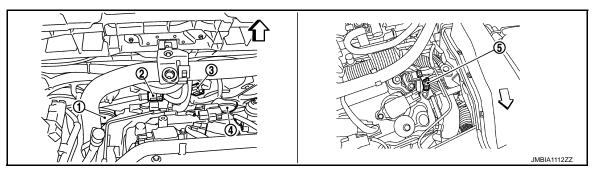


- Crankshaft position sensor (POS) 2. 1.
- Camshaft position sensor (PHASE) (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

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### < SYSTEM DESCRIPTION >



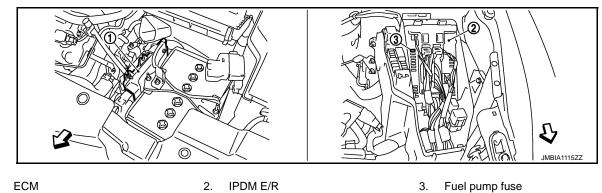
- Cooling fan motor-1 1.
- 2. Cooling fan motor-1 harness connector
- Cooling fan motor-1 harness connector

3.

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

- : Vehicle front
  - 00 000 2 JMBIA1113ZZ
- 1. Refrigerant pressure sensor
- 2. Battery current sensor

: Vehicle front



ECM 1.

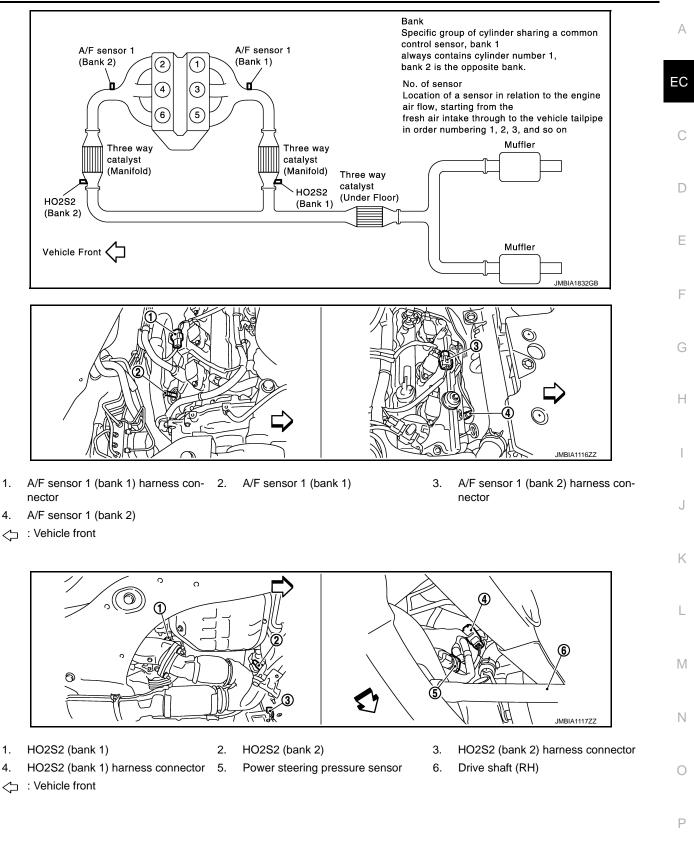
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2. IPDM E/R

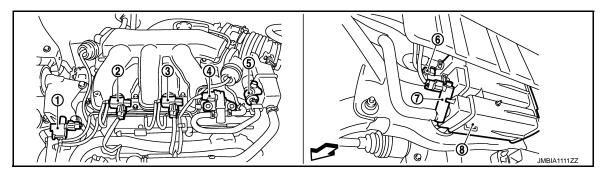
: Vehicle front

#### < SYSTEM DESCRIPTION >

#### [VQ35DE]



### < SYSTEM DESCRIPTION >



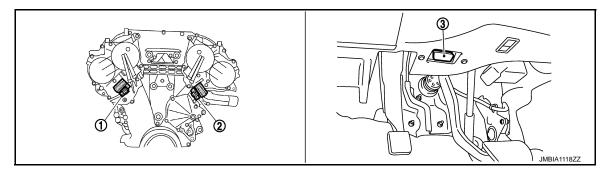
VIAS control solenoid valve 1

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

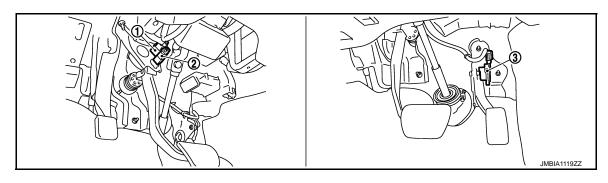
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

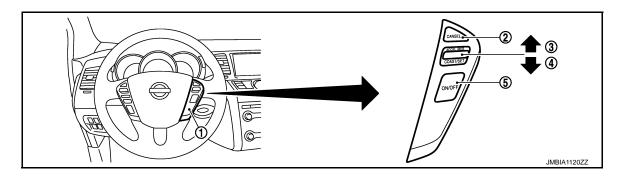
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



### < SYSTEM DESCRIPTION >

### [VQ35DE]

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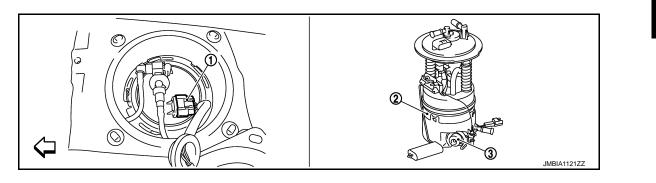
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- 1. ASCD steering switch
- 2. CANSEL switch
- SET/COAST switch 4.
- 5. MAIN switch

3. **RESUME/ACCELERATE** switch



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

# **Component Description**

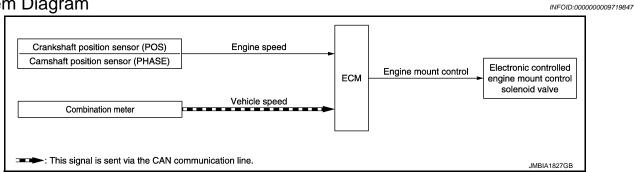
INFOID:000000009719846

Component	Reference	
Camshaft position sensor (PHASE)	EC-279, "Description"	
Cooling fan motor	EC-436, "Description"	
Crankshaft position sensor (POS)	EC-275, "Description"	
Engine coolant temperature sensor	EC-182, "Description"	
Refrigerant pressure sensor	EC-465, "Description"	

#### < SYSTEM DESCRIPTION >

# ELECTRONIC CONTROLLED ENGINE MOUNT

### System Diagram



## System Description

INFOID:000000009719848

### INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount control	
Combination meter	Vehicle speed*	Control	valve

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

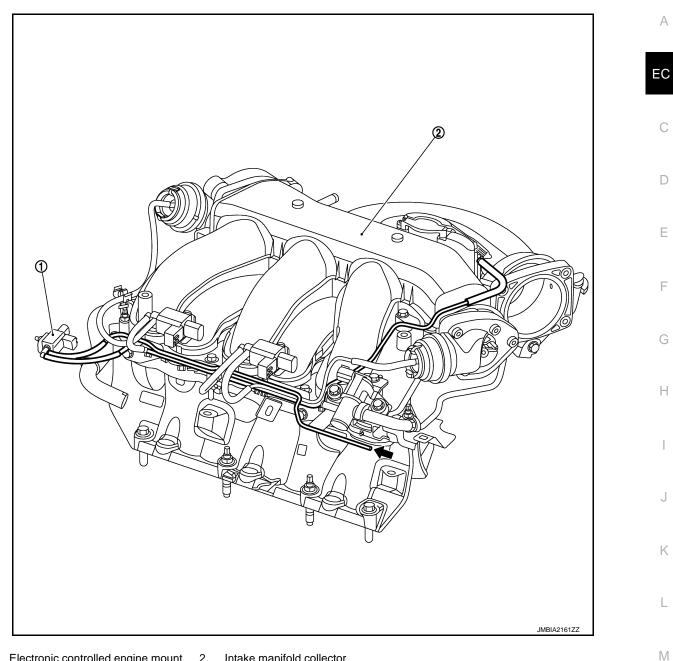
#### SYSTEM DESCRIPTION

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

Vehicle condition	Engine mount control
Idle (With vehicle stopped)	Soft
Except above conditions	Hard

ELECTRONIC CONTROLLED ENGINE MOUNT LINE DRAWING

#### < SYSTEM DESCRIPTION >

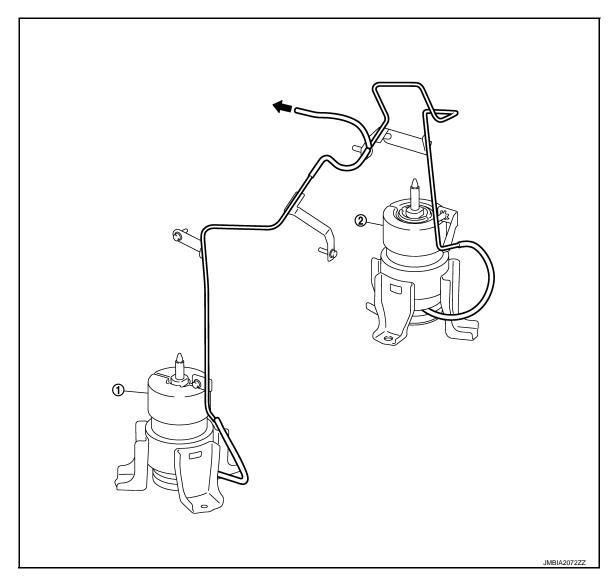


- 1. Electronic controlled engine mount 2. Intake manifold collector control solenoid valve
- : From next figure

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#### < SYSTEM DESCRIPTION >



- 1. Front electronic controlled engine mount 2. Rear electronic controlled engine mount
- To previous figure

#### NOTE:

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

#### < SYSTEM DESCRIPTION >

**Component Parts Location** 

[VQ35DE] INFOID:000000009719849

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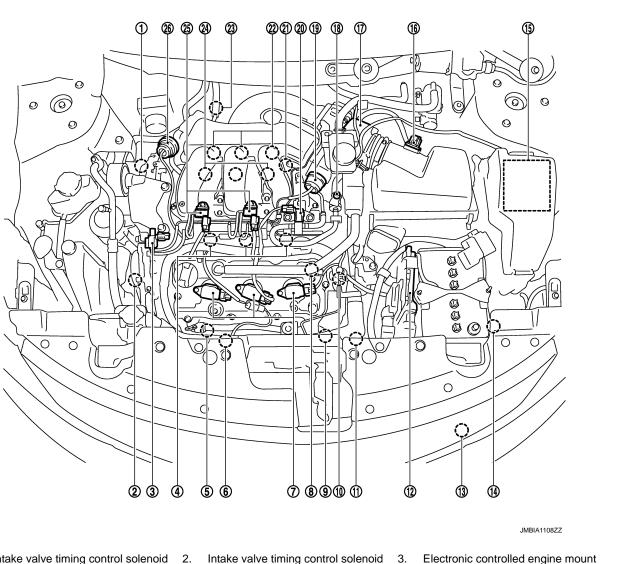
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- Intake valve timing control solenoid 1. valve (bank 1)
- Fuel injector (bank 2) 4.
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Engine coolant temperature sensor
- 13. Refrigerant pressure sensor
- 16. Mass air flow sensor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

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

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

12. ECM Ν 15. IPDM E/R

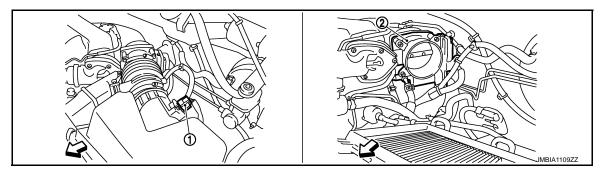
18. EVAP service port

6.

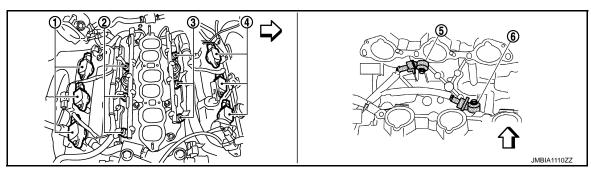
9.

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

### < SYSTEM DESCRIPTION >



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



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

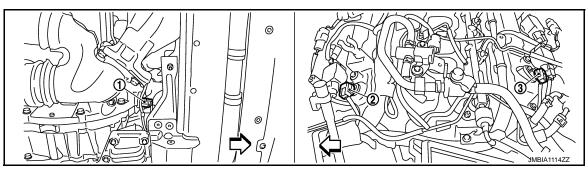
- Ignition coil (with power transistor) 4. and spark plug (bank 2)

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

: Vehicle front

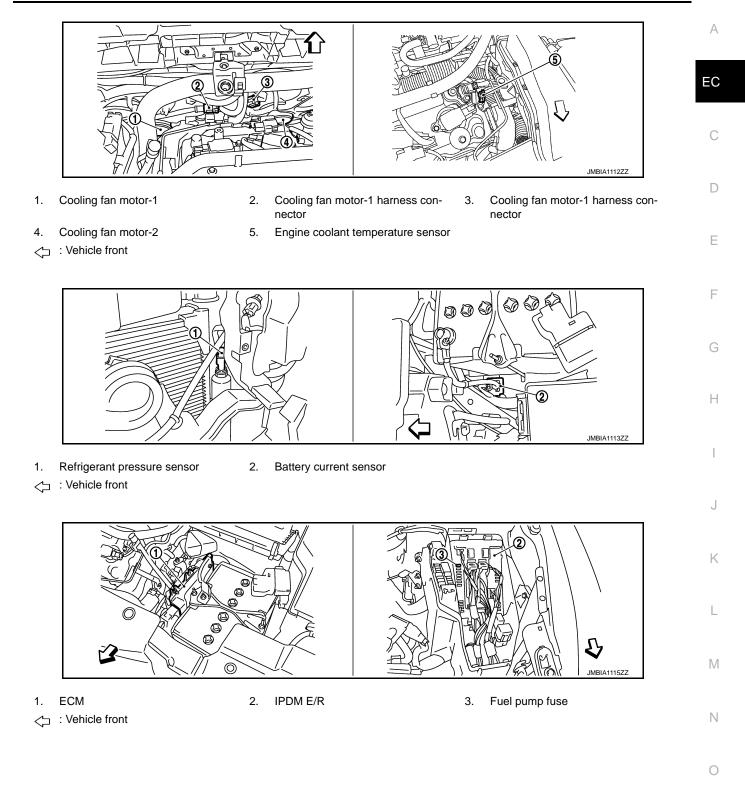


- Crankshaft position sensor (POS) 1.
- Camshaft position sensor (PHASE) 3. (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

: Vehicle front

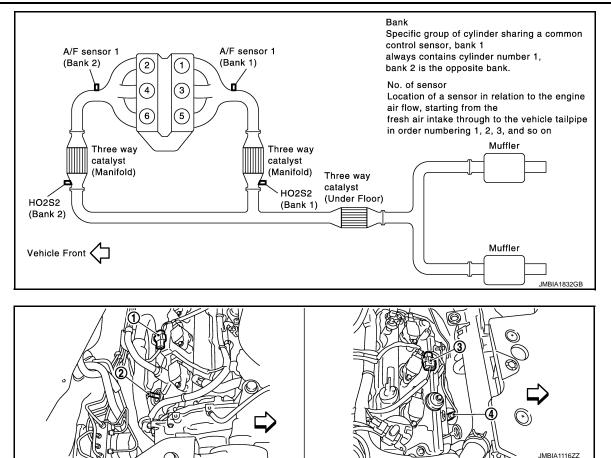
### < SYSTEM DESCRIPTION >

### [VQ35DE]



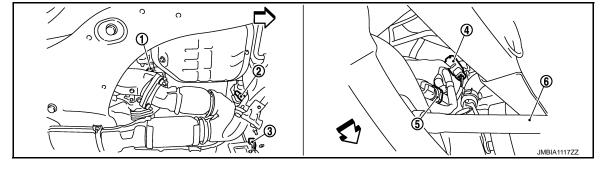
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#### < SYSTEM DESCRIPTION >



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

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



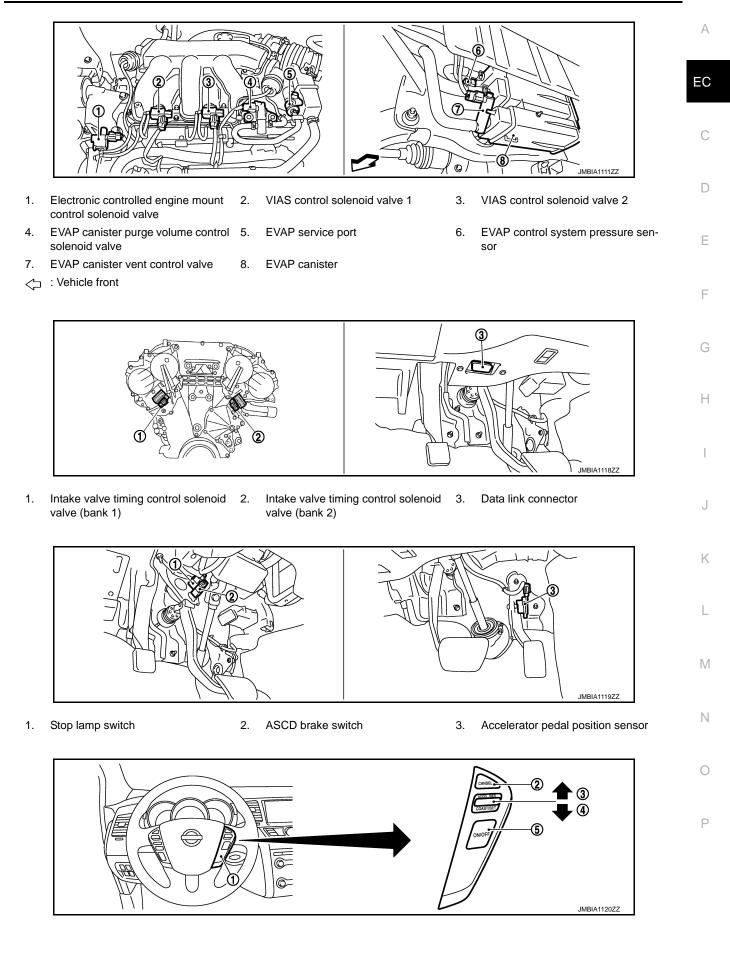
- 1. HO2S2 (bank 1)
  - HO2S2 (bank 1) harness connector 5.
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

∠ : Vehicle front

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### < SYSTEM DESCRIPTION >

#### [VQ35DE]



### < SYSTEM DESCRIPTION >

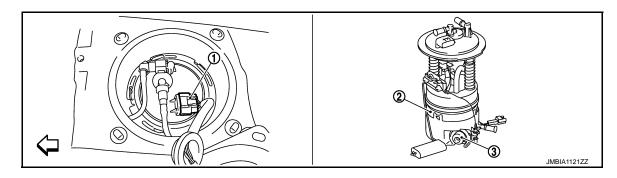
[VQ35DE]

- ASCD steering switch
   SET/COAST switch
- 2. CANSEL switch

MAIN switch

5.

3. RESUME/ACCELERATE switch



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

# **Component Description**

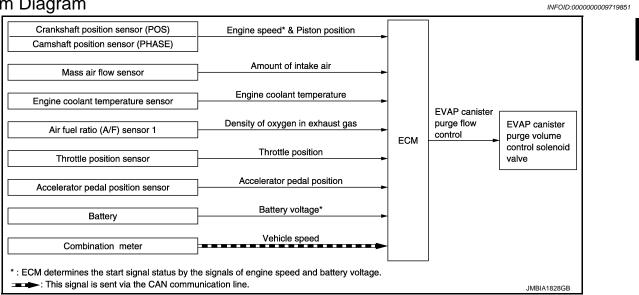
INFOID:000000009719850

Component	Reference
Camshaft position sensor (PHASE)	EC-279. "Description"
Crankshaft position sensor (POS)	EC-275, "Description"
Electronic controlled engine mount control solenoid valve	EC-443, "Description"

#### < SYSTEM DESCRIPTION >

# EVAPORATIVE EMISSION SYSTEM

### System Diagram



# System Description

INFOID:000000009719852

[VQ35DE]

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### INPUT/OUTPUT SIGNAL CHART

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

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

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

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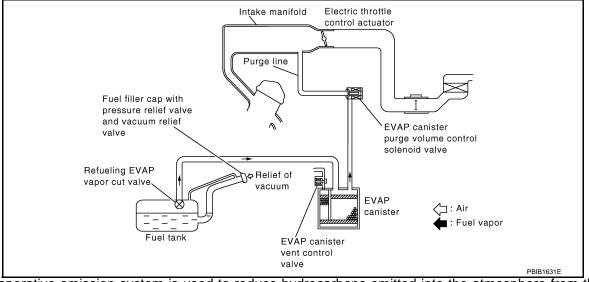
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### < SYSTEM DESCRIPTION >

### [VQ35DE]

#### SYSTEM DESCRIPTION



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

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

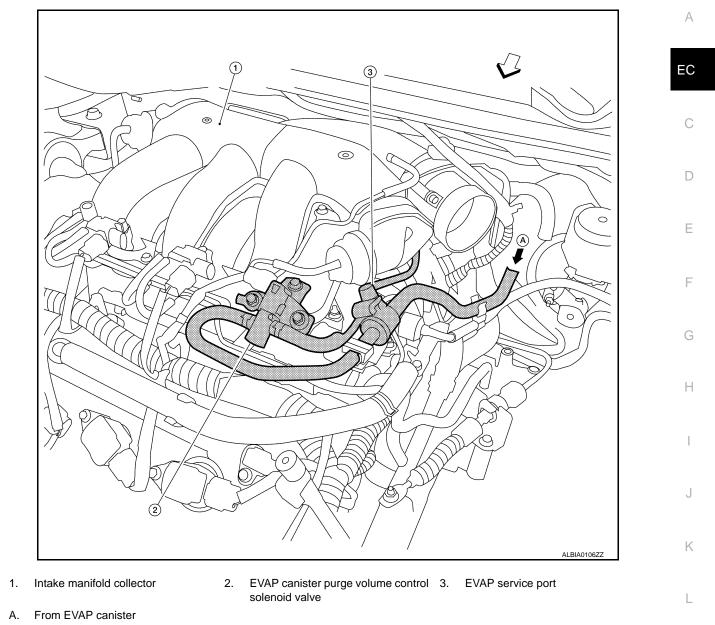
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid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

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

#### EVAPORATIVE EMISSION LINE DRAWING

#### < SYSTEM DESCRIPTION >

[VQ35DE]



∠ : Vehicle front

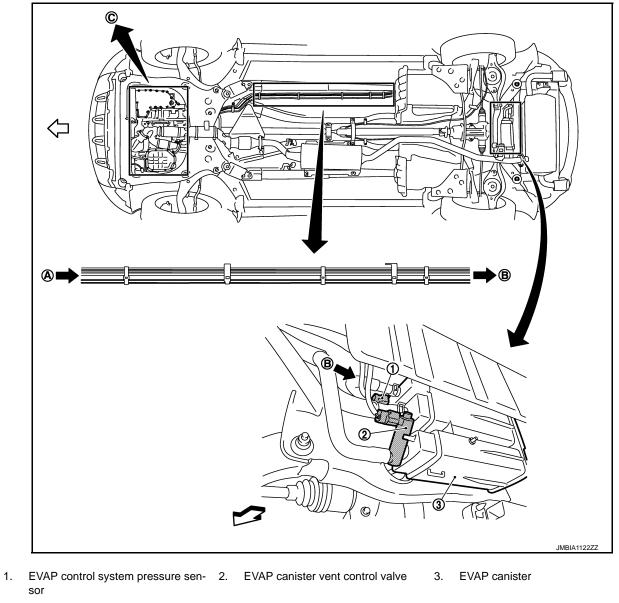
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#### < SYSTEM DESCRIPTION >

[VQ35DE]



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

∠ : Vehicle front

#### NOTE:

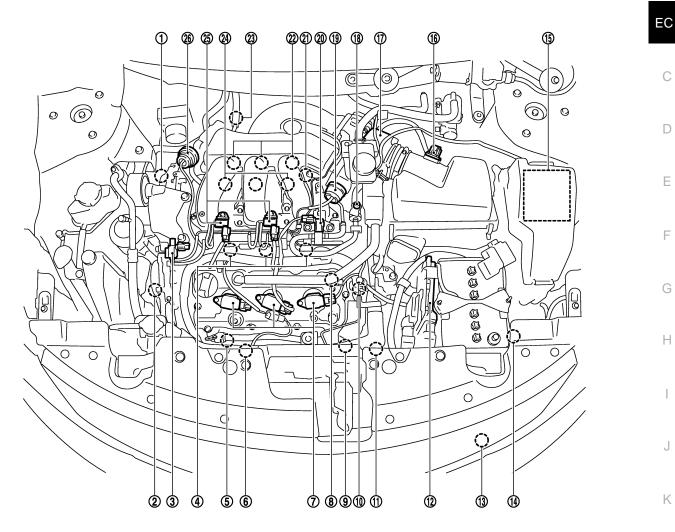
Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

#### < SYSTEM DESCRIPTION >

### **Component Parts Location**

[VQ35DE] INFOID:000000009719853





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

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

2.

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

Electronic controlled engine mount control solenoid valve Cooling fan motor-2

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Crankshaft position sensor (POS)

12. ECM Ν 15. IPDM E/R

18. EVAP service port

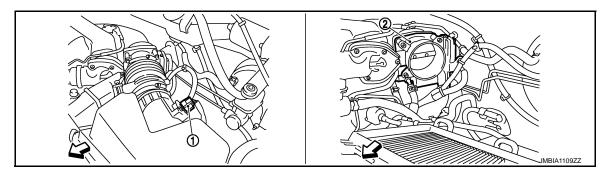
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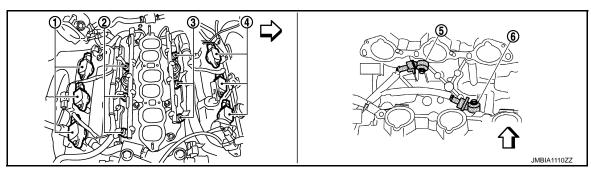
9.

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

#### < SYSTEM DESCRIPTION >



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



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

and spark plug (bank 2)

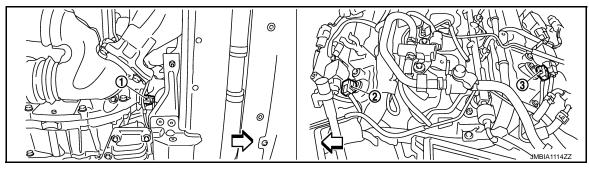
- 2. Fuel injector (bank 1)
- Ignition coil (with power transistor) 5. Knock sensor (bank 2)

2.

- 3. Fuel injector (bank 2)
- 6. Knock sensor (bank 1)

C : Vehicle front

4.

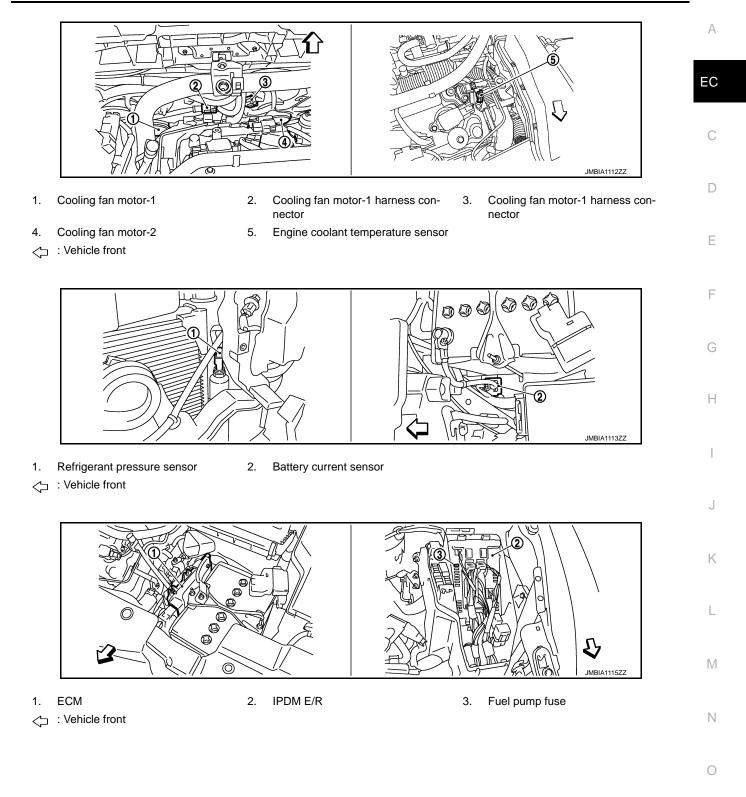


- 1. Crankshaft position sensor (POS)
- Camshaft position sensor (PHASE) 3. (bank 1)
- Camshaft position sensor (PHASE) (bank 2)

 $\triangleleft$ : Vehicle front

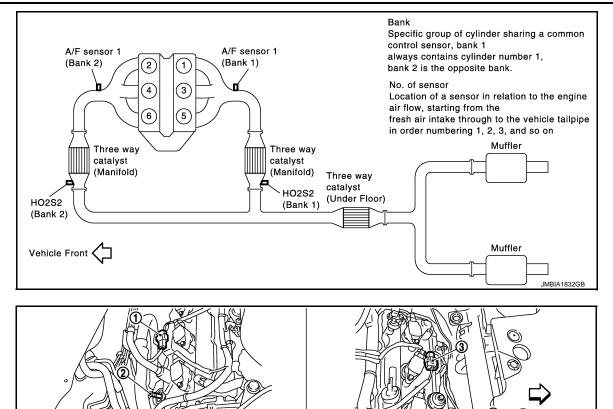
#### < SYSTEM DESCRIPTION >

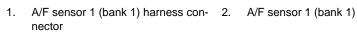
### [VQ35DE]



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#### < SYSTEM DESCRIPTION >

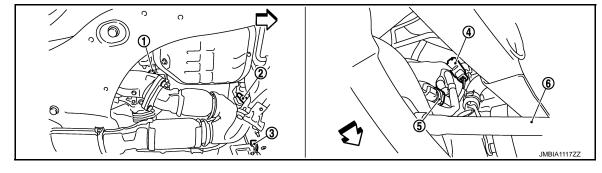




- 4. A/F sensor 1 (bank 2)
- : Vehicle front

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

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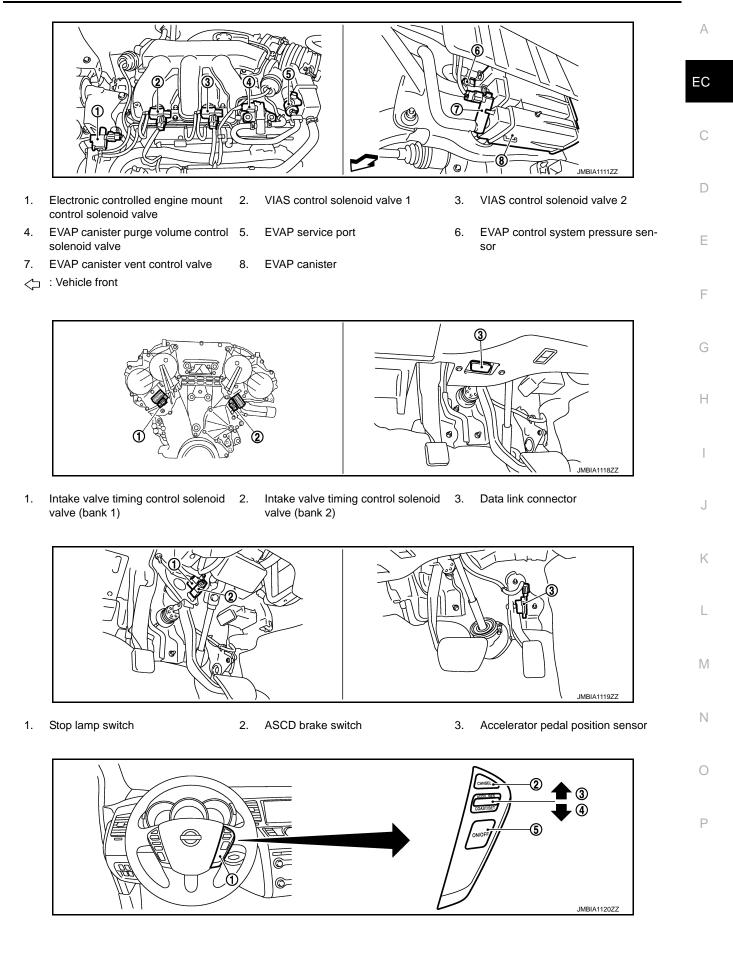
- 1. HO2S2 (bank 1)
  - HO2S2 (bank 1) harness connector 5. Pow
- 2. HO2S2 (bank 2)
  - Power steering pressure sensor
- 3. HO2S2 (bank 2) harness connector
- 6. Drive shaft (RH)

: Vehicle front

4.

#### < SYSTEM DESCRIPTION >

### [VQ35DE]

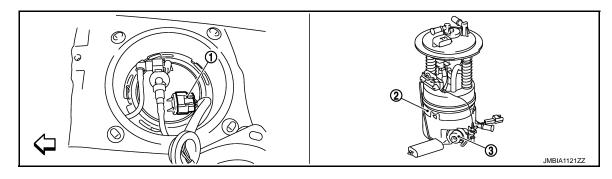


### < SYSTEM DESCRIPTION >

[VQ35DE]

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

3. RESUME/ACCELERATE switch



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

# **Component Description**

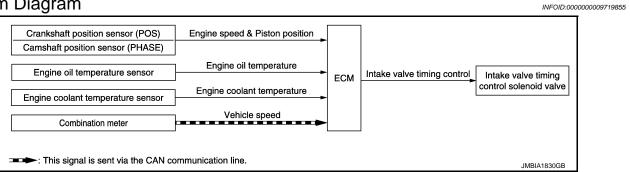
INFOID:000000009719854

Component	Reference
A/F sensor 1	EC-199, "Description"
Accelerator pedal position sensor	EC-419, "Description"
Camshaft position sensor (PHASE)	EC-279, "Description"
Crankshaft position sensor (POS)	EC-275. "Description"
Engine coolant temperature sensor	EC-182, "Description"
EVAP canister purge volume control solenoid valve	EC-293, "Description"
EVAP control system pressure sensor	EC-309, "Description"
Fuel tank temperature sensor	EC-248. "Description"
Mass air flow sensor	EC-167, "Description"
Throttle position sensor	EC-188, "Description"

### < SYSTEM DESCRIPTION >

# INTAKE VALVE TIMING CONTROL

### System Diagram



# System Description

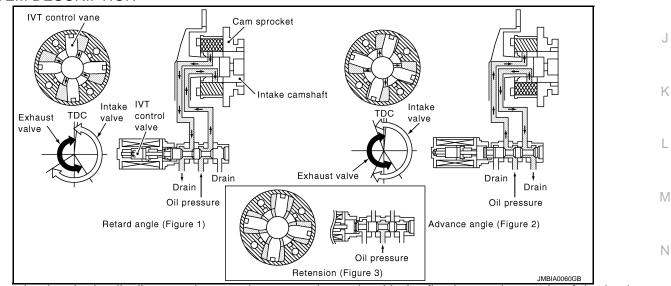
INFOID:000000009719856

## INPUT/OUTPUT SIGNAL CHART

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

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

### SYSTEM DESCRIPTION



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

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

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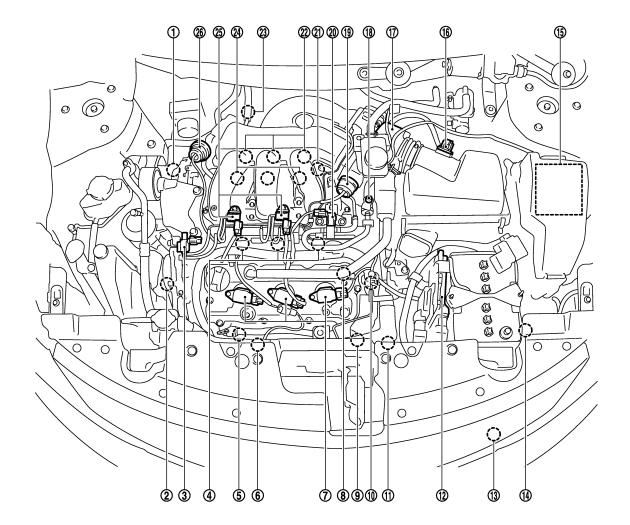
[VQ35DE]

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#### < SYSTEM DESCRIPTION >

**Component Parts Location** 

[VQ35DE] INFOID:000000009719857



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

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

2.

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

3. Electronic controlled engine mount control solenoid valve

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

# < SYSTEM DESCRIPTION >

### [VQ35DE]

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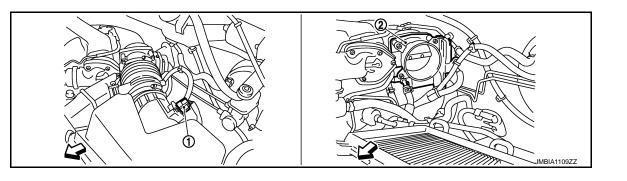
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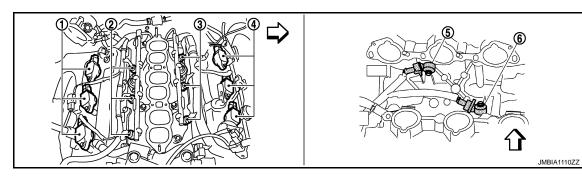
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- 1. Mas air flow sensor (with intake air 2. Electric throttle control actuator temperature sensor)
- ∠ : Vehicle front



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

5.

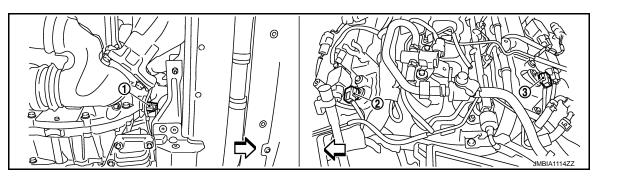
2.

(bank 1)

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

Camshaft position sensor (PHASE)

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



Camshaft position sensor (PHASE)

3.

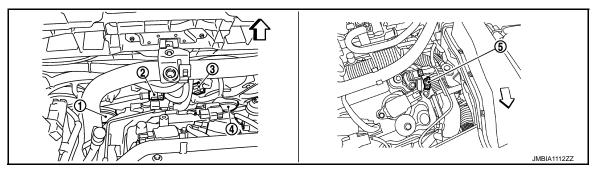
(bank 2)

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

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### < SYSTEM DESCRIPTION >

[VQ35DE]



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

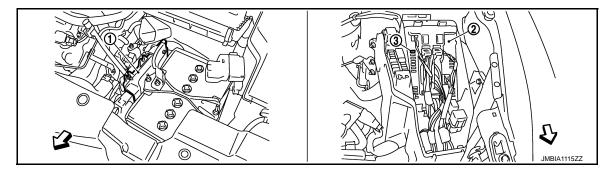
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- 4. Cooling fan motor-2
- 5. Engine coolant temperature sensor

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

∠ : Vehicle front

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1. ECM

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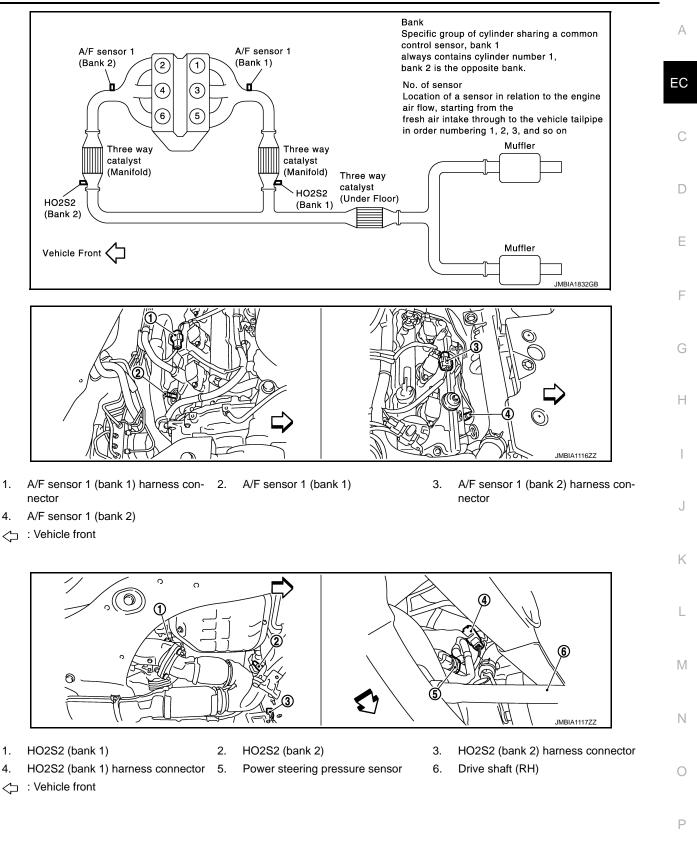
: Vehicle front

2. IPDM E/R

3. Fuel pump fuse

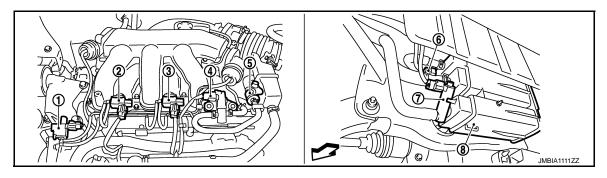
#### < SYSTEM DESCRIPTION >

#### [VQ35DE]



#### < SYSTEM DESCRIPTION >

[VQ35DE]



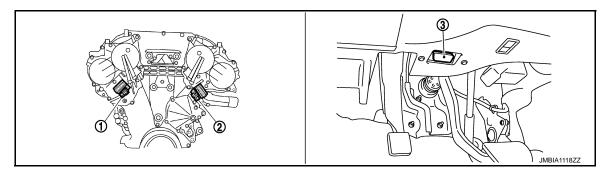
VIAS control solenoid valve 1

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

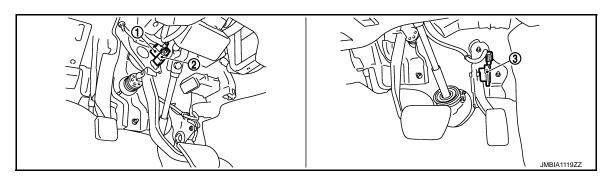
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

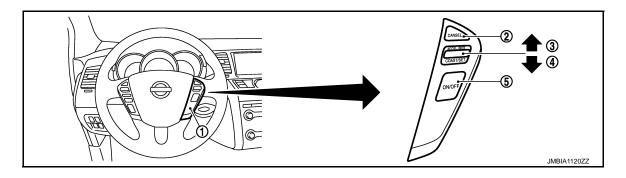
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



CANSEL switch

MAIN switch

2.

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### < SYSTEM DESCRIPTION >

ASCD steering switch

SET/COAST switch

1.

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### [VQ35DE]

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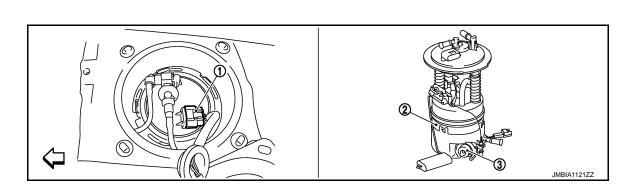
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3. RESUME/ACCELERATE switch



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

# **Component Description**

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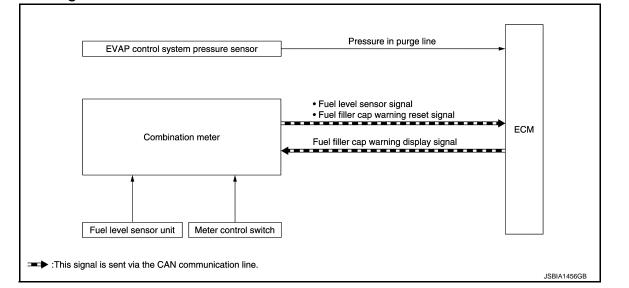
Component	Reference	
Camshaft position sensor (PHASE)	EC-279, "Description"	
Crankshaft position sensor (POS)	EC-275, "Description"	I
Engine coolant temperature sensor	EC-182, "Description"	
Engine oil temperature sensor	EC-256, "Description"	
Intake valve timing control solenoid valve	EC-164, "Description"	

## FUEL FILLER CAP WARNING SYSTEM

#### < SYSTEM DESCRIPTION >

FUEL FILLER CAP WARNING SYSTEM

### System Diagram



# System Description

INFOID:000000009719860

### INPUT/OUTPUT SIGNAL CHART

Input

Unit/Sensor	Input signal to ECM	ECM function
EVAP control system pressure sensor	Pressure in purge line	
Combination meter	Fuel level sensor signal <sup>*</sup>	Fuel filler cap warning control
	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 <sup>*</sup>	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 sensor signal transmitted from the combination meter via CAN communication.

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 tunes OFF, according to any condition listed below:

- Reset operation is performed by operating the meter control switch on the combination meter.
- 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.

INFOID:000000009719859

# FUEL FILLER CAP WARNING SYSTEM

< SYSTEM DESCRIPTION >	[VQ35DE]	
<ul> <li>Fuel refilled.</li> <li>DTC erased by using CONSULT.</li> <li>NOTE:</li> <li>MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel fille</li> </ul>	er cap warn-	А
ing display turns ON/OFF.		EC
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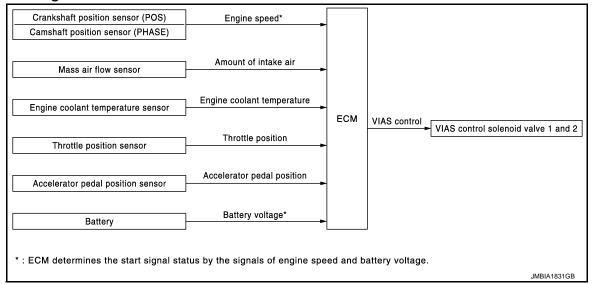
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# < SYSTEM DESCRIPTION >

# VARIABLE INDUCTION AIR SYSTEM

# System Diagram



# System Description

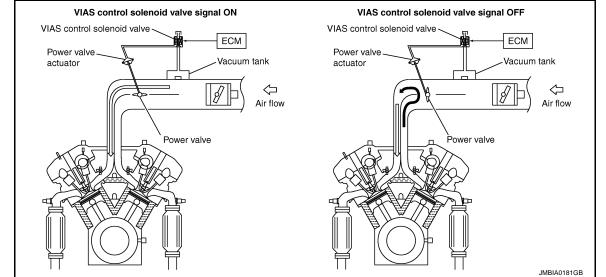
INFOID:000000009719862

# INPUT/OUTPUT SIGNAL CHART

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

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

### SYSTEM DESCRIPTION



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

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#### < SYSTEM DESCRIPTION >

#### [VQ35DE]

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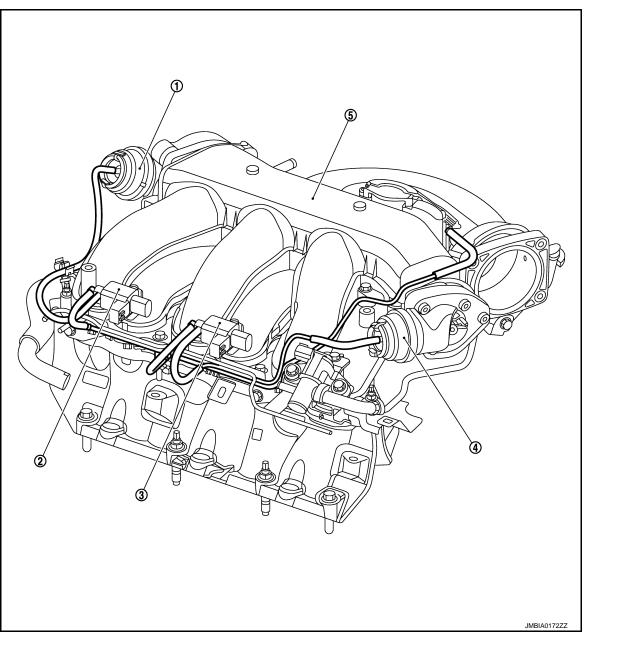
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Under this condition, the pressure waves of the exhaust stroke do not disturb the pressure waves of the intake stroke of each opposite bank. Therefore, charging efficiency is increased together with the effect of the long intake passage.

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

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

#### VACUUM HOSE DRAWING

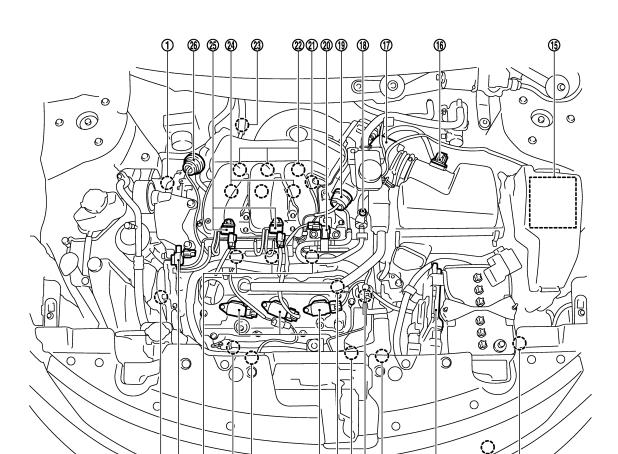


- 1. Power valve actuator 1
- Power valve actuator 2 4.
- 2. VIAS control solenoid valve 1 5.
  - Intake manifold collector
- 3. VIAS control solenoid valve 2

### < SYSTEM DESCRIPTION >

**Component Parts Location** 

[VQ35DE] INFOID:000000009719863



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

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Intake valve timing control solenoid 2. valve (bank 2)

(7)

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

3. Electronic controlled engine mount control solenoid valve

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(14)

Cooling fan motor-2 6.

13

- 9. Crankshaft position sensor (POS)
- 12. ECM

12

- 15. IPDM E/R
- 18. EVAP service port
- 20. EVAP canister purge volume control 21. Camshaft position sensor (PHASE) (bank 1)
  - 24. Fuel injector (bank 1)

# < SYSTEM DESCRIPTION >

### [VQ35DE]

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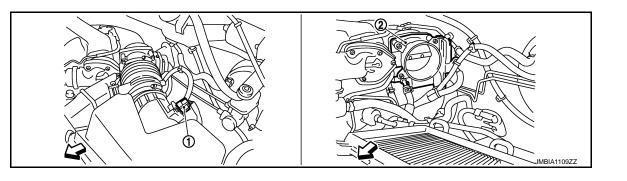
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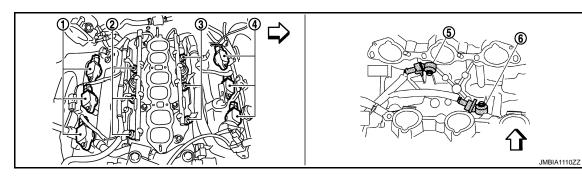
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- Mas air flow sensor (with intake air 2. Electric throttle control actuator 1. temperature sensor)
- : Vehicle front



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

Ignition coil (with power transistor)

2. Fuel injector (bank 1)

5.

2.

(bank 1)

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

Camshaft position sensor (PHASE)

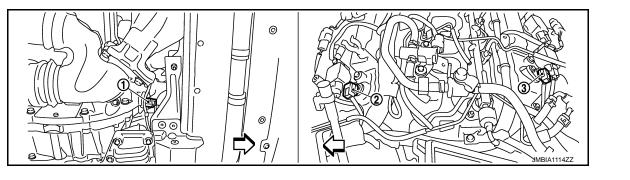
3.

3.

(bank 2)

and spark plug (bank 2) : Vehicle front

4.



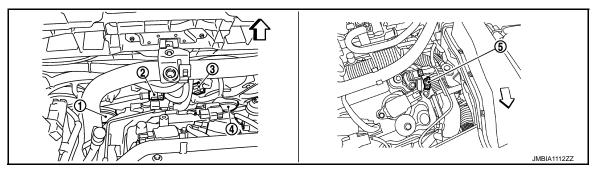
Camshaft position sensor (PHASE)

- Crankshaft position sensor (POS) 1.

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### < SYSTEM DESCRIPTION >

[VQ35DE]



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

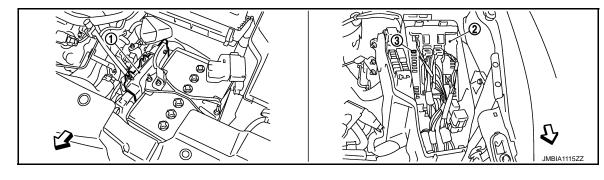
3.

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

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

∠ : Vehicle front

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1. ECM

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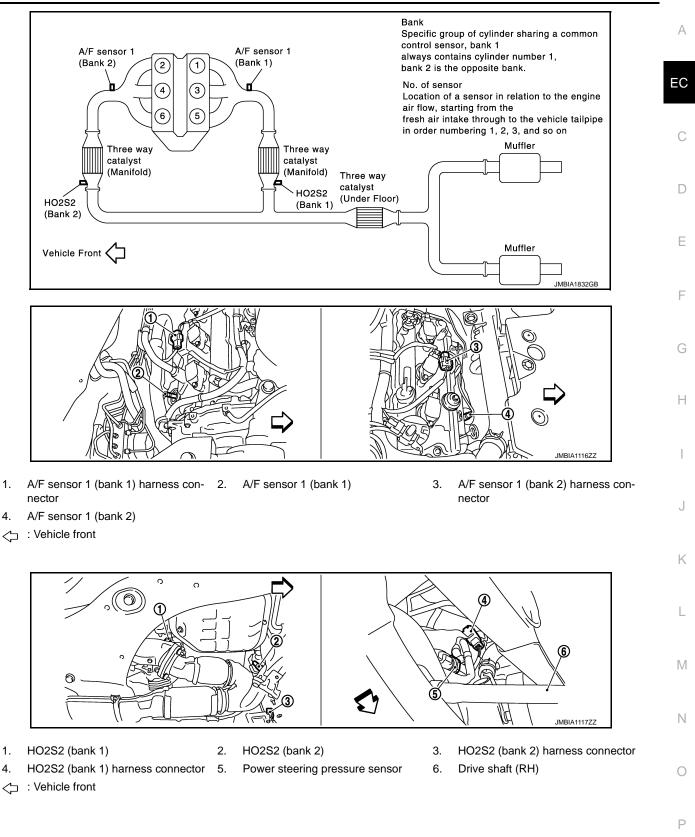
: Vehicle front

2. IPDM E/R

3. Fuel pump fuse

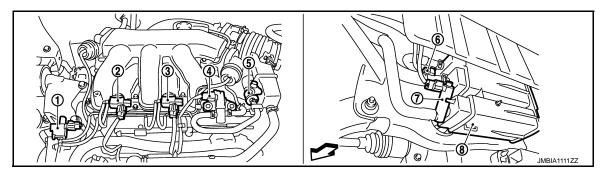
#### < SYSTEM DESCRIPTION >





#### < SYSTEM DESCRIPTION >

[VQ35DE]



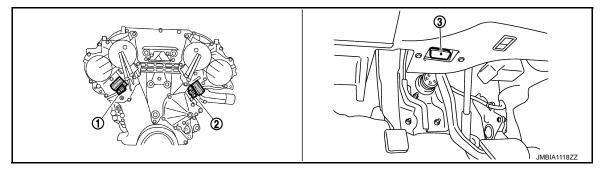
VIAS control solenoid valve 1

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

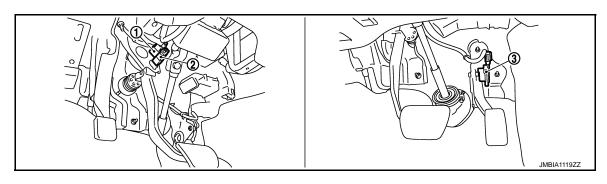
- 4. EVAP canister purge volume control 5. solenoid valve
  - 8. EVAP canister

6. EVAP control system pressure sensor

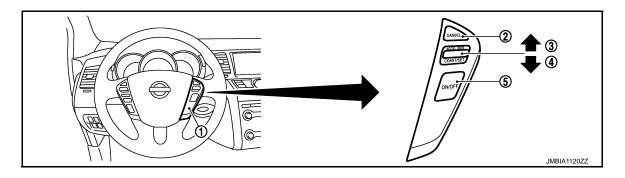
- 7. EVAP canister vent control valve
- : Vehicle front



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



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



CANSEL switch

MAIN switch

2.

5.

### < SYSTEM DESCRIPTION >

ASCD steering switch

SET/COAST switch

1.

4.

# [VQ35DE]

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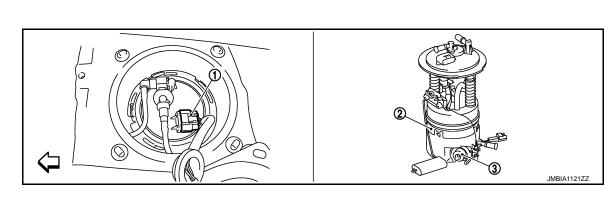
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3. RESUME/ACCELERATE switch



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

# **Component Description**

INFOID:000000009719864

		G
Component	Reference	
Accelerator pedal position sensor	EC-419, "Description"	
Camshaft position sensor (PHASE)	EC-279, "Description"	11
Crankshaft position sensor (POS)	EC-275, "Description"	
Engine coolant temperature sensor	EC-182, "Description"	
Mass air flow sensor	EC-167, "Description"	
Power valve 1 and 2	EC-468, "Description"	
Throttle position sensor	EC-188, "Description"	J
VIAS control solenoid valve 1	EC-394, "Description"	
VIAS control solenoid valve 2	EC-397, "Description"	K

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# **ON BOARD DIAGNOSTIC (OBD) SYSTEM**

### < SYSTEM DESCRIPTION >

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

## Diagnosis Description

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:000000009719866

INFOID:000000009719865

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 <u>EC-118</u>, "Diagnosis Description".

#### NOTE:

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

< SYSTEM DESCRIPTION >

# **DIAGNOSIS SYSTEM (ECM)** DIAGNOSIS DESCRIPTION

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

EC INFOID:000000009719867

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

		Μ	IL		D	тс	1st tri	Ε	
Items	1st trip 2nd			d trip		2nd trip	1st trip	2nd trip	
	Blinking	Illuminat- ed	Blinking	Illuminat- ed	1st trip 2nd trip displaying displayin		displaying	display- ing	F
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0306 is being detected	×	_	_	_	_	_	×	_	G
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0306 is being detected	_	_	×	_	_	×	_	_	Н
One trip detection diagnoses (Re- fer to <u>EC-507, "DTC Index".</u> )	_	×	_	_	×	_	_	_	
Except above	_		—	×		×	×		

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

# 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 M 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-507, "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.

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-8, "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. Ρ

### 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 or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen.

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#### < 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 – P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175								
2		Except the above items							
3	1st trip freeze frame	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 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:000000009719869

### 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 CON-SULT 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 "MIS-FIRE <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"

# EC-120

#### < SYSTEM DESCRIPTION >

#### А This driving pattern satisfies with B and C patterns. This driving pattern EC satisfies with C but not B. NG This driving pattern NG OK NG Detection satisfies with B but not C. Detection Detection Detection <Driving Pattern> Vehicle 1st speed Trip Trip Trip Trip D NG OK NG NG IGN ON MIL MIL illuminates illuminates MIL turns off F MIL turns off ۲Ż в Нc 0 Ω 0 Counter DTC & DISPLAY NO DISPLAY Freeze NO DISPL Data> Н Frame Data \*4 °3 DISPLAY DISPLAY Frame 1st trip CLEAR CLEAR Freeze Frame Freeze 6 Data DISPLAY DISPLAY 1st trip CLEAR CLEAF trip) DTC (1st 1 6 \*8 ∞ DTC 80 С 79 5 Counter Κ trip) <(1st L JMBIA1417GB Μ \*1: When the same malfunction is de-\*2: MIL will turn OFF after vehicle is driv- \*3: When the same malfunction is deen 3 times (pattern B) without any tected in two consecutive trips, MIL tected in two consecutive trips, the will light up. malfunctions. DTC and the freeze frame data will be stored in ECM. Ν \*4: The DTC and the freeze frame data \*6: The 1st trip DTC and the 1st trip \*5: When a malfunction is detected for freeze frame data will be cleared at will not be displayed any longer after the first time, the 1st trip DTC and the 1st trip freeze frame data will be the moment OK is detected. vehicle is driven 80 times (pattern C) stored in ECM. without the same malfunction. (The DTC and the freeze frame data still remain in ECM.) \*7: When the same malfunction is de-\*8: 1st trip DTC will be cleared when ve-Ρ tected in the 2nd trip, the 1st trip hicle is driven once (pattern C) withfreeze frame data will be cleared. out 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 <u>EC-123, "DIAGNOSIS DESCRIPTION : Driving Pattern"</u>.

# EC-121

< SYSTEM DESCRIPTION >

Driving Pattern C Refer to <u>EC-123</u>, "<u>DIAGNOSIS DESCRIPTION</u> : <u>Driving Pattern</u>". Example:

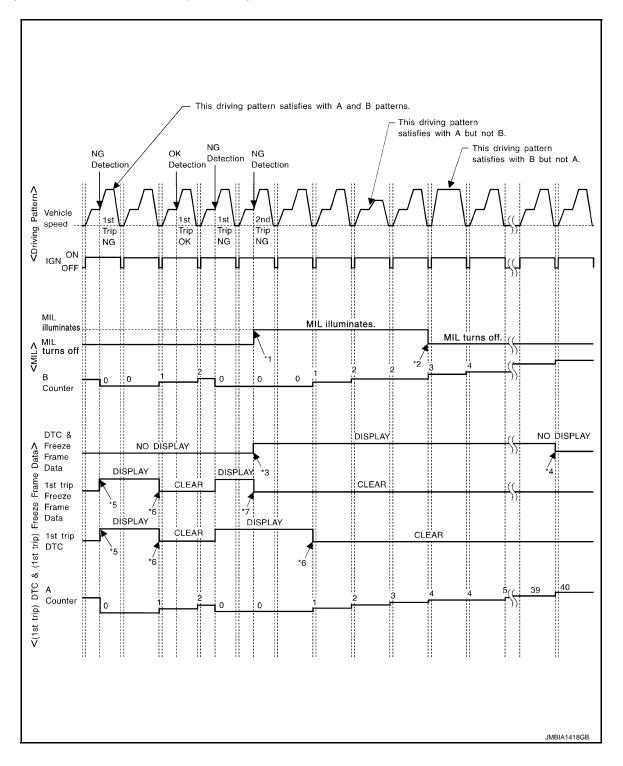
If the stored freeze frame data is as per the following:

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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< SYSTEM DESCRIPTION >	[VQ35DE]	
<ul> <li>*1: When the same malfunction is de-tected in two consecutive trips, MIL will turn OFF after vehicle is driv- *3</li> <li>*2: MIL will turn OFF after vehicle is driv- *3</li> <li>en 3 times (pattern B) without any malfunctions.</li> </ul>	tected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.	
<ul> <li>*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.)</li> <li>*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip DTC and the stored in ECM.</li> </ul>	5: 1st trip DTC will be cleared after vehi- cle is driven once (pattern B) without the same malfunction.	
*7: When the same malfunction is de- tected in the 2nd trip, the 1st trip freeze frame data will be cleared.	C	)
Explanation for Driving Patterns Except for "Misfire < Exhaust Quality System"	y Deterioration>", "Fuel Injection	-
Driving Pattern A Refer to <u>EC-123, "DIAGNOSIS DESCRIPTION : Driving Pattern"</u> .	F	-
Driving Pattern B Refer to <u>EC-123, "DIAGNOSIS DESCRIPTION : Driving Pattern"</u> .		
DIAGNOSIS DESCRIPTION : Driving Pattern	INFOID:00000009719870	ì
CAUTION: Always drive at a safe speed.	F	ł
<ul> <li>DRIVING PATTERN A</li> <li>Driving pattern A means a trip satisfying the following conditions.</li> <li>Engine speed reaches 400 rpm or more.</li> <li>Engine coolant temperature rises by 20°C (36°F) or more after starting the speed reaches the starting the speed reaches th</li></ul>	ne engine.	
<ul> <li>Engine coolant temperature reaches 70°C (158°F) or more.</li> <li>The ignition switch is turned from ON to OFF.</li> <li>NOTE:</li> <li>When the same molfunction is detected regardless of driving conditions.</li> </ul>	J	ļ
<ul> <li>When the same malfunction is detected regardless of driving conditions, A.</li> <li>When the above conditions are satisfied without detecting the same malf pattern A.</li> </ul>		
DRIVING PATTERN B Driving pattern B means a trip satisfying the following conditions. • Engine speed reaches 400 rpm or more.	L	-
<ul> <li>Engine coolant temperature reaches 70°C (158°F) or more.</li> <li>Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 second loop.</li> </ul>	conds or more under the control of $\square$	/
<ul> <li>Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 sec closed loop.</li> </ul>	Ν	J
<ul> <li>Under the closed loop control condition, the following state reaches 12 speed of 4 km/h (2 MPH) or less with idling condition.</li> <li>The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or n</li> </ul>	seconds or more in total: Vehicle	
• A lapse of 22 minutes or more after engine start. NOTE:	C	)
<ul> <li>Drive the vehicle at a constant velocity.</li> <li>When the same malfunction is detected regardless of driving conditions, B.</li> </ul>	reset the counter of driving pattern	)
<ul> <li>When the above conditions are satisfied without detecting the same malf pattern B.</li> </ul>	unction, reset the counter of driving	
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

### < SYSTEM DESCRIPTION >

Calculated load value: (Calculated load value in the freeze frame data)  $x (1\pm0.1)$  [%] 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:000000009719871

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 permanent DTC is stored or MIL illuminates during the state emissions inspection, the vehicle is alsoreturned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it isimportant to check SRT ("CMPLT"), DTC (No DTCs) and permanent DTC (NO permanent DTCs) before theinspection.

#### 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.

#### < SYSTEM DESCRIPTION >

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				Example			
Self-diagnosis result		Diagnosis	$\leftarrow ON \rightarrow$	$\begin{array}{rcl} & \text{Ignitio} \\ \text{OFF} & \leftarrow \text{ON} \rightarrow & \text{O} \end{array}$	n cycle FF $\leftarrow$ ON $\rightarrow$ OF	F $\leftarrow$ ON $\rightarrow$	-
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	E
		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	—	—	- 6
		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".  $\rightarrow$  Case 1 above

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

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

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

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

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

DIAGNOSIS DESCRIPTION : Permanent Diagnostic Trouble Code (Permanent DTC)

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Permanent DTC is defined in SAE J1979/ISO 15031-5 Service \$0A.

Control module stores a DTC issuing a command of turning on MIL as a permanent DTC and keeps storing the DTC as a permanent DTC until control module judges that there is no presence of malfunction.

Permanent DTCs cannot be erased by using the erase function of CONSULT or Generic Scan Tool (GST) and by disconnecting the 12V battery to shut off power to control module. This prevents a vehicle from passing the use inspection without repairing a malfunctioning part.

When not passing the use inspection due to more than one permanent DTC, permanent DTCs should be erased, referring to this manual.

#### NOTE:

- The important items in state emission inspection are that MIL is not ON, SRT test items are set, and permanent DTCs are not included.
- Permanent DTCs do not apply for regions that permanent DTCs are not regulated by law.

### < SYSTEM DESCRIPTION >

#### PERMANENT DTC SET TIMING

The setting timing of permanent DTC is stored in control module with the lighting of MIL when a DTC is confirmed.

### **DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)**

INFOID:000000009719873

SERVICE

ENGINE

SOON

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.

 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 <u>EC-</u> 458, "Component Function Check".

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

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:000000009719874

JSBIA131577

#### 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 po- sition learning	ECM can learn the accelerator pedal released position. Refer to EC-19, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description".					
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to <u>EC-19</u> , "THROTTLE VALVE CLOSED PO- <u>SITION LEARNING : Description</u> ".					
Idle air volume learning	ECM can learn the idle air volume. Refer to EC-20, "IDLE AIR VOLUME LEARNING : Description".					
Mixture ratio self-learning value       Mixture ratio self-learning value can be erased. Refer to EC-21. "MIXTURE RATIO SELF-LEA         clear       VALUE CLEAR : Description".						

### BULB CHECK MODE

#### Description

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

#### **Operation Procedure**

- 1. Turn ignition switch ON.
- The MIL on the instrument panel should stay ON. If it remains OFF, check MIL circuit. Refer to <u>EC-458, "Diagnosis Procedure"</u>.

#### 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 <u>EC-124</u>, "<u>DIAGNOSIS DESCRIPTION</u> : <u>System Readiness Test (SRT) Code</u>".

#### 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.

# EC-126

#### < SYSTEM DESCRIPTION >

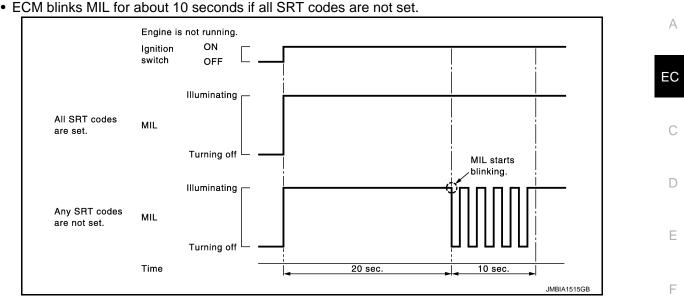
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# MALFUNCTION WARNING MODE

#### 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-458, "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 mal-function.
- 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.

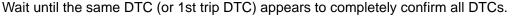
#### NOTE:

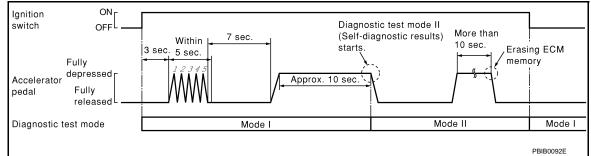
Do not release the accelerator pedal for 10 seconds if MIL starts blinking during this period. This blinking is displaying SRT status and is continued for another 10 seconds.

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

#### < SYSTEM DESCRIPTION >

#### NOTE:

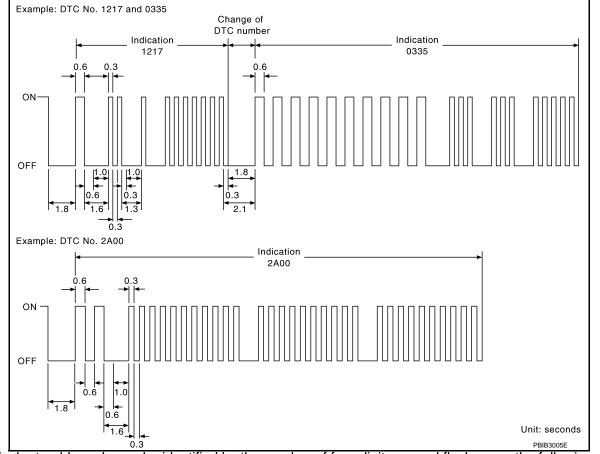




#### How to Read Self-diagnostic Results

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 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	А	В	С	D	Е	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.

# EC-128

#### < SYSTEM DESCRIPTION >

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to <u>EC-507</u>, "<u>DTC Index</u>".

How to Erase Self-diagnostic Results

By performing this procedure, ECM memory is erased and the following diagnostic information is erased as	
well.	E
	1 1

- 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** Function

### FUNCTION

Diagnostic test mode	Function
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.
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT unit.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
ECU Identification	ECM part number can be read.
DTC Work Support	The status of system monitoring tests and the self-diagnosis status/results can be confirmed.

\*: 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

### SELF DIAGNOSTIC RESULT MODE

# Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to <u>EC-507, "DTC\_Index"</u>.

#### 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.

# EC-129

[VQ35DE]

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INFOID:000000009719875

< SYSTEM DESCRIPTION >

#### NOTE:

- If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- If the DTC is not for CVT related items (see <u>EC-507, "DTC Index"</u>), skip step 1.
- 1. Erase DTC in TCM. Refer to <u>TM-128, "DTC Index"</u>.
- 2. Select "ENGINE" with CONSULT.
- 3. Select "SELF-DIAG RESULTS".
- 4. Touch "ERASE". (DTC in ECM will be erased.)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	<ul> <li>The engine control component part/control system has a trouble code that is displayed as PXXXX. (Refer to <u>EC-507, "DTC Index"</u>.)</li> </ul>
FUEL SYS-B1	• "Fuel injection system status" at the moment a malfunction is detected is displayed.
FUEL SYS-B2	<ul> <li>One of the following mode is displayed.</li> <li>Mode2: Open loop due to detected system malfunction</li> <li>Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment)</li> <li>Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>Mode5: Open loop - has not yet satisfied condition to go to closed loop</li> </ul>
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	"Long-term fuel trim" at the moment a malfunction is detected is displayed.
L-FUEL TRM-B2 [%]	• The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	"Short-term fuel trim" at the moment a malfunction is detected is displayed.
S-FUEL TRM-B2 [%]	<ul> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	The intake air temperature at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	These items are displayed but are not applicable to this model.
COMBUST CONDITION	

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

# DATA MONITOR MODE

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

#### Monitored Item

For reference values of the following items, refer to EC-472, "Reference Value".

### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	<ul> <li>Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul> <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> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul> <li>When the engine is stopped, a certain value is indicated.</li> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>
B/FUEL SCHDL	msec	"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running, specification range is indicated in "SPEC".
A/F ALPHA-B1			• When the engine is stopped, a certain
A/F ALPHA-B2	%	The mean value of the air-fuel ratio feedback cor- rection factor per cycle is indicated.	<ul> <li>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>
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	<ul> <li>When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The en- gine coolant temperature determined by the ECM is displayed.</li> </ul>
A/F SEN1 (B1)	V	• The A/F signal computed from the input signal of	
A/F SEN1 (B2)	v	the air fuel ratio (A/F) sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2	
HO2S2 (B2)	- V	is displayed.	
HO2S2 MNTR(B1)		Display of heated oxygen sensor 2 signal:	
HO2S2 MNTR(B2)	RICH/LEAN	RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	<ul> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1		• The accelerator pedal position sensor signal volt-	ACCEL SEN 2 signal is converted by
ACCEL SEN 2	V	age is displayed.	ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 1-B1		The throttle position sensor signal voltage is dis-	• TP SEN 2-B1 signal is converted by
TP SEN 2-B1	V	played.	ECM internally. Thus, it differs from ECM terminal voltage signal.
FUEL T/TMP SE	°C or °F	• The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
INT/A TEMP SE	°C or °F	• The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
EVAP SYS PRES	V	• The signal voltage of EVAP control system pres- sure sensor is displayed.	
FUEL LEVEL SE	V	• The signal voltage of the fuel level sensor is displayed.	
START SIGNAL	ON/OFF	<ul> <li>Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.</li> </ul>	<ul> <li>After starting the engine, [OFF] is dis- played regardless of the starter sig- nal.</li> </ul>

### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
CLSD THL POS	ON/OFF	<ul> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air condition- er switch as determined by the air conditioner sig- nal.	
P/N POSI SW	ON/OFF	Indicates [ON/OFF] condition from the park/neu- tral position (PNP) signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor) is indicated.	
LOAD SIGNAL	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from the electrical load signal.</li> <li>ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position.</li> <li>OFF: Both rear window defogger switch and light- ing switch are OFF.</li> </ul>	
IGNITION SW	ON/OFF	Indicates [ON/OFF] condition from ignition switch signal.	
HEATER FAN SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	
BRAKE SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1	msec	• Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	• When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	Indicates the ignition timing computed by ECM according to the input signals.	• When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%	"Calculated load value" indicates the value of the current air flow divided by peak air flow.	
MASS AIRFLOW	g/s	• Indicates the mass air flow computed by ECM ac- cording to the signal voltage of the mass air flow sensor.	
PURG VOL C/V	%	<ul> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM (B1)	°CA	Indicates [°CA] of intake camshaft advance an-	
INT/V TIM (B2)			
INT/V SOL-B1	%	<ul> <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>	
VIAS S/V-1	ON/OFF	<ul> <li>The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the in- put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 1 is operating.</li> <li>OFF: VIAS control solenoid valve 1 is not operat- ing.</li> </ul>	
VIAS S/V-2	ON/OFF	<ul> <li>The control condition of the VIAS control solenoid valve 2 (determined by ECM according to the in- put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 2 is operating.</li> <li>OFF: VIAS control solenoid valve 2 is not operat- ing.</li> </ul>	

### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (deter- mined by ECM according to the input signals) is indicated.	
ENGINE MOUNT	IDLE/TRVL	<ul> <li>The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated.</li> <li>IDLE: Engine speed is below 950 rpm TRVL: Engine speed is above 950 rpm</li> </ul>	
FUEL PUMP RLY	ON/OFF	<ul> <li>Indicates the fuel pump relay control condition determined by ECM according to the input sig- nals.</li> </ul>	
VENT CONT/V	ON/OFF	<ul> <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> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN	HI/MID/LOW/ OFF	<ul> <li>The control condition of the cooling fan (determined by ECM according to the input signals) is indicated.</li> <li>HI: High speed operation</li> <li>MID: Middle speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>	
HO2S2 HTR (B1)		Indicates [ON/OFF] condition of heated oxygen	
HO2S2 HTR (B2)	ON/OFF	sensor 2 heater determined by ECM according to the input signals.	
I/P PULLY SPD	rpm	• Indicates the engine speed computed from the in- put speed sensor signal.	
VEHICLE SPEED	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
IDL A/V LEARN	YET/CMPLT	<ul> <li>Displays the condition of idle air volume learning YET: Idle Air Volume Learning has not been per- formed yet.</li> <li>CMPLT: Idle Air Volume Learning has already been performed successfully.</li> </ul>	
ENG OIL TEMP	°C or °F	• The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed.	
TRVL AFTER MIL	km or mile	Distance traveled while MIL is activated.	
A/F S1 HTR(B1)		Air fuel ratio (A/F) sensor 1 heater control value     computed by ECM according to the input signals	
A/F S1 HTR(B2)	%	<ul><li>computed by ECM according to the input signals.</li><li>The current flow to the heater becomes larger as the value increases.</li></ul>	
AC PRESS SEN	V	• The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
SET VHCL SPD	km/h or mph	The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>	
CANCEL SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	

### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
RESUME/ACC SW	ON/OFF	Indicates [ON/OFF] condition from RESUME/AC- CELERATE switch signal.	
SET SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from SET/COAST switch signal.</li> </ul>	
BRAKE SW1	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from ASCD brake switch signal or ASCD clutch switch.</li> </ul>	
BRAKE SW2	ON/OFF	Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	<ul> <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> <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> <li>Indicates [ON/OFF] condition of CVT O/D ac- cording to the input signal from the TCM.</li> </ul>	
AT OD CANCEL	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of CVT O/D cancel request signal.</li> </ul>	
CRUISE LAMP	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	
SET LAMP	ON/OFF	Indicates [ON/OFF] condition of SET lamp deter- mined by the ECM according to the input signals.	
BAT CUR SEN	mV	The signal voltage of battery current sensor is displayed.	
ALT DUTY SIG	ON/OFF	<ul> <li>The control condition of the power generation voltage variable control (determined by ECM ac- cording 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>	
A/F ADJ-B1		• Indicates the correction of a factor stored in ECM.	
A/F ADJ-B2	_	The factor is calculated from the difference be- tween the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 sig- nal.	
ALT DUTY	%	<ul> <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>	
HO2 S2 DIAG1 (B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (delayed response) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
HO2 S2 DIAG1 (B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0159 self-diagnosis (delayed re- sponse) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
HO2 S2 DIAG2 (B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (slow re- sponse) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	

### < SYSTEM DESCRIPTION >

## [VQ35DE]

Monitored item	Unit	Description	Remarks
HO2 S2 DIAG2 (B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0159 self-diagnosis (slow re- sponse) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG1(B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P015A or P015B self-diagnosis condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG1(B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P015C or P015D self-diagnosis condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG2(B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P014C or P014D self-diagnosis condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG2(B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P014E or P014F self-diagnosis condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
A/F SEN1 DIAG3(B1)	ABSNT/ PRSNT	<ul> <li>Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition.</li> <li>ABSNT: The vehicle condition is not within the di- agnosis range.</li> <li>PRSNT: The vehicle condition is within the diag- nosis range.</li> </ul>	
A/F SEN1 DIAG3(B2)	ABSNT/ PRSNT	<ul> <li>Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition.</li> <li>ABSNT: The vehicle condition is not within the di- agnosis range.</li> <li>PRSNT: The vehicle condition is within the diag- nosis range.</li> </ul>	
THRTL STK CNT B1*	_		
EVAP LEAK DIAG	YET/CMPLT	<ul> <li>Indicates the condition of EVAP leak diagnosis.</li> <li>YET: EVAP leak diagnosis has not been performed yet.</li> <li>CMPLT: EVAP leak diagnosis has been performed successfully.</li> </ul>	
EVAP DIAG READY	ON/OFF	<ul> <li>Indicates the ready condition of EVAP leak diagnosis.</li> <li>ON: Diagnosis has been ready condition.</li> <li>OFF: Diagnosis has not been ready condition.</li> </ul>	
A/F-S ATMSPHRC CRCT B1	_	Displays a determined value of atmospheric correc- tion factor necessary for correcting an A/F sensor signal input to ECM. The signal used for the correc- tion is an A/F sensor signal transmitted while driving under atmospheric pressure.	
A/F-S ATMSPHRC CRCT B2	_	Displays a determined value of atmospheric correc- tion factor necessary for correcting an A/F sensor signal input to ECM. The signal used for the correc- tion is an A/F sensor signal transmitted while driving under atmospheric pressure.	
A/F-S ATMSPHRC CRCT UP B1	count	Displays the number of updates of the A/F sensor atmospheric correction factor.	
A/F-S ATMSPHRC CRCT UP B2	count	Displays the number of updates of the A/F sensor atmospheric correction factor.	

