SECTION ENGINE CONTROL SYSTEM C

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EVAPORATIVE EMISSION SYSTEM 702	
Inspection702	
SERVICE DATA AND SPECIFICATIONS	

(SDS)	

SERVICE DATA AND SPECIFICATIONS

(SDS)	703
Idle Speed	
Ignition Timing	

BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow



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INFOID:000000007420366 EC **OVERALL SEQUENCE** Inspection start 1. Get information for symptom Get the detailed information about symptom from the customer. 2. Check DTC*1 Check DTC*1 Print out DTC*1 and freeze frame data*2 (or, write it down). Check related service bulletins. Symptom is described. Symptom is not described. Symptom is described. DTC*1 is detected. DTC*1 is detected. DTC*1 is not detected. 3. Confirm the symptom 4. Confirm the symptom Try to confirm the symptom described by the Try to confirm the symptom described by the customer. customer. Also study the normal operation and fail-safe Also study the normal operation and fail-safe related to the symptom. related to the symptom. 5. Perform DTC CONFIRMATION PROCEDURE 6. Perform BASIC INSPECTION With CONSULT Without CONSULT 9. Detect malfunctioning 7. Perform "SPEC" in system by Symptom Within the "DATA MONITOR" mode SP value Table Out of the SP value 8. Detect malfunctioning part by **TROUBLE DIAGNOSIS** Malfunctioning part SPECIFICATION VALUE is not detected. Malfunctioning part 10. Detect malfunctioning part by is detected. **Diagnosis Procedure** 11. Repair or replace the malfunctioning part 12. Final check DTC*1 is detected. Check that the symptom is not detected. Symptom remains. Perform DTC Confirmation Procedure again, and then check that the malfunction is repaired. DTC*1 is not detected. Symptom does not remain. **INSPECTION END** *1: Include 1st trip DTC. *2: Include 1st trip freeze frame data.

DETAILED FLOW

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< BASIC INSPECTION >

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to <u>EC-13</u>, "<u>Diagnostic Work</u> <u>Sheet</u>".)

>> GO TO 2.

2.CHECK DTC

- 1. Check DTC.
- 2. Perform the following procedure if DTC is displayed.
- Record DTC and freeze frame data. (Print them out with CONSULT.)
- Erase DTC. (Refer to EC-95, "Diagnosis Description".)
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to <u>EC-311, "Symptom Table"</u>.)
- 3. Check related service bulletins for information.

Is any symptom described and is any DTC detected?

Symptom is described, DTC is detected>>GO TO 3. Symptom is described, DTC is not detected>>GO TO 4. Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON). Also study the normal operation and fail safe related to the symptom. Refer to <u>EC-315</u>, "<u>Description</u>" and <u>EC-284</u>, "Fail <u>Safe</u>".

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail safe related to the symptom. Refer to <u>EC-315</u>, "<u>Description</u>" and <u>EC-284</u>, "Fail Safe".

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

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

If two or more DTCs are detected, refer to <u>EC-286, "DTC Inspection Priority Chart"</u> and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.

If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-MATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to <u>GI-42, "Intermittent Incident"</u>.

6.PERFORM BASIC INSPECTION

Perform EC-15, "BASIC INSPECTION : Special Repair Requirement".

Do you have CONSULT?

DIAGNOSIS AND REPAIR WORKFLOW

DIAGNOSIS AND REPAIR WORKFLOW	
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YES >> GO TO 7. NO >> GO TO 9.	А
7. PERFORM SPEC IN DATA MONITOR MODE	1
(B)With CONSULT	
Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL" and "A/F ALPHA-B1" are within the SP value using SULT in "SPEC" of "DATA MONITOR" mode. Refer to <u>EC-107, "Component Function Check"</u> .	CON-
Is the measurement value within the SP value?	С
YES >> GO TO 9. NO >> GO TO 8.	
8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE	D
Detect malfunctioning part according to EC-108, "Diagnosis Procedure".	
Is malfunctioning part detected?	-
YES >> GO TO 11. NO >> GO TO 9.	E
9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE	_
Detect malfunctioning system according to <u>EC-311, "Symptom Table"</u> based on the confirmed symptostep 4, and determine the trouble diagnosis order based on possible causes and symptom.	om in ⊢
	G
>> GO TO 10. 10. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE	
	Н
Inspect according to Diagnosis Procedure of the system. NOTE: The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit insp is also required for the circuit check in the Diagnosis Procedure. For details, refer to Circuit Inspection <u>45</u> , "Circuit Inspection".	
Is malfunctioning part detected?	
YES >> GO TO 11.	J
 NO >> Monitor input data from related sensors or check the voltage of related ECM terminals using SULT. Refer to <u>EC-274</u>, "<u>Reference Value</u>". 	CON-
11.REPAIR OR REPLACE THE MALFUNCTIONING PART	K
 Repair or replace the malfunctioning part. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and rement. 	place-
3. Check DTC. If DTC is displayed, erase it. Refer to <u>EC-95, "Diagnosis Description"</u> .	
>> GO TO 12.	M
12. FINAL CHECK	
When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Fu Check again, and then make sure that the malfunction have been repaired securely. When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make that the symptom is not detected.	14
Is DTC detected and does symptom remain?	0
 YES-1 >> DTC is detected: GO TO 10. YES-2 >> Symptom remains: GO TO 6. NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECI TCM (Transmission Control Module). (Refer to <u>EC-95, "Diagnosis Description"</u>.) 	VI and P
Diagnostic Work Sheet	0007420367
DESCRIPTION	

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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

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

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

KEY POINTS

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

WORKSHEET SAMPLE

Customer nar	me MR/MS	Model & Year	VIN	
Engine #		Trans.	Mileage	
Incident Date		Manuf. Date	In Service Date	
Fuel and fuel	filler cap	 Vehicle ran out of fuel causing misfire Fuel filler cap was left off or incorrectly 	/ screwed on.	
	☐ Startability	Impossible to start No combust Partial combustion affected by th Partial combustion NOT affected Possible but hard to start Other	nrottle 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 occu	rrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime		
Frequency		All the time Under certain cond	ditions 🗌 Sometimes	
Weather conditions Not affected				
	Weather	Fine Raining Snowing	Others []	
	Temperature	🗌 Hot 🗌 Warm 🗌 Cool 🗌] Cold 🔲 Humid [°] F	
		Cold During warm-up After warm-up		
Engine conditions Engir		Engine speed		
Road condition	ons	🗌 In town 🔄 In suburbs 🗌 Hig	hway 🗌 Off road (up/down)	
Image: Not affected Image: At starting Image: At starting		ing ng (RH/LH)		
Malfunction ir	ndicator lamp	0 10 20 ☐ Turned on ☐ Not turned on	30 40 50 60 MPH	
			MTBL0017	

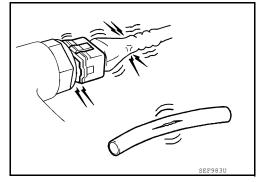
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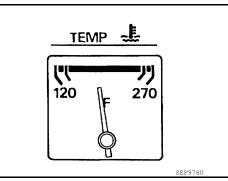
INSPECTION AND ADJUSTMENT BASIC INSPECTION

BASIC INSPECTION : Special Repair Requirement

1.INSPECTION START

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

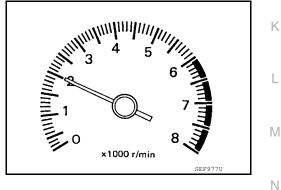




- Run engine at about 2,000 rpm for about 2 minutes under no 5. load.
- Make sure that no DTC is displayed with CONSULT or ECM 6. [Diagnostic Test Mode II (self-diagnostic results)].

Is any DTC detected?

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



2. REPAIR OR REPLACE

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

>> GO TO 3

3.CHECK TARGET IDLE SPEED

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

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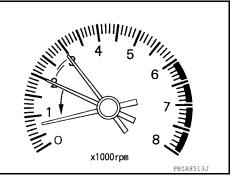
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< BASIC INSPECTION >

- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed.
 For procedure, refer to <u>EC-19</u>, "IDLE SPEED : Special Repair <u>Requirement"</u>. For specification, refer to <u>EC-325</u>, "Idle Speed".

Is the inspection result normal?

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



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4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

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

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-20, "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 TARGET IDLE SPEED AGAIN

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

 Check idle speed. For procedure, refer to <u>EC-19</u>, "IDLE SPEED : Special Repair Requirement". For specification, refer to <u>EC-325</u>, "Idle Speed".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART

Check the Following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-148, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-144, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK ECM FUNCTION

- 1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
- 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>SEC-227</u>, <u>"ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"</u>.

>> GO TO 4.

10.CHECK IGNITION TIMING

1. Run engine at idle.

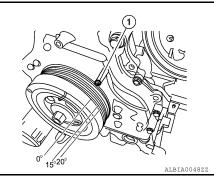
< BASIC INSPECTION >

2. Check ignition timing with a timing light. For procedure, refer to EC-19, "IGNITION TIMING : Special Repair Requirement". For specification, refer to EC-325, "Ignition Timing".

1 : Timing indicator

Is the inspection result normal?

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



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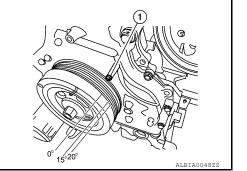
NO >> GOTOTI.	0° 15°20° ALBIA004822
11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEA	
 Stop engine. Perform <u>EC-19. "ACCELERATOR PEDAL RELEASED POSITION ment"</u>. 	N LEARNING : Special Repair Require-
>> GO TO 12.	F
12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	;
Perform EC-20, "THROTTLE VALVE CLOSED POSITION LEARNING	
	G
>> GO TO 13.	
13.PERFORM IDLE AIR VOLUME LEARNING	Н
Perform EC-20, "IDLE AIR VOLUME LEARNING : Special Repair Rec	<u> įuirement"</u> .
<u>Is Idle Air Volume Learning carried out successfully?</u> YES >> GO TO 14.	
NO >> Follow the instruction of Idle Air Volume Learning. Then G	60 TO 4.
14.CHECK TARGET IDLE SPEED AGAIN	
1. Start engine and warm it up to normal operating temperature.	J
2. Check idle speed.	
For procedure, refer to <u>EC-19, "IDLE SPEED : Special Repair Rec</u> For specification, refer to <u>EC-325, "Idle Speed"</u> .	<u>quirement"</u> . K
Is the inspection result normal?	
YES >> GO TO 15.	
NO >> GO TO 17.	L
15. CHECK IGNITION TIMING AGAIN	
1. Run engine at idle.	Μ
 Check ignition timing with a timing light. For procedure, refer to <u>EC-19</u>, "IGNITION TIMING : Special 	(1)
<u>Repair Requirement</u> ". For specification, refer to <u>EC-325, "Igni-</u>	1582 (EMAILICE N

1 : Timing indicator

Is the inspection result normal?

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

tion Timing".



16. CHECK TIMING CHAIN INSTALLATION

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

Is the inspection result normal?

YES >> GO TO 17.

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

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-148, "DTC Logic".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-144. "DTC Logic".

Is the inspection result normal?

YES >> GO TO 18.

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

18.CHECK ECM FUNCTION

- 1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
- 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to <u>SEC-227</u>, <u>"ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"</u>.

>> GO TO 4.

19.INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, go to <u>EC-18</u>, "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:000000007420369

When replacing ECM, this procedure must be performed.

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

1.PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS Refer to SEC-227, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement".

>> GO TO 2.

2.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-19. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-20, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 4.

4.PERFORM IDLE AIR VOLUME LEARNING

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

>> END IDLE SPEED

IDLE SPEED : Description

INFOID:000000007420371

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

Revision: February 2013

< BASIC INSPECTION >

IDLE SPEED : Special Repair Requirement

1.CHECK IDLE SPEED

With CONSULT

Check engine speed in "DATA MONITOR" mode with CONSULT.

Without CONSULT

Check engine speed by installing the pulse type tachometer clamp on the loop wire.

>> 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".

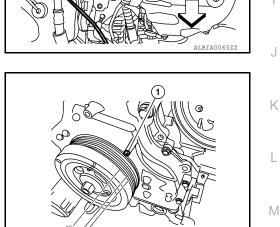
IGNITION TIMING : Special Repair Requirement

1.CHECK IGNITION TIMING

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

- 2 : Timing light

- 2. Check ignition timing.
 - 1 : Timing indicator
 - >> INSPECTION END



ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOLD.00000007420375

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

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement

1.START

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

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< BASIC INSPECTION >

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

>> END THROTTLE VALVE CLOSED POSITION LEARNING

THROTTLE VALVE CLOSED POSITION LEARNING : Description

INFOID:000000007420377

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

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

INFOID:000000007420378

1.START

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

>> END IDLE AIR VOLUME LEARNING

IDLE AIR VOLUME LEARNING : Description

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

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

IDLE AIR VOLUME LEARNING : Special Repair Requirement

1.PRECONDITIONING

Make sure that all of the following conditions are satisfied.

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

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 100°C (158 212°F)
- Selector lever: P or N (CVT), Neutral (M/T)
- Electric load switch: OFF (Air conditioner, headlamp, rear window defogger)
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
- CVT models
- With CONSULT: Drive vehicle until "ATF TENP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9V.
- Without CONSULT: Drive vehicle for 10 minutes.
- M/T models
- Drive vehicle for 10 minutes.

Do you have CONSULT?

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

With CONSULT

1. Perform Accelerator Pedal Released Position Learning. Refer to <u>EC-19, "ACCELERATOR PEDAL</u> <u>RELEASED POSITION LEARNING : Special Repair Requirement"</u>.

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2. Perform	Throttle Valve Clo	sed Position Le	arning. Refe	r to <u>EC-20, "T</u>	HROTTLE VALVE CL	OSED POSI-
 Start eng Select "II 	ARNING : Special ine and warm it up DLE AIR VOL LEA TART" and wait 20	to normal oper RN" in "WORK	ating temper			A
<u>ls "CMPLT" d</u>	isplayed on CONS	ULT screen?				EC
	GO TO 4. GO TO 5.					C
3.IDLE AIR	VOLUME LEARNI	NG				
Without C NOTE:	ONSULT					D
• It is better	to count the time					
It is impos a malfunct		e diagnostic m	lode when a	n accelerator	pedal position senso	er circuit nas
					EC-19, "ACCELERA	<u>FOR PEDAL</u>
	ED POSITION LEA Throttle Valve Clo				HROTTLE VALVE CL	OSED POSI-
2 Start and	ARNING : Special	Repair Require	<u>ment"</u> .	oturo		F
	ine and warm it up tion switch OFF ar			ature.		
5. Confirm	that accelerator pe	dal is fully relea	ised, turn ign		N and wait 3 seconds.	G
	he following proceo press the accelerat		e times within	5 seconds.		
- Fully rele	ase the accelerato	or pedal.				ha Mill atana H
	econds, fully depre and turned ON.	ss the accelerat	tor pedal and	keep it for ap	prox. 20 seconds until t	he MIL stops
8. Fully rele	ase the accelerato	or pedal within 3	seconds aft	er the MIL turn	ed ON.	
9. Start eng 10. Wait 20 s	ine and let it idle.					I
Engine	Run				[
Ignitio					i dle air volume learning s	J
switch	OFF	Within	'sec.	Approx. 20 sec. 13 sec		
		3 sec. 5 sec.	→ 4	10 sec.		
	Fully depressed _F					K
Accele pedal	Fully released					
MIL	Teleaseu		IN	Blinking ON	OFF	L
WILL				Binning ON	SEC897	С
>> (GO TO 4.					M
4.CHECK IE	DLE SPEED AND I	GNITION TIMI	١G			
Rev up the e	ngine two or three	times and mak	e sure that ic	le speed and	ignition timing are withi	n the specifi-
cations.	-					N
ITEM	SPECIFIC	ATION				0
Idle speed	CVT: 650 \pm 50 rpm (in M/T: 650 \pm 50 rpm (in	• •				0
Ignition timing	CVT: 15 \pm 5° (in P or M/T: 15 \pm 5° (in Neutr					P
Is the inspect	ion result normal?					
_	NSPECTION END					
5.DETECT	MALFUNCTIONIN	G PART				

Check the following

Check that throttle valve is fully closed.

< BASIC INSPECTION >

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

Is the inspection result normal?

NO >> Repair or replace malfunctioning part.

6.DETECT MALFUNCTIONING PART

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

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to <u>EC-107</u>, "<u>Description</u>". If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:

- Engine stalls.
- · Erroneous idle.

>> INSPECTION END MIXTURE RATIO SELF-LEARNING VALUE CLEAR

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description

INFOID:000000007420381

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

MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement

INFOID:000000007420382

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".

Without CONSULT

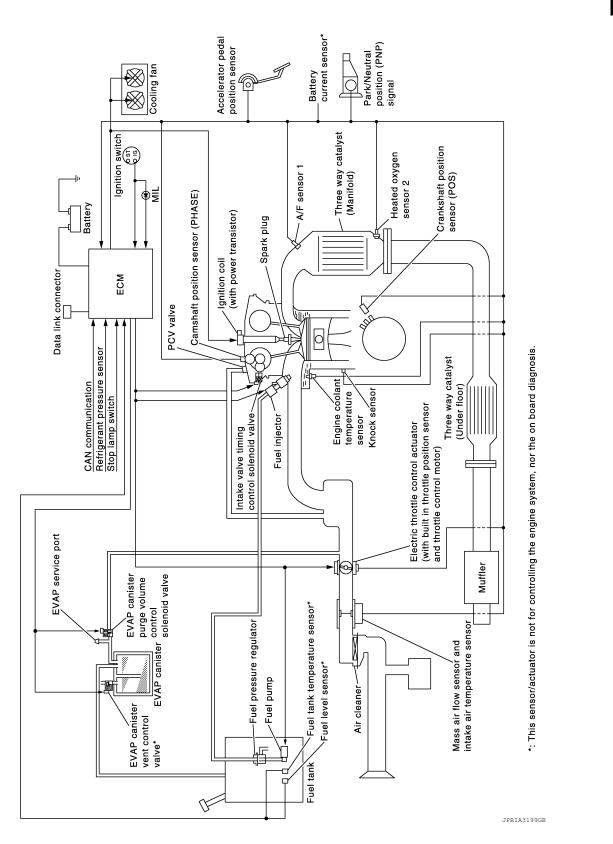
- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn ignition switch OFF.
- 3. Disconnect mass air flow sensor harness connector.
- 4. Restart engine and let it idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Turn ignition switch ON.
- 7. Check DTC and confirm that DTC P0102 is detected.
- 8. Erase the DTC P0102.

>> END

SYSTEM DESCRIPTION

ENGINE CONTROL SYSTEM

System Diagram



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System Description

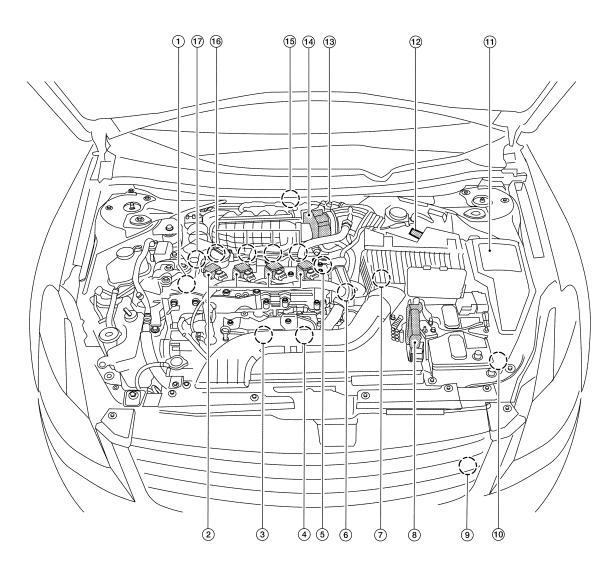
ECM performs various controls such as fuel injection control and ignition timing control.

Component Parts Location

INFOID:000000007420385

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- 1. Intake valve timing control solenoid 2. valve
- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor

- Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE) 6.
- 8. ECM
- 11. IPDM E/R

- ALBIA0094ZZ
- 3. Knock sensor, Crankshaft position sensor (POS)
- Engine coolant temperature sensor
 Refrigerant pressure sensor
- 12. Mass air flow sensor (with intake temperature sensor)

< SYSTEM DESCRIPTION >

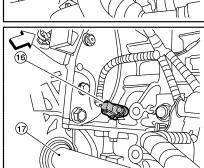
13. EVAP service port

16. Fuel injector

- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 15. EVAP canister purge volume control solenoid valve
- 17. Power steering pressure sensor

- 0000 ດດອດດ (10) (((15) 0
- 1. Battery
- Brake master cylinder 4.
- 7. Mass air flow sensor (with intake air 8. temperature sensor)
- 10. Intake air duct
- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- Fuel pump fuse (15A)
- Engine ground
 - Radiator hose (upper)
- 11. Camshaft position sensor (PHASE)
 - Knock sensor
- 17. Drive shaft (RH)



- 3. IPDM E/R
- 6. Air cleaner assembly
- 9. Engine coolant temperature sensor

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- 12. Tie rod (RH)
- 15. Engine oil cooler

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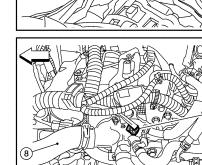
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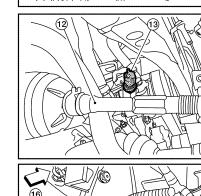
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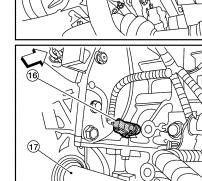
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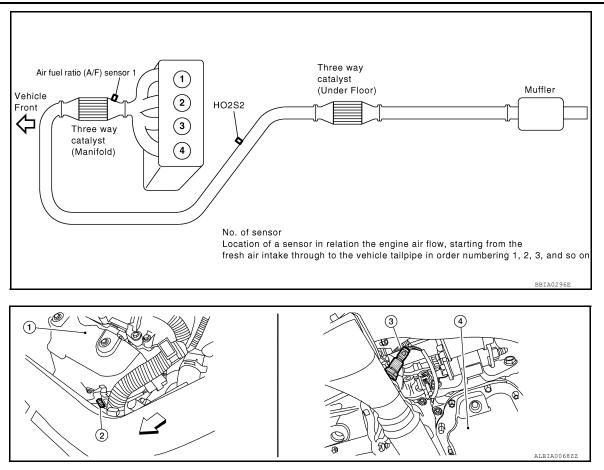




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< SYSTEM DESCRIPTION >

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- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

< SYSTEM DESCRIPTION >

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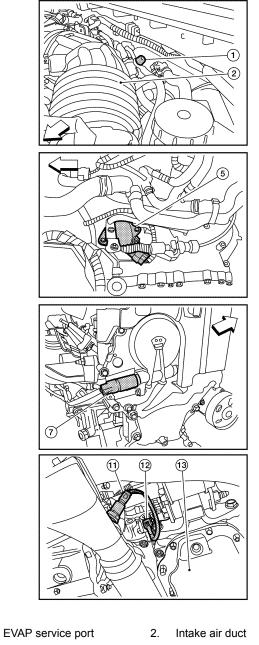
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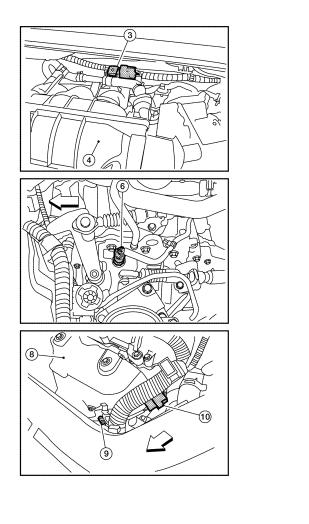
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- 1.
- Intake manifold collector 4.
- 7. Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1 11. Heated oxygen sensor 2 harness connector
- 13. Engine oil pan
- C: Vehicle front

- Transmission range switch (CVT models) 6. 5. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - (This illustration is view from under vehicle.)

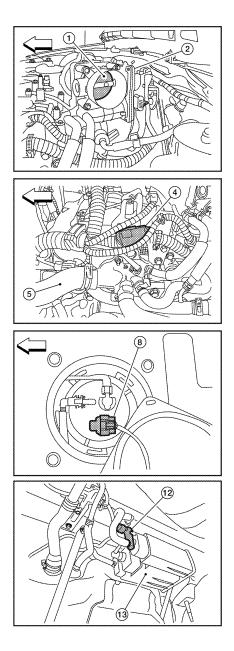


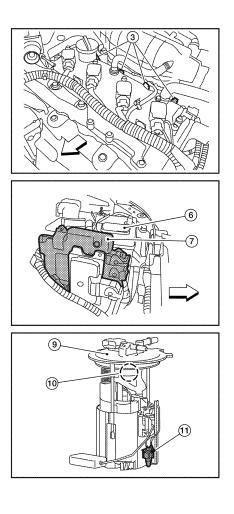
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- Μ 3. EVAP canister purge volume control solenoid valve Park/neutral position (PNP) switch (M/T models) (This illustration is view with air Ν cleaner assembly removed.) 9. Air fuel ratio (A/F) sensor 1 Ο
- 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.)