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

### < SYSTEM DESCRIPTION >

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

#### Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	FUEL PUMP WILL STOP BY TOUCHING "START" DUR- ING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEF- FICIENT.	When clearing mixture ratio self- learning value
EXH V/T CONTROL LEARN	IN THIS MODE, OPERATION TO LEARN EXHAUST VALVE TIMING CONTROL MAGNET RETARDER CHAR- ACTERISTIC.	When learning the exhaust valve timing control
EVAP SYSTEM CLOSE	CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS. • IGN SW ON • ENGINE NOT RUNNING • AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). • NO VACUUM AND NO HIGH PRESSURE IN EVAP SYS- TEM • FUEL TANK TEMP. IS MORE THAN 0°C (32°F). • WITHIN 10 MINUTES AFTER STARTING "EVAP SYS- TEM CLOSE" • WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. NOTE: WHEN STARTING ENGINE, CONSULT MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN WHEN IN USING A CHARGED BATTERY.	When detecting EVAP vapor leak- age in the EVAP system
VIN REGISTRATION	• IN THIS MODE, VIN IS REGISTERED IN ECM.	When registering VIN in ECM
TARGET IDLE RPM ADJ*	IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	IDLE CONDITION	When adjusting target ignition tim- ing
CLSD THL POS LEARN	IGNITION ON AND ENGINE STOPPED.	When learning the throttle valve closed position
SAVING DATA FOR REPLC CPU	In this mode, save data that is in ECM.	When ECM is replaced.
WRITING DATA FOR REPLC CPU	In this mode, write data stored by "SAVE DATA FOR CPU REPLC" in work support mode to ECM.	When ECM is replaced.

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

#### ACTIVE TEST MODE

Test Item

### < SYSTEM DESCRIPTION >

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

#### < SYSTEM DESCRIPTION >

### [VQ35DE]

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

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

#### DTC WORK SUPPORT MODE

Test Item

Test mode	Test item	Corresponding DTC No.	Reference page
	EVP V/S LEAK P0456/P1456*	P0456	<u>EC-324</u>
EVAPORATIVE SYSTEM	PURG VOL CN/V P1444	P0443	<u>EC-293</u>
	PURG FLOW P0441	P0441	<u>EC-288</u>
	A/F SEN1(B1) P1278/P1279	—	—
A/F SEN1	A/F SEN1(B1) P1276	P0130	<u>EC-199</u>
A/F SEINT	A/F SEN1(B2) P1288/P1289	—	—
	A/F SEN1(B2) P1286	P0150	<u>EC-199</u>
	HO2S2(B1) P1146	P0138	<u>EC-218</u>
	HO2S2(B1) P1147	P0137	<u>EC-211</u>
HO2S2	HO2S2(B1) P0139	P0139	<u>EC-227</u>
HU252	HO2S2(B2) P1166	P0158	<u>EC-218</u>
	HO2S2(B2) P1167	P0157	<u>EC-211</u>
	HO2S2(B2) P0159	P0159	<u>EC-227</u>

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

#### SRT & P-DTC MODE

SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT 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

- 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" in "DTC & SRT CONFIRMATION" mode with CONSULT. **NOTE:**

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

#### < SYSTEM DESCRIPTION >

#### [VQ35DE]

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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".

CAUTION: Turn ignition switch from C status screen.	ON to OFF twice to update the information	tion on the	
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D	
xxxx	INCMP	INCMP	
xxxx	CMPLT	INCMP	
хххх	INCMP	CMPLT	
хххх	CMPLT	INCMP	
хххх	INCMP	INCMP	
xxxx	INCMP	INCMP	

#### 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.

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#### < DTC/CIRCUIT DIAGNOSIS >

# DTC/CIRCUIT DIAGNOSIS TROUBLE DIAGNOSIS - SPECIFICATION VALUE

# Description

INFOID:000000009719876

INFOID:000000009719877

[VQ35DE]

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

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not illuminate the MIL.

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

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

# Component Function Check

**1.**START

Check that all of the following conditions are satisfied.

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

>> GO TO 2.

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

### With CONSULT

#### NOTE:

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

- 1. Perform "EC-13, "BASIC INSPECTION : Special Repair Requirement".
- 2. Select "B/FUEL SCHDL", "A/F ALPHA-B1", "A/F ALPHA-B2" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT.
- 3. Check that monitor items are within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Go to EC-141, "Diagnosis Procedure".

# < DTC/CIRCUIT DIAGNOSIS >

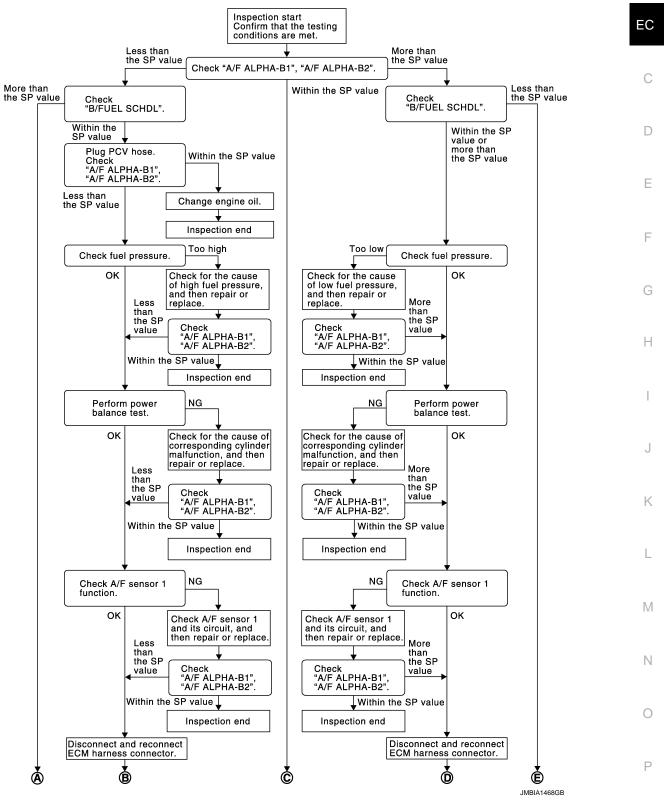
### **Diagnosis** Procedure



INFOID:000000009719878

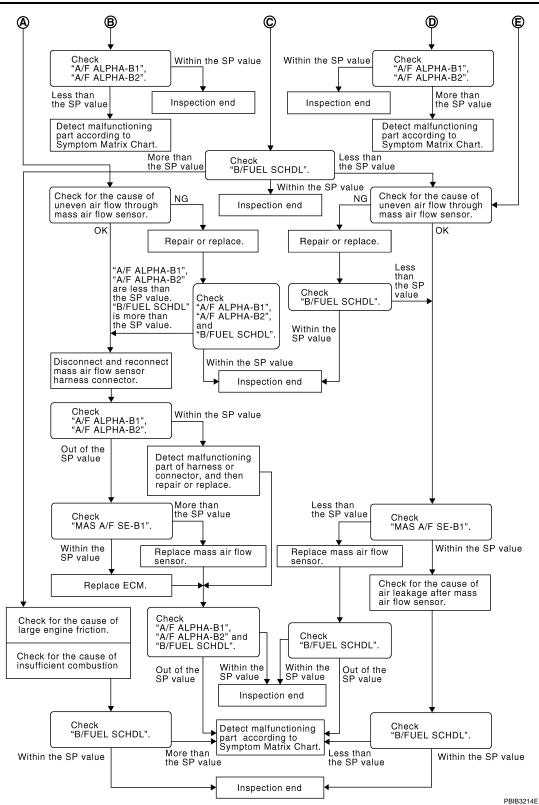
А

### **OVERALL SEQUENCE**



#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



### DETAILED PROCEDURE

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

#### () With CONSULT

- 1. Start engine.
- 2. Confirm that the testing conditions are met. Refer to EC-140, "Component Function Check".
- 3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

# EC-142

< DTC/CIRCUIT DIAGNOSIS > [VG	235DE]
<b>NOTE:</b> Check "A/F ALPHA-B1", "A/F ALPHA-B2" for approximately 1 minute because they may fluctuate. if the indication is out of the SP value even a little.	It is NG A
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.	EC
2.CHECK "B/FUEL SCHDL"	С
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within value.	the SP
Is the measurement value within the SP value?	D
YES >> GO TO 4. NO >> More than the SP value: GO TO 19.	-
3.CHECK "B/FUEL SCHDL"	E
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within value.	n the SP
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.	G
<b>4.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	
<ol> <li>Stop the engine.</li> <li>Disconnect PCV hose, and then plug it.</li> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check the</li> </ol>	Hat each
indication is within the SP value.	
<u>Is the measurement value within the SP value?</u> YES >> GO TO 5.	
NO >> GO TO 6.	J
5. CHANGE ENGINE OIL	
<ol> <li>Stop the engine.</li> <li>Change engine oil.</li> <li>NOTE:</li> </ol>	k
This symptom may occur when a large amount of gasoline is mixed with engine oil because of conditions (such as when engine oil temperature does not rise enough since a journey distanc short during winter). The symptom will not be detected after changing engine oil or changing drividitions.	e is too ing con-
	N
>> INSPECTION END	
6. CHECK FUEL PRESSURE	Ν
Check fuel pressure. (Refer to EC-532. "Inspection".)	
Is the inspection result normal?	
YES >> GO TO 9.	C
<ul> <li>NO-1 &gt;&gt; Fuel pressure is too high: Replace "fuel filter and fuel pump assembly", refer to <u>FL-5. "E</u> <u>View"</u>, and then GO TO 8.</li> <li>NO-2 &gt;&gt; Fuel pressure is too low: GO TO 7.</li> </ul>	<u>xploded</u> F
7. DETECT MALFUNCTIONING PART	
Check fuel hoses and fuel tubes for clogging. <u>Is the inspection result normal?</u>	
YES >> Replace "fuel filter and fuel pump assembly", refer to <u>FL-5, "Exploded View"</u> , and then GC	) TO 8.

NO >> Repair or replace malfunctioning part and then GO TO 8. [VQ35DF]

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> GO TO 9.

9.Perform power balance test

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

2. Check 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 below.

- Ignition coil and its circuit (Refer to EC-453, "Component Function Check".)
- Fuel injector and its circuit (Refer to EC-446, "Component Function Check".)
- Intake air leakage
- Low compression pressure (Refer to <u>EM-27, "Inspection"</u>.)

Is the inspection result normal?

- YES >> Replace fuel injector, refer to <u>EM-49, "Exploded View"</u>, and then GO TO 11.
- NO >> Repair or replace malfunctioning part and then GO TO 11.
- **11.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"
- 1. Start engine.
- 2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> GO TO 12.
- 12.CHECK A/F SENSOR 1 FUNCTION

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

- For DTC P0130, P0150, refer to EC-199, "DTC Logic".
- For DTC P0131, P0151, refer to <u>EC-203, "DTC Logic"</u>.
- For DTC P0132, P0152, refer to EC-207, "DTC Logic".
- For DTC P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D, refer to EC-234, "DTC Logic".
- For DTC P2096, P2097, P2098, P2099, refer to <u>EC-403, "DTC Logic"</u>.

Are any DTCs detected?

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

**13.**CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

#### >> GO TO 14.

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

1. Start engine.

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> GO TO 15.

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

<pre>     TROUBLE DIAGNOSIS - SPECIFICATION VALUE     &lt; DTC/CIRCUIT DIAGNOSIS &gt;     [VQ35D] </pre>	E1
15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR	
<ol> <li>Stop the engine.</li> <li>Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect</li> </ol>	
>> GO TO 16. <b>16.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	EC
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that ea indication is within the SP value.</li> </ol>	— С Ich
Is the measurement value within the SP value? YES >> INSPECTION END NO >> Detect malfunctioning part according to <u>EC-519, "Symptom Table"</u> .	D
17. CHECK "B/FUEL SCHDL"	E
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the S value.	SP F
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.	G
18. DETECT MALFUNCTIONING PART	
<ol> <li>Check for the cause of large engine friction. Refer to the following.</li> <li>Engine oil level is too high</li> <li>Engine oil viscosity</li> <li>Belt tension of power steering, alternator, A/C compressor, etc. is excessive</li> <li>Noise from engine</li> <li>Noise from transmission, etc.</li> <li>Check for the cause of insufficient combustion. Refer to the following.</li> <li>Valve clearance malfunction</li> <li>Intake valve timing control function malfunction</li> <li>Camshaft sprocket installation malfunction, etc.</li> </ol>	H I J
>> 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.	L
<ul> <li>Crushed air ducts</li> <li>Malfunctioning seal of air cleaner element</li> <li>Uneven dirt of air cleaner element</li> <li>Improper specification of intake air system</li> </ul>	M
<u>Is the inspection result normal?</u> YES >> GO TO 21.	Ν
NO >> Repair or replace malfunctioning part, and then GO TO 20.	
20.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"	0
Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, a check that each indication is within the SP value. Is the measurement value within the SP value?	ina P
YES >> INSPECTION END NO >> "B/FUEL SCHDL" is more, "A/F ALPHA-B1", "A/F ALPHA-B2" are less than the SP value: GO 1 21.	I
21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR	

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

#### < DTC/CIRCUIT DIAGNOSIS >

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

>> GO TO 22.

22.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

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

Is the measurement value within the SP value?

- YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to <u>EC-173. "Diagno-</u> <u>sis Procedure"</u>. 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 check 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, refer to <u>EM-31, "Exploded View"</u>, and then GO TO 29.

# 24.REPLACE ECM

- 1. Replace ECM.
- Refer to <u>EC-16</u>, "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 in air cleaner element
- Uneven dirt in air cleaner element
- Improper specification in 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 check 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 check 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, refer to <u>EM-31, "Exploded View"</u>, and then GO TO 30.

**28.**CHECK INTAKE SYSTEM

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

Disconnection, looseness, and cracks in air duct

Looseness of oil filler cap

# **TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]
<ul> <li>Disconnection of oil level gauge</li> <li>Open stuck, breakage, hose disconnection, or cracks in PCV valve</li> <li>Disconnection or cracks in EVAP purge hose, stuck open EVAP canister purge volume control solenoid valve</li> </ul>
<ul> <li>Malfunctioning seal in rocker cover gasket</li> <li>Disconnection, looseness, or cracks in hoses, such as a vacuum hose, connecting to intake air system parts</li> <li>Malfunctioning seal in intake air system, etc.</li> </ul>
>> GO TO 30.
29. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"
Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.
Is the measurement value within the SP value?
YES >> INSPECTION END NO >> Detect malfunctioning part according to <u>EC-519, "Symptom Table"</u> .
<b>30.</b> CHECK "B/FUEL SCHDL"
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then check that the indication is within the SP value.
Is the measurement value within the SP value?
YES >> INSPECTION END
NO >> Detect malfunctioning part according to <u>EC-519. "Symptom Table"</u> .
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# POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

# POWER SUPPLY AND GROUND CIRCUIT

**Diagnosis Procedure** 

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "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 connector.

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

EC	ECM		Continuity
Connector	Terminal	Ground	Continuity
F7	12		
Γ/	16	Ground	Existed
	107		
E16	108	Ground	Existed
E 10	111		
-	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 F121, E7
- 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 connector.
- 2. Turn ignition switch OFF and then ON.

3. Check the voltage between ECM harness connector terminals.

ECM			
Connector	+	-	Voltage
Connector	Terminal	Terminal	
E16	93	112	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

- NO >> GO TO 5.
- **5.**DETECT MALFUNCTIONING PART

#### Check the following.

- IPDM E/R connector E10
- 10 A fuse (No. 44)
- Harness for open or short between ECM and IPDM E/R

# POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Check the v	/oltage bet	ween ECN	I harness conr	nector terminal	S.	EC
	ECM					
Connector -	+ Terminal	– Terminal	Condition		Voltage	С
E16	105	112	Ignition switch $ON \rightarrow OFF$		nition switch OFF, battery st for a few seconds, then mately 0 V.	D
NO >>	GO TO 7. GO TO 9.		PLY CIRCUIT-I	II		E
	nition switc the voltage		IPDM E/R han	ness connector	r and ground.	F
	IPDM E/R				_	G
Connecto	or T	erminal	Ground	Voltage		
F12		49 53	Ground	Battery voltage		Н
B.CHECK Refer to <u>GI</u>	INTERMIT -44, "Intern INSPECT	TENT INC		<u>37, "Exploded</u>		J
			d wait at least ECM harness	10 seconds. connector term	ninals.	L
		ECN	1			Μ
	+			-	Voltage	
Connecto F7		erminal	Connector E16	Terminal 112	Battery voltage	Ν
s the inspe YES >> NO >> 10.CHEC	GO TO 12 GO TO 10 K ECM PO	<u>t normal?</u> 2. ). )WER SUI		<u> </u>		0 P
2. Discon		E/R harne	ess connector.	ss connector a	nd IPDM E/R harness connector.	F

24

F12

F7

Existed

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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

Is the inspection result normal?

YES >> GO TO 11.

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

- 11.CHECK 15 A FUSE
- 1. Disconnect 15 A fuse (No. 50) from IPDM E/R.
- 2. Check 15 A fuse.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace 15 A fuse.

12.CHECK ECM POWER SUPPLY CIRCUIT-VI

- 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	Continuity
E16	105	E10	10	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, short to ground or short to power in harness or connectors.

# **13.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-37, "Exploded View".

NO >> Repair or replace harness or connectors.

# **U0101 CAN COMM CIRCUIT**

# Description

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

# DTC Logic

INFOID:000000009719881 D

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101	Lost communication with TCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.	<ul> <li>CAN communication line between TCM and ECM</li> <li>CAN communication line open or shorted</li> </ul>
DTC CON	IFIRMATION PROCI	EDURE	
1.PERFO	RM DTC CONFIRMAT	TION PROCEDURE	
2. Check	DTC.	wait at least 3 seconds.	
	<u>EC-151, "Diagnosis  </u> INSPECTION END	Procedure".	
Diagnosi	is Procedure		INFOID:000000009719882
Go to LAN	-18, "Trouble Diagnosi	s Flow Chart".	

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[VQ35DE]

# **U0164 CAN COMM CIRCUIT**

### Description

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

## DTC Logic

INFOID:000000009719884

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0164	Lost communication with Unified meter and A/C amp.	When ECM is not transmitting or receiving CAN com- munication signal of OBD (emission related diagno- sis) with Unified meter and A/C amp. for 2 seconds or more.	<ul> <li>CAN communication line between Unified meter and A/C amp. and ECM</li> <li>CAN communication line 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-152, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009719885

Go to LAN-18, "Trouble Diagnosis Flow Chart".

# **U1001 CAN COMM CIRCUIT**

# Description

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

# DTC Logic

INFOID:000000009719887

#### 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 com- munication signal other than OBD (emission related diagnosis) for 2 seconds or more.	Harness or connectors     (CAN communication line is open or     shorted)
DTC CON	FIRMATION PRO	CEDURE	
1.PERFO	RM DTC CONFIRM	ATION PROCEDURE	
2. Check	DTC.	d wait at least 3 seconds.	
	<ul> <li><u>EC-153, "Diagnosis</u></li> <li>INSPECTION END</li> </ul>		
Diagnosi	s Procedure		INFOID:000000097198
Go to LAN-	-18, "Trouble Diagno	<u>sis Flow Chart"</u> .	

INFOID:000000009719886

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#### < DTC/CIRCUIT DIAGNOSIS >

# P0011, P0021 IVT CONTROL

#### DTC Logic

#### NOTE:

If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform the trouble diagnosis for DTC P0075, P0081. Refer to <u>EC-164, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0011	Intake valve timing control performance (bank 1)		<ul> <li>Crankshaft position sensor (POS)</li> <li>Camshaft position sensor (PHASE)</li> <li>Intake valve timing control solenoid valve</li> </ul>
P0021	Intake valve timing control performance (bank 2)	There is a gap between angle of target and phase-control angle degree.	<ul> <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 in- take valve timing control</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

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

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

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

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT

- Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 7.3 msec
Selector lever	D position

#### CAUTION:

#### Always drive at a safe speed.

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

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Go to EC-155, "Diagnosis Procedure"

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT

#### < DTC/CIRCUIT DIAGNOSIS >

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

	5	
ENG SPEED	1,400 - 3,175 rpm (A constant rotation is maintained.)	
COOLAN TEMP/S	More than 70°C (158°F)	E
Selector lever	1st or 2nd position	
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions re- quired for this test.)	
CAUTION: Always drive at a 2. Check 1st trip DT		
With GST Follow the procedure Is 1st trip DTC detected	"With CONSULT" above.	
•	-155, "Diagnosis Procedure"	
Diagnosis Proced	dure	INFOID:000000009719890
1.CHECK OIL PRES	SURE WARNING LAMP	
<ol> <li>Start engine.</li> <li>Check oil pressunated.</li> </ol>	re warning lamp and confirm it is not illumi-	
Is oil pressure warmin	ng lamp illuminated?	
YES >> Go to <u>LU</u> NO >> GO TO 2	-8, "Inspection"	9 <u>-</u>
		РВІА8559Ј
2.CHECK INTAKE V	ALVE TIMING CONTROL SOLENOID VALVE	1 54 10000
Refer to <u>EC-156, "Co</u>	mponent Inspection".	
Is the inspection resul	It normal?	
YES >> GO TO 3 NO >> Replace View".	malfunctioning intake valve timing control solenoid valve	. Refer to EM-57, "Exploded
3. CHECK CRANKSH	HAFT POSITION SENSOR (POS)	
Refer to <u>EC-278, "Co</u>	mponent Inspection".	
s the inspection resul	It normal?	
YES >> GO TO 4		a d Marcall
	crankshaft position sensor (POS). Refer to <u>EM-43, "Explod</u>	<u>ed View"</u> .
	FT POSITION SENSOR (PHASE)	
Refer to <u>EC-281, "Co</u>		
Is the inspection resul		
YES >> GO TO 5 NO >> Replace r	nalfunctioning camshaft position sensor (PHASE). Refer to	EM-54, "Exploded View".
5. CHECK CAMSHAI		
	· · · · · · · · · · · · · · · · · · ·	

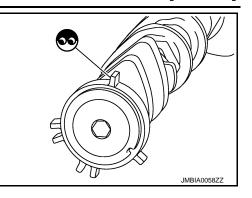
Check the following.

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Is the inspection result normal?

YES >> GO TO 6. NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-98</u>, "Exploded View".



[VQ35DE]

#### 6.CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misalignment.

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

YES >> Check timing chain installation. Refer to EM-94, "Disassembly and Assembly".

NO >> GO TO 7.

**7.**CHECK LUBRICATION CIRCUIT

Refer to EM-102, "Inspection".

Is the inspection result normal?

NO >> Clean lubrication line.

**8.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

INFOID:000000009719891

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

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

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-57</u>, "<u>Exploded</u> <u>View</u>".

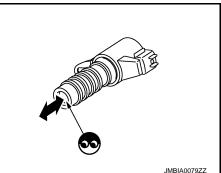
### 2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve. Refer to EM-57. "Exploded View".
- 2. Provide 12 V DC between intake valve timing control solenoid

valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure. CAUTION: Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE: Always replace O-ring when intake valve timing control

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

Is the inspection result normal?



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< DTC/CIRCUIT DIAGNOSIS >

- YES >> INSPECTION END
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-57</u>, "<u>Exploded</u> A <u>View</u>".

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

INFOID:000000009719892

[VQ35DE]

#### 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	
Mass air flow sensor	Amount of intake air	heater control	Tiedlei	

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

# DTC Logic

INFOID:000000009719893

# DTC DETECTION LOGIC

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

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

TESTING CONDITION:

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

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is 1st trip DTC detected?

- YES >> Go to EC-158. "Diagnosis Procedure".
- NG >> INSPECTION END

# Diagnosis Procedure

1.CHECK GROUND CONNECTION

# P0031 P0032 P0051 P0052 A/F SENSOR 1 HEATER

	P003 <sup>-</sup>	1, P0032,	P0051,	<b>P00</b>	52 A/	F SENS	OR 1 HEATER		
< DTC/CIRCU	IT DIAGN	OSIS >						[VQ35DE]	
	on switch O								
-			efer to Gro	ound I	nspection	on in <u>GI-44</u>	., "Intermittent Incident".		A
<u>Is the inspection</u> YES >> G0	on result no O TO 2.	<u>rmal?</u>							
		ace ground	connectio	n.					EC
2.CHECK AIF	• •	-			ER SUF	PLY CIRC	UIT		
		tio (A/F) sen							
2. Turn ignitio	on switch O	N.							С
3. Check the	voltage be	tween A/F so	ensor 1 ha	arness	conne	ctor and gro	ound.		
		/=							D
DTC		/F sensor 1		Ground	Vol	tage			
D0004 D0000			erminal						_
P0031, P0032 P0051, P0052	1	F27 F64	4	Ground	Battery	voltage			Ε
-		-	4						
<u>Is the inspection</u> YES >> G0	DTO 4.	<u>IIIIal (</u>							F
	D TO 3.								
3.DETECT M	ALFUNCTI	ONING PAR	кт						
Check the follo	wina.								G
<ul> <li>IPDM E/R has</li> </ul>	arness conr	ector F12							
<ul> <li>15 A fuse (No</li> <li>Harness for one</li> </ul>		ort botwoon	A/E sonso	r 1 on	d fuco				Н
			-11 361130	i i an	u iuse				
>> Re	epair or repl	ace harness	s or conne	ctors.					
4.CHECK A/F	• •				AL CIRO	CUIT			
1. Turn ignitio	on switch O	FF							
2. Disconnec	t ECM harr	ness connec							J
3. Check har	ness contir	uity betwee	n A/F sen	sor 1 ł	narness	connector	and ECM harness conn	ector.	
		A/F sensor 1			EC	M	T		K
DTC	Ponk		Terminal	Co		Terminal	Continuity		
P0031, P0032	Bank 1	Connector F27	3	0	nnector	4			
P0051, P0052	2	F27	3	_	F7	8	Existed		L
		_	-	chart	to power	-			
4. Also check Is the inspection		or short to gr	ound and	SHOL	to powe	51.			Μ
	D TO 5.	<u>IIIIai:</u>							IVI
		circuit, short	to ground	or sh	ort to po	ower in har	ness or connectors.		
5.CHECK A/F	SENSOR	1 HEATER							Ν
Refer to EC-16	0, "Compo	nent Inspect	tion".						
Is the inspection									$\cap$
YES >> GO	D TO 7.	—							0
•	O TO 6.								
<b>6.</b> REPLACE	AIR FUEL F	ratio (A/F)	SENSOR	1					Ρ
Replace malfu	nctioning ai	r fuel ratio (/	A/F) sense	or 1. R	lefer to	<u>EM-38, "E</u> )	<u>kploded View"</u> .		
CAUTION:	A/E conce	ar which he			d from	a haiakt	of more than 0.5 m (10	$\mathbf{x}$	

- 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).

[VQ35DE]

INFOID:000000009719895

#### >> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform GI-44, "Intermittent Incident".

>> INSPECTION END

#### Component Inspection

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

Check resistance between A/F sensor terminals as per the following.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	$\Omega \propto$
4 and 1, 2	(Continuity should not exist)

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

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

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-38, "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 Heated Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

# P0037, P0038, P0057, P0058 HO2S2 HEATER

ECM function

Heated oxygen sensor 2

#### < DTC/CIRCUIT DIAGNOSIS >

Sensor

Camshaft position sensor (PHASE)

Crankshaft position sensor (POS)

SYSTEM DESCRIPTION

# P0037, P0038, P0057, P0058 HO2S2 HEATER

### Description

		heater control	Heated oxygen sensor 2 heater			
Mass air flow sensor	Amount of intake air					
The ECM performs ON/OEE control of the heated oxygen sensor 2 heater corresponding to the engine speed						

Input signal to ECM

Engine speed

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

# **DTC Logic**

#### DTC DETECTION LOGIC

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

Revision: 2013 August

# [VQ35DE]

Actuator

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# P0037, P0038, P0057, P0058 HO2S2 HEATER

#### < DTC/CIRCUIT DIAGNOSIS >

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and warm it up to the normal operating temperature.
- 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.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check 1st trip DTC.

#### Is 1st tip DTC detected?

- YES >> Go to EC-162, "Diagnosis Procedure".
- >> INSPECTION END NO

#### Diagnosis Procedure

INFOID:000000009719898

#### 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

Disconnect heated oxygen sensor 2 (HO2S2) harness connector. 1.

2. Turn ignition switch ON.

3. Check the voltage between HO2S2 harness connector and ground.

DTC		HO2S2	Ground	Voltage	
DIC	Bank Connector 1	Terminal	Ground	voltage	
P0037, P0038	1	F95	2	Ground	Battery voltage
P0057, P0058	2	F96	2	Giouna	Dattery Voltage

Is the inspection result normal?

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

3. DETECT MALFUNCTIONING PART

Check the following.

IPDM E/R connector F8

15 A fuse (No. 46)

· Harness for open or short between heated oxygen sensor 2 and fuse

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

#### 4.CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

Disconnect ECM harness connector. 2.

Check the continuity between HO2S2 harness connector and ECM harness connector. 3.

DTC		HO2S2		EC	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0037, P0038	1	F95	3	F7	13	Existed
P0057, P0058	2	F96	3	F7	17	EXISIED

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

Is the inspection result normal?

YES >> GO TO 5.

# P0037, P0038, P0057, P0058 HO2S2 HEATER

[VQ35DE] < DTC/CIRCUIT DIAGNOSIS > NO >> Repair open circuit, short to ground or short to power in harness or connectors. А  ${f b}.$ CHECK HEATED OXYGEN SENSOR 2 HEATER Refer to EC-163, "Component Inspection". Is the inspection result normal? EC YES >> GO TO 7. NO >> GO TO 6. **6.**REPLACE HEATED OXYGEN SENSOR 2 Replace malfunctioning heated oxygen sensor 2. Refer to EM-38, "Exploded View". **CAUTION:**  Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant E (commercial service tool). >> INSPECTION END F 7. CHECK INTERMITTENT INCIDENT Refer to GI-44, "Intermittent Incident". >> INSPECTION END Component Inspection Н INFOID:000000009719899 **1.**CHECK HEATED OXYGEN SENSOR 2 HEATER Check resistance between HO2S2 terminals as per the following. Terminal No. Resistance 2 and 3 3.4 - 4.4 Ω [at 25°C (77°F)] 1 and 2, 3, 4  $\infty \Omega$ (Continuity should not exist) 4 and 1, 2, 3 Κ Is the inspection result normal? YES >> INSPECTION END NO >> GO TO 2. 2.REPLACE HEATED OXYGEN SENSOR 2 Replace malfunctioning heated oxygen sensor 2. Refer to EM-38, "Exploded View". Μ **CAUTION:**  Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Ν Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool). >> INSPECTION END Ρ

# P0075, P0081 IVT CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

# P0075, P0081 IVT CONTROL SOLENOID VALVE

#### Description

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

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

The longer pulse width advances valve timing.

The shorter pulse width retards valve timing.

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

# DTC Logic

#### DTC DETECTION LOGIC

INFOID:000000009719901

PBIB1842E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0075	Intake valve timing control so- lenoid valve (bank 1) circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid	Harness or connectors     (Intake valve timing control solenoid valve
P0081	Intake valve timing control so- lenoid valve (bank 2) circuit	valve.	circuit is open or shorted.) <ul> <li>Intake valve timing control solenoid valve</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is 1st trip DTC detected?

- YES >> Go to EC-164, "Diagnosis Procedure".
- NO >> INSPECTION END

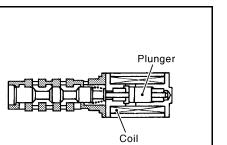
#### **Diagnosis** Procedure

INFOID:000000009719902

### 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 with CONSULT or tester.

DTC	IVT co	ontrol solenoi	d valve	Ground	Voltage
DIC	Bank	Connector	Terminal	Ground	
P0075	1	F81	2	Ground	Battery voltage
P0081	2	F82	2	Giounu	Dattery Voltage



# P0075, P0081 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

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Is the inspection	result normal?

YES >> GO TO 2.

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

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR O	PEN
AND SHORT	EC

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

DTC	IVT control solenoid valve			EC	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0075	1	F81	1	F8	78	Existed	
P0081	2	F82	1	10	75	LXISIEU	

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

#### Is the inspection result normal?

YES >> GO TO 3.

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

 ${
m 3.check}$  intake valve timing control solenoid valve

Refer to EC-165, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-57</u>, "<u>Exploded</u> <u>View</u>".

**4.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

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

1. Disconnect intake valve timing control solenoid valve harness connector.

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

Terminals	Resistance		M
1 and 2	7.0 - 7.5 Ω [at 20°C (68°F)]		
1 or 2 and ground	${}^{\infty\Omega}_{}$ (Continuity should not exist)		Ν
Is the inspection re	esult normal?		
YES >> GO TO NO >> Repla <u>View</u> ".	ce malfunctioning intake valve	e timing control solenoid valve. Refer to EM-57, "Exploded	0
2.CHECK INTAK	E VALVE TIMING CONTROL	SOLENOID VALVE-II	Р
1. Remove intak	e valve timing control solenoid	valve. Refer to EM-57, "Exploded View".	

# P0075, P0081 IVT CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

 Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure.
 CAUTION: Never apply 12 V DC continuously for 5 seconds or more.

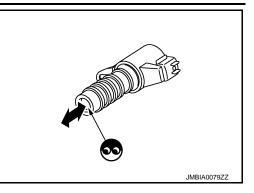
Doing so may result in damage to the coil in intake valve timing control solenoid valve.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-57</u>, "<u>Exploded</u> <u>View</u>".

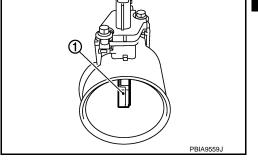


# P0101 MAF SENSOR

#### Description

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

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



#### DTC Logic

# 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 cir- cuit range/performance]	<ul> <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> <li>Harness or connectors (The sensor circuit is open or short- ed.)</li> <li>Intake air leaks</li> <li>MAF sensor</li> <li>EVAP control system pressure sensor</li> <li>Intake air temperature sensor</li> </ul>	H

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following proce-

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 warm it up to normal operating temperature.
- 2. 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.

# 3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to EC-168. "Diagnosis Procedure".
- NO >> INSPECTION END

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#### Diagnosis Procedure

INFOID:000000009719906

#### **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-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

### ${f 3.}$ 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	Ground		
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 E7, F121
- 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	E	Continuity	
Connector	Terminal Connector Terminal		Connector Terminal	
F4	4	F8	56	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

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

 ${f 6}.$ 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 >

MAF se	ensor	EC	CM			A
Connector	Terminal	Connector	Terminal	Continuity		
F4	3	F8	58	Existed		EC
2. Also check	harness for	short to groun	d and short t	o power.		
Is the inspectio	n result norr	nal?				
	) TO 7.					С
—	• •		0	nort to power in ha	rness or connectors.	
7.CHECK INT						- r
	•		er to <u>EC-180,</u>	"Component Insp	<u>ection"</u> .	L
Is the inspectio		nal?				
	) TO 8. place MAE s	ensor (with int	ake air temn	erature sensor).		E
8.CHECK EVA	•	•				
				EC-312, "Compor	ont Inspection"	F
Is the inspectio	•	•				I
	) TO 9.					
		control system	n pressure se	ensor.		G
9.CHECK MA	F SENSOR					
Check MAF ser	nsor. Refer t	o <u>EC-169, "Co</u>	mponent Ins	pection".		H
Is the inspectio	n result norr	nal?				
	) TO 10.					
	-	ensor. Refer to		ploded View".		
Check intermitt	ent incident.	Refer to GI-44	4. "Intermitter	<u>nt Incident"</u> .		J
>> ING	SPECTION I					
Component	Inspectio	n			INFOID:000000009719907	K
1.CHECK MA	SS AIR FLO	W SENSOR-I				
	JLT					L
1. Reconnect	all harness	connectors dis				
<ol> <li>Start engine</li> <li>Connect C</li> </ol>	e and warm	it up to normal d select "DATA	I operating te	mperature.		N
				er the following co	nditions.	I V
Monitor item			Condition		MAS A/F SE-B1 (V)	Ν
	Ignition swit	ch ON (Engine sto	opped.)		Approx. 0.4	

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

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

#### Without CONSULT

1. Reconnect all harness connectors disconnected.

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

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# P0101 MAF SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

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

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

#### Is the inspection result normal?

YES >> INSPECTION END

# $2. \mbox{check}$ for the cause of uneven air flow through mass air flow sensor

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

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK MASS AIR FLOW SENSOR-II

#### With CONSULT

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

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

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

#### **Without CONSULT**

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

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

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

Is the inspection result normal?

#### EC-170

[VQ35DE] < DTC/CIRCUIT DIAGNOSIS > YES >> INSPECTION END NO >> GO TO 4. 4. CHECK MASS AIR FLOW SENSOR-III (P)With CONSULT 1. Turn ignition switch OFF. Disconnect mass air flow sensor harness connector and reconnect it again. 2. 3. Start engine and warm it up to normal operating temperature. 4. Connect CONSULT and select "DATA MONITOR" mode. 5. Select "MAS A/F SE-B1" and check indication under the following conditions. Monitor item Condition MAS A/F SE-B1 (V) Ignition switch ON (Engine stopped.) Approx. 0.4 Idle (Engine is warmed-up to normal operating temperature.) 0.9 - 1.2 MAS A/F SE-B1 2,500 rpm (Engine is warmed-up to normal operating temperature.) 1.6 - 1.9 Idle to approximately 4,000 rpm 0.9 - 1.2 to Approx. 2.4\* \*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm. Without CONSULT 1. Turn ignition switch OFF. 2. Disconnect mass air flow sensor harness connector and reconnect it again. Start engine and warm it up to normal operating temperature. 3. Check the voltage between ECM harness connector terminals under the following conditions. 4. ECM + \_ Condition Voltage (V) Connector Terminal Terminal Ignition switch ON (Engine stopped.) Approx. 0.4 58 56 0.9 - 1.2 Idle (Engine is warmed-up to normal operating temperature.) F8 (MAF sen-(Sensor 1.6 - 1.9 2,500 rpm (Engine is warmed-up to normal operating temperature.) sor signal) ground) Idle to approximately 4,000 rpm 0.9 - 1.2 to Approx. 2.4\* \*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm. Is the inspection result normal? YES >> INSPECTION END NO >> Clean or replace mass air flow sensor. Refer to EM-31, "Exploded View".

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## P0102, P0103 MAF SENSOR

#### Description

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

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

# DBIA9559J

# DTC Logic

#### DTC DETECTION LOGIC

INFOID:000000009719909

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> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Intake air leakage</li> <li>Mass air flow sensor</li> </ul>
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul><li>Harness or connectors (The sensor circuit is open or shorted.)</li><li>Mass air flow sensor</li></ul>

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

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

#### Is DTC detected?

YES >> Go to EC-173, "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-173, "Diagnosis Procedure".
- NO >> GO TO 4.

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

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

# EC-172

# P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIA	GNOSIS	>			[VQ35DE]
Is DTC detected?					
YES >> Go to <u>EC</u> NO >> INSPECT	<u>-173, "Dia</u> 10N END	gnosis Proced	lure".		
Diagnosis Proced	dure				INFOID:000000009719910
1.INSPECTION STA	RT				
Confirm the detected	-				
Which DTC is detecte P0102 >> GO TO 2					
P0103 >> GO TO 3.					
2.CHECK INTAKE S					
<ul><li>Check the following for</li><li>Air duct</li></ul>	or connect	ion.			
<ul><li>Vacuum hoses</li><li>Intake air passage b</li></ul>	netween ai	r duct to intak	e manifold		
Is the inspection resul					
YES >> GO TO 3. NO >> Reconnec		<b>a</b>			
3.CHECK GROUND	•				
1. Turn ignition swite	ch OFF.				
2. Check ground con Is the inspection result		38. Refer to G	Fround Inspection i	n <u>GI-47, "Circuit Inspection"</u> .	
YES >> GO TO 4.					
· ·	-	round connect			
4.CHECK MAF SEN 1. Disconnect mass					
2. Turn ignition swite	ch ON.	-			
3. Check the voltage	e between	MAF sensor h	narness connector	and ground.	
MAF sensor		Ground	Voltago	-	
	rminal	Giouna	Voltage	_	
F4	5	Ground	Battery voltage	-	
Is the inspection result YES >> GO TO 6.					
NO >> GO TO 5.					
5.DETECT MALFUN	CTIONIN	G PART			
<ul><li>Check the following.</li><li>Harness connectors</li></ul>	5 E7, F121				
<ul> <li>Harness for open or</li> <li>Harness for open or</li> </ul>	short bety	ween mass air			
	SHOLL DEL	ween mass di	now sensor and h		
<b>^</b>		-	•	r in harness or connectors.	
6.CHECK MAF SEN				) SHORT	
<ol> <li>Turn ignition swite</li> <li>Disconnect ECM</li> </ol>		onnector			
	namess c				

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

# P0102, P0103 MAF SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 7.

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

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

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

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

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

Is the inspection result normal?

YES >> GO TO 8.

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

**8.**CHECK MASS AIR FLOW SENSOR

Refer to EC-174, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace mass air flow sensor. Refer to EM-31, "Exploded View".

9. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000009719911

1.CHECK MASS AIR FLOW SENSOR-I

#### With CONSULT

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

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

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

#### Without CONSULT

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

# P0102, P0103 MAF SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM				
Connector	+	-	Condition		Voltage (V)
Connector	Terminal	Terminal			
			Ignition switch ON (Engine stopped.)		Approx. 0.4
Го	58	56 (Sanaar	Idle (Engine is warmed-up to normal operating tempe	erature.)	0.9 - 1.2
F8	(MAF sen- sor signal)	(Sensor ground)	2,500 rpm (Engine is warmed-up to normal operating	temperature.)	1.6 - 1.9
			Idle to approximately 4,000 rpm		0.9 - 1.2 to Approx. 2.4*
*: Chec	k for linear vo	oltage rise in	response to engine being increased to approximately 4	,000 rpm.	
YES > NO >	ection resi → INSPEC → GO TO 2 < FOR THE	TION END 2.	-	AIR FLOW S	SENSOR
			air flow through mass air flow sensor. Refer		
<ul> <li>Crushec</li> </ul>	l air ducts		-		
	tioning sea dirt of air c		aner element		
			ke air system parts		
• •	ection resu				
	-> GO TO 4				
~	•> GO TO :				
	< N A A A A A A A A A A A A A A A A A A				
With Content University of the second secon	ONSULT	e malfuncti	SENSOR-II		
With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection State Collection With Collection State Collection	ONSULT ir or replace engine and ect CONSU	e malfuncti I warm it up JLT and se	ioning part. to normal operating temperature. elect "DATA MONITOR" mode. nd check indication under the following cond		
With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection With Collection State Collection With Collection State Collection	ONSULT ir or replac engine and ect CONSU t "MAS A/F	e malfuncti l warm it up JLT and se <sup>-</sup> SE-B1" a	ioning part. o to normal operating temperature. elect "DATA MONITOR" mode. nd check indication under the following cond Condition	MAS A/F	SE-B1 (V)
With Constant of the second se	ONSULT ir or replac engine and ect CONSU t "MAS A/F	e malfuncti l warm it up JLT and se <sup>-</sup> SE-B1" a	ioning part. to normal operating temperature. elect "DATA MONITOR" mode. nd check indication under the following cond	MAS A/F	SE-B1 (V) ox. 0.4
With Constant of the second se	ONSULT ir or replac engine and ect CONSU t "MAS A/F item Igni	e malfuncti l warm it up JLT and se SE-B1" a ition switch O	ioning part. to normal operating temperature. elect "DATA MONITOR" mode. and check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.)	MAS A/F Appro 0.9	- 1.2
With Control Repaired Start 6 3. Connor 4. Selec Monitor	ONSULT ir or replace engine and ect CONSU t "MAS A/F item Igni SE-B1	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engi	ioning part. b to normal operating temperature. elect "DATA MONITOR" mode. Ind check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) ne is warmed-up to normal operating temperature.)	MAS A/F Appro 0.9 1.6	- 1.2 - 1.9
With Connormalized Start of Start of Start of Start of Monitor	ONSULT ir or replace engine and ect CONSU t "MAS A/F item Idle 2,50 Idle	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engine to approxima	ioning part. to normal operating temperature. elect "DATA MONITOR" mode. and check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) the is warmed-up to normal operating temperature.) ately 4,000 rpm	MAS A/F Appro 0.9 1.6 0.9 - 1.2 to	- 1.2
With Control With Control Start of Control Monitor MAS A/F *: Checo Withou 1. Repai 2. Start of	ONSULT ir or replace engine and ect CONSU t "MAS A/F item Idle 2,50 Idle ck for linear vo t CONSUL ir or replace engine and	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engine to approximation to	ioning part. b to normal operating temperature. elect "DATA MONITOR" mode. Ind check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) ne is warmed-up to normal operating temperature.)	MAS A/F Appro 0.9 1.6 0.9 - 1.2 to 4,000 rpm.	ox. 0.4 - 1.2 - 1.9 Approx. 2.4*
With Control With Control Start of Control Monitor MAS A/F *: Checo Withou 1. Repai 2. Start of	ONSULT ir or replace ect CONSU t "MAS A/F item Idle 2,50 Idle ck for linear vo t CONSUL ir or replace engine and k the voltage	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engine to approximation to	ioning part. b to normal operating temperature. elect "DATA MONITOR" mode. Ind check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) ne is warmed-up to normal operating temperature.) ately 4,000 rpm response to engine being increased to approximately 4 ioning part. b to normal operating temperature.	MAS A/F Appro 0.9 1.6 0.9 - 1.2 to 4,000 rpm.	ox. 0.4 - 1.2 - 1.9 Approx. 2.4*
With Control With Control Start of Control Monitor MAS A/F *: Checo Withou 1. Repai 2. Start of	ONSULT ir or replace engine and ect CONSU t "MAS A/F item Idle 2,50 Idle ck for linear vo t CONSUL ir or replace engine and	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engine to approximation to	ioning part. b to normal operating temperature. elect "DATA MONITOR" mode. Ind check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) ne is warmed-up to normal operating temperature.) ately 4,000 rpm response to engine being increased to approximately 4 ioning part. b to normal operating temperature.	MAS A/F Appro 0.9 1.6 0.9 - 1.2 to 4,000 rpm.	ox. 0.4 - 1.2 - 1.9 Approx. 2.4*
With Control With Control Start of Control Monitor MAS A/F *: Checo Withou 1. Repai 2. Start of	ONSULT in or replace engine and ect CONSU t "MAS A/F item SE-B1 Idle 2,50 Idle 2,50 Idle ck for linear vo t CONSUL in or replace engine and k the voltage	e malfuncti I warm it up JLT and se SE-B1" a ition switch O (Engine is w 00 rpm (Engine to approximation to	ioning part. Detect "DATA MONITOR" mode. Ind check indication under the following cond Condition N (Engine stopped.) rarmed-up to normal operating temperature.) Ine is warmed-up to normal operating temperature.) ately 4,000 rpm response to engine being increased to approximately 4 ioning part. Detection terminals under the following cond Condition Detection (Condition (Condition)) Condition (Condition) Condition (Condition) Provide the following cond Condition (Condition) Provide the following cond Condition (Condition) Provide the following cond Condition (Condition) Provide the following cond Condition (Condition) Provide the following cond Provide the following cond Condition (Condition) Provide the following cond Provide the following cond Prov	MAS A/F Appro 0.9 1.6 0.9 - 1.2 to 4,000 rpm.	ox. 0.4 - 1.2 - 1.9 Approx. 2.4*

56

(Sensor

ground)

F8

58

(MAF sen-

sor signal)

# EC-175

Idle to approximately 4,000 rpm

Idle (Engine is warmed-up to normal operating temperature.)

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

0.9 - 1.2

1.6 - 1.9

0.9 - 1.2 to Approx. 2.4\*

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

4. CHECK MASS AIR FLOW SENSOR-III

#### With CONSULT

- 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 and select "DATA MONITOR" mode.
- 5. Select "MAS A/F SE-B1" and check indication under the following conditions.

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

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

#### Without CONSULT

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

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Clean or replace mass air flow sensor. Refer to <u>EM-31, "Exploded View"</u>.

# **P0111 IAT SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# P0111 IAT SENSOR

# DTC Logic

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> <li>Harness or connectors (High or low resistance in the IAT sensor circuit)</li> <li>IAT sensor</li> </ul>
4	NFIRMATION PROCEDU	JRE	
		TC2	
YES >	<u>ssary to erase permanent D</u> >> GO TO 3. >> GO TO 2.		
-	ORM COMPONENT FUNC	TION CHECK	
Perform c	component function check. I	Refer to EC-178, "Component Function	<u>Check"</u> .
Use the c	omponent function check to IC might not be confirmed.	o check the overall function of the IAT s	sensor circuit. During this check, a
	Dection result normal? >> INSPECTION END		
NO :	> Proceed to <u>EC-178, "Dia</u>	ignosis Procedure".	
	ONDITIONING		
dure befo	ONFIRMATION PROCEDU re conducting the next test. ignition switch OFF and wa		ways perform the following proce-
2. Turn 3. Turn	ignition switch ON. ignition switch OFF and wa		
<ul><li>Before</li><li>Before</li></ul>	performing the following	procedure, do not add fuel. procedure, check that fuel level is b procedure, confirm that battery volt	
;	>> GO TO 4.		
4.PERF	ORM DTC CONFIRMATION	N PROCEDURE	
	engine and let it idle for 60 the vehicle to a cool place		
Cool 3. Turn		ent of ambient air temperature between ak the vehicle for 12 hours.	−10°C (14°F) and 35°C (95°F).
	r turn ignition switch ON	during soaking.	
-	ב. ′ehicle must be cooled with engine and let it idle for 5 π		
4. Start	<b>FION:</b>	indles of more.	

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EC

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# P0111 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is 1st trip DTC detected?

YES >> Proceed to EC-178, "Diagnosis Procedure".

NO >> INSPECTION END

Component Function Check

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

#### 1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor (bank 1) harness connector.

3. Check resistance between mass air flow sensor (bank 1) terminals as follows.

Terminals	Condition	Resistance (k $\Omega$ )	
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-178, "Diagnosis Procedure".

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>EC-178, "Diagnosis Procedure"</u>.

#### Diagnosis Procedure

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

Check intake air temperature sensor. Refer to EC-178, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace mass air flow sensor (with intake air temperature sensor) (bank 1). Refer to <u>EM-31.</u> <u>"Exploded View"</u>.

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000009719915

INFOID:000000009719914

1.CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

1. Turn ignition switch OFF.

- 2. Disconnect mass air flow sensor (bank 1) harness connector.
- 3. Check resistance between mass air flow sensor (bank 1) terminals as follows.

Terminals	Condition	Resistance (k $\Omega$ )	
1 and 2	Temperature [°C (°F)]	25 (77)	1.800 – 2.200

Is the inspection result normal?

YES >> INSPECTION END

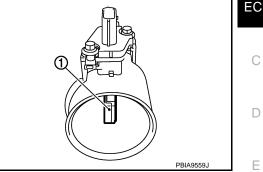
NO >> Replace mass air flow sensor (with intake air temperature sensor) (bank 1). Refer to <u>EM-31.</u> <u>"Exploded View"</u>.

#### P0112, P0113 IAT SENSOR

#### Description

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

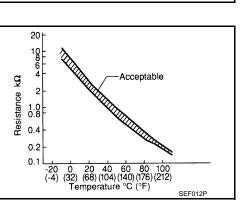
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



#### <Reference data>

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

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



INFOID:000000009719917

# DTC Logic

DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-180, "Diagnosis Procedure".

NO >> INSPECTION END

INFOID:000000009719916

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# P0112, P0113 IAT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### Diagnosis Procedure

INFOID:000000009719918

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

# 2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

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

2. Turn ignition switch ON.

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

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

Is the inspection result normal?

YES >> GO TO 3.

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

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

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

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

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

Is the inspection result normal?

YES >> GO TO 4.

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

 ${f 4}$  . CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-180, "Component Inspection".

#### Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-31, "Exploded</u> <u>View"</u>.

#### 5. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

#### **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.

# EC-180

### P0112, P0113 IAT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

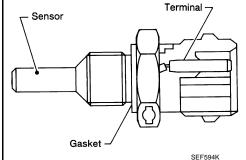
[VQ35DE]

Terminal	Condition		Resistance (kΩ)	
1 and 2	Temperature [°C (°F)]	25 (77)	1.800 - 2.200	
	n result normal?			
ES >> INS D >> Re	SPECTION END place mass air flow se	ensor (with	intake air temperature sensor). Refer to EM-3	31, "Exploded
<u>Vie</u>	ew".	,	·	

### P0116 ECT SENSOR

### Description

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



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#### <Reference data>

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

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

### DTC Logic

### 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/per- formance]	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> <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-183, "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-184, "Diagnosis Procedure".

INFOID:000000009719920

INFOID:000000009719921

### **P0116 ECT SENSOR**

3.PRECO	NDITI	ONING				А
			E has been p	previously conduc	ted, always perform the following proce-	A
		ucting the next test.	at logat 10 ac	aanda		
		switch OFF and wait a switch ON.		CONUS.	E	С
3. Turn ig	nition	switch OFF and wait a	at least 10 se	econds.		
TESTING (		ITION: ning the following pr	ocedure do	not add fuel		С
					el is between 1/4 and 4/4.	0
Before p	erforn	ning the following pr	ocedure, co	onfirm that batter	y voltage is 11 V or more at idle.	
	~ ~ -					D
	GOT	-				
4.PERFO	RM D1	C CONFIRMATION F	PROCEDUR	E		Е
		and let it idle for 60 mi	nutes.			
2. Move t NOTE:		nicle to a cool place.				
Cool th	ie vehi				etween –10°C (14°F) and 35°C (95°F).	F
3. Turn ig CAUTI		switch OFF and soak	the vehicle f	or 12 hours.		
		gnition switch ON du	iring soakin	g.		G
NOTE:		-	-			0
		nust be cooled with th and let it idle for 5 min				
CAUTI	ON:					Н
5. Check		gnition switch OFF d	luring idling	-		
Is 1st trip D	•					I.
		eed to <u>EC-184, "Diagr</u>	nosis Proced	ure".		
		ECTION END				
Compone	ent F	unction Check			INFOID:00000009719922	J
I.CHECK	ENGI	NE COOLANT TEMP	ERATURE (E	ECT) SENSOR		K
0		switch OFF.	nnnatar			
		CT sensor harness co sensor. Refer to <u>CO</u>		ed View".		
4. Check	resist	ance between ECT	sensor term			L
with ho	ot wate	r as shown in the figu	re.			
Termina	ls	Condition		Resistance (k $\Omega$ )		M
		Condition	20 (68)	2.1 – 2.9		
1 and 2	2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00		
			90 (194)	0.236 - 0.260		Ν
Is the inspe	ection I	result normal?	( )			
	GO T				JMBIA0080ZZ	0
-		eed to <u>EC-184, "Diagr</u>		ure".	JMBIA0080ZZ	
2.CHECK	INTEF	RMITTENT INCIDENT	Г			P
Check inter	mitten	it incident. Refer to <u>GI</u>	-44, "Intermi	ttent Incident".		2
		result normal?				
		ECTION END	onin Droood	uro"		
NU >>	FIUCE	eed to <u>EC-184, "Diagr</u>	10315 F10080			

< DTC/CIRCUIT DIAGNOSIS >

### P0116 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

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

Check ECT sensor. Refer to EC-184, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace ECT sensor. Refer to <u>CO-29</u>, "Exploded View".

2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-44, "Intermittent Incident".

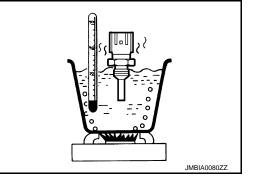
>> INSPECTION END

### Component Inspection

## 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-29. "Exploded View".
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

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



Is the inspection result normal?

YES >> INSPECTION END

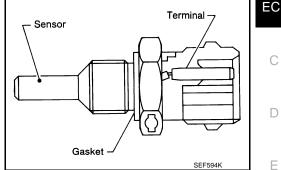
NO >> Replace engine coolant temperature sensor. Refer to CO-29, "Exploded View". INFOID:000000009719923

INFOID:000000009719924

### P0117, P0118 ECT SENSOR

#### Description

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

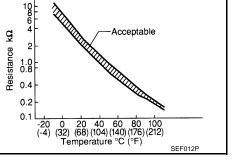


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#### <Reference data>

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

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



### DTC Logic

INFOID:000000009719926

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#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

#### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> Go to EC-186, "Diagnosis Procedure".
- NO >> INSPECTION END

# [VQ35DE]

INFOID:000000009719925

### Diagnosis Procedure

INFOID:000000009719927

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "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	Ground	voltage
F80	1	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 3.

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

### $\mathbf{3}$ . 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		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F80	2	F8	52	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-186. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u>.

**5.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

INFOID:000000009719928

### 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

3. Remove engine coolant temperature sensor. Refer to CO-29, "Exploded View".

<sup>1.</sup> Turn ignition switch OFF.

<sup>2.</sup> Disconnect engine coolant temperature sensor harness connector.

### P0117, P0118 ECT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

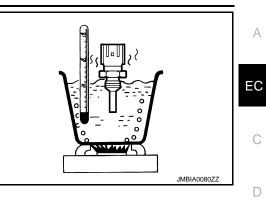
4. Check resistance between engine coolant temperature sensor terminals as per the following.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to CO-29, "Exploded View".



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P0122, P0123 TP SENSOR

### Description

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

the throttle 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.



135

90

### DTC Logic

#### 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-352, "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.	Harness or connectors     (TP sensor 2 circuit is open or shorted.)
P0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	<ul> <li>Electric throttle control actuator (TP sensor 2)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

### 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-188, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47. "Circuit Inspection".

Is the inspection result normal?

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

INFOID:000000009719931

INFOID:000000009719929

Throttle position sensor

Sensor 1

Seńsor 2

45

Throttle valve opening angle (deg) PBIB0145E

6.0

4.0

output voltage

### P0122, P0123 TP SENSOR

Electric throttle control actuator       Ground       Voltage         Connector       Terminal       Ground       Approx. 5 V         Sthe inspection result normal?       YES       > 60 TO 3.         NO       >> Repair open circuit, 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.         Disconnect ECM harness connector.         8. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM         Connector       Terminal         Continuity       YES         YES       > 60 TO 4.         NO       >> Repair open circuit, short to ground	< DTC/CIRCUI	T DIAGNOS	IS >			[VQ35DE	Ε]
2. Turn ignition switch ON. 3. Check the voltage between electric throttle control actuator harness connector and ground.           Electric throttle control actuator         Ground         Voltage           F29         1         Ground         Approx.5 V           Sthe inspection result normal?         YES         > S Repair open circuit, short to ground or short to power in harness or connectors.           St.CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT             Turn ignition switch OFF.            Disconnect ECM harness connector.           3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.           Electric throttle control actuator         ECM           Connector         Terminal           Connector         Stated           4. Also check harness for short to ground and 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.	CHECK THR	ROTTLE POS	ITION SENSO	R 2 POWER	SUPPLY CIRCUI	Т	
Connector         Terminal         Ground         Voltage           F29         1         Ground         Approx. 5 V           sthe inspection result normal?         YES         >> 60 T0 3.           NO         >> Repair open circuit, short to ground or short to power in harness or connectors.           JCHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT           Turn ignition switch OFF.         Disconnect ECM harness connector.           Check the continuity between electric throttle control actuator harness connector and ECM harness connector.           Electric throttle control actuator         ECM           Connector         Terminal           Context harness for short to ground ar short to power in harness or connectors.           Check the control actuator         ECM           Connector	. Turn ignitio	n switch ON.				onnector and ground.	
Connector         Terminal         Ground         Voltage           F29         1         Ground         Approx. 5 V           ithe inspection result normal?         YES >> 60 T0 3.         Sector 1         Sector 1           NO         >> Repair open circuit, short to ground or short to power in harness or connectors.         Sector 1         Sector 1           . Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between electric throttle control actuator harness connector and ECM harness connector.           Electric throttle control actuator         ECM         Conniculty         Coninuity           Connector         Terminal         Connector         Existed           . Also check harness for short to ground and short to power.         Sector 1         Sector 2           YES         > 60 T0 4.         Sector 3         Sector 3           NO         >> Repair open circuit, short to ground or short to power in harness or connectors.         Sector 4           . CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT         Context 4           . Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Centinuity           . Connector         Terminal         Connector         Continuity           YES         > 60 T0 5.         Sector 4	Electric throttle	e control actuato	r				
the inspection result normal?         YES       >> GO TO 3.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         .CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT         . Turn ignition switch OFF.         Disconnect ECM harness connector.         . Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM         Connector       Terminal         P29       4       F8         36       Existed          Check the continuity to ground or short to power in harness or connectors.         .CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT         . Check the continulator       ECM         Connector       Terminal       Continuity				nd Vo	ltage		
YES       >> GO TO 3.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT         Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM         Connector       Terminal         Connector       Continuity         YES       > GO TO 4.         NO       >> Repair open circuit, short to ground or short to power in harness connectors.         CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT         Check the control actuator       ECM         Connector       Terminal         Connector       Terminal         Connector	F29	1	Grour	nd Appr	rox. 5 V		
Turn ignition switch OFF.         Disconnect ECM harness connector.         Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM         Connector       Terminal         Connector       So Bord 1         VS       Repair open circuit, short to ground or short to power in harness or connectors.         CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT         .       Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         .       Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         .       Check the contrinuity between electric throttle control a	YES >> GO NO >> Rep	TO 3. Dair open circ	uit, short to gro		•		
Connector       Terminal       Connector       Terminal       Continuity         F29       4       F8       36       Existed         Also check harness for short to ground and short to power.       Stele inspection result normal?       Yes         YES       > GO TO 4.       NO       > Repair open circuit, short to ground or short to power in harness or connectors.         CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT       .       Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM       Continuity         Connector       Terminal       Connector         F29       3       F8       38         Also check harness for short to ground and short to power.       Stete         Sthe inspection result normal?       Yes         YES       > GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         CHECK THROTTLE POSITION SENSOR         Refer to EC-190. "Component Inspection".         Sthe inspection result normal?         YES       > GO TO 7.         NO       >> GO TO 7.         NO       >> GO TO 6.         REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR         R	. Turn ignition 2. Disconnect 3. Check the o	n switch OFF. ECM harnes	s connector.				)n-
Connector         Terminal         Connector         Terminal         Terminal           F29         4         F8         36         Existed           4. Also check harness for short to ground and short to power.         Sthe inspection result normal?           YES         > GO TO 4.           NO         >> Repair open circuit, short to ground or short to power in harness or connectors.           4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT           0. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.           Electric throttle control actuator         ECM           Connector         Terminal           Connetor         State ba	Electric throttle c	ontrol actuator	EC	CM	Continuity		
Also check harness for short to ground and short to power. <u>sthe inspection result normal?</u> YES >> GO TO 4. NO >> Repair open circuit, short to ground or short to power in harness or connectors. <u>4.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</u> Check the continuity between electric throttle control actuator harness connector and ECM harness connector. <u>Electric throttle control actuator</u> <u>ECM</u> <u>Continuity</u> <u>Connector</u> Terminal Connector Terminal <u>F8</u> 38 Existed <u>2. Also check harness for short to ground and short to power.     <u>s the inspection result normal?</u> YES &gt;&gt; GO TO 5. NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.     <u>5.CHECK THROTTLE POSITION SENSOR</u> Refer to EC-190. "Component Inspection".     <u>s the inspection result normal?</u> YES &gt;&gt; GO TO 7. NO &gt;&gt; GO TO 6.     <u>5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR</u>  . Replace electric throttle control actuator. Refer to EM-33. "Exploded View".     S. NSPECTION END</u>	Connector	Terminal	Connector	Terminal	Continuity		
sthe inspection result normal?         YES       >> GO TO 4.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT         C. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.         Electric throttle control actuator       ECM         Connector       Terminal         Connector       Continuity         F29       3       F8         State inspection result normal?	F29	4	F8	36	Existed		
Connector       Terminal       Continuity         F29       3       F8       38       Existed         2.       Also check harness for short to ground and short to power.       Existed         2.       Also check harness for short to ground and short to power.       Existed         2.       Also check harness for short to ground and short to power.       Existed         2.       Also check harness for short to ground and short to power.       Existed         YES       >> GO TO 5.       NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         D.CHECK THROTTLE POSITION SENSOR       Refer to EC-190, "Component Inspection".       Existed         Sthe inspection result normal?       YES       >> GO TO 7.         YES       >> GO TO 6.       NO       >> GO TO 6.         D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR       I.       Refer to EC-190, "Special Repair Requirement".         .       Refer to EC-190, "Special Repair Requirement".       >> INSPECTION END		continuity bet	ween electric t	hrottle control	actuator harness	s connector and ECM harness co	n-
Connector       Terminal       Connector       Terminal         F29       3       F8       38       Existed         2. Also check harness for short to ground and short to power.       sthe inspection result normal?         YES       >> GO TO 5.       NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         D.CHECK THROTTLE POSITION SENSOR       Refer to EC-190, "Component Inspection".       sthe inspection result normal?         YES       >> GO TO 7.       NO       >> GO TO 6.         D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR       .         Refer to EC-190, "Special Repair Requirement".       .         >> INSPECTION END       .	Electric throttle c	ontrol actuator	EC	СМ	Continuity		
<ul> <li>Also check harness for short to ground and short to power.</li> <li><u>s the inspection result normal?</u></li> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li>D.CHECK THROTTLE POSITION SENSOR</li> <li>Refer to EC-190, "Component Inspection".</li> <li><u>s the inspection result normal?</u></li> <li>YES &gt;&gt; GO TO 7.</li> <li>NO &gt;&gt; GO TO 6.</li> <li>D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR</li> <li>I. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".</li> <li>2. Refer to EC-190, "Special Repair Requirement".</li> <li>&gt;&gt; INSPECTION END</li> </ul>	Connector	Terminal	Connector	Terminal	Continuity		
s the inspection result normal? YES >> GO TO 5. NO >> Repair open circuit, short to ground or short to power in harness or connectors. D.CHECK THROTTLE POSITION SENSOR Refer to EC-190, "Component Inspection". s the inspection result normal? YES >> GO TO 7. NO >> GO TO 6. D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR 1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View". 2. Refer to EC-190, "Special Repair Requirement". >> INSPECTION END	F29	3	F8	38	Existed		
s the inspection result normal?         YES       >> GO TO 7.         NO       >> GO TO 6.         D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR         1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".         2. Refer to EC-190, "Special Repair Requirement".         >> INSPECTION END	<u>s the inspectior</u> YES >> GO NO >> Rep	n result norma TO 5. pair open circ	al? uit, short to gro	ound or short t		ss or connectors.	
s the inspection result normal?         YES       >> GO TO 7.         NO       >> GO TO 6.         D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR         1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".         2. Refer to EC-190, "Special Repair Requirement".         >> INSPECTION END	Refer to EC-190	), "Componer	nt Inspection".				
<ul> <li>NO &gt;&gt; GO TO 6.</li> <li>D.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR</li> <li>I. Replace electric throttle control actuator. Refer to <u>EM-33, "Exploded View"</u>.</li> <li>2. Refer to <u>EC-190, "Special Repair Requirement"</u>.</li> <li>&gt;&gt; INSPECTION END</li> </ul>	s the inspectior	n result norma					
<ul> <li><b>D.</b>REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR</li> <li>Replace electric throttle control actuator. Refer to <u>EM-33, "Exploded View"</u>.</li> <li>Refer to <u>EC-190, "Special Repair Requirement"</u>.</li> <li>&gt;&gt; INSPECTION END</li> </ul>							
<ol> <li>Replace electric throttle control actuator. Refer to <u>EM-33, "Exploded View"</u>.</li> <li>Refer to <u>EC-190, "Special Repair Requirement"</u>.</li> <li>&gt;&gt; INSPECTION END</li> </ol>	•		ROTTLE CON	TROL ACTU	ATOR		
	1. Replace ele	ectric throttle	control actuato	r. Refer to <u>EM</u>		<u>iew"</u> .	

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

#### Component Inspection

INFOID:000000009719932

[VQ35DE]

### 1.CHECK THROTTLE POSITION SENSOR

1. Turn ignition switch OFF.

2. Reconnect all harness connectors disconnected.

3. Perform EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

4. Turn ignition switch ON.

5. Set selector lever to D position.

6. Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	-	Condition		Voltage
Connector	Terminal	Terminal			
F8	37			Fully released	More than 0.36 V
	(TP sensor 1 sig- nal) 36	Appelorator padal	Fully depressed	Less than 4.75 V	
	38	(Sensor ground)	Accelerator pedal	Fully released	Less than 4.75 V
	(TP sensor 2 sig- nal)			Fully depressed	More than 0.36 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

**2.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".

2. Go to EC-190. "Special Repair Requirement".

#### >> INSPECTION END

Special Repair Requirement

INFOID:000000009719933

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-19. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

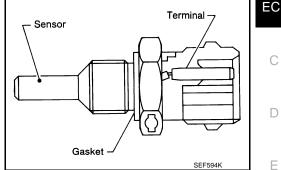
Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

### P0125 ECT SENSOR

### Description

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



20

10 6 4

0.1

-20

#### <Reference data>

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

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

#### 0 20 40 60 80 100 (32) (68) (104) (140) (176) (212) Temperature °C (°F) SEF012P

Acceptable

INFOID:000000009719935

# DTC Logic

DTC DETECTION LOGIC

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# NOTE: If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to <u>EC-182, "DTC Logic"</u>.

 If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to <u>EC-185, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	_ L
P0125	Insufficient engine cool- ant temperature for closed loop fuel control	<ul> <li>Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul> <li>Harness or connectors (High resistance in the circuit)</li> <li>Engine coolant temperature sensor</li> <li>Thermostat</li> </ul>	M

#### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

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

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

#### >> GO TO 2.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR FUNCTION

#### With CONSULT

1. Turn ignition switch ON.



[VQ35DE]

- 2. Select "DATA MONITOR" mode with CONSULT.
- 3. Check that "COOLAN TEMP/S" is above 10°C (50°F).

#### With GST

Follow the procedure "With CONSULT" above.

Is the temperature above 10°C (50°F)?

YES >> INSPECTION END

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

 Start engine and run it for 65 minutes at idle speed. If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK. CAUTION:

#### Never overheat engine.

2. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> <u>EC-192, "Diagnosis Procedure"</u> NO >> INSPECTION END

#### Diagnosis Procedure

**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "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-186. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace engine coolant temperature sensor.

3.CHECK THERMOSTAT OPERATION

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace thermostat. Refer to <u>CO-27, "Exploded View"</u>.

**4.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

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

1. Turn ignition switch OFF.

### EC-192

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[VQ35DE]

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<sup>2.</sup> Disconnect engine coolant temperature sensor harness connector.

Remove engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u>.

### **P0125 ECT SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

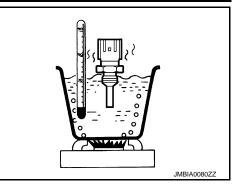
4. Check resistance between engine coolant temperature sensor terminals as per the following.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u>.



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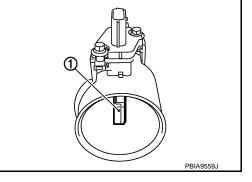
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### P0127 IAT SENSOR

### Description

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

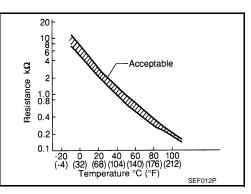
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



#### <Reference data>

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

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



INFOID:000000009719939

### DTC Logic

#### 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> <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 perform the following before conducting the next test.

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

2. Turn ignition switch ON.

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

**TESTING CONDITION:** 

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

#### >> GO TO 2.

### **2.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Wait until engine coolant temperature is less than 96°C (205°F)
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT.
- Check the engine coolant temperature.

INFOID:000000009719938

### **P0127 IAT SENSOR**

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
<ul> <li>If the engine coolant temperature is not less than 96°C (205°F), turn ignition switch OFF engine.</li> <li>NOTE:</li> </ul>	and cool down
Perform the following steps before engine coolant temperature is above 96°C (205°F).	
<ol> <li>Turn ignition switch ON.</li> <li>Select "DATA MONITOR" mode with CONSULT.</li> </ol>	EC
<ol> <li>Start engine.</li> <li>Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.</li> <li>CAUTION:</li> </ol>	C
<ul><li>Always drive vehicle at a safe speed.</li><li>6. Check 1st trip DTC.</li></ul>	-
With GST Follow the procedure "With CONSULT" above.	D
<u>Is 1st trip DTC detected?</u> YES >> Go to <u>EC-195, "Diagnosis Procedure"</u> . NO >> INSPECTION END	E
Diagnosis Procedure	INFOID:000000009719940
1. CHECK GROUND CONNECTION	
<ol> <li>Turn ignition switch OFF.</li> <li>Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>. <u>Is the inspection result normal?</u></li> </ol>	G
YES >> GO TO 2. NO >> Repair or replace ground connection.	F
2. CHECK INTAKE AIR TEMPERATURE SENSOR	
Refer to EC-195. "Component Inspection".	I
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 3.</li> <li>NO &gt;&gt; Replace mass air flow sensor (with intake air temperature sensor).</li> </ul>	J
3. CHECK INTERMITTENT INCIDENT	
Refer to GI-44, "Intermittent Incident".	k
>> INSPECTION END	
Component Inspection	INFOID:000000009719941
1. CHECK INTAKE AIR TEMPERATURE SENSOR	
1. Turn ignition switch OFF.	
<ol> <li>Disconnect mass air flow sensor harness connector.</li> <li>Check resistance between mass air flow sensor terminals as per the following.</li> </ol>	
	Ν
Terminal         Condition         Resistance (kΩ)           1 and 2         Temperature [°C (°F)]         25 (77)         1.800 - 2.200	
Is the inspection result normal?	C
YES >> INSPECTION END NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to $EN$ <u>View</u> ".	<u>Л-31, "Exploded</u> <sub>F</sub>

### P0128 THERMOSTAT FUNCTION

### DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303, P0304, P0305 or P0306, first perform the trouble diagnosis for P0300, P0301, P0302, P0303, P0304, P0305, P0306. Refer to <u>EC-266, "DTC Logic"</u>.

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

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

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0128	THERMSTAT FNCTN [Coolant thermostat (coolant temperature below thermostat regulating temperature)]	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul> <li>Thermostat</li> <li>Leakage from sealing portion of thermostat</li> <li>Engine coolant temperature sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### NOTE:

Never refuel before and during the following procedure.

#### **1.**PRECONDITIONING-I

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. PRECONDITIONING-II

#### (B) With CONSULT

- 1. Turn ignition switch ON.
- 2. Check the following conditions:

Ambient temperature	-10°C (14°F) or more	
A/C switch	OFF	
Blower fan switch	OFF	

3. Select "DATA MONITOR" mode of "ENGINE" using CONSULT.

4. Check the following conditions:

−10°C − 46°C (14 − 115°F)

#### Is the condition satisfied?

YES >> GO TO 3.

NO >> 1. Satisfy the condition.

2. GO TÓ 3.

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

#### With CONSULT

- 1. Start engine.
- 2. Drive the vehicle until the following condition is satisfied. CAUTION:
- Always drive vehicle at safe speed.
- STEP 1

INFOID:000000009719942

### **P0128 THERMOSTAT FUNCTION**

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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Drive the vehicle under the conditions instructed below until the difference between "COOLAN TEMP/S" and "FUEL T/TMP SE" becomes at least 24°C (43°F).

COOLAN TEMP/S	65°C (149°F) or less		<b>F</b> 0
FUEL T/TMP SE	Less than the value calculated by sub- tracting 24°C (43°F) from "COOLAN TEMP/S".*		EC
*: Example			С
COOLAN TEMP/S	FUEL T/TMP SE		
65°C (149°F)	41°C (106°F) or less		D
60°C (140°F)	36°C (97°F) or less		D
55°C (131°F)	31°C (88°F) or less		
T/TMP SE" maintained at 2 NOTE:		between "COOLAN TEMP/S" and "FUEL	E F
<b>NOTE:</b> Keep the accelerator pedal as	32 MPH) or more until "COOLAN TEI s steady as possible during cruising.	MP/S" increases by 2°C (4°F).	G
<u>Is the condition satisfied?</u> YES >> GO TO 4. NO >> GO TO 1.			Η
4.PERFORM DTC CONFIRM	ATION PROCEDURE-II		
<ul><li>With CONSULT</li><li>1. Drive the vehicle until the feature</li></ul>	ollowing condition is satisfied.		J
COOLAN TEMP/S	65°C (149°F) or more		0
CAUTION: Always drive vehicle at s 2. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Proceed to EC-197 NO >> INSPECTION END	7, "Diagnosis Procedure".		K
Diagnosis Procedure		INFOID:000000009719943	
		INFOID:00000009719943	M
1.CHECK ENGINE COOLANT	T TEMPERATURE SENSOR		
Refer to EC-186, "Component I			Ν
Is the inspection result normal?	-		
YES >> GO TO 2. NO >> Replace engine co	olant temperature sensor.		
2.CHECK THERMOSTAT			0
Check thermostat. Refer to CO	-27 "Exploded View"		
Is the inspection result normal?	· ·		Ρ
YES >> INSPECTION END			
NO >> Replace thermosta	t.		
Component Inspection		INFOID:000000009719944	
1.CHECK ENGINE COOLANT	T TEMPERATURE SENSOR		

### **P0128 THERMOSTAT FUNCTION**

#### < DTC/CIRCUIT DIAGNOSIS >

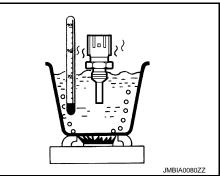
- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor. Refer to CO-29, "Exploded View".
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u>.



### P0130, P0150 A/F SENSOR 1

### Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor

outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

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

### DTC Logic

### DTC DETECTION LOGIC

To judge malfunctions, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal fluctuates according to fuel feedback control.

voltage

Output

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause	
P0130	Air fuel ratio (A/F) sensor 1 (bank 1) circuit	A)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V.	Harness or connectors     (The A/F sensor 1 circuit is open     or shorted.)	
	(Dank T) circuit	B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	A/F sensor 1	
P0150	Air fuel ratio (A/F) sensor 1	A)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V.	Harness or connectors     (The A/F sensor 1 circuit is open     or shorted )	Γ
	(bank 2) circuit	B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	or shorted.) • A/F sensor 1	

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

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

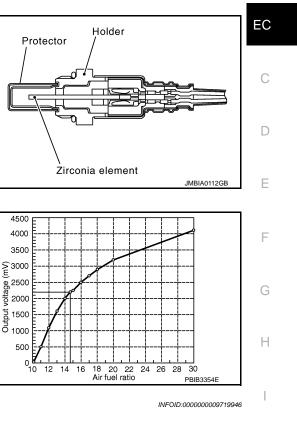
Turn ignition switch OFF and wait at least 10 seconds. 3.

**TESTING CONDITION:** 

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

>> GO TO 2.

INFOID:000000009719945



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### P0130, P0150 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

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

Is 1st trip DTC detected?

- YES >> Go to EC-201, "Diagnosis Procedure".
- NO-1 >> With CONSULT: GO TO 3.

NO-2 >> With GST: GO TO 7.

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

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

Does the indication fluctuate around 2.2 V?

YES >> GO TO 4.

NO >> Go to EC-201, "Diagnosis Procedure".

**4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-I

- Select "A/F SEN1 (B1) P1276" (for DTC P0130) or "A/F SEN1 (B2) P1286" (for DTC P0150) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT.
- 2. Touch "START".
- 3. When the following conditions are met, "TESTING" will be displayed on the CONSULT 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

# 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 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 when 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 screen?

OK >> INSPECTION END

NG >> Go to EC-201, "Diagnosis Procedure".

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

Perform component function check. Refer to EC-201, "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

1.PERFC	RM COM	IPONENT F	UNCTION	I CHECK		
With G						
<ol> <li>Start e</li> <li>Drive</li> <li>Shift the</li> <li>decrease</li> <li>CAUT</li> </ol>	ngine and the vehicle ne selecto ases to 50 ION: 's drive v	e at a speed	d of 80 km he D posit /IPH).	/h (50 MP tion, then		nutes in the suitable gear position. celerator pedal fully until the vehicle speed
<ol> <li>Repeation</li> <li>Stop the store of the</li></ol>	t steps 2 ne vehicle t least 10 it steps 2 ne vehicle 1st trip D DTC detect > Go to E	DTC. <u>cted?</u> <u>C-201, "Dia</u>	times. nition swit nd restart e times. <u>anosis Pre</u>	ch OFF. engine.	tor pedal.	
		CTION END				
Diagnos						INFOID:00000000971994
1.CHECK	GROUN	D CONNEC	TION			
Is the insp YES > NO > 2.CHECk	ection res > GO TO > Repair of ( AIR FUE	ult normal? 2. or replace g EL RATIO ( <i>A</i>	round con v/F) SENS	nection. OR 1 PO\	VER SUPPLY (	<u>GI-47, "Circuit Inspection"</u> . CIRCUIT
2. Turn ig	gnition sw				ss connector ar	nd ground.
DTO		A/F sensor 1		Ground	Valtaga	-
DTC	Bank	Connector	Terminal	Ground	Voltage	
P0130	1	F27	4	Ground	Battery voltage	
P0150	2	F64	4			_
YES > NO >	> GO TO > GO TO	3.				
3.DETEC	T MALFU following. R harness e (No. 46)	INCTIONIN	F12			

### P0130, P0150 A/F SENSOR 1

>> Repair or replace harness or connectors.

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

1. Turn ignition switch OFF.

< DTC/CIRCUIT DIAGNOSIS >

**Component Function Check** 

NO

>> Go to EC-201, "Diagnosis Procedure".

2. Disconnect ECM harness connector.

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### P0130, P0150 A/F SENSOR 1

#### < DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0130	1	F27	1		45		
F0130	I	121	2	F8	49	Existed	
D0150	P0150 2		1	10	53	LXISIGU	
P0150	2	F64	2		57		

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

DTC		A/F sensor 1	Ground	Continuity		
DIC	Bank	Connector	Terminal	Ground	Continuity	
P0130	1	F27	1		Not existed	
F0130	I	Γ21	2	Ground		
P0150	2	F64	1	Giouna	NUL EXISTED	
P0150	2	F04	2			

DTC	EC	CM	Ground	Continuity	
DIC	Connector	Terminal	Ground		
D0120		45		Not existed	
P0130	50	49	Ground		
P0150	F8	53			
F0150		57			

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK INTERMITTENT INCIDENT

Perform GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

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

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

• Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

• Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

### P0131, P0151 A/F SENSOR 1

### Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor

outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

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

### DTC Logic

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	ŀ
P0131	Air fuel ratio (A/F) sensor 1 (bank 1) circuit low voltage	• The A/F signal computed by ECM from the A/	Harness or connectors     (The A/F sensor 1 circuit is open or	
P0151	Air fuel ratio (A/F) sensor 1 (bank 2) circuit low voltage	F sensor 1 signal is constantly approx. 0 V.	shorted.) • A/F sensor 1	l

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

2.CHECK A/F SENSOR 1 FUNCTION

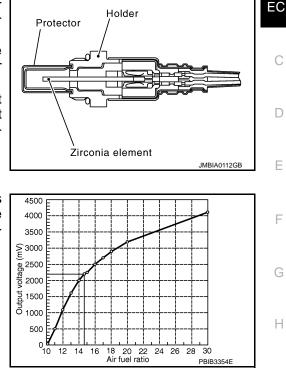
#### (P)With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

### EC-203

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INFOID:000000009719950

#### With GST

Follow the procedure "With CONSULT" above.

Is the indication constantly approx. 0 V?

YES >> Go to EC-204, "Diagnosis Procedure".

NO >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch OFF, wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
- 4. 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.

5. Maintain the following conditions for approximately 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 cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step
- 1.
- 6. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

- YES >> Go to EC-204, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:0000000971995

### 1.CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

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

1. Disconnect A/F sensor 1 harness connector.

2. Turn ignition switch ON.

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

DTC		A/F sensor 1	Ground	Voltage		
DIC	Bank	Connector	Terminal	Oround	voltage	
P0131	1	F27	4	Ground	Battery voltage	
P0151	2	F64	4	Ologia	Ballery vollage	

Is the inspection result normal?

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

NO >> GO IO 3

**3.** DETECT MALFUNCTIONING PART

Check the following.

### 

			P0131	, P0151 A	/F SENS	OR 1	
DTC/CIF	RCUIT DIA	GNOSIS >				[VQ35	DE]
	R harness ( e (No. 46)	connector F	12				
		r short betw	een A/F se	ensor 1 and	IPDM E/R		
	-	replace ha					
CHECK	A/F SENS	SOR 1 INPL	IT SIGNAL	CIRCUIT F	OR OPEN A	ND SHORT	
. Discor		harness co		or 1 harness	s connector a	and ECM harness connector.	
		A/F sensor 1		E	СМ		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
	20111		1		45		
P0131	1	F27	2	-	49	-	
			1	- F8	53	- Existed	
P0151	2	F64	2		57	-	
. Check and gr		-				r and ground, or ECM harness conn	60101
DTC		A/F sensor 1	I	Ground	Ground Continuity		
	Bank	Connector	Terminal				
P0131	1	F27	1	-			
			1	Ground	Not existed		
P0151	2	F64	2	-			
		ECM					
DTC	Connector	Termina		round Continuity			
D0124		45					
P0131	- F8	49	Groun	d Not exis	tod		
P0151	ГО	53	Gioun		ncu		
FUIDI		57					
Also c	heck harne	ss for short	to power.				
•	ection resu						
	> GO TO 5		short to are	und or shor	t to power in	harness or connectors.	
			•				
erform <u>G</u>	I-44, "Interr	mittent Incic	lent".				
the inen	ection resu						
	> GO TO 6		lfunctionia	a port			
YES >:		ronlage		******			
YES >: NO >:	> Repair or	EL RATIO		• •			

- 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

### P0132, P0152 A/F SENSOR 1

### Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor

outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

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

### **DTC Logic**

#### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	k
P0132	Air fuel ratio (A/F) sensor 1 (bank 1) circuit high voltage	• The A/F signal computed by ECM from the A/F	Harness or connectors     (The A/F sensor 1 circuit is open or	
P0152	Air fuel ratio (A/F) sensor 1 (bank 2) circuit high voltage	sensor 1 signal is constantly approx. 5 V.	shorted.) • A/F sensor 1	L

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

2.CHECK A/F SENSOR 1 FUNCTION

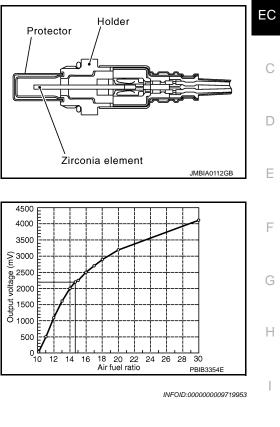
#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

### EC-207

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#### With GST

Follow the procedure "With CONSULT" above.

Is the indication constantly approx. 5 V?

YES >> Go to EC-208. "Diagnosis Procedure".

NO >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
- 4. 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.

5. Maintain the following conditions for approximately 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 cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step
- 1.
- 6. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

- YES >> Go to EC-208, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009719954

### 1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

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

1. Disconnect A/F sensor 1 harness connector.

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

DTC		A/F sensor 1		Ground	Voltage	
DIC	Bank	Connector	Terminal	Ground		
P0132	1	F27	4	Ground	Battery voltage	
P0152	2	F64	4	Ground		

Is the inspection result normal?

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

 $\sim > 00103$ 

**3.** DETECT MALFUNCTIONING PART

Check the following.

### 

			PU132,	, PU152 P	VF SENS	
	RCUIT DIA					[VQ35DE
15 A fuse	R harness o (No. 46)					
Harness	for open or	short betw	een A/F se	nsor 1 and I	PDM E/R	
>:	> Repair or	replace ha	rness or co	nnectors.		
	•	•			OR OPEN A	ND SHORT
	nition swite					
. Discor	nect ECM	harness co				
. Check	the continu	lity betweel	n A/F sense	or 1 harness	s connector a	and ECM harness connector.
		A/F sensor 1		E	СМ	
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity
<b>D</b> 0400	4	507	1		45	
P0132	1	F27	2	F8	49	Existed
P0152	2	F64	1	10	53	
1 0102	-	101	2		57	
		uity betwee	n A/F sens	sor 1 harnes	ss connector	and ground, or ECM harness connector
and gr	ouna.					
		A/F sensor 1				
DTC	Bank	Connector	Terminal	Ground	Ground Continuity	
D0122	1	F07	1			
P0132	1	F27	2	Ground	Not existed	
P0152	2	F64	1	Ground	NOT EXISTED	
			2			
		ECM				
DTC	Connector	Terminal	Groun	d Continu	lity	
		45				
P0132		49	_		_	
D0450	F8	53	Groun	d Not exis	ted	
P0152		57				
. Also cl	neck harne	ss for short	to power.			
	ection resul					
	> GO TO 5.		short to are	und or chor	to power in	harness or connectors.
-						namess of connectors.
NO >:						
NO >: CHECK	INTERMIT					
NO >: D.CHECK Perform G	INTERMIT	nittent Incid				
NO >: D.CHECK Perform G s the inspe	INTERMIT	nittent Incid t normal?				
NO >: D.CHECK Perform G s the inspective YES >:	INTERMIT	nittent Incid t normal?	lent".	g part.		

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

>> INSPECTION END

### P0137, P0157 HO2S2

### Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

### **DTC** Logic



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

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0137	Heated oxygen sensor 2 (bank 1) circuit low volt- age	The maximum voltage from the sensor does not	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>	K
P0157	Heated oxygen sensor 2 (bank 2) circuit low volt- age	reach the specified voltage.	<ul><li>Fuel pressure</li><li>Fuel injector</li><li>Intake air leakage</li></ul>	L

#### DTC CONFIRMATION PROCEDURE

#### **1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

2. PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

>> GO TO 3.

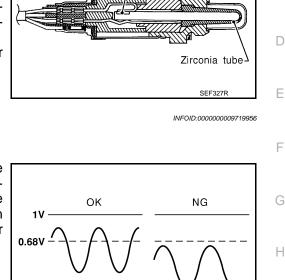
### EC-211

INFOID:000000009719955

Holder

А

EC



Heater pad

0V

J

SEF259VA

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Μ

Ο

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### **3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F). 9. Open engine hood.
- 10. Select "HO2S2 (B1) P1147" (for DTC P0137) or "HO2S2 (B2) P1167" (for DTC P0157) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT.
- 11. Follow the instruction of CONSULT display.
  - NOTE:

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

12. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT screen?

OK >> INSPECTION END

NG >> Go to EC-213, "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-212, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-213, "Diagnosis Procedure".

#### **Component Function Check**

INFOID:000000009719957

### **1.**PERFORM COMPONENT FUNCTION CHECK-I

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

### P0137, P0157 HO2S2

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		ECM			
DTC	Connec-	+	-	Condition	Voltage
	tor	Terminal	Terminal		
P0137	- F8	33 [HO2S2 (bank 1) signal]	35 (Sensor	Revving up to 4,000 rpm under no	The voltage should be above 0.68 V
P0157		34 [HO2S2 (bank 2) signal]	ground)	load at least 10 times	at least once during this procedure.
		ult normal?			
NO >	> GO TO				
<b>Z</b> .PERFC	DRM COM	PONENT FUNC	TION CH	ECK-II	
Check the	e voltage b	etween ECM har	ness con	nector terminals under the follow	ving conditions.
		ECM			
DTC	Connec-	+	-	Condition	Voltage
	tor	Terminal	Terminal	-	
P0137	- F8	33 [HO2S2 (bank 1) signal]	35 - (Sensor	Keeping engine at idle for 10 min-	The voltage should be above 0.68 V
D0157		34 [HO2S2 (bank 2)	ground)	utes	at least once during this procedure
YES > NO >	> INSPEC > GO TO				
Is the insp YES > NO > <b>3.</b> PERFC	>> INSPEC >> GO TO ORM COM	<u>ult normal?</u> TION END 3. PONENT FUNC		ECK-III nector terminals under the follow	ving conditions.
Is the insp YES > NO > <b>3.</b> PERFC	>> INSPEC >> GO TO ORM COM	<u>ult normal?</u> TION END 3. PONENT FUNC			ving conditions.
Is the insp YES > NO > <b>3.</b> PERFC	>> INSPEC >> GO TO ORM COM	<u>ult normal?</u> CTION END 3. PONENT FUNC etween ECM har			ving conditions. Voltage
Is the insp YES > NO > <b>3.</b> PERFC Check the	>> INSPEC >> GO TO DRM COM e voltage b	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM		nector terminals under the follow	
Is the insp YES > NO > <b>3.</b> PERFC Check the	>> INSPEC >> GO TO DRM COM e voltage b Connec-	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal]	Terminal	Condition Condition	Voltage The voltage should be above 0.68 V
Is the insp YES > NO > <b>3.</b> PERFC Check the DTC	>> INSPEC >> GO TO DRM COM 2 voltage b Connec- tor	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1)	rness con – Terminal 35	nector terminals under the follow	Voltage
Is the insp YES > NO > 3.PERFC Check the DTC P0137 P0157	<ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connec- tor</li> <li>F8</li> </ul>	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2)	Terminal	Condition Condition	Voltage The voltage should be above 0.68 V
Is the insp YES > NO > 3.PERFO Check the DTC P0137 P0157 Is the insp YES >	<ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise residence</li> <li>&gt; INSPEC</li> </ul>	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	Terminal 35 (Sensor ground)	Condition Condition Coasting from 80 km/h (50 MPH) with selector lever in the D position	Voltage The voltage should be above 0.68 V
Is the insp YES > NO > 3.PERFC Check the DTC P0137 P0157 Is the insp YES > NO >	<ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise residence</li> <li>&gt; INSPEC</li> </ul>	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal] ult normal? CTION END C-213, "Diagnos	Terminal 35 (Sensor ground)	Condition Condition Coasting from 80 km/h (50 MPH) with selector lever in the D position	Voltage The voltage should be above 0.68 V
Is the insp YES > NO > 3.PERFO Check the DTC P0137 P0157 Is the insp YES > NO > Diagnos	<ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; ORM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise F8</li> <li>&gt; Sis Procession</li> </ul>	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal] ult normal? CTION END C-213, "Diagnos	Terminal 35 (Sensor ground)	Condition Condition Coasting from 80 km/h (50 MPH) with selector lever in the D position	Voltage The voltage should be above 0.68 V at least once during this procedure.
Is the insp YES > NO > 3.PERFC Check the DTC P0137 P0157 NO > Diagnos 1.CHECH 1. Turn i 2. Checl	<ul> <li>&gt; INSPEC</li> <li>&gt; GO TO</li> <li>&gt; COM COM</li> <li>&gt; voltage b</li> <li>Connector</li> <li>Connector</li> <li>F8</li> <li>&gt; Exercise</li> <li>&gt; Sis Proce</li> <li>&gt; GROUN</li> <li>gnition swith ground c</li> </ul>	ult normal? CTION END 3. PONENT FUNC etween ECM har ECM + Terminal 33 [HO2S2 (bank 1) signal] (HO2S2 (bank 2) signal] ult normal? CTION END C-213, "Diagnos edure D CONNECTION itch OFF.	Terminal 35 (Sensor ground)	Condition Condition Coasting from 80 km/h (50 MPH) with selector lever in the D position	Voltage The voltage should be above 0.68 V at least once during this procedure.

# **2.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0174 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171 or P0174. Refer to <u>EC-240, "DTC Logic"</u>. NO >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

DTC	HO2S2 E				HO2S2 ECM	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0137	1	F95	1	F8	35	Existed
P0157	2	F96	1	ГО		Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC	HO2S2			E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0137	1	F95	4	F8	33	Existed
P0157	2	F96	4	10	34	LAISIEU

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

DTC		HO2S2		Ground	Continuity
DIC	Bank	Connector	Terminal	Giouna	Continuity
P0137	1	F95	4	Ground	Not existed
P0157	2	F96	4	Ground	TNUL EXISIEU

DTC	E	СМ	Ground	Continuity	
DIC	Connector	Terminal	Giouna		
P0137	F8	33	Ground	Not existed	
P0157	10	34	Gibunu	NOL EXISTED	

#### 3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK HEATED OXYGEN SENSOR 2

Refer to <u>EC-215</u>, "Component Inspection". Is the inspection result normal?

Revision: 2013 August

[VQ35DE] < DTC/CIRCUIT DIAGNOSIS > YES >> GO TO 7. NO >> GO TO 6. А **6.**REPLACE HEATED OXYGEN SENSOR 2 Replace malfunctioning heated oxygen sensor 2. Refer to EM-38, "Exploded View". EC **CAUTION:**  Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread С Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool). D >> INSPECTION END **1**.CHECK INTERMITTENT INCIDENT Ε Refer to GI-44, "Intermittent Incident". >> INSPECTION END Component Inspection INFOID:000000009719959 **1**.INSPECTION START Will CONSULT be used? Will CONSULT be used? Н YES >> GO TO 2. NO >> GO TO 3. 2. CHECK HEATED OXYGEN SENSOR 2 (B) With CONSULT 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT. Start engine and warm it up to the normal operating temperature. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 4. Let engine idle for 1 minute. 5. Κ Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item 6. with CONSULT. 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ . v L (Reference data) 1.28 M The voltage should be above 0.68V at least one time. 0.64 The voltage should Ν be below 0.18V at least one time. 0.00 PRIR3458 "HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is - 25%. Is the inspection result normal? YES >> INSPECTION END Ρ NO >> GO TO 6.  ${
m 3.}$ CHECK HEATED OXYGEN SENSOR 2-I Without CONSULT

1. Start engine and warm it up to the normal operating temperature.

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

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

### P0137, P0157 HO2S2

#### < DTC/CIRCUIT DIAGNOSIS >

#### 4. Let engine idle for 1 minute.

5. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	_	Condition	Voltage	
Terminal		Terminal			
F8	F8		Revving up to 4,000 rpm under no load at	The voltage should be above 0.68 V at least once during this procedure.	
10			least 10 times	The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	_	Condition	Voltage	
Terminal		Terminal			
F8	33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor ground)	Keeping engine 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 terminals under the following conditions.

ECM + -					
		-	Condition	Voltage	
	Terminal	Terminal	1		
F8	33 [HO2S2 (bank 1) signal]	35 (Sensor ground)	Coasting from 80 km/h (50 MPH) with se- lector lever in the D position	The voltage should be above 0.68 V at least once during this procedure.	
	34 [HO2S2 (bank 2) signal]			The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**6.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-38, "Exploded View"</u>. CAUTION:

• Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

### P0137, P0157 HO2S2

#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]

• Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

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#### < DTC/CIRCUIT DIAGNOSIS >

### P0138, P0158 HO2S2

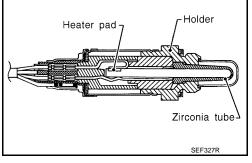
#### Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



#### **DTC Logic**

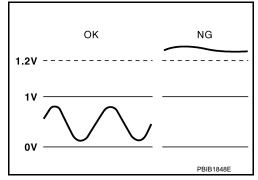
INFOID:000000009719961

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/ F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.

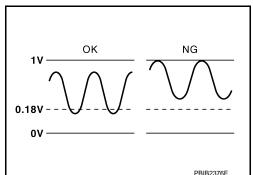
#### **MALFUNCTION A**

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during various driving conditions such as fuel cut.



#### MALFUNCTION B

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during various driving conditions such as fuel-cut.



DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
	Heated oxygen sensor 2	A)	An excessively high voltage from the sen- sor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>
P0138	(bank 1) circuit high volt- age	B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul> <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>

[VQ35DE]

INFOID:000000009719960

#### < DTC/CIRCUIT DIAGNOSIS >

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause	^
Heated oxygen sensor 2 P0158 (bank 2) circuit high volt- age		A)	An excessively high voltage from the sen- sor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>	A
			Harness or connectors     (The sensor circuit is open or shorted)	EC	
	age	B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul>	С

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON. 3.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 2 minutes.
- 7. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-221, "Diagnosis Procedure".
- NO-1 >> With CONSULT: GO TO 3.
- NO-2 >> Without CONSULT: GO TO 5.

#### ${\it 3.}$ PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B

#### NOTE:

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

- 1. Select "DATA MONITOR" mode with CONSULT.
- Start engine and warm it up to the normal operating temperature. 2.
- Turn ignition switch OFF and wait at least 10 seconds. 3.
- Turn ignition switch ON. 4.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- Μ 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- Ν If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F). 9. Open engine hood.
- 10. Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT.
- 11. Follow the instruction of CONSULT display. NOTE:
- It will take at most 10 minutes until "COMPLETED" is displayed.
- 12. Touch "SELF-DIAG RESULTS".

#### Which is displayed on CONSULT screen?

- OK >> INSPECTION END
- >> Go to EC-221, "Diagnosis Procedure". NG
- CON NOT BE DIAGNOSED>>GO TO 4.

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

Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle). 1.

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#### < DTC/CIRCUIT DIAGNOSIS >

2. Perform DTC confirmation procedure again.

#### >> GO TO 3.

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

Perform component function check. Refer to EC-220, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to <u>EC-221, "Diagnosis Procedure"</u>.

#### Component Function Check

INFOID:000000009719962

#### **1.**PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT

- T. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM					
DTC	Connec-	+ –		Condition	Voltage	
	tor	Terminal	Terminal			
P0138	F8 F8 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor	Revving up to 4,000 rpm under no			
P0158		[HO2S2 (bank 2)	ground)	load at least 10 times	at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM					
DTC	Connec-	+	_	Condition	Voltage		
	tor	Terminal	Terminal				
P0138	FQ	33 [HO2S2 (bank 1) signal]	35 (Sensor	Keeping engine speed at idle for 10	The voltage should be below 0.18 V		
P0158	P0158	34 [HO2S2 (bank 2) signal]	ground)	minutes	at least once during this procedure.		
Is the insp	pection res	ult normal?					
YES >							

NO >> GO TO 3.

**3.**PERFORM COMPONENT FUNCTION CHECK-III

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

#### Check the voltage between ECM harness connector terminals under the following conditions.

		ECM					
DTC	Connec-	+	_	Conditio	on	Voltage	
-	tor	Terminal	Terminal				
P0138	- F8	33 [HO2S2 (bank 1) signal]	35 – (Sensor	Coasting from 80 km		The voltage should be below 0.18 V	
P0158		34 [HO2S2 (bank 2) signal]	around)	with selector lever in	the D position	at least once during this procedure.	
the insp	ection res	ult normal?					
		TION END	cia Brocod				
		<u>C-221, "Diagno</u>	SIS PTOCEU	<u>ure</u> .			
Jagnos	sis Proce	edure				INFOID:000000009719963	
.INSPE	CTION ST	ART					
Confirm th	ne detecte	d malfunction (A	or B). Ret	er to <u>EC-218, "DT</u>	C Logic".		
		s detected?			-		
	> GO TO						
-		9. D CONNECTIC					
			νiN				
	gnition sw k around c		Refer to G	round Inspection i	n GI-47 "Circ	cuit Inspection"	
		ult normal?				<u>art nopodion</u> .	
YES >	> GO TO	3.					
		or replace grour					
5.CHEC	K HO2S2 (	CONNECTOR I	FOR WATE	R			
		ted oxygen sen		ess connector.			
		er is not inside c <u>ult normal?</u>	connectors.				
	>> GO TO						
		or replace harne	ess or conn	ectors.			
CHEC	K HO2S2 (	GROUND CIRC	UIT FOR (	OPEN AND SHOR	т		
		ted oxygen sen		ess connector.			
		A harness conn		Igon concor 2 /11	12821 harman	ss connector and ECM harness	
conne		nulty between	nealeu oxy	yen sensor z (no			
DTC		HO2S2		ECM	Continuity		
2.0	Bank	Connector Te	erminal Co	nnector Terminal	Continuity		
P0138	1	F95	1	F8 35	Existed		
P0158	2	F96	1				
. Also			ground an	d short to power.			
a .	NOOTION TOO	ut normal?					
s the insp							
YES >	> GO TO	5.	ort to aroun	d or short to powe	r in harness o	or connectors.	

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

DTC		HO2S2		E	Continuity	
DIC	Bank Connecto		Terminal	Connector		Terminal
P0138	1	F95	4	F8	33	Existed
P0158	2	F96	4	10	34	LAISIEU

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

DTC		HO2S2	Ground	Continuity	
DIC	Bank	Connector	Terminal	Giouna	Continuity
P0138	1	F95	4	Ground	Not existed
P0158	2	F96 4		Giouna	

DTC	E	CM	Ground	Continuity	
DIC	Connector	Terminal	Ground		
P0138	F8	33	Ground	Not existed	
P0158	10	34	Ground	NUL EXISIEU	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 6.

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

**6.**CHECK HEATED OXYGEN SENSOR 2

Refer to EC-224, "Component Inspection".

Is the inspection result normal?

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

**7.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to EM-38, "Exploded View".

#### CAUTION:

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

>> INSPECTION END

**8.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

9. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.
- Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace ground connection.

10. CLEAR MIXTURE RATIO SELF-LEARNING VALUE

			P	U138, PU	158 HOZ	.52		
< DTC/CI	RCUIT DIA	GNOSIS :	>				[VQ35DE]	
1. Clear	the mixture	e ratio self-	learning v	alue. Refer	to <u>EC-22,</u> "	MIXTURE	RATIO SELF-LEARNING VALUE	
<u>CLEA</u>	R : Special	Repair Re	<u>quirement</u>	<u>_</u> -				А
	ngine for a			•				
	•			ed? Is it diff		-		
	> Perform 1 > GO TO 1		gnosis for	DTC P0172	., P0175. Re	efer to <u>EC-2</u>	244, "DTC Logic".	EC
				FOR OPEN		рт		
			CIRCUIT		AND SHU			С
	gnition swit		sonsor 2 h	arness coni	nector			
	nnect ECM							
4. Check	the contin	uity betwee	en HO2S2	harness co	nnector and	d ECM harn	less connector.	D
				1			_	
DTC		HO2S2		EC	CM	Continuity		Е
	Bank	Connector	Terminal	Connector	Terminal		_	
P0138	1	F95	1	F8	35	Existed		
P0158	2	F96	1	10	00	Existed	_	F
5. Also c	heck harne	ess for sho	rt to ground	d and short	to power.		_	
-	ection resu							
	> GO TO 1							G
			-		•		or connectors.	
IZ.CHE	CK HO2S2	INPUT SIG	GNAL CIR	CUIT FOR	OPEN AND	SHORT		Н
1. Check	the contin	uity betwee	en HO2S2	harness co	nnector and	d ECM harn	less connector.	
							_	
DTC		HO2S2		EC	CM	Continuity		
	Bank	Connector	Terminal	Connector	Terminal	Containanty	_	
P0138	1	F95	4	F8	33	Existed		
P0158	2	F96	4	10	34	Existed	_	J
		nuity betwe	en HO2S	2 harness o	connector a	nd ground,	or ECM harness connector and	
groun	d.							Κ
		110000				-		
DTC		HO2S2		Ground	Continuity			
	Bank	Connector	Terminal			_		L
P0138	1	F95	4	Ground	Not existed			
P0158	2	F96	4			_		р. Л
	1							M
DTC	E	СМ	Ground	I Continu	itv			
	Connector	Terminal						Ν
P0138	F8	33	Ground	Not exist	hat			
P0158	10	34	Crodite					
3. Also c	heck harne	ess for sho	rt to power					0
Is the insp	ection resu	It normal?						
	> GO TO 1		1					Р
	• •		-		ort to power	' in harness	or connectors.	Г
1 <b>3.</b> CHE	CK HEATE	D OXYGEI	N SENSO	R 2				
Refer to E	<u>C-224, "Co</u>	mponent Ir	nspection"					

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 14.

< DTC/CIRCUIT DIAGNOSIS >

**14.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-38, "Exploded View"</u>. CAUTION:

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

>> INSPECTION END

15. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

Component Inspection

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

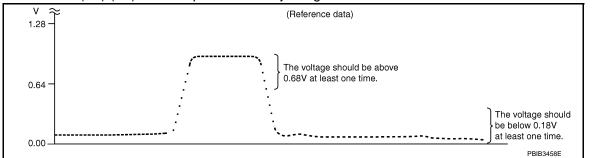
YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.
- 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm$  25%.



"HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is – 25%.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

**3.**CHECK HEATED OXYGEN SENSOR 2-I

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

INFOID:000000009719964

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM			
•	+	-	Condition	Voltage
Connector	Terminal	Terminal	-	
F8	33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor 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 inspe	ection result norr	nal?		
YES >> NO >> 4.CHECK	> INSPECTION I > GO TO 4. HEATED OXYG	END SEN SENS	SOR 2-II ness connector terminals under the	following conditions.
	ECM			
	-		Condition	Voltogo
Connector	+ To residual	- Terreinel	Condition	Voltage
	Terminal	Terminal		
F8	33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor ground)	Keeping engine 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.
ls the inspe	ection result norr	nal?		
NO >> 5.CHECK	<ul> <li>INSPECTION I</li> <li>GO TO 5.</li> <li>HEATED OXYG</li> <li>voltage between</li> <li>ECM</li> </ul>	EN SENS	SOR 2-III ness connector terminals under the	following conditions.
	+	_	Condition	Voltage
Connector	Terminal	Terminal		
F8	33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor ground)	Coasting from 80 km/h (50 MPH) with se- lector lever in the D position	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.
s the inspe	ection result norr	nal?		
YES >>	> INSPECTION I > GO TO 6.			
6.REPLA	CE HEATED OX	YGEN SE	NSOR 2	
Replace m			en sensor 2. Refer to <u>EM-38, "Explo</u> or which has been dropped from	

< DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

#### < DTC/CIRCUIT DIAGNOSIS >

### P0139, P0159 HO2S2

#### Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

#### **DTC** Logic

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst 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	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Eucl system</li> </ul>	
P0159	Heated oxygen sensor 2 (bank 2) circuit slow re- sponse	heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul><li>Fuel system</li><li>EVAP system</li><li>Intake air system</li></ul>	

#### DTC CONFIRMATION PROCEDURE

#### **1.**INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

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).

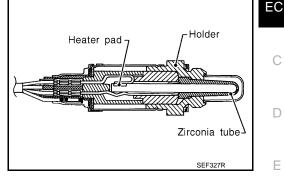
>> GO TO 3.

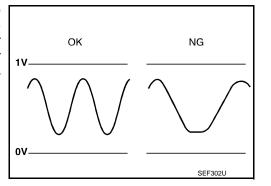
#### EC-227

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#### < DTC/CIRCUIT DIAGNOSIS >

## **3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 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 gear 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 the 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".

DTC	Data monitor item	Status
P0139	HO2 S2 DIAG1 (B1)	
F0139	HO2 S2 DIAG2 (B1)	CMPLT
P0159	HO2 S2 DIAG1 (B2)	GMFEI
F0159	HO2 S2 DIAG2 (B2)	

Is "CMPLT" displayed on CONSULT 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.
- Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT.
- 3. Start engine and follow the instruction of CONSULT display. **NOTE:**

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

#### Is "COMPLETED" displayed on CONSULT 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

Perform ECM self-diagnosis.

Is DTC "P0139" or "P0159" detected?

YES >> Proceed to EC-230, "Diagnosis Procedure".

NO >> INSPECTION END

**/**.PERFORM COMPONENT FUNCTION CHECK

· · · · · · · · · · · · · · · · · · ·	IRCUIT DI	AGNOSIS >			[VQ35DE]
Perform o	component	function check.	Refer to E	C-229, "Component Function C	Check".
se comp		ction check to ch C might not be c		verall function of the heated oxy	ygen sensor 2 circuit. During this
		ult normal?			
				) e o duno "	
		to <u>EC-230, "Di</u>	agnosis r		
Jompo	nent Fur	ction Check			INFOID:00000009719967
<b>1.</b> PERF	ORM COM	PONENT FUNC	TION CH	ECK-I	
I.         Start           2.         Turn           3.         Turn           4.         Turn           5.         Start           6.         Let e	ignition sw ignition sw ignition sw engine and ngine idle f	d warm it up to th itch OFF and wa itch ON. itch OFF and wa I keep the engine or 1 minute.	iit at least iit at least e speed b	10 seconds.	r at least 1 minute under no load. following conditions.
		ECM			
DTC	Connec-	+	-	Condition	Voltage
	tor	Terminal	Terminal		
P0139	– F8	33 [HO2S2 (bank 1) signal]	35 (Sensor	Revving up to 4,000 rpm under no	A change of voltage should be more than 0.8 V for 1 second during this
P0159		34 [HO2S2 (bank 2) signal]	ground)	load at least 10 times	procedure.
	-				
YES NO PERFO	>> INSPEC >> GO TO ORM COM	PONENT FUNC		ECK-II nector terminals under the follo	wing conditions.
YES NO 2.PERFO	>> INSPEC >> GO TO ORM COM	TION END 2. PONENT FUNC			wing conditions.
YES NO 2.PERFO	>> INSPEC >> GO TO ORM COM	CTION END 2. PONENT FUNC etween ECM ha			wing conditions. Voltage
YES NO 2.PERF( Check the	>> INSPEC >> GO TO ORM COM e voltage b	ETION END 2. PONENT FUNC etween ECM ha ECM		nector terminals under the follo	
YES NO 2.PERFO	>> INSPEC >> GO TO ORM COM e voltage b Connec- tor	ETION END 2. PONENT FUNC etween ECM ha ECM +	rness con – Terminal 35	nector terminals under the follor Condition	Voltage A change of voltage should be more
YES NO 2.PERFO Check the DTC	>> INSPEC >> GO TO ORM COM e voltage b	ETION END 2. PONENT FUNC etween ECM ha ECM + Terminal 33 [HO2S2 (bank 1)	rness con – Terminal	nector terminals under the follo	Voltage
YES NO 2.PERFO Check the DTC P0139 P0159	>> INSPEC >> GO TO ORM COM e voltage b Connec- tor F8	ETION END 2. PONENT FUNC etween ECM ha ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal] ult normal?	rness con – Terminal 35 (Sensor	nector terminals under the follor Condition	Voltage A change of voltage should be more than 0.8 V for 1 second during this
YES NO 2.PERFO Check the DTC P0139 P0159 NO	<ul> <li>&gt;&gt; INSPEC</li> <li>&gt;&gt; GO TO</li> <li>ORM COM</li> <li>ovoltage b</li> <li>connector</li> <li>F8</li> <li>contection res</li> <li>&gt;&gt; INSPEC</li> <li>&gt;&gt; GO TO</li> </ul>	ETION END 2. PONENT FUNC etween ECM ha ECM + Terminal 33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal] Ult normal? ETION END	Terminal 35 (Sensor ground)	nector terminals under the follor Condition Keeping engine at idle for 10 minutes	Voltage A change of voltage should be more than 0.8 V for 1 second during this

#### < DTC/CIRCUIT DIAGNOSIS >

VQ35DE1	

	ECM					
DTC	Connec- tor	+	_	Condition	Voltage	
		Terminal	Terminal	*		
P0139	33 [HO2S2 (bank 1) signal]		35 (Sensor	Coasting from 80 km/h (50 MPH) in	A change of voltage should be more than 0.8 V for 1 second during this	
P0159	10	34 [HO2S2 (bank 2) signal]	ground)	D position	procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-230, "Diagnosis Procedure".

### Diagnosis Procedure

INFOID:000000009719968

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

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".
- Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

### **2.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

 Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".

2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-240, "DTC Logic"</u> or <u>EC-244, "DTC Logic"</u>.

NO >> GO TO 3.

 $\mathbf{3}$ . CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

#### 1. Turn ignition switch OFF.

- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

DTC		HO2S2		E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0139	1	F95	1	F8	35	Existed
P0159	2	F96	1	10		Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

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DTC		HO2S2		E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0139	1	F95	4	F8	33	Existed
P0159	2	F96	4	10	34	LAISIEU

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

DTC		HO2S2	Ground	Continuity	
DIC	Bank	Connector	Terminal	Ground	Continuity
P0139	1	F95	4	Ground	Not existed
P0159	2	F96	4	Giouna	

DTC	E	СМ	Ground	Continuity	
DIC	Connector	Terminal	Cround		
P0139	F8	33	Ground	Not existed	
P0159	10	34	Ground		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK HEATED OXYGEN SENSOR 2

Refer to EC-224, "Component Inspection".

<u>Is the inspection result normal?</u> YES >> GO TO 7.

NO >> GO TO 6.

**6.**REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-38, "Exploded View"</u>. CAUTION:

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

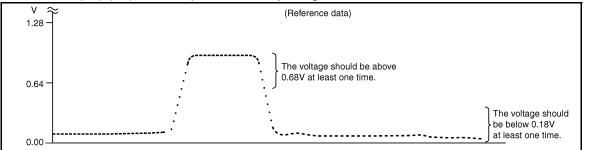
>> INSPECTION END 7.CHECK INTERMITTENT INCIDENT Refer to GI-44. "Intermittent Incident". >> INSPECTION END Component Inspection INFOID:0000009719969 1.INSPECTION START Will CONSULT be used? Will CONSULT be used? VES = \$\$ CO TO 2

YES  $\Rightarrow$  GO TO 2. NO  $\Rightarrow$  GO TO 3. 2.CHECK HEATED OXYGEN SENSOR 2

#### < DTC/CIRCUIT DIAGNOSIS >

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.
- 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



#### "HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

Is the inspection result normal?

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

**3.**CHECK HEATED OXYGEN SENSOR 2-I

#### Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	-	Condition	Voltage	
	Terminal	Terminal			
F8	33 [HO2S2 (bank 1) signal]	35 (Sensor	Revving up to 4,000 rpm under no load at	The voltage should be above 0.68 V at least once during this procedure.	
F8	34 [HO2S2 (bank 2) signal]	ground)	least 10 times	The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM					
Connector	+	_	Condition	Voltage		
	Terminal	Terminal				
F8	33 [HO2S2 (bank 1) signal]	35 (Sensor	Keeping engine 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		
	34 [HO2S2 (bank 2) signal]	ground)		least once during this procedure.		
s the inspe	ection result norn	nal?				
	INSPECTION E	END				
	• GO TO 5.					
<b>D.</b> CHECK	HEATED OXYG	EN SENS	SOR 2-III			
Check the	voltage between	ECM har	ness connector terminals under the	following conditions.		
	-			-		
	ECM					
Compostor	+	_	Condition	Voltage		
Connector	Terminal	Terminal				
	33					
	[HO2S2 (bank 1)	35		The voltage should be above 0.68 V at		
F8	signal]	(Sensor	Coasting from 80 km/h (50 MPH) with se- lector lever in the D position	least once during this procedure. The voltage should be below 0.18 V at		
	34 [HO2S2 (bank 2)	ground)	lector lever in the D position	least once during this procedure.		
	signal]					
Is the inspe	ection result norn	nal?				
YES >>	INSPECTION E	END				
NO >>	• GO TO 6.					
6.REPLA	CE HEATED OX	YGEN SE	NSOR 2			
Replace m	alfunctioning hea	ated oxva	en sensor 2. Refer to EM-38, "Explo	ded View".		
CAUTION:	0	,,,				
				a height of more than 0.5 m (19.7		
			concrete floor; use a new one.	ads using Oxygen Sensor Thread		
Cleaner	[commercial s	ervice to		and approved anti-seize lubrican		
(comme	cial service too	ol).				
>>	INSPECTION E	END				

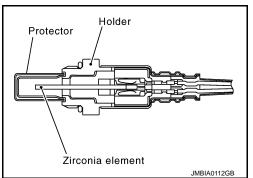
### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

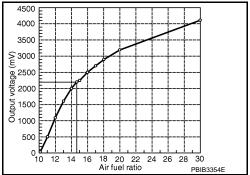
# P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR

### Description

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

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





### DTC Logic

#### 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				
P014D	(bank 1) circuit slow re- sponse				
P015A	Air fuel ratio (A/F) sensor 1				
P015B	(bank 1) circuit delayed re- sponse	• The response time of a A/F sensor 1 signal de- lays more than the specified time computed by ECM.	<ul> <li>Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> <li>A/F sensor 1</li> </ul>		
P014E	Air fuel ratio (A/F) sensor 1				
P014F	(bank 2) circuit slow re- sponse Air fuel ratio (A/F) sensor 1 (bank 2) circuit delayed re- sponse				
P015C					
P015D		delayed re-			

#### 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.

#### EC-234

INFOID:000000009719970

INFOID:000000009719971

< DTC/CIRCUIT DIAGNOSIS >

#### **TESTING CONDITION:** Before performing the following procedure, confirm that battery voltage is more than 11 V at idle. А Do you have CONSULT? YES >> GO TO 2. NO >> GO TO 6. EC 2. PERFORM DTC CONFIRMATION PROCEDURE-1 (P)With CONSULT Start engine and warm it up to normal operating temperature. 1. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. Turn ignition switch ON. D 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. Let engine idle for 1 minute. 7. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds. Е Fully release accelerator pedal and then let engine idle for about 1 minute. Check the items status of "DATA MONITOR" as follows. NOTE: F If "PRSNT" changed to "ABSNT", refer to EC-201, "Component Function Check". DTC Data monitor item Status P014C P014D A/F SEN1 DIAG3 (B1) P015A P015B Н PRSNT • P014E • P014F A/F SEN1 DIAG3 (B2) • P015C • P015D Is "PRSNT" displayed on CONSULT screen? YES >> GO TO 4. NO >> GO TO 3. **3.** PERFORM DTC CONFIRMATION PROCEDURE-2 Κ With CONSULT Perform DTC confirmation procedure-1 again. Is "PRSNT" displayed on CONSULT screen? L YES >> GO TO 4. NO >> Refer to EC-201, "Component Function Check". **4.**PERFORM DTC CONFIRMATION PROCEDURE-2 M With CONSULT Wait for about 20 seconds at idle. 1. Check the items status of "DATA MONITOR" as follows. 2. Ν NOTE: If "CMPLT" changed to "INCMP", refer to EC-201, "Component Function Check". DTC Data monitor item Status P014C A/F SEN1 DIAG1 (B1) P014D Ρ P015A A/F SEN1 DIAG2 (B1) P015B CMPLT • P014E A/F SEN1 DIAG1 (B2) P014F P015C A/F SEN1 DIAG2 (B2)

Is "CMPLT" displayed on CONSULT screen?

P015D

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 5.
- NO >> Refer to EC-201, "Component Function Check".

**5.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

Check the "SELF-DIAG RESULT".

#### Is any DTC detected?

YES >> Proceed to EC-236, "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.

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-236, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009719972

[VQ35DE]

### 1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection M95. Refer to Ground Inspection in GI-47, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

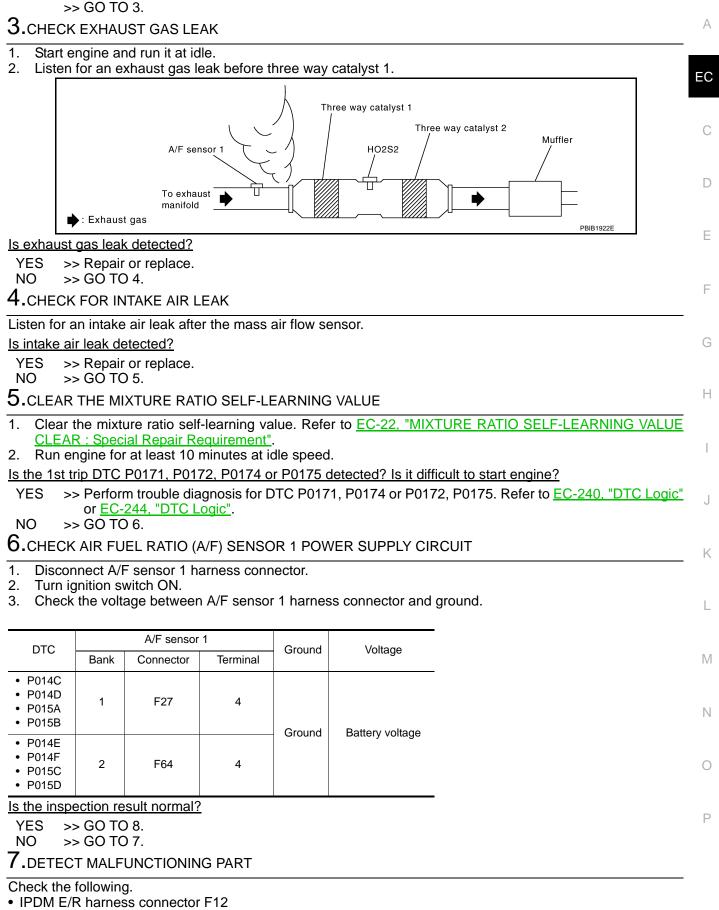
NO >> Repair or replace ground connection.

2.RETIGHTEN A/F SENSOR 1

Loosen and retighten the A/F sensor 1. Refer to EM-38. "Exploded View".

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



- 15 A fuse (No. 46)
- Harness for open or short between A/F sensor 1 and fuse

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

>> Repair or replace harness or connectors.

### $\mathbf{8}$ .CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

DTC		A/F sensor	1	EC	Continuity	
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
• P014C			1		45	Existed
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F27	2	F8	49	
• P014E			1	10	53	LAISteu
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2	F64	2		57	

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

DTC		A/F sensor	Ground	Continuity	
DIC	Bank Connector		Terminal		Ground
• P014C			1		Not existed
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F27	2	- Ground	
• P014E	2 F64		1		
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>		F64	2		

DTC		ECM		Ground	Continuity	
DIC	Bank	Connector Terminal		Ciouna	Continuity	
• P014C			45			
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	- F8	49	- Ground	Not existed	
• P014E			53			
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2		57			

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 9.

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

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

Refer to EC-160, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 13.

**10.**CHECK MASS AIR FLOW SENSOR

Check both mass air flow sensor (bank 1 and bank 2). Refer to <u>EC-169</u>, "Component Inspection".

< DTC/CIRCUIT DIAGNOSIS >	VQ35DE]
Is the inspection result normal?	
YES >> GO TO 11.	A
NO >> Replace malfunctioning mass air flow sensor. Refer to <u>EM-31, "Exploded View"</u> . <b>11.</b> CHECK PCV VALVE	
	EC
Refer to <u>EC-464. "Component Inspection"</u> .	
Is the inspection result normal?	
YES >> GO TO 12. NO >> Repair or replace PCV valve. Refer to <u>EM-54, "Exploded View"</u> .	С
12. CHECK INTERMITTENT INCIDENT	
Perform GI-44, "Intermittent Incident".	D
Is the inspection result normal?	
YES >> GO TO 13.	E
NO >> Repair or replace.	
13.REPLACE AIR FUEL RATIO (A/F) SENSOR 1	
Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to <u>EM-38. "Exploded View"</u> . CAUTION:	F
<ul> <li>Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 i</li> </ul>	in) onto a
hard surface such as a concrete floor; use a new one.	
<ul> <li>Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved Anti-seize</li> </ul>	or inread
(commercial service tool).	Lubricant
· · · · · ·	Н
>> INSPECTION END	
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#### < DTC/CIRCUIT DIAGNOSIS >

### P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

#### DTC Logic

INFOID:000000009719973

[VQ35DE]

#### DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (the actual mixture ratio is too lean), the ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator	
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector	

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171	Fuel injection system too lean (bank 1)	m too	<ul> <li>Intake air leakage</li> <li>A/F sensor 1</li> </ul>
P0174	Fuel injection system too lean (bank 2)	<ul> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul>	<ul> <li>Fuel injector</li> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

#### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".

2. Start engine.

Is it difficult to start engine?

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

**3.**RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too.

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-241, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

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

- 1. Keep engine idle for at least 5 minutes.
- 2. Check 1st trip DTC.

P0171, P0174 FUEL INJECTION SYSTEM FUNCTION	
< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	]
Is 1st trip DTC detected?	
YES >> Go to <u>EC-241, "Diagnosis Procedure"</u> . NO >> GO TO 5.	A
5. PERFORM DTC CONFIRMATION PROCEDURE-III	FO
1. Turn ignition switch OFF and wait at least 10 seconds.	– EC
<ol> <li>Start engine.</li> <li>Maintain the following conditions for at least 10 consecutive minutes. Hold the accelerator pedal as steady as possible.</li> </ol>	С
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-241, "Diagnosis Procedure".         NO       >> INSPECTION END	E
Diagnosis Procedure	F 974
1.CHECK EXHAUST GAS LEAKAGE	G
<ol> <li>Start engine and run it at idle.</li> <li>Listen for an exhaust gas leakage before three way catalyst (manifold).</li> </ol>	
A/F sensor 1 To exhaust manifold To exha	H
➡ : Exhaust gas	Ū
PBIB1216E Is exhaust gas leakage detected?	IZ.
YES >> Repair or replace malfunctioning part. NO >> GO TO 2.	ĸ
2. CHECK FOR INTAKE AIR LEAKAGE	L
<ol> <li>Listen for an intake air leakage after the mass air flow sensor.</li> <li>Check PCV hose connection.</li> </ol>	_
Is intake air leakage detected?	M
YES >> Repair or replace malfunctioning part. NO >> GO TO 3.	
<b>3.</b> CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT	Ν
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect corresponding A/F sensor 1 harness connector.</li> <li>Disconnect ECM harness connector.</li> </ol>	0

- Disconnect corresponding A/F sensor 1 harness connector.
   Disconnect ECM harness connector.
- 4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0171		E27	1		45	
FUITI		2	F8	49	Existed	
D0174		1	ГО	53	Existed	
P0174	2	F64	2		57	

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#### < DTC/CIRCUIT DIAGNOSIS >

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

DTC		A/F sensor 1	A/F sensor 1		Continuity	
DIC	Bank	Connector	Terminal	Ground	Continuity	
P0171	1	F27	1		Not existed	
FUITI	I	Γ21	2	Ground		
P0174	2 F64	F64	1	Giodila		
P0174	2	1 04	2			

DTC	E	CM	Ground Continuity		
DIC	Connector	Terminal	Giouna	Continuity	
P0171 P0174		45	Ground		
	F8	49		Not existed	
	۲O	53	Giouna	NOL EXISTED	
		57			

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-532, "Inspection".

2. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-532, "Inspection".

#### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

**5.** DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace "fuel filter and fuel pump assembly". Refer to FL-5, "Exploded View".

NO >> Repair or replace malfunctioning part.

**6.**CHECK MASS AIR FLOW SENSOR

#### With CONSULT

- 1. Install all removed parts.
- 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT. For specification, refer to <u>EC-536. "Mass Air Flow Sensor"</u>.

#### With GST

- 1. Install all removed parts.
- Check mass air flow sensor signal in Service \$01 with GST. For specification, refer to <u>EC-536</u>, "<u>Mass Air Flow Sensor</u>".

Is the measurement value within the specification?

- YES >> GO TO 7.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-173, "Diagnosis Procedure"</u>.

#### **7.**CHECK FUNCTION OF FUEL INJECTOR

#### With CONSULT

1. Start engine.

[VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

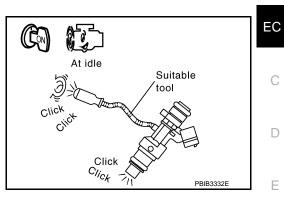
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-446</u>, "Diagnosis Procedure".



### 8.CHECK FUEL INJECTOR

1.	Turn ignition switch OFF.	
2.	Confirm that the engine is cooled down and there are no fire hazards near the vehicle.	F
3.	Disconnect all fuel injector harness connectors.	
4.	Remove fuel tube assembly. Refer to EM-49, "Exploded View".	
	Keep fuel hose and all fuel injectors connected to fuel tube.	G
5.	For DTC P0171, reconnect fuel injector harness connectors on bank 1.	0
	For DTC P0174, reconnect fuel injector harness connectors on bank 2.	
6.	Disconnect all ignition coil harness connectors.	
7.	Prepare pans or saucers under each fuel injector.	Н
8.	Crank engine for about 3 seconds.	
	For DTC P0171, check that fuel sprays out from fuel injectors on bank 1.	
	For DTC P0174, check that fuel sprays out from fuel injectors on bank 2.	1
	· · · · · · · · · · · · · · · · · · ·	1
	Fuel should be sprayed evenly for each fuel injector.	
1- 4		
	he inspection result normal?	J
	ES >> GO TO 9.	
N		
	Refer to <u>EM-49, "Exploded View"</u> .	K
9.	CHECK INTERMITTENT INCIDENT	
Re	fer to <u>GI-44, "Intermittent Incident"</u> .	I
	>> INSPECTION END	
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[VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

### P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

### DTC Logic

INFOID:000000009719975

[VQ35DE]

#### DTC DETECTION LOGIC

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from A/F sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (the actual mixture ratio is too rich), the ECM judges the condition as the fuel injection system malfunction and illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator	
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector	

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172	Fuel injection system too rich (bank 1)	• Fuel injection system does not operate properly.	<ul><li> A/F sensor 1</li><li> Fuel injector</li></ul>
P0175	Fuel injection system too rich (bank 2)	• The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	<ul> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> <li>Mass air flow sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE-I

- Clear the mixture ratio self-learning value. Refer to EC-22, "MIXTURE RATIO SELF-LEARNING VALUE 1. CLEAR : Special Repair Requirement".
- Start engine. 2.

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-245, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

#### 4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Keep engine idle for at least 5 minutes.

Check 1st trip DTC. 2.

#### Is 1st trip DTC detected?

>> Go to EC-245, "Diagnosis Procedure". YES

>> GO TO 5. NO

#### [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > 5. PERFORM DTC CONFIRMATION PROCEDURE-III А 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. EC 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. D Is 1st trip DTC detected? >> Go to EC-245, "Diagnosis Procedure". YES >> INSPECTION END NO Ε Diagnosis Procedure INFOID:000000009719976 1.CHECK EXHAUST GAS LEAKAGE F Start engine and run it at idle. 1. 2. Listen for an exhaust gas leakage before three way catalyst (manifold). Three way catalyst Three way catalyst Muffler (Manifold) (Under floor) H02S2 A/F sensor 1 Н To exhaust manifold 📫 : Exhaust gas PBIB1216E Is exhaust gas leakage detected? YES >> Repair or replace malfunctioning part. NO >> GO TO 2. 2.CHECK FOR INTAKE AIR LEAKAGE Κ Listen for an intake air leakage after the mass air flow sensor. Is intake air leakage detected? L YES >> Repair or replace malfunctioning part. 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.

DTC	A/F sensor 1		E	Continuity			
	Bank	Connector	Terminal	Connector	Terminal	Continuity	
-	P0172	1 F27	F27 —	1	F8	45	Existed
	P0172			2		49	
-	D0175		1	FO	53	Existed	
	P0175	2	Γ04	2		57	

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

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#### < DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1		Ground	Continuity
DIC	Bank	Connector	Terminal	Ground	Continuity
P0172	1	F27 1			
FUITZ	I	121	2	Ground	Not existed
P0175	2	F64	1	Gibunu	NUL EXISIEU
FU175	2 F64		2		

DTC	EC	CM	Ground	Continuity
DIC	Connector	Terminal	Giouna	Continuity
P0172		45		Not existed
P0172	ГО	49	Ground	
P0175	F8	53	Giouna	NOL EXISTED
P0175		57		

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-532, "Inspection".

2. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-532, "Inspection".

#### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace "fuel filter and fuel pump assembly". Refer to <u>EM-49, "Exploded View"</u>.

5.CHECK MASS AIR FLOW SENSOR

#### With CONSULT

- 1. Install all removed parts.
- 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT. For specification, refer to <u>EC-536, "Mass Air Flow Sensor"</u>.

#### With GST

- 1. Install all removed parts.
- Check mass air flow sensor signal in "Service \$01" with GST. For specification, refer to <u>EC-536, "Mass Air Flow Sensor"</u>.

Is the measurement value within the specification?

- YES >> GO TO 6.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-173, "Diagnosis Procedure"</u>.

#### **6.**CHECK FUNCTION OF FUEL INJECTOR

#### With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

1. Let engine idle.

#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]

2. Listen to each fuel injector operating sound.	
Is the inspection result normal?	
YES >> GO TO 7.	At idle
NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to	Suitable
EC-446, "Diagnosis Procedure".	tool
	Click
7.CHECK FUEL INJECTOR	од УЛ РЫВЗЗЗ2Е
1. Remove fuel injector assembly. Refer to EM-49, "Exploded View"	
Keep fuel hose and all fuel injectors connected to fuel tube.	
2. Confirm that the engine is cooled down and there are no fire haza	ards near the vehicle.
3. Disconnect all fuel injector harness connectors.	
<ol> <li>Disconnect all ignition coil harness connectors.</li> <li>Prepare pans or saucers under each fuel injectors.</li> </ol>	F
<ol> <li>Crank engine for about 3 seconds.</li> </ol>	1
Check fuel does not drip from fuel injector.	
Is the inspection result normal?	G
YES >> GO TO 8.	
NO >> Replace the fuel injectors from which fuel is dripping. Alw to <u>EM-49</u> , "Exploded View".	vays replace O-ring with new one. Refer ⊦
8. CHECK INTERMITTENT INCIDENT	
Refer to GI-44, "Intermittent Incident".	
	I
>> INSPECTION END	
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	F

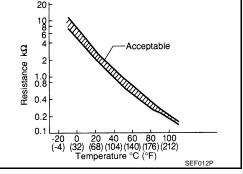
#### < DTC/CIRCUIT DIAGNOSIS >

### P0181 FTT SENSOR

### Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases. <**Reference data**>

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 terminals 95 (Fuel tank temperature sensor) and ground.

### **DTC Logic**

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition		Possible cause
		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> <li>Harness or connectors (The FTT sensor circuit is open or shorted)</li> <li>FTT sensor</li> </ul>
P0181	FTT SENSOR [Fuel tank temperature (FTT) sensor circuit range/perfor- mance]	B)	The comparison result of signals trans- mitted 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 temper- ature sensors when the engine is start- ed with its cold state.	<ul> <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?

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INFOID:000000009719978

### P0181 FTT SENSOR

P0181 FTT SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [V	Q35DE]
YES >> Proceed to <u>EC-250, "Diagnosis Procedure"</u> . NO >> GO TO 4.	А
4. CHECK ENGINE COOLANT TEMPERATURE	A
(F)With CONSULT	
<ol> <li>Select "COOLAN TEMP/S" in "DATA MONITOR" with CONSULT.</li> <li>Check "COOLAN TEMP/S" value.</li> </ol>	EC
With GST	
Follow the procedure "With CONSULT" above.	С
<u>"COOLAN TEMP/S" less than 60°C (140°F)?</u> YES >> INSPECTION END	
NO >> GO TO 5.	D
5.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-II	
With CONSULT <ol> <li>Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).</li> </ol>	E
2. Wait at least 10 seconds.	
<ol> <li>Check 1st trip DTC.</li> <li>With GST</li> </ol>	F
Follow the procedure "With CONSULT" above.	
<u>Is 1st trip DTC detected?</u> YES >> Proceed to <u>EC-250, "Diagnosis Procedure"</u> .	G
NO >> GO TO 6.	
6.PERFORM COMPONENT FUNCTION CHECK (FOR MALFUNCTION B)	Н
Perform component function check. Refer to <u>EC-250, "Component Function Check"</u> . NOTE:	
Use the component function check to check the overall function of the FTT sensor circuit. During this 1st trip DTC might not be confirmed.	check, a
Is the inspection result normal?	
YES >> INSPECTION END NO >> Proceed to <u>EC-250, "Diagnosis Procedure"</u> .	J
7. PRECONDITIONING	
If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following	ng proce-K
dure before conducting the next test. 1. Turn ignition switch OFF and wait at least 10 seconds.	
2. Turn ignition switch ON.	L
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>TESTING CONDITION:</li> </ol>	
<ul> <li>Before performing the following procedure, do not add fuel.</li> <li>Before performing the following procedure, check that fuel level is between 1/4 and 4/4.</li> </ul>	M
<ul> <li>Before performing the following procedure, confirm that battery voltage is 11 V or more at id</li> </ul>	le.
>> GO TO 8.	Ν
8.PERFORM DTC CONFIRMATION PROCEDURE B	
1. Start engine and let it idle for 60 minutes.	0
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 ( 3. Turn ignition switch OFF and soak the vehicle for 12 hours. CAUTION:	95°F). P
Never turn ignition switch ON during soaking.	
<b>NOTE:</b> The vehicle must be cooled with the food open.	
<ol> <li>Start engine and let it idle for 5 minutes or more.</li> <li>CAUTION:</li> </ol>	
Never turn ignition switch OFF during idling.	

#### < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-250</u>, "Diagnosis Procedure".

NO >> INSPECTION END

Component Function Check

### **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, "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 (k $\Omega$ )	
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 – 2.7
4 and 5		50 (122)	0.79 – 0.90

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to EC-250, "Diagnosis Procedure".

### 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-250, "Diagnosis Procedure".

#### Diagnosis Procedure

1.	INSPECTION START
----	------------------

Confirm the detected malfunction (A or B). Refer to EC-248, "DTC Logic".

Which malfunction is detected?

A >> GO TO 2.

B >> GO TO 7.

2. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace ground connection.

3.CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect "fuel level sensor unit and fuel pump" harness connector.

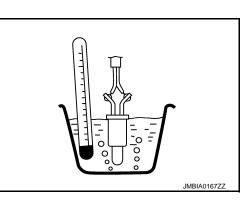
3. Turn ignition switch ON.

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	Ground		
B40	4	Ground	Approx. 5 V	

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.



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### P0181 FTT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

4.DETECT MA		IG PART				Λ
Check the follow						A
<ul><li>Harness conn</li><li>Harness for operation</li></ul>			and "fuel leve	l sensor unit a	nd fuel pump"	EC
						EC
		•		•	rness or connector.	
		ERATURE 5	ENSOR GRU		T FOR OPEN AND SHORT	С
2. Disconnect	n switch OFF. ECM harness c continuity betwe		l sensor unit	and fuel pump	" harness connector and ECM harness	D
Fuel level sensor	unit and fuel pump	EC	CM	Orationity	-	Е
Connector	Terminal	Connector	Terminal	Continuity		
B40	5	E16	104	Existed	-	F
4. Also check		•	and short to	power.		
Is the inspection YES >> GO		<u>.</u>				
NO >> GO						G
6.DETECT MA	LFUNCTIONIN	IG PART				
Check the follow						Н
<ul><li>Harness conn</li><li>Harness conn</li></ul>						
Harness for open set of the			evel sensor u	nit and fuel pur	mp" and ECM	I
. De		about to suc		te neuronie her		
7.CHECK FUE	•	•		to power in ha	rness or connector.	J
Refer to EC-25			LINGOR			
Is the inspection						K
YES >> GO	TO 8.					
-			and fuel pum	p". Refer to <u>FL</u>	-5, "Exploded View".	
8.CHECK INTI						L
Refer to <u>GI-44,</u>	"Intermittent Inc	<u>sident"</u> .				
>> INS	SPECTION END	)				M
Component					INFOID:000000009719981	
	-				iiii old.cococodob (1990)	Ν
1.CHECK FUE		ERATURE S	ENSOR			
	n switch OFF. el level sensor u	ınit. Refer to	<u>FL-5, "Explo</u>	ded View".		0

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### P0181 FTT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

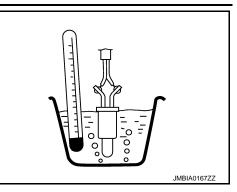
3. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance	
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 - 2.7 kΩ
4 810 5		50 (122)	0.79 - 0.90 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-5, "Exploded View"</u>.



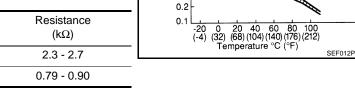
#### < DTC/CIRCUIT DIAGNOSIS >

### P0182, P0183 FTT SENSOR

### Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases. <**Reference data>** 

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90



Resistance kΩ

20

10 8 6

ž

2

1.0 0.8

0.4

\*: These data are reference values and are measured between ECM terminals 95 (Fuel tank temperature sensor) and ground.

### **DTC Logic**

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or shorted.)
P0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	Fuel tank temperature sensor

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

## >> GO TO 2.

### 2.PERFORM DTC CONFIRMATION PROCEDURE 1. Turn ignition switch ON and wait at least 5 seconds.

- 2. Check 1st trip DTC.
- Is 1st trip DTC detected?
- Is is input delected?
- YES >> Go to EC-253, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

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

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.
- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

2.CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

## EC-253



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Acceptable

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## P0182, P0183 FTT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between "fuel level sensor unit and fuel pump" harness connector and ground.

Fuel level sensor	unit and fuel pump	Ground	Voltage	
Connector	Connector Terminal		voltage	
B40	4	Ground	Approx. 5 V	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E104, B4

• Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

#### 4.CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ECM harness connector.

Fuel level sensor unit and fuel pump		E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B40	5	E16	104	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E105, M11

Harness connectors M77, B11

• Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

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

#### 6.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-254, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-5, "Exploded View"</u>.

**7.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

**1.**CHECK FUEL TANK TEMPERATURE SENSOR

1. Turn ignition switch OFF.

## P0182, P0183 FTT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

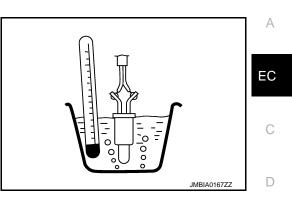
- 2. Remove fuel level sensor unit. Refer to FL-5, "Exploded View".
- 3. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance	
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 - 2.7 kΩ
4 and 5		50 (122)	0.79 - 0.90 kΩ

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-5, "Exploded View"</u>.



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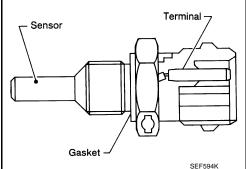
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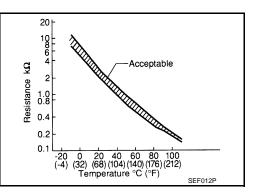
### Description

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



#### <Reference data>

Engine oil temperature [°C (°F)]	Voltage* (V)	Resistance (k $\Omega$ )
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260
110 (230)	0.6	0.143 - 0.153



\*: These data are reference values and are measured between ECM terminals 54 (Engine oil temperature sensor) and 52 (Sensor ground).

## **DTC** Logic

## DTC DETECTION LOGIC

NOTE:

If DTC P0196 is displayed with DTC P0197 or P0198, first perform the trouble diagnosis for DTC P0197 or P0198. Refer to <u>EC-260, "DTC Logic"</u>.

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition		Possible cause
		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> <li>Harness or connectors (The EOT sensor circuit is open or shorted)</li> <li>EOT sensor</li> </ul>
P0196	EOT SENSOR [Engine oil temperature (EOT) sensor circuit range/perfor- mance]	B)	The comparison result of signals trans- mitted 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 high- er/lower than that of other temperature sensors when the engine is started with its cold state.	<ul> <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

Is it necessary to erase permanent DTC?

YES >> GO TO 6. NO >> GO TO 2. INFOID:000000009719986

< DTC/CIRCUIT DIAGNOSIS >	[]	
2.preconditioning		А
If DTC CONFIRMATION PROCEDURE has been prev dure before conducting the next test.	iously conducted, always perform the following proce-	Λ
1. Turn ignition switch OFF and wait at least 10 secor	nds.	EC
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 secor</li> </ol>		
TESTING CONDITION:		0
Before performing the following procedure, confirm	i that battery voltage is 11 v or more at Idle.	С
>> GO TO 3.		
<b>3.</b> PERFORM DTC CONFIRMATION PROCEDURE F	OR MULFUNCTION A-I	D
1. Start engine and warm it up to normal operating ter		
<ol> <li>Turn ignition switch OFF and wait at least 10 secor</li> <li>Turn ignition switch ON.</li> </ol>	IdS.	Е
<ol> <li>Turn ignition switch OFF and wait at least 10 secor</li> <li>Start engine and let it idle for 5 minutes and 10 sec</li> </ol>		
<ol> <li>Start engine and let it idle for 5 minutes and 10 sec</li> <li>Check 1st trip DTC.</li> </ol>	unus.	F
Is 1st trip DTC detected?		
YES >> Proceed to <u>EC-259, "Diagnosis Procedure'</u> NO >> GO TO 4.		G
4. PERFORM DTC CONFIRMATION PROCEDURE FOR	OR MULFUNCTION A-II	
		Н
<ol> <li>Select "DATA MONITOR" mode with CONSULT.</li> <li>Check that "COOLAN TEMP/S" indicates above 70</li> </ol>	N°C (150°E)	
If it is above 70°C (158°F), go to the following steps	3.	
If it is below 70°C (158°F), warm engine up until " Then perform the following steps.	COOLAN TEMP/S" indicates more than 70°C (158°F).	I
3. Turn ignition switch OFF and soak the vehicle in a	cool place.	
<ol> <li>Turn ignition switch ON.</li> <li>NOTE:</li> </ol>		J
Do not turn ignition switch OFF until step 8.		
<ol> <li>Select "DATA MONITOR" mode with CONSULT.</li> <li>Check the following.</li> </ol>		Κ
COOLAN TEMP/S	Below 40°C (104°F)	L
INT/A TEMP SE	Below 40°C (104°F)	
Difference between "COOLAN TEMP/S" and "INT/A TEMP SE" If they are within the specified range, perform the fo	Within 6°C (11°F)	M
	cle to meet the above conditions. Then perform the fol-	
lowing steps. NOTE:		NI
<ul> <li>Do not turn ignition switch OFF.</li> </ul>		Ν
<ul> <li>If it is supposed to need a long period of time</li> <li>7. Start engine and let it idle for 5 minutes.</li> </ul>	, do not deplete the battery.	
8. Check 1st trip DTC.		0
With GST Follow the procedure "With CONSULT" above.		
<u>Is 1st trip DTC detected?</u>		Ρ
YES >> Proceed to EC-259, "Diagnosis Procedure"	<u>'</u> .	
NO >> GO TO 5. 5.PERFORM COMPONENT FUNCTION CHECK (FO		
Perform component function check. Refer to <u>EC-258</u> , "(		
NOTE:	component rundion onder.	

< DTC/CIRCUIT DIAGNOSIS >

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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-259, "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:

3.

Cool the vehicle in an environment of ambient air temperature between -10°C (14°F) and 35°C (95°F).

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 food 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-259, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Component Function Check**

## 1.CHECK ENGINE OIL TEMPERATURE (EOT) SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect EOT sensor harness connector.
- Remove EOT sensor. Refer to <u>CO-29, "Exploded View"</u>.
- 4. Check resistance between EOT sensor terminals by heating with hot water as shown in the figure.

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

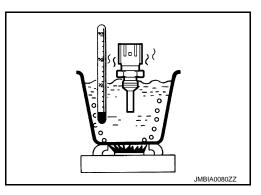
Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to EC-259, "Diagnosis Procedure".

## 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to <u>GI-44, "Intermittent Incident"</u>. <u>Is the inspection result normal?</u>



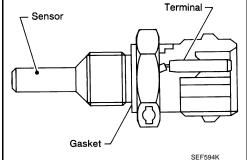
			P0196 EOT S	SENSOR			
< DTC/CIRCUIT	T DIAGNOSIS	>				[VQ35DE]	
	PECTION END ceed to <u>EC-259</u>		sis Procedure".			A	L
Diagnosis Pr	ocedure					INFOID:000000009719989	
1.CHECK GRO		CTION				EC	~ ~
	switch OFF.	-38 Rofo	r to Ground Inspe	etion in GL-17	"Circuit Inspection".		
Is the inspection				501011111 <u>01-47,</u>	<u>Circuit inspection</u> .	С	1 7
YES >> GO							
NO >> Rep 2.CHECK ENG	air or replace g					D	ł
Refer to EC-259 Is the inspection						Е	
YES >> GO	TO 3.						
· · ·	•	•	ure sensor. Refer	to <u>EM-57, "Ex</u>	oloded View".	F	
3.CHECK INTE						· · ·	
Refer to <u>GI-44, "</u>	Intermittent Inc	<u>ident"</u> .					
>> INSI	PECTION END	)				G	j
Component I	nspection					INFOID:000000009719990	1
1.CHECK ENG	INE OIL TEMP	ERATURI	E SENSOR				
	switch OFF.						
			ensor harness co or. Refer to <u>EM-</u>		/iew".		
4. Check resist	tance between	engine oi	I temperature services own in the figure.				
That's by theat	ing with not wa		wit in the lighte.				
Terminals	Condition		Resistance	-		ſ	~
		20 (68)	2.1 - 2.9 kΩ	_		K K	
1 and 2 Temp	perature [°C (°F)]	50 (122)	0.68 - 1.00 kΩ	_		0	
		90 (194)	0.236 - 0.260 kΩ	-		, <b>j</b>	
Is the inspection YES >> INSI							
NO >> Replace engine oil temperature sensor. Refer to EM-57,							
<u>"Exp</u>	oloded View".						
						Ν	
						0	\ \
						0	
						_	
						Р	

#### < DTC/CIRCUIT DIAGNOSIS >

### P0197, P0198 EOT SENSOR

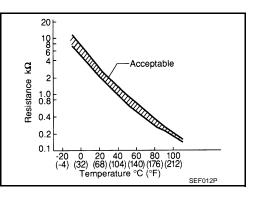
#### Description

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



#### <Reference data>

Engine oil temperature [°C (°F)]	Voltage* (V)	Resistance (k $\Omega$ )
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260
110 (230)	0.6	0.143 - 0.153



\*: These data are reference values and are measured between ECM terminals 54 (Engine oil temperature sensor) and 52 (Sensor ground).

## **DTC Logic**

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC detecting condition	Possible Cause
P0197	Engine oil tempera- ture sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul>
P0198	Engine oil tempera- ture sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	Engine oil temperature sensor

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

INFOID:000000009719991

## P0197, P0198 EOT SENSOR

PUIST, PUISO EUT SENSUR	N/005DE1
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
YES >> Go to <u>EC-261, "Diagnosis Procedure"</u> . NO >> INSPECTION END	A
Diagnosis Procedure	INFOID:000000009719993
1. CHECK GROUND CONNECTION	EC
1. Turn ignition switch OFF.	
<ol> <li>Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection</u>" <u>Is the inspection result normal?</u></li> </ol>	<u> </u>
YES $>>$ GO TO 2.	
NO >> Repair or replace ground connection.	D
2.CHECK EOT SENSOR POWER SUPPLY CIRCUIT	
1. Disconnect engine oil temperature (EOT) sensor harness connector.	
<ol> <li>Turn ignition switch ON.</li> <li>Check the voltage between EOT sensor harness connector and ground.</li> </ol>	E
EOT sensor Ground Voltage	F
Connector Terminal	
F66     1     Ground     Approx. 5 V	G
Is the inspection result normal? YES >> GO TO 3.	
NO >> Repair open circuit, short to ground or short to power in harness or connectors.	Н
${f 3.}$ CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> <li>Check the continuity between EOT sensor harness connector and ECM harness connector.</li> </ol>	ctor.
EOT sensor ECM	.1
Connector Terminal Connector Terminal	0
F66         2         F8         52         Existed	
4. Also check harness for short to ground and short to power.	K
Is the inspection result normal?	
YES >> GO TO 4. NO >> Repair open circuit, short to ground or short to power in harness or connectors.	L
4.CHECK ENGINE OIL TEMPERATURE SENSOR	
Refer to EC-259, "Component Inspection".	M
Is the inspection result normal?	
YES >> GO TO 5.	Ν
NO >> Replace engine oil temperature sensor. Refer to <u>EM-57, "Exploded View"</u> .	IN
5.CHECK INTERMITTENT INCIDENT	
Refer to <u>GI-44, "Intermittent Incident"</u> .	0
>> INSPECTION END	
Component Inspection	INFOID:000000009719994
1. CHECK ENGINE OIL TEMPERATURE SENSOR	
1. Turn ignition switch OFF.	

1. Turn ignition switch OFF.

2. Disconnect engine oil temperature sensor harness connector.

3. Remove engine oil temperature sensor. Refer to EM-57, "Exploded View".

## P0197, P0198 EOT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

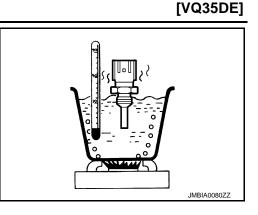
4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine oil temperature sensor. Refer to <u>EM-57.</u> <u>"Exploded View"</u>.



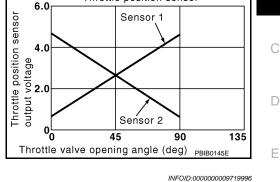
#### < DTC/CIRCUIT DIAGNOSIS >

P0222, P0223 TP SENSOR

### Description

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

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



Throttle position sensor

### DTC Logic

# DTC DETECTION LOGIC

#### NOTE:

If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

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.	Harness or connectors     (TP sensor 1 circuit is open or shorted.)
P0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	Electric throttle control actuator (TP sensor 1)

### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

YES >> GO TO 2.

NO >> Repair or replace ground connection.

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## P0222, P0223 TP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# **2.**CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

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

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

Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$  CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

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

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

Electric throttle	Electric throttle control actuator		ECM	
Connector	Terminal	Connector Terminal		Continuity
F29	2	F8	37	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK THROTTLE POSITION SENSOR

Refer to EC-265. "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. Refer to EM-33, "Exploded View".

Refer to <u>EC-265</u>, "Special Repair Requirement".