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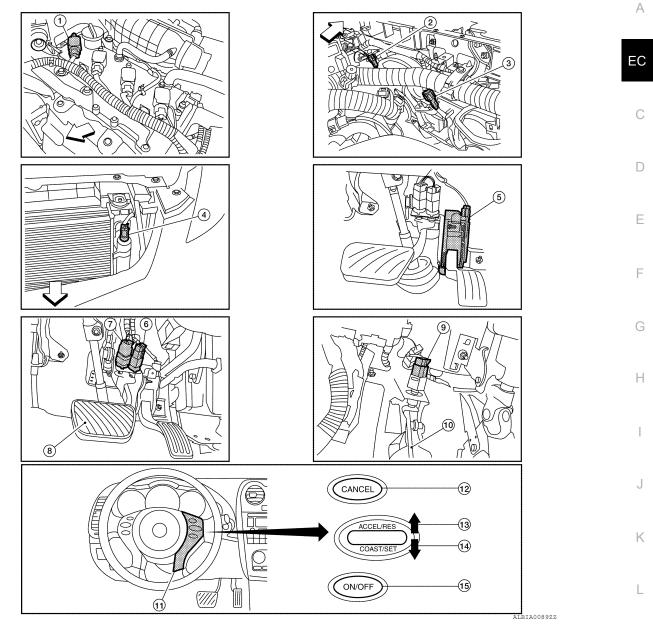
- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- 13. EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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Component	Reference
A/F sensor 1	EC-228. "Description"
A/F sensor 1 heater	EC-231. "Description"
Accelerator pedal position sensor	EC-208, "Description"
ASCD brake switch	EC-179. "Description"

Revision: February 2013

< SYSTEM DESCRIPTION >

Component	Reference
ASCD steering switch	EC-176, "Description"
Camshaft position sensor (PHASE)	EC-148. "Description"
Crankshaft position sensor (POS)	EC-144. "Description"
Cooling fan motor	EC-67. "System Description"
Electric throttle control actuator	EC-206, "Description"
Engine coolant temperature sensor	EC-133. "Description"
EVAP canister purge volume control solenoid valve	EC-241. "Description"
Fuel injector	EC-247, "Description"
Fuel pump	EC-250, "Description"
Heated oxygen sensor 2	EC-254. "Description"
Heated oxygen sensor 2 heater	EC-259. "Description"
Ignition signal	EC-264, "Description"
Intake air temperature sensor	EC-262, "Description"
Intake valve timing control solenoid valve	EC-87. "System Description"
Knock sensor	EC-142, "Description"
Mass air flow sensor	EC-128, "Description"
PCV valve	EC-270. "Description"
Power steering pressure sensor	EC-154, "Description"
Refrigerant pressure sensor	EC-271, "Description"
Stop lamp switch	EC-193. "Description"
Throttle control motor	EC-204. "Description"
Throttle control motor relay	EC-198, "Description"
Throttle position sensor	EC-136, "Description"

< SYSTEM DESCRIPTION >

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

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Crankshaft position sensor (POS)	Engine speed*2 & 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		
Park/neutral position (PNP) switch (M/T models)	Gear position	ECM	control	Fuel injector	
Transmission range switch (CVT models)	Gear position]			
Battery	Battery voltage*2				
	Engine knocking condition				
Knock sensor	<u> </u>	→			
Power steering pressure sensor	Power steering operation	→			
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas				
ABS actuator and electric unit (control unit)	VDC/TCS operation command	⇒			
Combination meter	Vehicle speed	⇒			
BCM	Air conditioner operation				
*1 : This sensor is not used to control the en *2 : ECM determines the start signal status b	gine system under normal conditions. by the signals of engine speed and battery	voltage.]		
: This signal is sent through CAN con	nmunication line.			JPBIA3150GB	

System Description

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	Engine speed* ³			
Camshaft position sensor (PHASE)	Piston position			
Mass air flow sensor	Amount of intake air			
Intake air temperature sensor	Intake air temperature			
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		
Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)	Gear position	& mixture ratio control	Fuel injector	
Battery	Battery voltage*3			
Knock sensor	Engine knocking condition			
Power steering pressure sensor	Power steering operation			
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas			
ABS actuator and electric unit (control unit)	ABS operation command* ²			
BCM	Air conditioner operation* ²			
Combination meter	Vehicle speed* ²			

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

< SYSTEM DESCRIPTION >

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

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

SYSTEM DESCRIPTION

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

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

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

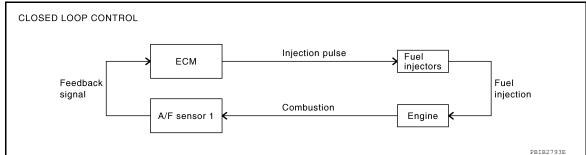
<Fuel increase>

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

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses A/F sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about A/F sensor 1, refer to <u>EC-228</u>, "<u>Description</u>". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

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

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

Open Loop Control

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

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

MIXTURE RATIO SELF-LEARNING CONTROL

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



< 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.

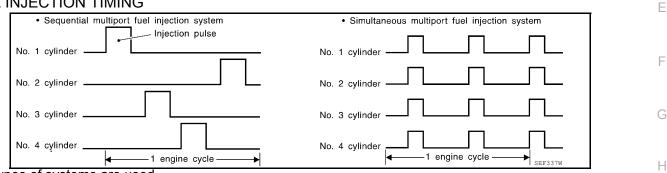
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

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

FUEL INJECTION TIMING



Two types of systems are used.

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

FUEL SHUT-OFF

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

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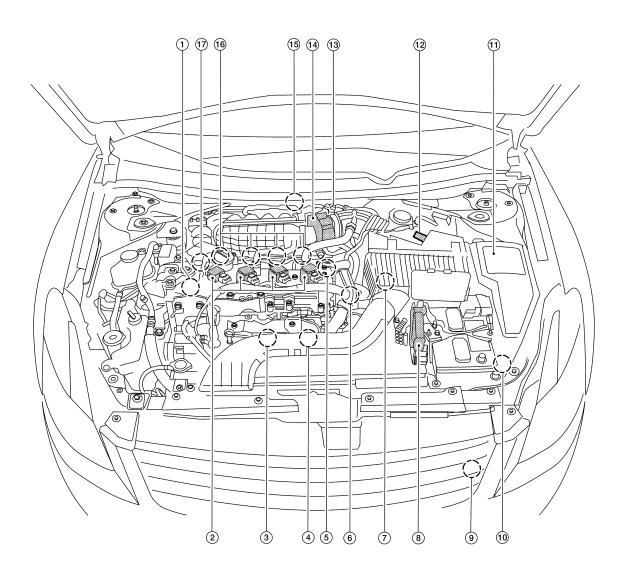
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Component Parts Location

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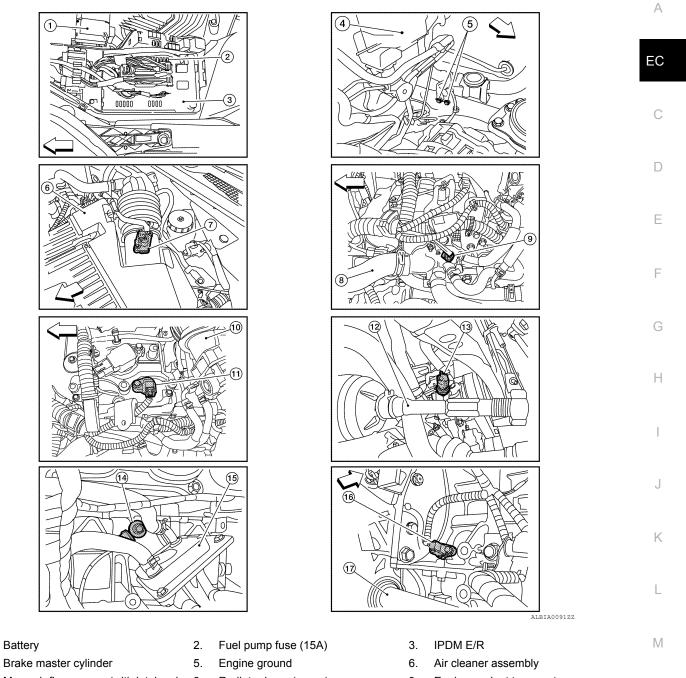
- 1. Intake valve timing control solenoid valve
- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor
- 13. EVAP service port
- 16. Fuel injector

- 2. Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE)
- 8. ECM
- 11. IPDM E/R
- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 17. Power steering pressure sensor

- Knock sensor, Crankshaft position sensor (POS)
- 6. Engine coolant temperature sensor
- 9. Refrigerant pressure sensor
- 12. Mass air flow sensor (with intake temperature sensor)
- 15. EVAP canister purge volume control solenoid valve

< SYSTEM DESCRIPTION >

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- Mass air flow sensor (with intake air 8. 7. temperature sensor)
- 10. Intake air duct

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- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- Radiator hose (upper)
- Camshaft position sensor (PHASE) 11.
- 14. Knock sensor
- 17. Drive shaft (RH)

- 9. Engine coolant temperature sensor
- 12. Tie rod (RH)
- 15. Engine oil cooler

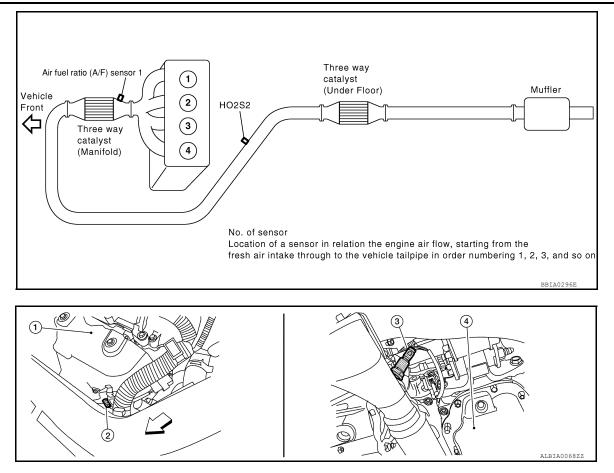
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< SYSTEM DESCRIPTION >

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- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

MULTIPORT FUEL INJECTION SYSTEM

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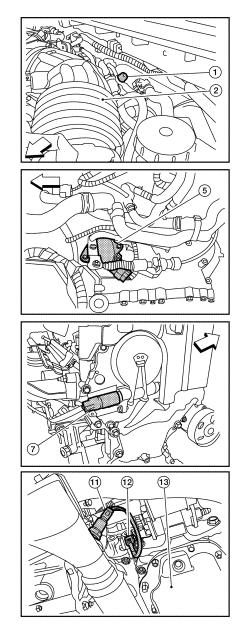
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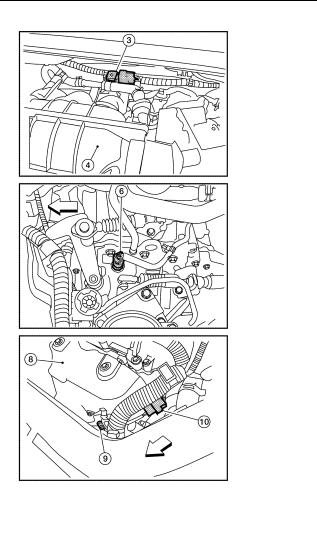
1. EVAP service port

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- Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view free)
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)



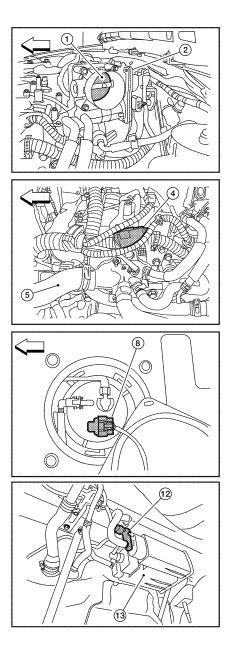
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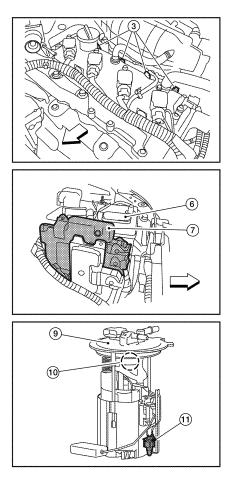
- EVAP canister purge volume control solenoid valve
 Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
 Air fuel ratio (A/F) sensor 1
 Heated oxygen sensor 2 harness con-
 - (This illustration is view from under vehicle.)

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MULTIPORT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >





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- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

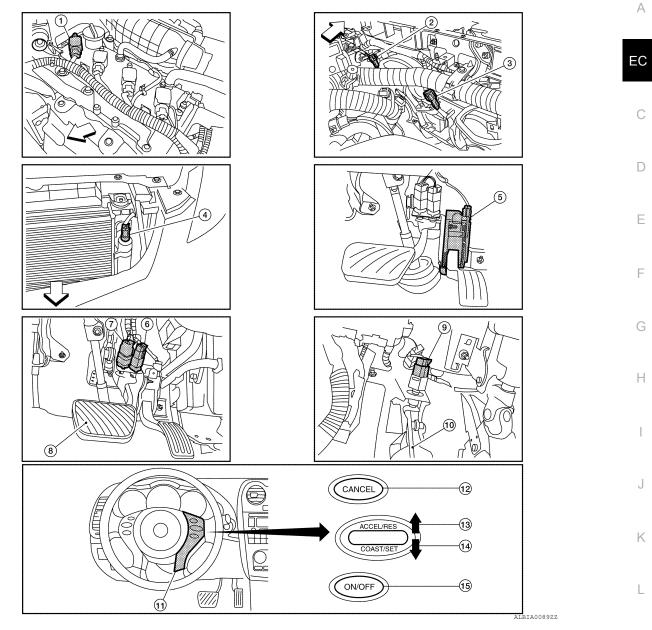
- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

MULTIPORT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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Component	Reference
A/F sensor 1	EC-228. "Description"
Accelerator pedal position sensor	EC-208. "Description"
Camshaft position sensor (PHASE)	EC-148, "Description"
Crankshaft position sensor (POS)	EC-144. "Description"

Revision: February 2013



MULTIPORT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >

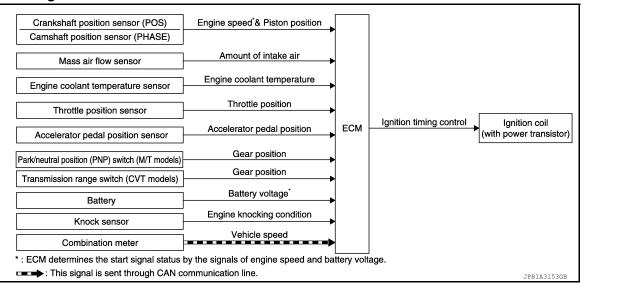
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Component	Reference
Engine coolant temperature sensor	EC-133, "Description"
Fuel injector	EC-247. "Description"
Heated oxygen sensor 2	EC-254, "Description"
Intake air temperature sensor	EC-262, "Description"
Knock sensor	EC-142, "Description"
Mass air flow sensor	EC-128, "Description"
Power steering pressure sensor	EC-154, "Description"
Throttle position sensor	EC-136, "Description"
Vehicle speed sensor	EC-152, "Description"

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ELECTRIC IGNITION SYSTEM

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

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

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

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

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

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

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

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

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

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

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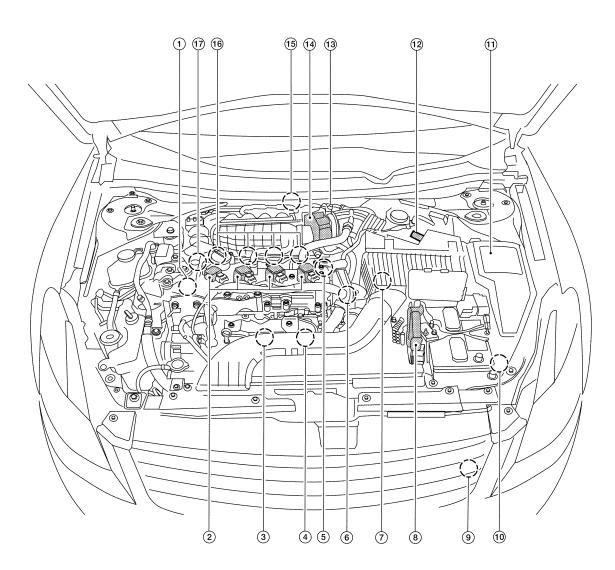
< SYSTEM DESCRIPTION >

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

Component Parts Location

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1.	Intake valve timing control solenoid	2
	valve	

- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor
- 13. EVAP service port
- 16. Fuel injector

- 2. Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE)
- 8. ECM

11. IPDM E/R

- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 17. Power steering pressure sensor

- ALBIA0094ZZ
- Knock sensor, Crankshaft position sensor (POS)
- 6. Engine coolant temperature sensor
- 9. Refrigerant pressure sensor

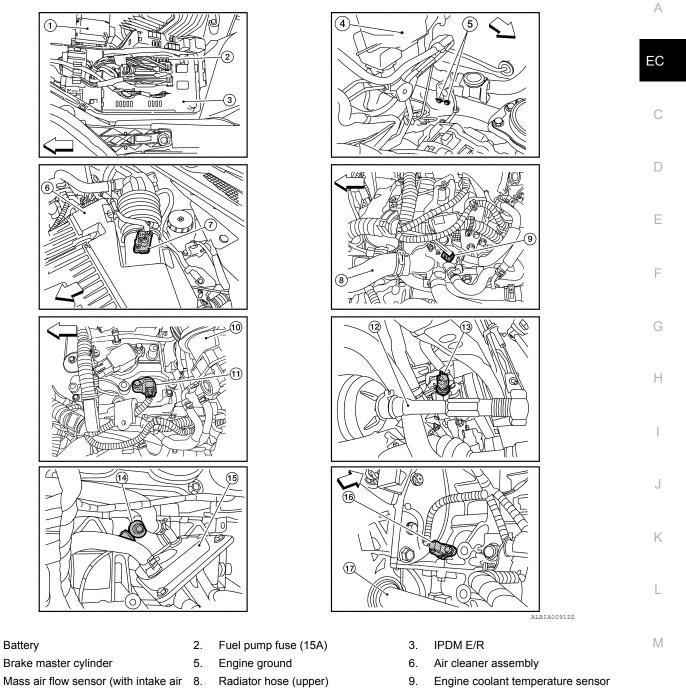
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- 12. Mass air flow sensor (with intake temperature sensor)
- 15. EVAP canister purge volume control solenoid valve



< SYSTEM DESCRIPTION >

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- 7. temperature sensor)
- 10. Intake air duct

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- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- Radiator hose (upper)
- Camshaft position sensor (PHASE) 11.
- 14. Knock sensor
- 17. Drive shaft (RH)

- 12. Tie rod (RH)
- 15. Engine oil cooler

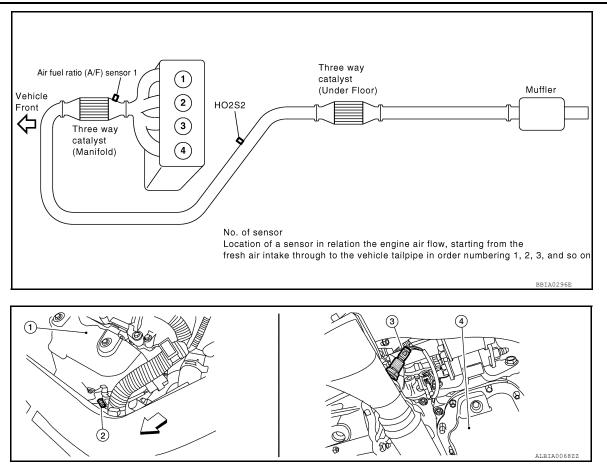
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< SYSTEM DESCRIPTION >

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- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

< SYSTEM DESCRIPTION >

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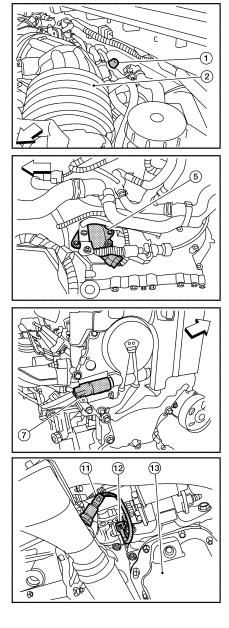
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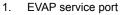
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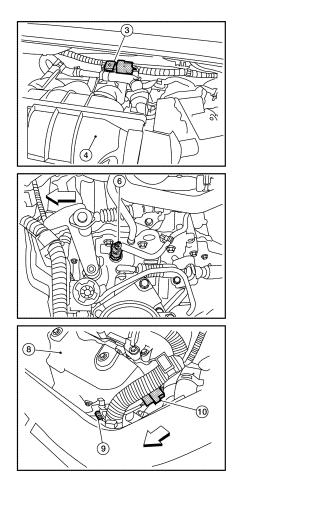




- 4. Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view finding the sensor 2)
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)

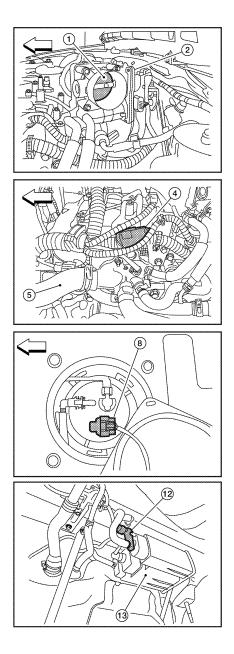


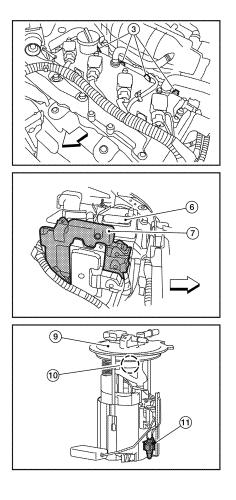
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- EVAP canister purge volume control solenoid valve
 Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
 Air fuel ratio (A/F) sensor 1
- 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.)

< SYSTEM DESCRIPTION >

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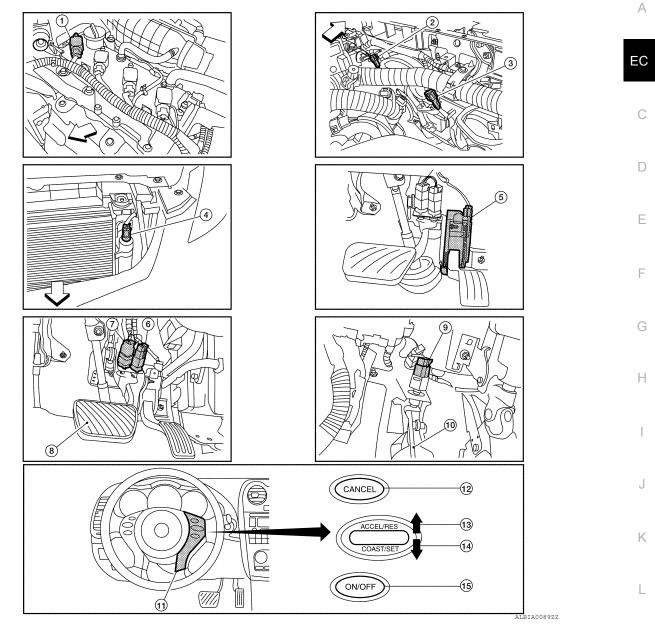
- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- 13. EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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Component	Reference
Accelerator pedal position sensor	EC-208. "Description"
Camshaft position sensor (PHASE)	EC-148. "Description"
Crankshaft position sensor (POS)	EC-144, "Description"
Engine coolant temperature sensor	EC-133. "Description"

Revision: February 2013



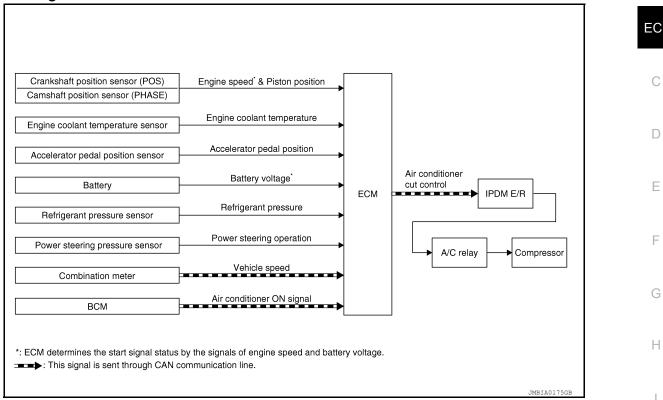
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Component	Reference
Ignition signal	EC-264, "Description"
Knock sensor	EC-142, "Description"
Mass air flow sensor	EC-128, "Description"
Throttle position sensor	EC-136, "Description"
Vehicle speed sensor	EC-152, "Description"

< SYSTEM DESCRIPTION >

AIR CONDITIONING CUT CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

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

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

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

SYSTEM DESCRIPTION

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

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

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

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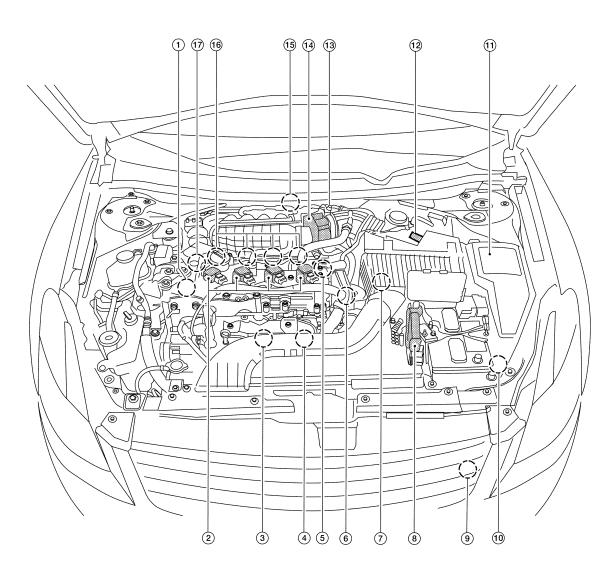
< SYSTEM DESCRIPTION >

• When engine speed is excessively low.

• When refrigerant pressure is excessively low or high.

Component Parts Location

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1. Intake valve timing control solenoid valve

- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor
- 13. EVAP service port
- 16. Fuel injector

- 2. Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE)
- 8. ECM

11. IPDM E/R

- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 17. Power steering pressure sensor

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- Knock sensor, Crankshaft position sensor (POS)
- 6. Engine coolant temperature sensor
- 9. Refrigerant pressure sensor

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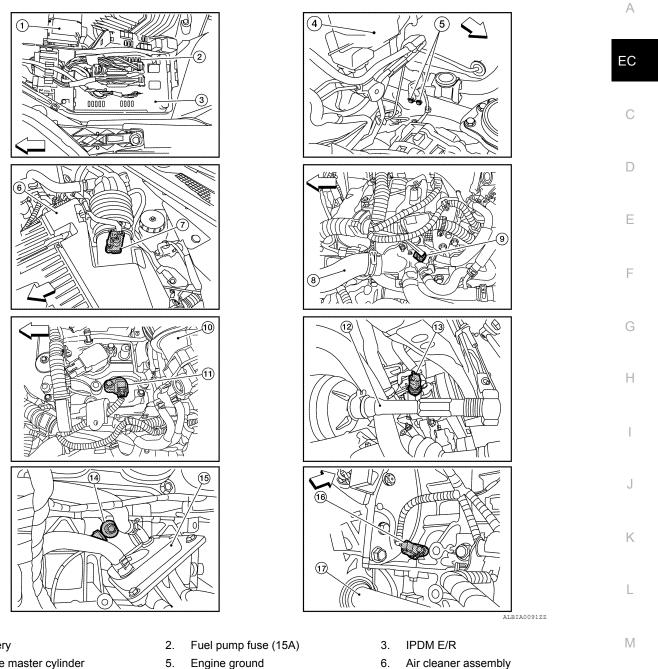
- 12. Mass air flow sensor (with intake temperature sensor)
- 15. EVAP canister purge volume control solenoid valve

Revision: February 2013



< SYSTEM DESCRIPTION >

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- 1. Battery
- Brake master cylinder 4.
- Mass air flow sensor (with intake air 8. 7. temperature sensor)
- 10. Intake air duct
- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- 5. Engine ground
 - Radiator hose (upper)
- Camshaft position sensor (PHASE) 11.
- 14. Knock sensor
- 17. Drive shaft (RH)

- 9. Engine coolant temperature sensor
- 12. Tie rod (RH)
- 15. Engine oil cooler

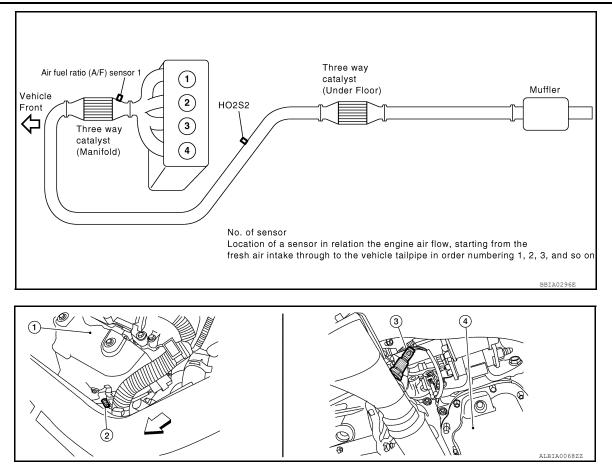
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< SYSTEM DESCRIPTION >

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- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

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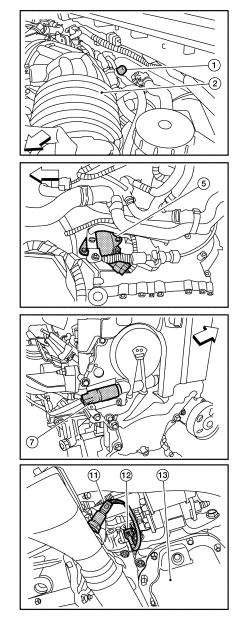
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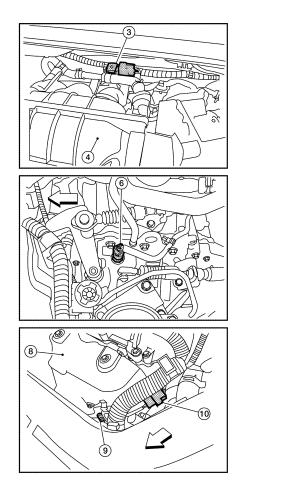
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- 1. EVAP service port
- 4. Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view free)
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)

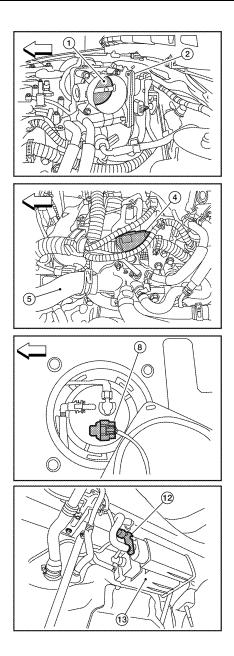


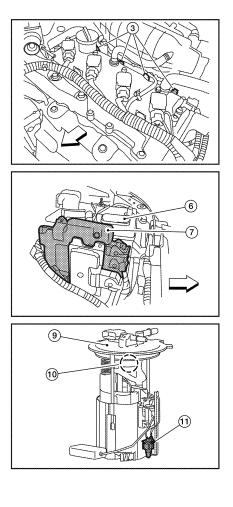
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- EVAP canister purge volume control solenoid valve
 Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
 Air fuel ratio (A/F) sensor 1
 Heated oxygen sensor 2 harness con
 - nector (This illustration is view from under vehicle.)

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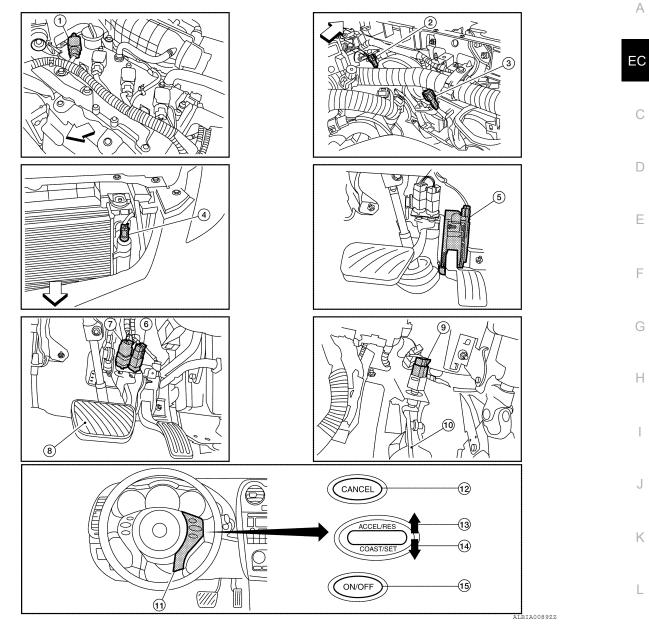
- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- 13. EVAP canister (This illustration is view with rear suspension member removed.)
- <□ : Vehicle front

- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

< SYSTEM DESCRIPTION >

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- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- : Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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 Component
 Reference

 Accelerator pedal position sensor
 EC-208, "Description"

 Camshaft position sensor (PHASE)
 EC-148, "Description"

 Crankshaft position sensor (POS)
 EC-144, "Description"

 Engine coolant temperature sensor
 EC-133, "Description"

Revision: February 2013



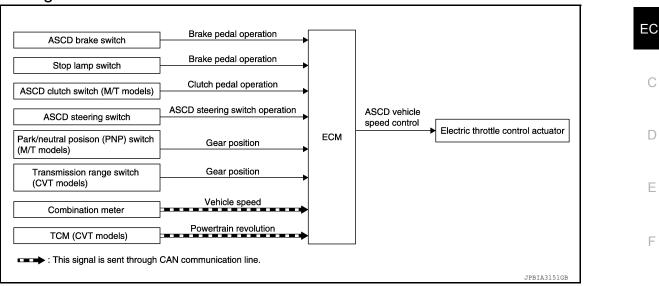
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Component	Reference
Power steering pressure sensor	EC-154, "Description"
Refrigerant pressure sensor	EC-271. "Description"
Vehicle speed sensor	EC-152, "Description"

< SYSTEM DESCRIPTION >

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

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

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

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/ Ν h (25 MPH) and 180 km/h (112 MPH).

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

The ASCD operation status is indicated by two indicators (CRUISE and SET on the information display) on the Ο combination meter. If any malfunction occurs in ASCD system, SET indicator blinks and ASCD control is deactivated.

NOTE:

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

SET OPERATION

Press MAIN switch. (CRUISE is indicated on the information display.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 180 km/h (112 MPH), press SET/COAST switch. (Then SET is indicated on the information display.)

ACCELERATE OPERATION

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

CANCEL OPERATION

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

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

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

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

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

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

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

COAST OPERATION

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

RESUME OPERATION

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

- Brake pedal is released
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 180 km/h (112 MPH)

< SYSTEM DESCRIPTION >

Component Parts Location

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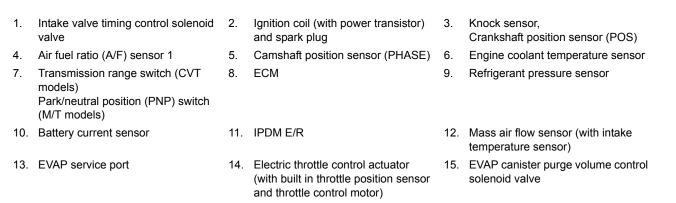
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17. Power steering pressure sensor

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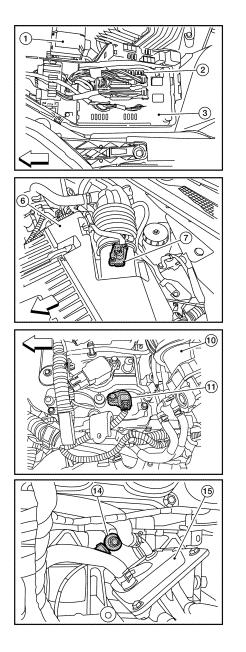
16. Fuel injector

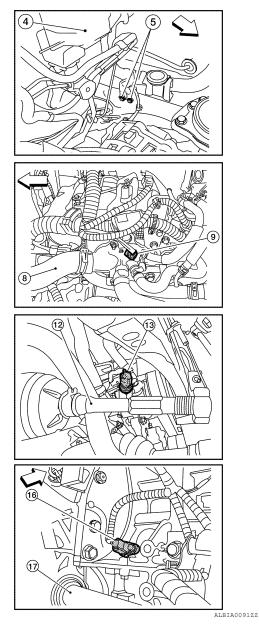


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AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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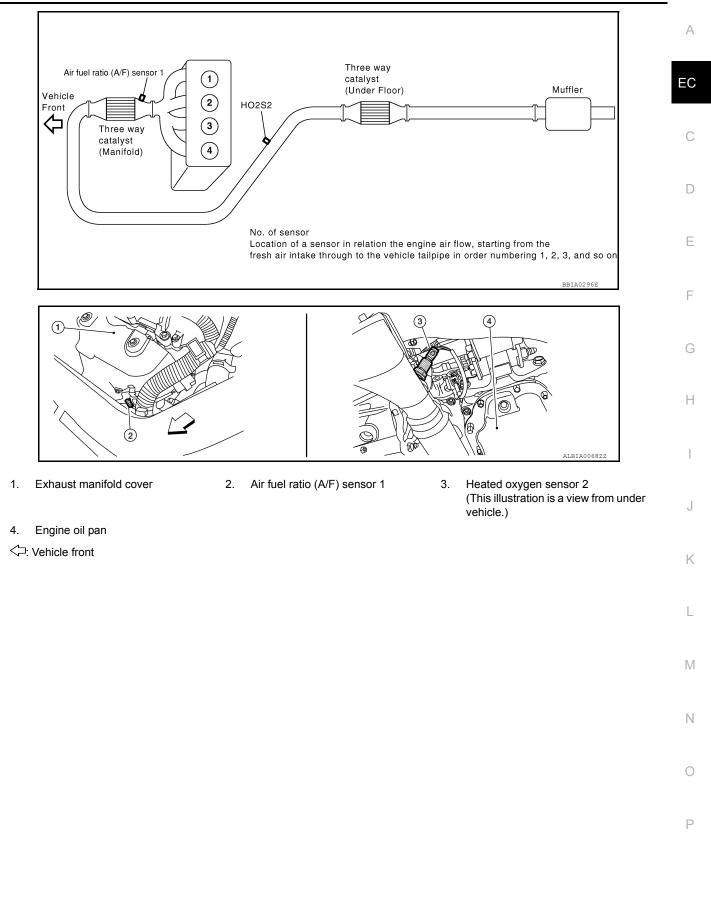
- 1. Battery
- Brake master cylinder 4.
- Mass air flow sensor (with intake air 8. 7. temperature sensor)
- 10. Intake air duct
- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- Fuel pump fuse (15A) 2.
- 5. Engine ground
 - Radiator hose (upper)
- 11. Camshaft position sensor (PHASE) 12. Tie rod (RH)
- 14. Knock sensor
- 17. Drive shaft (RH)

- IPDM E/R 3.
- 6. Air cleaner assembly
- 9. Engine coolant temperature sensor
- 15. Engine oil cooler

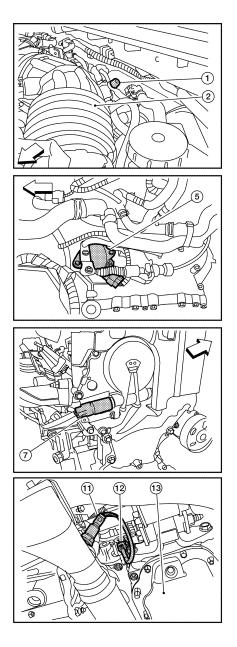
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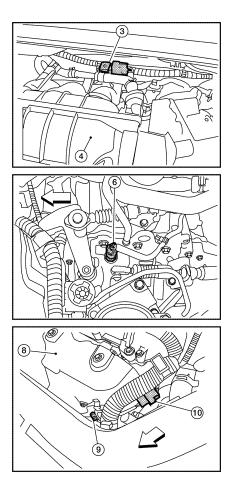
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- EVAP service port 1.
- Intake manifold collector 4.
- 7. Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- harness connector
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. 5. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
- 10. Air fuel ratio (A/F) sensor 1 11. Heated oxygen sensor 2 (This illustration is view from under vehicle.)



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- 3. EVAP canister purge volume control solenoid valve
 - Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
- 9. Air fuel ratio (A/F) sensor 1
- 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.)

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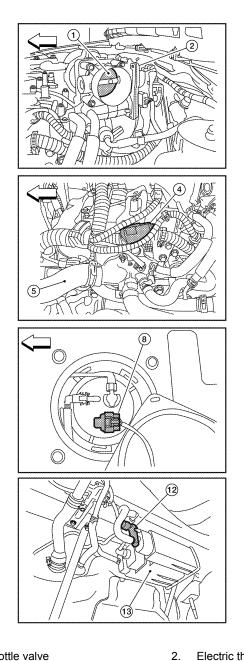
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6 7 9 10 (11) ALBIA0518ZZ Electric throttle control actuator 3. Fuel injector harness connector

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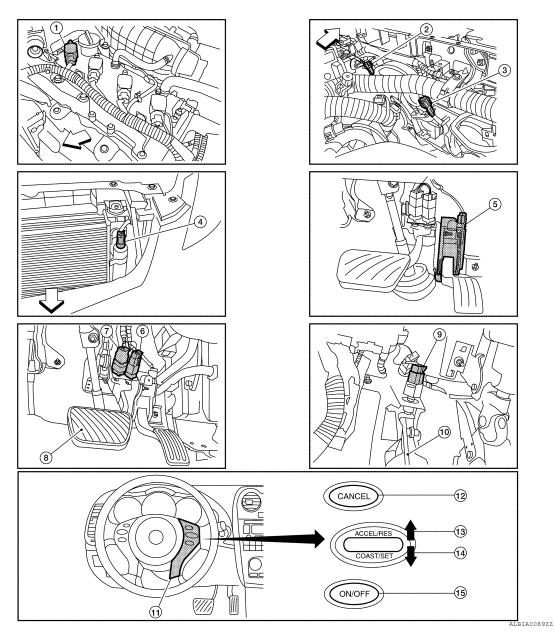
Radiator hose (upper)

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- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor
- Battery Fuel level sensor unit and fuel pump assembly
- 12. EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

- Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

< SYSTEM DESCRIPTION >



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- 3. Cooling fan motor-2 harness connector
- 6. ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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Component	Reference
ASCD steering switch	EC-176. "Description"
ASCD clutch switch	EC-179. "Description"
ASCD brake switch	EC-179, "Description"
Stop lamp switch	EC-193. "Description"

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< SYSTEM DESCRIPTION >

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Component	Reference	
Electric throttle control actuator	EC-206, "Description"	A
ASCD indicator	EC-227, "Description"	
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CAN COMMUNICATION

System 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.

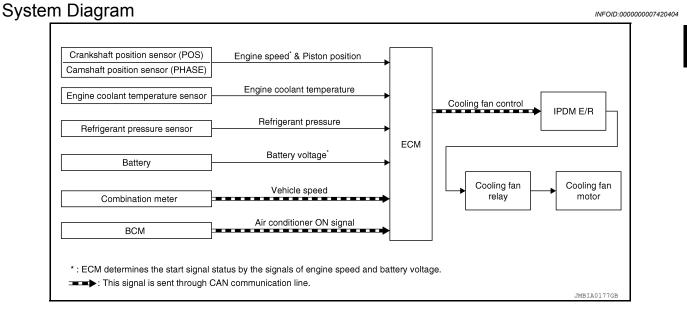
Refer to LAN-24, "CAN Communication Signal Chart", about CAN communication for detail.

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COOLING FAN CONTROL



System Description

INPUT/OUTPUT SIGNAL CHART

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

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

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

SYSTEM DESCRIPTION

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

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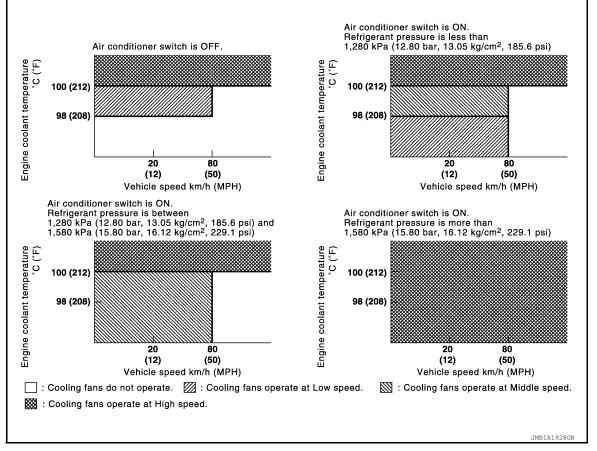
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Cooling Fan Operation



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

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

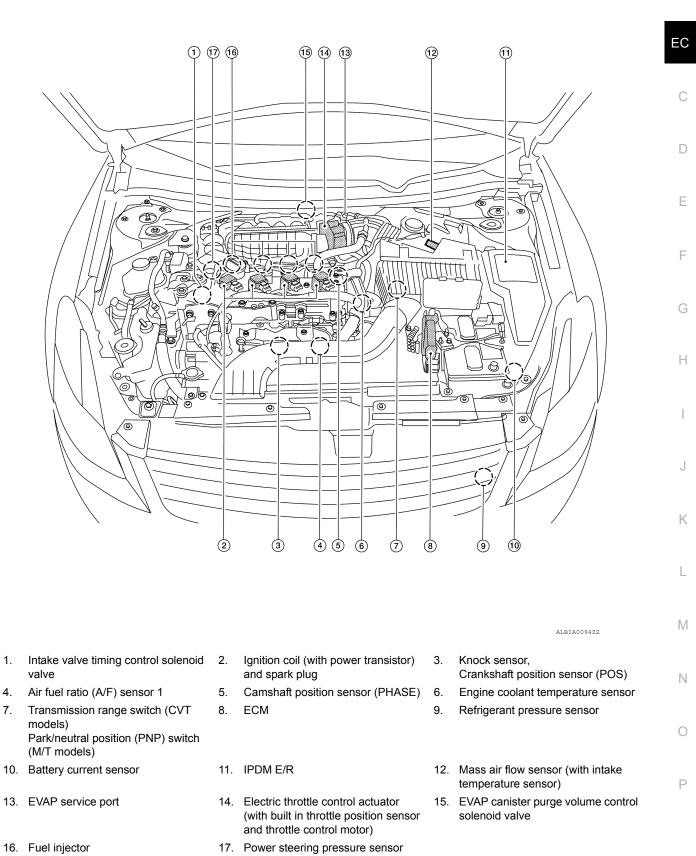
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Component Parts Location

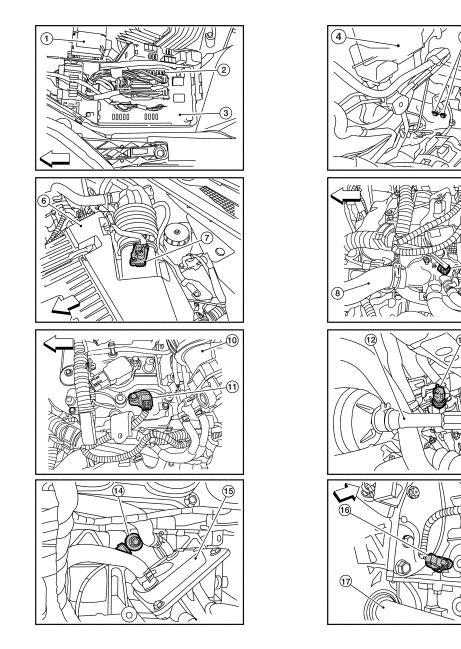
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< SYSTEM DESCRIPTION >



- 1. Battery
- 4. Brake master cylinder
- 7. Mass air flow sensor (with intake air 8. temperature sensor)
- 10. Intake air duct
- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- 2. Fuel pump fuse (15A)
- 5. Engine ground
 - Radiator hose (upper)
- 11. Camshaft position sensor (PHASE) 12. Tie rod (RH)
- 14. Knock sensor
- 17. Drive shaft (RH)

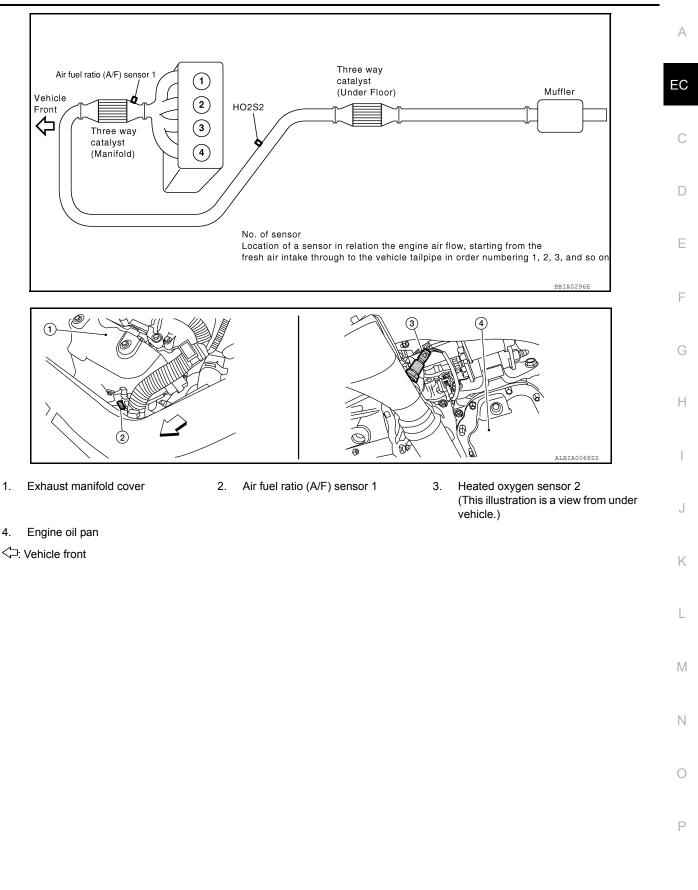
- IPDM E/R 3.
- 6. Air cleaner assembly
- 9. Engine coolant temperature sensor

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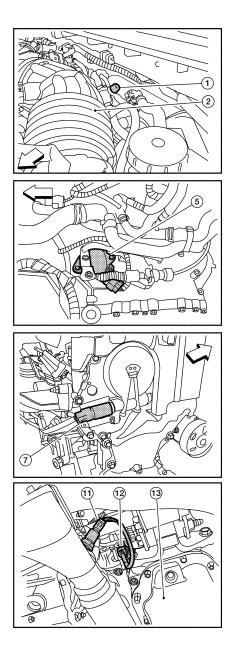
- 15. Engine oil cooler

< SYSTEM DESCRIPTION >

[QR25DE]



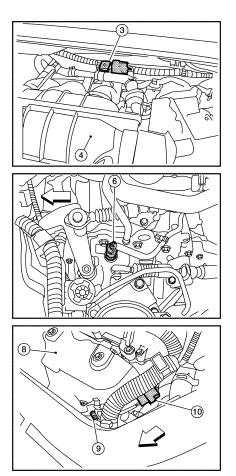
< SYSTEM DESCRIPTION >



- 1. EVAP service port
- 4. Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view fr
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)



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- 3. EVAP canister purge volume control solenoid valve
 - Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
- 9. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.)