#### >> INSPECTION END

**7.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

## P0222, P0223 TP SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

### Component Inspection

# 1.CHECK THROTTLE POSITION SENSOR

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

3. Perform EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

- 4. Turn ignition switch ON.
- 5. Set selector lever to D position.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM					
Connector	+	-	Condition Voltage			
Connector	Terminal	Terminal				
	37			Fully released	More than 0.36 V	<i>,</i>
F8	(TP sensor 1 sig- nal)	36	36 Accelerator pedal	Accolorator podal		
10	38 (TD	(Sensor ground)				Less than 4.75 V
	(TP sensor 2 sig- nal)			Fully depressed	More than 0.36 V	/
s the inspe	ection result norma	<u>al?</u>				
	INSPECTION E	ND				
-	GO TO 2.					
		IROTTLE CONTR				
		control actuator. F Repair Requireme	Refer to <u>EM-33, "Ex</u>	<u>ploded View"</u> .		
2. G0 t0 <u>1</u>			<u>an.</u> .			
>>	INSPECTION FI	ND				
	INSPECTION EI					INFOID:000000009719999
Special F	Repair Require	ement	POSITION LEARNII	NG		INFOID:000000009719999
Special F 1.perfoi	Repair Require	ement 'ALVE CLOSED P	POSITION LEARNI			
Special F 1.perfoi	Repair Require	ement 'ALVE CLOSED P				
Special F 1.PERFOI Refer to EC	Repair Require RM THROTTLE V 2-19. "THROTTLE • GO TO 2.	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR			
Special F 1.PERFOI Refer to EC	Repair Require RM THROTTLE V 2-19. "THROTTLE • GO TO 2.	ement 'ALVE CLOSED P	POSITION LEAR			
Special F 1.PERFOI Refer to EC >> 2.PERFOI	Repair Require RM THROTTLE V -19. "THROTTLE GO TO 2. RM IDLE AIR VOI	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		ment"
Special F 1.PERFOI Refer to EC >> 2.PERFOI	Repair Require RM THROTTLE V -19. "THROTTLE GO TO 2. RM IDLE AIR VOI	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		
Special F 1.PERFOI Refer to EC >> 2.PERFOI Refer to EC	Repair Require RM THROTTLE V -19. "THROTTLE GO TO 2. RM IDLE AIR VOI	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		ment"
Special F 1.PERFOI Refer to EC >> 2.PERFOI Refer to EC	Repair Require RM THROTTLE V C-19. "THROTTLE GO TO 2. RM IDLE AIR VOI C-20. "IDLE AIR V	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		ment"
Special F 1.PERFOI Refer to EC >> 2.PERFOI Refer to EC	Repair Require RM THROTTLE V C-19. "THROTTLE GO TO 2. RM IDLE AIR VOI C-20. "IDLE AIR V	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		ment"
Special F 1.PERFOI Refer to EC >> 2.PERFOI Refer to EC	Repair Require RM THROTTLE V C-19. "THROTTLE GO TO 2. RM IDLE AIR VOI C-20. "IDLE AIR V	ement ALVE CLOSED P VALVE CLOSED	POSITION LEAR	NING : Special I		ment"

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### < DTC/CIRCUIT DIAGNOSIS >

## P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

### **DTC Logic**

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[VQ35DE]

#### DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the 1st trip, when a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off. If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink. When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on. If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

 Two Trip Detection Logic (Exhaust quality deterioration) For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only illuminate when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected in any one cylinder or in multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300	Multiple cylinder misfires detected	Multiple cylinders misfire.	Improper spark plug
P0301	No. 1 cylinder misfire detected	No. 1 cylinder misfires.	Insufficient compression     Incorrect fuel pressure
P0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	The fuel injector circuit is open or shorted
P0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul> <li>Fuel injector</li> <li>Intake air leakage</li> </ul>
P0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	• The ignition signal circuit is open or shorted
P0305	No. 5 cylinder misfire detected	No. 5 cylinder misfires.	Lack of fuel     Signal plate
P0306	No. 6 cylinder misfire detected	No. 6 cylinder misfires.	<ul> <li>A/F sensor 1</li> <li>Incorrect PCV hose connection</li> </ul>

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

### >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and let it idle for approximately 15 minutes.
- 6. Check 1st trip DTC.

Is 1st trip DTC detected?

#### P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > YES >> Go to EC-267, "Diagnosis Procedure". NO >> GO TO 3. А **3.** PERFORM DTC CONFIRMATION PROCEDURE-II 1. Turn ignition switch OFF and wait at least 10 seconds. EC Turn ignition switch ON. 2. Turn ignition switch OFF and wait at least 10 seconds. 3. Start engine and drive the vehicle under similar conditions to (1st trip) Freeze Frame Data for a certain 4. time. Refer to the table below. Hold the accelerator pedal as steady as possible. Similar conditions to (1st trip) Freeze Frame Data mean that the following conditions should be satisfied at the same time. D CAUTION: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving. Е 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) F Basic fuel schedule Basic fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1) When the freeze frame data shows lower than 70°C (158°F),

condition When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

T should be lower than 70°C (158°F).

#### Driving time varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

### 5. Check 1st trip DTC.

Engine coolant temperature (T)

### Is 1st trip DTC detected?

- YES >> Go to EC-267, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

## 1. CHECK FOR INTAKE AIR LEAKAGE AND PCV HOSE

- 1. Start engine and run it at idle speed.
- 2. Listen for the sound of the intake air leakage.
- 3. Check PCV hose connection.

### Is intake air leakage detected?

YES >> Discover air leakage location and repair.

NO >> GO TO 2.

## 2.CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 3.

- YES-2 >> Without CONSULT: GO TO 4.
- NO >> Repair or replace malfunctioning part.

 ${\it 3.}$  perform power balance test

## With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.

## EC-267

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#### < DTC/CIRCUIT DIAGNOSIS >

3. Check that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

YES >> GO TO 9. NO >> GO TO 4.

4.CHECK FUNCTION OF FUEL INJECTOR

1. Start engine and let it idle.

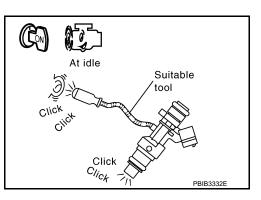
2. Listen to each fuel injector make operation sound.

#### Clicking sound should be heard.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-446, "Diagnosis Procedure"</u>.



## 5. CHECK FUNCTION OF IGNITION COIL-I

#### **CAUTION:**

Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- Remove fuel pump fuse in IPDM E/R to release fuel pressure. NOTE:

Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 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 approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### **CAUTION:**

- During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.
- It might damage the ignition coil if the gap of more than 17 mm (0.66 in) is made. NOTE:

When the gap is less than 13 mm (0.52 in), a spark might be generated even if the coil is malfunctioning.

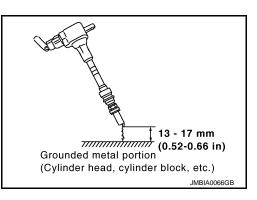
Is the inspection result normal?

YES >> GO TO 9. NO >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.

2. Disconnect spark plug and connect a non-malfunctioning spark plug.



## EC-268

#### < DTC/CIRCUIT DIAGNOSIS >

3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

Is the inspection result normal?

YES >> GO TO 7.

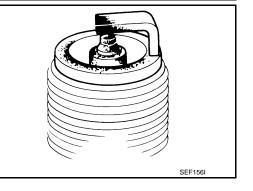
NO >> Check ignition coil, power transistor and their circuits. Refer to EC-453. "Diagnosis Procedure".

**7.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

#### Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>MA-41, "SPARK PLUG : Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 8.



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## 8. CHECK FUNCTION OF IGNITION COIL-III

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

#### Spark should be generated.

#### Is the inspection result normal? YES >> INSPECTION END >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-41, "SPARK NO PLUG : Spark Plug". 9. CHECK COMPRESSION PRESSURE Check compression pressure. Refer to EM-27, "Inspection". Κ 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. M Release fuel pressure to zero. Refer to EC-532, "Inspection". 2. Install fuel pressure gauge kit [SST (J-44321)] and check fuel pressure. Refer to EC-532, "Inspection". 3. At idle: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi) Ν Is the inspection result normal? >> GO TO 12. YES 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 <u>FL-5, "Exploded View"</u>. NO >> Repair or replace malfunctioning part. 12. CHECK IGNITION TIMING Check idle speed and ignition timing.

For procedure, refer to <u>EC-13, "BASIC INSPECTION : Special Repair Requirement"</u>.

## EC-269

#### 2014 MURANO



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#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

For specification, refer to EC-536, "Idle Speed" and EC-536, "Ignition Timing".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Follow the EC-13, "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.

	A/F sensor 1			ECM		
Bank	Connector	Terminal	Connector	Terminal	Continuity	
1	F27	1		45		
I	Γ21	2	50	49	Existed	
2	1	F64 1 2	F8	53	Existed	
2	г04			57		

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

	A/F sensor 1			Continuity
Bank	Connector Terminal		Ground	Continuity
1	F27	1		
I	Γ21	2	Ground	Not existed
2	E64	1	Giouna	NUL EXISTED
2	2 F64			

ECM		Ground	Continuity	
Connector	onnector Terminal		Continuity	
F8	45		Not existed	
	49	Ground		
	53	Giouna		
	57			

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

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

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

Refer to EC-160, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace malfunctioning A/F sensor 1. Refer to EM-38. "Exploded View".

15. CHECK MASS AIR FLOW SENSOR

#### With CONSULT

- 1. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
- 2. For specification, refer to EC-536. "Mass Air Flow Sensor".

#### With GST

- 1. Check mass air flow sensor signal in Service \$01 with GST.
- 2. For specification, refer to EC-536. "Mass Air Flow Sensor".

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
Is the measurement value within the specification?		
<ul> <li>YES &gt;&gt; GO TO 16.</li> <li>NO &gt;&gt; Check connectors for rusted terminals or loose connections in the mass air flow sens ground. Refer to <u>EC-173, "Diagnosis Procedure"</u>.</li> </ul>	A sor circuit or	
16.CHECK SYMPTOM TABLE	EC	
Check items on the rough idle symptom in EC-519, "Symptom Table".		
Is the inspection result normal?	С	
YES >> GO TO 17. NO >> Repair or replace malfunctioning part.		
17. ERASE THE 1ST TRIP DTC	D	
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-129, "CONS tion".	SULT Func- E	
>> GO TO 18. <b>18.</b> CHECK INTERMITTENT INCIDENT	F	
Refer to <u>GI-44, "Intermittent Incident"</u> .		
	G	
>> INSPECTION END	0	
	Н	
	I	
	J	
	K	
	L	
	M	
	Ν	
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#### < DTC/CIRCUIT DIAGNOSIS >

## P0327, P0328, P0332, P0333 KS

### Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.

## DTC Logic

INFOID:000000009720003

INFOID:000000009720002

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor (bank 1) circuit low input	An excessively low voltage from the sensor is sent to ECM.	
P0328	Knock sensor (bank 1) circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul>
P0332	Knock sensor (bank 2) circuit low input	An excessively low voltage from the sensor is sent to ECM.	Knock sensor
P0333	Knock sensor (bank 2) circuit high input	An excessively high voltage from the sensor is sent to ECM.	

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and run it for at least 5 seconds at idle speed.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to <u>EC-272</u>, "Diagnosis Procedure".

## NO >> INSPECTION END

### **Diagnosis Procedure**

1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

### 2.CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect knock sensor harness connector and ECM harness connector.
- 2. Check the continuity between knock sensor harness connector and ECM harness connector.

## P0327, P0328, P0332, P0333 KS

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

DTO		Knock senso		EC	CM	0	
DTC -	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0327, P0328	1	F201	2	F8	67	Existed	
P0332, P0333	2	F202	2	FØ	67	Existed	
3. Also chec	k harness	s for short to	o ground a	and short to	power.		
s the inspecti		normal?					
	O TO 4. O TO 3.						
<b>3.</b> DETECT M							
			ANT				
Check the foll Harness cor							
<ul> <li>Harness for</li> </ul>			en knock s	ensor and	ECM		
			-			in harness or co	
+.CHECK KN	NOCK SE	NSOR INP	JT SIGNA		FOR OPI	EN AND SHOR	Г
1. Check the	e continuit	y between	knock sen	sor harnes	s connecto	or and ECM har	ness connector.
		Kasala			204		
DTC	Deals	Knock senso			CM	Continuity	
D0207 D0200	Bank	Connector	Terminal	Connector	Terminal		
P0327, P0328 P0332, P0333	1	F201 F202	1	F8	61 62	Existed	
			-	nd chart to	-		
<ol> <li>Also chec</li> <li>Is the inspection</li> </ol>		s for short to	ground a		power.		
	0 TO 6.	<u>nonnar:</u>					
	O TO 5.						
5.DETECT N	IALFUNC	TIONING F	ART				
Check the follo	owing.						
<ul> <li>Harness cor</li> </ul>					5014		
<ul> <li>Harness for</li> </ul>	open or s	nort betwee	en knock s	sensor and	ECM		
~~ P	enair one	n circuit sh	ort to area	ind or shor	t to nower	in harness or co	onnectors
6.CHECK KN	• •						
			oction"				
Refer to <u>EC-2</u> Is the inspecti							
•	0 TO 7.	<u>normur:</u>					
		alfunctionin	g knock se	ensor. Refe	er to <u>EM-12</u>	22. "Exploded V	iew".
7.CHECK IN	TERMITT	ENT INCID	ENT				
Refer to <u>GI-44</u>	I, "Intermi	ttent Incide	<u>nt"</u> .				
>> IN	SPECTIO	ON END					
Componen	t Inspec	ction					INFOID:00000009720005
	NOCK SF	NSOR					
1. Turn igniti							
		sensor harn	ess conne	ector.			

2. Disconnect knock sensor harness connector.

3. Check resistance between knock sensor terminal as per the following. **NOTE:** 

#### < DTC/CIRCUIT DIAGNOSIS >

It is necessary to use an ohmmeter which can measure more than 10 M  $\!\Omega.$ 

Terminals	Resistance
1 and 2	Approx. 532 - 588 kΩ [at 20°C (68°F)]

#### **CAUTION:**

Never use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning knock sensor. Refer to <u>EM-122, "Exploded View"</u>.

#### < DTC/CIRCUIT DIAGNOSIS >

### P0335 CKP SENSOR (POS)

### Description

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

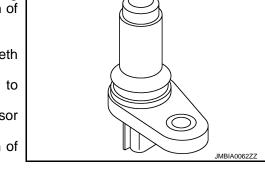
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



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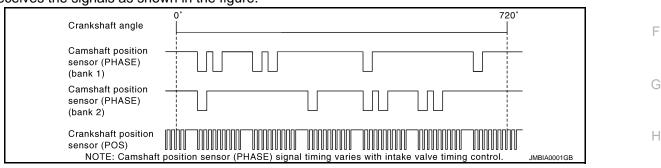
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INFOID:000000009720006

INFOID:000000009720007



## DTC Logic

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0335	Crankshaft position sen- sor (POS) circuit	<ul> <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 run- ning.</li> </ul>	<ul> <li>Harness or connectors [CKP sensor (POS) circuit is open or shorted.]</li> <li>(APP sensor 2 circuit is shorted.)</li> <li>(EVAP control system pressure sensor circuit is shorted.)</li> <li>(Refrigerant pressure sensor circuit is shorted.)</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> <li>Signal plate</li> </ul>	ľ

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

>> GO TO 2.

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#### < 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-276, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "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 sen	CKP sensor (POS)		Voltage (V)
Connector	Terminal	Ground	voltage (v)
F20	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

**3.**CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-II

- 1. Turn ignition switch ON.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F20	1	F8	76	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	72	Refrigerant pressure sensor	E300	1		
го 76	76	CKP sensor (POS)	F20	1		
<b>E16</b>	87	APP sensor	E110	5		
E16	91	EVAP control system pressure sensor	B17	3		

Is the inspection result normal?

YES >> GO TO 5.

< DTC/CIRCl					
	JIT DIAGNO	SIS >			[VQ35DE]
-	•	•	ort to power i	n harness or connectors.	
CHECK CO	OMPONENTS	S			
Refrigerant	ol system pre pressure sen	sor (Refer to E		312. "Component Inspection".) nosis Procedure".)	
	on result norr	mal?			
	O TO 6. eplace malfu	nctioning com	oonents		
CHECK AF	-				
		ent Inspection			
	on result norr				
YES >> G	O TO 12.				
	O TO 7.				
		TOR PEDAL A			
				C-4, "Exploded View".	
	<u>-421, Spe</u>	cial Repair Red	<u>quirement</u> .		
AI <<	SPECTION	END			
			ND CIRCUIT	FOR OPEN AND SHORT	
	ion switch OF				
		ess connector.			
Check the	e continuity be	etween CKP so	ensor (POS)	harness connector and ECM h	arness connector.
0//5			NA		
CKP sens	sor (POS)	EC	;M		
1	<b>T</b>	0		Continuity	
Connector	Terminal	Connector	Terminal		
Connector F20	2	F8	Terminal 60	Existed	
Connector F20 . Also chec	2 k harness for	F8 r short to grour	Terminal 60	Existed	
Connector F20 Also chec the inspecti	2 k harness for on result norr	F8 r short to grour	Terminal 60	Existed	
Connector F20 Also chect the inspecti YES >> G	2 k harness for on result norr O TO 9.	F8 r short to grour mal?	Terminal 60 nd and short	Existed	ectors.
Connector F20 Also chec the inspecti YES >> G NO >> R	2 k harness for on result norr O TO 9. epair open ci	F8 r short to grour mal? rcuit, short to g	Terminal 60 nd and short ground or sho	Existed to power.	
Connector F20 Also chec the inspecti YES >> G NO >> R CHECK CH	2 on result norr O TO 9. epair open ci XP SENSOR	F8 r short to grour <u>mal?</u> rcuit, short to g (POS) INPUT	Terminal 60 nd and short ground or sho SIGNAL CIR	Existed to power. ort to power in harness or conn	Т
Connector F20 Also chec the inspecti YES >> G NO >> R CHECK CP Check the	2 on result norr O TO 9. epair open ci <p sensor<br="">e continuity be</p>	F8 r short to grour <u>mal?</u> rcuit, short to g (POS) INPUT etween CKP so	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS)	Existed to power. ort to power in harness or conn CUIT FOR OPEN AND SHOR	Т
Connector F20 Also chec the inspecti YES >> G NO >> R .CHECK CH Check the CKP sens	2 ck harness for on result norr O TO 9. epair open ci KP SENSOR e continuity be sor (POS)	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC	Terminal 60 Ind and short ground or sho SIGNAL CIR ensor (POS)	Existed to power. ort to power in harness or conn CUIT FOR OPEN AND SHOR	Т
Connector F20 Also chec the inspecti (ES >> G NO >> R .CHECK CP Check the CKP sens Connector	2 ck harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) CM Terminal	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity	Т
Connector F20 Also chec the inspecti YES >> G NO >> R CHECK CF Check the CKP sens Connector F20	2 ck harness for on result norr O TO 9. epair open ci KP SENSOR e continuity be sor (POS) Terminal 3	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) CM Terminal 65	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed	Т
Connector F20 Also check the inspecting YES >> G NO >> R CHECK CH CHECK CH CKP sense Connector F20 Also check	2 ck harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 ck harness for	F8 r short to grour <u>mal?</u> rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) CM Terminal 65	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed	Т
Connector F20 Also check the inspection YES >> G NO >> R CHECK CP CHECK CP Check the CKP sense Connector F20 Also check the inspection	2 ck harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 ck harness for on result norr	F8 r short to grour <u>mal?</u> rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) CM Terminal 65	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed	Т
Connector F20 Also chec the inspecti YES >> G NO >> R CHECK CF Check the CKP sens Connector F20 Also chec the inspecti YES >> G	2 ck harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 ck harness for on result norr O TO 10.	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal?	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 20 Terminal 65 nd and short	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector.
Connector F20 Also chec the inspecti YES >> G NO >> R CHECK CF Check the CKP sens Connector F20 Also chec the inspecti YES >> G NO >> R	2 k harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal? rcuit, short to g	Terminal 60 Ind and short ground or sho SIGNAL CIR ensor (POS) CM Terminal 65 Ind and short ground or sho	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector.
Connector F20 Also check the inspecting YES >> G NO >> R CHECK CH CHECK CH CKP sense Connector F20 Also check the inspecting YES >> G NO >> R O.CHECK	2 k harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal? rcuit, short to g FT POSITION	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Pr	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector.
Connector F20 Also check the inspection YES $>>$ G NO $>>$ R CHECK CH CHECK CH CKP sense Connector F20 Also check the inspection YES $>>$ G NO $>>$ R O.CHECK CH CKP sense Connector F20 Also check Sthe inspection YES $>>$ G NO $>>$ R O.CHECK CH CKP sense CONNECTOR CONNEC	2 k harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF 78. "Compon	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal? rcuit, short to g FT POSITION ent Inspection	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Pr	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector.
Connector F20 Also check the inspection YES $>>$ G NO $>>$ R CHECK CP CHECK CP Check the CKP sense Connector F20 Also check the inspection YES $>>$ G NO $>>$ R O.CHECK CHECK CP CONNECTOR CO	2 k harness for on result norr O TO 9. epair open ci KP SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF 78. "Compon on result norr	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal? rcuit, short to g FT POSITION ent Inspection	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Pr	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector.
Connector F20 Also check the inspection YES $>>$ G NO $>>$ R CHECK CP Check the CKP sense Connector F20 Also check Sthe inspection YES $>>$ G NO $>>$ R O.CHECK CP Connector F20 Connector F20 Connector CONNECTOR CONNECTO	2 k harness for on result norr O TO 9. epair open ci KP SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF 78. "Compon on result norr O TO 11.	F8 r short to grour mal? rcuit, short to g (POS) INPUT etween CKP so EC Connector F8 r short to grour mal? rcuit, short to g FT POSITION ent Inspection mal?	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Po	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power.	T arness connector. ectors.
Connector F20 Also check the inspective YES $>>$ G NO $>>$ R CHECK CP Check the CKP sense Connector F20 Also check the inspective YES $>>$ G NO $>>$ R O.CHECK the inspective YES $>>$ G NO $>>$ R O.CHECK	2 k harness for on result norr O TO 9. epair open ci KP SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF 78. "Compon on result norr O TO 11.	F8         r short to grour         mal?         rcuit, short to grour         (POS) INPUT         etween CKP set         EC         Connector         F8         r short to grour         F8         r short to grour         mal?         rcuit, short to grour         mal?         rcuit, short to grour         mal?         shaft position set	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Po	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power. Ort to power in harness or conn OS)	T arness connector. ectors.
Connector F20 Also check the inspective YES $>> G$ NO $>> R$ CHECK CP Check the CKP sense Connector F20 Also check Sthe inspective YES $>> G$ NO $>> R$ O.CHECK Sthe inspective YES $>> G$ NO $>> R$ O.CHECK Sthe inspective YES $>> G$ NO $>> R$ O.CHECK Sthe inspective YES $>> G$ NO $>> R$ O.CHECK	2 k harness for on result norr O TO 9. epair open ci (P SENSOR e continuity be sor (POS) Terminal 3 k harness for on result norr O TO 10. epair open ci CRANKSHAF 78. "Compon on result norr O TO 11. eplace crank GEAR TOOT	F8         r short to grour         mal?         rcuit, short to grour         (POS) INPUT         etween CKP set         EC         Connector         F8         r short to grour         F8         r short to grour         mal?         rcuit, short to grour         mal?         rcuit, short to grour         mal?         shaft position set	Terminal 60 nd and short ground or sho SIGNAL CIR ensor (POS) 2M Terminal 65 nd and short ground or sho SENSOR (Pos) 	Existed to power. Ort to power in harness or conn CUIT FOR OPEN AND SHOR harness connector and ECM h Continuity Existed to power. Ort to power in harness or conn OS)	T arness connector. ectors.

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

YES >> GO TO 12.

NO >> Replace the signal plate. Refer to <u>EM-98</u>, "Exploded View".

12. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

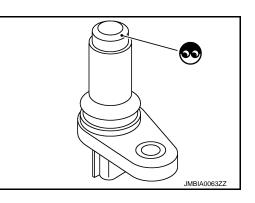
Component Inspection

1.CHECK CRANKSHAFT POSITION SENSOR (POS)-I

- 1. Loosen the fixing bolt of the sensor.
- 2. Disconnect crankshaft position sensor (POS) harness connector.
- 3. Remove the sensor.
- 4. Visually check the sensor for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-43, "Exploded View"</u>.



## 2.CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance crankshaft position sensor (POS) terminals as per the following.

Terminal No. (Polarity)	Resistance
1 (+) - 2 (-)	
1 (+) - 3 (-)	Except 0 or $\infty \Omega$ [at 25°C (77°F)]
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-43</u>, "Exploded View".

### P0340, P0345 CMP SENSOR (PHASE)

#### < DTC/CIRCUIT DIAGNOSIS >

## P0340, P0345 CMP SENSOR (PHASE)

### Description

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

Crankshaft angle Camshaft position sensor (PHASE) (bank 1)

Camshaft position sensor (PHASE) (bank 2)

Crankshaft position sensor (POS)

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes. ECM receives the signals as shown in the figure.

# DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P0340 or P0345 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

NOTE: Camshaft position sensor (PHASE) signal timing varies with intake valve timing control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0340	Camshaft position sen- sor (PHASE) (bank 1) circuit	<ul> <li>The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> </ul>	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> </ul>	L
P0345	Camshaft position sen- sor (PHASE) (bank 2) circuit	<ul> <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> <li>Camshaft (INT)</li> <li>Starter motor (Refer to <u>STR-7, "System</u> <u>Description"</u>.)</li> <li>Starting system circuit (Refer to <u>STR-7, "System Description"</u>.)</li> </ul>	Μ
			Dead (Weak) battery	Ν

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

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

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

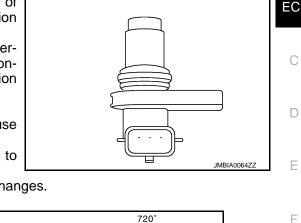
>> GO TO 2.



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< DTC/CIRCUIT DIAGNOSIS >

# 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 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-280, "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-280, "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000009720012

## **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 <u>STR-2, "Work Flow (With GR8-1200 NI)"</u>, or <u>STR-5, "Work Flow (Without GR8-1200 NI)"</u>. For the details of the GR8-1200 NI, refer to <u>STR-18, "Special Service Tools"</u>.)
- 2. CHECK GROUND CONNECTION
- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace ground connection.

 ${f 3.}$  CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

- 1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between CMP sensor (PHASE) harness connector and ground.

DTC	CMF	P sensor (PH	Ground	Voltage (V)	
DIC	Bank	Connector	Terminal	Giouna	voltage (v)
P0340	1	F26	1	Ground	Approx. 5
P0345	2	F69	1	Globalia	

Is the inspection result normal?

YES >> GO TO 4.

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

#### ${f 4}.$ CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.

3. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CMP sensor (PHASE)			ECM		Continuity
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F26	2	F8	64	Existed
P0345	2	F69	2	10	68	Existed

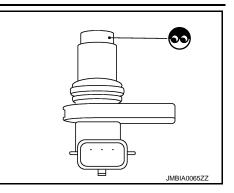
				d and about	to power			Q35DE]
		ult normal?	n to ground	d and short	to power.			
	> GO TO 5							
NO >>	Repair o	pen circuit,	-		•		or connectors.	
<b>D.</b> CHECK	CMP SEN	NSOR (PH/	ASE) INPL	JT SIGNAL	CIRCUIT F	FOR OPEN A	ND SHORT	
. Check	the contin	uity betwee	en CMP se	ensor (PHA	SE) harnes	s connector	and ECM harness conne	ector.
				1				
DTC		P sensor (PH			CM	Continuity		
	Bank	Connector	Terminal	Connector	Terminal			
P0340	1	F26	3	- F8	70	Existed		
P0345	2	F69	3		69		_	
			rt to groun	d and short	to power.			
		<u>ult normal?</u>						
-	> GO TO 6 > Repair o		short to a	round or sh	ort to powe	r in harness	or connectors.	
	•	•	•	OR (PHAS	•			
		mponent li			_/			
	oction resu	It normal?						
YES >		<u>ult normal?</u> 7						
-	- GO TO 7	7.	·		n sensor (P	HASE). Refe	er to <u>EM-54, "Exploded \</u>	<u>∕iew"</u> .
NO >>	> GO TO 7 > Replace	7. malfunctio	·		n sensor (P	HASE). Refe	er to <u>EM-54, "Exploded \</u>	<mark>√iew"</mark> .
NO >> CHECK	> GO TO 7 > Replace CAMSHA	7. malfunctio	·		n sensor (P	HASE). Refe	r to <u>EM-54, "Exploded \</u>	<mark>√iew"</mark> .
NO >> CHECK Check the f Accumula	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de</li> </ul>	7. malfunction FT (INT) bris to the	ning cams	haft positior			er to <u>EM-54, "Exploded \</u>	<u>√iew"</u> .
NO >> CHECK Check the Accumula Chipping	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de signal pla</li> </ul>	7. malfunction FT (INT) bris to the te of camsl	ning cams	haft positior			er to <u>EM-54. "Exploded \</u>	<u>√iew"</u> .
NO >> CHECK Check the Accumula Chipping s the inspe	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de signal pla</li> <li>section resultation resultation</li> </ul>	7. malfunction FT (INT) bris to the te of camsl ult normal?	ning cams	haft positior			er to <u>EM-54. "Exploded \</u>	<u>view"</u> .
NO >> CHECK Check the f Accumula Chipping s the inspective YES >>	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de</li> <li>signal pla</li> <li>action resultion of 2</li> </ul>	7. malfunction FT (INT) bbris to the te of camsl ult normal? 3.	ning camsl signal plat haft rear ei	haft positior e of camshand	aft rear end		er to <u>EM-54. "Exploded \</u>	view".
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NO >> CHECK Check the f Accumula Chipping s the inspective YES >>	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de</li> <li>signal pla</li> <li>ection results</li> <li>GO TO 8</li> <li>Remove</li> <li>rear en</li> </ul>	7. malfunction FT (INT) bris to the te of camsl <u>ult normal?</u> debris and d or repl	ning camsl signal plat haft rear ei	haft positior e of camshand e signal pla	aft rear end	shaft	er to <u>EM-54. "Exploded \</u>	view".
NO >> CHECK Check the f Accumula Chipping s the inspective YES >> NO >>	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de</li> <li>signal pla</li> <li>ection results</li> <li>GO TO 8</li> <li>Remove</li> <li>rear en</li> <li>"Explode</li> </ul>	7. malfunction FT (INT) bris to the te of camsl <u>lt normal?</u> 3. debris and d or repl ad View".	ning cams signal plat haft rear ei d clean the lace cam	haft positior e of camshand e signal pla	aft rear end	shaft		View".
NO >> CHECK Check the f Accumula Chipping s the inspective YES >> NO >> NO >> CHECK	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of de</li> <li>signal pla</li> <li>ection results</li> <li>GO TO 8</li> <li>Remove</li> <li>rear en</li> <li>"Explode</li> </ul>	7. malfunction FT (INT) bris to the te of camsl <u>lt normal?</u> 3. debris and d or repl ad View".	ning cams signal plat haft rear ei d clean the lace cam	haft positior e of camshand e signal pla	aft rear end	shaft		j
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NO >> CHECK Check the inspective Chipping Sthe inspective YES >> NO >> CHECK Refer to GI >> Compone .CHECK	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of designal pla</li> <li>action results</li> <li>GO TO 8</li> <li>Remove rear en "Explode</li> <li>INTERMI</li> <li>-44, "Inter</li> <li>INSPEC</li> <li>ent Insp</li> <li>CAMSHA</li> </ul>	7. malfunction FT (INT) bris to the te of camsl <u>lt normal?</u> 3. debris and d or repl ad View". TTENT INC mittent Inci TION END ection	ning camsl signal plat haft rear ei d clean the lace cam	haft positior e of camshand e signal pla	aft rear end ate of cams er to <u>EM</u>	shaft		JMBIA0058ZZ
NO >> CHECK Check the f Accumula Chipping S the inspec- YES >> NO >> NO >> CHECK Compone .CHECK . Turn ig	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of designal plate</li> <li>GO TO 8</li> <li>Remove</li> <li>Remove</li> <li>Remove</li> <li>TEXPLOSE</li> <li>INTERMI</li> <li>-44, "Inter</li> <li>INSPEC</li> <li>ent Insp</li> <li>CAMSHA</li> </ul>	7. malfunction FT (INT) bris to the te of camsl <u>lt normal?</u> 3. debris and d or repl ad View". TTENT INC <u>mittent Inci</u> TION END ection FT POSITI tch OFF.	ning camsi signal plat haft rear ei d clean the lace cam <u>CIDENT</u> ident".	haft positior e of camsha nd e signal pla shaft. Refe	aft rear end ate of cams er to <u>EM</u>	shaft		JMBIA0058ZZ
NO >> CHECK Check the inspective Accumula Chipping Sthe inspective YES >> NO >> NO >> CHECK Refer to GI >> Compone .CHECK . Turn ig . Looser	<ul> <li>GO TO 7</li> <li>Replace</li> <li>CAMSHA</li> <li>following.</li> <li>ation of designal plate</li> <li>GO TO 8</li> <li>Remove</li> <li>GO TO 8</li> <li>Remove</li> <li>Remove</li> <li>INTERMI</li> <li>-44, "Inter</li> <li>INSPEC</li> <li>ent Insp</li> <li>CAMSHA</li> <li>Inition switted</li> </ul>	7. malfunction FT (INT) bbris to the te of camsl <u>llt normal?</u> 3. debris and d or repl ad View". TTENT INC mittent Inci TION END pection FT POSITI	ning camsi signal plat haft rear ei d clean the lace cam CIDENT CIDENT	haft positior e of camsha nd e signal pla shaft. Refe	aft rear end te of cams er to <u>EM</u> E)-I	shaft		JMBIA0058ZZ

## P0340, P0345 CMP SENSOR (PHASE)

#### < DTC/CIRCUIT DIAGNOSIS >

#### 5. Visually check the sensor for chipping.

- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to <u>EM-54, "Exploded View"</u>.



## 2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as per the following.

Terminal No. (Polarity)	Resistance
1 (+) - 2 (-)	
1 (+) - 3 (-)	Except 0 or $\infty \Omega$ [at 25°C (77°F)]
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-54, "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

## P0420, P0430 THREE WAY CATALYST FUNCTION

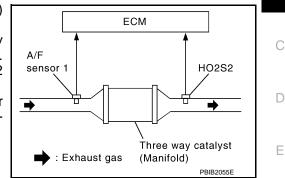
### **DTC Logic**

#### DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of A/F sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0420	Catalyst system efficien- cy below threshold (bank 1)	<ul> <li>Three way catalyst (manifold) does not oper- ate properly.</li> </ul>	<ul> <li>Three way catalyst (manifold)</li> <li>Exhaust tube</li> <li>Intake air leakage</li> </ul>	
P0430	Catalyst system efficien- cy below threshold (bank 2)		<ul> <li>Fuel injector</li> <li>Fuel injector leakage</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul>	

### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2. NO >> GO TO 7.

### 2.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

**TESTING CONDITION:** 

Do not maintain engine speed for more than the specified minutes below.

>> GO TO 3. **3.**PERFORM DTC CONFIRMATION PROCEDURE-I

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 9. Open engine hood.
- 10. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT.

### EC-283

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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

11. Rev engine between 2,000 and 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.

12. Check the indication of "CATALYST".

Which is displayed on CONSULT screen?

CMPLT>> GO TO 6.

INCMP >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.

2. Rev engine between 2,000 and 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  $70^{\circ}C$  (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-285, "Diagnosis Procedure".

NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-284, "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-285, "Diagnosis Procedure".

### Component Function Check

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**1.**PERFORM COMPONENT FUNCTION CHECK

#### Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Open engine hood.
- 8. Check the voltage between ECM harness connector terminals under the following conditions.

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		ECM				
DTC	Connec-	+	_	Condition	Voltage (V)	
	tor	Terminal	Terminal			
P0420	- F8	33 [HO2S2 (bank 1) signal]	35 (Sensor	Keeping engine speed at 2,500 rpm constant under no load	The voltage fluctuation cycle takes more than 5 seconds. • 1 cycle: $0.6 - 1.0 \rightarrow 0 - 0.3 \rightarrow 0.6 -$	
P0430		34 [HO2S2 (bank 2) signal]	ground)		1.0	
Is the insp	ection res	ult normal?				
			ic Proced	uro"		
		<u>C-285, "Diagnos</u>	<u>IS PIUCEU</u>	uie.		
Diagnos	sis proce	eaure			INFOID:00000009720016	
<b>1.</b> CHECK	K EXHAUS	ST SYSTEM				
Visually cl	neck exha	ust tubes and mu	uffler for d	ents.		
-		ult normal?				
-	> GO TO		otionine	Nort .		
-	•	or replace malfur ST GAS LEAKA0	• ·	Dart.		
			20			
		d run it at idle. haust gas leakag	e before	the three way catalyst (manifold	).	
			)	,,	<u>,</u>	
	To exha	A/F sensor 1 ( ust manifold		Anifold) HO2S2 House and the set of the set	yst Muffler ↓	
	🕩 : Exhaust g	gas			PBIB1216E	
Is exhaust	t gas leaka	age detected?				
	<ul> <li>&gt; Repair of &gt;&gt; GO TO</li> </ul>	or replace malfur	nctioning p	part.		
-		AIR LEAKAGE				
			<u> </u>	ain flaur ann an		
		air leakage after	the mass	air now sensor.		
	-	or replace malfur	nctionina r	part.		
-	> GO TO					
4.CHECH	K IGNITIO	N TIMING				
		nd ignition timing				
For proce	dure, refer	to <u>EC-13, "BAS</u> fer to EC-536_"//	IC INSPE	CTION : Special Repair Require <u>and EC-536, "Ignition Timing</u> ".	ement".	
		ult normal?		_ and <u>LO 000, rynitton mining</u> .		
YES >	> GO TO	5.				
_			IC INSPE	CTION : Special Repair Require	ement".	
<b>5.</b> CHEC	K FUEL IN	JECTORS				
1. Stop e	engine and	d then turn ignitic	n switch (	ON.		

Check the voltage between ECM harness connector terminals.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	+	_		Voltage
Connector	Terminal	Connector	Terminal	
	1	F40	112	Battery voltage
	3			
F7	29			
F7	30	E16		
	31			
	32			

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform <u>EC-446</u>, "Diagnosis Procedure".

6. CHECK FUNCTION OF IGNITION COIL-I

#### CAUTION:

#### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
- NOTE:

Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 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 approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### CAUTION:

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful 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:

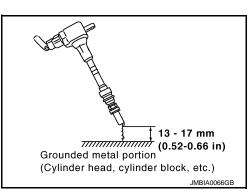
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

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 approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.



#### < DTC/CIRCUIT DIAGNOSIS >

Spark should be generated. А Is the inspection result normal? >> GO TO 8. YES EC NO >> Check ignition coil, power transistor and their circuit. Refer to EC-453, "Diagnosis Procedure". 8.CHECK SPARK PLUG Check the initial spark plug for fouling, etc. Is the inspection result normal? YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-41, "SPARK PLUG : Spark D Plua". NO >> Repair or clean spark plug. Then GO TO 9. Ε F SEF156I 9. CHECK FUNCTION OF IGNITION COIL-III 1. Reconnect the initial spark plugs. 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion. Spark should be generated. Н Is the inspection result normal? YES >> INSPECTION END >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-41, "SPARK NO PLUG : Spark Plug". 10. CHECK FUEL INJECTOR Turn ignition switch OFF. 1. Remove fuel injector assembly. Refer to EM-49, "Exploded View". 2. Refer to EM-49, "Exploded View". Κ 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. Turn ignition switch ON. 5. L 6. Check that the fuel does not drip from fuel injector. Does fuel drip from fuel injector? YES >> Replace the fuel injector(s) from which fuel is dripping. Refer to EM-49, "Exploded View". Μ NO >> GO TO 11. 11. CHECK INTERMITTENT INCIDENT Ν Refer to GI-44, "Intermittent Incident". Is the inspection result normal? YES >> Replace three way catalyst assembly. Refer to EM-38, "Exploded View". NO >> Repair or replace harness or connector.

Ρ

[VQ35DE]

### **P0441 EVAP CONTROL SYSTEM**

#### < DTC/CIRCUIT DIAGNOSIS >

## P0441 EVAP CONTROL SYSTEM

### DTC Logic

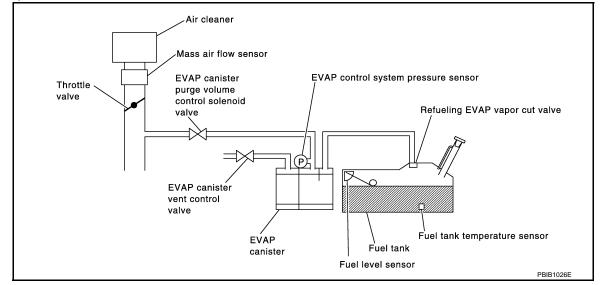
DTC DETECTION LOGIC

#### NOTE:

# If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441	EVAP control system in- correct purge flow	EVAP control system does not operate proper- ly, EVAP control system has a leakage between intake manifold and EVAP control system pres- sure sensor.	<ul> <li>EVAP canister purge volume control solenoid valve stuck closed</li> <li>EVAP control system pressure sensor and the circuit</li> <li>Loose, disconnected or improper connection of rubber tube</li> <li>Blocked rubber tube</li> <li>Cracked EVAP canister</li> <li>EVAP canister purge volume control solenoid valve circuit</li> <li>Accelerator pedal position sensor</li> <li>Blocked purge port</li> <li>EVAP canister vent control valve</li> </ul>

### DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2. NO >> GO TO 6.

2. PRECONDITIONING

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

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

PO	441 EVAP CONTROL SYSTEM	
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and w</li> <li>TESTING CONDITION:</li> <li>Always perform test at a temperative</li> </ol>		A
		EC
>> GO TO 3.		
3.PERFORM DTC CONFIRMATIC	DN PROCEDURE-I	- C
<ul> <li>With CONSULT</li> <li>Start engine and warm it up to</li> <li>Turn ignition switch OFF and w</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and w</li> </ul>	vait at least 10 seconds. vait at least 10 seconds.	D
<ol> <li>Start engine and let it idle for a</li> <li>Select "PURG FLOW P0441" o</li> <li>SULT.</li> <li>Touch "START".</li> </ol>	t least 70 seconds. f "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CON-	E
Is "COMPLETED" displayed on CO YES >> GO TO 5. NO >> GO TO 4.	NSULT screen?	F
	met, "TESTING" will be displayed on the CONSULT screen. Maintain the	G
	ING" changes to "COMPLETED". (It will take at least 35 seconds.)	F
Selector lever VHCL SPEED SE	Suitable position 32 - 120 km/h (20 - 75 mph)	
ENG SPEED	500 - 3,000 rpm	
B/FUEL SCHDL	1.3 - 9.0 msec	
COOLAN TEMP/S	More than 0°C (32°F)	J
CAUTION: Always drive vehicle at a safe sp If "TESTING" does not change for Is "COMPLETED" displayed on CO YES >> GO TO 5. NO >> Perform DTC CONFIR 5.PERFORM DTC CONFIRMATION	r a long time, retry from step 2. NSULT screen? MATION PROCEDURE again. GO TO 3.	k
Touch "SELF-DIAG RESULTS".		- N
Which is displayed on CONSULT sOK>> INSPECTION ENDNG>> Go to EC-290, "Diagno"	sis Procedure".	N
<b>6.</b> PERFORM COMPONENT FUN		_
NOTE:		F
Component Function Check	K INFOID:000000009720010	}
1.PERFORM COMPONENT FUN	CTION CHECK	<u>-</u>
Without CONSULT		

## P0441 EVAP CONTROL SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- 1. Lift up drive wheels.
- 2. Start engine (VDC switch OFF) and warm it up to normal operating temperature.
- 3. Turn ignition switch OFF, wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF, wait at least 10 seconds.
- 6. Start engine and wait at least 70 seconds.
- 7. Set voltmeter probes to ECM harness connector terminals under the following conditions.

ECM			
Connector	+	_	
Connector	Terminal	Terminal	
E16	86 (EVAP control system pressure sensor signal)	96 (Sensor ground)	

8. Check EVAP control system pressure sensor value at idle speed and note it.

9. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Head lamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than P, N or R

10. Verify that EVAP control system pressure sensor value stays 0.1 V less than the value at idle speed (measured at step 6) for at least 1 second.

Is the inspection result normal?

YES >> INSPECTION END NO >> Go to <u>EC-290, "Diagnosis Procedure"</u>.

### Diagnosis Procedure

#### 1.CHECK EVAP CANISTER

1. Turn ignition switch OFF.

2. Check EVAP canister for cracks.

#### Is the inspection result normal?

- YES-1 >> With CONSULT: GO TO 2.
- YES-2 >> Without CONSULT: GO TO 3.
- NO >> Replace EVAP canister. Refer to <u>FL-16, "Exploded View"</u>.

#### 2.CHECK PURGE FLOW

#### With CONSULT

- Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to <u>EC-91. "System Diagram"</u>.
- 2. Start engine and let it idle.
- 3. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT 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.

NO >> GO 10 4

## **P0441 EVAP CONTROL SYSTEM**

< DTC/CIRCUIT DIAGNOSIS >

## 3. CHECK PURGE FLOW

		Α
<ul> <li>Without CONSULT</li> <li>Start engine and warm it up to normal operating temperature.</li> </ul>		2.2
<ol> <li>Stop engine.</li> <li>Disconnect vacuum hose connected to EVAP canister purge voluvice port and install vacuum gauge. For the location of EVAP set</li> </ol>	ime control solenoid valve at EVAP ser-	EC
<ul> <li>4. Start engine and let it idle.</li> </ul>		С
<ul><li>Do not depress accelerator pedal even slightly.</li><li>5. Check vacuum gauge indication before 60 seconds pass after sta</li></ul>	rting engine.	
Vacuum should not exist.		D
6. Rev engine up to 2,000 rpm after 100 seconds pass after starting	engine.	_
Vacuum should exist.		E
<u>Is the inspection result normal?</u> YES >> GO TO 7. NO >> GO TO 4.		F
4.CHECK EVAP PURGE LINE		G
<ol> <li>Turn ignition switch OFF.</li> <li>Check EVAP purge line for improper connection or disconnection Refer to <u>EC-91, "System Diagram"</u>.</li> </ol>		Н
Is the inspection result normal?		
YES >> GO TO 5. NO >> Repair EVAP purge line.		I
5. CHECK EVAP PURGE HOSE AND PURGE PORT		I
<ol> <li>Disconnect purge hoses connected to EVAP service port A and EVAP canister purge volume control solenoid valve B.</li> <li>Blow air into each hose and EVAP purge port C.</li> </ol>	EVAP service port	J
	EVAP canister	K
	purge volume control solenoid valve	L
	Intake manifold SEF367U	в. 4
3. Check that air flows freely.		Μ
Is the inspection result normal? YES-1 >> With CONSULT: GO TO 6. YES-2 >> Without CONSULT: GO TO 7.	(2- T)	Ν
NO >> Repair or clean hoses and/or purge port.		0
	Intake manifold	Ρ
6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENCE	SEF368U	

## With CONSULTStart engine.

- 2. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

## **P0441 EVAP CONTROL SYSTEM**

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Does engine speed vary according to the valve opening?	
YES >> GO TO 8.	
NO >> GO TO 7. <b>7</b> outpotted dubble violuting control, and enable vial vie	
7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
Refer to <u>EC-297, "Component Inspection"</u> .	
<u>Is the inspection result normal?</u> YES >> GO TO 8.	
<ul> <li>YES &gt;&gt; GO TO 8.</li> <li>NO &gt;&gt; Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "E</li> </ul>	xploded View".
8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	• • • • • • • • • • • • • • • • • • • •
1. Disconnect EVAP control system pressure sensor harness connector.	
2. Check that water is not inside connectors.	
Is the inspection result normal?	
YES >> GO TO 9.	
NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16</u> , "Exploded View	<u>/~</u> .
9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
Refer to <u>EC-313</u> , " <u>DTC Logic</u> " for DTC P0452, <u>EC-318</u> , " <u>DTC Logic</u> " for DTC P0453.	
<u>Is the inspection result normal?</u> YES >> GO TO 10.	
NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View</u>	/".
10. CHECK RUBBER TUBE FOR CLOGGING	_
<ol> <li>Disconnect rubber tube connected to EVAP canister vent control valve.</li> <li>Check the rubber tube for clogging.</li> </ol>	
Is the inspection result normal?	
YES >> GO TO 11.	
NO >> Clean the rubber tube using an air blower.	
11.CHECK EVAP CANISTER VENT CONTROL VALVE	
Refer to <u>EC-303, "Component Inspection"</u> .	
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 12.</li> <li>NO &gt;&gt; Replace EVAP canister vent control valve. Refer to <u>FL-16, "Exploded View"</u>.</li> </ul>	
12. CHECK EVAP PURGE LINE	
Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leakage.	
Refer to <u>EC-91, "System Diagram"</u> . Is the inspection result normal?	
YES >> GO TO 13.	
NO >> Repair EVAP purge line.	
13.CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.	
>> GO TO 14.	
14. CHECK INTERMITTENT INCIDENT	

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

## Description

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

## **DTC Logic**

### DTC DETECTION LOGIC

DTC No. Possible cause Trouble diagnosis name DTC detecting condition The canister purge flow is detected during the cehicle is stopped while the en- EVAP control system pressure sensor • EVAP canister purge volume control so-Н А gine is running, even when EVAP canister purge volume control solenoid lenoid valve EVAP canister purge valve is completely closed. (The valve is stuck open.) volume control solenoid · EVAP canister vent control valve P0443 The canister purge flow is detected durvalve EVAP canister ing the specified driving conditions, even Hoses В when EVAP canister purge volume con-(Hoses are connected incorrectly or trol solenoid valve is completely closed. clogged.)

## 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:**

- Perform "DTC CONFIRMATION PROCEDURE" when the fuel level is between 1/4 and 3/4 full, and M 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

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

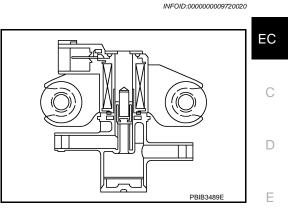
2. PERFORM DTC CONFIRMATION PROCEDURE A

#### With CONSULT

- 1. Turn ignition switch ON.
- Check that the following condition are met. FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
- 3. Start enfine and wait at least 60 seconds.
- 4. Check 1st trip DTC.

#### IS 1st trip DTC detected?

- YES >> Go to EC-294, "Diagnosis Procedure".
- NO >> GO TO 3.



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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

## 3.PERFORM DTC CONFIRMATION PROCEDURE B

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT.
- 7. Touch "START".
- 8. Start engine and let it idle until "TESTING" on CONSULT changes to "COMPLETED". (It will take approximately 10 seconds.)

#### If "TESTING" is not displayed after 5 minutes, retry from step 2.

9. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT screen?

- YES >> INSPECTION END
- NO >> Go to EC-294, "Diagnosis Procedure".

**4.**PERFORM DTC CONFIRMATION PROCEDURE A

#### With GST

- 1. Turn ignition switch ON.
- 2. Set voltmeter probes to ECM harness connector terminals.

Connector	+	-	Voltage (V)
Connector	Terminal	Terminal	
M107	95 (Fuel tank temperature sensor signal)	104 (Sensor 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-294, "Diagnosis Procedure".

5. PERFORM DTC CONFIRMATION PROCEDURE B

#### 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. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and let it idle for at least 20 seconds.
- 6. Check 1st trip DTC.

#### Is 1st trip DTC displayed?

- YES >> Go to EC-294, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009720022

## 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.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

EVAP canister pur solenoid		Ground	Voltage	<u>.</u>	
Connector	Terminal		voltage	, ,	
F30	1	Ground	Battery vol	tage	E
Is the inspection YES >> GO T NO >> GO T 2.DETECT MAL	fo 3. fo 2.				
Check the followi • Harness conne • Harness for ope	ng. ctors F121, E7 en or short bet	, ween EVAP car			olenoid valve and IPDM E/R olenoid valve and ECM
<b>^</b> '	CANISTER F	•	•		s or connectors. ALVE OUTPUT SIGNAL CIRCUIT
	CM harness ontinuity betwe		er purge volu	ne control sole	noid valve harness connector and
EVAP canister pure trol solenoi		EC	М	Continuity	-
Connector	Terminal	Connector	Terminal		_
F30	2	F7	25	Existed	_
4. CHECK EVAP	FO 4. air open circuit P CONTROL S EVAP control s	, short to ground YSTEM PRESS ystem pressure	SURE SENSO	R CONNECTO	s or connectors. PR
Is the inspection YES >> GO 1	<u>result normal?</u> ГО 5. ace EVAP con	trol system pres			"Exploded View".
Refer to <u>EC-312.</u> Is the inspection YES-1 >> With YES-2 >> With NO >> Repl	"Component I result normal? CONSULT: G out CONSULT ace EVAP con	nspection". O TO 6. : GO TO 7. trol system pres	ssure sensor.	Refer to <u>FL-16,</u>	"Exploded View".
<ol> <li>Start engine.</li> <li>Perform "PU</li> </ol>	<b>.T</b> switch OFF. arness connec	ctors disconnect ' in "ACTIVE T	ed.		LVE Check that engine speed varies
-	•	ding to the valve	opening?		

< DTC/CIRCUIT DIAGNOSIS >

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

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-297, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16. "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-303. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

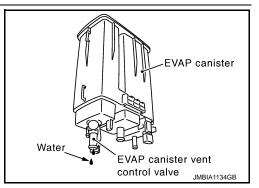
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16, "Exploded View"</u>.

10. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16.</u> "<u>Exploded View</u>".

Does water drain from the EVAP canister?

YES >> GO TO 11. NO >> GO TO 13.



[VQ35DE]

## **11.**CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

• EVAP canister for damage

• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to <u>FL-16, "Exploded View"</u>.

13. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

>> INSPECTION END

#### < DTC/CIRCUIT DIAGNOSIS >

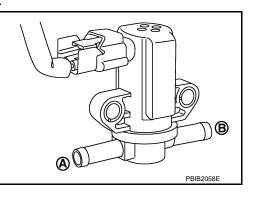
#### Component Inspection

## 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

- 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 C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT 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



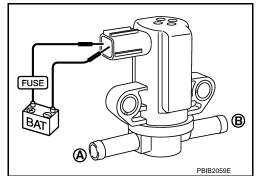
#### Without CONSULT

- 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 <u>FL-16, "Exploded View"</u>.



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< DTC/CIRCUIT DIAGNOSIS >

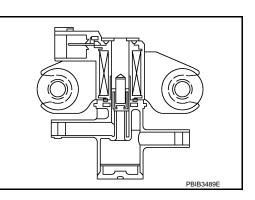
[VQ35DE]

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# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

## Description

The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



INFOID:000000009720025

## DTC Logic

## 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> <li>Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>EVAP canister purge volume control so- lenoid 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> <li>Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control so- lenoid valve</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.CONDITIONING

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

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

#### **TESTING CONDITION:**

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

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 13 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-298. "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

INFOID:000000009720026

## 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.

## EC-298

## P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ35DE]

## < DTC/CIRCUIT DIAGNOSIS >

Check the voltage between EVAP canister purge volume control solenoid valve harness connector and 4. ground.

EVAP canister purge volume control solenoid valve       Ground       Voltage         Connector       Terminal       Ground       Battery voltage         F30       1       Ground       Battery voltage         Is the inspection result normal?       YES       > 60 T0 3.         VES       >> 60 T0 2.       2.         2. DETECT MALFUNCTIONING PART	ground.						
F30       1       Ground       Battery voltage         Is the inspection result normal?       YES       >> SO TO 3.         YES       >> GO TO 2.       2.         2. DETECT MALFUNCTIONING PART         Check the following.       •         • Harness connectors F121. E7         • Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R         • Harness for open or short between EVAP canister purge volume control solenoid valve and ECM         >> Repair open circuit, short to ground or short to power in harness or connectors.         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       ECM         Connector       Terminal         F30       2       F7         YES-1       >> With CONSULT: GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. Also check harness connectors disconnected.         2. NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. Check EVAP CANISTER PURGE VOLUME		-		Voltage			E
is the inspection result normal?         YES       >> GO TO 3.         NO       >> SO TO 2.         2.DETECT MALFUNCTIONING PART         Check the following.         + Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R         + Harness for open or short between EVAP canister purge volume control solenoid valve and ECM         >> Repair open circuit, short to ground or short to power in harness or connectors.         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         trol solenoid valve         EVAP canister purge volume control         trol solenoid valve         EVAP canister purge volume control solenoid valve harness connectors.         4. Also check harness for short to ground and short to power.         Is the inspection result normal?         YES-1       >> With CONSULT GO TO 4.         YES-2       >> Without CONSULT GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. Also check harness connectors disconnected.<	Connector	Terminal					
YES ⇒ GO TO 3. NO ⇒> GO TO 2. 2.DETECT MALFUNCTIONING PART Check the following. + Harness connectors F121, E7 + Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R + Harness for open or short between EVAP canister purge volume control solenoid valve and ECM >> Repair open circuit, short to ground or short to power in harness or connectors. 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT 1. Turn ignition switch OFF. 2. Disconnect ECM harness connector. 3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector. EVAP canister purge volume con- trol solenoid valve Continuity VES-1 >> With CONSULT: GO TO 4. YES-2 >> Without CONSULT: GO TO 4. YES-2 >> Without CONSULT: GO TO 5. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION With CONSULT 1. Reconnect all harness connectors disconnected. 2. Start engine. 3. Perform "PURG VOL C//" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening. Desegning espeed varies condition to the valve opening? YES >> GO TO 6. NO >> GO TO 5. 5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION With CONSULT Refer to EC-300, "Component Inspection". Is the inspection result normal? YES >> GO TO 6. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View". 6. CHECK INTERMITTENT INCIDENT	F30	1	Ground	Battery vo	tage		
Check the following.         Harness connectors F121, E7         Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R         Harness for open or short between EVAP canister purge volume control solenoid valve and ECM         >> Repair open circuit, short to ground or short to power in harness or connectors.         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         roll ave a value of the continuity between EVAP canister purge volume control solenoid valve harness connector.         EVAP canister purge volume control         roll ave a value of the continuity of the valve opening?         YES-1 >> With CONSULT. GO TO 4.         YES-2 >> Without CONSULT. GO TO 5.         NO >> Repair open circuit, short to ground or short to power in harness or connectors.         4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION <b>With CONSULT</b> 9. Sepair open circuit, short to ground or short to power in harness or connectors.         4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION <b>With CONSULT</b> 1. Reco	YES >> GO NO >> GO	TO 3. TO 2.	_				
<ul> <li>Harness connectors F121, E7</li> <li>Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R</li> <li>Harness for open or short between EVAP canister purge volume control solenoid valve and ECM</li> <li>&gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT</li> <li>Turn ignition switch OFF.</li> <li>Disconnect ECM harness connector.</li> <li>Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.</li> </ul> EVAP canister purge volume control solenoid valve harness connector and ECM harness for short to ground and short to power. EVAP canister purge volume control solenoid valve F7 2 5 Existed 4. Also check harness for short to ground and short to power in harness or connectors. YES-1 >> With CONSULT: GO TO 4. YES-2 >> Without CONSULT: GO TO 5. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION With CONSULT With CONSULT: Repair open circuit, short to ground or short to power in harness or connectors. 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION With CONSULT With CONSULT 0. So GO TO 6. NO >> GO TO 6. NO so GO TO 5. O. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE Refer to EC:300. "Component Inspection". s the inspection result normal? YES >> GO TO 6. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16. "Exploded View". CHECK INTERMITTENT INCIDENT	2.DETECT MA	LFUNCTIONIN	IG PART				
CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT  Turn ignition switch OFF. Contended the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.  EVAP canister purge volume contended to the continuity Contended valve Contended valve Continuity Contended valve Contended Contended valve Contended Contended valve Contended Contended Contended Contended Contended Contended Contended Contended Con	<ul> <li>Harness conn</li> <li>Harness for open series</li> </ul>	ectors F121, E	tween EVAP car				E/R
COR 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 harness connector.         EVAP canister purge volume control solenoid valve harness connector.         EVAP canister purge volume control solenoid valve         Connector       Terminal         F30       2         F7       25         Existed         4. Also check harness for short to ground and short to power.         s the inspection result normal?         YES-1       > With CONSULT: GO TO 4.         YES-2       > Without CONSULT: GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION         With CONSULT       .         . Reconnect all harness connectors disconnected.         . Start engine.       .         . Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening?         YES       > GO TO 6.         NO       >> GO TO 5.         D. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	>> Rep	pair open circui	t, short to ground	d or short to p	ower in harness	or connectors.	
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 harness connector and ECM harness connector.         EVAP canister purge volume control solenoid valve         Connector       Terminal         F30       2         F7       25         Existed         4. Also check harness for short to ground and short to power.         Is the inspection result normal?         YES-1       >> With CONSULT: GO TO 4.         YES-2       >> Without CONSULT: GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION            Bwith CONSULT           1. Reconnect all harness connectors disconnected.             2. Start engine.           3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies a coording to the valve opening.          Does engine speed vary according to the valve opening?         YES >> GO TO 6.         NO         NO         NO         Settor result normal?         YES >> GO TO 6.         NO			PURGE VOLUM	E CONTROL	SOLENOID VA	LVE OUTPUT SIGNAL	. CIRCUIT
trol solenoid valve       EUM       Continuity         Connector       Terminal       Connector         F30       2       F7       25       Existed         4. Also check harness for short to ground and short to power.       Existed       Existed         4. Also check harness for short to ground and short to power.       Existed       Existed         4. Also check harness for short to ground and short to power.       Existed         YES-1 >> With CONSULT: GO TO 4.       YES-2 >> Without CONSULT: GO TO 5.       NO         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.       A.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION <b>With CONSULT</b> I. Reconnect all harness connectors disconnected.       Start engine.         3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening?       Second the valve opening?         YES       >> GO TO 6.       NO       >> GO TO 5.         5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE       Refer to EC-300, "Component Inspection".         Is the inspection result normal?       YES       >> GO TO 6.         NO       >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View".         Acter to EC-300, "Component Inspection".       Stend to the valve opening	<ol> <li>Disconnect</li> <li>Check the or</li> </ol>	ECM harness continuity between		er purge volu	ne control soler	noid valve harness conr	nector and
F30       2       F7       25       Existed         4. Also check harness for short to ground and short to power.       sthe inspection result normal?         YES-1 >> With CONSULT: GO TO 4.         YES-2 >> Without CONSULT: GO TO 5.         NO       >> Repair open circuit, short to ground or short to power in harness or connectors.         4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION         With CONSULT         1. Reconnect all harness connectors disconnected.         2. Start engine.         3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening?         YES       >> GO TO 6.         NO       >> GO TO 5.         D. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE         Refer to EC-300, "Component Inspection".         s the inspection result normal?         YES       >> GO TO 6.         NO       >> GO TO 6.     <			ECI	M	Continuity	,	
<ul> <li>A. Also check harness for short to ground and short to power.</li> <li><u>s the inspection result normal?</u></li> <li>YES-1 &gt;&gt; With CONSULT: GO TO 4.</li> <li>YES-2 &gt;&gt; Without CONSULT: GO TO 5.</li> <li>NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li><b>4.</b> CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</li> <li><b>With CONSULT</b></li> <li>1. Reconnect all harness connectors disconnected.</li> <li>2. Start engine.</li> <li>3. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.</li> <li><b>Does engine speed vary according to the valve opening?</b></li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; GO TO 5.</li> <li><b>5.</b> CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</li> <li>Refer to <u>EC-300</u>, "Component Inspection".</li> <li><u>s the inspection result normal?</u></li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16, "Exploded View"</u>.</li> <li><b>6.</b> CHECK INTERMITTENT INCIDENT</li> </ul>	Connector	Terminal	Connector	Terminal	]	_	
<ul> <li>sthe inspection result normal?</li> <li>YES-1 &gt;&gt; With CONSULT: GO TO 4.</li> <li>YES-2 &gt;&gt; Without CONSULT: GO TO 5.</li> <li>NO &gt;&gt; Repair open circuit, short to ground or short to power in harness or connectors.</li> <li>4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</li> <li>With CONSULT <ul> <li>Reconnect all harness connectors disconnected.</li> <li>Start engine.</li> </ul> </li> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.</li> <li>Does engine speed vary according to the valve opening?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; GO TO 5.</li> </ul> <li>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</li> <li>Refer to EC-300, "Component Inspection".</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View".</li> <li>CHECK INTERMITTENT INCIDENT</li>	F30	2	F7	25	Existed		
<ul> <li>Reconnect all harness connectors disconnected.</li> <li>Start engine.</li> <li>Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.</li> <li>Does engine speed vary according to the valve opening?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; GO TO 5.</li> <li>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</li> <li>Refer to EC-300, "Component Inspection".</li> <li>s the inspection result normal?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; GO TO 6.</li> <li>CHECK EVAP CANISTER PURGE volume control solenoid valve. Refer to FL-16, "Exploded View".</li> <li>CHECK INTERMITTENT INCIDENT</li> </ul>	YES-1 >> Wit YES-2 >> Wit NO >> Rep	h CONSULT: G hout CONSULT pair open circuit	O TO 4. : GO TO 5. t, short to ground	•			
NO       >> GO TO 5.         D.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE         Refer to EC-300, "Component Inspection". <u>s the inspection result normal?</u> YES       >> GO TO 6.         NO       >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View".         D.CHECK INTERMITTENT INCIDENT	<ol> <li>Reconnect</li> <li>Start engine</li> <li>Perform "P according to</li> </ol>	all harness con e. URG VOL C/V o the valve ope	" in "ACTIVE TI ning.	EST" mode v	rith CONSULT.	Check that engine spe	ed varies
Refer to <u>EC-300, "Component Inspection"</u> . Is the inspection result normal? YES >> GO TO 6. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16, "Exploded View"</u> . 6.CHECK INTERMITTENT INCIDENT	_NO >> GO	TO 5.					
s the inspection result normal? YES >> GO TO 6. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16, "Exploded View"</u> . CHECK INTERMITTENT INCIDENT				E CONTROL	SOLENOID VA	LVE	
YES >> GO TO 6. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16, "Exploded View"</u> . CHECK INTERMITTENT INCIDENT	Refer to <u>EC-300</u>	), "Component	Inspection".				
NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16, "Exploded View"</u> . 6.CHECK INTERMITTENT INCIDENT	•		2				
	NO >> Rep	place EVAP car		me control so	enoid valve. Re	er to <u>FL-16, "Exploded</u>	<u>l View"</u> .

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#### < DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

[VQ35DE]

INFOID-000000009720027

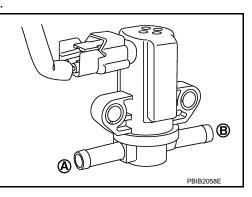
Component Inspection

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

- 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 C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT 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



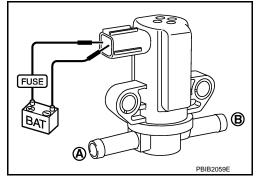
#### **Without CONSULT**

- 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 <u>FL-16, "Exploded View"</u>.



## P0447 EVAP CANISTER VENT CONTROL VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

## P0447 EVAP CANISTER VENT CONTROL VALVE

### Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

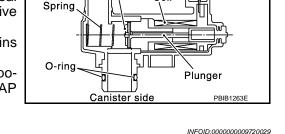
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.



#### DTC DETECTION LOGIC



Coil

Valve

To atmosphere

OID:00	00000	00097	20029

[VQ35DE]

INFOID:000000009720028

Terminal



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Ν

C

P

А

EC

D

E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	G
P0447	EVAP canister vent con- trol valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul> <li>Harness or connectors (The valve circuit is open or shorted.)</li> <li>EVAP canister vent control valve</li> <li>Hoses (Hoses are connected incorrectly or clogged.)</li> </ul>	Н

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

Start engine and wait at least 8 seconds. 1.

Check 1st trip DTC. 2.

#### Is 1st trip DTC detected?

YES >> Go to EC-301, "Diagnosis Procedure". NO >> INSPECTION END

## **Diagnosis** Procedure

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2.

NO >> GO TO 3.

 ${
m 2.}$ CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

#### (P)With CONSULT

## P0447 EVAP CANISTER VENT CONTROL VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF and then ON.
- 2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT.
- 3. Touch "ON/OFF" on CONSULT screen.
- 4. Check for operating sound of the valve.

#### Clicking sound should be heard.

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

 $\mathbf{3}.$  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 v	ent control valve	Ground	Voltage
Connector	Terminal	Ground	voltage
B65	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 F121, E7
- Harness connectors E104, B4
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair open circuit, 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.
- Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

Refer to Wiring Diagram.

EVAP canister vent control valve		ECM		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
B65	2	E16	109	Existed	

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

Is the inspection result normal?

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

**6.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E104, B4

Harness for open or short between EVAP canister vent control valve and ECM

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

#### **I**.CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

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P0447 E	EVAP CANISTER VENT CON	ITROL VALVE	
< DTC/CIRCUIT DIAGNOSIS	>	[VQ35DE]	
2. Check the rubber tube for a	clogging.		
Is the inspection result normal?	-		А
YES >> GO TO 8. NO >> Clean the rubber tu	ıbe using an air blower.		
8.CHECK EVAP CANISTER V	-		EC
Refer to EC-303, "Component I			
Is the inspection result normal?			0
YES >> GO TO 9.	-		C
	ister vent control valve. Refer to FL-16	6, "Exploded View".	
9. CHECK INTERMITTENT IN	CIDENT		D
Refer to GI-44, "Intermittent Inc	<u>sident"</u> .		
			Е
>> INSPECTION END	)		
Component Inspection		INF0ID:00000009720031	
<b>1.</b> CHECK EVAP CANISTER V	/ENT CONTROL VALVE-I		F
	nt control valve from EVAP canister. Re	efer to EL-16 "Exploded View"	
	canister vent control valve for rust.		G
<u>Is it rusted?</u>			
	hister vent control valve. Refer to <u>FL-</u>		Н
<u>16, "Exploded View</u> NO >> GO TO 2.	<u>v</u> .		
		JMBIA0168ZZ	J
2. CHECK EVAP CANISTER V	/ENT CONTROL VALVE-II	JWDIAOTODEL	
With CONSULT			K
1. Reconnect harness connect	ctors disconnected.		r.
2. Turn ignition switch ON.	./V" in "ACTIVE TEST" mode.		
	ity and operation delay time.		L
Check that new O-ring is	installed properly.	E .	
			M
Condition VENT CONTROL/V	Air passage continuity between (A) and (B)		
ON OFF	Not existed	₩ <b>®</b>	
OFF Operation takes less than 1 sec	Existed		Ν
Without CONSULT			
1. Disconnect EVAP canister	vent control valve harness connector.	a 🖉	0
<ol><li>Check air passage continui following conditions.</li></ol>	ity and operation delay time under the	JMBIA0169ZZ	
Check that new O-ring is inst	alled properly.		D
			Р
Condition	Air passage continuity between (A) and (B)		
12 V direct current supply between terminals 1 and 2	Not existed		

Operation takes less than 1 second.

OFF

Existed

## P0447 EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Is the inspection result normal? YES >> INSPECTION END

NO >> GO TO 3.

**3.**CHECK EVAP CANISTER VENT CONTROL VALVE-III

#### With CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

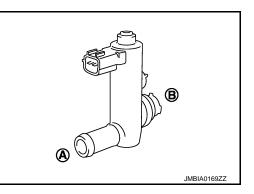
Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.

#### **Without CONSULT**

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.



Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16, "Exploded View"</u>.

## P0448 EVAP CANISTER VENT CONTROL VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

## P0448 EVAP CANISTER VENT CONTROL VALVE

#### Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid value is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.

### DTC Logic



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448	EVAP canister vent con- trol valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul> <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 perform the following before conducting the next test.

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

#### >> GO TO 2.

#### **2.** PERFORM DTC CONFIRMATION PROCEDURE

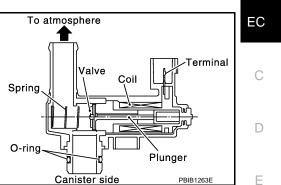
#### With CONSULT

- 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.
- 4. Start engine and let it idle for at least 1 minute.
- 5. Repeat next procedures 3 times.
- Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.

#### Never exceed 3 minutes.

- Fully released accelerator pedal and keep engine idle for about 5 seconds.
- 6. Repeat next procedure 20 times.
- Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.

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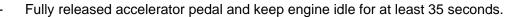
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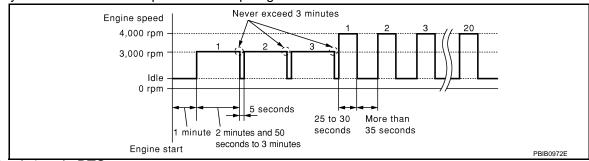
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## P0448 EVAP CANISTER VENT CONTROL VALVE

#### < DTC/CIRCUIT DIAGNOSIS >





#### 7. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-306, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000009720034

[VQ35DE]

## **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-303, "Component Inspection".

Is he inspection result normal?

YES >> GO TO 3.

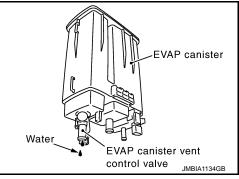
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16. "Exploded View"</u>.

 $\mathbf{3}$ . CHECK IF EVAP CANISTER SATURATED WITH WATER

- Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16. "Exploded View"</u>.
- 2. Check if water will drain from the EVAP canister.

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



## 4.CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

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

5. DETECT MALFUNCTIONING PART

Check the following.EVAP canister for damage

P0448 EVAP CANISTER VENT CONTROL VALVE		
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection		А
>> Repair hose or replace EVAP canister. Refer to FL-16, "Exploded View".		
6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR		EC
<ol> <li>Disconnect EVAP control system pressure sensor harness connector.</li> <li>Check that water is not inside connectors.</li> </ol>		
Is the inspection result normal?		С
YES >> GO TO 7. NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u> .		
7.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR		D
Refer to EC-312, "Component Inspection".		
Is the inspection result normal?		E
YES >> GO TO 8. NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u> .		_
<b>8.</b> CHECK INTERMITTENT INCIDENT		
		F
Refer to <u>GI-44, "Intermittent Incident"</u> .		
>> INSPECTION END		G
Component Inspection	IFOID:000000009720035	
1. CHECK EVAP CANISTER VENT CONTROL VALVE-I		Н
1. Remove EVAP canister vent control valve from EVAP canister. Refer to FL-16, "Exploded Vie	₩".	
2. Check portion (A) of EVAP canister vent control valve for rust.		
<u>Is it rusted?</u> YES >> Replace EVAP canister vent control valve. Refer to <u>FL-</u>		
$\frac{16. \text{"Exploded View"}}{\text{NO}} >> \text{GO TO 2.}$		J
		1.4

## 2. CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### (B) With CONSULT 1. Reconnect har

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

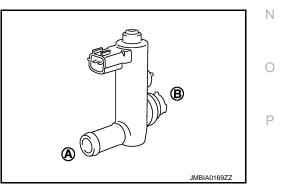
Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	Not existed
OFF	Existed

Operation takes less than 1 second.

#### Without CONSULT

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.



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## P0448 EVAP CANISTER VENT CONTROL VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Condition	Air passage continuity between (A) and (B)

12 V direct current supply between terminals 1 and 2

OFF

OFF

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

**3.**CHECK EVAP CANISTER VENT CONTROL VALVE-III

#### With CONSULT

1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.

Not existed

Existed

- 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

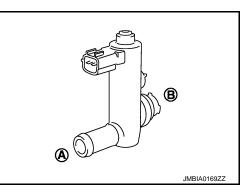
Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.

#### **Without CONSULT**

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.



Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

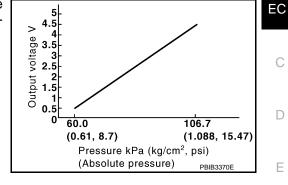
NO >> Replace EVAP canister vent control valve. Refer to FL-16. "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

## P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

#### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## DTC Logic

#### DTC DETECTION LOGIC

INFOID:000000009720037

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451	EVAP control system pressure sensor perfor- mance	ECM detects a sloshing signal from the EVAP control system pressure sensor	<ul> <li>Harness or connectors (EVAP control system pressure sensor circuit is shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> </ul>

## DTC CONFIRMATION PROCEDURE

#### NOTE.

NOTE: Never remove fuel filler cap during DTC confirmation procedure. 1.PRECONDITIONING	K
<ul> <li>If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.</li> <li>1. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>2. Turn ignition switch ON.</li> </ul>	L
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>With CONSULT&gt;&gt;GO TO 2.</li> </ol>	Μ
Without CONSULT>>GO TO 5. 2.PERFORM DTC CONFIRMATION PROCEDURE-1	Ν
<ul> <li>With CONSULT</li> <li>Start engine and let it idle for least 40 seconds.</li> <li>NOTE:</li> </ul>	0
Do not depress accelerator pedal even slightly. 2. Check 1st trip DTC. Is 1st trip DTC detected? VES as presed to EC 210. "Diagnosis Presedure"	Ρ
YES >> Proceed to <u>EC-310, "Diagnosis Procedure"</u> . NO >> GO TO 3. 3.PERFORM DTC CONFIRMATION PROCEDURE-2	

()With CONSULT

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< DTC/CIRCUIT DIAGNOSIS >

- 1. Select "EVAP DIAG READY" in "DATA MONITOR" mode of "ENGINE".
- 2. Let it 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.
- 5. Select "EVAP LEAK DIAG" in "DATA MONITOR" mode of "ENGINE".
- 6. Check that "EVAP LEAK DIAG" indication.

#### Which is displayed on CONSULT?

#### CMPLT>> GO TO 4.

- YET >> 1. Perform DTC CONFIRMATION PROCEDURE again.
  - 2. GO TO 1.

#### **4.**PERFORM DTC CONFIRMATION PROCEDURE-3

#### With CONSULT

Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-310, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM DTC CONFIRMATION PROCEDURE-4

#### With GST

1. Start engine and let it idle for least 40 seconds. **NOTE:** 

#### Do not depress accelerator pedal even slightly.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to <u>EC-310. "Diagnosis Procedure"</u>.

NO >> GO TO 6.

**6.**PERFORM DTC CONFIRMATION PROCEDURE-5

#### With GST

- 1. Let it 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 >> Proceed to <u>EC-310, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### NO >> INSPECTION ENL

#### Diagnosis Procedure

**1.**CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-47, "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 that water is not inside connectors.

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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- 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 pressu	ire sensor						
Connector	Ter	minal	Ground	Voltage (	V)			
B17		3	Ground	Approx.	5			
Is the inspec	tion result r	normal?		1				
	GO TO 8. GO TO 4.							
<b>4.</b> снеск s	SENSOR PO	OWER S	UPPLY CIRCUI	Т				
Check harne	ess for short	to powe	r and short to gr	ound, betwe	een the follo	wing term	inals.	
		-	_			_	_	
EC	M			Sensor				
Connector	Terminal		Name		Connector	Terminal		
F8 -	72	Refrigera	ant pressure sensor		E300	1	_	
10	76	CKP ser	nsor (POS)		F20	1		
E16	87	APP ser	isor		E110	5	_	
	91	EVAP co	ontrol system pressu	ire sensor	B17	3	_	
Is the inspec	tion result r	ormal?						
	llowing.	ensor (PC	DS) (Refer to <u>EC</u> Refer to <u>EC-465.</u>					
Is the inspec	-					- /		
	GO TO 6.							
•	•		ing components	5.				
6.CHECK A	APP SENSO	DR						
Refer to EC-	-		spection".					
	GO TO 9.	ormal?						
-	GO TO 7.							
			PEDAL ASSEME					
			ssembly. Refer t air Requirement		Exploded Vi	<u>ew"</u> .		
2. 00 to <u>L</u>				-				
>>	INSPECTIC	N END						
•			STEM PRESSU	JRE SENSC	)R			
Refer to EC-								
Is the inspec								
-	GO TO 9.	2						
		AP conti	ol system press	ure sensor.	Refer to FL	<u>-16, "Explo</u>	<u>oded View"</u> .	

9. CHECK INTERMITTENT INCIDENT

#### < DTC/CIRCUIT DIAGNOSIS >

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000009720039

[VQ35DE]

## 1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-16</u>, "<u>Exploded</u> <u>View</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

	ECM				
Connector	+	_	Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage	
Connector	Terminal	Terminal	(, pol)		
	86	96	Not applied	1.8 - 4.8 V	
E16	(EVAP control system pressure sensor signal)	(Sensor ground)	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	

#### **CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

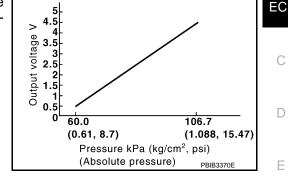
- YES >> INSPECTION END
- NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

#### < DTC/CIRCUIT DIAGNOSIS >

## P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

#### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## DTC Logic

#### DTC DETECTION LOGIC

DTC No. Possible cause Trouble diagnosis name DTC detecting condition Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) EVAP control system (Refrigerant pressure sensor circuit is An excessively low voltage from the sensor is P0452 pressure sensor low insent to ECM. shorted.) put EVAP control system pressure sensor Crankshaft position sensor (POS) Accelerator pedal position sensor · Refrigerant pressure sensor

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-

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

2. Turn ignition switch ON.

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

#### **TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Set voltmeter probes to ECM harness connector terminals under the following conditions.

## EC-313

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#### < DTC/CIRCUIT DIAGNOSIS >

INFOID:000000009720042

ECM				
Connector	+	-		
Connector	Terminal	Terminal		
E16	95 (Fuel tank temperature sensor signal)	104 (Sensor ground)		

- 3. Check that the voltage is less than 4.2 V.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Turn ignition switch OFF and wait at least 10 seconds.
- 7. Start engine and wait at least 20 seconds.
- 8. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-314, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

1.CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

## 2. CHECK CONNECTOR

- 1. Disconnect EVAP control system pressure sensor harness connector.
- 2. Check that water is not inside connector.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness connector.

#### ${f 3.}$ CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch ON.
- 2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

EVAP control syste	em pressure sensor	Ground	Voltage (V)	
Connector	Terminal	Ground		
B17	3	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 4.

#### **4.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control syste	em pressure sensor	ECM		Continuity
Connector	Terminal	Connector	Continuity	
B17	3	E16	91	Existed

Is the inspection result normal?