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

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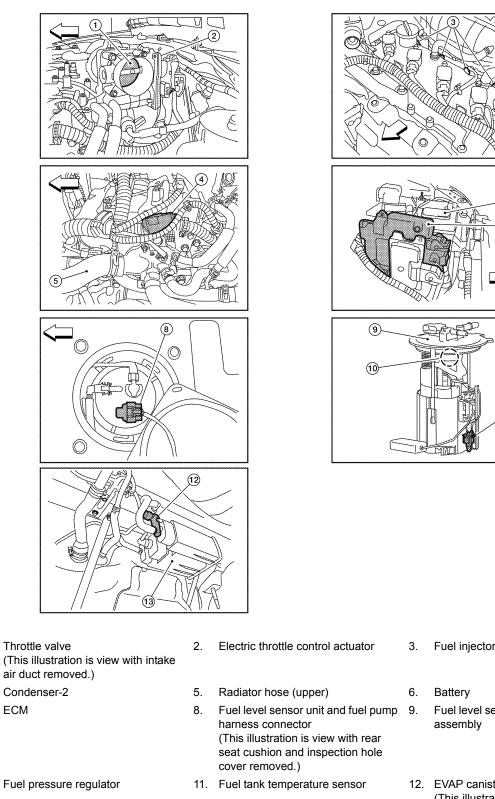
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- Throttle valve 1. (This illustration is view with intake air duct removed.)
- 4.
- 7. ECM
- 10. Fuel pressure regulator
- 13. EVAP canister (This illustration is view with rear suspension member removed.)
- : Vehicle front

		ALBIA0518ZZ	
	3.	Fuel injector harness connector	M
)	6. 9.	Battery Fuel level sensor unit and fuel pump assembly	Ν
			0
	12.	EVAP canister vent control valve (This illustration is view with rear	D

suspension member removed.)

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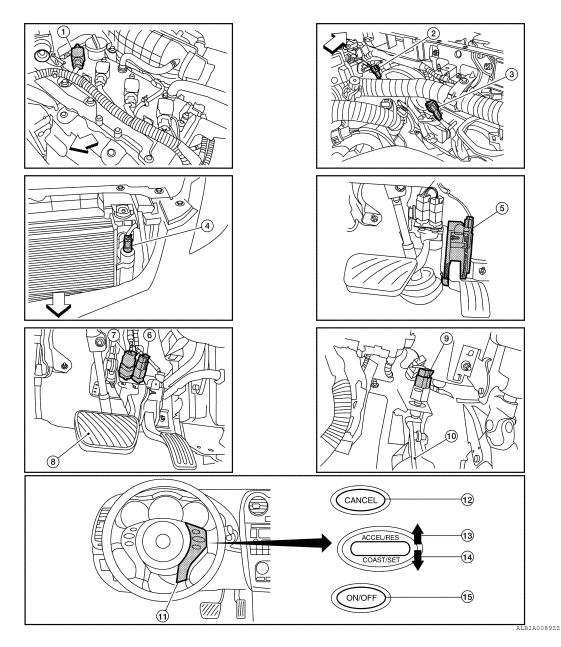
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Revision: February 2013

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch

- Cooling fan motor-2 harness connector
- 6. ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

3.

INFOID:000000007420407

Component	Reference
Camshaft position sensor (PHASE)	EC-148. "Description"
Crankshaft position sensor (POS)	EC-144. "Description"
Cooling fan motor	EC-67, "System Description"

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

Component	Reference
Engine coolant temperature sensor	EC-133, "Description"
Refrigerant pressure sensor	EC-271. "Description"

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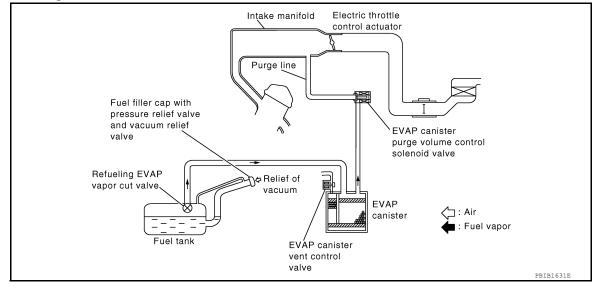
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< SYSTEM DESCRIPTION >

EVAPORATIVE EMISSION SYSTEM

System Diagram



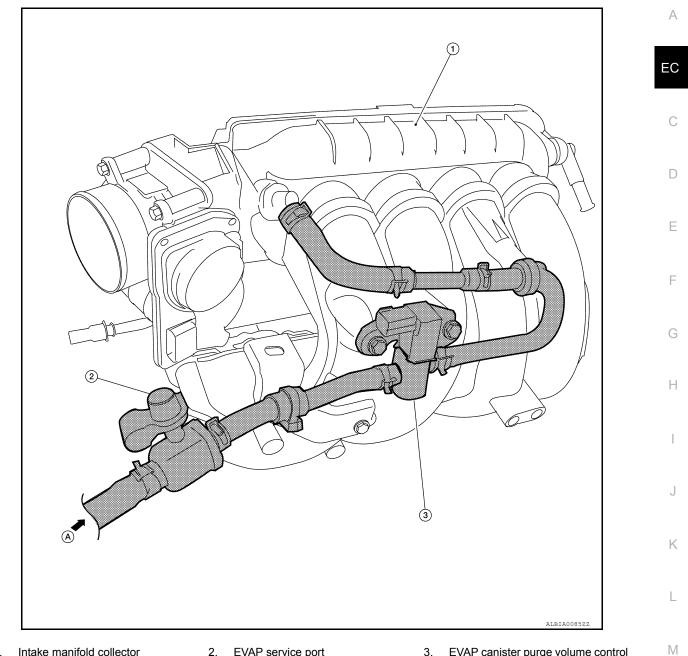
EVAPORATIVE EMISSION LINE DRAWING

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[QR25DE]

< SYSTEM DESCRIPTION >

[QR25DE]



- Intake manifold collector 1.
- 2. EVAP service port
- 3. EVAP canister purge volume control solenoid valve

A. From next figure

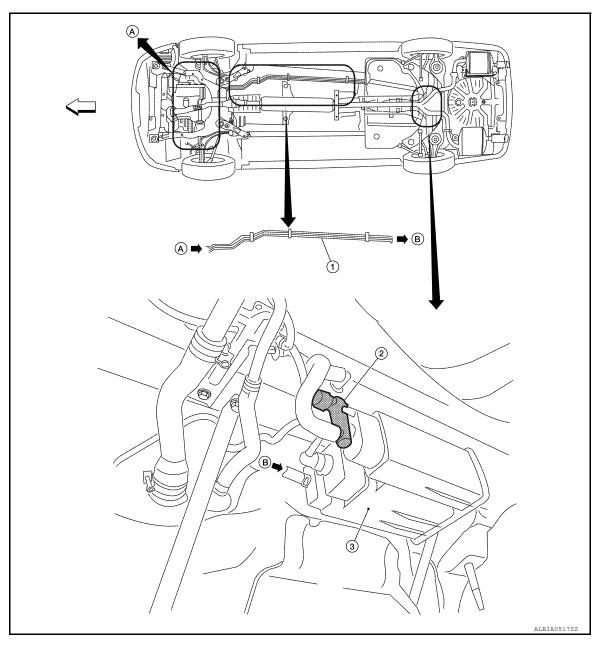
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< SYSTEM DESCRIPTION >

[QR25DE]



- 1. EVAP vapor purge line (view with rear 2. suspension member removed)
- EVAP canister vent control valve (view with rear suspension member removed)
 - 3. EVAP canister (view with rear suspension member removed)

√ Vehicle front

NOTE:

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

Previous page

System Description

INFOID:000000007420409

INPUT/OUTPUT SIGNAL CHART

< SYSTEM DESCRIPTION >

[QR25DE]

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

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

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

SYSTEM DESCRIPTION

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

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

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

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

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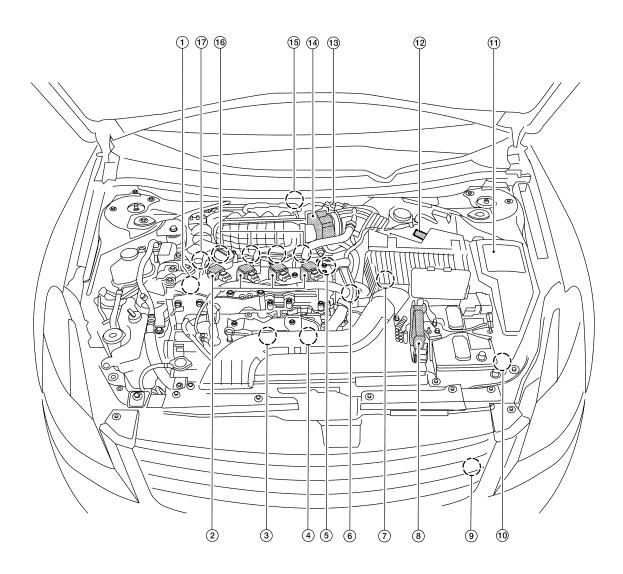
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< SYSTEM DESCRIPTION >

Component Parts Location

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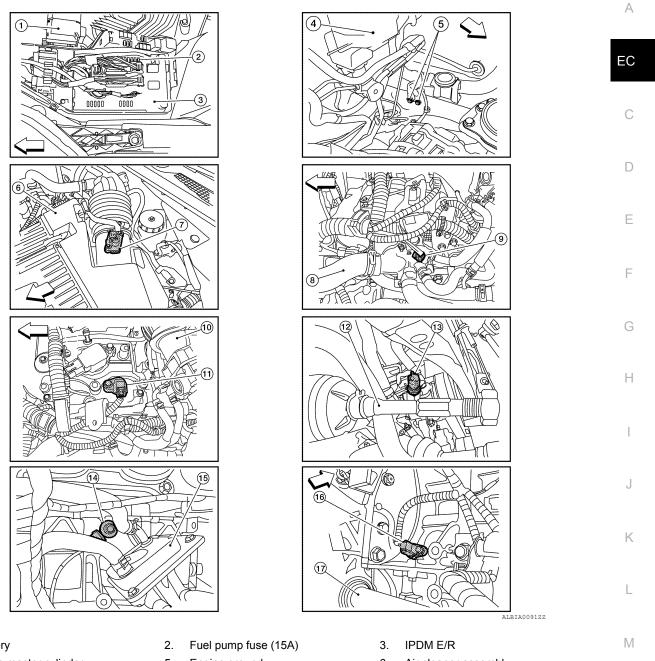
- 1. Intake valve timing control solenoid valve
- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor
- 13. EVAP service port
- 16. Fuel injector

- 2. Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE)
- 8. ECM
- 11. IPDM E/R
- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 17. Power steering pressure sensor

- Knock sensor, Crankshaft position sensor (POS)
- 6. Engine coolant temperature sensor
- 9. Refrigerant pressure sensor
- 12. Mass air flow sensor (with intake temperature sensor)
- 15. EVAP canister purge volume control solenoid valve

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. Battery
- Brake master cylinder 4.
- Mass air flow sensor (with intake air 8. 7. temperature sensor)
- 10. Intake air duct
- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- 5. Engine ground
 - Radiator hose (upper)
- Camshaft position sensor (PHASE) 11.
- 14. Knock sensor
- 17. Drive shaft (RH)

- 6. Air cleaner assembly
- 9. Engine coolant temperature sensor
- 12. Tie rod (RH)
- 15. Engine oil cooler

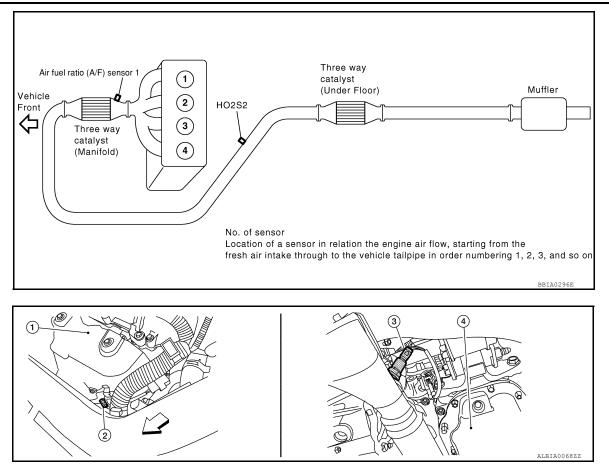
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< SYSTEM DESCRIPTION >

[QR25DE]



- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

< SYSTEM DESCRIPTION >

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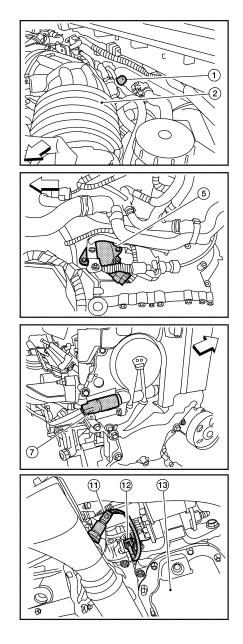
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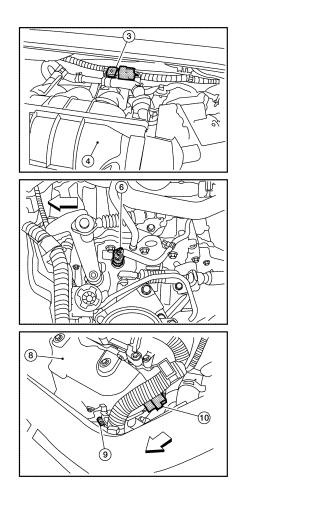
1. EVAP service port

4.

- Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view free)
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)

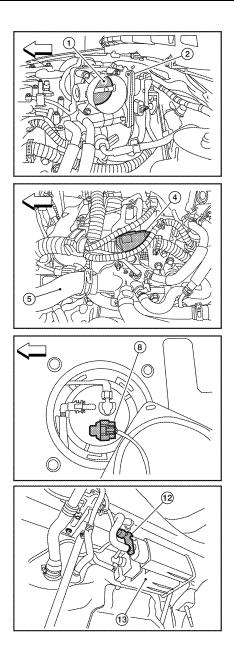


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- EVAP canister purge volume control solenoid valve
 Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
 Air fuel ratio (A/F) sensor 1
 Heated oxygen sensor 2 harness con
 - nector (This illustration is view from under vehicle.)

< SYSTEM DESCRIPTION >

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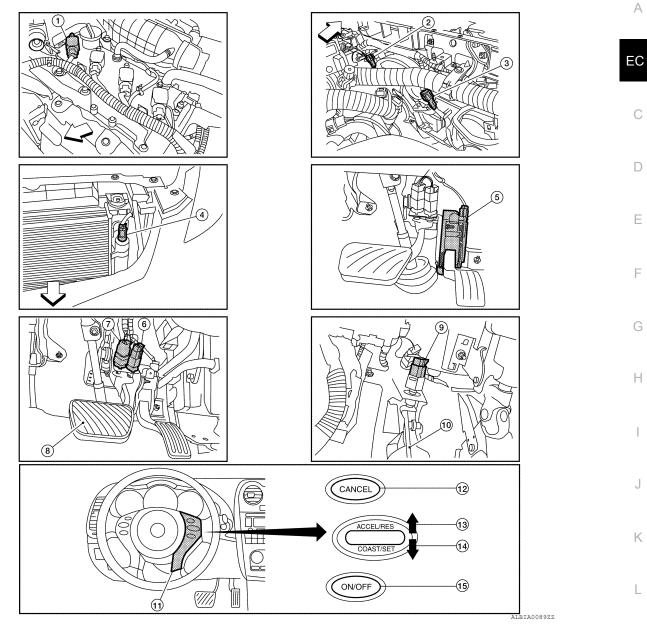
- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- 13. EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- : Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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ComponentReferenceA/F sensor 1EC-228. "Description"Accelerator pedal position sensorEC-208. "Description"Camshaft position sensor (PHASE)EC-148. "Description"Crankshaft position sensor (POS)EC-144. "Description"

Revision: February 2013



< SYSTEM DESCRIPTION >

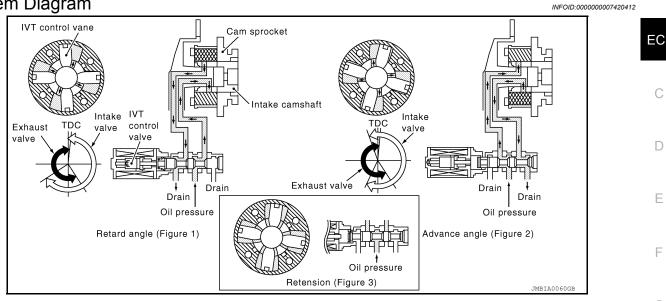
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Component	Reference
Engine coolant temperature sensor	EC-133, "Description"
EVAP canister purge volume control solenoid valve	EC-241. "Description"
Mass air flow sensor	EC-128. "Description"
Throttle position sensor	EC-136. "Description"
Vehicle speed sensor	EC-152, "Description"

< SYSTEM DESCRIPTION >

INTAKE VALVE TIMING CONTROL

System Diagram



System Description

INFOID:000000007420413

INPUT/OUTPUT SIGNAL CHART

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

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

SYSTEM DESCRIPTION

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

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

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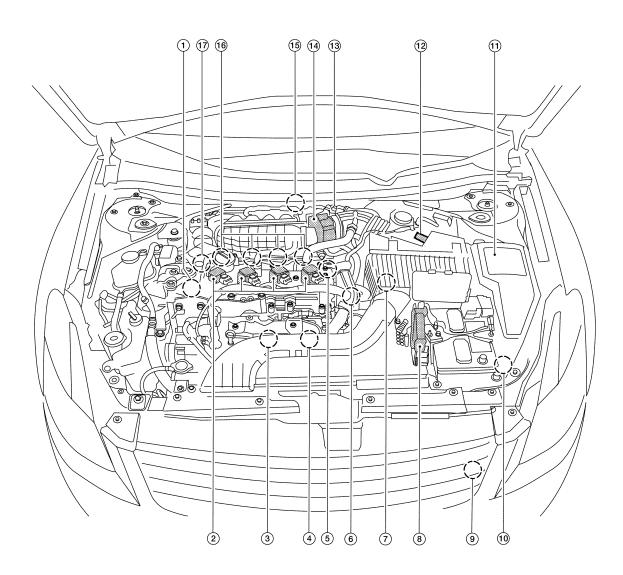
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< SYSTEM DESCRIPTION >

Component Parts Location



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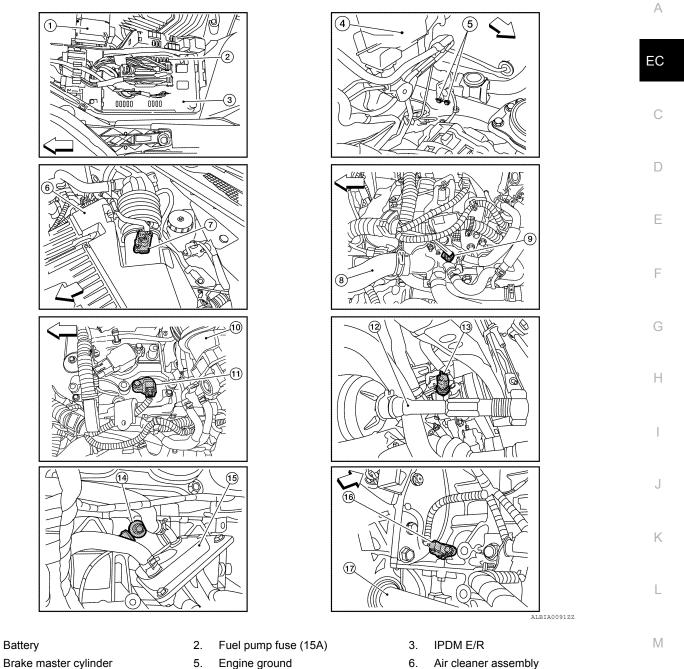
- 1. Intake valve timing control solenoid valve
- 4. Air fuel ratio (A/F) sensor 1
- Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)
- 10. Battery current sensor
- 13. EVAP service port
- 16. Fuel injector

- 2. Ignition coil (with power transistor) and spark plug
- 5. Camshaft position sensor (PHASE)
- 8. ECM
- 11. IPDM E/R
- 14. Electric throttle control actuator (with built in throttle position sensor and throttle control motor)
- 17. Power steering pressure sensor

- Knock sensor, Crankshaft position sensor (POS)
- 6. Engine coolant temperature sensor
- 9. Refrigerant pressure sensor
- 12. Mass air flow sensor (with intake temperature sensor)
- 15. EVAP canister purge volume control solenoid valve

< SYSTEM DESCRIPTION >

[QR25DE]



- Mass air flow sensor (with intake air 8. 7. temperature sensor)
- 10. Intake air duct

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- 13. Power steering pressure sensor
- 16. Crankshaft position sensor (POS)
- C: Vehicle front

- - Radiator hose (upper)
- Camshaft position sensor (PHASE) 11.
- 14. Knock sensor
- 17. Drive shaft (RH)

- Air cleaner assembly
- 9. Engine coolant temperature sensor
- 12. Tie rod (RH)
- 15. Engine oil cooler

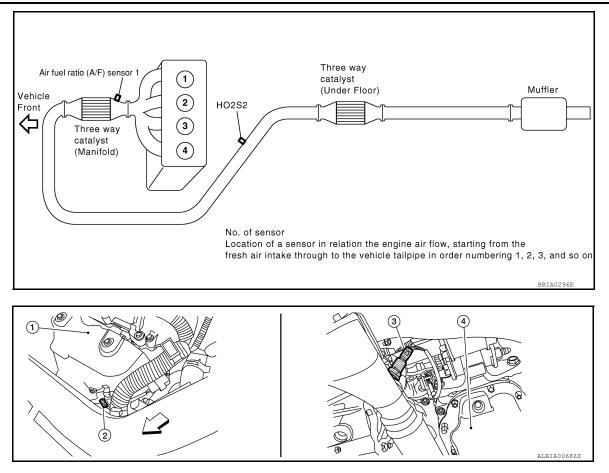
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< SYSTEM DESCRIPTION >

[QR25DE]



- 1. Exhaust manifold cover
- 2. Air fuel ratio (A/F) sensor 1
- Heated oxygen sensor 2 (This illustration is a view from under vehicle.)

- 4. Engine oil pan
- C: Vehicle front

< SYSTEM DESCRIPTION >

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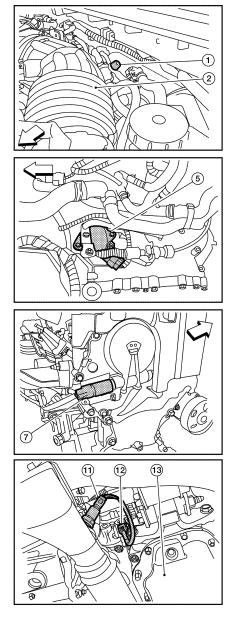
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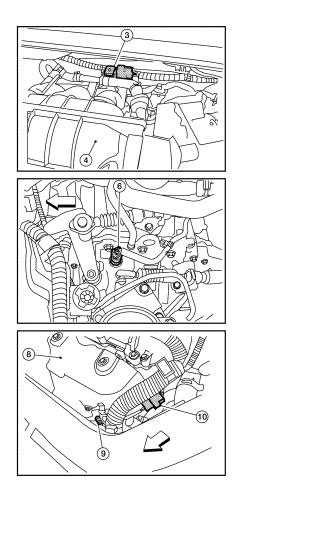
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- 1. EVAP service port
- 4. Intake manifold collector
- Intake valve timing control 8. solenoid valve (This illustration is view with engine removed.)
- 10. Air fuel ratio (A/F) sensor 1
 11. Heated oxygen sensor 2

 harness connector
 (This illustration is view free)
- 13. Engine oil pan
- C: Vehicle front

- 2. Intake air duct
- Transmission range switch (CVT models) 6. (This illustration is view with air cleaner assembly removed.)
 - Exhaust manifold cover
 - Heated oxygen sensor 2 (This illustration is view from under vehicle.)

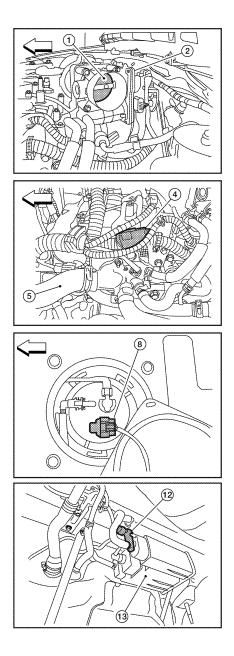


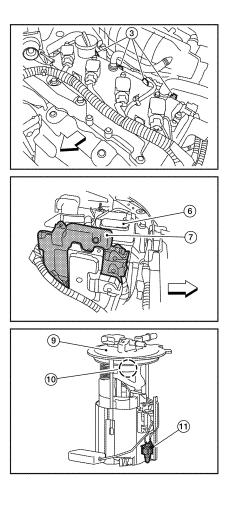
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- EVAP canister purge volume control solenoid valve
 Park/neutral position (PNP) switch (M/T models) (This illustration is view with air cleaner assembly removed.)
 Air fuel ratio (A/F) sensor 1
- 12. Heated oxygen sensor 2 harness connector (This illustration is view from under vehicle.)

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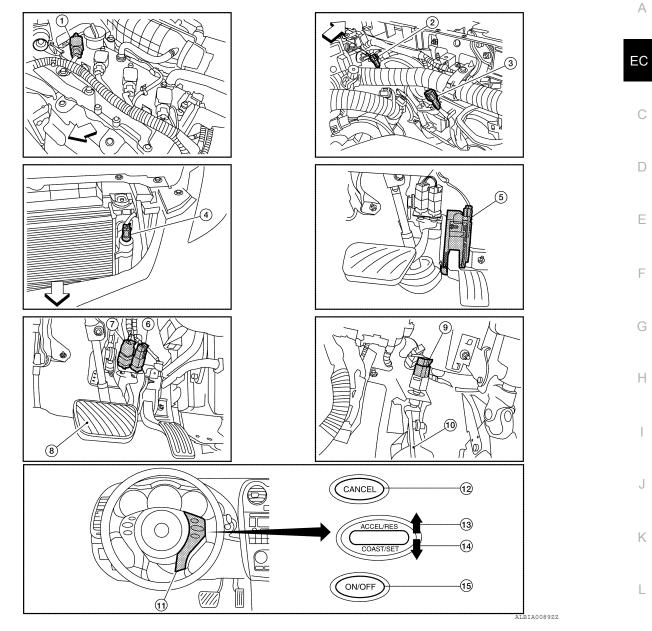
- 1. Throttle valve (This illustration is view with intake air duct removed.)
- 4. Condenser-2
- 7. ECM
- 10. Fuel pressure regulator
- EVAP canister (This illustration is view with rear suspension member removed.)
- ∠ : Vehicle front

- 2. Electric throttle control actuator
- 5. Radiator hose (upper)
- Fuel level sensor unit and fuel pump 9. harness connector (This illustration is view with rear seat cushion and inspection hole cover removed.)
- 11. Fuel tank temperature sensor

- 3. Fuel injector harness connector
- 6. Battery
 - Fuel level sensor unit and fuel pump assembly
- EVAP canister vent control valve (This illustration is view with rear suspension member removed.)

< SYSTEM DESCRIPTION >

[QR25DE]



- 1. No.1 ignition coil
- 4. Refrigerant pressure sensor
- 7. Stop lamp switch
- 10. Clutch pedal
- 13. RESUME/ACCELERATE switch
- C: Vehicle front

Component Description

- 2. Cooling fan motor-1 harness connector
- 5. Accelerator pedal position sensor
- 8. Brake pedal
- 11. ASCD steering switch
- 14. SET/COAST switch
- Cooling fan motor-2 harness connector
 ASCD brake switch
- 9. ASCD clutch switch
- 12. CANCEL switch
- 15. MAIN switch

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Component	Reference
Camshaft position sensor (PHASE)	EC-148, "Description"
Crankshaft position sensor (POS)	EC-144, "Description"
Engine coolant temperature sensor	EC-133, "Description"

< SYSTEM DESCRIPTION >

Component	Reference
Intake valve timing control solenoid valve	EC-87, "System Description"
Vehicle speed sensor	EC-152. "Description"

DIAGNOSIS SYSTEM (ECM)

Diagnosis Description

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INTRODUCTION

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

Emission-related diagnostic information

Diagnostic Trouble Code (DTC)

Freeze Frame data

1st Trip Diagnostic Trouble Code (1st Trip DTC)

1st Trip Freeze Frame data

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

				×: Applicable —: Not applicable
	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data
CONSULT	×	×	×	×
ECM	×	×*	—	_

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other. The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to <u>EC-284</u>, <u>"Fail Safe"</u>.)

TWO TRIP DETECTION LOGIC

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

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The "trip" in the "Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation.

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

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

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

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

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is

< SYSTEM DESCRIPTION >

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. If freeze frame data is stored in the ECM memory and another freeze frame data occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

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

How to Read DTC and 1st Trip DTC

With CONSULT

CONSULT displays the DTC in "SELF-DIAG RESULTS" mode. Example: P0340, P0850, etc.

(CONSULT also displays the malfunctioning component or system.)

Without CONSULT

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

These DTCs are controlled by NISSAN.

• 1st trip DTC No. is the same as DTC No.

• Output of a DTC indicates a malfunction. However, the Diagnostic Test Mode II does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT can identify malfunction status. Therefore, using CONSULT (if available) is recommended.

DTC or 1st trip DTC of a malfunction is displayed in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

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

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

How to Erase DTC and 1st Trip DTC

(P) With CONSULT

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.

- 1. Select "ENGINE" with CONSULT.
- 2. Select "SELF-DIAGNOSTIC RESULTS".
- 3. Touch "ERASE". (DTC in ECM will be erased.)

No Tools

NOTE:

If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.

- Wait at least 10 seconds and then turn it ON (engine stopped) again.
- 1. Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).
- If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.
- The following data are cleared when the ECM memory is erased.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data

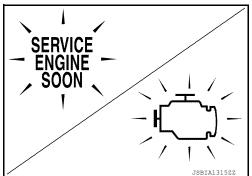
Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

MALFUNCTION INDICATOR LAMP (MIL)

Description

The MIL is located on the instrument panel.

- The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check. If the MIL does not light up, refer to <u>EC-269</u>, "Component Function Check".
- 2. When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



< SYSTEM DESCRIPTION >

On Board Diagnostic System Function

The on board diagnostic system has the following three functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function	EC
Mode I	Ignition switch in ON position	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.	C
	Engine running	MALFUNCTION WARNING	 This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up the MIL in the 1st trip. One trip detection diagnoses 	F
Mode II	Ignition switch in ON position	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.	G

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to <u>EC-</u> <u>269, "Component Function Check"</u>.

Diagnostic Test Mode I — Malfunction Warning

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

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

Diagnostic Test Mode II — Self-diagnostic Results

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

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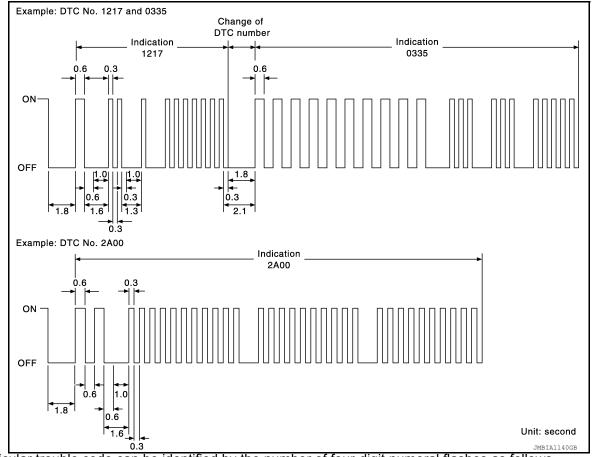
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tified codes can be identified by using the CONSULT. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes as follows.

Number	0	1	2	3	4	5	6	7	8	9	А	В	С	D	E	F
Flashes	10	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16

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

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle. A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later

numeral appears on the display 1.3 seconds after the former numeral has disappeared.

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

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See <u>EC-286, "DTC Index"</u>)

How to Switch Diagnostic Test Mode

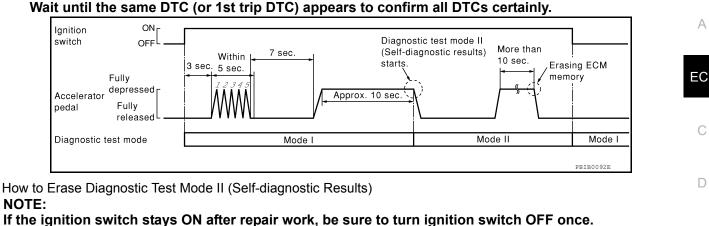
NOTE:

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



< SYSTEM DESCRIPTION >





Wait at least 10 seconds and then turn it ON (engine stopped) again.

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal.

- Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to "HOW TO SET DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)".
- Fully depress the accelerator pedal and keep it for more than 10 seconds. The emission-related diagnostic information has been erased from the backup memory in the ECM.

3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours. Be careful not to erase the stored memory before starting trouble diagnoses.

• Be careful not to erase the stored memory before starting tro

CONSULT Function

FUNCTION

Diagnostic test mode	Function			
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT unit.			
Self Diagnostic Result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*			
Data Monitor	Input/Output data in the ECM can be read.			
Active Test Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and als some parameters in a specified range.				
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.			
ECU Identification	ECM part number can be read.			

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

Diagnostic trouble codes

• 1st trip diagnostic trouble codes

Freeze frame data

· 1st trip freeze frame data

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

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		DIAGNOSTIC TEST MODE				
	Item	WORK	SELF-DIAGNOSTIC RESULTS			
		WORK SUPPORT	DTC*1	FREEZE FRAME DATA*2	DATA MON- ITOR	ACTIVE TEST
	Crankshaft position sensor (POS)		×	×	×	
	Camshaft position sensor (PHASE)		×	×	×	
	Mass air flow sensor		×		×	
	Engine coolant temperature sensor		×	×	×	×
	Air fuel ratio (A/F) sensor 1				×	
	Heated oxygen sensor 2				×	
	Vehicle speed sensor		×	×	×	
	Accelerator pedal position sensor		×		×	
	Throttle position sensor		×	×	×	
	Intake air temperature sensor			×	×	
	Knock sensor		×			
INPUT	Refrigerant pressure sensor				×	
	Closed throttle position switch (accelerator pedal position sensor signal)				x	
2	Air conditioner switch				×	
ENGINE CONTROL COMPONENT PARTS	Transmission range switch (CVT models) Park/neutral position (PNP) switch (M/T models)		×		×	
	Stop lamp switch		×		×	
	Power steering pressure sensor		×		×	
5	Battery voltage				×	
	Load signal				×	
3	Input speed sensor		×		×	
	ASCD steering switch		×		×	
	ASCD brake switch		×		×	
	Fuel injector				×	×
	Power transistor (Ignition timing)				×	×
	Throttle control motor relay		×		×	
	Throttle control motor		×			
	EVAP canister purge volume control sole- noid valve				х	×
UT L	Air conditioner relay				×	
Ουτρυτ	Fuel pump relay	×			×	×
0	Cooling fan relay				×	×
	Air fuel ratio (A/F) sensor 1 heater				×	
	Heated oxygen sensor 2 heater				×	
	EVAP canister vent control valve				×	×
	Intake valve timing control solenoid valve		×		×	×
	Calculated load value			×		

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to <u>EC-95</u>, "<u>Diagnosis Description</u>".

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WORK SUPPORT MODE

Work Item

Work Item	Condition	Usage
FUEL PRESSURE RELEASE	Fuel pump will stop by touching "START" during idling. crank a few times after engine stalls.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	• The idle air volume that keeps the engine within the spec- ified 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 coefficient.	When clearing mixture ratio self- learning value
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition tim- ing

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

SELF-DIAGNOSTIC RESULT MODE

Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to <u>EC-286, "DTC Index"</u>.)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description			
DIAG TROUBLE CODE [PXXXX]	The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to <u>EC-286, "DTC_Index"</u> .)			
FUEL SYS-B1	 "Fuel injection system status" at the moment a malfunction is detected is displayed. One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop 			
CAL/LD VALUE [%]	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. 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. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel so ule. 			
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.			

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Freeze frame data item*	Description
FUEL SYS-B2	
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	These items displayed but are not applicable to this model.
INT MANI PRES [kPa]	
COMBUST CONDI- TION	

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

DATA MONITOR MODE

Monitored Item

			×: Applicable
Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	 Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	 Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	 The signal voltage of the mass air flow sensor is displayed. 	 When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC".
B/FUEL SCHDL	ms	 "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	%	 The mean value of the air-fuel ratio feedback cor- rection factor per cycle is indicated. 	 When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S	°C or °F	 The engine coolant temperature (determined by the signal voltage of the engine coolant tempera- ture sensor) is displayed. 	 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.
A/F SEN1 (B1)	V	• The A/F signal computed from the input signal of the air fuel ratio (A/F) sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S2 MNTR(B1)	RICH/LEAN	 Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large. 	 When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	 The vehicle speed computed from the vehicle speed signal sent from combination meter is dis- played. 	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1	V	• The appelerator podel position concerning with	ACCEL SEN 2 signal is converted by
ACCEL SEN 2	V	The accelerator pedal position sensor signal volt- age is displayed.	ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 1-B1	V	The throttle position sensor signal voltage is dis-	TP SEN 2-B1 signal is converted by
TP SEN 2-B1	I he throttle position sensor signal voltage is dis-		ECM internally. Thus, it differs from ECM terminal voltage signal.

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Monitored item	Unit	Description	Remarks
INT/A TEMP SE	°C or °F	• The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
START SIGNAL	ON/OFF	 Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS	ON/OFF	 Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. 	
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	 Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and light- ing switch are OFF. 	
IGNITION SW	ON/OFF	Indicates [ON/OFF] condition from ignition switch signal.	
HEATER FAN SW	ON/OFF	Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1	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.
PURG VOL C/V	%	 Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
INT/V TIM(B1)	°CA	 Indicates [°CA] of intake camshaft advance an- gle. 	
INT/V SOL(B1)	%	 The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. The advance angle becomes larger as the value increases. 	
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (deter- mined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY	ON/OFF	 Indicates the fuel pump relay control condition determined by ECM according to the input sig- nals. 	
VENT CONT/V	ON/OFF	 The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 	 Always "OFF" is displayed.

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Monitored item	Unit	Description	Remarks
THRTL RELAY	ON/OFF	 Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 	
COOLING FAN	HI/LOW/OFF	 Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation MID: Middle speed operation LOW: Low speed operation OFF: Stop 	
HO2S2 HTR (B1)	ON/OFF	 Indicates [ON/OFF] condition of heated oxygen sensor 3 heater determined by ECM according to the input signals. 	
I/P PULLY SPD	rpm	Indicates the engine speed computed from the in- put shaft revolution 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	 Display the condition of Idle Air Volume Learning YET: Idle air volume learning has not been per- formed yet. CMPLT: Idle air volume learning has already been performed successfully. 	
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. The current flow to the heater becomes larger as the value increases. 	
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	 Indicates [ON/OFF] condition from MAIN switch signal. 	
CANCEL SW	ON/OFF	 Indicates [ON/OFF] condition from CANCEL switch signal. 	
RESUME/ACC SW	ON/OFF	Indicates [ON/OFF] condition from RESUME/AC- CELERATE switch signal.	
SET SW	ON/OFF	 Indicates [ON/OFF] condition from SET/COAST switch signal. 	
BRAKE SW1	ON/OFF	 Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2	ON/OFF	 Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT	NON/CUT	 Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. 	
LO SPEED CUT	NON/CUT	 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. 	

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Monitored item	Unit	Description	Remarks	٨
AT OD MONITOR	ON/OFF	Indicates [ON/OFF] condition of CVT O/D ac- cording to the input signal from the TCM.	 For M/T models, always "OFF" is dis- played. 	A
AT OD CANCEL	ON/OFF	Indicates [ON/OFF] condition of CVT O/D cancel request signal.	 For M/T models, always "OFF" is dis- played. 	EC
CRUISE LAMP	ON/OFF	 Indicates [ON/OFF] condition of CRUISE indica- tor determined by the ECM according to the input signals. 		С
SET LAMP	ON/OFF	 Indicates [ON/OFF] condition of SET indicator determined by the ECM according to the input signals. 		D
A/F ADJ-B1	_	 Indicates the correction of factor stored in ECM. 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. 		E

NOTE:

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

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	 Engine: Return to the original trouble condition Change the amount of fuel injec- tion using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIMING	 Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
POWER BALANCE	 Engine: After warming up, idle the engine. A/C switch OFF Shift lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT. 	Engine runs rough or dies.	 Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil
COOLING FAN*	 Ignition switch: ON Turn the cooling fan "LOW", "MID", "HI" and "OFF" CONSULT. 	Cooling fan moves and stops.	 Harness and connectors IPDM E/R (Cooling fan relay) Cooling fan motor
ENG COOLANT TEMP	 Engine: Return to the original trouble condition Change the engine coolant tem- perature using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Engine coolant temperature sensor Fuel injector
FUEL PUMP RELAY	 Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound. 	Fuel pump relay makes the operat- ing sound.	 Harness and connectors Fuel pump relay
PURG VOL CONT/V	 Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT. 	Engine speed changes according to the opening percent.	Harness and connectorsSolenoid valve

< SYSTEM DESCRIPTION >

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TEST ITEM CONDITION		JUDGMENT	CHECK ITEM (REMEDY)
VENT CONTROL/V	 Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound. 	Solenoid valve makes an operating sound.	Harness and connectorsSolenoid valve
V/T ASSIGN ANGLE	 Engine: Return to the original trouble condition Change intake valve timing using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Intake valve timing control sole- noid valve

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

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

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)

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

- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Component Function Check

1.START

Make sure that all of the following conditions are satisfied.

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 104.3 kPa (0.983 1.043 bar, 1.003 1.064 kg/cm², 14.25 15.12 psi)
- Atmospheric temperature: 20 30°C (68 86°F)
- Engine coolant temperature: 75 95°C (167 203°F)
- · Engine speed: Idle
- Transmission: Warmed-up
- CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes. Electrical load: Not applied
- Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

>> 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-15, "BASIC INSPECTION : Special Repair Requirement".
- Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode 2. with CONSULT. Ν
- 3. Make sure that monitor items are within the SP value.
- Is the inspection result normal?
- YES >> END
- NO >> Go to EC-108, "Diagnosis Procedure".

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TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS > DTC/CIRCUIT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

in "SPEC" of "DATA MONITOR" mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

MIL.

Description

INFOID:000000007420418

INFOID:000000007420419

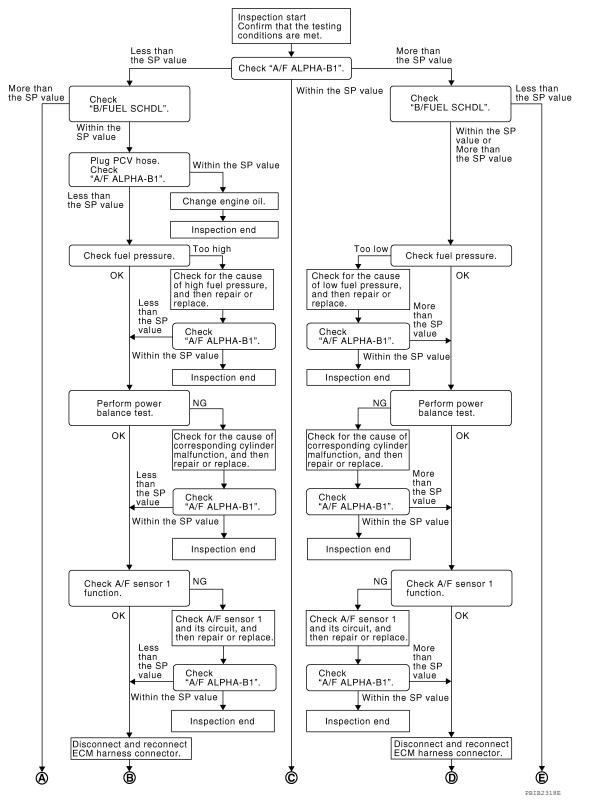
TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

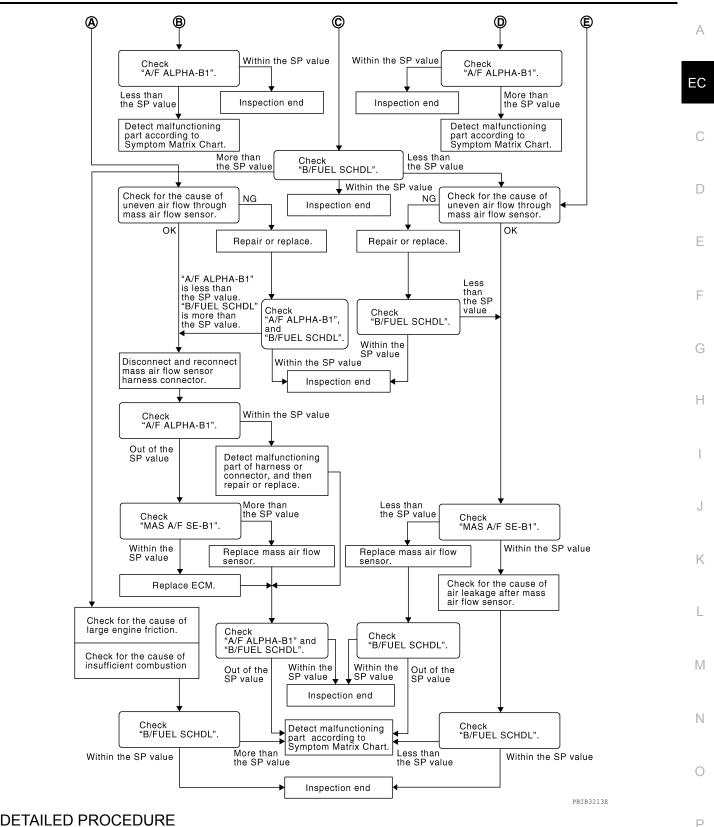
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OVERALL SEQUENCE



< DTC/CIRCUIT DIAGNOSIS >

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1.CHECK "A/F ALPHA-B1"

With CONSULT

- 1. Start engine.
- 2. Confirm that the testing conditions are met. Refer to EC-107, "Component Function Check".
- 3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the each indication is within the SP value.

< DTC/CIRCUIT DIAGNOSIS >

NOTE:

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

Is the measurement value within the SP value?

- YES >> GO TO 19.
- NO-1 >> Less than the SP value: GO TO 2.
- NO-2 >> More than the SP value: GO TO 3.

2.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> GO TO 4.

NO >> More than the SP value: GO TO 21.

3.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> GO TO 6.

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

NO-2 >> Less than the SP value: GO TO 27.

4.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

YES >> GO TO 5.

NO >> GO TO 6.

5.CHANGE ENGINE OIL

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

NOTE:

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

>> INSPECTION END

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-322, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.

NO-1 >> Fuel pressure is too high: Replace "fuel filter and fuel pump assembly", refer to <u>FL-6. "Removal</u> <u>and Installation"</u>, and then GO TO 8.

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

1.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-6, "Removal and Installation"</u>, and then GO TO 8.
- NO >> Repair or replace and then GO TO 8.

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

8. CHECK "A/F ALPHA-B1"
 Start engine. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.
Is the measurement value within the SP value?
YES >> INSPECTION END
NO $>>$ GO TO 9.
9.PERFORM POWER BALANCE TEST
 Perform "POWER BALANCE" in "ACTIVE TEST" mode. Make sure that the each cylinder produces a momentary engine speed drop.
Is the inspection result normal?
YES >> GO TO 12. NO >> GO TO 10.
10. DETECT MALFUNCTIONING PART
Check the following. 1. Ignition coil and its circuit (Refer to EC-264, "Component Function Check".)
2. Fuel injector and its circuit (Refer to EC-247, "Component Function Check".)
 Intake air leakage Low compression pressure (Refer to <u>EM-23, "Compression pressure"</u>.)
4. Low compression pressure (Refer to <u>EM-23, "Compression pressure"</u> .)
YES >> Replace fuel injector, refer to EM-37, "Removal and Installation", and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.
11.CHECK "A/F ALPHA-B1"
 Start engine. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.
Is the measurement value within the SP value?
YES >> INSPECTION END
NO >> GO TO 12.
12.CHECK A/F SENSOR 1 HEATER FUNCTION
Perform Component Function Check related with A/F sensor 1 heater. Refer to <u>EC-231. "Component Function</u> Check".
Is the inspection result normal?
YES >> GO TO 14.
NO >> GO TO 13. 13. CHECK A/F SENSOR 1 HEATER CIRCUIT
Perform Diagnosis Procedure. Refer to EC-231, "Diagnosis Procedure".
>> GO TO 16.
14. CHECK A/F SENSOR 1 FUNCTION
Perform Component Function Check related with A/F sensor 1. Refer to EC-228, "Component Function Check".
Is the inspection result normal?
YES >> GO TO 16.
NO >> GO TO 15.
15. CHECK A/F SENSOR 1 CIRCUIT
Perform Diagnostic Procedure. Refer to EC-228, "Diagnosis Procedure".

>> GO TO 16.

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

16.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> GO TO 17.

17. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

- 1. Stop the engine.
- 2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 18.

18.CHECK "A/F ALPHA-B1"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-311, "Symptom Table"</u>.

19.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO-1 >> More than the SP value: GO TO 20.
- NO-2 >> Less than the SP value: GO TO 25.

20. DETECT MALFUNCTIONING PART

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

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

21. CHECK INTAKE SYSTEM

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

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

Is the inspection result normal?

- YES >> GO TO 23.
- NO >> Repair or replace malfunctioning part, and then GO TO 22.

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

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

EC-112

I ROUBLE DIAGNOSIS - SPECIFICATION VALUE	
< DTC/CIRCUIT DIAGNOSIS >	[QR25DE]
Is the measurement value within the SP value?	٨
YES >> INSPECTION END NO >> "B/FUEL SCHDL" is more, "A/F ALPHA-B1" is less than the SP value: GO TO 23.	A
23. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR	FO
 Stop the engine. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for then reconnect it again. 	damage and
>> GO TO 24.	
24.CHECK "A/F ALPHA-B1"	D
 Start engine. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indicate the SP value. 	ation is within ${}_{\!$
Is the measurement value within the SP value?	
 YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to <u>Logic</u>". Then GO TO 31. NO >> GO TO 25. 25.CHECK "MAS A/F SE-B1" 	<u>C-128, "DTC</u> F
	G
Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication SP value.	n is within the
Is the measurement value within the SP value?	Н
 YES >> GO TO 26. NO >> More than the SP value: Replace mass air flow sensor, refer to <u>EM-25, "Removal tion"</u>, and then GO TO 31. 	
26.REPLACE ECM	I
 Replace ECM. refer to <u>EC-24</u>, "Component Parts Location". Go to <u>EC-18</u>, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Rement". 	pair Require- J
>> GO TO 31.	К
27.CHECK INTAKE SYSTEM	IX.
Check for the cause of uneven air flow through mass air flow sensor. Refer to the following. Crushed air ducts 	
Malfunctioning seal of air cleaner element	
Uneven dirt of air cleaner element	
 Improper specification of intake air system Is the inspection result normal? 	M
YES >> GO TO 29.	
NO >> Repair or replace malfunctioning part, and then GO TO 28.	Ν
28. CHECK "B/FUEL SCHDL"	
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication SP value.	n is within the $_{\bigcirc}$
Is the measurement value within the SP value?	
YES >> INSPECTION END	Р
NO >> Less than the SP value: GO TO 29.	F
29.CHECK "MAS A/F SE-B1"	
Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication SP value.	n is within the
Is the measurement value within the SP value?	

YES >> GO TO 30.