	P045	2 EVAP CONTROL SYSTE		SURE SE	ENSOR	
< DTC/CIRC	CUIT DIAG	NOSIS >			[VQ35DE]	
NO >>	GO TO 5.					
5.DETECT	MALFUNC	TIONING PART				А
Check the fo						
Harness c		4, E104 hort between EVAP control system		or and EC	<b>`</b> M	EC
	or open or s	non between EVAP control system	pressure ser		7IVI	
>>	Repair oper	n circuit.				
•		OWER SUPPLY CIRCUIT				С
		to power and short to ground, betw	veen the follo	wina termir	 nals.	
onoonnaine				in ig terrin		D
EC	СМ	Sensor				
Connector	Terminal	Name	Connector	Terminal		Е
F8	72	Refrigerant pressure sensor	E300	1		
ΓO	76	CKP sensor (POS)	F20	1		
E16	87	APP sensor	E110	5		F
210	91	EVAP control system pressure sensor	B17	3		
Is the inspec		normal?				G
	GO TO 7.	t to ground or chart to nower in her	noce or conn	octore		0
7.снеск (	•	t to ground or short to power in har		eciois.		
		113				Н
<ul> <li>Check the for</li> <li>Crankshaf</li> </ul>		ensor (POS) (Refer to <u>EC-278, "Cor</u>	nponent Insc	ection".)		
		sensor (Refer to EC-465, "Diagnosis				1
Is the inspec		normal?				
	GO TO 8.	alfunctioning components.				
8.CHECK	•	<b>U</b> 1				J
Is the inspec		oonent Inspection".				Κ
	GO TO 15.	lonnar:				
-	GO TO 9.					1
9.REPLAC	E ACCELEI	RATOR PEDAL ASSEMBLY				
1. Replace	e accelerato	r pedal assembly. Refer to ACC-4,	"Exploded Vi	ew".		
2. Refer to	<u>EC-421, "S</u>	pecial Repair Requirement".				M
10	INSPECTIC					Ν
	K EVAP CO	ONTROL SYSTEM PRESSURE S	SENSOR GF	ROUND CI	RCUIT FOR OPEN AND	IN
SHORT						
	nition switch tect FCM ha	OFF. arness connector.				0
3. Check t	he continuit	y between EVAP control system p	pressure sens	sor harness	s connector and ECM har-	
ness co	nnector.					Р
	ovoto m	5014				1
	system pressu	ire sensor ECM				

	EVAP control syste	em pressure sensor	E	Continuity	
-	Connector	Terminal	Connector Terminal		Continuity
_	B17	1	E16	96	Existed

4. Also check harness for short to ground and short to power. Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

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

11. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors B4, E104

Harness for open or short between EVAP control system pressure sensor and ECM

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

12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control syste	em pressure sensor	E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
B17	2	E16	86	Existed

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

Is the inspection result normal?

YES >> GO TO 14. NO >> GO TO 13.

 $NO >> GO 10^{-13}$ .

13. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors B4, E104

Harness for open or short between EVAP control system pressure sensor and ECM

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

14.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-312. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16. "Exploded View"</u>.

15. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

INFOID:000000009720043

## 1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

#### 1. Turn ignition switch OFF.

2. Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-16</u>, "<u>Exploded</u> <u>View</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

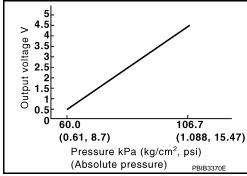
	ECM		Appliedures 15		
Connector	+	_	Applied vacuum kPa (kg/cm <sup>2</sup> , psi) Voltage		_
Connector	Terminal	Terminal	(kg/cm , psi)		
	86	96	Not applied	1.8 - 4.8 V	
E16	(EVAP control system pressure sensor signal)	96 (Sensor ground)	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	
CAUTI • Alwa	ON: lys calibrate the vac	uum pump ga	uae when usina it		
• Neve				r pressure over 101.3 kPa	(1.033 kg/cm <sup>2</sup> ,
	ection result normal?				
	INSPECTION END Roplace EV/AP cont	al system pros	sure consor Pofer	to FL-16, "Exploded View".	
10 22	Replace LVAF cont	or system pres	Sule Selisol. Relei	to <u>re-ro, exploded view</u> .	

#### < DTC/CIRCUIT DIAGNOSIS >

## P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

#### Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



## DTC Logic

#### DTC DETECTION LOGIC

INFOID:000000009720045

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453	EVAP control system pressure sensor high in- put	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors <ul> <li>(The sensor circuit is open or shorted.)</li> <li>[CKP sensor (POS) circuit is shorted.]</li> <li>(APP sensor 2 circuit is shorted.)</li> <li>(Refrigerant pressure sensor circuit is shorted.)</li> </ul> </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> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

А

- With GST
  Start engine and warm it up to normal operating temperature.
  Set voltmeter probes to ECM harness connector terminals.

	E	CM		
Connector	+		_	
Connector	Terminal		Terminal	
E16	95 (Fuel tank temperature	sensor signal)	104 (Sensor ground)	
4. Turn igr 5. Turn igr	hat the voltage is less ition switch OFF and ition switch ON.	wait at least 1		
<ol> <li>7. Start en</li> <li>8. Check 1</li> </ol>	ition switch OFF and gine and wait at least st trip DTC. <u>C detected?</u>		U seconds.	
YES >>	Go to <u>EC-319, "Diagr</u> INSPECTION END	nosis Procedur	<u>e"</u> .	
Diagnosis	Procedure			INFOID:00000009720046
1.снеск о	GROUND CONNECT	ION		
	ition switch OFF.	9 Pofor to Cro	und Increation in	GI-47, "Circuit Inspection".
	tion result normal?		und inspection ir	<u>GI-47, Circuit Inspection</u> .
	GO TO 2.			
	Repair or replace gro	und connection	n.	
2.снеск (	CONNECTOR			
	ect EVAP control sys	tem pressure s	sensor harness co	onnector.
	nat water is not inside			
Is the inspec	tion result normal?			
	GO TO 3.			
•	Repair or replace har			
<b>3.</b> CHECK	EVAP CONTROL SYS	STEM PRESS	URE SENSOR PO	OWER SUPPLY CIRCUIT
	ition switch ON. ne voltage between E	VAP control sy	/stem pressure se	ensor harness connector and ground.
EVAP control	system pressure sensor	Ground	Voltage (V)	
Connecto	Terminal	Giounu	voltage (v)	
B17	3	Ground	Approx. 5	
Is the inspec	tion result normal?			
-	GO TO 10. GO TO 4.			
<b>4.</b> CHECK <b>B</b>	EVAP CONTROL SYS	STEM PRESS	URE SENSOR PO	OWER SUPPLY CIRCUIT-II
	ition switch OFF.			
	ect ECM harness cor	nnector.		
	-	n EVAP contro	ol system pressu	re sensor harness connector and ECM har-

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

EVAP control syste	em pressure sensor	E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
B17	3	E16	91	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors B4, E104

• Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit.

#### 6.CHECK SENSOR POWER SUPPLY CIRCUIT

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

ECM		Sensor				
Connector	Terminal	Name	Connector	Terminal		
F8	72	Refrigerant pressure sensor	E300	1		
FO	76	CKP sensor (POS)	F20	1		
E16	87	APP sensor	E110	5		
EIO	91	EVAP control system pressure sensor	B17	3		

Is the inspection result normal?

YES >> GO TO 7.

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

7.CHECK COMPONENTS

Check the following.

• Crankshaft position sensor (POS) (Refer to EC-278, "Component Inspection".)

• Refrigerant pressure sensor (Refer to EC-465. "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace malfunctioning components.

8. CHECK APP SENSOR

Refer to EC-421, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> GO TO 9.

**9.**REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly. Refer to ACC-4, "Exploded View".

2. Refer to EC-421, "Special Repair Requirement".

#### >> INSPECTION END

10.check evap control system pressure sensor ground circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

EVAP control syste	m pressure sensor	E	CM	Continuity	
Connector	Terminal	Connector	Terminal	- Continuity	
B17	1	E16	96	Existed	-
Also check h	arness for short	to ground and	short to power.		-
the inspection					
YES >> GO NO >> GO					
4					
heck the follow					
Harness conne					
Harness for op	en or short betw	een EVAP cont	rol system pres	sure sensor a	nd ECM
_					
	air open circuit,	-	•		
	AP CONTROL	SYSTEM PRES	SURE SENSO	K INPUT SIG	NAL CIRCUIT FOR OPEN AND
HORT	ontinuity botwo	DD EVAP contro	l svetom pross	ire sensor ba	rness connector and ECM har-
ness connec	•		i system press	116 2611201 He	
					_
EVAP control syste	m pressure sensor	E	CM	- Continuity	-
Connector	Terminal	Connector	Terminal	Continuity	
B17	2	E16	86	Existed	-
. Also check h	arness for short	to ground and	short to power.		
the inspection					
YES >> GO NO >> GO					
•	ALFUNCTIONI				
		NG PART			
heck the follow	ing. ectors B4, E104				
	en or short betw	een EVAP cont	rol system pres	sure sensor a	nd ECM
	air open circuit,	short to ground	or short to powe	er in harness o	or connectors.
4.CHECK RU	IBBER TUBE				
	ubber tube conr		canister vent co	ontrol valve.	
	bber tube for clo	ogging.			
the inspection YES >> GO					
	in the rubber tub	e using an air b	lower, repair or	replace rubbe	r tube.
	AP CANISTER	-		-	
	, "Component In				
the inspection		<u></u> .			
YES >> GO					
· ·	lace EVAP canis				ded View".
<b>6</b> .CHECK EV	AP CONTROL S	SYSTEM PRES	SURE SENSOF	R	
efer to EC-312,	, "Component In	spection".			
	recult normal?				

Is the inspection result normal?

YES >> GO TO 17.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

#### < DTC/CIRCUIT DIAGNOSIS >

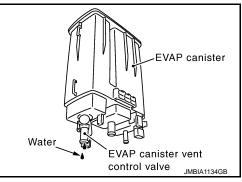
[VQ35DE]

17. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

- 1 Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to FL-16, "Exploded View".
- Check if water will drain from the EVAP canister. 2.

Does water drain from the EVAP canister?

- YES >> GO TO 18.
- NO >> GO TO 20.



## 18. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES	>> GO TO 20.
NO	>> GO TO 19.

19. DETECT MALFUNCTIONING PART

#### Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-16, "Exploded View".

#### 20. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

1.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- Turn ignition switch OFF. 1.
- 2. Remove EVAP control system pressure sensor with its harness connector. Refer to FL-16, "Exploded View".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

	ECM				
Connector	+	_	Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage	
Connector	Terminal	Terminal	(1.9, 0117, 1, 001)		
	86	96 (Sensor ground)	Not applied	1.8 - 4.8 V	
E16	(EVAP control system pressure sensor signal)		-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	

#### **CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

### EC-322

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Is the inspection result normal?	
YES >> INSPECTION END NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded V</u>	iew".
	EC
	С
	D
	E
	F
	G
	Н
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#### < DTC/CIRCUIT DIAGNOSIS >

## P0456 EVAP CONTROL SYSTEM

#### **DTC Logic**

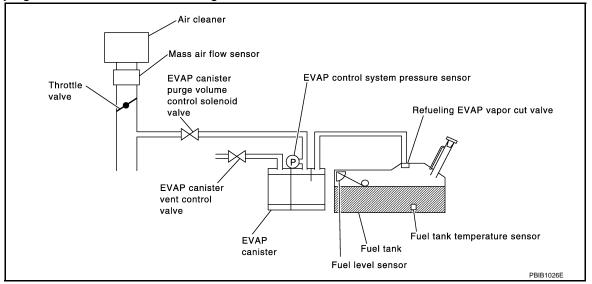
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[VQ35DE]

#### 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> <li>EVAP system has a leak.</li> <li>EVAP system does not operate properly.</li> </ul>	<ul> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Fuel filler cap remains open or does not close.</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leakage is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent con- trol valve.</li> <li>EVAP canister or fuel tank leakage</li> <li>EVAP purge line (pipe and rubber tube) leakage</li> <li>EVAP purge line rubber tube bent</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister vent control valve is miss- ing or damaged</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leakage</li> <li>Fuel level sensor and the circuit</li> <li>Foreign matter caught in EVAP canister purge vol- ume 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 illuminate.
- If the fuel filler cap is not tightened properly, the MIL may illuminate.
- Use only a genuine NISSAN rubber tube as a replacement.

#### DTC CONFIRMATION PROCEDURE

< DTC/CIRCUIT DIAGNOSIS >

1.PRECONDITIONING	А
If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct- ing the next test.	A
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	EC
3. Turn ignition switch OFF and wait at least 10 seconds.	
Do you have CONSULT?	С
YES >> GO TO 2. NO >> GO TO 4.	
2.PERFORM DTC CONFIRMATION PROCEDURE-I	D
WITH CONSULT	
<ol> <li>Turn ignition switch ON and select "EVAP DIAG READY" in "DATA MONITOR" mode with CONSULT.</li> <li>Start engine and wait at idle until "OFF" of "EVAP DIAG READY" changes to "ON". NOTE:</li> </ol>	E
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.	F
NOTE: Never turn ignition switch ON during 90 minutes.	I
4. Turn ignition switch ON and select "EVAP LEAK DIAG" in "DATA MONITOR" mode with CONSULT.	
5. Check that "EVAP LEAK DIAG" indication.	G
Which is displayed on CONSULT?	
CMPLT >> GO TO 3. YET >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 1.	Н
3. PERFORM DTC CONFIRMATION PROCEDURE-II	11
Check 1st trip DTC. <u>Is 1st trip DTC detected?</u>	
YES >> Proceed to EC-325, "Diagnosis Procedure".	
NO >> INSPECTION END.	J
4. PERFORM DTC CONFIRMATION PROCEDURE	0
@WITH GST	
<ol> <li>Start engine and wait engine idle for at least 2 hours.</li> <li>Turn ignition switch OFF and wait at least 90 minutes.</li> </ol>	Κ
NOTE:	
Never turn ignition switch ON during 90 minutes.	L
<ol> <li>Turn ignition switch ON.</li> <li>Check 1st trip DTC.</li> </ol>	
<u>Is 1st trip DTC detected?</u>	
YES >> Proceed to EC-325, "Diagnosis Procedure".	Μ
NO >> INSPECTION END.	
Diagnosis Procedure	Ν
1.CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch OFF.	0

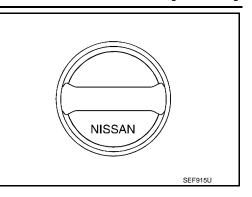
#### < DTC/CIRCUIT DIAGNOSIS >

#### 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. Refer to <u>FL-11, "Exploded View"</u>.



[VQ35DE]

2.CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Then retighten until reteaching 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-329, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace fuel filler cap with a genuine one. Refer to <u>FL-11, "Exploded View"</u>.

**5.**CHECK FOR EVAP LEAK

Refer to EC-534, "Inspection".

Is there any leak in EVAP line?

YES >> Repair or replace.

NO >> GO TO 6.

 $\mathbf{6}$ .CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to <u>FL-16</u>, "<u>Exploded View</u>".
- EVAP canister vent control valve. Refer to <u>EC-303, "Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to <u>FL-16, "Exploded View"</u>.

7.CHECK IF EVAP CANISTER SATURATED WITH WATER

#### < DTC/CIRCUIT DIAGNOSIS >

1

#### [VQ35DE]

Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to А FL-16, "Removal and Installation". 2. Check if water will drain from the EVAP canister. EVAP canister Does water drain from EVAP canister? EC YES >> GO TO 8. NO-1 >> With CONSULT: GO TO 10. NO-2 >> Without CONSULT: GO TO 11. Water EVAP canister vent control valve JMBIA1134GB D 8. CHECK EVAP CANISTER Weigh the EVAP canister assembly with the EVAP canister vent control valve and EVAP control system pressure sensor attached. Е The weight should be less than 2.1 kg (4.6 lb). Is the inspection result normal? YES-1 >> With CONSULT: GO TO 10. F YES-2 >> Without CONSULT: 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 Н >> Repair hose or replace EVAP canister. Refer to FL-16, "Removal and Installation". 10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION (P)WITH CONSULT 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 screen to increase "PURG VOL CONT/V" opening to 100%. 5. Check vacuum hose for vacuum. Κ Vacuum should exist. Is the inspection result normal? YES >> GO TO 13. NO >> GO TO 12. M 11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION **WITHOUT CONSULT** 1. Start engine and warm it up to normal operating temperature. Ν 2. Stop engine. 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. Ρ 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-91, "System Description". Is the inspection result normal?

< 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-297, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View".

14.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-251, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace fuel level sensor unit. Refer to <u>FL-6, "Removal and Installation"</u>.

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-312, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

**16.**CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to <u>EC-91, "System Description"</u>.

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or reconnect the hose.

**17.**CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 18.

**18.**CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to <u>EC-459</u>, "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-462, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 21.

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-11, "Exploded View"</u>.

21. CHECK FUEL LEVEL SENSOR

Refer to <u>MWI-47</u>, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 22.

#### < DTC/CIRCUIT DIAGNOSIS >

### NO >> Replace fuel level sensor unit. Refer to <u>FL-6</u>, "Removal and Installation".

## 22.CHECK INTERMITTENT INCIDENT

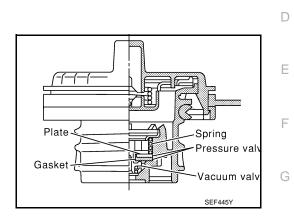
Refer to GI-44, "Intermittent Incident".

### >> INSPECTION END



## 1.CHECK FUEL FILLER CAP

- 1. Turn ignition switch OFF.
- 2. Remove fuel filler cap. Refer to FL-11, "Exploded View".
- 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>,

Is the inspection result normal?

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

2.REPLACE FUEL FILLER CAP

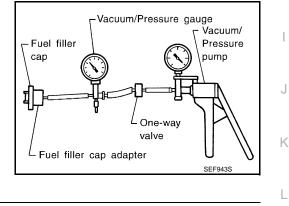
Replace fuel filler cap. Refer to <u>FL-11, "Exploded View"</u>.

-0.87 to -0.48 psi)

### CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END



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INFOID:000000009720050

А

## P0460 FUEL LEVEL SENSOR

## Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line.

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000009720052

### DTC DETECTION LOGIC

NOTE:

- If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-351, "DTC Logic"</u>.

When the vehicle is parked, the fuel level in the fuel tank is naturally stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal be- ing varied is sent from the fuel level sensor to ECM.	<ul> <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 perform the following before conducting the next test.

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

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and wait maximum of 2 consecutive minutes.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Go to EC-330, "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

**1.**CHECK COMBINATION METER FUNCTION

#### Refer to <u>MWI-35, "CONSULT Function (METER/M&A)"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to <u>MWI-46, "Diagnosis Procedure"</u>.

2. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

INFOID:000000009720053

>> INSPECTION END
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## P0461 FUEL LEVEL SENSOR

## Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line.

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000009720055

## 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 <u>EC-351, "DTC Logic"</u>.

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 dis- tance.	<ul> <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 <u>EC-332</u>, "<u>Component Function Check</u>". Use component function check to check the overall function of the fuel level sensor. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-333, "Diagnosis Procedure".

**Component Function Check** 

INFOID:000000009720056

1.PRECONDITIONING

#### WARNING:

When performing the following procedure, always observe the handling of the fuel. Refer to <u>FL-5</u>, <u>"Exploded View"</u>.

#### **TESTING CONDITION:**

Before starting component function check, preparation of draining fuel and refilling fuel is required. Will CONSULT be used?

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

2. PERFORM COMPONENT FUNCTION CHECK

## With CONSULT

#### NOTE:

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30  $\ell$  (7-7/8 US gal, 6-5/ 8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.

## **P0461 FUEL LEVEL SENSOR**

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Release fuel pressure from fuel line, refer to <u>EC-534, "Inspection"</u>.</li> <li>Remove the fuel feed hose on the fuel level sensor unit.</li> <li>Connect a spare fuel hose where the fuel feed hose was removed.</li> </ol>		A
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds then turn ON.</li> <li>Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT.</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> </ol>	E	EC
<ol> <li>Select "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT.</li> <li>Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> <li>Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> </ol>		С
13. Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.		D
Is the inspection result normal?		
YES >> INSPECTION END NO >> Go to EC-333, "Diagnosis Procedure".		Е
3. PERFORM COMPONENT FUNCTION CHECK		
Without CONSULT		F
NOTE: Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 $\ell$ (7-7/8		I
Imp gal) in advance.	-	0
<ol> <li>Prepare a fuel container and a spare hose.</li> <li>Release fuel pressure from fuel line. Refer to <u>EC-534, "Inspection"</u>.</li> </ol>		G
<ol> <li>Remove the fuel feed hose on the fuel level sensor unit. Refer to <u>FL-5. "Exploded View"</u>.</li> <li>Connect a spare fuel hose where the fuel feed hose was removed.</li> </ol>		
5. Turn ignition switch ON.		Η
6. Drain fuel by 30 $\ell$ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.		
<ol> <li>Confirm that the fuel gauge indication varies.</li> <li>Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).</li> </ol>		I
9. Confirm that the fuel gauge indication varies.		
Is the inspection result normal?		
YES >> INSPECTION END NO >> Go to <u>EC-333, "Diagnosis Procedure"</u> .		J
	INFOID:000000009720057	Κ
1. CHECK COMBINATION METER FUNCTION		
Refer to MWI-35, "CONSULT Function (METER/M&A)".		L
Is the inspection result normal?		
YES >> GO TO 2. NO >> Go to <u>MWI-46, "Diagnosis Procedure"</u> .		в. Л
2. CHECK INTERMITTENT INCIDENT		M
Refer to <u>GI-44, "Intermittent Incident"</u> .		
		Ν
>> INSPECTION END		
		0

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## P0462, P0463 FUEL LEVEL SENSOR

## Description

The fuel level sensor is mounted in the fuel level sensor unit.

The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line.

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

### DTC Logic

INFOID:000000009720059

### 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 <u>EC-351, "DTC Logic"</u>.

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.	Harness or connectors     (The CAN communication line is open or
P0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>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 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 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-334, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

**1.**CHECK COMBINATION METER FUNCTION

### Refer to MWI-35, "CONSULT Function (METER/M&A)".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to <u>MWI-46, "Diagnosis Procedure"</u>.

2. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

INFOID:000000009720060

< DTC/CIRCUIT DIAGNOSIS >	
>> INSPECTION END	

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## P0500 VSS

### Description

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.

## DTC Logic

INFOID:000000009720062

INFOID:000000009720061

# 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 <u>EC-351, "DTC Logic"</u>.

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 fol- lowing status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sen- sor transmitted from TCM to ECM via CAN communication and the vehicle speed indi- cated on the combination meter exceeds 15km/h (10 MPH).	<ul> <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>Secondary 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 <u>EC-336. "Diagnosis Procedure"</u>

NO >> INSPECTION END

### **Diagnosis Procedure**

**1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-38, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 2.

## P0500 VSS

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
NO >> Perform trouble shooting relevant to DTC indicated.		
2.check dtc with ABS Actuator and electric unit (control unit)		А
Check DTC with ABS actuator and electric unit (control unit). Refer to BRC-28, "CONSULT Fund	tion".	
Is the inspection result normal?	1	EC
YES >> GO TO 3.		
NO >> Perform trouble shooting relevant to DTC indicated.		
3. CHECK DTC WITH COMBINATION METER		С
Check DTC with combination meter. Refer to <u>MWI-35. "CONSULT Function (METER/M&amp;A)"</u> .		
Is the inspection result normal? YES >> GO TO 4.		D
NO >> Perform trouble shooting relevant to DTC indicated.		
4. CHECK SECONDARY SPEED SENSOR		Е
Check secondary speed sensor. Refer to TM-60, "Diagnosis Procedure".		
Is the inspection result normal?		
YES >> GO TO 5.		F
NO >> Replace or replace error-detected parts.		
5.CHECK WHEEL SENSOR		G
Check wheel sensor. Refer to <u>BRC-50, "Diagnosis Procedure"</u> .		
Is the inspection result normal? YES >> Check intermittent incident. Refer to GI-44, "Intermittent Incident".		
NO $>>$ Replace or replace error-detected parts.		Η
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## P0506 ISC SYSTEM

## Description

INFOID:000000009720064

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:000000009720065

## DTC DETECTION LOGIC

#### NOTE:

#### If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506	Idle speed control sys- tem RPM lower than ex- pected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul><li>Electric throttle control actuator</li><li>Intake air leakage</li></ul>

## DTC 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.

# If the target idle speed is out of the specified value, perform <u>EC-20, "IDLE AIR VOLUME LEARNING :</u> <u>Special Repair Requirement"</u>, 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. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and run it for at least 1 minute at idle speed.
- 6. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to <u>EC-338, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## Diagnosis Procedure

## **1.**CHECK INTAKE AIR LEAKAGE

1. Start engine and let it idle.

2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

INFOID:000000009720066

[VQ35DE]

## **P0506 ISC SYSTEM**

#### [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > YES >> Discover air leakage location and repair. NO >> GO TO 2. А 2.REPLACE ECM 1. Stop engine. EC 2. Replace ECM. 3. Go to EC-16, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement". С >> INSPECTION END

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## P0507 ISC SYSTEM

## Description

INFOID:000000009720067

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:000000009720068

## DTC DETECTION LOGIC

#### NOTE:

### If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507	Idle speed control sys- tem RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul><li>Electric throttle control actuator</li><li>Intake air leakage</li><li>PCV system</li></ul>

## DTC 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.

#### If the target idle speed is out of the specified value, perform <u>EC-20, "IDLE AIR VOLUME LEARNING :</u> <u>Special Repair Requirement"</u>, 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. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and run it for at least 1 minute at idle speed.
- 6. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to <u>EC-340, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## Diagnosis Procedure

**1.**CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

Is the inspection result normal?

YES >> GO TO 2.

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[VQ35DE]

## **P0507 ISC SYSTEM**

< DTC/CIRCUIT DIAGNOSIS > [VQ3	5DE]
NO >> Repair or replace malfunctioning part.	
2. CHECK INTAKE AIR LEAKAGE	A
<ol> <li>Start engine and let it idle.</li> <li>Listen for an intake air leakage after the mass air flow sensor.</li> <li><u>Is intake air leakage detected?</u></li> </ol>	EC
YES >> Discover air leakage location and repair. NO >> GO TO 3.	
3.REPLACE ECM	С
<ol> <li>Stop engine.</li> <li>Replace ECM.</li> <li>Go to <u>EC-16. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Recoment"</u>.</li> </ol>	D quire-
>> INSPECTION END	E
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## P050A, P050E COLD START CONTROL

### Description

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

### DTC Logic

NOTE:

#### DTC DETECTION LOGIC

## If DTC P050A, 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 con- dition.	<ul> <li>Lack of intake air volume</li> <li>Fuel injection system</li> </ul>
P050E	Cold start engine exhaust temper- ature 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.	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.

#### **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

#### (B) With CONSULT

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Select "DATA MONITOR" mode with CONSULT.
- 4. Check the indication of "COOLAN TEMP/S".

#### With GST

Follow the procedure "With CONSULT" 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

- 1. Set the select lever in N range.
- 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.

#### With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

YES >> Go to EC-343, "Diagnosis Procedure".

## EC-342

## P050A, P050E COLD START CONTROL

PUSUA, PUSUE COLD START CONTROL		
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
NO >> INSPECTION END		
Diagnosis Procedure	A INFOID:000000009720072	
1.PERFORM IDLE AIR VOLUME LEARNING	EC	
Perform EC-20, "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.	С	
2.CHECK INTAKE SYSTEM		
	D	
Check for the cause of intake air volume lacking. Refer to the following. <ul> <li>Crushed intake air passage</li> </ul>		
Intake air passage clogging	-	
Clogging of throttle body <u>Is the inspection result normal?</u>	E	
YES >> GO TO 3.		
NO >> Repair or replace malfunctioning part	F	
<b>3.</b> CHECK FUEL INJECTION SYSTEM FUNCTION		
Perform DTC Confirmation Procedure for DTC P0171, P0174. Refer to EC-240, "DTC Logic".	G	
Is the inspection result normal?	0	
YES >> GO TO 4. NO >> Go to <u>EC-241, "Diagnosis Procedure"</u> for DTC P0171, P0174.		
4. PERFORM DTC CONFIRMATION PROCEDURE	Н	
1. Turn ignition switch ON.		
2. Erase DTC.	1	
3. Perform DTC Confirmation Procedure.		
See <u>EC-342, "DTC Logic"</u> . Is the 1st trip DTC P050A, P050E displayed again?		
YES >> GO TO 5.	0	
NO >> INSPECTION END		
5.REPLACE ECM	K	
1. Replace ECM.		
<ol> <li>Go to <u>EC-16. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Rement"</u>.</li> </ol>	<u>epair Require-</u>	
>> INSPECTION END	M	
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## P0550 PSP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## P0550 PSP SENSOR

## Description

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load.

This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

### DTC Logic

INFOID:000000009720074

### DTC DETECTION LOGIC

#### NOTE:

# If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Power steering pressure sensor</li> </ul>

## DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is 1st trip DTC detected?

YES >> Go to EC-344, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect power steering pressure (PSP) sensor harness connector.

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

PSP	sensor	Ground	Voltage	
Connector Terminal		Ground	Vollage	
F62 3		Ground	Approx. 5 V	

INFOID:000000009720075

## **P0550 PSP SENSOR**

		•		OLNOON		
< DTC/CIRC						[VQ35DE]
Is the inspect		<u>mal?</u>				
	GO TO 3.					
-			•	•	rness or connectors.	-
J.CHECK P	SP SENSOR	GROUND CIR	CUIT FOR O	PEN AND SHOI	RT	
	tion switch OF					
		ess connector.	ncor hornoor	a connector and	ECM harness connector.	
5. Check th		elween FSF St	ensor names:			
PSP	sensor	EC	М			
Connector	Terminal	Connector	Terminal	Continuity		
F62	1	F8	48	Existed		
-			-			
		r short to grour	id and short t	o power.		
	ion result nor	mal?				
	GO TO 4. Penair open ci	reuit short to c	round short t	o nower in harn	ess or connectors.	
4	• •	-		OR OPEN AND		
1. Check th	e continuity b	etween PSP se	ensor harness	s connector and	ECM harness connector.	
PSP	sensor	EC	М	Continuity		
Connector	Terminal	Connector	Terminal	,		
F62	2	F8	41	Existed		
2. Also cheo	ck harness for	r short to grour	nd and short t	o power.		
s the inspect	ion result nor	<u>mal?</u>				
	GO TO 5.					
-		rcuit, short to g	pround or sho	rt to power in ha	rness or connectors.	
<b>D.</b> CHECK P	SP SENSOR					
Refer to EC-3	345, "Compon	ent Inspection	-			
<u>s the inspect</u>	ion result nor	mal?				
	GO TO 6.					
					TH HEATED STEERING	WHEEL), <u>ST-</u>
<u> </u>		<b>`</b>	OUT HEATEL	D STEERING W	HEEL)	
<b>D</b> .CHECK IN	ITERMITTEN	T INCIDENT				
Refer to <u>GI-4</u>	<u>4, "Intermitter</u>	<u>nt Incident"</u> .				
>>	NSPECTION	END				
Componer	nt Inspectio	on				INFOID:000000009720076
	•					W 012.0000000000720070
<b>1</b> .CHECK P	OWER STEE	RING PRESSU	JRE SENSO	२		
1. Reconne	ct all harness	connectors dis	sconnected.			
2. Start eng	ine and let it i	dle.				
3. Check the	e voltage betv	ween ECM terr	ninals under t	the following con	iditions.	
	ECM	1				
				Condition	Valtara	

	Eom			
Connector	+	_	Condition	Voltage
Connector	Terminal	Terminal		
=	41	48	Steering wheel: Being turned.	0.5 - 4.5 V
F8	(Power steering pressure sensor signal)	(Sensor ground)	Steering wheel: Not being turned.	0.4 - 0.8 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace power steering pressure sensor. Refer to <u>ST-64, "Exploded View"</u> ( WITH HEATED STEERING WHEEL ), <u>ST-106, "Exploded View"</u> ( WITHOUT HEATED STEERING WHEEL ).

## P0603 ECM POWER SUPPLY

### Description

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

properly.

## DTC Logic

DTC No.

P0603

### DTC DETECTION LOGIC

cuit

1.PRECONDITIONING If DTC Confirmation Procedure has been previously conducted, always perform the following before conduct-

DTC detecting condition

ECM back up RAM system does not function

Turn ignition switch OFF and wait at least 10 seconds.

Trouble diagnosis name

ECM power supply cir-

DTC CONFIRMATION PROCEDURE

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

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 10 second.
   Turn ignition switch OFF and wait at least 5 minutes.
- 3. Turn ignition switch ON, 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-347, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

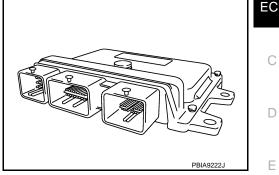
## 1.CHECK ECM POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the voltage between ECM harness connector terminals.

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Possible cause

[ECM power supply (back up) circuit is

Harness or connectors

open or shorted.]

• ECM

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## P0603 ECM POWER SUPPLY

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

_	+ –				Voltage
_	Connector	Terminal	Connector	Terminal	*
_	F8	77	E16	112	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- 15 A fuse (No. 50)
- IPDM E/R harness connector F12
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

**3.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

**4.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-347, "DTC Logic"</u>.

Is the 1st trip DTC P0603 displayed again?

YES >> GO TO 5.

NO >> INSPECTION END

**5.**REPLACE ECM

1. Replace ECM.

 Go to <u>EC-16</u>, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

## P0605 ECM

## Description

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.

## DTC Logic

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause	(.
		A)	ECM calculation function is malfunctioning.		
P0605	Engine control module	B)	ECM EEP-ROM system is malfunctioning.	• ECM	
		C)	ECM self shut-off function is malfunctioning.	-	H

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

#### >> GO TO 2.

## 2.perform dtc confirmation procedure for malfunction a

Turn ignition switch ON. 1. Check 1st trip DTC. 2. Is 1st trip DTC detected? YES >> Go to EC-350, "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.

- Turn ignition switch OFF, wait at least 10 seconds, and then turn it ON. 2.
- Check 1st trip DTC. 3.

#### Is 1st trip DTC detected?

YES >> Go to EC-350, "Diagnosis Procedure".

NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.

2. Turn ignition switch OFF, wait at least 10 seconds, and then turn it ON.

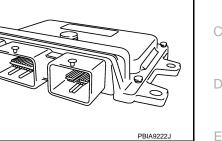
Repeat step 2 for 32 times. 3.

Check 1st trip DTC. 4.

Is 1st trip DTC detected?

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### YES >> Go to EC-350, "Diagnosis Procedure".

NO >> INSPECTION END

## **Diagnosis Procedure**

## **1.**INSPECTION START

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-349, "DTC Logic"</u>.

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.

NO >> INSPECTION END

## 2.REPLACE ECM

- 1. Replace ECM.
- 2. Go to EC-16. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

INFOID:000000009720082

[VQ35DE]

## P0607 ECM

## Description

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

## DTC Logic

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## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM
DTC CON	FIRMATION PROCED	URE	
1.PERFO	RM DTC CONFIRMATIO	N PROCEDURE	
	nition switch ON.		
2. Check Is DTC dete	-		
	Go to EC-351, "Diagnos	sis Procedure".	
NO >>	INSPECTION END		
Diagnosi	s Procedure		INF01D:000000009720085
1.INSPEC	TION START		
	nition switch ON.		
2. Erase I	DTC.		
	n DTC CONFIRMATION C-351, "DTC Logic".	PROCEDURE.	
4. Check	DTC.		
	P0607 displayed again?		
	GO TO 2. INSPECTION END		
2.REPLAC	CE ECM		
1. Replac	e ECM.		
	EC-16, "ADDITIONAL SE	ERVICE WHEN REPLACING CONTRO	L UNIT : Special Repair Require-
<u>ment"</u> .			
>>	INSPECTION END		

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## P0643 SENSOR POWER SUPPLY

## DTC Logic

INFOID:000000009720086

[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643	Sensor power supply circuit short	ECM detects that the voltage of power source for sensor is excessively low or high.	<ul> <li>Harness or connectors <ul> <li>(APP sensor 1 circuit is shorted.)</li> <li>(TP sensor circuit is shorted.)</li> <li>[CMP sensor (PHASE) circuit is shorted.)</li> <li>(PSP sensor circuit is shorted.)</li> <li>(Battery current sensor circuit is shorted.)</li> </ul> </li> <li>Accelerator pedal position sensor</li> <li>Throttle position sensor</li> <li>Camshaft position sensor (PHASE)</li> <li>Power steering pressure sensor</li> <li>Battery current sensor</li> </ul>

## DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

- YES >> Go to EC-352. "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000009720087

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

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.

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

APP	sensor	Ground	Voltage (V)	
Connector Terminal		Ground	voltage (v)	
E110	4	Ground	Approx. 5	

## P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

3. CHECK SENSOR POWER SUPPLY CIRCUIT

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

EC	M	Sensor		
Connector	Terminal	Name	Connector	Terminal
	47	TP sensor	F29	1
	51	Battery current sensor	F76	1
F8	55	PSP sensor	F62	3
	59	CMP sensor (PHASE) (bank 1)	F26	1
	63	CMP sensor (PHASE) (bank 2)	F69	1
E16	83	APP sensor	E110	4
4.CHECK CO Check the foll • Camshaft po	OMPONENT owing. osition senso	o ground or short to power in I S r (PHASE) (Refer to <u>EC-281,</u> Refer to <u>EC-369, "Component</u>	"Componer	it Inspecti
	O TO 5. eplace malfu	mal?	·	
Refer to EC-1	90. "Compor	nent Inspection".		
NO >> G	O TO 9. O TO 6.	<u>mal?</u> THROTTLE CONTROL ACTU	JATOR	
		e control actuator. Refer to <u>El</u> al Repair Requirement".	<u>M-33, "Expl</u>	oded Viev
-	ISPECTION	END		
<b>1</b> .CHECK AF	PP SENSOR			
<u>Is the inspecti</u> YES >> G	-	nent Inspection". mal?		
- · ·		TOR PEDAL ASSEMBLY		
		edal assembly. Refer to <u>ACC-</u> al Repair Requirement".	-4, "Explode	<u>d View"</u> .
>> IN 9.CHECK IN	ISPECTION TERMITTEN			

Refer to GI-44, "Intermittent Incident".

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>> INSPECTION END

# P0850 PNP SWITCH

## Description

When the selector lever position is P or N, pa	rk/neutral position (PNP) signal from the TCM is sent to ECM.
DTC Logic	INFOID:0000000097200

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850	Park/neutral position switch	The signal of the park/neutral position (PNP) signal does not change during driving after the engine is started.	<ul> <li>Harness or connectors [The park/neutral position (PNP) signal circuit is open or shorted.]</li> <li>TCM</li> </ul>
DTC CON	FIRMATION PROC	EDURE	
1.INSPEC	TION START		
	ULT be used?		
	ULT be used?		
	> GO TO 2. > GO TO 5.		
~	NDITIONING		
f DTC Cor	firmation Procedure h	as been previously conducted, always	perform the following before conduct-
ng the nex	t test.		<u>.</u>
	inition switch OFF and	l wait at least 10 seconds.	
		l wait at least 10 seconds.	
	> GO TO 3.		
<b>^</b>	PNP SIGNAL		
With CC 1. Turn ic	gnition switch ON.		
		ATA MONITOR" mode with CONSULT. T	hen check the "P/N POSI SW" signal
under	the following conditior	5.	
-			
Pos	ition (Selector lever)	Known-good signal	
Pos N or P posit		Known-good signal ON	
	ion		
N or P posit Except abov Is the inspe	ion ve position ection result normal?	ON	
N or P posit Except abov Is the inspe YES >>	ion ve position ection result normal? > GO TO 4.	ON OFF	
N or P posit Except above s the inspective YES >> NO >>	ion /e position ection result normal? > GO TO 4. > Go to <u>EC-356, "Diag</u>	ON OFF nosis Procedure".	
N or P posit Except above s the inspective YES >> NO >> 4.PERFO	ion /e position ection result normal? > GO TO 4. > Go to <u>EC-356, "Diag</u> RM DTC CONFIRMA	ON OFF nosis Procedure". TION PROCEDURE	
N or P posit Except abov YES >> NO >> <b>4.</b> PERFO 1. Select 2. Start e	ion /e position <u>ection result normal?</u> > GO TO 4. > Go to <u>EC-356, "Diag</u> RM DTC CONFIRMA "DATA MONITOR" mo ngine and warm it up	ON OFF Nosis Procedure". FION PROCEDURE ode with CONSULT. to normal operating temperature.	
N or P posit Except abov YES >> NO >> <b>4.</b> PERFO 1. Select 2. Start e 3. Mainta	ion /e position <u>ection result normal?</u> > GO TO 4. > Go to <u>EC-356, "Diag</u> RM DTC CONFIRMA" "DATA MONITOR" mo ngine and warm it up in the following condit	ON OFF nosis Procedure". FION PROCEDURE ode with CONSULT.	
N or P posit Except abov YES >> NO >> 4.PERFO 1. Select 2. Start e 3. Mainta CAUT	ion ve position <u>ection result normal?</u> > GO TO 4. > Go to <u>EC-356, "Diag</u> RM DTC CONFIRMA "DATA MONITOR" mo ngine and warm it up in the following condit ION:	ON OFF OFF TION PROCEDURE ode with CONSULT. to normal operating temperature. ions for at least 50 consecutive seconds	
N or P posit Except abov YES >> NO >> 4.PERFO 1. Select 2. Start e 3. Mainta CAUT	ion /e position <u>ection result normal?</u> > GO TO 4. > Go to <u>EC-356, "Diag</u> RM DTC CONFIRMA" "DATA MONITOR" mo ngine and warm it up in the following condit	ON OFF OFF TION PROCEDURE ode with CONSULT. to normal operating temperature. ions for at least 50 consecutive seconds	

ENG SPEED	1,100 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.0 - 31.8 msec

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## P0850 PNP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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-356, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to <u>EC-356. "Component Function Check"</u>. **NOTE:** 

# Use component function check to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to <u>EC-356</u>, "Diagnosis Procedure".

### Component Function Check

## **1.**PERFORM COMPONENT FUNCTION CHECK

- 1. Turn ignition switch ON.
- 2. Check the voltage between ECM harness connector terminals.

	ECM				
Connector	+	-	Con	dition	Voltage
Connector	Terminal	Terminal			
E16	102	112	Selector lever	P or N	Battery voltage
L10	102	112	position	Except above	Approx. 0 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-356. "Diagnosis Procedure".

## **Diagnosis Procedure**

**1.**CHECK DTC WITH TCM

Refer to EC-507, "DTC Index".

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair or replace malfunctioning part.

2. CHECK STARTING SYSTEM

Turn ignition switch OFF, then turn it to START.

#### Does starter motor operate?

YES >> GO TO 3.

NO >> Refer to <u>BCS-18</u>, "COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)".

 ${\it 3.}$  CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.

- 2. Disconnect TCM harness connector.
- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between TCM harness connector and IPDM E/R harness connector.

INFOID:000000009720091

## P0850 PNP SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

		TCM IPDM E/R		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F23	20	F12	72	Existed	
he inspectic ES >> G( O >> Re	on result norma O TO 4. epair open circ	uit, short to gro	und or short to	power in harness or connectors.	
Disconnec Disconnec	t IPDM E/R hat ECM harnes		ors.	RT-II r and IPDM E/R harness connect	Dr.
	CM	IPDM			
Connector	Terminal	Connector	Terminal	Continuity	
E16	102	E10	30	Existed	
<u>ne inspectio</u> ES >> G(	on result norma O TO 5.			power in harness or connectors.	
	FERMITTENT	INCIDENT		power in namess of connectors.	
		Incident".			
>> Re	epair or replace	e malfunctionin	g part.		
>> Re	epair or replace		g part.		
>> Re	epair or replace		g part.		
>> Re	epair or replace		g part.		
>> Re	epair or replace		g part.		
>> Re	epair or replace		g part.		

## P1148, P1168 CLOSED LOOP CONTROL

## DTC Logic

DTC DETECTION LOGIC NOTE: DTC P1148 or P1168 is display

DTC P1148 or P1168 is displayed with another DTC for A/F sensor 1. Perform the trouble diagnosis for the corresponding DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148	Closed loop control function (bank 1)	The closed loop control function for bank 1 does not operate even when vehicle is being driven in the specified condition.	Harness or connectors     (The A/F sensor 1 circuit is open or short- ed.)
P1168	Closed loop control function (bank 2)	The closed loop control function for bank 2 does not operate even when vehicle is being driven in the specified condition.	

## P1212 TCS COMMUNICATION LINE

#### < DTC/CIRCUIT DIAGNOSIS >

## P1212 TCS COMMUNICATION LINE

### Description

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)". Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

### **DTC** Logic

### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1212 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-351, "DTC Logic"</u>.

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	F
P1212	TCS communication line	ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously.	<ul> <li>Harness or connectors (The CAN communication line is open or short- ed.)</li> <li>ABS actuator and electric unit (control unit)</li> <li>Dead (Weak) battery</li> </ul>	G

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

#### TESTING CONDITION:

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

>> GO TO 2.

## **2.**PERFORM DTC CONFIRMATION PROCEDURE

Start engine and let it idle for at least 10 seconds.
 Check 1st trip DTC.
 <u>Is 1st trip DTC detected?</u>
 YES >> Go to <u>EC-359, "Diagnosis Procedure"</u>.
 NO >> INSPECTION END

### **Diagnosis** Procedure

Go to BRC-5, "Work Flow".

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## P1217 ENGINE OVER TEMPERATURE

### < DTC/CIRCUIT DIAGNOSIS >

## P1217 ENGINE OVER TEMPERATURE

### DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-351, "DTC Logic"</u>.

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 tempera- ture (Overheat)	<ul> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> <li>Engine coolant is not within the specified range.</li> </ul>	<ul> <li>Harness or connectors (The cooling fan circuit is open or short- ed.)</li> <li>IPDM E/R (Cooling fan relays)</li> <li>Cooling fan motor</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul>

#### **CAUTION:**

When a malfunction is indicated, always replace the coolant. Refer to <u>MA-20, "ENGINE COOLANT :</u> <u>Draining"</u>. Also, replace the engine oil. Refer to <u>MA-24, "ENGINE OIL : Draining"</u>.

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Always use coolant with the proper mixture ratio. Refer to <u>MA-16, "FOR NORTH AMERICA : Anti-Freeze Coolant Mixture Ratio"</u> (For NORTH AMERICA) or <u>MA-17, "FOR MEXICO : Engine Coolant Mixture Ratio"</u> (For MEXICO).
- 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-360, "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-361, "Diagnosis Procedure".

### Component Function Check

INFOID:000000009720097

## **1.**PERFORM COMPONENT FUNCTION CHECK-I

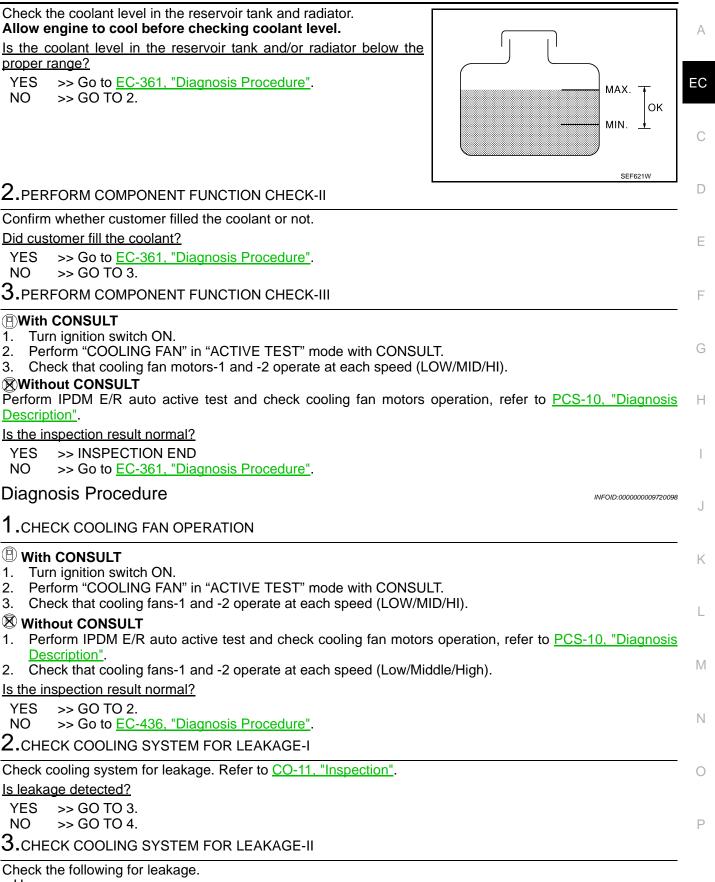
#### WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

# P1217 ENGINE OVER TEMPERATURE

[VQ35DE]



- Hose
- Radiator
- Water pump

< DTC/CIRCUIT DIAGNOSIS >

# **P1217 ENGINE OVER TEMPERATURE**

< DTC/CIRCUIT DIAGNOSIS >

>> Repair or replace malfunctioning part.

**4.**CHECK RADIATOR CAP

Check radiator cap. Refer to MA-23, "RADIATOR CAP : Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap. Refer to <u>CO-16, "Exploded View"</u>.

5. CHECK THERMOSTAT

Check thermostat. Refer to CO-28, "Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat. Refer to CO-27, "Exploded View".

**6.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-184, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u>.

**7.**CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul>	• Visual	No blocking	_
	2	Coolant mixture	Coolant tester	MA-19, "ENGINE COOLAI	NT : Inspection"
-	3	Coolant level	Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	MA-19, "ENGINE COOL- ANT : Inspection"
	4	Radiator cap	Pressure tester	MA-23, "RADIATOR CAP :	Inspection"
ON* <sup>2</sup>	5	Coolant leakage	Visual	No leakage	MA-19, "ENGINE COOL- ANT : Inspection"
ON* <sup>2</sup>	6	Thermostat	<ul> <li>Touch the upper and lower radiator hoses</li> </ul>	Both hoses should be hot	CO-28, "Inspection"
ON* <sup>1</sup>	7	Cooling fan	CONSULT	Operating	EC-436, "Component Function Check"
OFF	8	Combustion gas leak- age	Color checker chemical tester 4 Gas analyzer	Negative	_
ON* <sup>3</sup>	9	Coolant temperature     gauge	• Visual	Gauge less than 3/4 when driving	_
		Coolant overflow to res- ervoir tank	Visual	No overflow during driving and idling	MA-19, "ENGINE COOL- ANT : Inspection"
OFF* <sup>4</sup>	10	Coolant return from res- ervoir tank to radiator	Visual	Should be initial level in reservoir tank	MA-19, "ENGINE COOL- ANT : Inspection"
OFF	11	Cylinder head	Straight gauge feeler gauge	0.1 mm (0.004 in) Maxi- mum distortion (warping)	EM-119, "Inspection"
	12	Cylinder block and pis- tons	• Visual	No scuffing on cylinder walls or piston	EM-131, "Inspection"

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

# **P1217 ENGINE OVER TEMPERATURE**

Revision: 2013 August

# < DTC/CIRCUIT DIAGNOSIS >

For more information, refer to CO-4, "Troubleshooting Chart".

>> INSPECTION END

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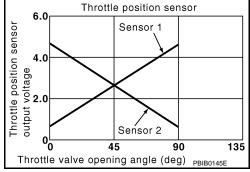
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# P1225 TP SENSOR

# Description

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

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



# DTC Logic

# DTC DETECTION LOGIC

INFOID:000000009720100

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 perform the following before conducting the next test.

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

#### TESTING CONDITION:

#### Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. 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-364, "Diagnosis Procedure".
- NO >> INSPECTION END

# **Diagnosis Procedure**

INFOID:000000009720101

### **1.**CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to <u>EM-31, "Exploded View"</u>.

INFOID:000000009720099

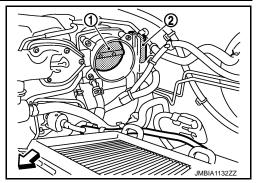
# P1225 TP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Description"</u>.



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2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".
- 2. Go to EC-365, "Special Repair Requirement".

>> INSPECTION END		
Special Repair Requirement	INFOID:000000009720102	F
1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING		
Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Require	ment"	G
>> GO TO 2. 2.PERFORM IDLE AIR VOLUME LEARNING		Н
Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"		I
>> END		1
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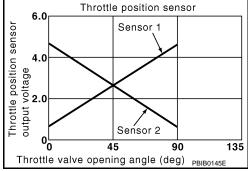
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# P1226 TP SENSOR

# Description

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

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



# DTC Logic

# DTC DETECTION LOGIC

INFOID:000000009720104

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not per- formed 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 perform the following before conducting the next test.

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

#### **TESTING CONDITION:**

#### Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Repeat steps 2 and 3 for 32 times.
- 5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-366, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:000000009720105

# **1.**CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-31, "Exploded View".

INFOID:000000009720103

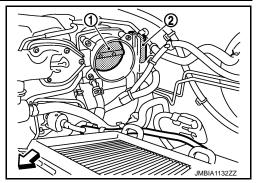
# P1226 TP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2) \_
- ⇒: Vehicle front \_

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Description".



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 $2. {\tt Replace electric throttle control actuator}$ 

- 1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".
- 2. Go to EC-367, "Special Repair Requirement".

2. Go to <u>EC-367, Special Repair Requirement</u> .	E
>> INSPECTION END	
Special Repair Requirement	0000009720106 F
1. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	
Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"	G
>> GO TO 2.	Н
2.PERFORM IDLE AIR VOLUME LEARNING	
Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"	I
>> END	
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# P1550 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# P1550 BATTERY CURRENT SENSOR

## Description

INFOID:000000009720107

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-12</u>. "System Description".

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000009720108

## DTC DETECTION LOGIC

#### NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

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> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

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

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

#### TESTING CONDITION:

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

#### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to <u>EC-368, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

# Diagnosis Procedure

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

- Is the inspection result normal?
- YES >> GO TO 2.

NO >> Repair or replace ground connection.

 ${
m 2.}$ CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

# EC-368

INFOID:000000009720109

#### P1550 BATTERY CURRENT SENSOR [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > 1. Disconnect battery current sensor harness connector. Turn ignition switch ON. 2. А Check the voltage between battery current sensor harness connector and ground. 3. Battery current sensor EC Ground Voltage (V) Connector Terminal F76 Approx. 5 1 Ground Is the inspection result normal? YES >> GO TO 3. NO >> Repair open circuit, short to ground or short to power in harness or connectors. D ${\it 3.}$ check battery current sensor ground circuit for open and short Turn ignition switch OFF. 1. Disconnect ECM harness connector. 2. Е Check the continuity between battery current sensor harness connector and ECM harness connector. 3. ECM Battery current sensor F Continuity Connector Terminal Connector Terminal F76 2 F8 44 Existed 4. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 4. Н NO >> Repair open circuit, short to ground or short to power in harness or connectors. ${f 4}.$ CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT Check the continuity between battery current sensor harness connector and ECM harness connector. Battery current sensor ECM Continuity Connector Terminal Connector Terminal F8 F76 3 42 Existed 2. Also check harness for short to ground and short to power. Κ Is the inspection result normal? YES >> GO TO 5. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 5.CHECK BATTERY CURRENT SENSOR Refer to EC-369, "Component Inspection". Μ Is the inspection result normal? YES >> GO TO 6. NO >> Replace battery negative cable assembly. Ν

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

# **1.**CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

Reconnect harness connectors disconnected.

INFOID:000000009720110

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# P1550 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- <a>: Vehicle front</a>
- 🖛: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

|--|--|--|

Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F8	42 (Battery current sensor signal)	44 (Sensor ground)	Approx. 2.5

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

# P1551, P1552 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# P1551, P1552 BATTERY CURRENT SENSOR

# Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-12</u>, "System Description".

#### **CAUTION:**

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

**DTC** Logic

INFOID:000000009720112

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P1551	Battery current sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The appear circuit is open or obserted.)	
P1552	Battery current sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul><li>(The sensor circuit is open or shorted.)</li><li>Battery current sensor</li></ul>	

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON

#### Μ >> GO TO 2. 2. PERFORM DTC CONFIRMATION PROCEDURE Ν 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-371, "Diagnosis Procedure". >> INSPECTION END NO Diagnosis Procedure INFOID:000000009720113 P 1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

#### Is the inspection result normal?

YES >> GO TO 2.

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# P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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#### NO >> Repair or replace ground connection.

# 2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

#### 1. Disconnect battery current sensor harness connector.

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

Battery cur	rrent sensor	Ground	Voltage (V)
Connector Terminal		Cround	voltage (v)
F76	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$  CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	rrent sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
F76	2	F8	44	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	rent sensor			Continuity
Connector	Terminal			Continuity
F76	3	F8	42	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK BATTERY CURRENT SENSOR

Refer to EC-379, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

**6.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

Component Inspection

# 1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

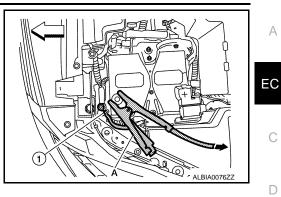
2. Reconnect harness connectors disconnected.

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# P1551, P1552 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- < : Vehicle front
- **(**: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.



[VQ35DE]

	ECM		
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F8	42 (Battery current sensor signal)	44 (Sensor ground)	Approx. 2.5

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

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# P1553 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# P1553 BATTERY CURRENT SENSOR

# Description

INFOID:000000009720115

[VQ35DE]

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-12</u>. "System Description".

#### CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000009720116

# DTC DETECTION LOGIC

#### NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1553	Battery current sensor perfor- mance	The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### **1.**PRECONDITIONING

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

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

#### TESTING CONDITION:

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

#### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-374, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

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

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

- Is the inspection result normal?
- YES >> GO TO 2.

NO >> Repair or replace ground connection.

 ${
m 2.}$ CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

# EC-374

INFOID:000000009720117

#### P1553 BATTERY CURRENT SENSOR [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > 1. Disconnect battery current sensor harness connector. Turn ignition switch ON. 2. А Check the voltage between battery current sensor harness connector and ground. 3. Battery current sensor EC Ground Voltage (V) Connector Terminal F76 Approx. 5 1 Ground Is the inspection result normal? YES >> GO TO 3. NO >> Repair open circuit, short to ground or short to power in harness or connectors. D ${\it 3.}$ check battery current sensor ground circuit for open and short Turn ignition switch OFF. 1. Disconnect ECM harness connector. 2. Е Check the continuity between battery current sensor harness connector and ECM harness connector. 3. ECM Battery current sensor F Continuity Connector Terminal Connector Terminal F76 2 F8 44 Existed 4. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 4. Н NO >> Repair open circuit, short to ground or short to power in harness or connectors. ${f 4}.$ CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT Check the continuity between battery current sensor harness connector and ECM harness connector. Battery current sensor ECM Continuity Connector Terminal Connector Terminal F8 F76 3 42 Existed 2. Also check harness for short to ground and short to power. Κ Is the inspection result normal? YES >> GO TO 5. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 5.CHECK BATTERY CURRENT SENSOR Refer to EC-379, "Component Inspection". Μ Is the inspection result normal? YES >> GO TO 6. NO >> Replace battery negative cable assembly. Ν **O.**CHECK INTERMITTENT INCIDENT Refer to GI-44, "Intermittent Incident". >> INSPECTION END **Component Inspection** P INFOID:000000009720118

## **1.**CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

2. Reconnect harness connectors disconnected.

# P1553 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- <a>: Vehicle front</a>
- 🖛: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM		
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F8	42 (Battery current sensor signal)	44 (Sensor ground)	Approx. 2.5

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

# P1554 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# P1554 BATTERY CURRENT SENSOR

# Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-12</u>, "System Description".

#### **CAUTION:**

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

**DTC Logic** 

INFOID:000000009720120

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	Ц
P1554	Battery current sensor perfor- mance	The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>	П

#### DTC CONFIRMATION PROCEDURE

#### **1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to <u>EC-377, "Component Function Check"</u>. 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-378, "Diagnosis Procedure".

#### Component Function Check

# **1.**PRECONDITIONING

#### **TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 2.

## 2. PERFORM COMPONENT FUNCTION CHECK

#### With CONSULT

- 1. Start engine and let it idle.
- 2. Select "BAT CUR SEN" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BAT CUR SEN" indication for 10 seconds.

#### "BAT CUR SEN" should be above 2,300mV at least once.

#### **Without CONSULT**

- 1. Start engine and let it idle.
- 2. Check voltage between ECM harness connector terminals under the following conditions.

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# P1554 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Is the inspection YES >> INS NO >> Go Diagnosis Pt 1.CHECK GRC 1. Turn ignition 2. Check grou Is the inspection YES >> GO	+ Terminal 42 Battery current	– Terminal	Voltage (V)		
F8 (1) Is the inspection YES >> INS NO >> Go Diagnosis Pi 1.CHECK GRO 1. Turn ignition 2. Check groute Is the inspection YES >> GO	42	Terminal			
Is the inspection YES >> INS NO >> Go Diagnosis Pr 1.CHECK GRO 1. Turn ignition 2. Check grou Is the inspection YES >> GO					
YES >> INS NO >> Go Diagnosis Pr 1.CHECK GRO 1. Turn ignition 2. Check grou Is the inspection YES >> GO	sensor signal)	44 (Sensor ground)	Above 2.3 at least onc		
NO >> Go Diagnosis Pr 1.CHECK GRO 1. Turn ignition 2. Check grou Is the inspection YES >> GO	n result norma	<u> ?</u>			
1. CHECK GRC 1. Turn ignition 2. Check grou Is the inspection YES >> GO	PECTION EN to <u>EC-378, "D</u>		<u>cedure"</u>		
1.Turn ignition2.Check groutIs the inspectionYES>> GO	rocedure				INFOID:000000009720122
2. Check grou Is the inspection YES >> GO	OUND CONN	ECTION			
Is the inspection YES >> GO	n switch OFF.				
YES >> GO			o Ground Inspection	in <u>GI-47, "Circuit Inspection"</u> .	
		<u> ?</u>			
	bair or replace	around conn	ection.		
· ·	•	0	R POWER SUPPLY	CIRCUIT	
			ness connector.		
	n switch ON.				
3. Check the v	oltage betwee	en battery cur	rent sensor harness	connector and ground.	
Battery curr	ent sensor	Ground	Voltage (V)		
Connector	Terminal				
F76	1	Ground	Approx. 5		
Is the inspection		?			

YES >> GO TO 3.

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

 $\mathbf{3.}$  CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	rrent sensor	ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F76	2	F8	44	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	rrent sensor	ECM Contin		Continuity	
Connector	Terminal			Continuity	
F76	3	F8	42	Existed	

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

Is the inspection result normal?

Revision: 2013 August

2014 MURANO

# P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

**5.**CHECK BATTERY CURRENT SENSOR

Refer to EC-379. "Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

 $\mathbf{6.}$ CHECK INTERMITTENT INCIDENT

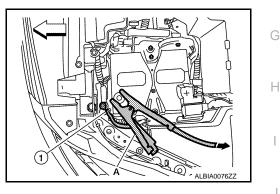
Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

# Component Inspection

# 1.CHECK BATTERY CURRENT SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect harness connectors disconnected.
- 3. Disconnect battery negative cable (1).
- <a>: Vehicle front</a>
- 🖛: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.



	ECM		
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F8	42 (Battery current sensor signal)	44 (Sensor ground)	Approx. 2.5

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

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# P1564 ASCD STEERING SWITCH

# Description

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated. Refer to <u>EC-66, "System Diagram"</u> for the ASCD function.

# DTC Logic

# DTC DETECTION LOGIC

#### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-349, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	<ul> <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> <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 perform the following before conducting the next test.

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

# >> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 5. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 6. Check DTC.
- Is DTC detected?
- YES >> Go to EC-380, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

# 1.CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

# Is the inspection result normal?

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

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT

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# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Turn ignition switch ON.

- Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT.
- 3. Check each item indication under the following conditions.

Monitor item	Condit	ion	Indication
MAIN SW	MAIN switch	Pressed	ON
MAIN SW	MAIN SWICH	Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
CANCEL SW	CANCEL SWICH	Released	OFF
RESUME/ACC SW	RESUME/ACCEL-	Pressed	ON
RESUME/ACC SW	ERATE switch	Released	OFF
SET SW	SET/COAST switch	Pressed	ON
321 300	SET/COAST SWICH	Released	OFF

#### **Without CONSULT**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals under the following conditions.

ECM				
Con-	+	_	Condition	Voltage (V)
nector	Terminal	Terminal		
	85	92	MAIN switch: Pressed	Approx. 0
			CANCEL switch: Pressed	Approx. 1
E16	(ASCD steering switch	(ASCD steering switch	SET/COAST switch: Pressed	Approx. 2
	signal)	-	RESUME/ACCELERATE switch: Pressed	Approx. 3
			All ASCD steering switches: Released	Approx. 4

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

# $\mathbf{3}.$ Check ascd steering switch ground circuit for open and short

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect combination switch harness connector.

4. Check the continuity between combination switch and ECM harness connector.

С	ombination switch	EC	M	Continuity	
	Terminal	Connector	Terminal	Continuity	
	16	E16	92	Existed	
5.	Also check har	ness for short	t to ground ar	nd short to powe	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M77, E105

Combination switch (spiral cable)

· Harness for open and short between ECM and combination switch

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

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# 5.check ascd steering switch input signal circuit for open and short

#### 1. Check the continuity between combination switch and ECM harness connector.

Combination switch	E	Continuity	
Terminal	Connector	Terminal	Continuity
13	E16	85	Existed

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

Is the inspection result normal?

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

6. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M77, E105

· Combination switch (spiral cable)

• Harness for open and short between ECM and combination switch

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

7. CHECK ASCD STEERING SWITCH

Refer to EC-382, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch.

**8.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### **Component Inspection**

INFOID:000000009720127

# 1. CHECK ASCD STEERING SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect combination switch (spiral cable) harness connector.
- 3. Check resistance between combination switch harness connector terminals as per the following.

Combination switch Connector Terminals		Condition	Resistance ( $\Omega$ )	
		Condition		
	13 and 16	MAIN switch: Pressed	Approx. 0	
		CANCEL switch: Pressed	Approx. 250	
M33		SET/COAST switch: Pressed	Approx. 660	
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480	
		All ASCD steering switches: Released	Approx. 4,000	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch

# P1572 ASCD BRAKE SWITCH

# Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by those two types of input (ON/OFF signal). Refer to <u>EC-66, "System Diagram"</u> for the ASCD function.

## DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-349, "DTC Logic"</u>.
- This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch is turned OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause	
		A)	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the ECM at the same time.	(The ASCD brake switch circuit is shorted.)	G
P1572	ASCD brake switch	B)	ASCD brake switch signal is not sent to ECM for extremely long time while the ve- hicle is being driven.	<ul> <li>Stop lamp switch</li> <li>ASCD brake switch</li> <li>Incorrect stop lamp switch installation</li> <li>Incorrect ASCD brake switch installation</li> <li>ECM</li> </ul>	

# DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

2. Turn ignition switch ON.

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

#### NOTE:

The procedure for malfunction B is not described. It takes extremely long time to complete the procedure for malfunction B. By performing the procedure for malfunction A, the condition that causes malfunction B can be detected.

>> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE	Ν
<ul> <li>With CONSULT</li> <li>Start engine (VDC switch OFF).</li> <li>Select "DATA MONITOR" mode with CONSULT.</li> <li>Press MAIN switch and check that CRUISE illuminates.</li> <li>Drive the vehicle for at least 5 consecutive seconds under the following conditions.</li> </ul>	0
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.	Ρ

This procedure may be conducted with the drive wheels lifted in the shop or by driving the If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position

EC-383

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# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Go to <u>EC-384, "Diagnosis Procedure"</u>.

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

#### CAUTION: Always drive vehicle at a safe speed.

NOTE:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Go to <u>EC-384, "Diagnosis Procedure"</u>. NO >> INSPECTION END

# Diagnosis Procedure

# **1.**CHECK OVERALL FUNCTION-I

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Сог	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
DIVARE SWI	Blake pedal	Fully released	ON

#### **Without CONSULT**

- 1. Turn ignition switch ON.
- 2. Check the voltage between ECM harness connector terminals.

	ECM					
Connector	+	_	Condition		Voltage	
Connector	Terminal	Terminal				
	110		Brake pedal	Slightly depressed	Approx. 0 V	
E16	(ASCD brake switch signal)	112		Fully released	Battery voltage	

Is the inspection result normal?

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

Revision: 2013 August

# [VQ35DE]

2. CHECK OVERALL FUNCTION-II

#### With CONSULT

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

Monitor item	Cor	Indication	
BRAKE SW2	Brake pedal	Slightly depressed	ON
DRARE SWZ	Diake pedal	Fully released	OFF

**Without CONSULT** Check the voltage between ECM harness connector terminals.

	ECM					
+ -		-	Condition		Voltage	
Connector	Terminal	Terminal				
<b>-</b>	106	110	5	Slightly depressed	Battery voltage	
E16	(Stop lamp switch signal)	112	Brake pedal	Fully released	Approx. 0 V	
s the inspe	ection result	normal?	1			
	- GO TO 12.					
-	• GO TO 7.					
			CHPOWER	SUPPLY CIRCUIT		
	nition switch		ch harness	connector.		
3. Turn ig	nition switch	ON.				
4. Check	the voltage I	between A	SCD brake	switch harness conne	ector and ground.	
ASCD br	ake switch	i				
Connector	Terminal	Ground	Voltage			
E49	1	Ground	Battery voltag			
Is the inspe	ection result	normal?	, , ,	<u> </u>		
YES >>	> GO TO 5.					
4	> GO TO 4.					
4.DETEC	T MALFUNC	TIONING	PART			
Check the	following. ck (J/B) conn	ootor E10	<b>1</b> 2			
<ul> <li>Fuse bloc</li> <li>10 A fuse</li> </ul>			13			
		short betw	een ASCD b	orake switch and fuse		
					_	
			-	nd or short to power i		
<b>J.</b> CHECK	ASCD BRA	KE SWIT	CH INPUT S	IGNAL CIRCUIT FOR	R OPEN AND SH	ORT
	nition switch		anactor			
	nect ECM hat the continuit			ke switch harness cor	nnector and ECM	harness connector.
ASCD bra	ake switch	E	СМ	Continuity		
Connector	Terminal	Connector	Terminal	Continuity		
			I I			

4. Also check harness for short to ground and short to power. Is the inspection result normal?

110

E16

2

E49

# **EC-385**

Existed

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2014 MURANO

# P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 6.

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

**6.**CHECK ASCD BRAKE SWITCH

Refer to EC-387, "Component Inspection (ASCD Brake Switch)"

#### Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace ASCD brake switch. Refer to <u>BR-20, "Exploded View"</u>.

7. 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 lam	np switch	Ground	Voltage
Connector	Terminal	Cround	
E116	1	Ground	Battery voltage

Is the inspection result normal?

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

 $\mathbf{N}$  >> GO 10 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10 A fuse (No. 7)

Harness for open or short between stop lamp switch and battery

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

# 9.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between stop lamp switch harness connector and ECM harness connector.

Stop lan	np switch	ECM				Continuity
Connector	Terminal	Connector	Terminal	Continuity		
E116	2	E16	106	Existed		

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10. DETECT MALFUNCTIONING PART

#### Check the following.

• Fuse block (J/B) connector E103

Harness for open or short between stop lamp switch and ECM

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

**11.**CHECK STOP LAMP SWITCH

Refer to EC-387, "Component Inspection (Stop Lamp Switch)"

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>.

12. CHECK INTERMITTENT INCIDENT

# P1572 ASCD BRAKE SWITCH

DTC/CIRC	UIT DIAGNO	-			SWITCH	[VQ35DE]
	4. "Intermitter					
	NSPECTION		Proko Su	witch)		
	t Inspectio	,	Diake St	witch)		INFOID:000000009720131
	SCD BRAKE					
. Disconne	ion switch OF ct ASCD brai e continuity b	ke switch hai			under the followir	ng conditions.
	-	0			_	
Terminals		Condition	-1	Continuity		
1 and 2	Brake pedal	Fully released Slightly depre		Existed Not existed		
the inspect	ion result nor		53560	NOT EXISTEN		
YES >> II	SPECTION					
	60 TO 2.					
CHECK AS	SCD BRAKE	SWITCH-II				
					ection and Adjustr	
Check the	e continuity b	etween ASC	D brake sw	itch terminals	under the followir	ng conditions.
Terminals		Condition		Continuity	_	
1 and 0	Droke nedal	Fully release	d	Existed	—	
1 and 2	Brake pedal	Slightly depre	essed	Not existed		
the inspect	ion result nor	mal?				
-	NSPECTION		b Dofor to	BR-20, "Expl	odod View"	
	•				<u>Jaea view</u> .	
omponen	it Inspectio	on (Stop L	amp Swi	icn)		INFOID:000000009720132
.CHECK S	TOP LAMP S	WITCH-I				
	ion switch OF					
	ct stop lamp				als under the follow	wing conditions
Oneckind		ity between				wing conditions.
Terminals	Condit	ion	Continuity	,		
1 and 2 Br	ake pedal	y released	Not existed	t		
	Slig	htly depressed	Existed			
-	ion result nor					
	NSPECTION SO TO 2.	END				
	TOP LAMP S					
			Defente D			
					ion and Adjustme als under the follov	
						3
Terminals	Condit	ion	Continuity	,		
	<b>E</b>	v rologgod	Not ovictor	 J		

Terminals	Condition		Continuity	
1 and 2	Brake pedal	Fully released	Not existed	
T anu z	Diake pedai	Slightly depressed	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>.

#### Revision: 2013 August

#### < DTC/CIRCUIT DIAGNOSIS > P1574 ASCD VEHICLE SPEED SENSOR

# Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-66, "System Diagram" for ASCD functions.

# DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P1574 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-336, "DTC Logic".
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-349, "DTC Logic".
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-351, "DTC Logic".

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	The difference the between two vehicle speed signals is out of the specified range.	<ul> <li>Harness or connectors (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>ECM</li> </ul>
DTC CO	VERMATION PRO	OCEDURE	
1.PREC	ONDITIONING		
<ol> <li>Turn i</li> <li>Turn i</li> </ol>	gnition switch OFF gnition switch ON. gnition switch OFF -> GO TO 2.	and wait at least 10 seconds. and wait at least 10 seconds. MATION PROCEDURE	
2. Drive CAUT Alway	TION: ys drive vehicle at	than 40 km/h (25 MPH).	
lf a ro	procedure may be bad test is expecte < DTC.	conducted with the drive wheels lifte d to be easier, it is unnecessary to lif	d in the shop or by driving the vehicle. It the vehicle.

YES >> Go to EC-389, "Diagnosis Procedure". >> INSPECTION END NO

# **Diagnosis** Procedure

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-36, "Diagnosis Description". Is the inspection result normal?

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# P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2.

NO >> Perform trouble shooting relevant to DTC indicated.

2.check dtc with "abs actuator and electric unit (control unit)"

Refer to <u>BRC-28, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part.

 $\mathbf{3}$ . CHECK COMBINATION METER FUNCTION

Refer to MWI-35, "CONSULT Function (METER/M&A)".

>> INSPECTION END

# P1700 CVT CONTROL SYSTEM

## Description

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for corresponding DTC. Refer to <u>EC-507</u>, "<u>DTC Index</u>". When this DTC is detected, the ASCD control is canceled.

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# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

#### < DTC/CIRCUIT DIAGNOSIS >

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

## Description

ECM receives input speed sensor signal from TCM via the CAN communication line. ECM uses this signal for engine control.

# DTC Logic

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# DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC UXXXX first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to <u>EC-275, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0340, P0345, first perform the trouble diagnosis for DTC P0340, P0345. Refer to <u>EC-279, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-349, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-351, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and en- gine rpm signal.	<ul> <li>Harness or connectors (The CAN communication line is open or short- ed)</li> <li>Harness or connectors (Input 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 perform the following before conducting the next test.

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

#### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
- 3. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Go to EC-392, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

## **1.**CHECK DTC WITH TCM

#### Check DTC with TCM. Refer to <u>TM-128, "DTC Index"</u>.

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-165, "Exploded View".

INFOID:000000009720139

[VQ35DE]

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

< DTC/CIRCUIT DIAGNOSIS >	<b>v</b>	[VQ35DE]
>> INSPECTION END		

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# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < DTC/CIRCUIT DIAGNOSIS >

# P1800 VIAS CONTROL SOLENOID VALVE 1

#### Description

INFOID:000000009720140

[VQ35DE]

The VIAS control solenoid valve 1 cuts the intake manifold vacuum signal for power valve 1 control. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and sends the vacuum signal to the power valve actuator 1.

# DTC Logic

INFOID:000000009720141

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1800	VIAS control solenoid valve 1 circuit	An excessively low or high voltage signal is sent to ECM through the VIAS control solenoid valve 1.	<ul> <li>Harness or connectors (The solenoid valve 1 circuit is open or shorted.)</li> <li>VIAS control solenoid valve 1</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.CONDITIONING

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

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

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

#### **TESTING CONDITION:**

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

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-394, "Diagnosis Procedure".

NO >> INSPECTION END

#### **Diagnosis Procedure**

INFOID:000000009720142

# 1. CHECK VIAS CONTROL SOLENOID VALVE 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect VIAS control solenoid valve 1 harness connector.

3. Turn ignition switch ON.

4. Check the voltage between VIAS control solenoid valve 1 harness connector and ground.

VIAS control solenoid valve 1		Ground	Voltage	
Connector	Terminal	Ground	voltage	
F74	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 2.

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

#### 2.CHECK VIAS CONTROL SOLENOID VALVE 1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < DTC/CIRCUIT DIAGNOSIS >

 Check the continuity between VIAS control solenoid valve 1 harness connector and ECM harness connector.

VIAS CONTO SC	lenoid valve 1	EC	M		
Connector	Terminal	Connector	Terminal	Continuity	
F74	2	F7	27	Existed	
. Also check	harness for she	ort to ground and	d short to powe	er.	
the inspection	result normal	<u>?</u>			
YES >> GO					
	•	•		ower in harness or conn	ectors.
			/E 1		
Refer to <u>EC-395</u>					
<u>s the inspectior</u> YES >> GO		<u> </u>			
		trol solenoid val	ve 1. Refer to	EM-33, "Exploded View	
CHECK INTE					
Refer to <u>GI-44, '</u>	Intermittent In	cident".			
>> INS	PECTION END	D			
Component	nspection				INFOID:000000009720143
•	•				
		a	· <b>_</b> .		
.CHECK VIAS	CONTROL S		/E 1		
With CONSU	LT	OLENOID VALV	/E 1		
With CONSU	LT n switch OFF.				
With CONSU . Turn ignition . Reconnect . Disconnect	LT switch OFF. all harness cor vacuum hoses	OLENOID VALV	nected.	enoid valve 1.	
With CONSU Turn ignition Reconnect Disconnect	LT switch OFF. all harness cor vacuum hoses switch ON.	nectors disconr connected to V	nected. IAS control so		
With CONSU Turn ignition Reconnect Disconnect Turn ignition Select "VIA Check air pa	LT aswitch OFF. all harness cor vacuum hoses a switch ON. S S/V-1" in "AC assage continu	nectors disconr	nected. IAS control so ode with CONS	SULT.	
With CONSU Turn ignition Reconnect Disconnect Turn ignition Select "VIA	LT aswitch OFF. all harness cor vacuum hoses a switch ON. S S/V-1" in "AC assage continu	nectors disconr connected to V TIVE TEST" mo	nected. IAS control so ode with CONS	SULT.	
<ul> <li>With CONSU</li> <li>Turn ignition</li> <li>Reconnect</li> <li>Disconnect</li> <li>Turn ignition</li> <li>Select "VIA:</li> <li>Check air particular pa</li></ul>	LT all harness cor vacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	nectors disconr connected to V TIVE TEST" mo ity and operatio	nected. IAS control so ode with CONS n delay time ur	SULT. Inder the	
With CONSU Turn ignition Reconnect Disconnect Turn ignition Select "VIA Check air pa	LT all harness corvacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	nectors disconr connected to V TIVE TEST" mo	nected. IAS control so ode with CONS	SULT. Inder the C	
<ul> <li>With CONSU</li> <li>Turn ignition</li> <li>Reconnect</li> <li>Disconnect</li> <li>Turn ignition</li> <li>Select "VIAS</li> <li>Check air particular following condition</li> </ul>	LT all harness corvacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	nectors disconr connected to V TIVE TEST" mo ity and operatio	nected. IAS control so ode with CONS n delay time ur Air passage co	SULT. Inder the C	
With CONSU Turn ignition Reconnect Disconnect Turn ignition Select "VIAS Check air pa following co Condition (VIAS S/V-	LT aswitch OFF. all harness corvacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	nectors disconr connected to V TIVE TEST" mo ity and operatio	nected. IAS control sol ode with CONS n delay time ur Air passage co between (A) a	SULT. Inder the C	
With CONSU Turn ignition Reconnect Disconnect Turn ignition Select "VIA Check air pa following co Condition (VIAS S/V- ON	LT aswitch OFF. all harness corvacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	anectors disconr connected to V CTIVE TEST" mo ity and operation assage continuity reen (A) and (B) Existed	nected. IAS control sol ode with CONS n delay time ur Air passage co between (A) a Not existe	SULT. Inder the C	
<ul> <li>With CONSU</li> <li>Turn ignition</li> <li>Reconnect</li> <li>Disconnect</li> <li>Turn ignition</li> <li>Select "VIA</li> <li>Check air particular following condition (VIAS S/V-ON</li> </ul>	LT aswitch OFF. all harness corvacuum hoses a switch ON. S S/V-1" in "AC assage continu nditions.	anectors disconr connected to V CTIVE TEST" mo ity and operation assage continuity reen (A) and (B) Existed	nected. IAS control sol ode with CONS n delay time ur Air passage co between (A) a Not existe	SULT. Inder the C	

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 1.