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

NO >> Less than the SP value: Replace mass air flow sensor, refer to <u>EM-25, "Removal and Installation"</u>, and then GO TO 32.

30.CHECK INTAKE SYSTEM

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

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

>> GO TO 32.

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

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-311. "Symptom Table"</u>.

32.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-311, "Symptom Table"</u>.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

1.INSPECTION START

Start engine.

<u>Is engine running?</u> YES >> GO TO 8. NO >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

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

EC	CM	Ground	Voltage
Connector	Terminal	Cround	voltage
E10	93	Ground	Battery voltage

Is the inspection result normal?

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

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector E18
- 10A fuse (No. 35)
- · Harness for open or short between ECM and fuse

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

4.CHECK GROUND CONNECTION-I

 Turn ignition switch OFF. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>. 	Κ
Is the inspection result normal?	
YES >> GO TO 5.	L
NO >> Repair or replace ground connection.	
5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I	
 Disconnect ECM harness connectors. Check the continuity between ECM harness connector and ground. 	Μ

EC	CM	Ground	Continuity
Connector	Terminal	Ground	Continuity
F14 -	12		
1 14	16		
	107	Ground	Existed
E10	108	Ground	Existed
EIU	111	-	
-	112		

3. Also check harness for short to power. Is the inspection result normal?

YES >> GO TO 7.

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 6.

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6.DETECT MALFUNCTIONING PART

Check the following.

NO

Harness connectors F2, E11

· Harness for open or short between ECM and ground

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

7. CHECK ECM POWER SUPPLY CIRCUIT-II

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

IPDN	/I E/R	Ground	Voltage
Connector	Terminal	Cround	voltage
F10	53	Ground	Battery voltage

Is the inspection result normal?

YES >> Go to <u>EC-264</u>, "Diagnosis Procedure". NO >> GO TO 8.

8. CHECK ECM POWER SUPPLY CIRCUIT-III

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

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

Is the inspection result normal?

YES >> GO TO 13.

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

NO-2 >> Battery voltage exists for more than a few seconds: GO TO 11.

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

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

EC	CM	Ground	Voltage
Connector	Terminal	Oround	voltage
F14	24	Ground	Battery voltage

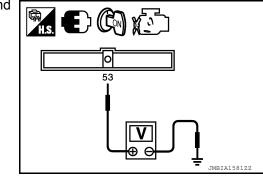
Is the inspection result normal?

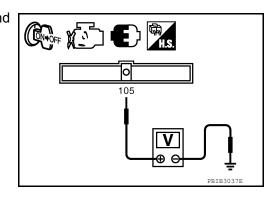
YES >> GO TO 10.

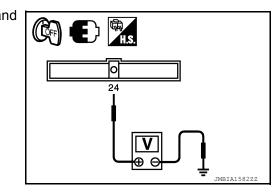
NO >> GO TO 11.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

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







POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

					Δ.
	CM		ME/R	Continuity	A
Connector	Terminal	Connector	Terminal		
E10	105	E18	10	Existed	EC
	eck harness for	-	ind and short	to power.	
•	tion result nor	mal?			
-	GO TO 16. Repair open ci	ircuit or short	to around or s	short to power in harness or connectors.	С
	ECM POWER		-	short to power in marness of connectors.	
					D
	ect ECM harne ect IPDM E/R				
				ector and IPDM E/R harness connector.	
	,				E
E	CM	IPDI	ME/R		
Connector	Terminal	Connector	Terminal	- Continuity	F
F14	24	F10	69	Existed	F
4. Also che	ck harness for	r short to grou	ind and short	to power.	
	tion result nor				G
YES >> (GO TO 12.				
		rcuit or short	to ground or s	short power in harness or connectors.	
12.CHECK	(15A FUSE				Н
	ect 15A fuse (No. 42) from I	PDM E/R.		
2. Check 1		10			Ι
	tion result nor	mal?			
	GO TO 16. Replace 15A f	use			
	GROUND C		.11		J
	ition switch OF round connect		to Ground In	spection in <u>GI-45, "Circuit Inspection"</u> .	К
	tion result nor				
	GO TO 14.				
	Repair or repla	-			L
14. CHECK	K ECM GROUI	ND CIRCUIT	FOR OPEN A	ND SHORT-II	
1. Disconn	ect ECM harne	ess connector			ЪЛ
2. Check the	ne continuity b	etween ECM	harness conn	ector and ground.	M
				_	
E	СМ	Ground	Continuity		Ν
Connector	Terminal	Cround	Continuity	_	
F14	12				
	16				0
	107	Ground	Existed		
E10	108	Giouna	LINEU		Р
EIU	111				Г
	1	1	İ.		

3. Also check harness for short to power.

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Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 15.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

15. DETECT MALFUNCTIONING PART

Check the following.

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

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

16. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".
- NO >> Repair open circuit or short to power in harness or connectors.

U1000, 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:000000007420423

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000	CAN communication	When ECM is not transmitting or receiving CAN com- munication signal of OBD (emission related diagno- sis) for 2 seconds or more.	Harness or connectors (CAN communication line is open or
U1001	line	When ECM is not transmitting or receiving CAN com- munication signal other than OBD (emission related diagnosis) for 2 seconds or more.	(CAN communication line is open or shorted)
	FIRMATION PRO	CEDURE ATION PROCEDURE	
1. Turn ig 2. Check Is DTC dete	DTC.	d wait at least 3 seconds.	
YES >>	EC-119, "Diagnosis INSPECTION END		
Diagnosi	s Procedure		INFOID:00000007420424
Go to <u>LAN-</u>	15, "Trouble Diagno	osis Flow Chart".	

Revision: February 2013

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U1010 CONTROL UNIT (CAN)

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:000000007420426

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1010	CAN communication bus	When detecting error during the initial diagno- sis of CAN controller of ECM.	• ECM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Check DTC.

Is DTC detected?

YES >> Go to <u>EC-120, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

- **1.**INSPECTION START
- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC Confirmation Procedure. See <u>EC-120, "DTC Logic"</u>.
- 4. Check DTC.

Is the DTC U1010 displayed again?

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

2.REPLACE ECM

- 1. Replace ECM. Refer to EC-24. "Component Parts Location".
- 2. Go to EC-18, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

[QR25DE]

INFOID:000000007420425

P0011 IVT CONTROL

< DTC/CIRCUIT DIAGNOSIS > P0011 IVT CONTROL

DTC Logic

NOTE:

If DTC P0011 is displayed with DTC P0075, first perform the trouble diagnosis for EC-161, "DTC Logic".

	Trouble diagnosis name	DTC detecting condition	Possible cause
P0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	 Crankshaft position sensor (POS) Camshaft position sensor (PHASE) Intake valve control solenoid valve Accumulation of debris to the signal pick-up portion of the camshaft Timing chain installation Foreign matter caught in the oil groove for intake valve timing control
	NFIRMATION PRO	OCEDURE	
1. INSPE	CTION START		
-	ave CONSULT?		
-	ave CONSULT? >> GO TO 2.		
	>> GO TO 2.		
2.PREC	ONDITIONING		
least 10 s TESTING	econds before conc CONDITION:	lucting the next test.	vays turn ignition switch OFF and wait at
		wing procedure, commin that batte	ry voltage is between 10V and 16V at
idle.		Juing procedure, commin that batte	ry voltage is between 10v and 16v at
idle.	-> GO TO 3.		ry voltage is between 10v and 16v at
idle.	-> GO TO 3.	MATION PROCEDURE-I	ry voltage is between 10v and 16v at
idle. 3.PERF(@With C	-> GO TO 3. DRM DTC CONFIR ONSULT	MATION PROCEDURE-I	
idle. 3.PERF()With C 1. Turn 2. Start	> GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature	CONSULT.
idle. 3.PERFO BWith C 1. Turn i 2. Start 3. Maint	> GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature	CONSULT.
idle. 3.PERFO With C 1. Turn i 2. Start 3. Maint	> GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it ain the following co ssible.	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature	CONSULT.
idle. 3.PERFC With C 1. Turn 1 2. Start 3. Maint as po	 > GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it ain the following co ssible. ED 1,200 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive second	CONSULT.
idle. 3.PERFC 9.With C 1. Turn 1 2. Start 3. Maint as po ENG SPE	 > GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it ain the following co ssible. ED 1,200 TEMP/S More to Mo	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive secon	CONSULT.
idle. 3.PERFC 9.With C 1. Turn 2. Start 3. Maint as po ENG SPEI COOLAN	 >> GO TO 3. DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it ain the following cossible. ED 1,200 TEMP/S More t More t CHDL More t 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive secon - 2,000 rpm han 60°C (140°F) han 3.5 msec (CVT)	CONSULT.

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4.PERFORM DTC CONFIRMATION PROCEDURE-II

() With CONSULT

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

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (221°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

CAUTION:

Always drive at a safe speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-123. "Diagnosis Procedure"

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-122, "Component Function Check".

NOTE:

Use component function check to check the overall function of intake valve timing control system. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

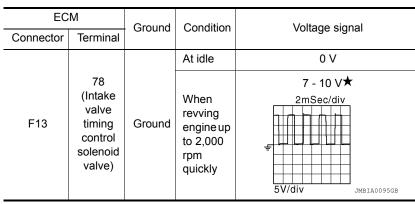
NO >> Go to EC-123, "Diagnosis Procedure".

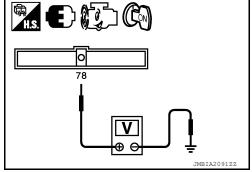
Component Function Check

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. Start engine and let it idle.
- 4. Check the voltage between ECM harness connector and ground under the following condition.





★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-123, "Diagnosis Procedure".

1. CHECK OIL PRESSURE WARNING LAMP

Diagnosis Procedure

[QR25DE]

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 Start engine. Check oil pressure warning lamp and confirm it is not illumi- 	EC
nated. <u>Is oil pressure warning lamp illuminated?</u>	
YES >> Go to LU-9, "Inspection".	С
NO >> GO TO 2.	
	D
	Е
2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE	
Refer to EC-124, "Component Inspection".	F
Is the inspection result normal?	
YES >> GO TO 3. NO >> Replace intake valve timing control solenoid valve. Refer to <u>EM-53</u> , "Intake Valve Timing Control <u>Solenoid Valve"</u> .	G
3. CHECK CRANKSHAFT POSITION SENSOR (POS)	
Refer to EC-147. "Component Inspection".	Н
Is the inspection result normal?	
YES >> GO TO 4. NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-78, "Disassembly and Assembly"</u> .	
4. CHECK CAMSHAFT POSITION SENSOR (PHASE)	
Refer to EC-150, "Component Inspection".	J
Is the inspection result normal?	
YES >> GO TO 5.	K
NO >> Replace camshaft position sensor (PHASE). Refer to <u>EC-24, "Component Parts Location"</u> .	r.
5.CHECK CAMSHAFT (INTAKE)	
 Check the following. Accumulation of debris to the signal plate of camshaft (1) rear end 	L
Chipping signal plate of camshaft rear end	
Is the inspection result normal?	M
YES >> GO TO 6. NO >> Remove debris and clean the signal plate of camshaft	
rear end or replace camshaft. Refer to EM-42, "Removal	NI
and Installation".	Ν
	0
6.CHECK TIMING CHAIN INSTALLATION	
Check service records for any recent repairs that may cause timing chain misaligned.	Ρ
Are there any service records that may cause timing chain misaligned?	
 YES >> Check timing chain installation. Refer to <u>EM-54, "Removal and Installation"</u>. NO >> GO TO 7. 	

Refer to EM-70, "Inspection After Disassembly".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean lubrication line.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

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

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

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace intake valve timing control solenoid valve. Refer to <u>EM-53, "Intake Valve Timing Control Solenoid</u> <u>Valve"</u>.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve. Refer to <u>EM-53</u>, "Intake Valve Timing Control Solenoid <u>Valve</u>".
- Provide 12V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Make sure that the plunger moves as shown in the figure.
 CAUTION:

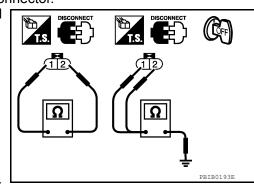
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to <u>EM-53</u>, "Intake Valve Timing Control <u>Solenoid Valve</u>".





P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

P0075 IVT CONTROL SOLENOID VALVE

Description

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

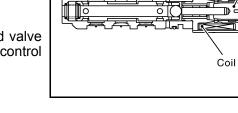
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

Trouble diagnosis name

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



Possible cause

INFOID:000000007420433

TMBTA0098GB

DTC Logic

DTC No.

DTC DETECTION LOGIC

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P0075	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	 Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) Intake valve timing control solenoid valve 	-	
DTC CO	NFIRMATION PROC	EDURE			
1.PREC	ONDITIONING				
	econds before conduct		s turn ignition switch OFF and wait at		
10031 10 3		ing the next test.		I	
	>> GO TO 2.			,	
•	ORM DTC CONFIRMA				
Z .PERF		TION PROCEDURE	K	\langle	
	engine and let it idle for	r 5 seconds.			
	k 1st trip DTC.				
<u>Is 1st trip</u>	DTC detected?		L	_	
	> Go to <u>EC-125, "Diag</u> >> INSPECTION END	inosis Procedure".			
Diagnos	Diagnosis Procedure				

DTC detecting condition

$1. \mathsf{CHECK} \text{ intake valve timing control solenoid valve power supply circuit}$

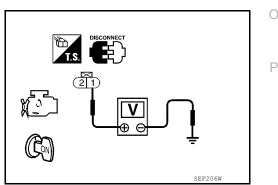
- 1. Turn ignition switch OFF.
- 2. Disconnect intake valve timing control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between intake valve timing control solenoid valve harness connector and ground.

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

Is the inspection result normal?

YES >> GO TO 2.

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



INFOID:000000007420432

Plunger

[QR25DE]



P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

$2. {\sf CHECK}$ intake value timing control solenoid value output signal circuit for open and short

- 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.

IVT control solenoid valve		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F59	2	F13	78	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-126, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace intake valve timing control solenoid valve. Refer to <u>EM-53, "Intake Valve Timing Control</u> <u>Solenoid Valve"</u>.
- **4.**CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

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

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

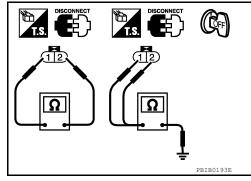
Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace intake valve timing control solenoid valve. Refer to <u>EM-53</u>, "Intake Valve Timing Control Solenoid Valve".

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to <u>EM-53</u>, "Intake Valve Timing Control Solenoid <u>Valve</u>".



P0075 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

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

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace intake valve timing control solenoid valve. Refer to EM-53, "Intake Valve Timing Control Solenoid Valve".

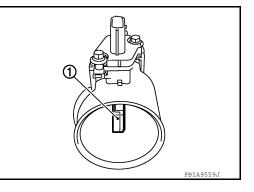


P0102, P0103 MAF SENSOR

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 more air, the greater the heat loss.

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



DTC Logic

DTC DETECTION LOGIC

INFOID:000000007420437

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.	 Harness or connectors (The sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.)Mass air flow sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.

2. Check DTC.

Is DTC detected?

YES >> Go to EC-129, "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-129, "Diagnosis Procedure".

NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

- 1. Start engine and wait at least 5 seconds.
- 2. Check DTC.
- Is DTC detected?
- YES >> Go to EC-129. "Diagnosis Procedure".

P0102, P0103	MAF SENSOR
< DTC/CIRCUIT DIAGNOSIS >	[QR25DE]
NO >> INSPECTION END	
Diagnosis Procedure	A INFOID:000000007420438
1.INSPECTION START	EC
Confirm the detected DTC.	
Which DTC is detected?	
P0102 >> GO TO 2.	С
P0103 >> GO TO 3. 2.CHECK INTAKE SYSTEM	
	D
Check the following for connection. • Air duct	
Vacuum hoses	
 Intake air passage between air duct to intake manifor Is the inspection result normal? 	bld
YES >> GO TO 3.	
NO >> Reconnect the parts.	F
3. CHECK GROUND CONNECTION	
 Turn ignition switch OFF. Check ground connection E9. Refer to Ground Institution 	G
2. Check ground connection E9. Refer to Ground In: Is the inspection result normal?	spection in <u>Gi-45, Circuit inspection</u> .
YES >> GO TO 4.	H
NO >> Repair or replace ground connection.	
4. CHECK MAF SENSOR POWER SUPPLY CIRCUI	Т
1. Disconnect mass air flow (MAF) sensor harness of	connector.
 Turn ignition switch ON. Check the voltage between MAF sensor harness 	connector and
ground.	
MAF sensor Ground Voltage	CITE TO K
Connector Terminal F31 2 Ground Battery voltage	
Is the inspection result normal?	
YES >> GO TO 5.	
NO >> Repair open circuit or short to ground or	short to power
in harness or connectors. 5.CHECK MAF SENSOR GROUND CIRCUIT FOR (Γ.Λ.
 Turn ignition switch OFF. Disconnect ECM harness connector. 	Ν
3. Check the continuity between MAF sensor harnes	
MAF sensor ECM Connector Terminal Connector Terminal	Continuity
F31 3 F13 56	Existed
4. Also check harness for short to ground and short	B
Is the inspection result normal?	
YES >> GO TO 6.	
NO >> Repair open circuit or short to ground or s	
6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT	

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

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

MAF sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F31	4	F13	58	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

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

7.CHECK MASS AIR FLOW SENSOR

Refer to EC-130, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace mass air flow sensor. Refer to EM-25, "Removal and Installation".

8.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1.CHECK MASS AIR FLOW SENSOR-I

()With CONSULT

- Turn ignition switch OFF. 1.
- 2. Reconnect all harness connectors disconnected.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT and select "DATA MONITOR" mode.
- Select "MAS A/F SE-B1" and check indication. 5.

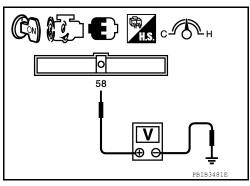
Monitor item	Condition	MAS A/F SE-B1
	Ignition switch ON (Engine stopped.)	Approx. 0.4V
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

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

Without CONSULT

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

ECM		Ground	Ground Condition	Voltage
Connector	Terminal	Giouna	Condition	voltage
	58		Ignition switch ON (Engine stopped.)	Approx. 0.4V
F13	3 (MAF sensor Ground	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V	
	signal)		Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*



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

Is the inspection result normal?

>> GO TO 4. YES

[QR25DE]

NO >> GO TO 2.							
-			E OF UNEVEN AIR FLOW	THROUGH MA	ASS AIR FLOW SENSOR	А	
 Turn igi Check f Crushe Malfund Unever Improper Is the inspective 	5						
	GO TC GO TC					D	
3.снеск	MASS	AIR FLOV	V SENSOR-II				
With CO		ce malfur	ictioning part.			Ε	
 Start er Connect 	ngine ar ct CONS	id warm it SULT and	up to normal operating tem select "DATA MONITOR" m and check indication.			F	
Monitor iter	m		Condition		MAS A/F SE-B1	G	
	-		ON (Engine stopped.)		Approx. 0.4V	9	
MAS A/F SE		to about 4,	warmed-up to normal operating ter	mperature.)	0.9 - 1.1V 0.9 - 1.1V to Approx. 2.4V*	Н	
*: Check			in response to engine being incre	ased to about 4.00			
 Without CONSULT Repair or replace malfunctioning part. Start engine and warm it up to normal operating temperature. Check the voltage between ECM harness connector and ground. 						l	
ECN	Л						
Connector	Terminal	Ground	Condition	Voltage	58 I	K	
	58		Ignition switch ON (Engine stopped.)	Approx. 0.4V			
F13	(MAF sensor	Ground	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V		L	
	signal)		Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*	PBIB3481E	M	
		-	in response to engine being incre	ased to about 4,00	00 rpm.		
Is the inspection result normal?						Ν	
YES >> INSPECTION END NO >> GO TO 4.							
4. CHECK	MASS	AIR FLOV	V SENSOR-III			\bigcirc	
 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. 						P	

< DTC/CIRCUIT DIAGNOSIS >

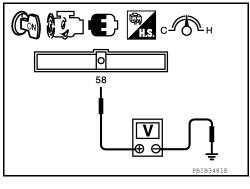
Monitor item	Condition	MAS A/F SE-B1
	Ignition switch ON (Engine stopped.)	Approx. 0.4V
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1V
	Idle to about 4,000 rpm	0.9 - 1.1V to Approx. 2.4V*

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

Without CONSULT

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

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



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

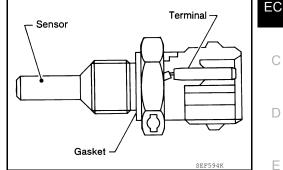
- Is the inspection result normal?
- YES >> INSPECTION END

NO >> Clean or replace mass air flow sensor. Refer to EM-25. "Removal and Installation".

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.



Acceptable

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

20

10 6 4

0.1

-20

<Reference data>

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



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

CAUTION:

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

DTC Logic

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DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

2. Check DTC.

Is DTC detected?

NO

YES >> Go to EC-134, "Diagnosis Procedure".

>> INSPECTION END



[QR25DE]

P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2.

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 s	sensor	Ground	Voltage	
Connector	Terminal	Cround	voltage	
F11	1	Ground	Approx. 5V	

Is the inspection result normal?

YES >> GO TO 3.

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

${f 3}.$ 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
F11	2	F13	52	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-134, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine coolant temperature sensor. Refer to CO-20, "Exploded View".

5.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

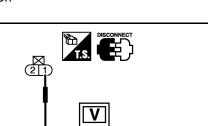
1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- Remove engine coolant temperature sensor. Refer to CO-20, "Exploded View". 3.

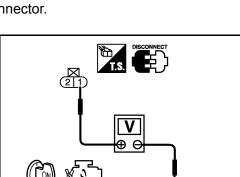




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P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Terminals	Condit	on Resistance	
		20 (68) 2.37 - 2.63 kΩ	
1 and 2	Temperature °C (°F)	50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

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			20 (68)	2.37 - 2.63		
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-20, "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 position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-161, "DTC Logic"</u>.

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.	 Electric throttle control actuator (TP sensor 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to <u>EC-136, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

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

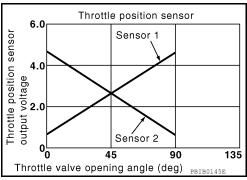
2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

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

EC-136

INFOID:000000007420446





P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle	control actuator	Ground	Voltage	
Connector Terminal		Ciouna	voltage	
F57	1	Ground	Approx. 5V	

Is the inspection result normal?

YES >> GO TO 3.

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

$\mathbf{3}$. Check throttle position sensor 2 ground circuit for open and short

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

Electric throttle	e control actuator	E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F57	4	F13	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

Electric throttle	ectric throttle control actuator ECM			Continuity
Connector	Terminal	Connector	Terminal	Continuity
F57	3	F13	38	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-138, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

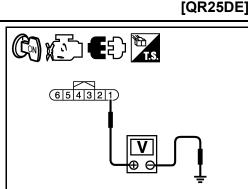
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

I.CHECK INTERMITTENT INCIDENT

Refer to GI-42. "Intermittent Incident".

>> INSPECTION END



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P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

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1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-20, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Set shift lever to D (CVT) or 1st (M/T) position.
- 6. Check the voltage between ECM harness connector and ground.

E	ECM	Ground	C	andition	Voltage	
Connector	Terminal	Giouna	Condition		vollage	37 38
	37 (TP sensor 1			Fully released	More than 0.36V	
F13	signal)	signal)		Fully depressed	Less than 4.75V	
115	38 (TP sensor 2	Giouna	pedal	Fully released	Less than 4.75V	PBIB3482E
	signal)			Fully depressed	More than 0.36V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

DTC detecting condition

An excessively low voltage from the TP sensor

1 is sent to ECM.

< 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 potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

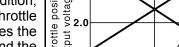
DTC No.

P0222

DTC DETECTION LOGIC

Trouble diagnosis name Throttle position sensor

1 circuit low input



INFOID:000000007420450

INFOID:000000007420449

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)
	FIRMATION PROCE	EDURE	
least 10 sec TESTING C	conds before conducti	nas been previously conducted, always t ng the next test. g procedure, confirm that battery volta	C C
-	GO TO 2.		
2.PERFOR	RM DTC CONFIRMAT	ION PROCEDURE	
2. Check Is DTC dete YES >>	-		
Diagnosi	s Procedure		INFOID:00000007420451
1.снеск	GROUND CONNECT	ION	
2. Check Is the inspe YES >> NO >> 2.CHECK	ction result normal? GO TO 2. Repair or replace gro THROTTLE POSITIC	. Refer to Ground Inspection in <u>GI-45, "C</u> ound connection. N SENSOR 1 POWER SUPPLY CIRCU	
	nition switch ON.		

EC Throttle position sensor 6.0 Throttle position sensor output voltage 0 0 0 0 0 0 0 Sensor 1 Seńsor 2 0∟ 0 45 90 135 Throttle valve opening angle (deg) PBTB0145F

Possible cause

(TP sensor 1 circuit is open or shorted.)

· Harness or connectors

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P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle of	Ground	Voltage	
Connector	Terminal	Cround	voltage
F57	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.

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

 $\mathbf{3}$.check throttle position sensor 1 ground circuit for open and short

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

Electric throttle c	EC	М	Continuity	
Connector	Terminal	Connector Termina		Continuity
F57	4	F13	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

 ${f 4}$. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

Electric throttle of	EC	М	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F57	2	F13	37	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-141, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

 $\mathbf{6}$.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

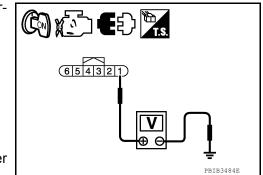
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "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-20, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Set shift lever to D (CVT) or 1st (M/T) position.
- 6. Check the voltage between ECM harness connector and ground.