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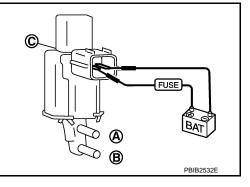
[VQ35DE]

# P1800 VIAS CONTROL SOLENOID VALVE 1

# < DTC/CIRCUIT DIAGNOSIS >

4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed



[VQ35DE]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 1. Refer to <u>EM-33</u>, <u>"Exploded View"</u>.

# P1801 VIAS CONTROL SOLENOID VALVE 2

### < DTC/CIRCUIT DIAGNOSIS >

# P1801 VIAS CONTROL SOLENOID VALVE 2

## Description

The VIAS control solenoid valve 2 cuts the intake manifold vacuum signal for power valve 2 control. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and sends the vacuum signal to the power valve actuator 2.

# DTC Logic

INFOID:000000009720145

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1801	VIAS control solenoid valve 2 circuit	An excessively low or high voltage signal is sent to ECM through the VIAS control solenoid valve 2.	<ul> <li>Harness or connectors (The solenoid valve 2 circuit is open or shorted.)</li> <li>VIAS control solenoid valve 2</li> </ul>
DTC CON	IFIRMATION PROCEDU	IRE	
1.condi	TIONING		
ing the nex 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING</b>	kt test. gnition switch OFF and wai gnition switch ON. gnition switch OFF and wai <b>CONDITION:</b>		-
>	> GO TO 2.		
2.perfc	ORM DTC CONFIRMATION	I PROCEDURE	
	engine and let it idle for at le	east 5 seconds.	
	t 1st trip DTC. DTC detected?		
	> Go to <u>EC-397, "Diagnosis</u>	s Procedure".	
	> INSPECTION END		
NO >	is Procedure		INFOID:00000009720146
NO > Diagnos		OID VALVE 2 POWER SUPPLY CIR	
NO > Diagnos 1.check	VIAS CONTROL SOLEN	OID VALVE 2 POWER SUPPLY CIR	
NO > Diagnos 1.CHECk 1. Turn ig 2. Discor	VIAS CONTROL SOLEN gnition switch OFF. nnect VIAS control solenoid	OID VALVE 2 POWER SUPPLY CIR	
NO > Diagnos 1.CHECK 1. Turn ig 2. Discor 3. Turn ig	VIAS CONTROL SOLEN gnition switch OFF. nnect VIAS control solenoid gnition switch ON.	d valve 2 harness connector.	CUIT
NO > Diagnos 1.CHECk 1. Turn ig 2. Discor 3. Turn ig	VIAS CONTROL SOLEN gnition switch OFF. nnect VIAS control solenoid gnition switch ON.		CUIT
NO > Diagnos 1.CHECk 1. Turn ig 2. Discor 3. Turn ig 4. Check	VIAS CONTROL SOLEN gnition switch OFF. nnect VIAS control solenoid gnition switch ON.	d valve 2 harness connector. 6 control solenoid valve 2 harness co	CUIT
NO > Diagnos 1.CHECk 1. Turn ig 2. Discor 3. Turn ig 4. Check	C VIAS CONTROL SOLEN gnition switch OFF. nnect VIAS control solenoid gnition switch ON. the voltage between VIAS	d valve 2 harness connector.	CUIT

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

## 2.CHECK VIAS CONTROL SOLENOID VALVE 2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

# EC-397

# [VQ35DE]

INFOID:000000009720144

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# P1801 VIAS CONTROL SOLENOID VALVE 2

### < DTC/CIRCUIT DIAGNOSIS >

 Check the continuity between VIAS control solenoid valve 2 harness connector and ECM harness connector.

VIAS control s	olenoid valve 2	E	ECM		
Connector	Terminal	Connector Terminal		Continuity	
F75	2	F7	26	Existed	

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

Is the inspection result normal?

YES >> GO TO 3.

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

## **3.**CHECK VIAS CONTROL SOLENOID VALVE 2

Refer to EC-398, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace VIAS control solenoid valve 2. Refer to EM-33, "Exploded View".

**4.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

### **Component Inspection**

INFOID:000000009720147

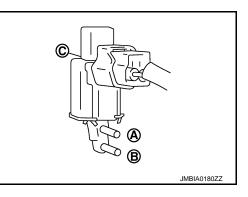
[VQ35DE]

# 1. CHECK VIAS CONTROL SOLENOID VALVE 2

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect vacuum hoses connected to VIAS control solenoid valve 2.
- 4. Turn ignition switch ON.
- 5. Select "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- 6. Check air passage continuity and operation delay time under the following conditions.

Condition (VIAS S/V-2)	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
ON	Existed	Not existed
OFF	Not existed	Existed



#### Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 2.

# P1801 VIAS CONTROL SOLENOID VALVE 2

### < DTC/CIRCUIT DIAGNOSIS >

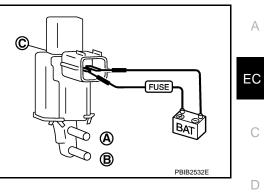
4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 2. Refer to <u>EM-33</u>, <u>"Exploded View"</u>.



[VQ35DE]

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# P1805 BRAKE SWITCH

# Description

INFOID:000000009720148

[VQ35DE]

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is being driven.

# DTC Logic

INFOID:000000009720149

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for ex- tremely long time while the vehicle is being driv- en.	(Stop Jamp Switch circuit is open or short-

### 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 <u>EC-400, "Diagnosis Procedure"</u>. NO >> INSPECTION END

# Diagnosis Procedure

# 1. CHECK STOP LAMP SWITCH CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

# **2.**CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- 1. Disconnect stop lamp switch harness connector.
- 2. Check the voltage between stop lamp switch harness connector and ground.

Stop lamp switch		Ground	Voltage	
Connector	Terminal	Ground	voltage	
E116	1	Ground	Battery voltage	
i a i	<i></i>	10		

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.** DETECT MALFUNCTIONING PART

Check the following.

• Fuse block (J/B) connector E103

• 10 A fuse (No. 7)

#### P1805 BRAKE SWITCH [VQ35DE] < DTC/CIRCUIT DIAGNOSIS > Harness for open or short between battery and stop lamp switch А >> Repair open circuit, short to ground or short to power in harness or connectors. 4.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT EC 1. Disconnect stop lamp switch harness connector. 2. Disconnect ECM harness connector. Check the continuity between stop lamp switch harness connector and ECM harness connector. 3. ECM Stop lamp switch Continuity Connector Terminal Connector Terminal D E116 2 E16 106 Existed Also check harness for short to ground and short to power. 4. Is the inspection result normal? YES >> GO TO 6. NO >> GO TO 5. **5.**DETECT MALFUNCTIONING PART Check the following. Fuse block (J/B) connector E103 · Harness for open or short between ECM and stop lamp switch >> Repair open circuit, short to ground or short to power in harness or connectors. Н 6.CHECK STOP LAMP SWITCH Refer to EC-401, "Component Inspection (Stop Lamp Switch)". Is the inspection result normal? YES >> GO TO 7. NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>. 7. CHECK INTERMITTENT INCIDENT Refer to GI-44, "Intermittent Incident". Κ >> INSPECTION END Component Inspection (Stop Lamp Switch) INFOID:000000009720151 1.CHECK STOP LAMP SWITCH-I 1. Turn ignition switch OFF. M Disconnect stop lamp switch harness connector. 2. 3. Check harness continuity between stop lamp switch terminals under the following conditions. Ν Terminals Condition Continuity Fully released Not existed 1 and 2 Brake pedal 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 <u>BR-9, "Inspection and Adjustment"</u>.

2. Check harness continuity between stop lamp switch terminals under the following conditions.

# EC-401

# P1805 BRAKE SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

Terminals	С	Continuity	
1 and 2	2 Brake pedal	Fully released	Not existed
	Diake peuai	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

# P2096, P2097, P2098, P2099 A/F SENSOR 1

# Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range.

The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

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

# **DTC Logic**

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible Cause	
P2096	POST CAT FUEL TRIM SYS B1 (Post catalyst fuel trim system too lean bank 1)	The output voltage computed by ECM from the A/ F sensor 1 signal is shifts to the lean side for a specified period.	<ul> <li>A/F sensor 1 heater</li> <li>Heated oxygen sensor 2 (bank 1)</li> </ul>	
P2097	POST CAT FUEL TRIM SYS B1 (Post catalyst fuel trim system too rich bank 1)	The A/F signal computed by ECM from the A/F sensor 1 signal is shifts to the rich side for a spec- ified period.	<ul><li>Fuel pressure</li><li>Fuel injector</li><li>Intake air leaks</li><li>Exhaust gas leaks</li></ul>	
P2098	POST CAT FUEL TRIM SYS B2 (Post catalyst fuel trim system too lean bank 2)	The output voltage computed by ECM from the A/ F sensor 1 signal is shifts to the lean side for a specified period.	<ul> <li>A/F sensor 1 (bank 2)</li> <li>A/F sensor 1 heater</li> <li>Heated oxygen sensor 2 (bank 2)</li> <li>Fuel pressure</li> </ul>	
P2099	POST CAT FUEL TRIM SYS B2 (Post catalyst fuel trim system too rich bank 2)	The A/F signal computed by ECM from the A/F sensor 1 signal is shifts to the rich side for a spec- ified period.	Fuel injector	

# 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.

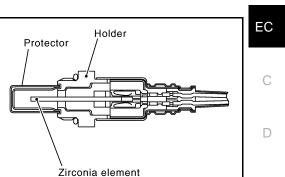
### TESTING CONDITION:

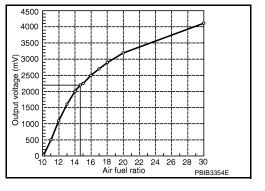
# EC-403

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JMBIA0112GB

INFOID:000000009720153





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### < DTC/CIRCUIT DIAGNOSIS >

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR</u>: <u>Special Repair Requirement</u>".
- 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 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
- 8. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-404, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000009720154

**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.RETIGHTEN A/F SENSOR 1 AND HEATED OXYGEN SENSOR 2

Loosen and retighten the A/F sensor 1 and heated oxygen senosr 2. Refer to EM-38. "Exploded View".

>> GO TO 3.

**3.**CHECK FOR EXHAUST GAS LEAK

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

Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 4.

**4.**CHECK FOR INTAKE AIR LEAKAGE

1. Start engine and run it at idle.

2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning part.

**5.**CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-240. "DTC Logic"</u> or <u>EC-244, "DTC Logic"</u>.

**6.**CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.

< DTC/C	CIRCUIT D		-	97, P209	98, P2099 A	/F SENSOR 1	[VQ35DE]	
	connect A/F ck harness			nnector.				А
v	Vater shou	ld not exit						
	spection res		<u>?</u>					EC
YES NO	>> GO TO >> Repair		narness co	nnector.			_	
7.сне	CK AIR FUE	EL RATIO (	A/F) SENS	SOR 1 POV	WER SUPPLY	CIRCUIT		С
2. Turr	connect A/F i ignition sw ck the volta	itch ON.			ss connector a	nd ground.		D
DTC		A/F sensor		Ground	Voltage (V)	_		Е
	Bank	Connector	Terminal	Ground	voltage (v)	_		
P2096 P2097	1	F27	4	Ground	Battery voltage			F
P2098 P2099	2	F64	4					
	spection res		<u>?</u>					G
YES NO	>> GO TO >> GO TO							
8.DETE	ECT MALFL	JNCTIONIN	IG PART					Η
• IPDM • 15 A fu	ne following E/R harnes use (No. 46 ss for open	s connecto )		sensor 1 a	and IPDM E/R			I
	>> Repair	or replace l	narness or	connector	S.			J
<b>9.</b> CHE0	CK A/F SEN	ISOR 1 IN	PUT SIGN	AL CIRCU	IT FOR OPEN	AND SHORT		
2. Disc	ignition sw connect ECI ck the conti	M harness			ness connecto	r and ECM harnes	s connector.	K
DTO		A/F sensor 1			ECM	Continuit		L
DTC	Bank	Connector	Terminal	Connecto	r Terminal	Continuity		
P2096	1	F27	1	-	45			Μ
P2097			2	- F8	49 53	Existed		
P2098 P2099	2	F64	2	-	57			Ν

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

57

DTC	A/F sensor 1			Ground	Continuity
DIC	Bank	Connector	Terminal	Ground	Continuity
P2096	1	F27	1		
P2097	I	Γ21	2	Ground	Not existed
P2098	2	F64	1	Ground No	NOT EXISTED
P2099	2	F04	2		

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## < DTC/CIRCUIT DIAGNOSIS >

DTC	EC	CM	Ground	Continuity
	Connector	Terminal	Ground	
P2096		45		
P2097	F8	49	Ground	Not existed
P2098	10	53	Ground	NOT EXISTED
P2099		57		

5. Also check harness for 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 A/F SENSOR 1 HEATER

Check A/F sensor 1 heater. Refer to EC-160, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 13.

11.CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-231, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace malfunctioning heated oxygen sensor 2.

12. CHECK INTERMITTENT INCIDENT

Perform GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace malfunctioning part.

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

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-38, "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).

Do you have CONSULT?

YES >> GO TO 14.

NO >> GO TO 15.

**14.**CONFIRM A/F ADJUSTMENT DATA

#### With CONSULT

- Turn ignition switch ON.
- 2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.
- 3. Make sure that "0.000" is displayed on CONSULT screen.

Is "0.000" displayed?

YES >> INSPECTION END

NO >> GO TO 15.

15. CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

Clear the mixture ratio self-learning value. Refer to <u>EC-22</u>, "<u>MIXTURE RATIO SELF-LEARNING VALUE</u> <u>CLEAR : Special Repair Requirement</u>".

Do you have CONSULT?

P2096, P2097, P2098, P2099 A/F SENSOR 1		
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
YES >> GO TO 16. NO >> INSPECTION END		А
16.confirm a/f adjustment data		
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch ON.</li> <li>2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.</li> <li>3. Make sure that "0.000" is displayed on CONSULT screen.</li> </ul>		EC
		С
>> INSPECTION END		
		D
		_
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		6
		Ρ

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

### < DTC/CIRCUIT DIAGNOSIS >

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

## Description

INFOID:000000009720155

[VQ35DE]

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is controlled ON/OFF by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

## DTC Logic

INFOID:000000009720156

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100	Throttle control motor relay circuit open	ECM detects that the voltage of power source for throttle control motor is excessively low.	<ul> <li>Harness or connectors (Throttle control motor relay circuit is open)</li> <li>Throttle control motor relay</li> </ul>
P2103	Throttle control motor relay circuit short	ECM detects that the throttle control motor relay is stuck ON.	<ul> <li>Harness or connectors (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 perform the following before conducting the next test.

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

#### **TESTING CONDITION:**

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

Witch DTC is detected?

P2100 >> GO TO 2.

P2103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P2100

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

- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

### Is DTC detected?

- YES >> Go to EC-408, "Diagnosis Procedure".
- NO >> INSPECTION END

# **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P2103

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

#### Is DTC detected?

- YES >> Go to EC-408, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis** Procedure

# **1.**CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

# EC-408

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

### < DTC/CIRCUIT DIAGNOSIS >

### 3. Disconnect IPDM E/R harness connector.

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

IPDN	/I E/R	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F12	70	F7	15	Existed

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

Is the inspection result normal?

YES >> GO TO 2.

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

# 2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

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

IPDN	M E/R	E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F12	54	F7	2	Existed

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

### Is the inspection result normal?

YES >> GO TO 3. NO >> Repair open circuit, short to ground or short to power in harness or connectors. **3.**CHECK FUSE 1. Disconnect 15 A fuse (No. 51) from IPDM E/R.

2. Check if 15 A fuse is blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15 A fuse.

**4.**CHECK INTERMITTENT INCIDENT

Refer to	<u>GI-44,</u>	"Intermittent	Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-37, "Exploded View"</u>. NO >> Repair or replace harness or connectors. EC

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# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### < DTC/CIRCUIT DIAGNOSIS >

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

# Description

INFOID:000000009720158

[VQ35DE]

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor. The throttle position sensor provides feedback to the ECM, when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

## DTC Logic

INFOID:000000009720159

# DTC DETECTION LOGIC

NOTE: If DTC P2101 is displayed with DTC P2100, first perform the trouble diagnosis for DTC P2100. Refer to

### EC-408, "DTC Logic"

If DTC P2101 is displayed with DTC 2119, first perform the trouble diagnosis for DTC P2119. Refer to <u>EC-417, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2101	Electric throttle control performance	Electric throttle control function does not oper- ate properly.	<ul> <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 perform the following before conducting the next test.

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

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

### Is DTC detected?

YES >> Go to <u>EC-410, "Diagnosis Procedure"</u>. NO >> INSPECTION END

# **Diagnosis Procedure**

INFOID:000000009720160

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

- 1. Turn ignition switch OFF.
- Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

### Is the inspection result normal?

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

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

1. Check the voltage between ECM harness connector terminals.

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	EC	M				-
	F		_	Condition	Voltage	
Connector	Terminal	Condition	Terminal			E
		<b>5</b> 40		Ignition switch OFF	Approx. 0 V	_
F7	2	E16	112	Ignition switch ON	Battery voltage	_
Is the insp	ection resu	ult normal?	?			
	> GO TO 7					
~	> GO TO 3					
			ROL MOT	OR RELAY POW	ER SUPPLY CIF	
<ol> <li>Discor</li> <li>Discor</li> </ol>	nition swit nect ECM nect IPDN the contin	l harness ( /I E/R harr	ness conn	ector.	nector and ECM	harness connector.
I	PDM E/R		EC			F
Connecto	r Term	inal C	connector	Terminal	Continuity	
F12	70	)	F7	15	Existed	C
5. Also c	heck harne	ess for sho	ort to grou	nd and short to po	ower.	
Is the insp			<u>?</u>			
	> GO TO 4		t chart to	ground or short to	nower in harnes	s or connectors
	-	•		OR RELAY INPU	•	
1. Check	the contin	uity betwe	een IPDM	E/R harness conr	nector and ECM	harness connector.
	PDM E/R		EC	CM		
Connecto		inal C	onnector		Continuity	`
F12	54		F7		Existed	
2. Also c	heck harne	ess for sho	ort to arou	nd and short to po		ł
Is the insp			-			
	> GO TO 5		_			
_	•	pen circui	t, short to	ground or short to	power in harnes	ss or connectors.
5.снеск	FUSE					
				IPDM E/R.		Ν
	if 15 A fus					
<u>s the insp</u> YES >			<u> </u>			1
	> GO TO 6 > Replace					1
6.CHECK						
Refer to <u>G</u>						(
Is the insp						
			_	PCS-37, "Explode	ed View".	I
NO >	> Repair o	r replace h	harness or	connectors.		'
.CHECK	THROTT	LE CONT	ROL MOT	OR OUTPUT SIG	SNAL CIRCUIT F	FOR OPEN OR SHORT
<ol> <li>Discor</li> <li>Discor</li> </ol>	nnect ECM	ric throttle	connector			s connector and ECM harness con-

# EC-411

# P2101 ELECTRIC THROTTLE CONTROL FUNCTION

## < DTC/CIRCUIT DIAGNOSIS >

Electric throttle control actuator		ECI	N	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	5		5	Not existed
F29	5	F7	6	Existed
125	6	17	5	Existed
			6	Not existed

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

Is the inspection result normal?

YES >> GO TO 8.

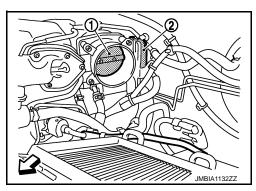
NO >> Repair or replace malfunctioning part.

# $\mathbf{8}$ . CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Remove the intake air duct. Refer to EM-31, "Exploded View".
- 2. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front

### Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, refer to <u>EM-33</u>, "<u>Exploded View</u>", and then perform throttle valve closed position learning. Refer to <u>EC-19</u>, "<u>THROTTLE VALVE CLOSED POSI-TION LEARNING</u>: <u>Description</u>".



## **9.**CHECK THROTTLE CONTROL MOTOR

### Refer to EC-412, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Repair or replace harness or connectors.

11. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".

Refer to <u>EC-413</u>, "Special Repair Requirement".

### >> INSPECTION END

# Component Inspection

# 1.CHECK THROTTLE CONTROL MOTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- 3. Check resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25°C (77°F)]

Is the inspection result normal?

# EC-412

# D2404 ELECTRIC TUROTTI E CONTROL EUNCTION

<pre></pre>	5DE]
YES >> INSPECTION END	
NO >> GO TO 2.	А
2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
<ol> <li>Replace electric throttle control actuator. Refer to <u>EM-33, "Exploded View"</u>.</li> <li>Go to <u>EC-413, "Special Repair Requirement"</u>.</li> </ol>	EC
>> INSPECTION END	С
Special Repair Requirement	0009720162
1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	D
Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"	
>> GO TO 2.	E
2. PERFORM IDLE AIR VOLUME LEARNING	
Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"	F
>> END	G
	Н
	1
	I
	J
	K
	L
	M
	Ν
	0
	Р

# P2118 THROTTLE CONTROL MOTOR

# Description

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor. The throttle position sensor provides feedback to the ECM, when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

# DTC Logic

INFOID:000000009720164

# 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> <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 perform the following before conducting the next test.

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

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

### Is DTC detected?

- YES >> Go to EC-414, "Diagnosis Procedure".
- NO >> INSPECTION END

# **Diagnosis Procedure**

# **1.**CHECK GROUND CONNECTIONS

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connections.

# 2.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

INFOID-000000009720165

# P2118 THROTTLE CONTROL MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	control actuator	ECI	N	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	_		5	Not existed	
500	5		6	Existed	
F29	_	F7	5	Existed	
	6		6	Not existed	
. Also chec	k harness for	short to ground	and short to r	oower.	
	on result norm	-			
	O TO 3.				
		ce malfunctioni	ng part.		
CHECK TH	<b>IROTTLE CO</b>	NTROL MOTO	R		
efer to FC-4	15 "Compone	ent Inspection".			
	on result norm				
	0 TO 4.				
	O TO 5.				
CHECK IN	TERMITTENT	INCIDENT			
	, "Intermittent				
	on result norm				
•	0 TO 5.	<u></u>			
		ce harness or c	onnectors.		
REPLACE	ELECTRIC T	HROTTLE CO	NTROL ACTU	ATOR	
				I-33, "Exploded View".	
		Repair Require			
>> IN	ISPECTION E	ND			
omponen	t Inspectio	n			INFOID:000000009720166
omponon	c mopoodoi	•			
.CHECK TH	IROTTLE CO	NTROL MOTO	R		
	IROTTLE CO		R		
. Turn igniti . Disconne	on switch OFI	F. ttle control acti	uator harness o		
. Turn igniti . Disconne	on switch OFI	F. ttle control acti	uator harness o	connector. tuator terminals as per the following.	
. Turn ignit . Disconne . Check res	on switch OFI ct electric thro sistance betwe	F. ttle control actu een electric thro	uator harness o ottle control act		
. Turn igniti Disconne Check res	on switch OFI ct electric thro sistance betwe	F. ttle control actu een electric thro R	uator harness o ottle control act esistance	uator terminals as per the following.	
. Turn igniti Disconne Check res Termina 5 and	on switch OFI ct electric thro sistance betwee als 6	F. ttle control actu een electric thro R Approx. 1 - 1	uator harness o ottle control act	uator terminals as per the following.	
. Turn igniti Disconne Check res Termina 5 and 5 the inspecti	on switch OFI ct electric thro sistance between als 6 on result norm	F. ttle control actu een electric thro R Approx. 1 - 1	uator harness o ottle control act esistance	uator terminals as per the following.	
. Turn igniti Disconne Check res Termina 5 and the inspecti YES >> IN	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E	F. ttle control actu een electric thro R Approx. 1 - 1	uator harness o ottle control act esistance	uator terminals as per the following.	
. Turn igniti Disconne Check res Termina 5 and the inspecti YES >> IN NO >> G	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E O TO 2.	F. ttle control actu een electric thro R Approx. 1 - 1 <u>nal?</u> END	uator harness o ottle control act esistance 5 Ω [at 25°C (77°)	F)]	
. Turn igniti Disconne Check res Termina 5 and sthe inspecti YES >> IN NO >> G REPLACE	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E O TO 2. ELECTRIC T	F. ttle control actu een electric thro Approx. 1 - 1 <u>nal?</u> END HROTTLE COI	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/	TTOR	
. Turn igniti Disconne Check res Termina 5 and the inspecti YES >> IN NO >> G REPLACE Replace 6	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E O TO 2. ELECTRIC TI electric throttle	F. ttle control actu een electric thro Approx. 1 - 1 nal? END HROTTLE COI	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u>	F)]	
. Turn igniti Disconne Check res Termina 5 and the inspecti YES >> IN NO >> G REPLACE Replace 6	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E O TO 2. ELECTRIC TI electric throttle	F. ttle control actu een electric thro Approx. 1 - 1 <u>nal?</u> END HROTTLE COI	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u>	TTOR	
. Turn igniti Disconne Check res Termina 5 and sthe inspecti YES >> IN NO >> G REPLACE Replace 6 Go to EC	on switch OFI ct electric thro sistance betwee als 6 on result norm ISPECTION E O TO 2. ELECTRIC TI electric throttle -413, "Special	F. ttle control actu een electric thro Approx. 1 - 1 <u>nal?</u> END HROTTLE COI control actuat <u>Repair Require</u>	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u>	TTOR	
. Turn igniti Disconne Check res Termina 5 and sthe inspecti YES >> IN NO >> G REPLACE Replace 6 Go to EC	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E O TO 2. ELECTRIC TI electric throttle	F. ttle control actu een electric thro Approx. 1 - 1 <u>nal?</u> END HROTTLE COI control actuat <u>Repair Require</u>	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u>	TTOR	
. Turn igniti Disconne Check res Termina 5 and sthe inspecti YES >> IN NO >> G REPLACE Replace 6 Go to <u>EC</u>	on switch OFI ct electric thro sistance betwee als 6 on result norm ISPECTION E O TO 2. ELECTRIC TI electric throttle -413, "Special	F. ttle control actu een electric thro Approx. 1 - 1 nal? END HROTTLE COI control actuat Repair Require END	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u>	TTOR	INFOID:000000009720167
Turn igniti Disconne Check res Termina 5 and the inspecti YES >> IN NO >> G REPLACE Replace 6 Go to EC >> IN	on switch OFI ct electric thro sistance between als 6 on result norm ISPECTION E 0 TO 2. ELECTRIC TI electric throttle 413, "Special ISPECTION E pair Requir	F. ttle control actu een electric thro Approx. 1 - 1 nal? END HROTTLE COI control actuat Repair Require END	uator harness o ottle control act esistance 5 Ω [at 25°C (77°) NTROL ACTU/ or. Refer to <u>EN</u> ement".	ATOR I-33, "Exploded View".	

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2.

 $2. {\tt perform idle air volume learning}$ 

Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### < DTC/CIRCUIT DIAGNOSIS >

# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

# Description

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and sends the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and opens/closes the throttle valve in response to driving conditions via the throttle control motor.

# DTC Logic

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause	
	Electric throttle control		Electric throttle control actuator does not func- tion properly due to the return spring malfunc- tion.		
P2119	P2119 Electric throttle control actuator	B)	Throttle valve opening angle in fail-safe mode is not in specified range.	Electric throttle control actuator	
		C)	ECM detects that the throttle valve is stuck open.		
DTC CON	FIRMATION PROC	EDU	RE		
1.PRECO	NDITIONING				
ing the nex 1. Turn ig 2. Turn ig		l wait			
•	→ GO TO 2. RM DTC CONFIRMA	ΓΙΟΝ	PROCEDURE FOR MALFUNCTION A	AND B	
<ol> <li>Turn ig</li> <li>Shift se</li> <li>Shift se</li> </ol>	nition switch ON and	wait a positio	at least 1 second. on and wait at least 3 seconds. on.		
<ol> <li>Turn ig</li> <li>Shift se</li> <li>Shift se</li> <li>Turn ig</li> </ol>	nition switch ON and elector lever to the D p elector lever to the P p inition switch OFF, wa	wait a positio positio	at least 1 second. on and wait at least 3 seconds.		
9. Check Is DTC dete					
YES >>	- Go to <u>EC-418, "Diag</u>	nosis	Procedure".		
-	GO TO 3.		PROCEDURE FOR MALFUNCTION C		
	nition switch ON and				
<ol> <li>Shift se</li> <li>Shift se</li> <li>Shift se</li> <li>Start en</li> </ol>	elector lever to the D p elector lever to the N o ngine and let it idle for	oositio or P p	on and wait at least 3 seconds. osition.		
5. Check Is DTC det					

#### Is DTC detected?

- YES >> Go to EC-418, "Diagnosis Procedure".
- NO >> INSPECTION END

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INFOID:000000009720169

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# P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

# < DTC/CIRCUIT DIAGNOSIS >

## Diagnosis Procedure

INFOID:000000009720170

# 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-31, "Exploded View".
- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- Sehicle front
- 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 <u>EC-19</u>, <u>"THROTTLE VALVE CLOSED POSITION LEARNING : Description"</u>.

# 2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-33, "Exploded View".
- 2. Go to EC-418. "Special Repair Requirement"

### >> INSPECTION END

## Special Repair Requirement

**1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

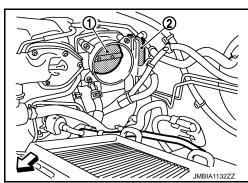
Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END



### < DTC/CIRCUIT DIAGNOSIS >

# P2122, P2123 APP SENSOR

# Description

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

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

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

DTC Logic

### DTC DETECTION LOGIC

#### NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P2122	Accelerator pedal posi- tion sensor 1 circuit low input	An excessively low voltage from the APP sen- sor 1 is sent to ECM.	<ul> <li>Harness or connectors (APP sensor 1 circuit is open or shorted.)</li> </ul>	
P2123	Accelerator pedal posi- tion sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	<ul> <li>Accelerator pedal position sensor (APP sensor 1)</li> </ul>	

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

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

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

#### Is DTC detected?

YES >> Go to <u>EC-419. "Diagnosis Procedure"</u>.

NO >> INSPECTION END

## Diagnosis Procedure

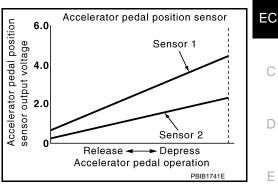
**1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in <u>GI-47, "Circuit Inspection"</u>.

Is the inspection result normal?





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# P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

## 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

APP	sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
E110	4	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 3.

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

## ${f 3.}$ CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

APP	sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
E110	2	E16	84	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

APP	sensor	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
E110	3	E16	81	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK APP SENSOR

Refer to EC-421, "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. Refer to ACC-4, "Exploded View".

2. Refer to EC-421, "Special Repair Requirement".

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

# P2122, P2123 APP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

### >> INSPECTION END

# **Component Inspection**

# $1. CHECK \ ACCELERATOR \ PEDAL \ POSITION \ SENSOR$

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

	EC	M				
	+		-	Conc	Condition	
Connector	Terminal	Connector	Terminal			
	81		84		Fully released	0.5 - 1.0
540	(APP sensor 1 sig- nal)	<b>F</b> 40	(Sensor ground)		Fully depressed	4.2 - 4.8
E16	82 (ADD and a contract of a co	E16	100	Accelerator pedal	Fully released	0.25 - 0.50
	(APP sensor 2 sig- nal)		(Sensor ground)		Fully depressed	2.0 - 2.5
YES >> NO >> CREPLAC	ction result norma INSPECTION EN GO TO 2. E ACCELERATO accelerator peda C-421. "Special F	ND PR PEDAL / al assembly	/. Refer to <u>ACC-</u>	4, "Exploded Vie	<u>w"</u> .	
	INSPECTION EN					INFO ID-000000000
Special R	epair Require	ement				INFOID:0000000097
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Special R	epair Require	ement DR PEDAL				
Special R PERFOF Refer to <u>EC</u>	epair Require RM ACCELERATO	ement DR PEDAL				
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Special R PERFOF Refer to <u>EC</u> >> 2.PERFOF	epair Require RM ACCELERATO -19, "ACCELERA GO TO 2. RM THROTTLE V	ement DR PEDAL <u>TOR PEDA</u> ALVE CLOS	AL RELEASED F	POSITION LEAR	NING : Special R	epair Requireme
Special R PERFOF Refer to <u>EC</u> >> 2.PERFOF	epair Require MACCELERATO	ement DR PEDAL <u>TOR PEDA</u> ALVE CLOS	AL RELEASED F	POSITION LEAR	NING : Special R	epair Requireme
Special R PERFOF Refer to EC >> PERFOF Refer to EC	epair Require RM ACCELERATO -19, "ACCELERA GO TO 2. RM THROTTLE V	ement DR PEDAL <u>TOR PEDA</u> ALVE CLOS	AL RELEASED F	POSITION LEAR	NING : Special R	epair Requireme
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Special R PERFOF Refer to EC >> PERFOF Refer to EC >> B.PERFOF	epair Require AM ACCELERATO -19. "ACCELERATO GO TO 2. AM THROTTLE VA -19. "THROTTLE GO TO 3.	ement DR PEDAL TOR PEDA ALVE CLO VALVE CL	SED POSITION OSED POSITIC	POSITION LEARI	NING : Special R	epair Requireme
Special R PERFOF Refer to EC >> PERFOF Refer to EC >> B.PERFOF	ACCELERATO ACCELERATO -19. "ACCELERATO GO TO 2. M THROTTLE VA -19. "THROTTLE GO TO 3. M IDLE AIR VOL	ement DR PEDAL TOR PEDA ALVE CLO VALVE CL	SED POSITION OSED POSITIC	POSITION LEARI	NING : Special R	epair Requireme
Special R PERFOF Refer to EC >> PERFOF Refer to EC >> B.PERFOF Refer to EC	ACCELERATO ACCELERATO -19. "ACCELERATO GO TO 2. M THROTTLE VA -19. "THROTTLE GO TO 3. M IDLE AIR VOL	ement DR PEDAL TOR PEDA ALVE CLO VALVE CL	SED POSITION OSED POSITIC	POSITION LEARI	NING : Special R	epair Requireme

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### < DTC/CIRCUIT DIAGNOSIS >

# P2127, P2128 APP SENSOR

# Description

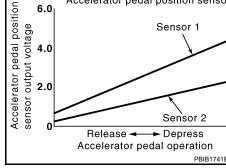
The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

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

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

# DTC Logic

### DTC DETECTION LOGIC



6.0

Accelerator pedal position sensor

Sensor 1

INFOID:000000009720178

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal posi- tion sensor 2 circuit low input	An excessively low voltage from the APP sen- sor 2 is sent to ECM.	Harness or connectors     (APP sensor 2 circuit is open or shorted.)     [CKP sensor (POS) circuit is shorted.]
P2128	Accelerator pedal posi- tion sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	<ul> <li>(Refrigerant pressure sensor circuit is shorted.)</li> <li>(EVAP control system pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

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

# **TESTING CONDITION:**

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

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and let it idle for 1 second. 1.
- 2. Check DTC.
- Is DTC detected?
- YES >> Go to EC-422, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis** Procedure

### 1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E38. Refer to Ground Inspection in GI-47. "Circuit Inspection". 2.

### EC-422

**2014 MURANO** 

INFOID:000000009720179

# P2127, P2128 APP SENSOR

< DTC/CIRC	CUIT DIAG	NOSIS >	٢Z	121, F2120	DAFF JENJ	UK	[VQ35DE]
Is the inspec	tion result	normal?					
	GO TO 2.						A
NO >>	Repair or r	eplace gro	und c	onnection.			
2.CHECK A	PP SENS	OR 2 POV	VER S	SUPPLY CIRC	UIT-I		
			posit	ion (APP) sen	sor harness con	nector.	EC
	ition switch						
3. Check th	he voltage	between A	APP SE	ensor narness	connector and g	jrouna.	С
Α	PP sensor						
Connector		minal	Gr	ound V	oltage (V)		
E110		5	Gr	ound A	Approx. 5		D
Is the inspec	tion result	_	0.				
	GO TO 6.	<u>nonnar:</u>					E
-	GO TO 3.						
3.CHECK A	APP SENS	OR 2 POW	VER S	SUPPLY CIRC	UIT-II		
	ition switch						F
2. Disconn	ect ECM h	arness cor					
3. Check th	ne continui	ty betweer	ו APP	sensor harne	ss connector and	d ECM harness con	nector.
							0
	sensor			CM	Continuity		
Connector	Terminal			Terminal			Н
E110	5	E1	6	87	Existed		
Is the inspec		normal?					1
	GO TO 4. Repair ope	n circuit					I
4.CHECK S	• •						
-							J
Check harne	ess for shor	t to power	and s	snort to ground	d, between the to	ollowing terminals.	
EC	M			Se	ensor		IZ
Connector	Terminal		N	ame	Connector	Terminal	K
	72	Refrigerant			E300	1	
F8 –	72	CKP senso	-		F20	1	L
	87	APP senso		1	E110	5	
E16	91			em pressure sen		3	
Is the inspec			51 3 3 3 5	em pressure sell		5	M
	GO TO 5.	<u>normar</u>					
		rt to groun	d or s	hort to power	in harness or co	nnectors.	Ν
5.снеск с	-	-					
Check the fo							
<ul> <li>Crankshaft</li> </ul>	t position s				<u>3, "Component Ir</u>		0
					-312, "Compone		
•	•		erer to	EC-465, "Dia	ignosis Procedur	<u>e</u> .)	P
Is the inspec							F
	GO TO 10. Replace m		na co	mponents.			
<b>^</b>	•		-	•	R OPEN AND SI	HORT	

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

# EC-423

# P2127, P2128 APP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

APP	sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E110	1	E16	100	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

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

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	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
E110	6	E16	82	Existed

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

Is the inspection result normal?

YES >> GO TO 8.

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

**8.**CHECK APP SENSOR

Refer to EC-424, "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. Refer to ACC-4, "Exploded View".

2. Refer to EC-425, "Special Repair Requirement"

### >> INSPECTION END

# 10. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

### >> INSPECTION END

# **Component Inspection**

INFOID:000000009720180

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM						
	+	-		Condition		Voltage (V)	
Connector	Terminal	Connector	Terminal				
	81 (APP sensor 1 sig- nal) 82		84 (Sensor ground)	Accelerator pedal	Fully released	0.5 - 1.0	
E16		E16			Fully depressed	4.2 - 4.8	
LIU		LIU	100		Fully released	0.25 - 0.50	
	(APP sensor 2 sig- nal)		(Sensor ground)		Fully depressed	2.0 - 2.5	

# P2127, P2128 APP SENSOR

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< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	
Is the inspection result normal? YES >> INSPECTION END NO >> GO TO 2.	A
2.REPLACE ACCELERATOR PEDAL ASSEMBLY	
<ol> <li>Replace accelerator pedal assembly. Refer to <u>ACC-4, "Exploded View"</u>.</li> <li>Go to <u>EC-432, "Special Repair Requirement"</u>.</li> </ol>	EC
>> INSPECTION END	С
Special Repair Requirement	
1. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING	D
Refer to EC-19. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".	Е
>> GO TO 2.	
2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	F
Refer to EC-19. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".	
>> GO TO 3.	G
3. PERFORM IDLE AIR VOLUME LEARNING	
Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".	Н
>> END	
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## < DTC/CIRCUIT DIAGNOSIS >

# P2135 TP SENSOR

# Description

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

The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signals to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

#### throttle position sensor 6.0 4.0 4.0 4.0 5 ensor 1 5 ensor 2 6.0 4.0 5 ensor 2 6.0 5 ensor 2 5 ensor 2 90 135 Throttle valve opening angle (deg) PBIB0145E

INFOID:000000009720183

# DTC Logic

## DTC DETECTION LOGIC

### NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/perfor- mance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul> <li>Harness or connector (TP sensor 1 or 2 circuit is open or short- ed.)</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 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 let it idle for 1 second.
- 2. Check DTC.

### Is DTC detected?

YES >> Go to <u>EC-426. "Diagnosis Procedure"</u>.

NO >> INSPECTION END

### Diagnosis Procedure

# **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

- Is the inspection result normal?
- YES >> GO TO 2.
- NO >> Repair or replace ground connection.

# EC-426

#### 2014 MURANO

[VQ35DE]



INFOID:000000009720184

# **P2135 TP SENSOR**

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< DTC/CIRCU	IT DIAGNOSI	S >	2100 11 0		[VQ35DE]
2.снеск тн	ROTTLE POSI	TION SENSO	R POWER SI	JPPLY CIRCUIT-I	
	t electric throttl	e control actua	ator harness o	connector.	
	on switch ON.	an alastria thra	ttle control or	tuator hornoon connector a	and ground
. Check the	vollage betwee			ctuator harness connector a	ana grouna.
Electric thrott	le control actuator				-
Connector	Terminal	Groun	d Volta	age (V)	
F29	1	Groun	d Apr	prox. 5	
the inspectio	n result norma	1?			
	D TO 3.				
		-		o power in harness or conr	
		TION SENSO	R GROUND (	CIRCUIT FOR OPEN AND	SHORT
	on switch OFF. t ECM harness	annaatar			
			hrottle control	actuator harness connected	or and ECM harness con-
nector.	2				
				1	
Electric throttle			CM	- Continuity	
Connector	Terminal	Connector	Terminal	Estimate of	
F29	4 harness for st	F8	36	Existed	
nector.					
Electric throttle	control actuator	EC	CM	Continuity	
Connector	Terminal	Connector	Terminal	- Continuity	
F29	2	F8	37	Existed	
129	3	10	38		
Also check	harness for sh	nort to ground	and short to p	oower.	
	n result norma	<u>l?</u>			
	) TO 5. pair open circu	uit short to are	und or short t	o power in harness or conr	nectors
	ROTTLE POSI				
	<u>8, "Componen</u> n result norma				
	) TO 7.	<u></u>			
	D TO 6.				
.REPLACE E	ELECTRIC THI	ROTTLE CON	TROL ACTU	ATOR	
	ectric throttle c C-428, "Specia			I-33, "Exploded View".	
>> IN!	SPECTION EN	ID			
-	ERMITTENT I				
		-			
eiei iu <u>GI-44,</u>	"Intermittent Ir				

INFOID:000000009720185

>> INSPECTION END

# Component Inspection

# 1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-428, "Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Shift selector lever position to D.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

	EC					
+ –		Condition		Voltage		
Connector	Terminal	Connector	Terminal			
	F8 37 (TP sensor 1 signal) F8 F8	,	36	Accelerator pedal	Fully released	More than 0.36 V
Eo					Fully depressed	Less than 4.75 V
FO		(Sensor ground)	Accelerator pedar	Fully released	Less than 4.75 V	
	(TP sensor 2 signal)				Fully depressed	More than 0.36 V

## Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

# **2.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-33. "Exploded View".
- 2. Go to EC-428, "Special Repair Requirement".

### >> INSPECTION END

Special Repair Requirement

INFOID:000000009720186

# **1.**PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-19. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

### >> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-20. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

### < DTC/CIRCUIT DIAGNOSIS >

# P2138 APP SENSOR

# Description

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

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

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

### DTC Logic

### DTC DETECTION LOGIC

#### NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-352, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal posi- tion sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul> <li>Harness or connector (APP sensor 1 or 2 circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 1 or 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

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

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

- 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 let it idle for 1 second. 2. Check DTC

2. Check DTC.

Is DTC detected?

YES >> Go to EC-430, "Diagnosis Procedure".

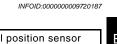
NO >> INSPECTION END

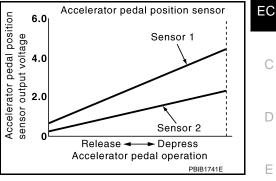
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# P2138 APP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# Diagnosis Procedure

## **1.**CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E38. Refer to Ground Inspection in GI-47, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

# 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

APP	sensor	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E110 4		Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 3.

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

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

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

APP :	sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
E110	5	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

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

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

APP	sensor	E	Continuity	
Connector	Connector Terminal		Connector Terminal	
E110	5	E16	87	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit.

5. CHECK SENSOR POWER SUPPLY CIRCUIT

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

ECM		Sensor				
Connector	Terminal	Name	Connector	Terminal		
F8	72	Refrigerant pressure sensor	E300	1		
76		CKP sensor (POS)	F20	1		

# P2138 APP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		10010 >						
	CM		Sens	1	<b>-</b> - · ·			
Connector	Terminal		ame	Connector	Terminal			
E16	87	APP sensor		E110	5			
	91	-	em pressure sensor	B17	3			
	ction result r	normal?						
	GO TO 6.	t to around or s	hort to power in	harness or co	onactors			
<b>^</b>	COMPONE	-		namess of co	Inectors.			
		113						
Check the fo		ensor (POS) (Re	efer to <u>EC-278,</u> '	Component In	spection")			
EVAP con	trol system	pressure senso	r (Refer to EC-3	12, "Compone	nt Inspection".)	)		
-	-	-	EC-465, "Diagr	nosis Procedur	<u>e"</u> .)			
	ction result r	normal?						
-	GO TO 11.		mpopopto					
_	•	alfunctioning co	•					
			IRCUIT FOR O	PEN AND SHO	ואנ			
	nition switch	OFF. arness connecto	or.					
			or. I sensor harness	connector and	d ECM harness	connector.		
		,						
APF	o sensor	ECM						
Connector	Terminal	Connector	Terminal	Continuity				
	2		84					
E110	1	— E16	100	Existed				
I. Also ch	eck harness	for short to gro	ound and short to	power.				
	ction result r	-		•				
	GO TO 8.							
~	• •		o ground or shoi	•		ectors.		
<b>3.</b> CHECK	APP SENSO	OR INPUT SIGN	NAL CIRCUIT FO	OR OPEN ANI	O SHORT			
. Check t	the continuity	y between APP	sensor harness	connector and	d ECM harness	connector.		
APF	o sensor	E	СМ	Continuity				
Connector	Terminal	Connector	Terminal	Continuity				
E110	3	E16	81	Existed				
EIIV	6	EIO	82	LVISIGO				
2. Also ch	eck harness	for short to gro	ound and short to	power.				
s the inspe	ction result r	normal?						
	GO TO 9.							
•			o ground or shoi	t to power in h	arness or conn	ectors.		
J.CHECK	APP SENSC	DR						
Refer to <u>EC</u>	-424, "Comp	onent Inspectio	<u>on"</u> .					
s the inspe	ction result r	normal?						
	GO TO 11.							
	GO TO 10.							
IU.REPLA	ACE ACCEL	ERATOR PEDA	AL ASSEMBLY					
I. Replace	e accelerato	r pedal assemb	ly. Refer to ACC	-4, "Exploded	View".			
. Refer to	o <u>EC-425, "S</u>	pecial Repair F	Requirement".					

### < DTC/CIRCUIT DIAGNOSIS >

### >> INSPECTION END

# 11.CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

### >> INSPECTION END

### Component Inspection

INFOID:000000009720190

[VQ35DE]

# 1. CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM						
+ –		– Cond		lition	Voltage (V)		
Connector	Terminal	Connector	Terminal				
81		84		Fully released	0.5 - 1.0		
E16	(APP sensor 1 sig- nal)	`	(Sensor ground)	A coolerator podel	Fully depressed	4.2 - 4.8	
(APP ser	82	E16	100	Accelerator pedal	Fully released	0.25 - 0.50	
	(APP sensor 2 sig- nal)		(Sensor ground)		Fully depressed	2.0 - 2.5	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly. Refer to ACC-4, "Exploded View".

2. Go to EC-432, "Special Repair Requirement".

### >> INSPECTION END

Special Repair Requirement

INFOID:000000009720191

# **1.**PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-19, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

### >> GO TO 2.

**2.** PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-19, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

# **3.**PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

### ASCD BRAKE SWITCH

Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by those two types of input (ON/OFF signal). Refer to EC-66, "System Diagram" for the ASCD function.

#### **Component Function Check**

< DTC/CIRCUIT DIAGNOSIS > ASCD BRAKE SWITCH

### 1.CHECK ASCD BRAKE SWITCH FUNCTION

#### With CONSULT

- Turn ignition switch ON. 1.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT. 2.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Co	ondition	Indication
BRAKE SW1	Brake pedal	Slightly depressed	OFF
DRARE OWN	Brake pedal	Fully released	ON

#### **Without CONSULT**

- Turn ignition switch ON. 1.
- 2. Check the voltage between ECM harness connector terminals.

+         -         Condition         Voltage           Terminal         Terminal         Terminal         Voltage           110         Frame         Slightly depressed         Approx. 0 V           Kasch brake         112         Brake pedal         Fully released         Battery voltage	ECM					
Terminal     Terminal       110     Slightly depressed       E16     (ASCD brake       112     Brake pedal	Connector	+	_	Condition		Voltage
E16 (ASCD brake 112 Brake pedal	Connector	Terminal	Terminal			
	= + =				Slightly depressed	Approx. 0 V
	E16		112	Brake pedal Fully released		Battery voltage

#### <u>Is the inspection result normal?</u>

- YES >> INSPECTION END
- NO >> Go to EC-433, "Diagnosis Procedure".

#### Diagnosis Procedure

### 1.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- Turn ignition switch ON. 3.
- Check the voltage between ASCD brake switch harness connector and ground. 4.

ASCD bra	ake switch	Ground	Voltage
Connector	Terminal	Giouna	voltage
E49	1	Ground	Battery voltage
Is the inspe	ection resul	t normal?	
-	• GO TO 3.		
_	• GO TO 2.		
2.DETEC	T MALFUN	CTIONING	G PART

#### Check the following.

- Fuse block (J/B) connector E103
- 10 A fuse (No.3)
- Harness for open or short between ASCD brake switch and fuse

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## ASCD BRAKE SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

## **3.**CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

ASCD bra	ake switch	E	СМ	Continuity	
Connector	Terminal	Connector Terminal		Continuity	
E49	2	E16	110	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK ASCD BRAKE SWITCH

Refer to EC-434, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace ASCD brake switch. Refer to <u>BR-20, "Exploded View"</u>.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection (ASCD Brake Switch)

INFOID:000000009720195

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
	Tanu Z Brake pedai	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH-II

- 1. Adjust ASCD brake switch installation. Refer to <u>BR-9, "Inspection and Adjustment"</u>.
- 2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Diake peual	Slightly depressed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch. Refer to <u>BR-20, "Exploded View"</u>.

### **ASCD INDICATOR**

### < DTC/CIRCUIT DIAGNOSIS >

## ASCD INDICATOR

### Description

ASCD indicator lamp illuminates to indicate ASCD operation status. CRUISE is integrated in combination meter.

CRUISE illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

Refer to <u>EC-66. "System Diagram"</u> for the ASCD function.

### **Component Function Check**

### **1.**CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR		CONDITION		
CRUISE	Ignition switch: ON	• MAIN switch: Pressed at the 1st time →at the 2nd time	$ON\toOFF$	
Is the inspection result nor	rmal?			
YES >> INSPECTION				
NO >> Go to <u>EC-435</u>	<u>, "Diagnosis Procedure"</u> .			
<b>Diagnosis</b> Procedure	9		INFOID:00000009720198	
1.снеск отс				
Check that DTC UXXXX is	s not displayed			
Is the inspection result not				
YES >> GO TO 2.				
	le diagnosis for DTC UX	XXX.		
2. CHECK COMBINATION	N METER FUNCTION			
Refer to MWI-35, "CONSU		&A)".		
Is the inspection result no				
YES >> GO TO 3.				
NO >> Repair or repl	ace malfunctioning part.			
3. CHECK INTERMITTEN	IT INCIDENT			
Refer to GI-44, "Intermitte	nt Incident".			
Is the inspection result not	rmal?			
		MWI-105, "Exploded View".		
NO >> Repair or repl	ace malfunctioning part.			

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### < DTC/CIRCUIT DIAGNOSIS >

## COOLING FAN

### Description

INFOID:000000009720199

[VQ35DE]

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

#### COOLING FAN MOTOR

The cooling fan operates at each speed when the current flows in the cooling fan motor as per the following.

Cooling fan speed	Cooling fan motor terminals			
Cooling fair speed	(+)	(-)		
Middle (MID)	1	3 and 4		
	2	3 and 4		
	1 and 2	3		
	1 and 2	4		
High (HI)	1 and 2	3 and 4		

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under the middle speed condition.

Refer to EC-74, "System Diagram".

### **Component Function Check**

1. CHECK COOLING FAN FUNCTION

#### (I) With CONSULT

- 1. Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that cooling fan operates at each speed.

#### **Without CONSULT**

- 1. Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-10, "Diagnosis</u> <u>Description"</u>.
- 2. Check that cooling fan operates at each speed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-436, "Diagnosis Procedure".

#### **Diagnosis** Procedure

INFOID:000000009720201

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### 1. CHECK COOLING FAN RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect cooling fan relays-2, -3.
- 3. Turn ignition switch ON.
- 4. Check the voltage between cooling fan relays-2, -3 harness connectors and ground.

Cooling fan re	lay	Ground	Voltage	
Connector	Terminal	Giouna	voltage	
E57	2			
(cooling fan relay-2)	5	Ground	Battery voltage	
E59	2	Giodina		
(cooling fan relay-3)	5			

Is the inspection result normal?

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

#### < DTC/CIRCUIT DIAGNOSIS >

2.DETECT MALFUN	ICTIONING PAI	RT				Λ
Check the following. • 40 A fusible link (letter K) • 10 A fuse (No. 42) • IPDM E/R harness connector E10						
<ul> <li>Harness for open of</li> <li>Harness for open of</li> <li>Harness for open of</li> <li>Harness for open of</li> </ul>	r short between r short between	cooling fan re cooling fan re	elay-3 and batte elay-2 and IPD	ery M E/R		С
>> Repair of <b>3.</b> CHECK COOLING	-	0		r in harness or c	onnectors.	D
<ol> <li>Turn ignition switt</li> <li>Disconnect IPDN</li> <li>Check the contin tor.</li> </ol>	I E/R harness co		y-2, -3 harness	connectors and	IPDM E/R harness connec-	Е
	_					F
Cooling fan	relay Terminal		M E/R Terminal	Continuity		
E57		Connector				G
(cooling fan relay-2)	1	E11	42	Existed		
E59 (cooling fan relay-3)	1	E10	34		_	Н
4. Also check harne	-	round and sh	ort to power.			
Is the inspection resu YES >> GO TO 4						
		t to ground or	short to power	r in harness or c	onnectors.	
4.CHECK COOLING	FAN MOTOR	POWER SUP	PLY CIRCUIT			J
<ol> <li>Disconnect coolir</li> <li>Check the voltage</li> </ol>				nector and grou	nd.	K
Cooling fan me	otor-1	<b>a</b> i				
Connector	Terminal	Ground	Voltage			L
E301 -	1 2	Ground	Battery voltage	e		
Is the inspection resu	It normal?					M
YES >> GO TO 6 NO >> GO TO 5						
5.DETECT MALFUN	ICTIONING PAI	RT				Ν
Check the following. • Harness connector • 40 A fusible link (let • Harness for open of	ter M)	cooling fan m	otor-1 and bat	tery		0
>> Repair or <b>6.</b> CHECK COOLING		•	short to power	r in harness or c	onnectors.	Ρ
1. Disconnect coolir	ng fan motor-2 h	arness conne	ector.			

- 1. Disconnect cooling fan motor-2 harness connector.
- 2. Check the continuity between cooling fan relay-2, -3 harness connectors and cooling fan motor-1, -2 harness connectors.

[VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

Cooling fan r	elay	Cooling fan	motor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E57	3	E302 (Cooling fan motor-2)	2	
(cooling fan relay-2)	7	E301 (Cooling fan motor-1)	3	Existed
E59	3	E302 (Cooling fan motor-2)	1	LXISIEU
(cooling fan relay-3)	7	E301 (Cooling fan motor-1)	4	

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

Is the inspection result normal?

YES >> GO TO 8.

<u>NO</u> >> GO TO 7.

7. DETECT MALFUNCTIONING PART

#### Check the following.

Harness connector E70, E305

• Harness for open or short between cooling fan motor-1 and cooling fan relay-2

- Harness for open or short between cooling fan motor-1 and cooling fan relay-3
- Harness for open or short between cooling fan motor-2 and cooling fan relay-2

Harness for open or short between cooling fan motor-2 and cooling fan relay-3

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

#### 8. CHECK COOLING FAN MOTOR CIRCUIT-II

1. Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

IPDM E/R		Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	35	E301 (Cooling fan motor-1)	4	Existed
E10 —	38	E302 (Cooling fan motor-2)	1	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

**9.** DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connector E70, E305
- Harness for open or short between cooling fan motor-1 and IPDM E/R
- Harness for open or short between cooling fan motor-2 and IPDM E/R

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

### **10.**CHECK COOLING FAN MOTOR CIRCUIT-III

1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground.

#### < DTC/CIRCUIT DIAGNOSIS >

Cooling fa	in motor			
Connector	Terminal	- Ground	Continuity	
E57 (cooling fan relay-2)	6	Ground	Existed	
E59 (cooling fan relay-3)	6	Clound		
	ss for short to grou	nd and short to p	ower.	
the inspection resul				
	en circuit, short to	-	power in harness o	r connectors.
1.CHECK COOLIN	IG FAN MOTOR CI	IRCUIT-IV		
Check the continu	uity between cooling	g fan motor-2 har	ness connector and	ground.
Cooling for	motor 0			
Cooling fan Connector	Terminal	Ground	Continuity	
Connector	3			
E302	4	Ground	Existed	
2.CHECK COOLIN efer to EC-440, "Cor the inspection resul (ES >> GO TO 1: O >> Replace r 3.CHECK COOLIN	mponent Inspection It normal? 3. nalfunctioning cool	n (Cooling Fan Re	<u>elay)"</u> .	
efer to EC-439, "Cor	mponent Inspection	n (Cooling Fan Mo	otor)".	
the inspection resul	t normal?			
YES >> GO TO 14 NO >> Replace r		ing fan motor. Re	fer to <u>CO-20, "Explo</u> e	ded View".
4.CHECK INTERM	ITTENT INCIDEN	Т		
erform <u>GI-44, "Intern</u>	nittent Incident".			
the inspection resul				
•	PDM E/R. Refer to replace harness co		led View".	
omponent Inspe	ection (Cooling	Fan Motor)		INF01D:000000009720202
.CHECK COOLING	FAN MOTOR			
. Turn ignition swite				
	ig fan motor harnes n motor terminals w		e and check operatio	n

### < DTC/CIRCUIT DIAGNOSIS >

	Condition	Terminals		
	Condition	(+)	()	
		1	3 and 4	
	A	2	3 and 4	
Cooling fan motor		1 and 2	3	
		1 and 2	4	
	В	1, 2	3, 4	

Check that cooling fan speed of condition B is higher than that of A. <u>Is the inspection result normal?</u>

YES >> INSPECTION END

NO >> Replace cooling fan motor. Refer to <u>CO-20, "Exploded View"</u>.

Component Inspection (Cooling Fan Relay)

## 1. CHECK COOLING FAN RELAY

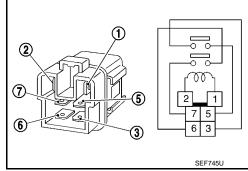
- 1. Disconnect cooling fan relays -2, -3 harness connectors.
- 2. Check continuity between cooling fan relay -2, -3 terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
6 and 7	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.



[VQ35DE]

INFOID:000000009720203

### **ELECTRICAL LOAD SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

### ELECTRICAL LOAD SIGNAL

### Description

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication.

### Component Function Check

## 1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

- 1. Turn ignition switch ON.
- 2. Connect CONSULT and select "DATA MONITOR" mode.
- 3. Select "LOAD SIGNAL" and check indication under the following conditions.

Monitor item	Condition			Indication	
	viadour dofoarar	O	١	ON	_
LOAD SIGNAL Rear v	vindow defogger	O	F	OFF	
s the inspection resu	It normal?				-
YES >> GO TO 2	-				
NO >> Go to EC	-441, "Diagno	osis Proce	dure	<u>ə"</u> .	
2.CHECK LIGHTING	G SWITCH FU	JNCTION			
Check "LOAD SIGNA	L" indication	under the	follo	wing con	ditions
				-	
Monitor item	Condition	ı		Indication	
	g switch	t 2nd positio	۱	ON	

is the inspection result h

YES	>> GO TO 3.
NO	>> Go to EC-441. "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
HEATEN LAN SW		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-441, "Diagnosis Procedure".

### Diagnosis Procedure

### **1.**INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to <u>EC-441, "Compo-nent Function Check"</u>.

Which circuit is related to the incident?

Rear window defogger>>GO TO 2.

Headlamp>>GO TO 3.

Heater fan>>GO TO 4.

2. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-3, "Work Flow".

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### ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

**3.**CHECK HEADLAMP SYSTEM

Refer to EXL-6, "Work Flow" (XENON TYPE) or EXL-194, "Work Flow" (HALOGEN TYPE).

>> INSPECTION END

>> INSPECTION END

**4.**CHECK HEATER FAN CONTROL SYSTEM

Refer to VTL-71, "System Description".

>> INSPECTION END

### **ELECTRONIC CONTROLLED ENGINE MOUNT**

#### < DTC/CIRCUIT DIAGNOSIS >

### ELECTRONIC CONTROLLED ENGINE MOUNT

### Description

In the idle range, ECM turns OFF the electronically-controlled engine mount control solenoid valve and applies manifold pressure to the electronically-controlled engine mount. This decreases damping force of the electronically-controlled engine mount and absorbs vibrations traveling from the engine to the body for improving the quietness.

In the driving range, ECM turns ON the electronically-controlled engine mount control solenoid valve and cuts manifold pressure applied on the electronically-controlled engine mount. This increases damping force of the electronically-controlled solenoid during driving.

### Component Function Check

1. CHECK OVERALL FUNCTION 1. Start engine and warm it up to normal operating temperature. Shift selector position is D while depressing the brake pedal and parking brake pedal. 2. 3. Disconnect electronic controlled engine mount control solenoid valve harness connector. Check that body vibration increases compared to the condition of step 2 above (with vehicle stopped). 4. Is the inspection result normal? YES >> INSPECTION END NO >> EC-443, "Diagnosis Procedure". Diagnosis Procedure INFOID:000000009720209 1.CHECK VACUUM SOURCE 1. Turn ignition switch OFF. Reconnect electronic controlled engine mount control solenoid valve harness connector. 2. Disconnect vacuum hose connected to electronic controlled engine mount. 3. Start engine and let it idle. 4. 5. Check vacuum hose for vacuum existence. Vacuum should exist. Is the inspection result normal? YES >> GO TO 7. NO >> GO TO 2. 2.CHECK VACUUM HOSES AND VACUUM GALLERY 1. Turn ignition switch OFF. Check vacuum hoses and vacuum gallery for clogging, cracks or improper connection. Refer to EC-82. 2. "System Diagram". Is the inspection result normal? YES >> GO TO 3. NO >> Repair or replace vacuum hoses and vacuum gallery.  ${f 3.}$  CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT 1. Disconnect electronic controlled engine mount control solenoid valve harness connector. 2. Turn ignition switch ON. 3. Check the voltage between front electronic controlled engine mount harness connector and ground. Electronic controlled anging mount

		enoid valve	Ground	Voltage	
-	Connector	Terminal			
	F11	1	Ground	Battery voltage	

Is the inspection result normal?

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### ELECTRONIC CONTROLLED ENGINE MOUNT

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 5. NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connectors E6, F123
- 10 A fuse (No. 3)
- Fuse block (J/B) connector E103
- Harness for open or short between electronic controlled engine mount control solenoid valve and fuse

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

**5.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and electronic controlled engine mount control solenoid valve harness connector.

E	EC:N/		Electronic controlled engine mount control solenoid valve	
Connector	Terminal	Connector Terminal		
F7	28	F11	2	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

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

 $\mathbf{6.}$  CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Refer to EC-444, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace electronic controlled engine mount control solenoid valve. Refer to EM-33, "Exploded View".

### 7. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

- 1. Turn ignition switch OFF.
- Install vacuum pump (A) to electronic controlled engine mount (1).
- Check that a vacuum is maintained when applying the vacuum of -40 kPa (-0.41 kg/cm<sup>2</sup>, -5.8 psi) to electronic controlled engine mount.
- 4. Also visually check electronic controlled engine mount.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace electronic controlled engine mount.

### 8. CHECK INTERMITTENT INCIDENT

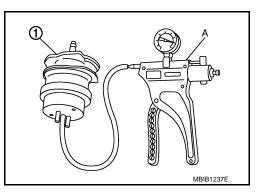
Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace intake manifold collector. Refer to EM-33, "Exploded View".
- NO >> Repair or replace malfunctioning part.

### **Component Inspection**

**1.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE



INFOID:000000009720210

## ELECTRONIC CONTROLLED ENGINE MOUNT

#### < DTC/CIRCUIT DIAGNOSIS >

#### () With CONSULT

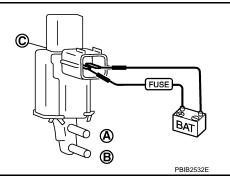
- 1. Turn ignition switch OFF.
- 2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Turn ignition switch ON.
- 5. Select "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT.
- 6. Check air passage continuity and operation delay time under the following conditions.

Condition (ENGINE MOUNTING)	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
TRVL	Existed	Not existed
IDLE	Not existed	Existed

#### **Without CONSULT**

- 1. Turn ignition switch OFF.
- 2. Disconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed



B

C

is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electronic controlled engine mount control solenoid valve. Refer to <u>EM-33, "Exploded View"</u>. А

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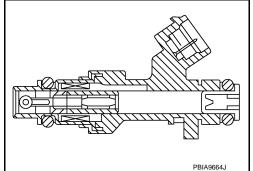
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### < DTC/CIRCUIT DIAGNOSIS >

## FUEL INJECTOR

### Description

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



## **Component Function Check**

INFOID:000000009720212

### **1.**INSPECTION START

Turn ignition switch to START.

Are any cylinders ignited?

YES >> GO TO 2.

NO >> Go to EC-446, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

#### With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### Without CONSULT

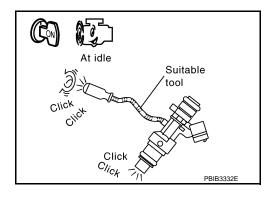
- 1. Start engine.
- 2. Listen to each fuel injector operating sound.

#### Clicking sound should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-446, "Diagnosis Procedure".



INFOID:000000009720213

### 1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

**Diagnosis** Procedure

- 2. Disconnect fuel injector harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between fuel injector harness connector and ground.

INFOID:000000009720211

### **FUEL INJECTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

	<b>Eval</b> inicator								
Culinder	Fuel injector	Terminal	Ground	Voltage					
Cylinder									
1	F37	1	Ground	- Ground Battery voltage					
2	F38	1							
3	F39	1			Battery voltage	Э			
4	F40	1	-						
5	F41	1	-						
6	F42	1							
YES >> NO >>	Ction result no GO TO 3. GO TO 2. MALFUNCT		RT						
<ul> <li>10 A fuse</li> <li>IPDM E/R</li> <li>Harness for</li> </ul>	(No.44) harness con or open or sh	ort between	-	and IPDM E/R r short to powe	r in harness (	or connectors			
3.CHECK	FUEL INJEC	FOR OUTPU	IT SIGNAL C	CIRCUIT FOR					
		ness connec							
			l injector har	ness connecto		arness conne	ctor.		
	he continuity		l injector har		or and ECM ha	arness conne	ctor.		
3. Check t	he continuity Fuel injector	between fue	l injector har	СМ		arness conne	ctor.		
3. Check t	he continuity Fuel injector Connector	between fue	l injector har	CM Terminal		arness conne — —	ctor.		
3. Check t Cylinder 1	he continuity Fuel injector Connector F37	between fue	l injector har	CM Terminal 32	Continuity	arness conne 	ctor.		
3. Check t Cylinder 1 2	he continuity Fuel injector Connector F37 F38	between fue Terminal 2 2	l injector har	CM Terminal 32 31		arness conne 	ctor.		
3. Check t Cylinder 1 2 3	he continuity Fuel injector Connector F37 F38 F39 F40	Terminal 2 2 2 2 2 2	l injector har	CM Terminal 32 31 30	Continuity	arness conne 	ctor.		
3. Check t Cylinder 1 2 3 4 5	Fuel injector         Connector         F37         F38         F39         F40         F41	Terminal 2 2 2 2 2 2 2 2 2 2	l injector har	CM Terminal 32 31 30 29	Continuity	arness conne — —	ctor.		
<ol> <li>Check t</li> <li>Cylinder</li> <li>1</li> <li>2</li> <li>3</li> <li>4</li> <li>5</li> <li>6</li> </ol>	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F41 F42	Terminal 2 2 2 2 2 2 2 2 2 2 2 2 2	F7	CM Terminal 32 31 30 29 3 1	Continuity	arness conne 	ctor.		
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3. Check t Cylinder 1 2 3 4 5 6 4. Also che <u>Is the inspec</u> YES >> NO >> NO >> 4.CHECK I	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC	Terminal 2 2 2 2 2 or short to g ormal? circuit, short	F7 F7 to ground or	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed	<b>-</b>	ctor.		
3. Check t Cylinder 1 2 3 4 5 6 4. Also che Is the inspect YES >> NO >> 4. CHECK I Refer to EC	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC -448, "Compo	between fue Terminal 2 2 2 2 2 2 or short to g ormal? circuit, short FOR	F7 F7 to ground or	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed	<b>-</b>	ctor.		
3. Check t Cylinder 1 2 3 4 5 6 4. Also che Is the insper YES >> NO >> 4. CHECK I Refer to EC Is the insper YES >>	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC -448, "Compo GO TO 5.	Terminal 2 2 2 2 2 cr short to g <u>ormal?</u> circuit, short FOR <u>onent Inspec</u> <u>ormal?</u>	F7 F7 to ground or tion".	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed		ctor.		
3. Check t Cylinder 1 2 3 4 5 6 4. Also che Is the inspect YES >> NO >> 4. CHECK I Refer to EC Is the inspect YES >> NO >>	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC -448, "Compo ction result no GO TO 5. Replace mali	between fue Terminal 2 2 2 2 2 or short to g <u>ormal?</u> circuit, short FOR <u>onent Inspec</u> <u>ormal?</u> functioning fu	F7 F7 to ground or tion".	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed		ctor.		
3. Check t Cylinder 1 2 3 4 5 6 4. Also che Is the inspen- YES >> NO >> 4. CHECK I Refer to EC Is the inspen- YES >> S.CHECK I	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC -448, "Compo ction result no GO TO 5. Replace main NTERMITTE	Terminal 2 2 2 2 2 2 or short to g ormal? circuit, short FOR onent Inspec ormal? functioning functioning function	I injector har	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed		ctor.		
3. Check t Cylinder 1 2 3 4 5 6 4. Also che Is the inspect YES >> NO >> 4. CHECK I Refer to EC Is the inspect YES >> So >> 5. CHECK I Refer to GI-	he continuity Fuel injector Connector F37 F38 F39 F40 F41 F42 eck harness f ction result no GO TO 4. Repair open FUEL INJEC -448, "Compo ction result no GO TO 5. Replace mali	between fue Terminal 2 2 2 2 2 or short to g ormal? circuit, short FOR onent Inspec ormal? functioning functioning functing functing functioning functioning func	I injector har	CM Terminal 32 31 30 29 3 1 nort to power.	Continuity Existed		ctor.		

YES >> Replace IPDM E/R. Refer to <u>PCS-37</u>, "Exploded View".

NO >> INSPECTION END

### **FUEL INJECTOR**

### < DTC/CIRCUIT DIAGNOSIS >

### Component Inspection

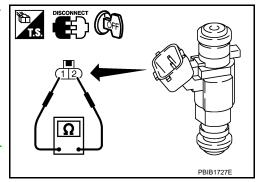
## 1.CHECK FUEL INJECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector harness connector.
- 3. Check resistance between fuel injector terminals as per the following.

Terminals	Resistance
1 and 2	11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)]

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning fuel injector. Refer to <u>EM-49</u>, <u>"Exploded View"</u>.



### **FUEL PUMP**

### < DTC/CIRCUIT DIAGNOSIS > FUEL PUMP

## Description

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				EC
Sensor	Input signal to ECM	ECM Function	Actuator	
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓	С
Battery	Battery voltage*		Fuel pump	

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

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation	F
Ignition switch is turned to ON.	Operates for 1 second.	
Engine running and cranking	Operates.	0
When engine is stopped	Stops in 1.5 seconds.	G
Except as shown above	Stops.	

### **Component Function Check**

### 1. CHECK FUEL PUMP FUNCTION

- 1. Turn ignition switch ON.
- 2. Pinch fuel feed hose with two fingers.
- <>: Vehicle front (Illustration shows the view with intake air duct removed)

# Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> EC-449, "Diagnosis Procedure".

### Diagnosis Procedure

1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connector terminals.

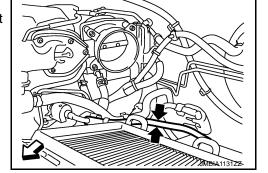
	ECM					
	+		_	Voltage		
Connector	Terminal	Connector	Terminal			
F7	14	E16	112	Battery voltage		

EC-449

#### Is the inspection result normal?

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

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#### < DTC/CIRCUIT DIAGNOSIS >

## 2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

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

IPDN	/I E/R	Ground	Voltage
Connector	Terminal	Ground	voltage
F12	77	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 16.

**3.**DETECT MALFUNCTIONING PART

#### Check the following.

• IPDM E/R harness connector F12

Harness for open or short between IPDM E/R and ECM

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

### **4.**CHECK CONDENSER POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.

2. Reconnect all harness connectors disconnected.

3. Disconnect condenser harness connector.

4. Turn ignition switch ON.

5. Check the voltage between condenser harness connector and ground.

Cond	lenser	Ground	Voltage	
Connector	Terminal	Ground	Voltage	
B81	1	Ground	Battery voltage should exist for 1 second after ignition switch is turned ON.	

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 5.

**5.**CHECK 15 A FUSE

1. Turn ignition switch OFF.

2. Disconnect 15 A fuse (No. 41).

3. Check 15 A fuse.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace fuse.

6.CHECK CONDENSER POWER SUPPLY CIRCUIT-II

1. Disconnect IPDM E/R harness connector.

2. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDN	M E/R	Condenser		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	13	B81	1	Existed

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

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

### **FUEL PUMP**

heck the following.         Harness connectors E104, B4         HPDM E/R connector E10         Harness for open or short between IPDM E/R and condenser         >> Repair open circuit or short to power in harness or connectors.         BCHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Connector       Terminal         Ground       Existed         Also check harness for short to power.         tibe inspection result normal?         YES       > GO TO 10.         NO       >> GO TO 10.         NO       >> GO TO 10.         NO       >> Repair open circuit or short to power in harness or connectors.         D-CHECK CONDENSER       E104 (with rear view monitor)         Harness for open or short between condenser and ground       >> Repair open circuit or short to power in harness or connectors.         O-CHECK CONDENSER       Effect to EC-452. "Component Inspection (Condenser)".         the inspection result normal?       YES         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         1.Check Harness connicuity between IPDM E/R h	Dreck the following.       Final Additional and the provided and the	Determinent       Terminal         PDM E/R connector E10         Harness connectors E104, B4         PDM E/R connector E10         Harness for open or short between IPDM E/R and condenser         >>> Repair open circuit or short to power in harness or connectors.         .CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Connector         The inspection result normal?         (FS >> GO TO 10.         NO >> GO TO 9.         .DETECT MALFUNCTIONING PART         hack the following.         Harness or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> . HECK CONDENSER         Fer to EC-452.         Connector fuel level sensor unit and fuel pump' harness connector. <b>0</b> >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump' harness connector. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnector <b>1</b> .PDM E/R Fuel level sensor unit and fuel pump' harness connector. <b>1</b> .Check Fuel pump POWER SUPPLY CIRCUIT-III         Disconnector <b>1</b> tevisted <b>1</b> . OPM E/R Fu	Check the follo Harness con IPDM E/R co Harness for >> Re B.CHECK CC	owing. nectors E104 onnector E10	4, B4			[VQ35DE]
Hamess connector E10         Hamess for open or short between IPDM E/R and condenser         >>> Repair open circuit or short to power in hamess or connectors.         CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser hamess connector and ground.         Image: Connector Image: Continuity Detween condenser hamess connector and ground.         Connector Terminal Ground Continuity         Bat 2       Ground Existed         .       Also check hamess for short to power.         :the inspection result normal?         YES >> GO TO 10.         NO >> Repair open circuit or short to power in hamess or connectors. <b>O</b> .CHECK CONDENSER         effer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES >> GO TO 11.         NO >> Replaic poen circuit or short to power in hamess connectors. <b>O</b> .CHECK CONDENSER         effer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES >> GO TO 11.         NO >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" hamess connector. <b>1</b> .Check Fuels proved on the pump is a seconnector. <b>1</b> .Check Fuels PUMP POWER SUPPLY CI	Harness connectors E104, E4 IPPM E/R connector E10 Harness for open or short between IPDM E/R and condenser >> Repair open circuit or short to power in harness or connectors. 3. CHECK CONDENSER GROUND CIRCUIT . Turn ignition switch OFF. 2. Check the continuity between condenser harness connector and ground. Contenser Condenser Condenser Condenser Condenser Condenser Continuity B31 2 Ground Continuity B31 2 Ground Existed 3. Also check harness for short to power. sthe inspection result normal? YES >> GO TO 10. DETECT MALFUNCTIONING PART Check the following. Harness connectors B4, E104 (with rear view monitor) Harness connectors CONDENSER Repair open circuit or short to power in harness or connectors. 0. CHECK CONDENSER Refer to EC-452. "Component Inspection (Condenser)"- sthe inspection result normal? YES >> GO TO 11. NO >> Replace condenser. 1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. 2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connectors 2. Check harness contentity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connectors 3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III E10 13 B40 1 Existed sthe inspection result normal? YES >> GO TO 13. NO >> CO TO 14. 2. DETECT MALFUNCTIONING PART Check the following. Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R Harness for open circuit or short to power in harnes	Harness connectors E104, B4         HPDM E/R connector E10         Harness for open or short between IPDM E/R and condenser         >>> Repair open circuit or short to power in harness or connectors.         .CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Condenser         Connector Terminal         Ground       Existed         Also check harness for short to power.         the inspection result hormal?         YES       >> GO TO 10.         VO       >> GO TO 9.        DETECT MALFUNCTIONING PART         hearness connectors 84, E104 (with rear view monitor)         Harness connectors 84, E104 (with rear view monitor)         Harness connectors 84, E104 (with rear view monitor)         Harness on short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER         effer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         YO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check haress	Harness con IPDM E/R co Harness for >> Re B.CHECK CC	nectors E104 onnector E10				
>> Repair open circuit or short to power in harness or connectors.         C-CHECK CONDENSER GROUND CIRCUIT <ul> <li>Turn ignition switch OFF.</li> <li>Check the continuity between condenser harness connector and ground.</li> </ul> <u>Condenser</u> <ul> <li><u>Condenser</u></li> <li><u>Ground</u></li> <li><u>Continuity</u></li> <li><u>BB1</u></li> <u>2</u> <u>Ground</u> <u>Existed</u> </ul> <u>Condenser</u> <u>Ground</u> <u>Continuity</u> <u>BB1</u> <u>2</u> <u>Ground</u> <u>Existed</u> <u>Condenser</u> <u>Ground</u> <u>Existed</u> <u>Condenser</u> <u>Ground</u> <u>Existed</u> <u>Condenser</u> (Control) <u>Continuity</u> <u>Existed</u> <u>Condenser</u> (Control) <u>Continuity</u> <u>Continuity</u> <u>Condenser</u> (Control) <u>Continuity</u> <u>Continuity</u> <u>Condenser</u> (Control) <u>Continuity</u> <u>Continuity</u> <u>Condenser</u> (Control) <u>Condenser</u> (Control) <u>DetTECT MALFUNCTIONING PART</u> <u>Heatingspection result normal?</u> <u>YES</u> > GO T011. <u>No</u> > Replace condenser.	>> Repair open circuit or short to power in harness or connectors.         3.CHECK CONDENSER GROUND CIRCUIT         1       Turn ignition switch OFF.         2       Check the continuity between condenser harness connector and ground.         Image: Connector Image: Contendent Image: Continuity Detween Condenser Image: Contendent Image: Contendent Continuity Detween Condenser Image: Contendent Continuity Detween Condenser Image: Contendent Contende	>> Repair open circuit or short to power in harness or connectors.         CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground. <u>an or condenser</u> <u>dennector</u> <u>the inspection result formal?</u> <u>RSS</u> > 60 T0 10. <u>NO</u> > 60 T0 19. <u>DETECT MALFUNCTIONING PART             heack the following.          Harness for open or short between condenser and ground             <i>S</i> Repair open circuit or short to power in harness or connectors.             <b>OLECK CONDENSER</b>             Per to EC-452. "Component Inspection (Condenser)":             the inspection result normal?             <u>S</u> &gt; 60 T0 11.             <u>S</u> &gt; 60 T0 12.             <u>IPDM E/R Turle level sensor unit and fuel pump" namess connector.             <u>Intersection result normal?             <u>S</u> &gt; 60 T0 13.             <u>S</u> &gt; 60 T0 13.      </u></u></u>	>> Re <b>3.</b> CHECK CC	open or snor				
>> Repair open circuit or short to power in harness or connectors.         B.CHECK CONDENSER GROUND CIRCUIT         • Turn ignition switch OFF.         • Check the continuity between condenser harness connector and ground.         Image: Connector Terminal Ground Continuity         B81       2         Ground Existed         • Also check harness for short to power.         • the inspection result normal?         YES       > GO TO 9.         • DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> -CHECK CONDENSER         effer to EC-452. "Component Inspection (Condenser)".         :hen inspection result normal?         YES       > GO TO 11.         NO       > Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect' "fuel level sensor unit and fuel pump" harness connector.         • Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         • Disconnect'''''''''''''''''''''''''''''''''''	>> Repair open circuit or short to power in harness or connectors.         3. CHECK CONDENSER GROUND CIRCUIT         1. Turn ignition switch OFF:         2. Check the continuity between condenser harness connector and ground.         Tornector       Terminal         Ground       Existed         3. Also check harness for short to power.         s the inspection result normal?         YES       > GO TO 19.         D.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         IO.CHECK CONDENSER         Refer to EC-452, "Component Inspection (Condenser)".         s the inspection result normal?         YES       > GO TO 11.         NO       > Replaie condenser.         II.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Condenser       Terminal         E10       13       B40         13       B40       1         E10       13       B40       1         Check harnestor origon or short between "fuel level sensor unit and fuel pump" and IPDM E/R	>> Repair open circuit or short to power in harness or connectors.         .CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Image: Connector Terminal Ground Existed         Also check harness for short to power.         the inspection result normal?         YES       > GO TO 10.         V0       >> Repair open circuit or short to power in harness or connectors. <b>0.</b> -CHECK CONDENSER         Fef to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         Y0       >> Replace condenser. <b>1.</b> -CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "tuel level sensor unit and fuel pump" harness connector.	<b>B.</b> CHECK CC	•	t between IPD	M E/R and co	ndenser	
CHECK CONDENSER GROUND CIRCUIT         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Image: Condenser Image: Condenser Image: Continuity Ground Image: Condenser Image: Continuity Detween IPDM E/R Image: Continuity Detween Image: Continuity Continuity Context Image:		Image: Condenser Ground Continuity         Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Image: Condenser Ground Existed         Condenser Ground Existed         Also check harness for short to power.         the inspection result normal?         YES         YES         > GO TO 10.         NO         >> Content Purce         DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CNDENSER         Fer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       > GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         Continuity         Connector       Terminal         Eto       13         B40       1         Eto	<b>B.</b> CHECK CC	enair open ci	rcuit or short to	o power in ha	mess or connectors	
Turn ignition switch OFF.         Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power.       Ethe inspection result normal?         YES       > GO TO 10.         NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452, "Component Inspection (Condenser)".         : the inspection result normal?         YES       > GO TO 11.         O> >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector. <b>1</b> .PDM E/R       Fuel level sensor unit and fuel pump" harness connector. <b>i</b> .the inspection result normal?       YES         YES       > GO TO 13.	1. Turn ignition switch OFF.         2. Check the continuity between condenser harness connector and ground.         2. Condenser       Ground         2. Also check harness for short to power.         3. Also check harness for short to power.         3. Has check harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10. CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         3. The inspection result normal?         YES       > GO TO 1.         NO       >> GO TO 1.         NO <td< td=""><td>Turn ignition switch OFF. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power. the inspection result normal? (FS &gt;&gt; GO TO 10. NO &gt;&gt; GO TO 9. .DETECT MALFUNCTIONING PART      </td><td>. Turn ignitio</td><td></td><td></td><td>•</td><td></td><td>-</td></td<>	Turn ignition switch OFF. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power. the inspection result normal? (FS >> GO TO 10. NO >> GO TO 9. .DETECT MALFUNCTIONING PART	. Turn ignitio			•		-
Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power.       Ethe inspection result normal?         YES       > GO TO 10.         NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector. <b>1</b> .Check harness connector.         Image: Connector Terminal Connector Terminal Ento         pump" harness connector.         Image: Connector Terminal Connector Terminal Ento         POM E/R       Fuel level sensor unit and fuel pump" continuity         Connector Terminal Connector Terminal Ento       Existed <td>2. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power in harness or connectors.       D.ETECT MALFUNCTIONING PART         Check the following.       Harness for open or short between condenser and ground         &gt;&gt; Repair open circuit or short to power in harness or connectors.       Image: She inspection result normal?         YES       &gt;&gt; GO TO 11.       NO         NO       &gt;&gt; Replace condenser.       Image: She inspection result normal?         YES       &gt;&gt; GO TO 11.       Image: She inspection result normal?         YES       &gt;&gt; GO TO 11.       Evel evel sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector.       Evel evel sensor unit and fuel pump" harness connector.         2. Check not result normal?       YES       &gt;&gt; GO TO 13.         YES       &gt;&gt; GO TO 13.       Evel evel sen</td> <td>Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power.       the inspection result normal?       KS         VES       &gt; GO TO 10.       NO       &gt;&gt; SQ TO 9.         .DETECT MALFUNCTIONING PART       heck the following.         Harness connectors B4, E104 (with rear view monitor)       Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)       Harness connectors B4, E104 (with rear view monitor)         Kes &gt;&gt; Go TO 11.       NO       &gt;&gt; Repair open circuit or short to power in harness or connectors.         <b>0.</b>CHECK CONDENSER       Effer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?       YES         VO       &gt;&gt; Replace condenser.       1         <b>1.</b>CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III       Disconnect<sup>*</sup> fuel level sensor unit and fuel pump" harness connector.         Connector       Terminal       Continuity         Connector       Terminal       Continuity         Connector       Terminal       Continuity         Connector       Terminal       Existed         the inspection result normal?       YES       &gt; GO TO 13.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	2. Check the continuity between condenser harness connector and ground.         Condenser       Ground       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power.       Existed         3. Also check harness for short to power in harness or connectors.       D.ETECT MALFUNCTIONING PART         Check the following.       Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.       Image: She inspection result normal?         YES       >> GO TO 11.       NO         NO       >> Replace condenser.       Image: She inspection result normal?         YES       >> GO TO 11.       Image: She inspection result normal?         YES       >> GO TO 11.       Evel evel sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector.       Evel evel sensor unit and fuel pump" harness connector.         2. Check not result normal?       YES       >> GO TO 13.         YES       >> GO TO 13.       Evel evel sen	Check the continuity between condenser harness connector and ground.         Condenser       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power.       the inspection result normal?       KS         VES       > GO TO 10.       NO       >> SQ TO 9.         .DETECT MALFUNCTIONING PART       heck the following.         Harness connectors B4, E104 (with rear view monitor)       Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)       Harness connectors B4, E104 (with rear view monitor)         Kes >> Go TO 11.       NO       >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER       Effer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?       YES         VO       >> Replace condenser.       1 <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III       Disconnect <sup>*</sup> fuel level sensor unit and fuel pump" harness connector.         Connector       Terminal       Continuity         Connector       Terminal       Continuity         Connector       Terminal       Continuity         Connector       Terminal       Existed         the inspection result normal?       YES       > GO TO 13.						
Condenser         Ground         Continuity           Connector         Terminal         Ground         Existed           B81         2         Ground         Existed           Also check harness for short to power.         Existed         Existed           Also check harness for short to power.         Existed         Existed           DOTESCT MALFUNCTIONING PART         Here view monitor)         Harness connectors B4, E104 (with rear view monitor)           Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.           O.CHECK CONDENSER         Effect of EC-452, "Component Inspection (Condenser)".         Ethe inspection result normal?           YES         > GO TO 11.         NO         >> Replace condenser.           1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.           Check Arness 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           E10         13         E40           YES         > GO TO 13.           NO         >> GO TO 13.           NO         >> GO TO 12.           2.DETE	Ground         Ground         Continuity           B81         2         Ground         Existed           3. Also check harness for short to power.         State           as the inspection result normal?         YES         > GO TO 10.           NO         >> GO TO 9.         DETECT MALFUNCTIONING PART           Check the following.         Harness connectors B4, E104 (with rear view monitor)           Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground           >> Repair open circuit or short to power in harness or connectors.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Continuity           Image: Connector         Image: Connector         Image: Connector           Image: Connector         Fuel leve	Condenser         Ground         Continuity           Connector         Terminal         Ground         Existed           Also check harness for short to power.         Also check harness for short to power.         Also check harness for short to power.           Left_CT_MALFUNCTIONING PART         Detect_MALFUNCTIONING PART           heck the following.         Harness connectors B4, E104 (with rear view monitor)           Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.           O.CHECK CONDENSER         Before to EC-452. "Component Inspection (Condenser)".           the inspection result normal?         YES           YES         > GO TO 11.           VO         >> Replace condenser.           1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III           Disconnect "fuel level sensor unit and fuel pump" harness connector.           Check Arness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.           Image: Terminal         Continuity           Connector         Terminal           Edot 1         Existed	Check the			nser harness	connector and ground.	
Connector       Terminal       Ground       Continuity         B81       2       Ground       Existed         Also check harness for short to power.       The inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replaic condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" continuity <u>Connector Terminal Connector Terminal Pump Continuity</u> <u>Connector Terminal Connector Terminal Pump Continuity</u> <u>Connector Terminal Connector Terminal Connector Terminal Connector Terminal Connector Terminal Connector SU </u>	Ground         Ground         Continuity           B81         2         Ground         Existed           3. Also check harness for short to power.         State           as the inspection result normal?         YES         > GO TO 10.           NO         >> GO TO 9.         DETECT MALFUNCTIONING PART           Check the following.         Harness connectors B4, E104 (with rear view monitor)           Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground           >> Repair open circuit or short to power in harness or connectors.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Image: Content inspection result normal?           YES         >> GO TO 11.         NO           NO         >> Replace condenser.         Continuity           Image: Connector         Image: Connector         Image: Connector           Image: Connector         Fuel leve	Connector         Terminal         Ground         Continuity           B81         2         Ground         Existed           Also check harness for short to power.         the inspection result normal?         (KS)           (KS)         >> GO TO 10.         NO           NO         >> GO TO 10.         NO           .DETECT MALFUNCTIONING PART         Image: Connector B4, E104 (with rear view monitor)           Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)           Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         Effer to EC-452, "Component Inspection (Condenser)".           the inspection result normal?         (KS)           YES         >> GO TO 11.           VO         >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III           Disconnect "fuel level sensor unit and fuel pump" harness connector.           Check harness continuity between IPDM E/R harness connector.           Check namess connector.           Check namess connector.           IPDM E/R         Fuel level sensor unit and fuel pump" harness connector.           IPDM E/R         Fuel level sensor unit and fuel           pump	Conde	noor			_	
B81       2       Ground       Existed         Also check harness for short to power.       The inspection result normal?         YES       >> GO TO 10.       NO         NO       >> GO TO 9.       .         JETECT MALFUNCTIONING PART       Herness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)       Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.       O.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".       .         the inspection result normal?       YES         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         in the inspection result normal?       Continuity         Connector       Terminal	B81       2       Ground       Existed         3. Also check harness for short to power.       Sine inspection result normal?         YES       > 60 T0 10.         NO       >> 60 T0 9.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO T0 1.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III          Check harness continuity between IPDM E/R harness connector.         2. Check harness connector.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III          Connector         inpump       Continuity         connector.       Continuity         Connector       Terminal         E10       13       B40         13       B40       1         20.DETECT MALFUNCTIONING PART         Check the following. <td>B81       2       Ground       Existed         Also check harness for short to power.       the inspection result normal?         (FS &gt;&gt; GO TO 10.       NO       &gt;&gt; GO TO 9.         .DETECT MALFUNCTIONING PART       heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         &gt;&gt; Repair open circuit or short to power in harness or connectors.         <b>0</b>.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (YES &gt;&gt; GO TO 11.         VO &gt;&gt; Replace condenser.         <b>1</b>.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector.         Check harness connector.         inpump" harness connector.         inpump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         Etio       1       Existed         the inspection result normal?       1       Exis</td> <td></td> <td></td> <td>Ground</td> <td>Continuity</td> <td></td> <td></td>	B81       2       Ground       Existed         Also check harness for short to power.       the inspection result normal?         (FS >> GO TO 10.       NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART       heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (YES >> GO TO 11.         VO >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector.         Check harness connector.         inpump" harness connector.         inpump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" harness connector.         inpum E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         Etio       1       Existed         the inspection result normal?       1       Exis			Ground	Continuity		
the inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity <u>connector Terminal Connector Terminal Ento 13 B40 1 Existed</u> the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	sthe inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         J.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         11. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         11. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         12. DETECT MALFUNCTIONING PART         Connector       Terminal        IPDM E/R       Fuel level sensor unit and fuel pump" and IPDM E/R        SO >> GO TO 13.       NO >> GO TO 12.         22. DETECT MALFUNCTIONING PART         Check the following.       Harness connectors B4, E104     <	the inspection result normal?         /ES       >> GO TO 10.         VO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (FS       >> GO TO 11.         VO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         connector       Terminal         E10       1       Existed         the inspection result normal?       Existed         the inspection result normal?       Existed         2. DETECT MALFUNCTIONING PART       Existed         the inspection result normal?       Existed         2. DETECT MALFUNCTIONING PART       Harness connecto			Ground	Existed	_	
the inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity <u>connector Terminal Connector Terminal Ento 13 B40 1 Existed</u> the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	sthe inspection result normal?         YES       >> GO TO 10.         NO       >> GO TO 9.         J.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         11. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         11. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnector.         12. DETECT MALFUNCTIONING PART         Connector       Terminal        IPDM E/R       Fuel level sensor unit and fuel pump" and IPDM E/R        SO >> GO TO 13.       NO >> GO TO 12.         22. DETECT MALFUNCTIONING PART         Check the following.       Harness connectors B4, E104     <	the inspection result normal?         /ES       >> GO TO 10.         VO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (FS       >> GO TO 11.         VO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         connector       Terminal         E10       1       Existed         the inspection result normal?       Existed         the inspection result normal?       Existed         2. DETECT MALFUNCTIONING PART       Existed         the inspection result normal?       Existed         2. DETECT MALFUNCTIONING PART       Harness connecto	3. Also checl	k harness for	short to powe	er.	_	
NO       >> GO TO 9.         DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         Connector       Terminal         E10       13       B40         13       B40       1         EXT >> GO TO 13.       NO       >> GO TO 13.         NO       >> GO TO 12.       2 <b>2</b> .DETECT MALFUNCTIONING PART       Harness connectors B4, E104	NO       >> GO TO 9.         9. DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         ste inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III          Check harness connector.         2. Check namess connector.         2. Check namess connector.         2. Check namess connector.         IPDM E/R       Fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check harness connector.       Continuity         Connector       Terminal         E10       13       B40         13       B40         2. DETECT MALFUNCTIONING PART         Check the following. <td>NO       &gt;&gt; GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         &gt;&gt; Repair open circuit or short to power in harness or connectors.         <b>0.CHECK CONDENSER</b>         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       &gt;&gt; GO TO 11.         NO       &gt;&gt; Replace condenser.         <b>1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III</b>         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         <u>Connector Terminal Connector Terminal Pump</u>       Continuity         <u>Connector Terminal Connector Terminal Pump</u>       Continuity         <u>Connector result normal?</u>       YES         YES       &gt;&gt; GO TO 13.         YO       &gt;&gt; GO TO 13.         YO       &gt;&gt; GO TO 12.         <b>2.DETECT MALFUNCTIONING PART</b>         heck the following.         Harness connectors B4, E104</td> <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td>	NO       >> GO TO 9.         .DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.CHECK CONDENSER</b> efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III</b> Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity <u>Connector Terminal Connector Terminal Pump</u> Continuity <u>Connector Terminal Connector Terminal Pump</u> Continuity <u>Connector result normal?</u> YES         YES       >> GO TO 13.         YO       >> GO TO 13.         YO       >> GO TO 12. <b>2.DETECT MALFUNCTIONING PART</b> heck the following.         Harness connectors B4, E104			•			
DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0</b> .CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         :the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1</b> .CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         in the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12. <b>2</b> .DETECT MALFUNCTIONING PART          heck the following.         Harness connectors B4, E104	P.DETECT MALFUNCTIONING PART         Check the following:         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         1. Obsconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         1. Obsconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         1. Onector       Terminal         connector       Terminal         Continuity       Continuity         2. Sthe inspection result normal?       YES         YES       >> GO TO 13.         NO       >> GO TO 12.         2. DETECT MALFUNCTIONING PART         Check the following.         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >	DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.CHECK CONDENSER</b> efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         YES       > GO TO 11.         VO       >> Replace condenser. <b>1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III</b> Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" continuity <u>Connector Terminal Connector Terminal Pump Continuity</u> <u>Connector Terminal Connector Terminal Existed</u> the inspection result normal?         YES       > GO TO 13.         NO       >> GO TO 12. <b>2.DETECT MALFUNCTIONING PART</b> heck the following.         Harness connectors B4, E104						
heck the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         :the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         connector       Terminal         E10       13         B40       1         Existed         : the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	Check the following.         Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452, "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GOTO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         1. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check namess continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check namess continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         2. Check namess continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" continuity         Connector       Terminal         E10       13       B40         YES       > GO TO 13.         NO       > GO TO 12.         12.DETECT MALFUNCTIONING PART       Check the following.         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to po	heck the following. Harness connectors B4, E104 (with rear view monitor) Harness for open or short between condenser and ground >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER effer to EC-452. "Component Inspection (Condenser)". the inspection result normal? YES >> GO TO 11. NO >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector. IPDM E/R Fuel level sensor unit and fuel pump Continuity <u>Connector Terminal Connector Terminal E10 13 B40 1 Existed</u> the inspection result normal? YES >> GO TO 13. NO >> GO TO 13. NO >> GO TO 13. 2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104						
Harness connectors B4, E104 (with rear view monitor) Harness for open or short between condenser and ground >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER efer to EC-452. "Component Inspection (Condenser)". the inspection result normal? YES >> GO TO 11. NO >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump the inspection result normal? YES >> GO TO 13. NO >> GO TO 13. NO >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104	Harness connectors B4, E104 (with rear view monitor)         Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452, "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         I. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector Terminal Content         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal Connector Terminal         E10       13       B40         s the inspection result normal?       YES         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	Harness connectors B4, E104 (with rear view monitor) Harness for open or short between condenser and ground >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER efer to EC-452. "Component Inspection (Condenser)". the inspection result normal? (FS >> GO TO 11. NO >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector. (Connector Terminal Connector Terminal E10 13 B40 1 Existed the inspection result normal? (FS >> GO TO 13. NO >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104			INING PART			
Harness for open or short between condenser and ground  >> Repair open circuit or short to power in harness or connectors.  O.CHECK CONDENSER  efer to EC-452. "Component Inspection (Condenser)".  the inspection result normal? YES >> GO TO 11. NO >> Replace condenser.  1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III  Disconnect "fuel level sensor unit and fuel pump" harness connector.  Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fuel level sensor unit and fuel pump" harness connector.  IPDM E/R Fuel level sensor unit and fuel pump Continuity  Connector Terminal Connector Terminal E10 13 B40 1 Existed  the inspection result normal? YES >> GO TO 13. NO >> GO TO 13. NO >> GO TO 12.  2.DETECT MALFUNCTIONING PART  heck the following. Harness connectors B4, E104	Harness for open or short between condenser and ground         >> Repair open circuit or short to power in harness or connectors.         10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         1. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         1. IPDM E/R       Fuel level sensor unit and fuel pump" Continuity         connector       Terminal         Continuity       Continuity         Connector       Terminal         E10       13       B40         13       B40       1         EXT       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	Harness for open or short between condenser and ground >> Repair open circuit or short to power in harness or connectors. <b>0.</b> CHECK CONDENSER effer to EC-452. "Component Inspection (Condenser)". the inspection result normal? (YES >> GO TO 11. NO >> Replace condenser. <b>1.</b> CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector and "fue			E104 (with rea	r view monito	r)	
0.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         ethe inspection result normal?         YES >> GO TO 11.         NO >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         E10       13       B40         1       Existed         the inspection result normal?         YES >> GO TO 13.         NO >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         st the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         .       Disconnect "fuel level sensor unit and fuel pump" harness connector.         .       Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         .       IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal       Continuity         St the inspection result normal?       YES       >> GO TO 13.         NO       >> GO TO 12.       2       2         DETECT MALFUNCTIONING PART       Check the following.         Harness connectors B4, E104       Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R	0.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (FS >> GO TO 11.         VO >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         Check harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" continuity <u>Connector</u> Terminal         E10       13       B40         1       Existed         the inspection result normal?         (FS >> GO TO 13.         VO >>> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104						
0.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         ethe inspection result normal?         YES >> GO TO 11.         NO >>> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         imponetion         IPDM E/R       Fuel level sensor unit and fuel pump" continuity         connector       Terminal         E10       13       B40         13       B40       1         Ethe inspection result normal?       YES >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	10.CHECK CONDENSER         Refer to EC-452. "Component Inspection (Condenser)".         st the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         1. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         impose the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 13.         NO       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	0.CHECK CONDENSER         efer to EC-452. "Component Inspection (Condenser)".         the inspection result normal?         (FS >> GO TO 11.         NO >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         Connector       Terminal         Connector       Terminal         E10       13       B40         the inspection result normal?         (FS >> GO TO 13.         NO >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	-		·· · · · ·			
efer to EC-452. "Component Inspection (Condenser)".         ethe inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         • Disconnect "fuel level sensor unit and fuel pump" harness connector.         • Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         • Disconnect Terminal       Continuity         Connector       Terminal         Ethe inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	Refer to EC-452, "Component Inspection (Condenser)".         s the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         . Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         11.CHECK Terminal       Continuity         Connector       Terminal         E10       13       B40         13       B40       1         Existed       Sthe inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	efer to EC-452. "Component Inspection (Condenser)". the inspection result normal? (FS >> GO TO 11. NO >> Replace condenser. 1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector. <u>IPDM E/R</u> <u>Fuel level sensor unit and fuel</u> <u>continuity</u> <u>Connector Terminal Connector Terminal</u> <u>E10 13 B40 1 Existed</u> the inspection result normal? (FS >> GO TO 13. NO >> GO TO 12. 2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104				o power in na	ness of connectors.	
it the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Obsconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Ethe inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	st the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         I. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         st the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	the inspection result normal?         YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104				(Condonoor)	1	
YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         Sthe inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	YES       >> GO TO 11. NO       >> Replace condenser.         11.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump" Continuity <u>Connector</u> Terminal         E10       13       B40         13       B40       1         Existed       Sthe inspection result normal?         YES       >> GO TO 13. NO       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	YES       >> GO TO 11.         NO       >> Replace condenser.         1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104				(Condenser)	2	
1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         The inspection result normal?         YES         S GO TO 13.         NO         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         I. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         Connector       Terminal         Connector       Terminal         E10       13       B40         1       Existed         s the inspection result normal?         YES       > GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	1.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III         Disconnect "fuel level sensor unit and fuel pump" harness connector. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         Connector       Terminal         E10       13         B40       1         Existed         the inspection result normal?         (FS)       > GO TO 13.         VO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104						
Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         Connector       Terminal         E10       13         B40       1         Existed         Sthe inspection result normal?         YES       > GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	I. Disconnect "fuel level sensor unit and fuel pump" harness connector.         2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	Disconnect "fuel level sensor unit and fuel pump" harness connector.         Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         the inspection result normal?         (FS)         YCONTO 13.         YO         SO TO 13.         YO         PUTECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104		•				
. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         Connector       Terminal         E10       13       B40         at the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal         E10       13         B40       1         Existed         S the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         the inspection result normal?       CS       S GO TO 13.       SO       SO TO 12.         DETECT MALFUNCTIONING PART       Harness connectors B4, E104       E104       E104	11.CHECK F	UEL PUMP	POWER SUP	PLY CIRCUIT	-111	
pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         Ethe inspection result normal?       YES       >> GO TO 13.       NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART       Harness connectors B4, E104       Harness connectors B4, E104       Harness connectors B4, E104	pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Fuel level sensor unit and fuel pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?       YES       >> GO TO 13.       NO       >> GO TO 12.         YES       DETECT MALFUNCTIONING PART       Deteck the following.       Harness connectors B4, E104         Harness connectors B4, E104       Harness or poen or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.       13.chECK FUEL PUMP GROUND CIRCUIT	pump" harness connector.         IPDM E/R       Fuel level sensor unit and fuel pump         Connector       Terminal       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         the inspection result normal?       (FS)       >> GO TO 13.       NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART       Harness connectors B4, E104       Harness connectors B4, E104       Harness connectors B4, E104						lovel concer unit and fuel
IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       Ethe inspection result normal?     Existed     Existed       YES     >> GO TO 13.     NO     >> GO TO 12.       2.DETECT MALFUNCTIONING PART     Harness connectors B4, E104     Ethel	IPDM E/R       pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?       YES       >> GO TO 13.       NO       >> GO TO 12.         YES_DETECT MALFUNCTIONING PART       Etail       DETECT MALFUNCTIONING PART       Etail       Continuity         Check the following.       Harness connectors B4, E104       Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.       13.CHECK FUEL PUMP GROUND CIRCUIT	IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       the inspection result normal? YES     >> GO TO 13. NO     >> GO TO 12.       2.DETECT MALFUNCTIONING PART					intess connector and ruer	level sensor unit and fuer
IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       Ethe inspection result normal?     YES     >> GO TO 13.       YES     >> GO TO 13.     NO       NO     >> GO TO 12.     Z.DETECT MALFUNCTIONING PART	IPDM E/R       pump       Continuity         Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?       YES       >> GO TO 13.       NO       >> GO TO 12.         YES_DETECT MALFUNCTIONING PART       Etail       DETECT MALFUNCTIONING PART       Etail       Continuity         Check the following.       Harness connectors B4, E104       Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.       13.CHECK FUEL PUMP GROUND CIRCUIT	IPDM E/R     pump     Continuity       Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       the inspection result normal? YES     >> GO TO 13. NO     >> GO TO 12.       2.DETECT MALFUNCTIONING PART						
Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       a the inspection result normal?       YES     >> GO TO 13.       NO     >> GO TO 12.       2.DETECT MALFUNCTIONING PART       heck the following.       Harness connectors B4, E104	Connector       Terminal       Connector       Terminal         E10       13       B40       1       Existed         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         12.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         13.CHECK FUEL PUMP GROUND CIRCUIT	Connector     Terminal     Connector     Terminal       E10     13     B40     1     Existed       the inspection result normal?          YES     >> GO TO 13.         NO     >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.     Harness connectors B4, E104	IPDM	E/R				
E10       13       B40       1       Existed         E the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         Theck the following.         Harness connectors B4, E104	E10       13       B40       1       Existed         s the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         I2.DETECT MALFUNCTIONING PART         Check the following.         Harness connectors B4, E104         Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R         >> Repair open circuit or short to power in harness or connectors.         I3.CHECK FUEL PUMP GROUND CIRCUIT	E10       13       B40       1       Existed         the inspection result normal?         YES       >> GO TO 13.         NO       >> GO TO 12.         2.DETECT MALFUNCTIONING PART         heck the following.         Harness connectors B4, E104	Connector	Terminal		•	Continuity	
YES >> GO TO 13. NO >> GO TO 12. 2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104	YES >> GO TO 13. NO >> GO TO 12. 2.DETECT MALFUNCTIONING PART Check the following. Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. 3.CHECK FUEL PUMP GROUND CIRCUIT	YES >> GO TO 13. NO >> GO TO 12. <b>2.</b> DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104					Existed	
NO >> GO TO 12. 2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104	NO >> GO TO 12. 12.DETECT MALFUNCTIONING PART Check the following. Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. 13.CHECK FUEL PUMP GROUND CIRCUIT	NO >> GO TO 12. 2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104	s the inspection	on result norr	nal?			
2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104	12.DETECT MALFUNCTIONING PART Check the following. Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. 13.CHECK FUEL PUMP GROUND CIRCUIT	2.DETECT MALFUNCTIONING PART heck the following. Harness connectors B4, E104						
heck the following. Harness connectors B4, E104	Check the following. Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. 13.CHECK FUEL PUMP GROUND CIRCUIT	heck the following. Harness connectors B4, E104				_		
Harness connectors B4, E104	Harness connectors B4, E104 Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. 3.CHECK FUEL PUMP GROUND CIRCUIT	Harness connectors B4, E104			IONING PART			
	Harness for open or short between "fuel level sensor unit and fuel pump" and IPDM E/R >> Repair open circuit or short to power in harness or connectors. <b>13.</b> CHECK FUEL PUMP GROUND CIRCUIT				E104			
	13. CHECK FUEL PUMP GROUND CIRCUIT					l level sensor	unit and fuel pump" and IPE	DM E/R
	13. CHECK FUEL PUMP GROUND CIRCUIT							
						•	mess or connectors.	
<b>3.</b> CHECK FUEL PUMP GROUND CIRCUIT		J.CHECK FUEL PUMP GROUND CIRCUIT	<b>3.</b> CHECK F	FUEL PUMP	GROUND CIF	RCUIT		
	<ol> <li>Disconnect "fuel level sensor unit and fuel pump" harness connector.</li> <li>Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ground.</li> </ol>							

### **FUEL PUMP**

### < DTC/CIRCUIT DIAGNOSIS >

	sor unit and fuel mp	Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 15. NO >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors B4, E104 (with rear view monitor)

• Harness for open or short between "fuel level sensor unit and fuel pump" and ground

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

15.CHECK FUEL PUMP

Refer to EC-452, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace fuel pump. Refer to <u>FL-5, "Exploded View"</u>.

16. CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-37, "Exploded View"</u>.

NO >> Repair or replace harness or connectors.

### Component Inspection (Fuel Pump)

### 1.CHECK FUEL PUMP

- 1. Turn ignition switch OFF.
- 2. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 3. Check resistance between "fuel level sensor unit and fuel pump" terminals as per the following.

Terminals	Resistance
1 and 3	0.2 - 5.0 Ω [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace "fuel level sensor unit and fuel pump". Refer to FL-5, "Exploded View".

#### Component Inspection (Condenser)

### **1.**CHECK CONDENSER

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser harness connector.

3. Check resistance between condenser terminals as per the following.

Terminals	Resistance
1 and 2	Above 1 MΩ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser.

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### < DTC/CIRCUIT DIAGNOSIS >

## **IGNITION SIGNAL**

### Description

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

## Component Function Check

### **1.**INSPECTION START

Turn ignition switch OFF, and restart engine.

### Does the engine start?

YES-1 >> With CONSULT: GO TO 2.

YES-2 >> Without CONSULT: GO TO 3.

NO >> Go to EC-453, "Diagnosis Procedure".

2.CHECK IGNITION SIGNAL FUNCTION

### (P)With CONSULT

- Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT. 1
- Check that each circuit produces a momentary engine speed drop. 2.

### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-453, "Diagnosis Procedure".

**3.**CHECK IGNITION SIGNAL FUNCTION

### **Without CONSULT**

- Let engine idle. 1.
- Read the voltage signal between ECM harness connector terminals with an oscilloscope. 2.

	E	СМ			J
+	+	-	_	Voltage signal	
Connector	Terminal	Connector	Terminal		K
	9				
	10			50mSec/div	
	11				L
F7	18	E16	112		
	19				ЪЛ
	21			2V/div JMBIA0035GB	Μ
NOTE:					
The pulse	cycle changes	depending on	rpm at idle.		Ν
s the inspec	tion result r	ormal?			
YES >>	INSPECTIC	N END			

NO

### **Diagnosis** Procedure

### 1.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

Turn ignition switch OFF, wait at least 10 seconds and then turn it ON. 1.

2. Check the voltage between ECM harness connector terminals. А

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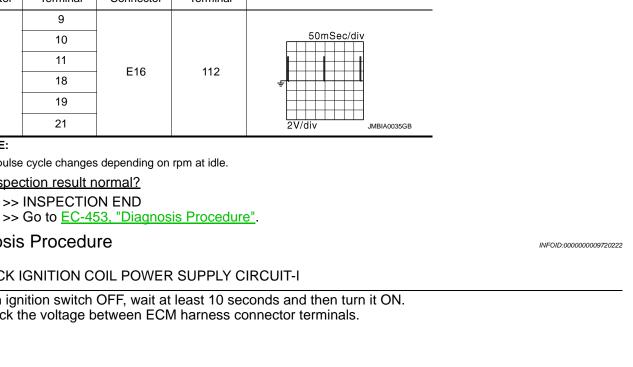
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Revision: 2013 August

### < DTC/CIRCUIT DIAGNOSIS >

Connector	+	_	Voltage
Connector	Terminal	Terminal	
E16	105	112	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to <u>EC-148, "Diagnosis Procedure"</u>.

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	Ground	vollage	
F13	1	Ground	Battery voltage	

Is the inspection result normal?

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

**3.**CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

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

IPDN	IPDM E/R		Condenser	
Connector	Terminal	Connector Terminal		Continuity
F12	49	F13	1	Existed

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

Is the inspection result normal?

YES >> Refer to EC-148, "Diagnosis Procedure".

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

**4.**CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between condenser harness connector and ground.

Condenser		Ground	Continuity	
Connector	Terminal	Ground	Continuity	
F13	2	Ground	Existed	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK CONDENSER

Refer to EC-457, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace condenser.

#### < DTC/CIRCUIT DIAGNOSIS >

## 6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

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

	Ignition coil		Ground	Valtage
Cylinder	Connector	Terminal	Giouna	Voltage
1	F31	3		
2	F32	3		
3	F33	3	Ground	Battery voltage
4	F34	3	Giouna	
5	F35	3	1	
6	F36	3		

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness or connectors.

### 7. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between ignition coil harness connector and ground.

Ignition coil		Ground	Continuity	
Cylinder	Connector	Terminal	Giodila	Continuity
1	F31	2		
2	F32	2		Existed
3	F33	2	Ground	
4	F34	2	Ground	
5	F35	2	1	
6	F36	2	-	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ignition coil harness connector and ECM harness connector.

	Ignition coil			E	ECM	
_	Cylinder	Connector	Terminal	Connector	Terminal	Continuity
_	1	F31	1		11	
	2	F32	1		10	
_	3	F33	1	F7	9	Existed
	4	F34	1	F7	21	LAISted
	5	F35	1		19	
	6	F36	1		18	

3. Also check harness for short to ground and short to power. Is the inspection result normal? А

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< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 9.

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

9.CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-456. "Component Inspection (Ignition Coil with Power Transistor)".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning ignition coil with power transistor. Refer to EM-54, "Exploded View".

**10.**CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

#### >> INSPECTION END

### Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000009720223

1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.

2. Disconnect ignition coil harness connector.

3. Check resistance between ignition coil terminals as per the following.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	Except 0

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning ignition coil with power transistor. Refer to EM-54, "Exploded View".

2.CHECK IGNITION COIL WITH POWER TRANSISTOR-II

#### CAUTION:

#### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
- NOTE:

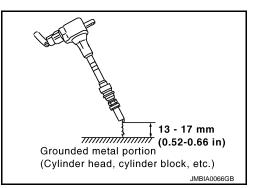
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 4. Start engine.
- 5. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 6. Turn ignition switch OFF.
- 7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 8. Remove ignition coil and spark plug of the cylinder to be checked.
- 9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 10. Connect spark plug and harness connector to ignition coil.
- 11. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 12. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

#### Spark should be generated.

#### **CAUTION:**

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful



< DTC/CIRCU	JIT DIAGNOSIS >	[VQ35DE]
		ing, because the electrical discharge voltage becomes
	r more. t cause to damage the ignition coil	if the gap of more than 17 mm (0.66 in) is taken.
-		, the spark might be generated even if the coil is mal-
	ion result normal?	
	NSPECTION END	
		th power transistor. Refer to <u>EM-54, "Exploded View"</u> .
Componen	t Inspection (Condenser)	INFOID:000000009720224
1. СНЕСК С	ONDENSER	
	ion switch OFF.	
	ct condenser harness connector. sistance between condenser terminal	s as per the following.
Terminals	Resistance	F
1 and 2	Above 1 M $\Omega$ [at 25C° (77C°)]	
Is the inspecti	on result normal?	
		G
NO >> R	eplace condenser.	
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### MALFUNCTION INDICATOR LAMP

#### < DTC/CIRCUIT DIAGNOSIS >

### MALFUNCTION INDICATOR LAMP

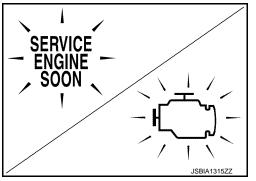
### Description

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will illuminate when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should turn off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to <u>EC-126. "DIAGNOSIS DESCRIPTION : Malfunc-</u> tion Indicator Lamp (MIL)".



### Component Function Check

**1.**CHECK MIL FUNCTION

- 1. Turn ignition switch ON.
- Check that MIL illuminates.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-458, "Diagnosis Procedure".

### **Diagnosis Procedure**

1. СНЕСК DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC UXXXX.

2. CHECK COMBINATION METER FUNCTION

Refer to <u>MWI-35, "CONSULT Function (METER/M&A)"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-44, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace combination meter. Refer to <u>MWI-105, "Exploded View"</u>.

NO >> Repair or replace.

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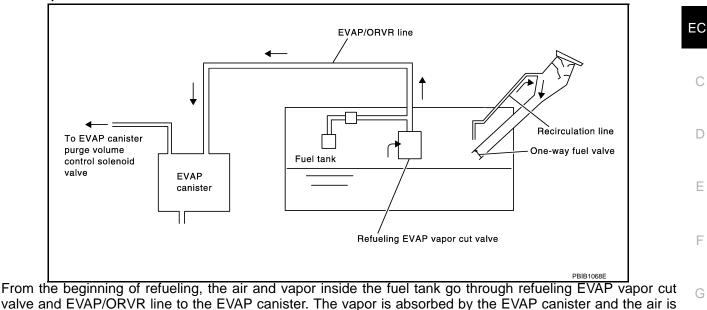
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#### < DTC/CIRCUIT DIAGNOSIS >

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### Description



released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and Н refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

#### WARNING:

<ul> <li>When conducting inspections below, be sure to observe the following:</li> <li>Put a "CAUTION: FLAMMABLE" sign in workshop.</li> </ul>		
• Never smoke while servicing fuel system. Keep open flames and sparks away from wo	rk area.	
Always to furnish the workshop with a CO <sub>2</sub> fire extinguisher.		J
<ul> <li>CAUTION:</li> <li>Before removing fuel line parts, carry out the following procedures:</li> </ul>		
- Put drained fuel in an explosion-proof container and put lid on securely.		
- Release fuel pressure from fuel line. Refer to <u>EC-532, "Inspection"</u> .		Κ
- Disconnect battery ground cable.		
<ul> <li>Always replace O-ring when the fuel gauge retainer is removed.</li> <li>Never kink or twist hose and tube when they are installed.</li> </ul>		1
<ul> <li>Never tighten hose and clamps excessively to avoid damaging hoses.</li> </ul>		
After installation, run engine and check for fuel leakage at connections.		
<ul> <li>Never 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</li> </ul>		M
Component Function Check	INFOID:000000009720229	
1. CHECK ORVR FUNCTION		Ν
Check whether the following symptoms are present.		
<ul> <li>Fuel odor from EVAP canister is strong.</li> </ul>		0
• Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.		
Are any symptoms present?		
YES >> Go to <u>EC-459, "Diagnosis Procedure"</u> . NO >> INSPECTION END		Ρ
Diagnosis Procedure	INFOID:000000009720230	
1.INSPECTION START		
Check whether the following symptoms are present.		

A: Fuel odor from EVAP canister is strong.

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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

<u>A or B</u>

- A >> GO TO 2.
- B >> GO TO 7.

2. CHECK EVAP CANISTER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "Exploded View".
- Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

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

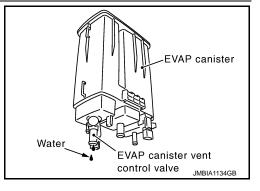
 $\frac{10}{2} = \frac{104}{2}$ 

3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



### **4.**REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to FL-16, "Exploded View".

>> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose. Refer to EM-33, "Exploded View".

**6.**CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-462. "Component Inspection".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-11, "Exploded View"</u>.

**7.**CHECK EVAP CANISTER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "<u>Exploded View</u>".
- 2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

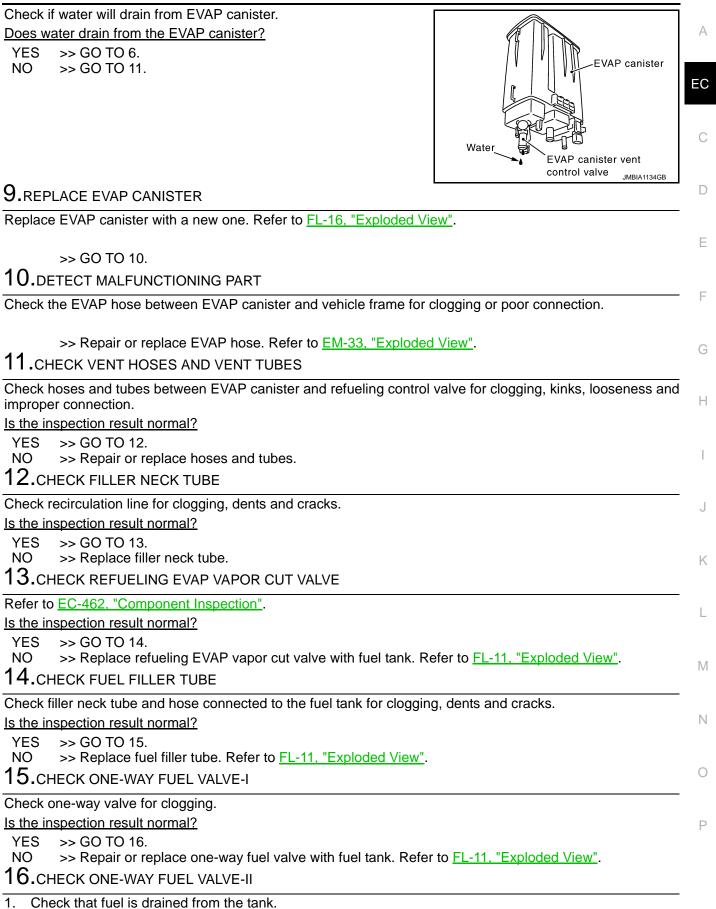
YES >> GO TO 8.

NO >> GO TO 9.

8.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



2. Remove fuel filler tube and hose. Refer to FL-11, "Exploded View".

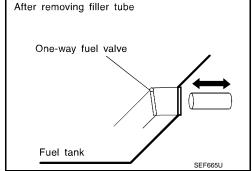
#### < DTC/CIRCUIT DIAGNOSIS >

 Check one-way fuel valve for operation as per the following. When a stick is inserted, the valve should open, when removing stick it should close.

### Do not drop any material into the tank.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to <u>FL-11, "Exploded View"</u>.



Component Inspection

INFOID:000000009720231

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### **1.**INSPECTION START

Will CONSULT be used?

#### Will CONSULT be used?

YES >> GO TO 2.

NO >> GO TO 3.

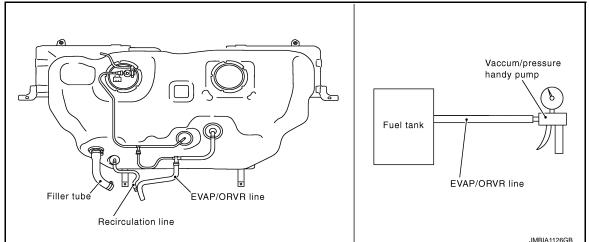
**2.**CHECK REFUELING EVAP VAPOR CUT VALVE

#### (B) With CONSULT

- 1. Turn ignition switch OFF.
- 2. Remove fuel tank. Refer to FL-11, "Exploded View".
- 3. Drain fuel from the tank as per the following:
- Remove fuel feed hose located on the fuel gauge retainer. Refer to EM-49, "Exploded View".
- 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.
- Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
- 5. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
- Connect vacuum pump to hose end.
- Remove fuel gauge retainer with fuel gauge unit.

#### Always replace O-ring with new one.

- Turn fuel tank upside down.
- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-11, "Exploded View"</u>.

### EC-462

< DTC/CIRCUIT DIAGNOSIS >

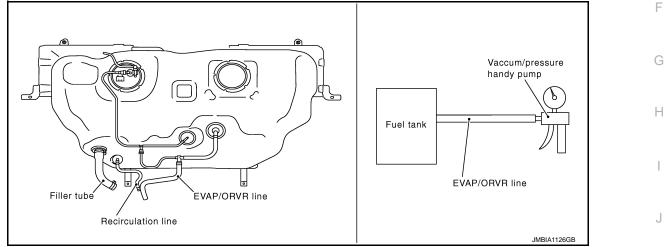
## **3.**CHECK REFUELING EVAP VAPOR CUT VALVE

#### Without CONSULT

- Turn ignition switch OFF. 1.
- 2. Remove fuel tank. Refer to FL-11, "Exploded View".
- 3. Drain fuel from the tank as per the following:
- Remove fuel gauge retainer. -
- Drain fuel from the tank using a handy pump into a fuel container.
- 4. Check refueling EVAP vapor cut valve for being stuck to close as per the following. Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
- 5. Check refueling EVAP vapor cut valve for being stuck to open as per the following.
- Connect vacuum pump to hose end.
- Remove fuel gauge retainer with fuel gauge unit.

#### Always replace O-ring with new one.

- Turn fuel tank upside down.
- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>3</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-11, "Exploded View". А

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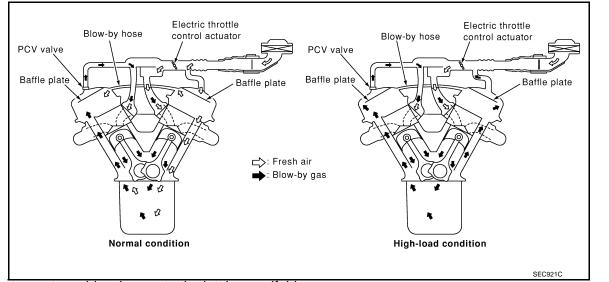
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#### < DTC/CIRCUIT DIAGNOSIS >

## POSITIVE CRANKCASE VENTILATION

### Description



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

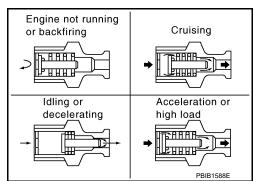
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is drawn from the air inlet tubes into the crankcase. In this process the air passes through

the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



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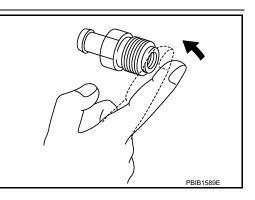
### **Component Inspection**

### **1.**CHECK PCV VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace PCV valve. Refer to .<u>EM-54, "Exploded View"</u>



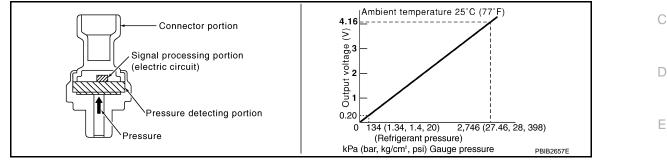
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#### < DTC/CIRCUIT DIAGNOSIS >

## REFRIGERANT PRESSURE SENSOR

### Description

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



### **Component Function Check**

## INFOID:000000009720235

1.CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn A/C switch and blower fan switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			-	
Connector	+	-	Voltage (V)		
Connector	Terminal	Terminal			
F8	39 (Refrigerant pressure sensor signal)	40 (Sensor ground)	1.0 - 4.0	-	J
YES >> I	<u>ion result normal?</u> NSPECTION END So to <u>EC-465, "Diagnosis Procedu</u> Procedure	<u>ire"</u> .		INFOID:000000009720236	K
	ROUND CONNECTION				L
<ol> <li>Turn ignit</li> <li>Check group</li> </ol>	switch and blower fan switch OF ion switch OFF. ound connection E38. Refer to G ion result normal?		n <u>GI-47, "Circu</u>	iit Inspection".	M
YES >> G NO >> R	GO TO 2. Repair or replace ground connection EFRIGERANT PRESSURE SEN			r	Ν
1. Disconne 2. Turn ignit	ct refrigerant pressure sensor ha ion switch ON. e voltage between refrigerant pre	rness connector.			0
Refrigeran	t pressure sensor Ground	Voltage (V)	-		Ρ

<u> </u>		Ground Voltage		
Connector	Terminal	Ground	voltage (v)	
E300	1	Ground	Approx. 5	
	14 10			

Is the inspection result normal?

YES >> GO TO 4.

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### **REFRIGERANT PRESSURE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

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## 3. DETECT MALFUNCTIONING PART

#### Check the following.

- Harness connectors F123, E6
- IPDM E/R harness connectors E10, E346
- Harness for open or short between ECM and refrigerant pressure sensor

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

### 4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E300	3	F8	40	Existed

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

Is the inspection result normal?

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

**5.**DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F123, E6

• IPDM E/R harness connectors E10, E346

• Harness for open or short between ECM and refrigerant pressure sensor

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

#### $\mathbf{6}$ . CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E300	2	F8	39	Existed

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

Is the inspection result normal?

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

#### 7. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F123, E6

IPDM E/R harness connectors E10, E346

• Harness for open or short between ECM and refrigerant pressure sensor

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

#### **8.**CHECK INTERMITTENT INCIDENT

Refer to <u>GI-44</u>, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace refrigerant pressure sensor. Refer to <u>HA-54, "Exploded View"</u>.

### EC-466

## **REFRIGERANT PRESSURE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

### NO >> Repair or replace malfunctioning part.

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#### < DTC/CIRCUIT DIAGNOSIS >

## VARIABLE INDUCTION AIR SYSTEM

### Description

Power Valves 1 and 2

The power valves 1 and 2 are installed in intake manifold collector and used to control the suction passage of the variable induction air control system. They are set in the fully closed or fully opened position by the power valve actuators 1 and 2 operated by the vacuum stored in the vacuum tank. The vacuum to power valve actuators is controlled by the VIAS control solenoid valves 1 and 2.

### Component Function Check

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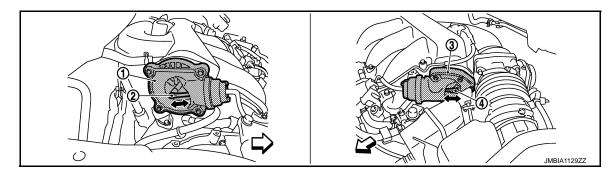
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## 1.CHECK OVERALL FUNCTION-I

#### With CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT.
- 3. Turn VIAS control solenoid valve 1 "ON" and "OFF", and check that power valve actuator 1 rod moves.



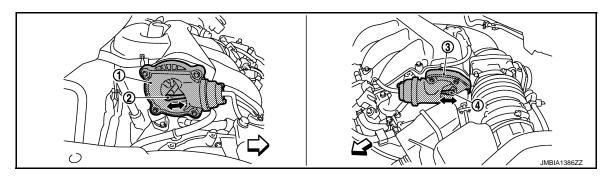
- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- Power valve actuator 2

3.

- 4. Power valve actuator 2 rod
- : Vehicle front

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Rev engine quickly up to approximately 5,000 rpm.
- 3. Check that power valve actuator 1 rod moves.



- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- Power valve actuator 2

- 4. Power valve actuator 2 rod
- C : Vehicle front

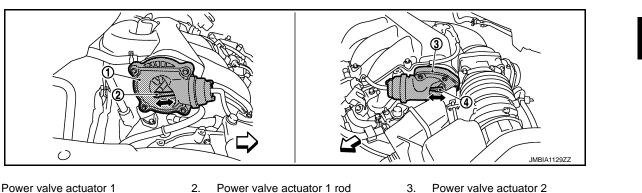
#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> <u>EC-469, "Diagnosis Procedure"</u>.
- 2.CHECK OVERALL FUNCTION-II
- With CONSULT

# VARIABLE INDUCTION AIR SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

- Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT. 1.
- 2. Turn VIAS control solenoid valve 2 "ON" and "OFF", and check that power valve actuator 2 rod moves.

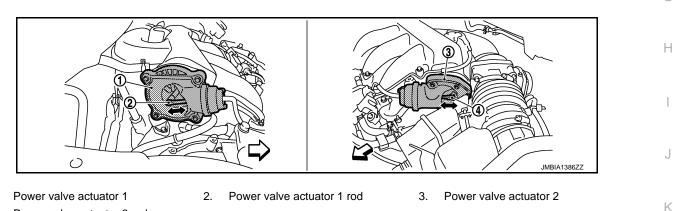


3.

- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- Power valve actuator 2 rod 4.
- : Vehicle front

#### **Without CONSULT**

- When revving engine up to 5,000 rpm quickly. 1
- Rev engine quickly up to approximately 5,000 rpm. 2.
- Check that power valve actuator 2 rod moves. 3.



- Power valve actuator 2 rod
- : Vehicle front  $\triangleleft$

1.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> EC-469, "Diagnosis Procedure".

## **Diagnosis Procedure**

#### **1.**INSPECTION START

Confirm the malfunctioning system (power valve 1 or power valve 2). Refer to EC-468, "Component Function Check".

Which system is related to the incident?

Power valve 1>>GO TO 2. Power valve 2>>GO TO 6.

**2.**CHECK VACUUM EXISTENCE-I

#### (P) With CONSULT

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
- Start engine and let it idle. 2.
- Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT. 3.
- 4. Turn VIAS control solenoid valve 1 ON and OFF, and check vacuum existence under the following conditions.

# **EC-469**

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# VARIABLE INDUCTION AIR SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

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VIAS S/V-1	Vacuum
ON	Existed
OFF	Not existed

#### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Vacuum
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

#### Is the inspection result normal?

YES >> Repair or replace power valve actuator 1. Refer to <u>EC-36, "Component Parts Location"</u>. NO >> GO TO 3.

# 3. CHECK VACUUM TANK

- 1. Stop engine and disconnect vacuum hose connected to intake manifold collector.
- 2. Start engine and let it idle.
- 3. Check vacuum existence from intake manifold collector.

Does vacuum existence from the intake manifold collector?

YES >> GO TO 4.

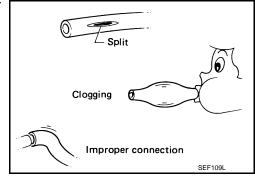
NO >> Replace intake manifold collector. Refer to EM-33, "Exploded View".

#### **4.**CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-110, "System Diagram"</u>.

#### Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair hoses or tubes.



## 5. CHECK VIAS CONTROL SOLENOID VALVE 1

#### Refer to EC-395, "Component Inspection".

#### Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace VIAS control solenoid valve 1. Refer to EM-33, "Exploded View".

#### **6.**CHECK VACUUM EXISTENCE-II

#### (I) With CONSULT

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Start engine and let it idle.
- 3. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- Turn VIAS control solenoid valve 2 ON and OFF, and check vacuum existence under the following conditions.

# VARIABLE INDUCTION AIR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

VIAS S/V 2	Vacuum
ON	Existed
OFF	Not existed

#### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Operation
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

#### Is the inspection result normal?

YES >> Repair or replace power valve actuator 2. Refer to <u>EC-36, "Component Parts Location"</u>. NO >> GO TO 7.

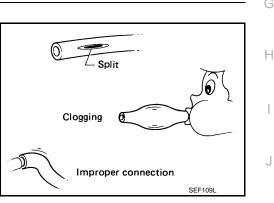
## 7. CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-110, "System Diagram"</u>.

#### Is the inspection result normal?

1ES >> GU   U o.	YES	>> GO	TO 8.
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NO >> Repair hoses or tubes.



8. CHECK VIAS CONTROL SOLENOID VALVE 2	K
Refer to EC-398, "Component Inspection".	
Is the inspection result normal?	
YES >> GO TO 9.	L
NO >> Replace VIAS control solenoid valve 2. Refer to <u>EM-33</u> , "Exploded View".	
9. CHECK INTERMITTENT INCIDENT	1
Refer to <u>GI-44, "Intermittent Incident"</u> .	VI

>> INSPECTION END

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# ECU DIAGNOSIS INFORMATION ECM

Reference Value

INFOID:000000009720240

[VQ35DE]

#### VALUES ON THE DIAGNOSIS TOOL

#### NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that ECM receives/transmits and may differ from actual operations. Example:

The ignition timing shown by the timing light may differ from the ignition timing displayed on the data monitor. This occurs because the timing light shows a value calculated by ECM according to signals received from the cam shaft position sensor and other sensors related to ignition timing.

For outlines of following items, refer to EC-129, "CONSULT Function".

Monitor Item	Condition		Values/Status	
ENG SPEED	Run engine and compare CONSULT value with the tachometer indication.		Almost the same speed as the tachometer indication.	
MAS A/F SE-B1	See EC-140, "Description".		I	
B/FUEL SCHDL	See EC-140, "Description".			
A/F ALPHA-B1	See EC-140, "Description".			
A/F ALPHA-B2	See EC-140, "Description".	See EC-140, "Description".		
COOLANT TEMP/S	Engine: After warming up		More than 70°C (158°F)	
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V	
A/F SEN1 (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V	
HO2S2 (B1)	<ul> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V	
HO2S2 (B2)	<ul> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V	
HO2S2 MNTR (B1)	<ul> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		LEAN ←→ RICH	
HO2S2 MNTR (B2)	<ul> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		$LEAN \leftarrow \rightarrow RICH$	
VHCL SPEED SE	• Turn drive wheels and compare CONSULT value with the speedometer indi- cation.		Almost the same speed as speedometer indication	
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14 V	
	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V	
ACCEL SEN 1	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8 V	
	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V	
ACCEL SEN 2*1	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8 V	

## < ECU DIAGNOSIS INFORMATION >

Monitor Item	C	ondition	Values/Status	
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V	/
TP SEN 1-B1	<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V	
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V	E
TP SEN 2-B1* <sup>1</sup>	<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V	
FUEL T/TMP SE	Ignition switch: ON		Indicates fuel tank tempera- ture	(
INT/A TEMP SE	Ignition switch: ON		Indicates intake air tempera- ture	,
EVAP SYS PRES	Ignition switch: ON		Approx. 1.8 - 4.8 V	
FUEL LEVEL SE	Ignition switch: ON		Depending on fuel level of	
START SIGNAL	• Ignition switch: $ON \rightarrow START \rightarrow O$		fuel tank OFF $\rightarrow$ ON $\rightarrow$ OFF	
	Ignition switch: ON	Accelerator pedal: Fully released	ON	
CLSD THL POS	(Engine stopped)	Accelerator pedal: Slightly depressed	OFF	ľ
		Air conditioner switch: OFF	OFF	
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates.)	ON	(
		Selector lever: P or N position	ON	
P/N POSI SW	Ignition switch: ON	Selector lever: Except above position	OFF	
	Engine: After warming up, idle the	Steering wheel: Not being turned	OFF	
PW/ST SIGNAL	engine	Steering wheel: Being turned	ON	
		Rear window defogger switch: ON		
		and/or	ON	
LOAD SIGNAL	Ignition switch: ON	Lighting switch: 2nd position Rear window defogger switch and lighting		
		switch: OFF	OFF	
IGNITION SW	• Ignition switch: $ON \rightarrow OFF \rightarrow ON$	-	$ON\toOFF\toON$	
HEATER FAN SW	• Engine: After warming up, idle the	Heater fan switch: ON	ON	
HEATER TAN SW	engine	Heater fan switch: OFF	OFF	
BRAKE SW	Ignition switch: ON	Brake pedal: Fully released	OFF	
BIARE SW		Brake pedal: Slightly depressed	ON	
	Engine: After warming up	ldle	2.0 - 3.0 msec	
INJ PULSE-B1	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec	
	Engine: After warming up	Idle	2.0 - 3.0 msec	
INJ PULSE-B2	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec	
	Engine: After warming up	ldle	7 - 17°BTDC	
IGN TIMING	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	25 - 45°BTDC	
	Engine: After warming up	ldle	5 - 35%	
CAL/LD VALUE	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	5 - 35%	
	Engine: After warming up	Idle	2.0 - 6.0 g/s	
MASS AIRFLOW	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	7.0 - 20.0 g/s	

## < ECU DIAGNOSIS INFORMATION >

Monitor Item	С	ondition	Values/Status
PURG VOL C/V	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> </ul>	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%
	No load	2,000 rpm	_
	Engine: After warming up	Idle	–5 - 5°CA
INT/V TIM (B1)	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	–5 - 5°CA
INT/V TIM (B2)	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	0 - 2%
INT/V SOL (B1)	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	Approx. 0 - 50%
	Engine: After warming up	Idle	0 - 2%
INT/V SOL (B2)	<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	Approx. 0 - 50%
VIAS S/V-1	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	When revving engine up to 5,000 rpm quickly	$OFF \rightarrow ON \rightarrow OFF$
VIAS S/V-2	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	When revving engine up to 5,000 rpm quickly	$OFF \rightarrow ON \rightarrow OFF$
	Air conditioner switch: OFF	OFF	
AIR COND RLY	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates)	ON
ENGINE MOUNT	Engine: After warming up	Idle (With vehicle stopped)	IDLE
	Engine: After warming up     Except above conditions		TRVL
FUEL PUMP RLY	<ul><li>For 1 second after turning ignition</li><li>Engine running or cranking</li></ul>	switch: ON	ON
	Except above		OFF
VENT CONT/V	Ignition switch: ON		OFF
THRTL RELAY	Ignition switch: ON		ON
		Engine coolant temperature: 97°C (206°F) or less	OFF
COOLING FAN	Engine: After warming up, idle the engine	Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
	Air conditioner switch: OFF	Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	MID
		Engine coolant temperature: 105°C (221°F) or more	н
HO2S2 HTR (B1)	<ul> <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
	• Engine speed: Above 3,600 rpm		OFF

## < ECU DIAGNOSIS INFORMATION >

Monitor Item	C	ondition	Values/Status
HO2S2 HTR (B2)	<ul> <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
	Engine speed: Above 3,600 rpm		OFF
I/P PULLY SPD	Vehicle speed: More than 20 km/h	n (12 MPH)	Almost the same speed as the tachometer indication
VEHICLE SPEED	• Turn drive wheels and compare C cation.	ONSULT value with the speedometer indi-	Almost the same speed as the speedometer indication
IDL A/V LEARN	Engine: Running	Idle air volume learning has not been per- formed yet.	YET
		Idle air volume learning has already been performed successfully.	CMPLT
ENG OIL TEMP	Engine: After warming up		More than 70°C (158°F)
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has illumi- nated.	0 - 65,535 km (0 - 40,723 miles)
A/F S1 HTR (B1)	Engine: After warming up, idle the (More than 140 seconds after star		4 - 100%
A/F S1 HTR (B2)	Engine: After warming up, idle the (More than 140 seconds after star		4 - 100%
AC PRESS SEN	<ul><li>Engine: Idle</li><li>Both A/C switch and blower fan switch: ON (Compressor operates)</li></ul>		1.0 - 4.0 V
VHCL SPEED SE			Almost the same speed as the speedometer indication
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 OW		CANCEL switch: Released	OFF
		RESUME/ACCELERATE switch: Pressed	ON
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Re- leased	OFF
SET SW	Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1	<ul> <li>Ignition switch: ON</li> </ul>	Brake pedal: Fully released	ON
(ASCD brake switch)	<ul> <li>Ignition switch: ON</li> </ul>	Brake pedal: Slightly depressed	OFF
BRAKE SW2	- Invitien entitely ON	Brake pedal: Fully released	OFF
(Stop lamp switch)	<ul> <li>Ignition switch: ON</li> </ul>	Brake pedal: Slightly depressed	ON
VHCL SPD CUT	Ignition switch: ON	1	NON
LO SPEED CUT	Ignition switch: ON		NON
AT OD MONITOR	Ignition switch: ON		OFF
AT OD CANCEL	Ignition switch: ON		OFF
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at the 1st time $\rightarrow$ at the 2nd time	$ON \rightarrow OFF$
	MAIN switch: ON	ASCD: Operating	ON
SET LAMP	• When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Not operating	OFF

#### < ECU DIAGNOSIS INFORMATION >

Monitor Item	Condition	Values/Status
ALT DUTY	Engine: Idle	0 - 80%
A/F ADJ-B1	Engine: Running	-0.330 - 0.330
A/F ADJ-B2	Engine: Running	-0.330 - 0.330
BAT CUR SEN	<ul> <li>Engine speed: Idle</li> <li>Battery: Fully charged*<sup>2</sup></li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Approx. 2,600 - 3,500 mV
ALT DUTY SIG	Power generation voltage variable control: Operating	ON
ALI DOTT OIG	Power generation voltage variable control: Not operating	OFF
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
1102 32 DIAGT (DT)	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
	DTC P0159 self-diagnosis (delayed response) is incomplete.	INCMP
HO2 S2 DIAG1 (B2)	DTC P0159 self-diagnosis (delayed response) is complete.	CMPLT
	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
	DTC P0159 self-diagnosis (slow response) is incomplete.	INCMP
HO2 S2 DIAG2 (B2)	DTC P0159 self-diagnosis (slow response) is complete.	CMPLT
A/F SEN1 DIAG1	DTC P015A and P015B self-diagnosis is incomplete.	INCMP
(B1)	DTC P015A and P015B self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG1	DTC P015C and P015D self-diagnosis is incomplete.	INCMP
(B2)	DTC P015C and P015D self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG2	DTC P014C and P014D self-diagnosis is incomplete.	INCMP
(B1)	DTC P014C and P014D self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG2	DTC P014E and P014F self-diagnosis is incomplete.	INCMP
(B2)	DTC P014E and P014F self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG3	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.	ABSNT
(B1)	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.	PRSNT
A/F SEN1 DIAG3	The vehicle condition is not within the diagnosis range of DTC P014E, P014F, P015C or P015D.	ABSNT
(B2)	The vehicle condition is within the diagnosis range of DTC P014E, P014F, P015C or P015D.	PRSNT
THRTL STK CNT B1 <sup>*3</sup>	_	_
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.
A/F-S ATMSPHRC CRCT B1	Engine: After warming up, idle the engine	Varies depending on vehicle environment.
A/F-S ATMSPHRC CRCT B2	Engine: After warming up, idle the engine	Varies depending on vehicle environment.
A/F-S ATMSPHRC CRCT UP B1	Engine: Running	Varies depending on the number of updates.
A/F-S ATMSPHRC CRCT UP B2	Engine: Running	Varies depending on the number of updates.

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

А

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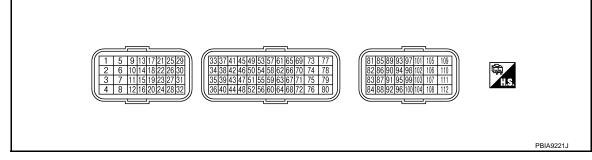
F

\*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-3, "How to</u> <u>Handle Battery"</u>.

\*3: The item is indicated, but not used.

#### TERMINAL LAYOUT



#### PHYSICAL VALUES

#### NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values.
- Pulse signal is measured by CONSULT.

Termin	al No.	Description			Value	Н	
+		Signal name	Input/ Output	Condition	(Approx.)		
1 (P/B)		Fuel injector No. 6			BATTERY VOLTAGE (11 - 14 V)★	I	
3 (L/W)		Fuel injector No. 5		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> </ul>	50mSec/div	J	
29 (LG/R)	112	Fuel injector No. 4		NOTE: The pulse cycle changes de- pending on rpm at idle	10V/div JMBIA0047GB	K	
30 (R/Y)	(B)	Fuel injector No. 3	Output		BATTERY VOLTAGE (11 - 14 V)★	L	
31 (R/W)		Fuel injector No. 2		[Engine is running] <ul> <li>Warm-up condition</li> </ul>	50mSec/div		
32 (R/B)		Fuel injector No. 1			Engine speed: 2,000 rpm	f and a straight and	M
2 (G/W)	112 (B)	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)		
4 (BR/Y)	112 (B)	A/F sensor 1 heater (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div JMBIA0902GB	P	

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
5	112	Throttle control motor (Open)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div
(L)	(B)			<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div JMBIA0032GB
6 (P)	112 (B)	Throttle control motor (Close)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div
8 (SB)	112 (B)	A/F sensor 1 heater (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div
9 (L/B)		Ignition signal No. 3			0 - 0.2 V★ 50mSec/div
10 (G/R)		Ignition signal No. 2		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes de-</li> </ul>	
11 (Y/R)	112	Ignition signal No. 1		pending on rpm at idle	2V/div JMBIA0035GB
18 (GR/R)	(B)	Ignition signal No. 6	Output		0.1 - 0.4 V★ 50mSec/div
19 (P)		Ignition signal No. 5		[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	
21 (W)		Ignition signal No. 4			2V/div JMBIA0036GB
12 (B)		ECM ground	_	_	

#### < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

Termin	al No.	Description			Value	0
+		Signal name	Input/ Output	Condition	(Approx.)	А
13 (P/B)	112 (B)	Heated oxygen sensor 2 heat- er (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following condi- tions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed be- tween 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div	EC C
				<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	Е
14 (GR)	112 (B)	Fuel pump relay	Output	<ul> <li>[Ignition switch: ON]</li> <li>For 1 second after turning ignition switch ON</li> <li>[Engine is running]</li> </ul>	0 - 1.5 V	F
(GR)	(В)		Output	<ul><li>[Ignition switch: ON]</li><li>More than 1 second after turning ignition switch ON</li></ul>	BATTERY VOLTAGE (11 - 14 V)	G
15 (O)	112 (B)	Throttle control motor relay	Output	[Ignition switch: $ON \rightarrow OFF$ ]	0 - 1.0 V $\rightarrow$ BATTERY VOLTAGE (11 - 14 V) $\rightarrow$ 0 V	Н
	( )			[Ignition switch: ON]	0 - 1.0 V	
16 (B/Y)		ECM ground	—	_	_	
17 (R)	112 (B)	Heated oxygen sensor 2 heat- er (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div 50mSec/div 5V/div JMBIA0902GB	J
				<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	L
24 (W/B)	112 (B)	ECM relay (Self shut-off)	Output	<ul><li>[Engine is running]</li><li>[Ignition switch: OFF]</li><li>A few seconds after turning ignition switch OFF</li></ul>	0 - 1.5 V	Ν
(				<ul><li>[Ignition switch: OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)	0

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#### < ECU DIAGNOSIS INFORMATION >

Termina	al No.	Description			Value
+		Signal name	Input/ Output	Condition	Value (Approx.)
25	112	EVAP canister purge volume	Output	<ul> <li>[Engine is running]</li> <li>Idle speed</li> <li>Accelerator pedal: Not depressed even slightly, after engine starting</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div ⊊ 10V/div JMBIA0039GB
(P/L)	(B)	control solenoid valve	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: approximately 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0040GB
26 (GR/B)	112 (B)	VIAS control solenoid valve 2	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>When revving engine up to 5,000 rpm quickly</li> </ul>	BATTERY VOLTAGE (11 - 14 V) BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓
27 (V)	112 (B)	VIAS control solenoid valve 1	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>When revving engine up to 5,000 rpm quickly</li> </ul>	BATTERY VOLTAGE (11 - 14 V) BATTERY VOLTAGE (11 - 14 V) BATTERY VOLTAGE (11 - 14 V) $\downarrow$ 0 - 1.0 V $\downarrow$ BATTERY VOLTAGE (11 - 14 V)
28 (BR/W)	112 (B)	Electronic controlled engine mount control solenoid valve	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: For 2 seconds after reaching 950 rpm or less</li> <li>[Engine is running]</li> <li>Engine speed: After a lapse of 2 seconds after reaching 950 rpm or less</li> <li>[Engine is running]</li> <li>Engine speed: 950 rpm or more</li> </ul>	0 - 1.0 V 2.0 - 3.0 V BATTERY VOLTAGE (11 - 14 V)
33 (W)	112 (B)	Heated oxygen sensor 2 (bank 1)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	Value (Approx.)	Α
34 (W/L)	112 (B)	Heated oxygen sensor 2 (bank 2)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V	
35 (B)	—	Sensor ground (Heated oxygen sensor 2)	—	_	_	
36 (B)	_	Sensor ground (Throttle position sensor)	_	_	_	E
37	112	Throttle position sensor 1	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	More than 0.36 V	F
(W) (B) (B)	mput	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	Less than 4.75 V	C F		
38 (P)	112 (P)	Throttle position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Selector lever: D position • Accelerator pedal: Fully re- leased	Less than 4.75 V	I
(R)	(B)			<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	More than 0.36 V	ŀ
39 (R)	40 (G)	Refrigerant pressure sensor	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Both A/C switch and blower fan motor switch: ON (Com- pressor operates)</li> </ul>	1.0 - 4.0 V	I
40 (G)		Sensor ground (Refrigerant pressure sensor)	_	_	_	N
41 (O/B)	48 (B/P)	Power steering pressure sen- sor	Output	<ul> <li>[Engine is running]</li> <li>Steering wheel: Being turned</li> <li>[Engine is running]</li> <li>Steering wheel: Not being turned</li> </ul>	0.5 - 4.5 V 0.4 - 0.8 V	Γ
42 (BR)	44 (G/B)	Battery current sensor	Input	[Engine is running] • Battery: Fully charged* <sup>2</sup> • Idle speed	2.6 - 3.5 V	(
44 (G/B)	_	Sensor ground (Battery current sensor)	_	_	_	F
45 (P)	49 (L)	A/F sensor 1 (bank 1)	Input	[Ignition switch: ON]	2.2 V	
46 (Y)	52 (B/R)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.	