						N/
	ECM	Ground	C	ondition	Voltage	
Connector	Terminal				-	37 38
	37 (TP sensor 1			Fully released	More than 0.36V	
F13	signal)	Ground	Accelerator	Fully depressed	Less than 4.75V	
F I J	38 (TP sensor 2	Ground	pedal	Fully released	Less than 4.75V	PBIB3482E
	signal)			Fully depressed	More than 0.36V	
Is the insp	ection result	normal?	2			
	> INSPECTI > GO TO 2.)			
\mathbf{a}						

Z.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

INFOID:000000007420452

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P0327, P0328 KS

Description

INFOID:000000007420454

[QR25DE]

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:000000007420455

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detected condition	Possible cause
P0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors (The sensor circuit is open or shorted.)
P0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	Knock sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and run it for at least 5 seconds at idle speed.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-142, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK KNOCK SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect knock sensor harness connector and disconnect ECM harness connector.
- 2. Check the continuity between knock sensor harness connector and ECM harness connector.

Knock s	sensor	EC	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F45	2	F13	67	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

P0327, P0328 KS

[QR25DE]

< DTC/CIRCUIT DIAGNOSIS > $\overline{\mathbf{3}}$.check knock sensor input signal circuit for open and short А 1. Check the continuity between knock sensor harness connector and ECM harness connector. Knock sensor ECM EC Continuity Connector Terminal Connector Terminal F45 1 F13 61 Existed 2. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 4. D NO >> Repair open circuit or short to ground or short to power in harness or connectors. 4.CHECK KNOCK SENSOR Е Refer to EC-143, "Component Inspection". Is the inspection result normal? YES >> GO TO 5. NO >> Replace knock sensor. Refer to EM-78, "Disassembly and Assembly". 5.check intermittent incident Refer to GI-42, "Intermittent Incident". >> INSPECTION END Н Component Inspection INFOID:000000007420457 1.CHECK KNOCK SENSOR Turn ignition switch OFF. 1. 2. Disconnect knock sensor harness connector. 3. Check resistance between knock sensor terminals as follows. NOTE: It is necessary to use an ohmmeter which can measure more than 10 M Ω . Κ Terminals Resistance 1 and 2 Approx. 532 - 588 kΩ [at 20°C (68°F)] Ω **CAUTION:** Do not use any knock sensors that have been dropped or physically damaged. Use only new ones. JMBIA1630ZZ M Is the inspection result normal? >> INSPECTION END YES NO >> Replace knock sensor. Refer to EM-78, "Disassembly and Assembly". Ν Ρ

P0335 CKP SENSOR (POS)

Description

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

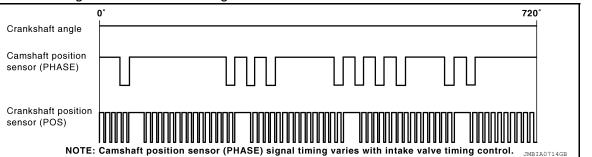
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.



DTC Logic

INFOID:000000007420459

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sen- sor (POS) circuit	 The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine run- ning. 	 Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Refrigerant pressure sensor circuit is shorted.) (Accelerator pedal position sensor circuit is shorted.) Crankshaft position sensor (POS) Refrigerant pressure sensor Accelerator pedal position sensor Signal plate

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 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.

INFOID:000000007420458

IMBTA00625

P0335 CKP SENSOR (POS)

	DIAGNOSI	S >				[QR25DE]
<u>Is 1st trip DTC det</u>	ected?					
	<u>EC-145, "D</u> ECTION EN	iagnosis Proce	dure".			
NO >> INSPE						INFOID:00000007420460
1.CHECK GROU	ND CONNI	ECTION				
1. Turn ignition s	witch OFF.					
-			Fround Ir	nspection	in <u>GI-45</u>	. "Circuit Inspection".
Is the inspection re		<u>ll?</u>				
YES >> GO TO NO >> Repai		ground conned	ction			
• '		•		OR (POS)	POWE	R SUPPLY CIRCUIT-I
		sition (CKP) se				
2. Turn ignition s	witch ON.	, , , , , , , , , , , , , , , , , , ,	,	,		
3. Check the vol	age betwe	en CKP sensor	(POS) h	narness co	onnector	and ground.
CKP sensor (POS	Ground	Voltage				
	-					
F30 1 Is the inspection re	Ground					
YES >> GO T		<u>u :</u>				
NO >> GO T						
3.CHECK CRAN	(SHAFT P	OSITION (CKP) SENSO	OR (POS)	POWE	R SUPPLY CIRCUIT-II
1. Turn ignition s				. ,		
2. Disconnect E	CM harness					
Check the con nector and EC	itinuity betw M harness	ween CKP sens	sor (POS	S) harnes	s con-	
)					
CKP sensor (POS	/	ECM	• •	••		
CKP sensor (POS Connector Termin			- Continu	ity		
		ctor Terminal	- Continu Existed			
Connector Termin	al Conne F13	ctor Terminal				
ConnectorTerminF301Is the inspection reYES>> GO Termin	esult norma	ctor Terminal 76				
ConnectorTerminF301Is the inspection reYES>> GO Termin	esult norma	ctor Terminal 76				
ConnectorTerminF301Is the inspection regimeYES>> GO ToNO>> Repai	Example and Connect F13 Esult norma O 4. In open circu	ctor Terminal 76 <u>11?</u> uit.	Existed	d	POWEI	
ConnectorTerminF301Is the inspection registrationYES>> GO TerminYES>> RepairNO>> Repair4.CHECK CRAN	Conne F13 Sesult norma O 4. r open circu	ctor Terminal 3 76 <u>11?</u> uit. OSITION (CKP	Existed	DR (POS)		SUPPLY CIRCUIT-III
ConnectorTerminF301Is the inspection reYES>> GO ToNO>> Repai	Conne F13 Sesult norma O 4. r open circu	ctor Terminal 3 76 <u>11?</u> uit. OSITION (CKP	Existed	DR (POS)		SUPPLY CIRCUIT-III
ConnectorTerminF301Is the inspection regimeYES>> GO ToNO>> Repai4.CHECK CRAN	Conne F13 Sesult norma O 4. r open circu	ctor Terminal 76 <u>11?</u> uit. OSITION (CKP ower and short t	Existed	DR (POS)		SUPPLY CIRCUIT-III
ConnectorTerminF301Is the inspection registryYES>> GO ToNO>> Repai4.CHECK CRANCheck harness for	Conne F13 esult norma O 4. r open circu SHAFT Pe short to po	ctor Terminal 76 <u>11?</u> uit. OSITION (CKP ower and short t	Existed) SENSC	DR (POS)		R SUPPLY CIRCUIT-III lowing terminals.
Connector Termin F30 1 Is the inspection regime YES >> GO TO NO >> Repai 4.CHECK CRAN Check harness for ECM Connector Termina 72	Conne F13 esult norma O 4. r open circu SHAFT P short to po	ctor Terminal 76 II? Jit. OSITION (CKP ower and short t	Existed) SENSC	DR (POS)	n the fol	R SUPPLY CIRCUIT-III lowing terminals.
Connector Termin F30 1 Is the inspection regime YES >> GO To NO >> Repai 4.CHECK CRAN Check harness for ECM Connector Termina	Conne F13 esult norma O 4. r open circu SHAFT P short to po	ctor Terminal 76 11? Juit. OSITION (CKP ower and short t Se Name t pressure sensor	Existed) SENSC	DR (POS) d, betwee	n the fol Termina	R SUPPLY CIRCUIT-III lowing terminals.
Connector Termin F30 1 Is the inspection regime YES >> GO TO NO >> Repai 4.CHECK CRAN Check harness for ECM Connector Termina 72 F13	Conne F13 esult norma O 4. r open circu SHAFT P short to pc	ctor Terminal 3 76 11? uit. OSITION (CKP ower and short t Se Name t pressure sensor or (POS)	Existed) SENSC	DR (POS) d, betwee Connector E219	n the fol Termina	R SUPPLY CIRCUIT-III lowing terminals.
$\begin{array}{c c} \hline Connector & Termin \\ \hline F30 & 1 \\ \hline Is the inspection re \\ YES >> GO Termina \\ \hline NO >> Repair \\ \hline A.CHECK CRAN \\ \hline Check harness for \\ \hline \hline Connector & Termina \\ \hline F13 & 72 \\ \hline 76 \\ \hline \end{array}$	Image Connect F13 F13 esult normal F13 O 4. F r open circu CSHAFT P Short to pc Image Refrigerant CKP senso APP senso	ctor Terminal 3 76 11? uit. OSITION (CKP ower and short t Se Name t pressure sensor or (POS) or	Existed) SENSC	DR (POS) d, betwee Connector E219 F30	n the fol Termina 1 1	R SUPPLY CIRCUIT-III lowing terminals.
$\begin{tabular}{ c c c c } \hline Connector & Termin \\ \hline F30 & 1 \\ \hline Is the inspection restriction restri$	Image Connect F13 F13 esult norma F13 O 4. Open circu CSHAFT Pole F13 short to pole F13 Refrigerant CKP senso APP senso F13 Statt norma F13 O 5. F13	ctor Terminal 3 76 11? uit. OSITION (CKP ower and short the set pressure sensor or (POS) or 11?) SENS(to ground ensor	DR (POS) d, betwee Connector E219 F30 E40	n the fol Termina 1 6	R SUPPLY CIRCUIT-III lowing terminals.
$\begin{tabular}{ c c c c } \hline Connector & Termin \\ \hline F30 & 1 \\ \hline Is the inspection restriction restri$	Connect F13 esult norma O 4. r open circu KSHAFT Per short to po Refrigerant CKP senso APP senso esult norma O 5. r short to gu	ctor Terminal 3 76 11? uit. OSITION (CKP ower and short t Se Name t pressure sensor or (POS) or) SENS(to ground ensor	DR (POS) d, betwee Connector E219 F30 E40	n the fol Termina 1 6	R SUPPLY CIRCUIT-III lowing terminals.

Check the following.

• Refrigerant pressure sensor (Refer to EC-271, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

6.CHECK APP SENSOR

Refer to EC-210, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 7.

7.REPLACE ACCELERATOR PEDAL ASSEMBLY

- 1. Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".
- 2. Go to EC-18. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

 $\mathbf{8}$. Check CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP set	nsor (POS)	ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F30	2	F13	60	Existed

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

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP se	nsor (POS)	ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F30	3	F13	65	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

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

10.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-147, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace crankshaft position sensor (POS). Refer to EM-78, "Disassembly and Assembly".

11.CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace the signal plate. Refer to <u>EM-78, "Disassembly and Assembly"</u>.

12. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

[QR25DE]

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>> INSPECTION END

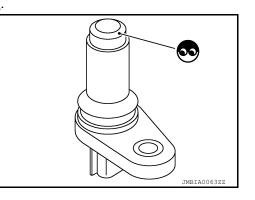
Component Inspection

1. CHECK CRANKSHAFT POSITION SENSOR (POS)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect crankshaft position sensor (POS) harness connector.
- 4. Remove the sensor. Refer to EM-78, "Disassembly and Assembly".
- 5. Visually check the sensor for chipping.

Is the inspection result normal?

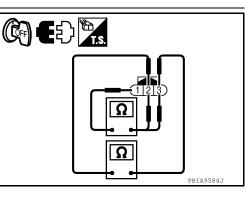
- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-</u> 78. "Disassembly and Assembly".



2. CHECK CRANKSHAFT POSITION SENSOR (POS)-II

Check resistance between crankshaft position sensor (POS) terminals as follows.

Terminals (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	
1 (+) - 3 (-)	Except 0 or ∞
2 (+) - 3 (-)	
T. 0	10



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-</u> 78, "Disassembly and Assembly".

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P0340 CMP SENSOR (PHASE)

Description

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

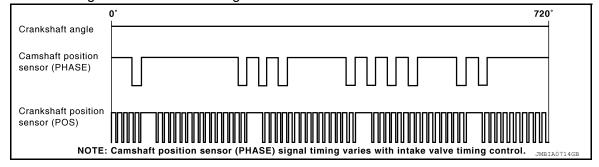
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes. ECM receives the signals as shown in the figure.



DTC Logic

INFOID:000000007420463

DTC DETECTION LOGIC

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-161, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sen- sor (PHASE) circuit	 The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not sent to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	 Harness or connectors (The sensor circuit is open or shorted) Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to <u>STR-9, "System</u> <u>Diagram"</u>.) Starting system circuit (Refer to <u>STR-9, "System Diagram"</u>.) Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

1. Start engine and let it idle for at least 5 seconds.



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P0340 CMP SENSOR (PHASE)

PU34U CIVIP SENSOR (PHASE	-)
< DTC/CIRCUIT DIAGNOSIS >	[QR25DE]
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 <u>EC-149, "Diagnosis Procedure"</u> .	
NO >> GO TO 3.	
3. PERFORM DTC CONFIRMATION PROCEDURE-I	
 Maintaining engine speed at more than 800 rpm for at least 5 seconds Check 1st trip DTC. 	3.
Is 1st trip DTC detected?	
YES >> Go to <u>EC-149, "Diagnosis Procedure"</u> . NO >> INSPECTION END	
Diagnosis Procedure	
	INFOID:0000000742046
1.CHECK STARTING SYSTEM	
Turn ignition switch to START position.	
Does the engine turn over? Does the starter motor operate?	
YES >> GO TO 2. NO >> Check starting system.	
2. CHECK GROUND CONNECTION	
1. Turn ignition switch OFF.	
 Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "C</u> 	ircuit Inspection".
Is the inspection result normal?	
YES >> GO TO 3.	
NO >> Repair or replace ground connection.	
3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER S	
 Disconnect camshaft position (CMP) sensor (PHASE) harness conne Turn ignition switch ON. 	ctor.
3. Check the voltage between CMP sensor (PHASE) harness con-	
nector and ground.	<u>s</u> • + 7 • • • • • • • • • • • • • • • • •
CMP sensor (PHASE)	X
Connector Terminal Ground Voltage	
F55 1 Ground Approx. 5V	
Is the inspection result normal?	
YES >> GO TO 4.	
NO >> Repair open circuit or short to ground or short to power in harness or connectors.	PBIB3312E
4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN ANI	D SHORT
1. Turn ignition switch OFF.	
 Check the continuity between CMP sensor (PHASE) harness connect 	or and ECM harness connector.
CMP sensor (PHASE) ECM Continuity	
Connector Terminal Connector Terminal	
F55 2 F13 64 Existed	
3. Also check harness for short to power.	
Is the inspection result normal? YES >> GO TO 5.	
YES >> GO TO 5. NO >> Repair open circuit or short to ground or short to power in har	ness or connectors.
5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPE	

P0340 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

CMP sensor (PHASE)		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F55	3	F13	69	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-150, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

```
NO >> Replace camshaft position sensor (PHASE). Refer to EC-24, "Component Parts Location".
```

7.CHECK CAMSHAFT (INT)

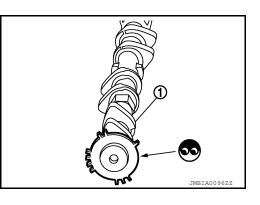
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 8.

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-42</u>, "<u>Removal</u> <u>and Installation</u>".



8. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

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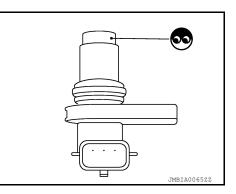
1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor. Refer to EC-24. "Component Parts Location".
- 5. Visually check the sensor for chipping.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace camshaft position sensor (PHASE). Refer to <u>EC-24. "Component Parts Location"</u>.



2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

P0340 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

Check resistance camshaft position sensor (PHASE) terminals as follows.

[QR25DE]

Terminals (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 camshaft position sensor (PHASE). Refer to <u>EC-24, "Component Parts Location"</u>.



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P0500 VSS

Description

The vehicle speed signal is sent to the combination meter from the "ABS actuator and electric unit (control unit)" by CAN communication line. The combination meter then sends a signal to the ECM by CAN communication line.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001.Refer to <u>EC-119</u>, "DTC Logic".
- If DTC P0500 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to <u>EC-120, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The vehicle speed signal to ECM is almost 0 km/h (0 MPH) even when vehicle is be- ing driven.	 Harness or connectors (The CAN communication line is open or short- ed) Harness or connectors (The vehicle speed signal circuit is open or shorted) Wheel sensor Combination meter ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES	>> GO TO 2.
NO	>> GO TO 5.
2 .PRE	ECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

>> GO TO 3.

3.CHECK VEHICLE SPEED SIGNAL

NOTE:

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

- With CONSULT 1. Start engine.
- Start engine.
 Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT. The vehicle speed on CONSULT should exceed 10 km/h (6 mph) when rotating wheels with suitable gear position.

Is the inspection result normal?

```
YES >> GO TO 4.
```

NO >> Go to EC-153, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Select "DATA MONITOR" mode with CONSULT.
- 2. Warm engine up to normal operating temperature.
- 3. Maintain the following conditions for at least 50 (CVT models) or 40 (M/T models) consecutive seconds. CAUTION:

INFOID:000000007420466

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Always drive vehicle at a safe speed.

-		
ENG SPEED	CVT: 1,350 - 6,000 rpm M/T: 1,650 - 6,000 rpm	
COOLAN TEMP/S	More than 70°C (158°F)	E
B/FUEL SCHDL	CVT: 5.5 - 31.8 msec M/T: 4.8 - 31.8 msec	
Shift lever	Except P or N position (CVT) Except Neutral position (M/T)	
PW/ST SIGNAL	OFF	
 4. Check 1st trip DTC. <u>Is 1st trip DTC detected?</u> YES >> Go to <u>EC-153</u>, "Diagr 	posis Procedure"	
NO >> INSPECTION END	IUSIS FIOCEULIE.	
5.PERFORM COMPONENT FU	NCTION CHECK	
Perform component function chec	ck. Refer to <u>EC-153, "Component F</u> o check the overall function of the	<u>unction Check"</u> . vehicle speed signal circuit. During this
<u>Is the inspection result normal?</u> YES >> INSPECTION END		
NO >> Go to <u>EC-153. "Diagr</u>	nosis Procedure".	
Component Function Cheo	ck	INFOID:00000007420468
1.PERFORM COMPONENT FU	NCTION CHECK	
 Without CONSULT 1. Lift up drive wheels. 2. Start engine. 3. Read vehicle speed of speed The vehicle speed should be position. 		when rotating wheels with suitable gear
Is the inspection result normal?		
YES >> INSPECTION END NO >> Go to EC-153, "Diagr	oosis Procedure"	
Diagnosis Procedure	<u>10315 1 1000 dulo</u> .	INFOID:00000007420469
1. CHECK DTC WITH "ABS ACT	UATOR AND ELECTRIC UNIT (CO	ONTROL UNIT)"
	nction (ABS)" or BRC-81, "CONSUL	
Is the inspection result normal?		
YES >> GO TO 2.		
NO >> Repair or replace. 2.CHECK COMBINATION METE	D	
Refer to <u>MWI-28, "CONSULT Fun</u> >> INSPECTION END		

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:000000007420471

DTC DETECTION LOGIC

NOTE:

If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-161, "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.	 Harness or connectors (The sensor circuit is open or shorted) Power steering pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-154, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

- 1. Disconnect power steering pressure (PSP) sensor harness connector.
- 2. Turn ignition switch ON.

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P0550 PSP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between PSP sensor harness connector and ground.

PSP s	ensor	Ground	Voltage	
Connector	Terminal	Cround	voltage	
F40	1	Ground	Approx. 5V	

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

PSP sensor		EC	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F40	3	F13	48	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

 ${f 4}$. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

PSP s	ensor	ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F40	2	F13	41	Existed	
	hool (hor	noon for ok	ort to ar		

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK PSP SENSOR

Refer to <u>EC-155. "Component Inspection"</u>. <u>Is the inspection result normal?</u> YES >> GO TO 6. NO >> Replace PSP sensor. Refer to <u>ST-21. "QR25DE : Component Parts Location"</u>. **6.**CHECK INTERMITTENT INCIDENT Refer to <u>GI-42. "Intermittent Incident"</u>.

>> INSPECTION END

Component Inspection

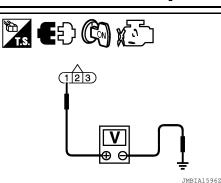
1. CHECK POWER STEERING PRESSURE SENSOR

1. Turn ignition switch OFF.

2. Reconnect all harness connectors disconnected.

3. Start engine and let it idle.

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P0550 PSP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

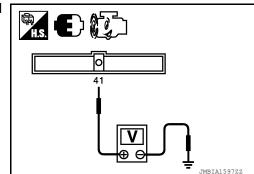
4. Check the voltage between ECM harness connector and ground under the following conditions.

ECM		Condition		Voltage
Connector	Terminal	CO	Condition	
	41	Stooring	Being turned	0.5 - 4.5V
F13	(Power steering pressure sensor signal)	Steering wheel	Not being turned	0.4 - 0.8V

Is the inspection result normal?

YES >> INSPECTION END

>> Replace power steering pressure sensor. Refer to ST-21, "QR25DE : Component Parts Location". NO



[QR25DE]

P0603 ECM POWER SUPPLY

Description

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

DTC Logic

DTC No.

DTC DETECTION LOGIC

Trouble diagnosis name

 P0603
 ECM power supply circuit
 ECM back-up RAM system does not function properly.
 [ECM power supply (back-up) circuit is open or shorted.]

 DTC CONFIRMATION PROCEDURE
 1.PRECONDITIONING

DTC detecting condition

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 5 minutes
- 3. Turn ignition switch ON and wait at least 10 seconds.
- 4. Repeat steps 2 and 3 for five times.

5. Check 1st trip DTC.

- Is 1st trip DTC detected?
- YES >> Go to EC-157. "Diagnosis Procedure".
- NO >> INSPECTION END

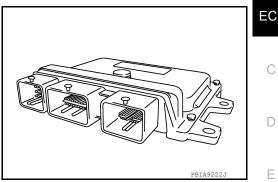
Diagnosis Procedure

1.CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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Possible cause

Harness or connectors

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P0603 ECM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

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

I	ECM	Ground	Voltage	
Connector	Terminal	Ground	voltage	
F13	77	Ground	Battery voltage	

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse (No. 42)
- IPDM E/R harness connector F10
- · Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

4.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC Confirmation Procedure. See <u>EC-157, "DTC Logic"</u>.

Is the 1st trip DTC P0603 displayed again?

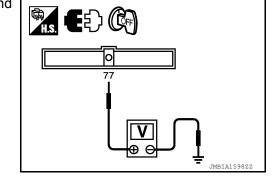
YES >> GO TO 5.

NO >> INSPECTION END

5.REPLACE ECM

- 1. Replace ECM. Refer to EC-24, "Component Parts Location".
- Go to <u>EC-18</u>, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END



[QR25DE]

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	G
P0605 Engine control module	A)	ECM calculation function is malfunctioning.		0	
	B)	ECM EEP-ROM system is malfunctioning.	• ECM		
	C)	ECM self shut-off function is malfunctioning.		Н	
DTC CONFIRMATION PROCEDURE					
1.PRECONDITIONING					Ι

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A	K
 Turn ignition switch ON. Check 1st trip DTC. 	
Is 1st trip DTC detected?	L
YES >> Go to <u>EC-160, "Diagnosis Procedure"</u> . NO >> GO TO 3.	
3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B	\mathbb{M}
 wait at least 1 second. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON. Check 1st trip DTC. 	N
Is 1st trip DTC detected?	
YES >> Go to <u>EC-160, "Diagnosis Procedure"</u> . NO >> GO TO 4.	0
4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C	
 wait at least 1 second. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON. Repeat step 2 for 32 times. 	Ρ
4. Check 1st trip DTC.	
Is 1st trip DTC detected?	
YES >> Go to <u>EC-160, "Diagnosis Procedure"</u> .	

NO >> INSPECTION END

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Diagnosis Procedure

[QR25DE]

1.INSPECTION START

1. Turn ignition switch ON.

- 2. Erase DTC.
- 3. Perform DTC Confirmation Procedure. See <u>EC-159</u>, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

YES >> GO TO 2.

NO >> INSPECTION END

2.REPLACE ECM

- 1. Replace ECM. Refer to EC-24. "Component Parts Location".
- 2. Go to EC-18. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

P0643 SENSOR POWER SUPPLY

DTC Logic

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[QR25DE]

DTC DETECTION LOGIC

DTC No. Trouble diagnosis DTC detecting condition	Possible cause
P0643 Sensor power supply ECM detects a voltage of power source for circuit short sensor is excessively low or high.	 Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) (Battery current sensor circuit is shorted.) (PSP sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.] Accelerator pedal position sensor Throttle position sensor Battery current sensor Power steering pressure sensor Camshaft position sensor (PHASE)
DTC CONFIRMATION PROCEDURE	
1.PRECONDITIONING	
If DTC Confirmation Procedure has been previously conducted, least 10 seconds before conducting the next test. TESTING CONDITION:	always turn ignition switch OFF and wait at
Before performing the following procedure, confirm that batte	ery voltage is more than 8V at idle.
>> GO TO 2.	
2. PERFORM DTC CONFIRMATION PROCEDURE	
1. Start engine and let it idle for 1 second.	
2. Check DTC.	
<u>Is DTC detected?</u> YES >> Go to EC-161, "Diagnosis Procedure".	
YES >> Go to <u>EC-161, "Diagnosis Procedure"</u> . NO >> INSPECTION END	
Diagnosis Procedure	INFOID:000000007420481
1.CHECK GROUND CONNECTION	
1. Turn ignition switch OFF.	
2. Check ground connection E9. Refer to Ground Inspection in (GI-45, "Circuit Inspection".
Is the inspection result normal?	
YES >> GO TO 2. NO >> Repair or replace ground connection.	
2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POW	
- OHEOR ACCELERATOR I EDALT COTTON CENCOR I FOR	ER SUPPLY CIRCUIT
1. Disconnect accelerator pedal position (APP) sensor harness	

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P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between APP sensor harness connector and ground.