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	Value (Approx.)
47 (G)	36 (B)	Sensor power supply (Throttle position sensor)	_	[Ignition switch: ON]	5 V
48 (B/P)	_	Sensor ground (Power steering pressure sensor)	_	_	_
49 (L)	112 (B)	A/F sensor 1 (bank 1)	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	1.8 V Output voltage varies with air fuel ratio.
50 (L/Y)	56 (G/B)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.
51 (R/Y)	44 (G/B)	Sensor power supply (Battery current sensor)		[Ignition switch: ON]	5 V
52 (B/R)		Sensor ground (Engine coolant temperature sensor/Engine oil tempera- ture sensor)	_	_	_
53 (V)	57 (LG)	A/F sensor 1 (bank 2)	Input	[Ignition switch: ON]	2.2 V
54 (G)	52 (B/R)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine oil temperature.
55 (SB)	48 (Y)	Sensor power supply (Power steering pressure sensor)	_	[Ignition switch: ON]	5 V
56 (G/B)	_	Sensor ground (Mass air flow sensor/Intake air temperature sensor)	_	_	_
57 (LG)	112 (B)	A/F sensor 1 (bank 2)	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	1.8 V Output voltage varies with air fuel ratio.
58	56	Maga oir flow oppoor	Input	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V
(O)	(G/B)	Mass air flow sensor	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,500 rpm</li></ul>	1.6 - 1.9 V
59 (G/W)	64 (B/R)	Sensor power supply [Camshaft position sensor (PHASE) (bank 1)]	_	[Ignition switch: ON]	5 V
60 (Y/B)	_	Sensor ground [Crankshaft position sensor (POS)]	_	_	_
61 (B)	67 (—)	Knock sensor (bank 1)	Input	[Engine is running] • Idle speed	2.5 V*1
62 (W)	67 (—)	Knock sensor (bank 2)	Input	[Engine is running] • Idle speed	2.5 V*1
63 (R/W)	68 (Y/G)	Sensor power supply [Camshaft position sensor (PHASE) (bank 2)]	_	[Ignition switch: ON]	5 V
64 (B/R)		Sensor ground [Camshaft position sensor (PHASE) (bank 1)]	_	_	-

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value	0
+		Signal name	Input/ Output	Condition	(Approx.)	A
65	60	Crankshaft position sensor		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	4.0 - 5.0 V★ 1mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	EC C
(W/B)	(Y/B)	(POS)	Input	[Engine is running] • Engine speed: 2,000 rpm	4.0 - 5.0 V★ 1mSec/div 2V/div JMBIA0042GB	E
67 (—)	_	Sensor ground (Knock sensor)	_	_	_	G
68 (Y/G)	_	Sensor ground [Camshaft position sensor (PHASE) (bank 2)]	_	_	_	Н
	Camshaft position sensor (PHASE) (bank 2)	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	3.0 - 5.0 V★ 20mSec/div 20mSec/div 20mSec/div 20mSec/div 3.0 - 5.0 V★	J	
				[Engine is running] • Engine speed is 2,000 rpm	20mSec/div	K L M
70	64	Camshaft position sensor		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	3.0 - 5.0 V★ 20mSec/div 	N
(W/R)	64 (B/R)	Camshaft position sensor (PHASE) (bank 1)	Input	[Engine is running] • Engine speed is 2,000 rpm	3.0 - 5.0 V★ 20mSec/div 20mSec/div 20mSec/div 20mSec/div 20mSec/div	Ρ

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	Value (Approx.)
72 (BR/W)	40 (G)	Sensor power supply (Refrigerant pressure sensor)	_	[Ignition switch: ON]	5 V
				<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	BATTERY VOLTAGE (11 - 14 V)
75 (Y)	112 (B)	Intake valve timing control so- lenoid valve (bank 2)	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	7 - 12 V★
76 (R/G)	60 (Y/B)	Sensor power supply [Crankshaft position sensor (POS)]	—	[Ignition switch: ON]	5 V
77 (W/L)	112 (B)	Power supply for ECM (Back- up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
	112 (B)	Intake valve timing control so- lenoid valve (bank 1)	Output	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	7 - 12 V★
81 (W)	81 84 Accelerator pedal position (W) (B) sensor 1	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Accelerator pedal: Fully released</li> <li>[Ignition switch: ON]</li> </ul>	0.5 - 1.0 V	
				<ul> <li>Engine stopped</li> <li>Accelerator pedal: Fully depressed</li> </ul>	4.2 - 4.8 V
82	100	Accelerator pedal position sensor 2	Input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.25 - 0.50 V
(O)	(G)		mput	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	2.0 - 2.5 V
83 (BR)	84 (B)	Sensor power supply (Accelerator pedal position sensor 1)	_	[Ignition switch: ON]	5 V
84 (B)		Sensor ground (Accelerator pedal position sensor 1)	_	_	_

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description				
+		Signal name	Input/ Output	Condition	Value (Approx.)	A
				[Ignition switch: ON] • ASCD steering switch: OFF	4 V	EC
				[Ignition switch: ON] • MAIN switch: Pressed	0 V	С
85 (Y)	92 (BR)	ASCD steering switch	Input	[Ignition switch: ON] • CANCEL switch: Pressed	1 V	C
				<ul><li>[Ignition switch: ON]</li><li>RESUME/ACCELERATE switch: Pressed</li></ul>	3 V	D
				[Ignition switch: ON] • SET/COAST switch: Pressed	2 V	E
86 (SB)	96 (GR)	EVAP control system pres- sure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V	
87 (GR)	100 (G)	Sensor power supply (Accelerator pedal position sensor 2)	_	[Ignition switch: ON]	5 V	F
88 (O)	_	Data link connector	Input/ Output	_	_	G
91 (L)	96 (GR)	Sensor power supply (EVAP control system pres- sure sensor)	_	[Ignition switch: ON]	5 V	Н
92 (BR)	_	Sensor ground (ASCD steering switch)	_	_	_	
93	112	Ignition switch	Input	[Ignition switch: OFF]	0 V BATTERY VOLTAGE	
(BR)	(B)			[Ignition switch: ON]	(11 - 14 V)	J
94	112	Engine speed output signal	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes depending on rpm at idle</li> </ul>	1 V★ 10mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	K
(GR)	(B)		Cutput	[Engine is running] • Engine speed: 2,000 rpm	1 V★ 10mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	M
95 (Y)	104 (SB)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.	0
96 (GR)	_	Sensor ground (EVAP control system pres- sure sensor)	_	_	_	Ρ
97 (P)	_	CAN communication line (CAN-L)	Input/ Output	_	_	
98 (L)	_	CAN communication line (CAN-H)	Input/ Output	_	_	

#### < ECU DIAGNOSIS INFORMATION >

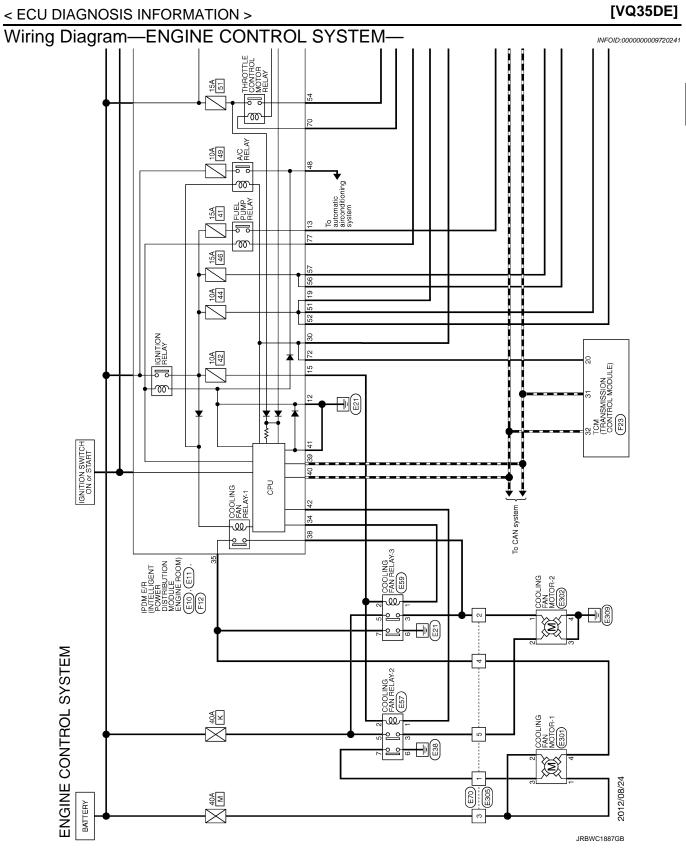
[VQ35DE]

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
100 (G)	_	Sensor ground (Accelerator pedal position sensor 2)	_	_	_
102 (R)	112 (B)	PNP signal	Input	<ul> <li>[Ignition switch: ON]</li> <li>Selector lever: P or N position</li> <li>[Ignition switch: ON]</li> <li>Selector lever: Except above</li> </ul>	BATTERY VOLTAGE (11 - 14 V)
				position	
104 (SB)		Sensor ground (Fuel tank temperature sen- sor)	_	_	_
105 (V)	112 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
106	112			<ul><li>[Ignition switch: OFF]</li><li>Brake pedal: Fully released</li></ul>	0 V
(SB)	(B)	Stop lamp switch	Input	<ul><li>[Ignition switch: OFF]</li><li>Brake pedal: Slightly depressed</li></ul>	BATTERY VOLTAGE (11 - 14 V)
107 (B) 108 (B)	_	ECM ground	_	_	_
109 (W)	112 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
110 (G)	112 (B)	ASCD brake switch	Input	<ul><li>[Ignition switch: ON]</li><li>Brake pedal: Slightly depressed</li></ul>	0 V
(0)	(B)			[Ignition switch: ON] • Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14 V)
111 (B) 112 (B)	_	ECM ground	_	_	_

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

\*1: This may vary depending on internal resistance of the tester.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-3, "How to Handle Battery"</u>.



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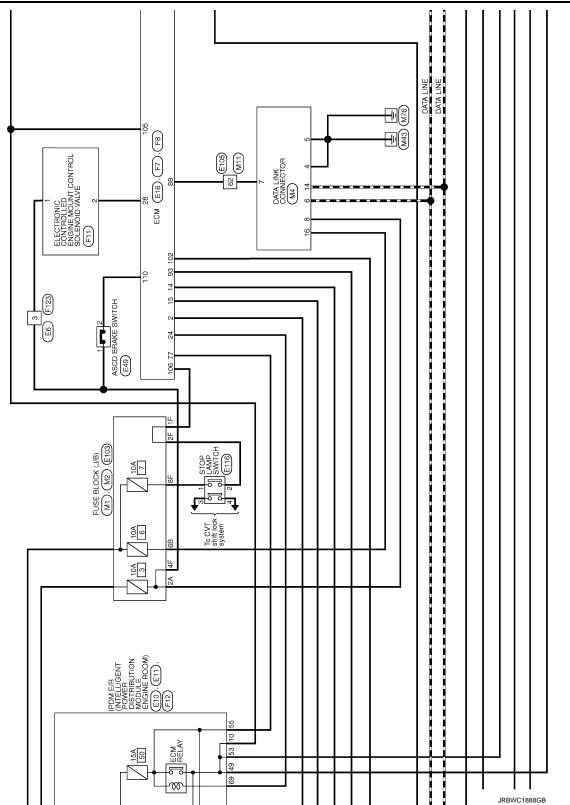
L

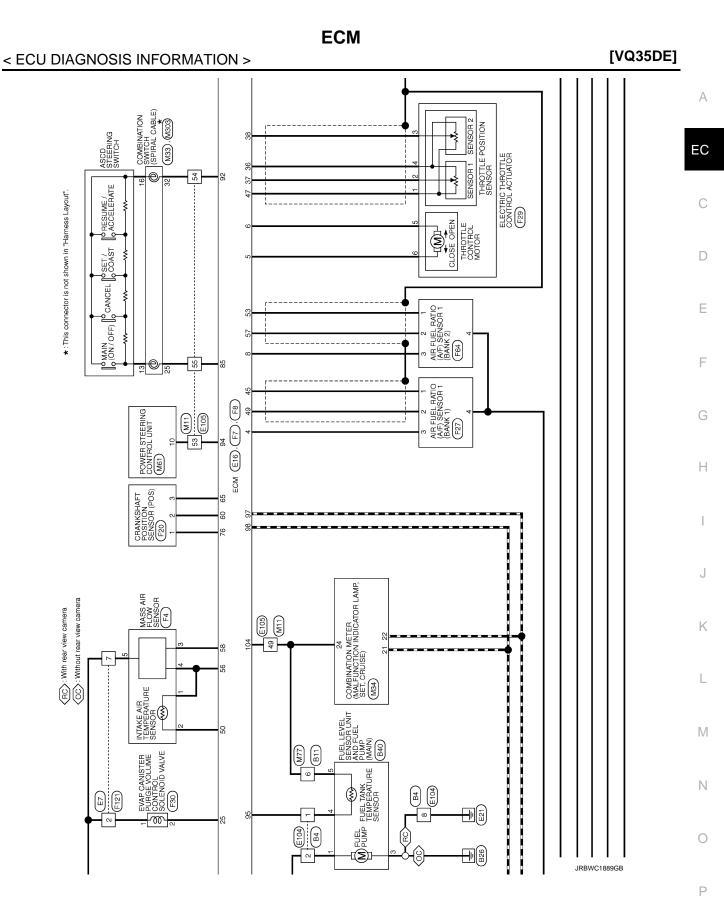
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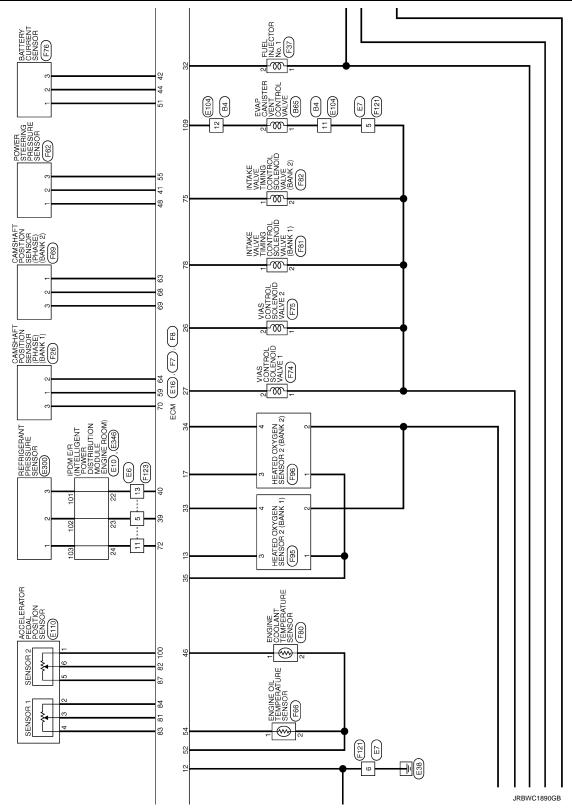
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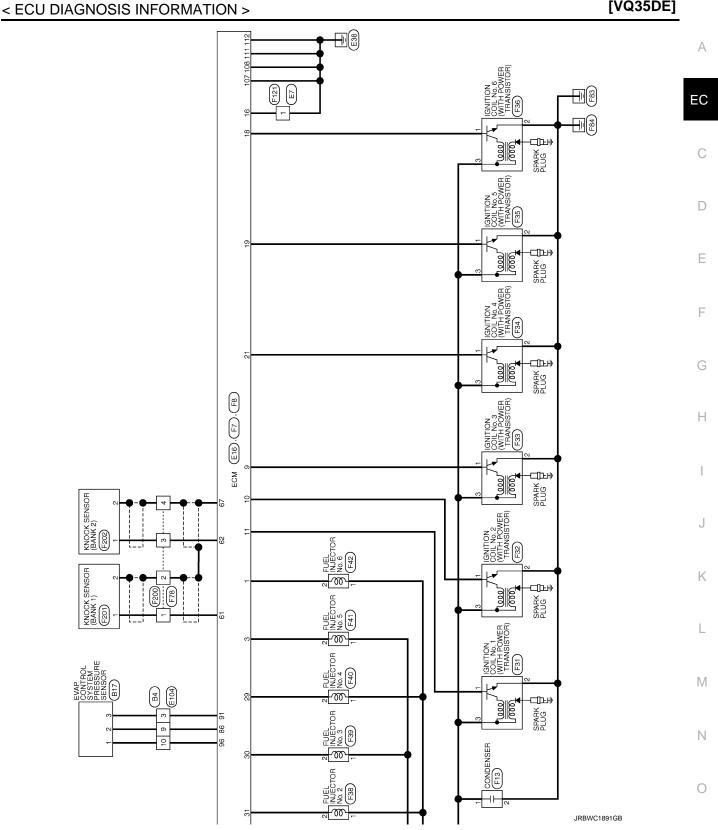




Revision: 2013 August

2014 MURANO





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ENGINE CONTDOL SVSTEM							
	4	R/W		26	•	   	Connector No. B17
	9	٩	1	57		-	
Connector Name WIRE 10 WIRE	~	>	1	58	œ	1	Connector Name EVAP CONTROL SYSTEM PRESSURE SENSOR
Connector Type NS16MW-CS	8	SHIELD	1	59	æ	-	Connector Type E03FGY-RS
ģ	6	BR/L	1	59	SHIELD	-	Q
(Tapata)	<u>0</u>	9//	1	99	œ :	1	(MMM)
H.S. 4 2 2 4 4 5 4 5 4 7	= !	7/1		9	-		
	2 9	- N	10 11	19 19			
8 9 10 11 12 13 14 15 16	2	- 8		70	× ·		
	4 4	Η C		29	2 >		)
	2 9	8 8		5 5	- 6		
Terminal Color Of	9	¥ >		69 92	Ξœ		Terminal Color Of
No. Wire Signal Name [Specification]	<u>8</u>	83	,	99			No. Wire Signal Name [Specification]
┢	19	ď	-	99	>	-	┢
	20	•		67	0	-	2 LG -
	21	ΓC	1	67	ß	•	3 W -
4 R –	22	w	T	68	BR	-	
5 0 -	23	Y		68	ж	-	
6 P -	24	GR	-	69	SHIELD	-	Connector No. B40
7 L –	25	Y	-	70	W/R	-	Connector Name Erici JEVEL SENSOR HALT AND FLICT PUNC
	27	>	-	71	B/R	-	
9 LG –	28	œ	-	72	Y	=	Connector Type E05FGY-RS
10 V –	30	٩		73	ΓC	1	4
11	31	BR		74	SB	1	
12 BR -	32	BR	1	75	-	-	
13 P -	34	SB	-	76	9	-	U
14 BR -	35	SHIELD	1	11	æ	-	((1 2 3 4 5))
15 0 -	36	9	1	79	8	-	
16 G –	37	ΓC	1	80	M	1	
	40	Y	-	81	ж	-	
	41	GR		82	L	-	la O
Connector No. B11	42	g	-	83	BR	-	
Connector Name WIRE TO WIRE	46	σ	1	8	0		1 W -
	46	ΓC	-	85	9	-	2 V =
Connector Type TH80MW-CS19	47	SB	-	86	SB	-	3 B -
	47	>	-	87	œ	-	4 SB –
	48	GR		88	9	-	5 P -
	48	SHIELD	1	68	GR	-	
	49	8	1	96	>	1	
	49	BR		91	σ		
	50	9	1	92	BR	-	
	20	R/W	1	93	9	1	
	51	œ		94	>		
al (	51	R/L		96	BR		
	52	8	1	96	GR	-	
1 SHIELD -	53	Y	1	97	œ	-	
2 B –	54	ΓC	11	88	ΓC		

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al Color Of Wire Wire B B B A J J Color Of B B B C A J J C A B B C A C A C A C A C A C A C A C A	9         Br         Display (Strength of the control o
Connector No.     E7       Connector Name     WRE TO WRE       Connector Type     NS (GMM-CS)       Connector Type     NS (GMM-CS)       Connector Type     NS (GMM-CS)	Terminal         Othor of New         Sgrad Nume (Specification)           10         8         1         1           2         1         1         1         1           2         1         1         1         1         1           2         1         1         1         1         1         1           2         1         1         1         1         1         1         1           1         0         1 </td
ENGINE CONTROL SYSTEM Connector Name Connector Name Connector Name Connector Name Connector Type Connector Type Connector Type Connector Type Connector Name Connector Name Connect	Terminal In:     Color OI New     Signal Nume (Socification)       In:     Vie     Signal Nume (Socification)       In:     Vie     Vie       Connector Name     WE: TO WEE       Connector Name     WE: TO WEE       In:     No       I

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ENGINE CONTROL SYSTEM	Connector No. E70	Connector No.	E104	=	•	,
Connector Name COOI INC EAN DEL AV-2	Commentant Name TO MIDE		WIDE TO MIDE	12		1
				13	Y	1
Connector Type M06FBR-R-LC	Connector Type M06MW-LC	Connector Type	NS16FW-CS	14	0	1
Ó	ģ	ģ		15	BR	1
				20	+	I
	S.	SI		21	+	I
	1 2 3		7 6 5 0 3 2 1	22	۵.	1
- (			16 15 11 12 12 11 10 D 8	5	+	1
6 3	[C] [4]		0 1 7 0 4 10	25	+	I
	]			28	_	
			ſ	29	>	
o Ie		la I	Sienal Name [Snecification]	8	+	I
	No. Wire Using Copromotion	No. Wire	Disconcered and and in the	8	æ	I
- 38	 	+	T	ŝ	+	п
2 G -	2 GR –	2 SB		40	+	I
3 L -	3 BR -	3		47	۵.	
5 Y -	4 P -	4 R	-	48	_	-
6 B -	5 L L	5		49	+	
7 R -		6 P	-	50	GR	-
		7 L	1	51	ΓC	1
	Connector No. E103	8 B/W	1	52	>	1
Connector No. E59	Connector Name	9 SB	1	53	GR	1
Connector Name COOI ING EAN DEL AV-2		10 GR	-	54	BR	
	Connector Type NS16FW-CS	11 R	1	55	>	1
Connector Type M06FBR-R-LC	ģ	12 W	1	56	W/L	1
ģ		13 P	-	60	>	-
		14 V	-	61	BR	-
1 S F 1	4 5	15 Y	-	62	0	-
	11 13 14 15 17 18 19	16 L	-	63		-
2	2			64	SHIELD	-
6 3				99	-	
		Connector No.	E105	67	BR	1
	o Ie	Connector Name	WIRE TO WIRE	68	>	1
al C	No. Wire Opposition to the opposition of the opp			69	SB	-
No. Wire Opposition Coprovince of the	11F G -	Connector Type	TH70MW-CS10-M3	70	_	1
1 0 -	12F V -	4	Q	71	SB	-
2 Y -	1F L -	E	ľ	72	Y	
3 GR -	2F LG -	S i		73		
5 Y -	4F BR -			74	×	1
6 B -	6F Y -			75	BR	-
7 P -	8F R -			76	GR	-
	9F GR -			11	0	1
				78	σ	<ul> <li>[With iPod without navigation system]</li> </ul>
		al C	Signal Name [Snacification]	78	>	<ul> <li>[Without iPod and navigation system]</li> </ul>
		No. Wire	Olyma manus concernant	78	>	<ul> <li>[With navigation system]</li> </ul>
		3	1	<i>51</i>	>	-
		2 FC		8	œ	1

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а илтзаст товае аат W-WH Signal Name (Spr Signal N	С
Connector No.         E348           Connector Name         E348           Connector Name         Rout 51           Signation         Connector Name           Rout 51         Rout 51           Signation         Connector Name           Rout 51         Rout 51           Signation         Connector Name           Rout 51         Rout 51           Signation         Connector Name         Rout 51           Rout 51         Rout 51         Rout 51           Rout 51         Rout 51         Rout 51           Rout 51         Rout 51         Rout 51           Rout 51         Connector Name         Rout 51           Signation 51         Rout 51         Rout 51           Signation 51	D
	E
E32 COOLING FAN MOTOR-2 ISBAGCV-PR Signal Name (Specification) Signal Name (Specification) Signal Name (Specification) Signal Name (Specification)	F
	G
Commetter No.       Commetter Name       Commetter	Н
WIT PRESSURE SEMSOR	I
	J
Connector No.     E300       Connector Name     RE FI       Connector Type     R001       1     0       1     0       1     1	K
Vertical V	L
BIGINE CONTROL SYSTEM       all     one control     all       0     0     0	Μ
ENGINE         Connector No.         E           83         0         Connector No.         E           Connector None         E         Connector No.         E           No.         1         Connector None         E           No.         0         0         0         0           No.         0         0         0         0         0           No.         0         0         0         0         0         0           No.         No.         No.         No.         0	Ν
	0

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Ц	GINE C	ENGINE CONTROL SYSTEM							
Conne	Connector No.	E7	Connector No.	Π	F8	72	BR/W	SENSOR POWER SUPPLY	- 0 12
100	Connector Name	ECM	Connect	Connector Name	FCM	75	Y	INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 2)	72 R/B –
					LOW	76	R/G	SENSOR POWER SUPPLY	75 LG –
Connt	sctor Type	Connector Type RH24FGY-RZ8-R-LH	Connect	Connector Type	RH40FBR-RZ8-L-LH	17	W/L	POWER SUPPLY FOR ECM (BACK-UP)	76 SB –
ļ			Í			78	R/L	INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 1)	77 GR –
B			F						80 B –
	vi	52	HS		33 37 41 45 49 53 57 51 56 59 77 24 15 45 46 50 54 56 55 77 76	Connector No	No.	100	
		2 6 10 14 18 26 30		•	22 23 24 44 23 24 25 25 25 21 41 22	CONTRECTO	NO.		Connector No. 1712
		4 8 12 16 24 28 32			28 40 44 48 22 58 50 54 68 72 78	Connector Name	Name	ELECTRONIC CONTROLLED ENGNE MOUNT CONTROL SOLENOD VALVE	
						Connector Type		E02FBR-RS	Connector Name CONDENSER
						ą			Connector Type M02FW-GY-LC
Terminal	inal Color Of Mire	Of Signal Name [Specification]	Terminal	al Color Of Mira	Signal Name [Specification]	ANT		[	Ð
-	╈	FLEL INJECTOR No. 6	8	Ň	HEATED OXYGEN SENSOR 2 (BANK 1)	H.S.		Ø	
~	0/0	THROTTLE	ŝ	M/F	HEATED OXYGEN SENSOR 2 (BANK 2)			((1 2))	1.3.
"	L/W	+-	35	•	SENSOR GROUND			)	
4	BR/Y	A/F S	36	m	SENSOR GROUND				2
5	-	THROTTLE CONTROL MOTOR (OPEN)	37	W	THROTTLE POSITION SENSOR 1				]
9	۵.	THROTTLE CONTROL MOTOR (CLOSE)	38	œ	THROTTLE POSITION SENSOR 2	Terminal	Color Of	Signal Name [Snerification]	
00	BS	A/F	39	œ	REFRIGERANT PRESSURE SENSOR	No.	Wire		al C
6	ΓB		4	σ	SENSOR GROUND	-	G/R	1	
10	G/R		41	0/B	POWER STEERING PRESSURE SENSOR	2	BR/W	1	1 R/B -
11	Y/R	IGNI	42	BR	BATTERY CURRENT SENSOR				2 B =
12	8	ECM GROUND	44	G/B	SENSOR GROUND				
13	_	HEATED OXY	45	٩	A/F SENSOR 1 (BANK 1)	Connector No.		F12	
14	+	4	46	>	ENGINE COOLANT TEMPERATURE SENSOR	Connector Name		IPOM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE	Connector No. F20
15	┥	THROTTLE	47	σ	SENSOR POWER SUPPLY		- 1	(WDCA)	Connector Name CRANKSHAFT POSITION SENSOR (POS)
<u>۹</u>		+	48	B/P	SENSOR GROUND	Connector Type	' I ype	TH20FW-CS12-M4	- 1
2	+	HEATED 03	49		A/F SENSOR 1 (BANK 1)	đ			Connector Type RH03FB
2 9	ekk GKK	R IGNITION SIGNAL No. 6	B 1	22	INTAKE AIK LEMPERATURE SENSOR	Matta			Į.
2	+	IGNITION SIGNAL NO. 3	5	2 0	CENSOR FOREN SUFFLE	H.S.			
10		1	20					63 76  22	
1 2	╋	FVAD C2	3 2	> c	FNGINE OIL TEMPERATURE SENSOR				
26	┢	⊢	55	es:	SENSOR POWER SLIPPLY		1		
27	┢	L	28	G/B	SENSOR GROUND				)
28	BR/W	ana B	57	D	A/F SENSOR 1 (BANK 2)	Terminal	Color Of		
29	D LG/R	R FUEL INJECTOR No. 4	58	0	MASS AIR FLOW SENSOR	.oN	Wire	Signal Name [Specification]	Terminal Color Of
30	RV		59	G/W	SENSOR POWER SUPPLY	48	w	1	No. Wire Signal Name (Specification)
31	R/W	/ FUEL INJECTOR No. 2	09	Y/B	SENSOR GROUND	49	R/B	1	1 R/G -
32	R/B	FUEL INJECTOR No. 1	61	в	KNOCK SENSOR (BANK 1)	51	ΓC	1	2 Y/B –
			62	w	KNOCK SENSOR (BANK 2)	52	Υ/G	-	3 W/B -
			63	R/W	SENSOR POWER SUPPLY	53	R/W	1	
			64	B/R	SENSOR GROUND	54	G/W	1	
			65	W/B	CRANKSHAFT POSITION SENSOR(POS)	55	W/L	-	
			67	SHIELD	SENSOR GROUND	56	RV	,	

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ser rore fication]	EC
F31     Image: Signal Nume (Specification)       Signal Nume (Specification)     Signal Nume (Specification)       Signal Nume (Specification)     Signal Nume (Specification)	С
Connector Num     F31       Connector Num     Data       Connector Num     Data       Data     Connector Num       Data     Num       1     Vin       1     Connector Num       1     Connector Num       1     Or       1     Connector Num       1     Or       1     Or       1     Or       1     Or       1     Or	D
	F
F20     LLECTIRE DIABOTLLE CONTROL, ACTUATOR       LLECTIRE DIABOTLLE CONTROL, ACTUATOR     LLECTIRE DIABOTLLE       READ     READ       READ     Mannel       Signal Mannel     Signal Mannel       Signal Mannel     Signal Mannel	G
Connector Nume Connector Nume Connector Type Connector Type Connector Nume Connector Nume Connector Num Connector	Н
Ottron and neuron n neuron neuron neu	I
F23           Alls FUEL R	J
Connector No.       Connector Name	K
L SYSTEM solution in the solution in the solu	L
INTRUE DATACIANCIANCIANCIANCIANCIANCIANCIANCIANCIA	Μ
ENGINE         Connector Nu.         F           Connector Nu.         F         Connector Nu.         F           Connector Nu.         T         F         Connector Nu.           T         T         Nu.         F         Connector Nu.           Nu.         T         T         Nu.         F           Nu.         T         T         Nu.         Nu.           Nu.         Nu.         Nu.         Nu.         Nu.           Add         V.         Nu.         Nu.         Nu.	Ν
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ENGINE CONTROL SYSTEM Connector Name Connector Name Connector Name Participation Connector Name Participation Partico	Connector No. F35 Connector Name Demonstration Content Name Connector Types Connector Types	Connector No. F37 Connector Name Connector Name HS02FGV	Connector No. F39 Connector Name FLEL NJ.ECTOR No. 3 Connector Type HSU2FGV
Terminal         Color Of No.         Signal Name [Specification]           No.         Wre         -           1         UB         -           2         B         -           3         R/B         -	Terminal         Oalor Of No.         Signal Name [Specification]           1         P         -           2         B         -           3         R/3         -	Terminal         Color Of More         Signal Mame [Specification]           1         LG         -           2         R/B         -	Terminal         Color Of         Signal Name [Specification]           No.         Wire         -           1         LG         -           2         R/Y         -
Gammeter No.         F34           Connector Nume         Institution to a term tower towers to a connector Nume           Connector Nume         Edite Give Circles           Connector Nume         Edite Give Circles	Connector No.         F36           Connector Name         Damma Landon Los & a Wini Forest Thomas Tola           Connector Type         ExpErior Forest	Connector No. 738 Connector Name FUEL RUECTOR No. 2 Connector Type HS02FCV	Corrector No. F40 Corrector Name LUEL NJ.ECTOR No. 4 Connector Type HS02FOY
Terminal No.         Color Of Wire         Signal Name [Specification]           1         W         -           2         B         -           3         R/B         -	Terminal         Color Of No.         Signal Name [Specification]           1         0R/R         -           2         B         -           3         R/B         -	Terminal         Odor Of         Signal Mame [Specification]           No.         Wre         -           1         V/G         -           2         R/W         -	Terminal No.         Odor Of Wire         Signal Name [Specification]           1         Y/G         -           2         LG/R         -

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Connector No.         F14           Connector Name         VAS           Connector Name         Connector Name           Name         Connector Name           Name         Connector Name           Name         VAS           Name         VAS           Name         VAS           Name         VAS           Name         Specification           Name         VAS           Connector Name         VAS           Name         VAS           Connector Name         VAS           Name         Consector Name           Name         Connector Name </td <td>EC C D</td>	EC C D
Connector No.     Feb       Connector No.     Feb       Connector Name     FNDME OL. TEMPERATURE SENSOR       Connector Name     Experimentation       Connector Name     Mane Ispace/fination	E F G
Connector Num     F2       Connector Num     F2       Connector Num     PORER STEENUO PRESSURE SENSOR       Connector Num     PONER SENSOR       Connector	I J K
	L M N

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ENGINE CONTROL SYSTEM	Connector No E80	Connector No E82	Connector No E66
me	e	ę	ę
Connector Type RH03FB	Connector Type E02FGY-RS	Connector Type E02FG-RS-LGY	Connector Type RH04MB
HS.	HS.	a H.S.	H.S.
			4321
Terminal Color Of Signal Name [Specification] No.	Terminal Color Of Signal Name [Specification] No.	Terminal Color Of Signal Name [Specification] No.	Terminal Color Of Signal Name [Specification] No.
1 R/Y = -	1 Y =	1 Y =	1 B
3 BR -			3 R
	Connector No. F81	Connector No. F95	
Connector No. F78	Connector Name INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BAWK 1)	Connector Name HEATED OXYGEN SENSOR 2 (BANK 1)	Connector No. F121
- 1	Connector Type E02FG-RS-LGY	Connector Type RH04MB	Connector Name WIRE TO WIRE
Connector Type RS04FL-B	Ø	E	
	HS.	H.S.	Ē
		(4321)	H.S.
			98 88 78 688
Terminal Color Of	Terminal Color Of Signal Name [Specification] No. Wire	Terminal Color Of Signal Name [Specification] No. Wire	
No. Wire Signal Name [Specification]		+	Terminal Color Of similar [Security Contention]
H	2 R/W -	2 R/Y -	
5			
T		4 W =	$^+$
4 SHIELD -			6 B
			ľ
			10 B -

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Connector No.         M4           Connector Name         DATA LINK CONNECTOR           Connector Type         BD16FW           Connector Type         BD16FW	Terminal Res         Color Of Wree         Sensal Name (Specification)           4         1         1         - <t< th=""></t<>
Connector No. MI Connector Name FISE BLOCK (J/B) Connector Type NS0FIY-N2 ALS	Terminal         Color         Signal Mane [Specification]           No.         V         V         V           2A         V         O         V         V           2A         V         O         V         V         V           A         O         O         O         V         V         V           A         O         O         O         V         V         V         V           A         O         O         O         O         V
Oometer Na.         F201           Connector Name         RNOCK SENSOR (BAWK 1)           Connector Name         E02FG-RS	Terminal     Opicor of his     Signal Name (Specification)       1     w     -       2     State Low     Micro       2     State Low     Micro       1     w     -
ENGINE CONTROL SYSTEM	Terminal     Galer     Of     Signal Name (Saocrification)       No.     0.1     0.0     0.0       0.0     0.0     0.0     0.0       1     0.0     0.0     0.0       2     0.0     0.0     0.0       0     0.0     0.0

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ENG	INE C	ENGINE CONTROL SYSTEM									
20	>	-[With colour display]	Conn	Connector No.	M33	18	_	AMBIENT SENSOR SIGNAL	Connector No.		M77
21	H	1	Ŀ			19	•	AMBIENT SENSOR POWER		Г	
22	P		Cont	Connector Name	COMBINATION SWITCH (SPIRAL CABLE)	20	, -	AMBIENT SENSOR GROUND	Connector Name		WIRE TO WIRE
VC	>	,	Conc	Connector Type	TK00ECV-1V	10	-	CAN-H	Connector Type	Г	
25	-				A1 10 0001	-7		CAN-I			2100 M 1001
2 6	2		Æ			77			Æ		
97	ň.		手		[	3	•	GROUND	Here -		
29	-	-		ŝ		24	>	FUEL LEVEL SENSOR GROUND	ŝ		
30	œ	T		1		25	H	ALTERNATOR SIGNAL			
38	œ	-			24 25 26	26	σ	PARKING BRAKE SWITCH SIGNAL			
39					31 32 33 34	27	>	BRAKE FLUID LEVEL SWITCH SIGNAL			
40	۵	,				29	æ	WASHER LEVEL SWITCH SIGNAL			) 
47	٩	,				30	٩	VEHICLE SPEED SIGNAL (2-PULSE)			
48	-		Terr	erminal Color Of		3	>	VEHICLE SPEED SIGNAL (8-PLILSE)	Terminal	Color Of	
49	>	-	No	_	Signal Name [Specification]	32	ГG	OVERDRIVE CONTROL SWITCH SIGNAL	No.	Wire	Signal Name [Specification]
20	6	,	24	BR	,	34	0	FUEL LEVEL SENSOR SIGNAL	-	SHIELD	,
5	-	1	25	┝	'	35	t	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)	ĥ	œ	,
5	>	'	26	╞	'	36	T	SEAT RELT RUCKLE SWITCH SIGNAL (PASSENGER SIDE)		>	,
5			2	┝		3	1		,	: 0	
3	> 6		2	+					4	2	
ŧ	8		26	<b>0</b>		ļ			•		
55	۵	-	ŝ			Connector No.	Ι	M61	~	5	
56	Ъ	1	34	≻ ₹	'	Connector Name		POWER STEERING CONTROL LINIT		SHIELD	
60	>	-							6	W	
61	В	-				Connector Type	Γ	TH12FW-NH	10	œ	'
62	æ	1	Conn	Connector No.	M34				:	c	
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68	>	0						7	16	œ	1
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70	9	-		1					18	۵.	
71	σ				3 4 5 8 9 9 11 12 13 14 5	Terminal	Color Of		19	٩	,
72	R	1			21 22 23 24 25 25 23 29 29 51 22 24 26 29 1	.ºN	Wire	Signal Name [Specification]	20	LG	1
73	-	'				-	>	EPS SOL+	21	>	,
74	>	,				~	0	IGN	22	ä	
75	ä	,	Terr	Terminal Color Of		ur.	6	FPS SOI -	23	۳ -	
92	a	,	No.		Signal Name [Specification]		ſα	GROIND	24	e e	,
22		,	ľ	>	BATTERV DOWED SLIDDI V	•		VEHICLE SDEED (3-DIII SE)	35	>	
e P	, ,		ľ			Ş	. >	VELINGEE OF EED (2. 1. OEOC)	27	- >	
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80	æ	-	4	4 B	GROUND				30	Y	-
<del>8</del>	M	-		5 SB	ILLUMINATION CONTROL SIGNAL				31	W	
82	×		Ľ	8 SB	TRIP RESET SIGNAL				32	æ	1
3	BG		ľ	A 6	SW ILL POWER				34	>	
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			15	BH	AIR BAG SIGNAL				42	BS	

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# NON DTC RELATED ITEM

Fail-safe

ENGINE CONTROL SYSTEM

< ECU DIAGNOSIS INFORMATION >

Signal Name [Specification]

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Engine operating condi- tion in fail-safe mode	Detected items	Remarks	Reference page
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MIL circuit, the ECM cannot warn the driver by illuminating 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 the 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.	<u>EC-458</u>

## DTC RELATED ITEM

DTC No.	Detected items	Engine opera	ating condition in fail-safe mode
P0011 P0021	Intake valve timing control	The signal is not energized to the in control does not function.	take valve timing control solenoid valve and the valve
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more that	n 2,400 rpm due to the fuel cut.
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be CONSULT displays the engine coo	determined by ECM based on the following condition. lant temperature decided by ECM.
		Condition	Engine coolant temperature decided (CONSULT display)
		Just as ignition switch is turned ON or START	40°C (104°F)
		Approx 4 minutes or more after en- gine starting	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engin fan operates while engine is runnin	e coolant temperature sensor is activated, the cooling g.
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	order for the idle position to be with	eed of the throttle valve to be slower than the normal
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does no	t function.
P0500	Vehicle speed sensor	The cooling fan operates (Highest) while engine is running.	
P0605	ECM	(When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.	
P0643	Sensor power supply	ECM deactivates ASCD operation. 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 co small range. Therefore, acceleration will be pool	ontrol actuator by regulating the throttle opening to a r.
		Vehicle condition	Driving condition
		When engine is idling	Normal
		When accelerating	Poor acceleration
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) b	rol actuator control, throttle valve is maintained at a by the return spring.

#### < ECU DIAGNOSIS INFORMATION >

DTC No.	Detected items	Engine operating condition in fail-safe mode	•
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.	A
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.	EC
P2119	Electric throttle control ac- tuator	(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.	С
		(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.	D
		(When ECM detects the throttle valve is stuck open:) While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls. The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.	E
P2122 P2123 P2127	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	F
P2128 P2138		condition. Therefore, the acceleration will be poor.	G

# DTC Inspection Priority Chart

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## < ECU DIAGNOSIS INFORMATION >

Priority	Detected items (DTC)
1	<ul> <li>U0100 U0101 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>P0196 P0197 P0198 Engine oil temperature sensor</li> <li>P0196 P0197 P0198 Engine oil temperature sensor</li> <li>P0335 Crankshaft position sensor (POS)</li> <li>P0340 P0345 Camshaft position sensor (PHASE)</li> <li>P0460 P0461 P0462 P0463 Fuel level sensor</li> <li>P0500 Vehicle speed sensor</li> <li>P0643 Sensor power supply</li> <li>P0705 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>P1700 CVT control system</li> <li>P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> </ul>
2	<ul> <li>P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater</li> <li>P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater</li> <li>P0075 P0081 Intake valve timing control solenoid valve</li> <li>P0130 P0131 P0132 P014C P014D P014E P014F P0150 P0151 P0152 P015A P015B P015C P015D P2096 P2097 P209 P2099 Air fuel ratio (A/F) sensor 1</li> <li>P0137 P0138 P0139 P0157 P0158 P0159 Heated oxygen sensor 2</li> <li>P0441 EVAP control system purge flow monitoring</li> <li>P0443 P0444 P0445 EVAP canister vent control valve</li> <li>P0447 P0448 EVAP canister vent control valve</li> <li>P0445 P0452 P0453 EVAP control system pressure sensor</li> <li>P0603 ECM power supply</li> <li>P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 CVT related sensors, solenoid valve 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 motor relay</li> <li>P2101 Electric throttle control function</li> <li>P2118 Throttle control motor</li> </ul>
3	<ul> <li>P0011 P0021 Intake valve timing control</li> <li>P0171 P0172 P0174 P0175 Fuel injection system function</li> <li>P0300 - P0306 Misfire</li> <li>P0420 P0430 Three way catalyst function</li> <li>P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> <li>P0506 P0507 Idle speed control system</li> <li>P050A P050E Cold start control</li> <li>P1148 P1168 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 Primary speed sensor</li> <li>P2119 Electric throttle control actuator</li> </ul>

## < ECU DIAGNOSIS INFORMATION >

## DTC Index

## [VQ35DE]

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 $\times$ :Applicable —: Not applicable

DT	C <sup>*1</sup>		0.07			Dermanant	<b>.</b>	
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Ltems (CONSULT screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Refer- ence page	EC
U0100	0100	LOST COMM (ECM A)	_	1	×	В	<u>TM-42</u>	С
U0101	0101 <sup>*5</sup>	LOST COMM (TCM)	_	1	×	В	<u>EC-151</u>	0
U1001	1001 <sup>*5</sup>	CAN COMM CIRCUIT	_	2	_	_	<u>EC-153</u>	_
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.			Blinking <sup>*8</sup>	_	_	D
P0011	0011	INT/V TIM CONT-B1	×	2	×	В	EC-154	E
P0021	0021	INT/V TIM CONT-B2	×	2	×	В	EC-154	
P0031	0031	A/F SEN1 HTR (B1)	_	2	×	В	<u>EC-158</u>	F
P0032	0032	A/F SEN1 HTR (B1)	—	2	×	В	<u>EC-158</u>	
P0037	0037	HO2S2 HTR (B1)	—	2	×	В	<u>EC-161</u>	
P0038	0038	HO2S2 HTR (B1)	_	2	×	В	<u>EC-161</u>	G
P0051	0051	A/F SEN1 HTR (B2)	_	2	×	В	<u>EC-158</u>	
P0052	0052	A/F SEN1 HTR (B2)	_	2	×	В	<u>EC-158</u>	Н
P0057	0057	HO2S2 HTR (B2)	_	2	×	В	<u>EC-161</u>	П
P0058	0058	HO2S2 HTR (B2)	_	2	×	В	<u>EC-161</u>	
P0075	0075	INT/V TIM V/CIR-B1	_	2	×	В	<u>EC-164</u>	
P0081	0081	INT/V TIM V/CIR-B2	_	2	×	В	<u>EC-164</u>	
P0101	0101	MAF SEN/CIRCUIT-B1	_	2	×	В	<u>EC-167</u>	
P0102	0102	MAF SEN/CIRCUIT-B1	_	1	×	В	<u>EC-172</u>	J
P0103	0103	MAF SEN/CIRCUIT-B1	_	1	×	В	<u>EC-172</u>	
P0111	0111	IAT SENSOR 1 B1	_	2	×	A	<u>EC-177</u>	K
P0112	0112	IAT SEN/CIRCUIT-B1	_	2	×	В	<u>EC-179</u>	
P0113	0113	IAT SEN/CIRCUIT-B1	_	2	×	В	<u>EC-179</u>	
P0116	0116	ECT SEN/CIRC	_	2	×	A	<u>EC-182</u>	L
P0117	0117	ECT SEN/CIRC	_	1	×	В	<u>EC-185</u>	
P0118	0118	ECT SEN/CIRC	_	1	×	В	<u>EC-185</u>	M
P0122	0122	TP SEN 2/CIRC-B1	_	1	×	В	<u>EC-188</u>	1 V I
P0123	0123	TP SEN 2/CIRC-B1	_	1	×	В	<u>EC-188</u>	
P0125	0125	ECT SENSOR	_	2	×	В	<u>EC-191</u>	Ν
P0127	0127	IAT SENSOR-B1	_	2	×	В	<u>EC-194</u>	
P0128	0128	THERMSTAT FNCTN	_	2	×	A	<u>EC-196</u>	0
P0130	0130	A/F SENSOR1 (B1)	_	2	×	A	<u>EC-199</u>	0
P0131	0131	A/F SENSOR1 (B1)	_	2	×	В	EC-203	
P0132	0132	A/F SENSOR1 (B1)	_	2	×	В	<u>EC-207</u>	Р
P0137	0137	HO2S2 (B1)	×	2	×	А	EC-211	
P0138	0138	HO2S2 (B1)	×	2	×	A	<u>EC-218</u>	
P0139	0139	HO2S2 (B1)	×	2	×	A	<u>EC-227</u>	
P014C	014C	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-234</u>	
P014D	014D	A/F SENSOR1 (B1)	×	2	×	A	<u>EC-234</u>	
	I			1			1	

#### < ECU DIAGNOSIS INFORMATION >

DTC	;*1		0.07			Permanent	Pofor
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Items     (CONSULT screen terms)	SRT code	Trip	MIL	DTC group <sup>*4</sup>	Refer- ence page
P014E	014E	A/F SENSOR1 (B2)	×	2	×	А	<u>EC-234</u>
P014F	014F	A/F SENSOR1 (B2)	×	2	×	А	EC-234
P0150	0150	A/F SENSOR1 (B2)	—	2	×	А	<u>EC-199</u>
P0151	0151	A/F SENSOR1 (B2)	—	2	×	В	EC-203
P0152	0152	A/F SENSOR1 (B2)	—	2	×	В	<u>EC-207</u>
P0157	0157	HO2S2 (B2)	×	2	×	А	<u>EC-211</u>
P0158	0158	HO2S2 (B2)	×	2	×	А	<u>EC-218</u>
P0159	0159	HO2S2 (B2)	×	2	×	А	<u>EC-227</u>
P015A	015A	A/F SENSOR1 (B1)	×	2	×	А	<u>EC-234</u>
P015B	015B	A/F SENSOR1 (B1)	×	2	×	А	<u>EC-234</u>
P015C	015C	A/F SENSOR1 (B2)	×	2	×	А	<u>EC-234</u>
P015D	015D	A/F SENSOR1 (B2)	×	2	×	А	<u>EC-234</u>
P0171	0171	FUEL SYS-LEAN-B1		2	×	В	<u>EC-240</u>
P0172	0172	FUEL SYS-RICH-B1		2	×	В	<u>EC-244</u>
P0174	0174	FUEL SYS-LEAN-B2	_	2	×	В	<u>EC-240</u>
P0175	0175	FUEL SYS-RICH-B2	_	2	×	В	<u>EC-244</u>
P0181	0181	FTT SENSOR		2	×	A and B	<u>EC-248</u>
P0182	0182	FTT SEN/CIRCUIT	_	2	×	В	<u>EC-253</u>
P0183	0183	FTT SEN/CIRCUIT	_	2	×	В	<u>EC-253</u>
P0196	0196	EOT SENSOR		2	×	A and B	<u>EC-256</u>
P0197	0197	EOT SEN/CIRC	_	2	×	В	<u>EC-260</u>
P0198	0198	EOT SEN/CIRC	—	2	×	В	<u>EC-260</u>
P0222	0222	TP SEN 1/CIRC-B1	_	1	×	В	EC-263
P0223	0223	TP SEN 1/CIRC-B1		1	×	В	EC-263
P0300	0300	MULTI CYL MISFIRE		1 or 2	×	В	<u>EC-266</u>
P0301	0301	CYL 1 MISFIRE	_	1 or 2	×	В	<u>EC-266</u>
P0302	0302	CYL 2 MISFIRE		1 or 2	×	В	<u>EC-266</u>
P0303	0303	CYL 3 MISFIRE		1 or 2	×	В	<u>EC-266</u>
P0304	0304	CYL 4 MISFIRE		1 or 2	×	В	<u>EC-266</u>
P0305	0305	CYL 5 MISFIRE	—	1 or 2	×	В	<u>EC-266</u>
P0306	0306	CYL 6 MISFIRE	_	1 or 2	×	В	<u>EC-266</u>
P0327	0327	KNOCK SEN/CIRC-B1	_	2		_	<u>EC-272</u>
P0328	0328	KNOCK SEN/CIRC-B1	—	2	_	_	EC-272
P0332	0332	KNOCK SEN/CIRC-B2	—	2	_	_	<u>EC-272</u>
P0333	0333	KNOCK SEN/CIRC-B2		2			<u>EC-272</u>
P0335	0335	CKP SEN/CIRCUIT		2	×	В	<u>EC-275</u>
P0340	0340	CMP SEN/CIRC-B1	_	2	×	В	<u>EC-279</u>
P0345	0345	CMP SEN/CIRC-B2		2	×	В	EC-279
P0420	0420	TW CATALYST SYS-B1	×	2	×	A	EC-283
P0430	0430	TW CATALYST SYS-B2	×	2	×	A	EC-283
P0441	0441	EVAP PURG FLOW/MON	×	2	×	A	<u>EC-288</u>
P0443	0443	PURG VOLUME CONT/V	—	2	×	A	<u>EC-293</u>

#### < ECU DIAGNOSIS INFORMATION >

DTC	<b>)</b> *1	H	ODT			Pormonont	D. (	Δ
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Items     (CONSULT screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Refer- ence page	A
P0444	0444	PURG VOLUME CONT/V	_	2	×	В	<u>EC-298</u>	EC
P0445	0445	PURG VOLUME CONT/V	—	2	×	В	EC-298	
P0447	0447	VENT CONTROL VALVE	—	2	×	В	EC-301	
P0448	0448	VENT CONTROL VALVE	—	2	×	В	EC-305	С
P0451	0451	EVAP SYS PRES SEN	_	2	×	А	EC-309	
P0452	0452	EVAP SYS PRES SEN	—	2	×	В	EC-313	D
P0453	0453	EVAP SYS PRES SEN	—	2	×	В	EC-318	
P0456	0456	EVAP VERY SML LEAK	×*7	2	×	А	EC-324	
P0460	0460	FUEL LEV SEN SLOSH	_	2	×	A	<u>EC-330</u>	E
P0461	0461	FUEL LEVEL SENSOR	_	2	×	В	EC-332	
P0462	0462	FUEL LEVL SEN/CIRC	_	2	×	В	<u>EC-334</u>	F
P0463	0463	FUEL LEVL SEN/CIRC	—	2	×	В	EC-334	I
P0500	0500	VEH SPEED SEN/CIRC*6	_	2	×	В	EC-336	
P0506	0506	ISC SYSTEM	_	2	×	В	EC-338	G
P0507	0507	ISC SYSTEM	—	2	×	В	<u>EC-340</u>	
P050A	050A	COLD START CONTROL	—	2	×	А	EC-342	Н
P050E	050E	COLD START CONTROL	—	2	×	А	EC-342	
P0550	0550	PW ST P SEN/CIRC	—	2	_	—	EC-344	
P0603	0603	ECM BACK UP/CIRCUIT	—	2	×	В	<u>EC-347</u>	
P0605	0605	ECM	—	1 or 2	× or —	В	EC-349	
P0607	0607	ECM	—	1	×	В	EC-351	1
P0643	0643	SENSOR POWER/CIRC	—	1	×	В	EC-352	0
P0705	0705	T/M RANGE SENSOR A	—	2	×	В	<u>TM-50</u>	
P0710	0710	FLUID TEMP SENSOR A <sup>*9</sup>	—	1	×	В	<u>TM-53</u>	Κ
P0715	0715	INPUT SPEED SENSOR A	_	2	×	В	<u>TM-57</u>	
P0720	0720	OUTPUT SPEED SEN- SOR <sup>*6</sup>	_	2	×	В	<u>TM-60</u>	L
P0740	0740	TORQUE CONVERTER	_	2	×	В	<u>TM-65</u>	
P0744	0744	TORQUE CONVERTER	—	2	×	В	<u>TM-67</u>	M
P0745	0745	PC SOLENOID A	—	2	×	В	<u>TM-69</u>	
P0746	0746	PC SOLENOID A	_	1	×	В	<u>TM-71</u>	
P0776	0776	PC SOLENOID B	—	2	×	В	<u>TM-73</u>	Ν
P0778	0778	PC SOLENOID B	—	2	×	В	<u>TM-75</u>	
P0840	0840	FLUID PRESS SEN/SW A	—	2	×	В	<u>TM-77</u>	0
P0845	0845	FLUID PRESS SEN/SW B	—	2	×	В	<u>TM-82</u>	-
P0850	0850	P-N POS SW/CIRCUIT	—	2	×	В	EC-355	
P1148	1148	CLOSED LOOP-B1	—	1	×	A	EC-358	Ρ
P1168	1168	CLOSED LOOP-B2	—	1	×	А	<u>EC-358</u>	
P1212	1212	TCS/CIRC	—	2	—	—	<u>EC-359</u>	
P1217	1217	ENG OVER TEMP	—	1	×	В	<u>EC-360</u>	
P1225	1225	CTP LEARNING-B1	_	2	_	_	<u>EC-364</u>	
P1226	1226	CTP LEARNING-B1	—	2	—	—	<u>EC-366</u>	

#### < ECU DIAGNOSIS INFORMATION >

DT	C <sup>*1</sup>	Items	SRT			Permanent	Refer-
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	ence page
P1550	1550	BAT CURRENT SENSOR		2			<u>EC-368</u>
P1551	1551	BAT CURRENT SENSOR		2			<u>EC-371</u>
P1552	1552	BAT CURRENT SENSOR		2			<u>EC-371</u>
P1553	1553	BAT CURRENT SENSOR		2			<u>EC-374</u>
P1554	1554	BAT CURRENT SENSOR		2		_	<u>EC-377</u>
P1564	1564	ASCD SW		1			<u>EC-380</u>
P1572	1572	ASCD BRAKE SW		1			<u>EC-383</u>
P1574	1574	ASCD VHL SPD SEN		1			<u>EC-389</u>
P1610	1610	LOCK MODE		2	_	_	<u>SEC-34</u>
P1611	1611	ID DISCORD, IMM-ECM		2	_		<u>SEC-71</u>
P1612	1612	CHAIN OF ECM-IMMU		2	_		<u>SEC-37</u>
P1614	1614	CHAIN OF IMMU-KEY	_	2	_	_	<u>SEC-38</u>
P1615	1615	DIFFERENCE OF KEY	_	2	_	_	<u>SEC-41</u>
P1700	1700	CVT C/U FUNCT	_	1	_	_	EC-391
P1715	1715	IN PULY SPEED		2	_		EC-392
P1740	1740	SLCT SOLENOID	_	2	×	В	<u>TM-98</u>
P1777	1777	STEP MOTOR	_	1	×	В	<u>TM-101</u>
P1778	1778	STEP MOTOR	_	2	×	В	<u>TM-104</u>
P1800	1800	VIAS S/V-1	_	2	_	_	EC-394
P1801	1801	VIAS S/V-2	_	2	_	_	<u>EC-397</u>
P1805	1805	BRAKE SW/CIRCUIT	_	2	_	_	<u>EC-400</u>
P2096	2096	POST CAT FUEL TRIM SYS B1		2	×	A	
P2097	2097	POST CAT FUEL TRIM SYS B1	_	2	×	A	<u>EC-403</u>
P2098	2098	POST CAT FUEL TRIM SYS B2	_	2	×	A	<u>LC-403</u>
P2099	2099	POST CAT FUEL TRIM SYS B2	—	2	×	A	
P2100	2100	ETC MOT PWR-B1	—	1	×	В	<u>EC-408</u>
P2101	2101	ETC FNCTN/CIRC-B1	_	1	×	В	<u>EC-410</u>
P2103	2103	ETC MOT PWR		1	×	В	<u>EC-408</u>
P2118	2118	ETC MOT-B1		1	×	В	<u>EC-414</u>
P2119	2119	ETC ACTR-B1		1	×	В	<u>EC-417</u>
P2122	2122	APP SEN 1/CIRC		1	×	В	<u>EC-419</u>
P2123	2123	APP SEN 1/CIRC		1	×	В	<u>EC-419</u>
P2127	2127	APP SEN 2/CIRC		1	×	В	<u>EC-422</u>
P2128	2128	APP SEN 2/CIRC	_	1	×	В	<u>EC-422</u>
P2135	2135	TP SENSOR-B1	—	1	×	В	<u>EC-426</u>
P2138	2138	APP SENSOR	_	1	×	В	<u>EC-429</u>

\*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-29, "Description", "HOW TO ERASE PERMANENT DTC".

#### < ECU DIAGNOSIS INFORMATION >

\*5: The troubleshooting for this DTC needs CONSULT.

\*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 displays SRT status, MIL may blink. For the details, refer to "How to Display SRT Status".

\*9: When erasing this DTC, always use CONSULT or GST.

#### Test Value and Test Limit

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.

**ECM** 

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 >

Item	OBD- MID	Self-diagnostic test item	DTC	li	e and Test mit display) Unitand	Description
				TID	Scaling ID	
			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 or P2096	89H	84H	The amount of shift in air fuel ratio (too lean)
			P2A00 or P2097	8AH	84H	The amount of shift in air fuel ratio (too rich)
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	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
			P0133	95H	04H	Response rate: Response ratio (lean to rich)
			P0133	96H	84H	Response rate: Response ratio (rich to lean)

## < ECU DIAGNOSIS INFORMATION >

					e and Test mit	
Item	OBD-	Self-diagnostic test item	DTC		display)	Description
MID	MID			TID	Unitand Scaling ID	Description
		P0138	07H	0CH	Minimum sensor output voltage for test cycle	
		Heated oxygen sensor 2	P0137	08H	0CH	Maximum sensor output voltage for test cycle
	02H	(Bank 1)	P0138	80H	0CH	Sensor output voltage
		P0139	81H	0CH	Difference in sensor output voltage	
		P0139	82H	11H	Rear O2 sensor delay response diag- nosis	
		P0143	07H	0CH	Minimum sensor output voltage for test cycle	
	03H	Heated oxygen sensor 3 (Bank 1)	P0144	08H	0CH	Maximum sensor output voltage for test cycle
			P0146	80H	0CH	Sensor output voltage
			P0145	81H	0CH	Difference in sensor output voltage
		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
HO2S			P0153	87H	04H	Response rate: Response ratio (lean to rich)
			P0153	88H	04H	Response rate: Response ratio (rich to lean)
		Air fuel ratio (A/F) sensor 1	P2A03 or P2098	89H	84H	The amount of shift in air fuel ratio (too lean)
			P2A03 or P2099	8AH	84H	The amount of shift in air fuel ratio (too rich)
	05H	(Bank 2)	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

## < ECU DIAGNOSIS INFORMATION >

					e and Test mit	
Item	OBD-	Self-diagnostic test item	DTC		display)	Description
item	MID	Sen-diagnostic test item	DIC	TID	Unitand Scaling ID	Description
			P015D	94H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	P0153	95H	04H	Response rate: Response ratio (lean to rich)
			P0153	96H	84H	Response rate: Response ratio (rich to lean)
			P0158	07H	0CH	Minimum sensor output voltage for test cycle
	0011	Heated oxygen sensor 2	P0157	08H	0CH	Maximum sensor output voltage for test cycle
HO2S	06H	(Bank 2)	P0158	80H	0CH	Sensor output voltage
		P0159	81H	0CH	Difference in sensor output voltage	
			P0159	82H	11H	Rear O2 sensor delay response diag- nosis
		Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
	07H		P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage
		Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
	21H		P0420	82H	01H	Switching time lag engine exhaust in- dex value
	2		P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
CATA-			P2423	84H	84H	O2 storage index in HC trap catalyst
LYST			P0430	80H	01H	O2 storage index
	22H	Three way catalyst function	P0430	82H	01H	Switching time lag engine exhaust in- dex value
	2211	(Bank2)	P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
			P0400	80H	96H	Low flow faults: EGR temp change rate (short term)
			P0400	81H	96H	Low flow faults: EGR temp change rate (long term)
EGR SYSTEM	31H	IH EGR function	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

## < ECU DIAGNOSIS INFORMATION >

	OBD-			li	e and Test mit display)	
Item	MID	Self-diagnostic test item	DTC	TID	Unit and Scaling ID	Description
			P0011	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)
	35H		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)
	35H	VVT Monitor (Bank1)	P100A	84H	10H	VEL slow response diagnosis
VVT SYSTEM		P1090	85H	10H	VEL servo system diagnosis	
			P0011	86H	9DH	VTC intake intermediate lock function diagnosis (VTC intermediate position alignment check diagnosis)
			Advanced: P052A Retarded: P052B	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock posi- tion check diagnosis)
		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)
	36H		P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	301		P100B	84H	10H	VEL slow response diagnosis
			P1093	85H	10H	VEL servo system diagnosis
			P0021	86H	9DH	VTC intake intermediate lock function diagnosis (VTC intermediate position alignment check diagnosis)
			Advanced: P052C Retarded: P052D	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock position check diagnosis)
	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)
			P0456	80H	05H	Leak area index (for more than 0.02 inch)
EVAP SYSTEM	ЗСН	H EVAP control system leak (Very small leak)	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

## < ECU DIAGNOSIS INFORMATION >

lite ee	OBD-	Self-diagnostic test item	DTO	lir	e and Test mit display)	Description	
ltem	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description	
	41H	A/F sensor 1 heater (Bank 1)	Low Input: P0031 High Input: P0032	81H	0BH	Converted value of heater electric cur- rent to voltage	
	42H	Heated oxygen sensor 2 heat- er (Bank 1)	Low Input: P0037 High Input: P0038	80H	0CH	Converted value of heater electric cur- rent to voltage	
O2 SEN- 43H SOR	43H	Heated oxygen sensor 3 heat- er (Bank 1)	P0043	80H	0CH	Converted value of heater electric cur- rent to voltage	
HEATER	45H	A/F sensor 1 heater (Bank 2)	Low Input: P0051 High Input: P0052	81H	0BH	Converted value of heater electric cur- rent to voltage	
	46H	Heated oxygen sensor 2 heat- er (Bank 2)	Low Input: P0057 High Input: P0058	80H	0CH	Converted value of heater electric cur- rent to voltage	
	47H	Heated oxygen sensor 3 heat- er (Bank 2)	P0063	80H	0CH	Converted value of heater electric cur- rent to voltage	
		H Secondary air system	P0411	80H	01H	Secondary air injection system incor- rect flow detected	
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary air injection system insufficient flow	
			P2445	82H	01H	Secondary air injection system pump stuck off	
SEC- OND- ARY AIR	71H		P2448	83H	01H	Secondary air injection system high airflow	
			Bank1: P2440 Bank2: P2442	84H	01H	Secondary air injection system switch- ing valve stuck open	
			P2440	85H	01H	Secondary air injection system switch- ing valve stuck open	
			P2444	86H	01H	Secondary air injection system pump stuck on	
			P0171 or P0172	80H	2FH	Long term fuel trim	
	81H	Fuel injection system function (Bank 1)	P0171 or P0172	81H	24H	The number of lambda control clamped	
FUEL			P117A	82H	03H	Cylinder A/F imbalance monitoring	
SYSTEM			P0174 or P0175	80H	2FH	Long term fuel trim	
	82H	Fuel injection system function (Bank 2)	P0174 or P0175	81H	24H	The number of lambda control clamped	
			P117B	82H	03H	Cylinder A/F imbalance monitoring	

## < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

	OBD- OK K			li	e and Test mit display)		A
Item	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description	EC
			P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder	С
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder	0
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder	D
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder	Е
			P0305 84H 24H Misfiring counter at 1000 revol the fifth cylinder	Misfiring counter at 1000 revolution of the fifth cylinder			
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder	F
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder	
		P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder	G	
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders	Н
MICEIDE			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder	
MISFIRE	A1H	Multiple cylinder misfires	P0302	8AH	24H	Misfiring counter at 200 revolution of the second cylinder	
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder	J
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder	
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder	K
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder	L
		P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder		
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder	N
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder	N
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder	
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders	0

## < ECU DIAGNOSIS INFORMATION >

	OBD-	Self-diagnostic test item		li	e and Test mit display)			
Item	MID		DTC	TID	Unitand Scaling ID	Description		
	A2H	No. 1 cylinder misfire	P0301	0ВН	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles		
			P0301	0CH	24H	Misfire counts for last/current driving cycles		
	АЗН	No. 2 cylinder misfire	P0302	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing 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 driv- ing 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 driv- ing cycles		
MISFIRE			P0304	0CH	24H	Misfire counts for last/current driving cycles		
MISTIKE	A6H	No. 5 cylinder misfire	P0305	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing 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 driv- ing 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 driv- ing 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 driv- ing cycles		
			P0308	0CH	24H	Misfire counts for last/current driving cycles		

#### < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

## Symptom Table

## SYSTEM — BASIC ENGINE CONTROL SYSTEM

			SYMPTOM								С					
		_				NO					HIGH					D
		START/RESTART (EXCP. HA)		LAT SPOT	TION	ACCELERATION				OLE	MPERATURE H	UMPTION	MPTION	CHARGE)		E
		<b>ART/RESTA</b>		surging/F	K/DETONA	POWER/POOR	W IDLE	HUNTING	TION	TURN TO II	WATER TEI	UEL CONS	IL CONSUI	AD (UNDER	Reference page	F
		HARD/NO STA	ENGINE STALL	HESITATION/SURGING/FLAT	SPARK KNOCK/DETONATION	LACK OF POV	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)		G
Warrant	y symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	<u>EC-449</u>	
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-532	
	Fuel injector circuit	1	1	2	3	2		2	2			2			<u>EC-446</u>	
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<u>EC-91</u>	
Air	Positive crankcase ventilation sys- tem	3	3	4	4	4	4	4	4	4		4	1		<u>EC-464</u>	J
	Incorrect idle speed adjustment						1	1	1	1		1			<u>EC-13</u>	K
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<u>EC-410,</u> <u>EC-417</u>	TX.
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<u>EC-13</u>	L
	Ignition circuit	1	1	2	2	2		2	2			2			<u>EC-453</u>	
Power s	supply and ground circuit	2	2	3	3	3		3	3		2	3			<u>EC-148</u>	
Mass ai	r flow sensor circuit	1			2										<u>EC-167,</u> <u>EC-172</u>	M
Engine	coolant temperature sensor circuit						3			3					<u>EC-185,</u> <u>EC-191</u>	Ν
Air fuel	ratio (A/F) sensor 1 circuit		1	2	3	2		2	2			2			<u>EC-199,</u> <u>EC-203,</u> <u>EC-207,</u> <u>EC-234,</u> <u>EC-403</u>	0
Throttle	position sensor circuit						2	+		2					<u>EC-188,</u> <u>EC-263,</u> <u>EC-364,</u> <u>EC-366,</u> <u>EC-426</u>	Ρ
Acceler	ator pedal position sensor circuit			3	2	1									EC-352, EC-419, EC-422, EC-429	

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#### < SYMPTOM DIAGNOSIS >

## [VQ35DE]

		SYMPTOM												
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDRE/ROM IDRE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Knock sensor circuit			2								3			<u>EC-272</u>
Engine oil temperature sensor			4		2						3			<u>EC-256,</u> <u>EC-260</u>
Crankshaft position sensor (POS) circuit	2	2												EC-275
Camshaft position sensor (PHASE) circuit	3	2												EC-279
Vehicle speed signal circuit		2	3		3						3			EC-336
Power steering pressure sensor circuit		2					3	3						EC-344
ECM	2	2	3	3	3	3	3	3	3	3	3			<u>EC-347,</u> EC-349
Intake valve timing control solenoid valve cir- cuit		3	2		1	3	2	2	3		3			<u>EC-164</u>
PNP signal circuit			3		3		3	3			3			EC-355
VIAS control solenoid valve 1 circuit					1									EC-394
VIAS control solenoid valve 2 circuit					1									<u>EC-397</u>
Refrigerant pressure sensor circuit		2				3			3		4			EC-465
Electrical load signal circuit							3							<u>EC-441</u>
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	HAC-166
ABS actuator and electric unit (control unit)			4											BRC-28

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

### SYSTEM — ENGINE MECHANICAL & OTHER

#### < SYMPTOM DIAGNOSIS >

## [VQ35DE]

		SYMPTOM										А				
		T (EXCP. HA)		AT SPOT	NO	LACK OF POWER/POOR ACCELERATION				Ш	PERATURE HIGH	MPTION	PTION	CHARGE)		EC
		RT/RESTAR		URGING/FL		/ER/POOR /	W IDLE	HUNTING	TION	rurn to Idi	VATER TEM	NEL CONSL	OIL CONSUMPTION	D (UNDER	Reference page	D
		HARD/NO START/RESTART (EXCP.	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POV	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE C	BATTERY DEAD (UNDER	_	E
Warranty s	ymptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		F
Fuel	Fuel tank	5													<u>FL-11</u>	
	Fuel piping	5		5	5	5		5	5			5			<u>MA-24</u>	
	Vapor lock		5												—	G
	Valve deposit														_	
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5			_	Н
Air	Air duct														<u>EM-31</u>	
	Air cleaner														<u>EM-31</u>	
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5			5			<u>EM-31</u>	
	Electric throttle control actuator	5			5		5			5					<u>EM-34</u>	J
	Air leakage from intake manifold/ Collector/Gasket														<u>EM-34</u> , <u>EM-36</u>	K
Cranking	Battery	1	1	1		1		1	1					1	<u>PG-97</u>	
	Generator circuit		•			1			1						<u>CHG-29</u>	
	Starter circuit	3										1			<u>STR-7</u>	L
	Signal plate	6													<u>EM-119</u>	
	PNP signal	4													<u>TM-51</u>	M
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-112	
	Cylinder head gasket	5				5			5		4	5	3			
	Cylinder block															Ν
	Piston												4			
	Piston ring	6	6	6	6	6		6	6			6			<u>EM-123</u>	0
	Connecting rod								5							0
	Bearing															
	Crankshaft															Ρ
Valve	Timing chain														<u>EM-70</u>	
mecha- nism	Camshaft														<u>EM-99</u>	
	Intake valve timing control	5	5	5	5	5		5	5			5			<u>EM-70</u>	
	Intake valve Exhaust valve												3		<u>EM-112</u>	
					<u> </u>			<u> </u>							<u> </u>	

Revision: 2013 August

2014 MURANO

#### < SYMPTOM DIAGNOSIS >

[VQ35DE]	
[າຜວວກະ]	

							S	(MPT)	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDRE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty s	symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			<u>EM-38</u> , <u>EX-</u>
	Three way catalyst														<u>4</u>
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<u>LU-8, LU-</u> <u>11, LU-12, LU-14</u>
	Oil level (Low)/Filthy oil														<u>LU-8</u>
Cooling	Radiator/Hose/Radiator filler cap														<u>CO-15</u>
	Thermostat									5					<u>CO-27</u>
	Water pump														<u>CO-22</u>
	Water gallery	5	5	5	5	5		5	5		4	5			<u>CO-3</u>
	Cooling fan														<u>CO-20</u>
	Coolant level (Low)/Contaminat- ed coolant									5					<u>CO-11</u>
NVIS (NIS NATS)	SAN Vehicle Immobilizer System —	1	1												<u>SEC-14</u>

1 - 6: The numbers refer to the order of inspection.

## NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

## Description

Description	IFOID:000000009720247	
FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED) If the engine speed is above 2,000 rpm under no load (for example, the selector lever position is		EC
engine speed is over 2,000 rpm) fuel will be cut off after some time. The exact time when the fuel ies based on engine speed. Fuel cut will be operated until the engine speed reaches 1,100 rpm, then fuel cut will be cancelled <b>NOTE:</b>		С
This function is different from deceleration control listed under Multiport Fuel Injection (MFI) Sys "System Description".	stem, <u>EC-43.</u>	D
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# < PRECAUTION > PRECAUTION PRECAUTIONS FOR USA AND CANADA

## FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "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.

FOR MEXICO

FOR MEXICO : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. 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:

#### < PRECAUTION >

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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 iniury.
- EC 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.

Precautions For Xenon Headlamp Service

#### WARNING:

Comply with the following warnings to prevent any serious accident.

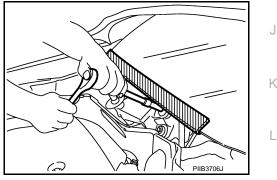
- D Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts. Е
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)
- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

#### CAUTION:

- Comply with the following cautions to prevent any error and malfunction.
- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

## Precaution for Procedure without Cowl Top Cover

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



## Precautions for Removing of Battery Terminal

When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

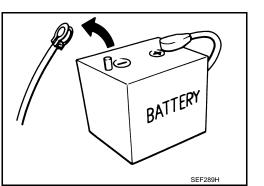
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch. NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

 After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC. NOTE:

The removal of 12V battery may cause a DTC detection error.





## On Board Diagnostic (OBD) System of Engine and CVT

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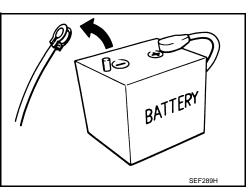
The ECM has an on board diagnostic system. It will illuminate the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

#### CAUTION:

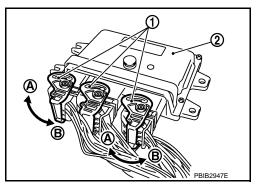
- Always to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to illuminate.
- Always to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to illuminate due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-86, "Description".
- Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.
- Always to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.
- Always to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

#### General Precautions

- Always use a 12 volt battery as power source.
- Never attempt to disconnect battery cables while engine is runnina.
- · Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- · Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.

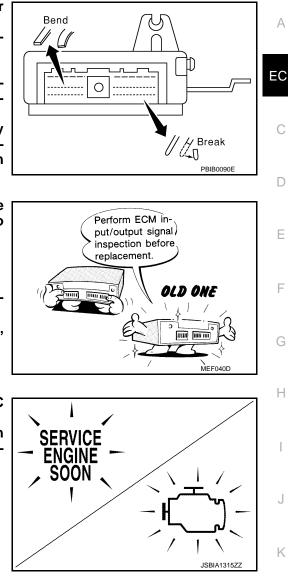


- Never disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value.
- The ECM will now start to self-control at its initial value. Thus, engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Never replace parts because of a slight variation.
- If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.
- ECM (2)
- Loosen (A)



#### < PRECAUTION >

- When connecting or disconnecting pin connectors into or from ECM, never damage pin terminals (bends or break). Check that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- Securely connect ECM harness connectors.
   A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and check ECM functions properly. Refer to <u>EC-472, "Reference Value"</u>.
- Handle mass air flow sensor carefully to avoid damage.
- Never clean mass air flow sensor with any type of detergent.
- Never disassemble electric throttle control actuator.
- Even a slight leakage in the air intake system can cause serious incidents.
- Never shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Component Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



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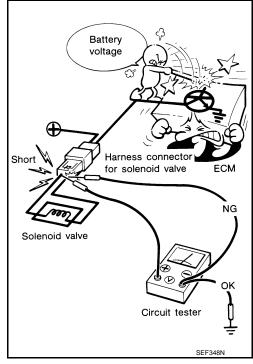
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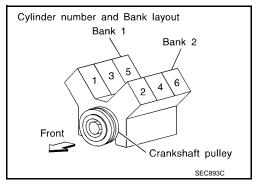
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#### < PRECAUTION >

[VQ35DE]

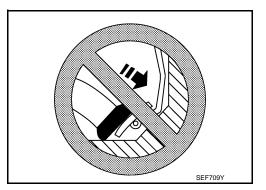
 When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.





- B1 indicates bank 1, B2 indicates bank 2 as shown in the figure.
- Never operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

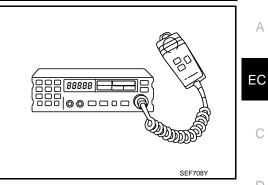
- Never depress accelerator pedal when starting.
- Immediately after starting, never rev up engine unnecessarily.
- Never rev up engine just prior to shutdown.



#### < PRECAUTION >

#### [VQ35DE]

- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
- Keep the antenna as far as possible from the electronic control units.
- Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.
- Never let them run parallel for a long distance.Adjust the antenna and feeder line so that the standing-wave
- ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



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# PREPARATION

# Special Service Tools

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The actual shapes of Kent-Moore tools may differ from those of special service tools il	lustrated here.
Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge kit	Checks fuel pressure
(J-44321-6) Fuel pressure adapter	Connects fuel pressure gauge to quick connector type fuel lines

## **Commercial Service Tools**

INFOID:000000009720255

Tool name (Kent-Moore No.)		Description
(J-45488) Quick connector re- lease		Removes fuel tube quick connectors in engine room
Leak detector i.e.: (J-41416)	PBIC0198E	Locates the EVAP leakage
EVAP service port adapter i.e.: (J-41413-OBD)		Applys positive pressure through EVAP service port
	S-NT704	

Revision: 2013 August

## PREPARATION

#### < PREPARATION >

## [VQ35DE]

Tool name (Kent-Moore No.)		Description
Fuel filler cap adapter i.e.: (MLR-8382)		Checks fuel tank vacuum relief valve opening pressure
Socket wrench	S-NT815	Removes and installs engine coolant temperature sensor. Refer to <u>CO-29, "Exploded View"</u> .
	19 mm (0.75 in) Nore than 32 mm (1.26 in) S-NT705	
Dxygen sensor thread cleaner .e.: (J-43897-18) J-43897-12)	a Mating surface shave cylinder	Reconditions the exhaust system threads before installing a new oxygen sensor. Use with anti- seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirco- nia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Tita- nia Oxygen Sensor
Anti-seize lubricant .e.: (Permatex <sup>TM</sup> 133AR or equivalent neeting MIL specifica- ion MIL-A-907)	S-NI779	Lubricates oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

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## < PERIODIC MAINTENANCE >

# PERIODIC MAINTENANCE FUEL PRESSURE

Inspection

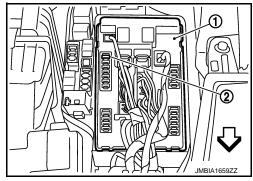
## FUEL PRESSURE RELEASE

() With CONSULT

- 1. Turn ignition switch ON.
- 2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT.
- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 5. Turn ignition switch OFF.

**Without CONSULT** 

- 1. Remove fuel pump fuse (2) located in IPDM E/R (1).
- 2. Start engine.
- 3. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 4. Turn ignition switch OFF.
- 5. Reinstall fuel pump fuse after servicing fuel system.

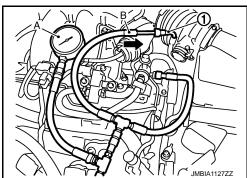


## FUEL PRESSURE CHECK

#### **CAUTION:**

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger. NOTE:

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because Z51 models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains seal ability.
- Use Fuel Pressure Gauge Kit [SST (J-44321)] and Fuel Pressure Adapter [SST (J-44321-6)] to check fuel pressure.
- 1. Release fuel pressure to zero.
- 2. Remove fuel hose using Quick Connector Release [SST (J-45488)].
  - Do not twist or kink fuel hose because it is plastic hose.
  - Do not remove fuel hose (1) from quick connector.
  - Keep fuel hose connections clean.
- 3. Install Fuel Pressure Adapter [SST (J-44321-6)] (B) and Fuel Pressure Gauge kit [SST (J44321)] (A) as shown in figure.
  - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
  - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
- 4. Turn ignition switch ON (reactivate fuel pump) and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- 6. Read the indication of fuel pressure gauge kit [SST (J-44321)].
  - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.



At idling : Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

## EC-532

#### 2014 MURANO

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< PERIODIC MAINTENANCE > [VQ	35DE]
7. If result is unsatisfactory, go to next step.	
<ul> <li>8. Check the following.</li> <li>Fuel hoses and fuel tubes for clogging</li> <li>Fuel filter for clogging</li> </ul>	A
<ul> <li>Fuel filter for clogging</li> <li>Fuel pump</li> <li>Fuel pressure regulator for clogging</li> </ul>	EC
<ol> <li>If OK, replace fuel pressure regulator.</li> <li>If NG, repair or replace malfunctioning part.</li> </ol>	0
10. Before disconnecting Fuel Pressure Gauge kit [SST (J-44321)] and Fuel Pressure Adapter [S 44321-6)], release fuel pressure to zero.	SST (J-
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# < PERIODIC MAINTENANCE >

# EVAP LEAK CHECK

## Inspection

#### **CAUTION:**

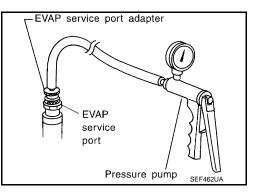
- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

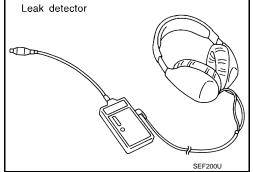
#### NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter (commercial service tool) to the EVAP service port may cause a leakage.

#### (I) WITH CONSULT

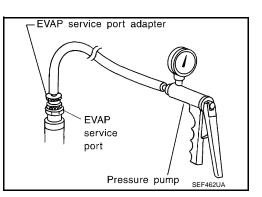
- To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Turn ignition switch ON.
- 3. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT.
- 4. Touch "START". A bar graph (Pressure indicating display) will appear 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) and hose with pressure pump.
- Locate the leakage using a leakage detector (commercial service tool). Refer to <u>EC-91, "System Diagram"</u>.





### **WITHOUT CONSULT**

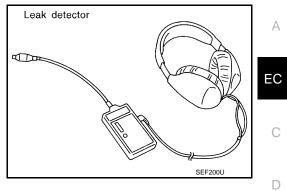
- 1. To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Apply battery voltage between the terminals of EVAP canister vent control valve to make a closed EVAP system.
- To locate the leakage, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).
- 4. Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.



## **EVAP LEAK CHECK**

#### < PERIODIC MAINTENANCE >

5. Locate the leakage using a leak detector (commercial service tool). Refer to <u>EC-91, "System Diagram"</u>.



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## SERVICE DATA AND SPECIFICATIONS (SDS)

# SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

## Idle Speed

INFOID:000000009720258

[VQ35DE]

Condition	Specification
No load* (in P or N position)	600 ± 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:000000009720259

Condition	Specification
No load* (in P or N position)	$12 \pm 5^{\circ}$ 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:000000009720260

Condition	Specification (Using CONSULT or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

## Mass Air Flow Sensor

INFOID:000000009720261

Supply voltage	Battery voltage (11 – 14 V)
Output voltage at idle (in N position)	0.9 – 1.2 V*
Mass air flow (Using CONSULT or GST)	2.0 – 6.0 g/s at idle* 7.0 – 20.0 g/s at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and running under no load.