APP s	sensor	Ground	Voltage	
Connector	Terminal	Crodina		
E40	5	Ground	Approx. 5V	

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.

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

ECM		Sensor			
Connector	Terminal	Name	Connector	Terminal	
	47	Electric throttle control actuator	F57	1	
F13 55	51	Battery current sensor	F5	1	
	55	PSP sensor	F40	1	
	59	CMP sensor (PHASE)	F55	1	
E10	83	APP sensor	E40	5	

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK COMPONENTS

Check the following.

• Power steering pressure sensor (Refer to <u>EC-155, "Component Inspection"</u>.)

Camshaft position sensor (PHASE) (Refer to <u>EC-150, "Component Inspection"</u>.)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

5.CHECK BATTERY CURRENT SENSOR

1. Disconnect battery current sensor harness connector.

2. Check the continuity between battery current sensor terminals.

Battery current sensor		Battery cur	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F5	1	F5	2	Existed
	I	15	3	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK TP SENSOR

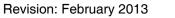
Refer to EC-138, "Component Inspection".

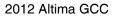
Is the inspection result normal?

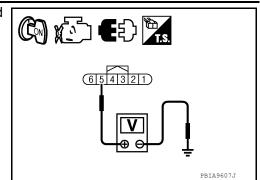
YES >> GO TO 8.

NO >> GO TO 7.

7.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR







[QR25DE]

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >	[QR25DE]	
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".		Λ
>> INSPECTION END		А
8. CHECK APP SENSOR		EC
Refer to EC-210, "Component Inspection".		
<u>Is the inspection result normal?</u> YES >> GO TO 9.		С
NO >> GO TO 10.		0
9.REPLACE ACCELERATOR PEDAL ASSEMBLY		D
Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".		D
>> INSPECTION END		Е
10.CHECK INTERMITTENT INCIDENT		
Refer to GI-42, "Intermittent Incident".		F
>> INSPECTION END		Г
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P0850 PNP SWITCH

Description

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[QR25DE]

When the shift lever position is P or N (CVT), Neutral position (M/T), park/neutral position (PNP) signal is ON. ECM detects the position because the continuity of the line (the ON signal) exists.

DTC Logic

INFOID:000000007420483

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850	Park/neutral position switch	The park/neutral position (PNP) signal is not changed in the process of engine starting and driving.	 Harness or connectors [The park/neutral position (PNP) signal circuit is open or shorted.] Park/neutral position (PNP) switch (M/T models) Transmission range switch (CVT models)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT? YES >> GO TO 2. NO >> GO TO 5.

2.PRECONDITIONING

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

>> GO TO 3.

3. CHECK TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T) FUNCTION

With CONSULT

1. Turn ignition switch ON.

2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT. Then check the "P/N POSI SW" signal under the following conditions.

Position (Shift lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above position	OFF

Is the inspection result normal?

YES >> GO TO 4.

NO >> Go to EC-165, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Maintain the following conditions for at least 50 consecutive seconds. CAUTION:

Always drive vehicle at a safe speed.

ENG SPEED	CVT: 1,300 - 6,375 rpm M/T: 1,500 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)

P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

B/FUEL SCHDL	CVT: 3.0 - 31.8 msec M/T: 2.1 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 mph)
Shift lever	Suitable position

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-165, "Diagnosis Procedure".

NO >> INSPECTION END

$\mathbf{5}.$ PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to <u>EC-165. "Component Function Check"</u>. **NOTE:**

Use component function 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 EC-165, "Diagnosis Procedure".

Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK

- 1. Turn ignition switch ON.
- Check the voltage between ECM harness connector and ground.

EC	CM	Ground	Co	ndition	Voltage
Connector	Terminal	Ciouna	Condition		voltage
E10	102 (PNP sig-	Ground	Shift lever	P or N (CVT) Neutral (M/T)	Approx. 0V
LIU	nal)	Ground	Shift lever	Except above	BATTERY VOLTAGE

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-165. "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T) POWER SUPPLY CIRCUIT

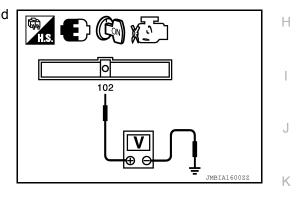
- 1. Turn ignition switch OFF.
- 2. Disconnect transmission range switch (CVT) or PNP switch (M/T) harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between transmission range switch (CVT) or PNP switch (M/T) harness connector and ground.

Transmission (C [\] PNP swi	/T)	Ground	Voltage
Connector	Terminal		
F25 (CVT) (A) F32 (M/T) (B)	1	Ground	Battery voltage

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART



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P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Check the following.

- IPDM E/R harness connector F10
- 10A fuse (No. 33)
- Harness for open and short between transmission range switch (CVT) or PNP switch (M/T) and IPDM E/R

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

 ${\it 3.}$ CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between transmission range switch (CVT) or PNP switch (M/T) harness connector and ECM harness connector.

Transmission range switch (CVT) PNP switch (M/T)		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F25 (CVT) F32 (M/T)	2	E10	102	Existed

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

Is the inspection result normal?

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

4.DETECT MALFUNCTIONING PART

Check the following.

• IPDM E/R harness connectors E18, F10

• Harness for open and short between transmission range switch (CVT) or PNP switch (M/T) and IPDM E/R

• Harness for open and short between transmission range switch (CVT) or PNP switch (M/T) and ECM

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

5.CHECK TRANSMISSION RANGE SWITCH (CVT) OR PNP SWITCH (M/T)

Refer to <u>TM-297</u>, "Component Inspection (Transmission Range Switch)" (CVT) or <u>TM-22</u>, "Inspection" (M/T).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace transmission range switch (CVT), refer to <u>TM-416, "Exploded View"</u>, or PNP switch (M/ T), Refer to <u>TM-22, "Removal and Installation"</u>.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

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

Description

DTC DETECTION LOGIC

< DTC/CIRCUIT DIAGNOSIS >

P1212 TCS COMMUNICATION LINE

NOTE:

- If DTC P1212 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX. Refer to <u>EC-119, "DTC Logic"</u>.
- If DTC P1212 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to <u>EC-120, "DTC Logic"</u>.

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name DTC detecting condition		Possible cause	
P1212	TCS communication line	ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously.	 Harness or connectors (The CAN communication line is open or shorted.) ABS actuator and electric unit (control unit) Dead (Weak) battery 	(

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always 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.

Is 1st trip DTC detected?

- YES >> Go to EC-167, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

Go to GI-38, "Work Flow".

P1212 TCS COMMUNICATION LINE

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INFOID:000000007420486

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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 U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-119, "DTC Logic"</u>.
- If DTC P1217 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to <u>EC-120, "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)	 Cooling fan does not operate properly (Overheat). Cooling fan system does not operate properly (Overheat). Engine coolant was not added to the system using the proper filling method. Engine coolant is not within the specified range. 	 Harness or connectors (The cooling fan circuit is open or short- ed.) IPDM E/R (Cooling fan relay-1) Cooling fan relays-2 and -3 Cooling fan motor Radiator hose Radiator hose Radiator cap Reservoir tank Water pump Thermostat Water control valve

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to <u>CO-12, "Changing Engine</u> <u>Coolant"</u>. Also, replace the engine oil. Refer to <u>LU-10, "Changing Engine Oil"</u>.

- 1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to <u>MA-12</u>, "<u>SAE Viscosity Number</u>".
- 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-168, "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-169, "Diagnosis Procedure".

Component Function Check

INFOID:000000007420490

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

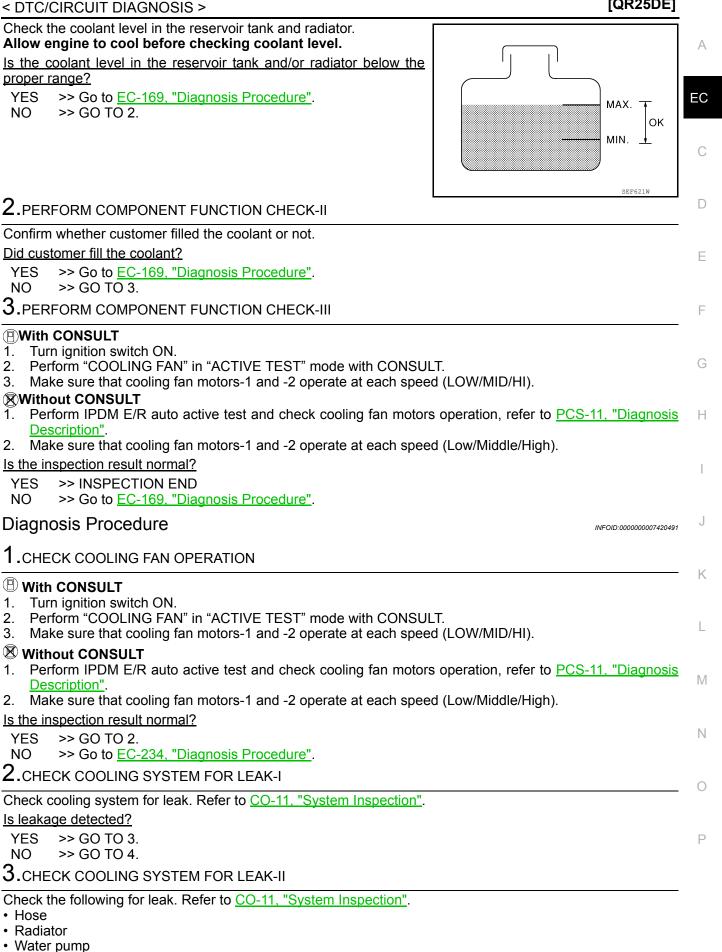
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

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.

INFOID:000000007420489

P1217 ENGINE OVER TEMPERATURE

[QR25DE]



>> Repair or replace malfunctioning part.

4.CHECK RADIATOR CAP

Check radiator cap. Refer to CO-15. "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap.

5.CHECK THERMOSTAT

Check thermostat. Refer to CO-20, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat. Refer to <u>CO-20, "Removal and Installation"</u>.

6.CHECK WATER CONTROL VALVE

Check water control valve. Refer to <u>CO-22, "Removal and Installation"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace water control valve. Refer to <u>CO-22, "Removal and Installation"</u>.

7. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-134, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-20. "Exploded View"</u>.

8.CHECK MAIN 13 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	 Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper 	• Visual	No blocking	_
	2	Coolant mixture	Coolant tester	MA-12, "SAE Viscosity Nu	mber"
	3	Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-12, "Changing Engine Coolant"
	4	Radiator cap	Pressure tester	CO-15. "Removal and Inst	allation"
ON* ²	5	Coolant leaks	• Visual	No leaks	CO-11, "System Inspec- tion"
ON* ²	6	Thermostat	 Touch the upper and lower radiator hoses 	Both hoses should be hot	CO-20. "Removal and In- stallation"
ON* ¹	7	Cooling fan motor	CONSULT	Operating	EC-234, "Component Function Check"
OFF	8	Combustion gas leak	Color checker chemical tester 4 Gas analyzer	Negative	_
ON* ³	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	CO-11, "System Inspec- tion"
OFF* ⁴	10	Coolant return from res- ervoir tank to radiator	Visual	Should be initial level in reservoir tank	CO-11, "System Inspec- tion"
OFF	11	Water control valve	Remove and inspect the valve	Within the specified value	CO-22, "Removal and In- stallation"

P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

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Engine	Step	Inspection item	Equipment	Standard	Reference page	٨	
OFF	12	Cylinder head	 Straight gauge feeler gauge 	0.1 mm (0.004 in) Maxi- mum distortion (warping)	EM-70, "Inspection After Disassembly"	A	
	13	 Cylinder block and pis- tons 	Visual	No scuffing on cylinder walls or piston	EM-86, "Inspection After Disassembly"	EC	
*1: Turn the	*1: Turn the ignition switch ON.						

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to CO-9, "Troubleshooting Chart".

>> INSPECTION END

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 potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

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DTC Logic

DTC DETECTION LOGIC

INFOID:000000007420493

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	Electric throttle control actuator (TP sensor 1 and 2)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to <u>EC-172</u>, "<u>Diagnosis Procedure</u>". NO >> INSPECTION END

Diagnosis Procoduro

Diagnosis Procedure

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.

2. Remove the intake air duct. Refer to EM-25. "Removal and Installation".

INFOID:000000007420494

INFOID:000000007420492

P1225 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - 2. Electric throttle control actuator
 - <□ : Vehicle front

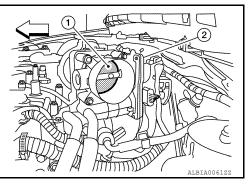
Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END



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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.

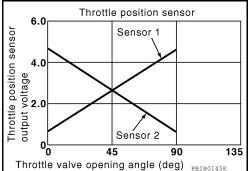
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

DTC DETECTION LOGIC

INFOID:000000007420496

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INFOID:000000007420497

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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Turn ignition switch OFF, wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Repeat steps 2 and 3 for 32 times.
- 5. Check 1st trip DTC.
- Is 1st trip DTC detected?
- YES >> Go to EC-174, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420498

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-25, "Removal and Installation".

P1226 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check if foreign matter is caught between the throttle valve (1) and the housing.

- 2. Electric throttle control actuator
- <□ : Vehicle front

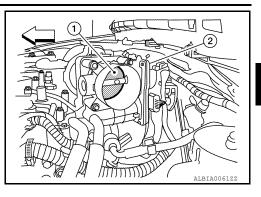
Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END



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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 EC-57, "System Description" 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-159, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P1564	ASCD steering switch	 An excessively high voltage signal from the ASCD steering switch is sent to ECM. ECM detects that input signal from the ASCD steering switch is out of the specified range. ECM detects that the ASCD steering switch is stuck ON. 	 Harness or connectors (The switch circuit is open or shorted.) ASCD steering switch ECM 	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Wait at least 10 seconds.
- 3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 7. Check DTC.

Is DTC detected?

- YES >> Go to EC-176, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT

Turn ignition switch ON.

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P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

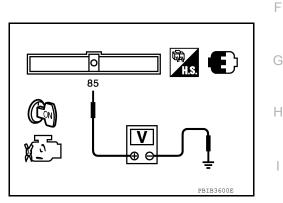
- 2. Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT.
- 3. Check each item indication under the following conditions.

Monitor item	Condition	Indication	
MAIN SW	MAIN switch	Pressed	ON
MAIN SW		Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
CANCEL SW		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
RESUME/ACC SW		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
SET SW	SET/COAST SWICH	Released	OFF

Without CONSULT

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

EC	ECM		Condition	Voltage
Connector	Terminal	Ground	Condition	voltage
		85 (ASCD steering Ground switch signal)	MAIN switch: Pressed	Approx. 0V
	85		CANCEL switch: Pressed	Approx. 1V
= 10	•		SET/COAST switch: Pressed	Approx. 2V
E10	•		RESUME/ACCELERATE switch: Pressed	Approx. 3V
		All ASCD steering switches: Released	Approx. 4V	



Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 3.

 $\mathbf{3}.$ 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 M88.

4. Check the continuity between combination switch and ECM harness connector.

Combination switch	ECM		Continuity
Terminal	Connector	Terminal	Continuity
16	E10	92	Existed
5. Also check ha	arness for sh	ort to grour	nd and sho
Is the inspection r	esult norma	?	

YES >> GO TO 5.

NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M1, E30

• Combination switch (spiral cable)

· Harness for open and short between ECM and combination switch

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P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and combination switch.

Combination switch	E	Continuity	
Terminal	Connector Terminal		Continuity
13	E10	85	Existed

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

Is the inspection result normal?

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

6.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors M1, E30

Combination switch (spiral cable)

Harness for open and short between ECM and combination switch

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

1.CHECK ASCD STEERING SWITCH

Refer to EC-178, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace ASCD steering switch. Refer to <u>ST-13, "Removal and Installation"</u>.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

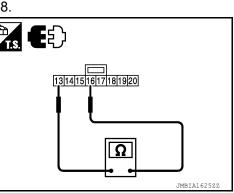
Component Inspection

INFOID:000000007420503

1.CHECK ASCD STEERING SWITCH

- 1. Disconnect combination switch (spiral cable) harness connector M88.
- Check the continuity between combination switch harness connector terminals under following conditions.

Combination switch		Condition	Posistanoo
Connector	Terminals		
		MAIN switch: Pressed	Approx. 0 Ω
		CANCEL switch: Pressed	Approx. 250 Ω
M88	13 and 16	SET/COAST switch: Pressed	Approx. 660 Ω
mee		RESUME/ACCELERATE switch: Pressed	Approx. 250 Ω
		All ASCD steering switches: Released	



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch. Refer to <u>ST-13, "Removal and Installation"</u>.

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 this input of two kinds (ON/OFF signal). Refer to <u>EC-57</u>, "System Description" 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-159, "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 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.	 Harness or connectors (The stop lamp switch circuit is shorted.) Harness or connectors (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 driving.	 Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T) Stop lamp switch ASCD brake switch ASCD clutch switch (M/T) Incorrect stop lamp switch installation Incorrect ASCD brake switch installation Incorrect ASCD clutch switch installation (M/T) ECM 	Ι J

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

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

 $\mathbf{2}$ DEFORMUTIONING

2.PRECONDITIONING

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

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-I

1. Start engine.

2. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

Always drive vehicle at a safe speed. NOTE: INFOID:000000007420504

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P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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

Vehicle speed	More than 30 km/h (19 mph)
Selector lever	Suitable position

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-181, "Diagnosis Procedure".

NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-II

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions. **CAUTION:**

Always drive vehicle at a safe speed. NOTE:

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

Vehicle speed	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-181, "Diagnosis Procedure".

NO >> INSPECTION END

5. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-180, "Component Function Check".

NOTE:

Use component function check to check the overall function of ASCD brake switch. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-181, "Diagnosis Procedure".

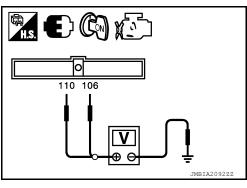
Component Function Check

INFOID:000000007420506

1.PERFORM COMPONENT FUNCTION CHECK

- 1. Turn ignition switch ON.
- Check the voltage between ECM harness connector and ground.

ECM		Ground		Condition	Voltage
Connector	Terminal	Giouna		Condition	vollage
	110 (ASCD brake switch signal) 106 (Stop lamp			Slightly depressed	Approx. 0V
E10		- Ground	Brake pedal	Fully released	Battery voltage
ETO				Slightly depressed	Battery voltage
	switch signal)			Fully released	Approx. 0V



Is the inspection result normal? YES >> INSPECTION END

NO >> Go to EC-181, "Diagnosis Procedure".



< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

1.CHECK OVERALL FUNCTION-I

(B) With CONSULT

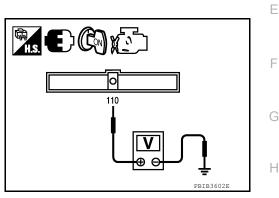
- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Condition		Indication
BRAKE SW1	Brake pedal (CVT)	Slightly depressed	OFF
	Brake pedal and clutch pedal (M/T)	Fully released	ON

Without CONSULT

- 1. Turn ignition switch ON.
- Check the voltage between ECM harness connector and ground.

ECM		Ground	Conditio	Voltage	
Connector	Terminal	Ground	Condition		vollage
E10	110 (ASCD	Ground	Brake pedal (CVT)	Slightly de- pressed	Approx. 0 V
	brake switch signal)	Ground	Brake pedal and clutch pedal (M/T)	Fully re- leased	Battery voltage



Is the inspection result normal?

YES >> GO TO 2.

NO-1 >> CVT models: GO TO 3.

NO-1 >> M/T models: GO TO 7.

2. CHECK OVERALL FUNCTION-II

With CONSULT

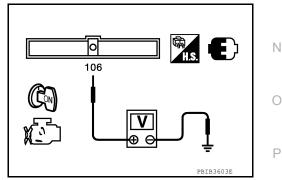
Select "BRAKE SW2" and check indication in "DATA MONITOR" mode.

Monitor item	Condition		Indication
BRAKE SW2	Brake pedal (CVT)	Slightly depressed	ON
	Brake pedal and clutch pedal (M/T)	Fully released	OFF

Without CONSULT

Check the voltage between ECM harness connector and ground.

ECM		Groun	Conditio	n	Voltage	
Connector	Terminal	d	Conditio		vollage	
E10	106 (Stop Jamp	Groun d	Brake pedal (CVT)	Slightly depressed	Battery voltage	
	(Stop lamp switch signal)		Brake pedal and clutch pedal (M/T)	Fully re- leased	Approx. 0 V	



Is the inspection result normal?

YES >> GO TO 25.

NO >> GO TO 14.

3.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

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< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD brak	ke switch	Ground	Voltage	
Connector	Terminal	Oround	vollage	
E37	1	Ground	Battery voltage	

Is the inspection result normal?

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

4.DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10 A fuse (No.3)

· Harness for open or short between ASCD brake switch and fuse

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

5. Check ascd brake switch input signal circuit for open and short

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

ASCD brake switch		EC	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
E37	2	E10	110	Existed	

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

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK ASCD BRAKE SWITCH

Refer to EC-186, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.

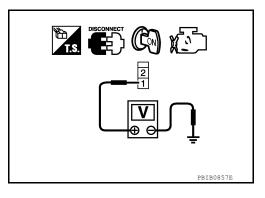
NO >> Replace ASCD brake switch. Refer to <u>BR-17, "Removal and Installation"</u>.

7. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ASCD clutch switch harness connector.

3. Turn ignition switch ON.





 Check the voltage between ASCD clutch switch harness connector and ground.

ASCD clutch switch		Ground Condition		ondition	Voltage (V)	
Connector	Terminal	Ground	Condition		voltage (v)	
E39	1	Ground	Brake pedal	Slightly de- pressed	Approx. 0	
			pedal	Fully released	Battery voltage	

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 8.

8.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD bral	ke switch	Ground	Voltage		
Connector	Connector Terminal		vollage		
E37	1	Ground	Battery voltage		

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E46
- 10 A fuse (No.3)
- · Harness for open or short between ASCD brake switch and fuse
 - >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD bra	ke switch	ASCD clut	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E37	2	E39	1	Existed

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

Is the inspection result normal?

YES >> GO TO 11.

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

11.CHECK ASCD BRAKE SWITCH

Refer to EC-186, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD brake switch. Refer to <u>BR-17</u>, "Removal and Installation".



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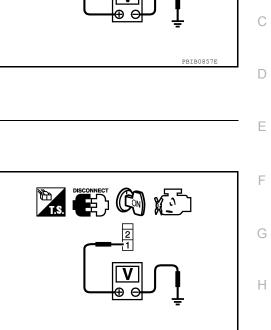
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< DTC/CIRCUIT DIAGNOSIS >

12. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

ECM		ASCD clut	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
E10	110	E39	2	Existed	

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

Is the inspection result normal?

YES >> GO TO 13.

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

13. CHECK ASCD CLUTCH SWITCH

Refer to EC-187, "Component Inspection (ASCD Clutch Switch)".

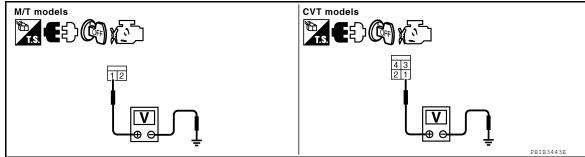
Is the inspection result normal?

YES >> GO TO 19.

NO >> Replace ASCD clutch switch. Refer to CL-9, "Removal and Installation".

14. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check the voltage between stop lamp switch harness connector and ground.



Stop lam	o switch	Ground	Voltage	
Connector	Terminal	Ground		
E38	1	Ground	Battery voltage	

Is the inspection result normal?

YES-1 >> M/T models: GO TO 16.

YES-2 >> CVT models: GO TO 18.

NO >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10 A fuse (No.7)
- Harness for open or short between stop lamp switch and battery

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

16. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

< DTC/CIRCUIT DIAGNOSIS >

EC	M	Stop	lamp switch	Continuity			A
Connector	Terminal	Connec	ctor Termi	nal Continuity			_
E10	106	E38	2	Existed	_		EC
3. Also ch	eck harne	ess for sh	nort to grou	und and short	to power.		LO
Is the inspe	ction resu	<u>llt norma</u>	<u> ?</u>		-		
YES >>	GO TO 2	3.					С
· —	GO TO 1						
17.dete	CT MALF	UNCTIO	NING PAF	RT			
Check the f	ollowing.						D
Fuse bloc							
 Junction I Harness 1 				CM and stop la	amn switch		Е
Tamess	or open o	I SHOLE			amp Switch		
>>	· Repair o	oen circu	uit or short	to around or s	short to power in	harness or connectors.	
				ROUND CIRC			F
					011		
	nition swit nect stop		av-1 harne	ess connector.			
					I harness con-		G
nector	and and g	round.					
							Н
Stop lam	p relay-1	Ground	d Continu	uity			
Connector	Terminal						
E57	2	Ground	d Existe	ed			
Is the inspe			<u> ?</u>				
	GO TO 1		uit or chart	to ground or	abort to now or		1
NO >>	in harnes			to ground or	short to power	JPBIA4954ZZ	J
19.CHEC				PUT SIGNAL	CIRCUIT		
							Κ
	nition swit		Thamess	connector.			
3. Check	the voltag		en stop lan	np relay-1 hari	ness connector		
and gro	ound.					CO ED K	L
Stop lam	-	Ground	С	ondition	Voltage (V)		Μ
Connector	Terminal						
F 5 7	4	Oneveral	Brake	Slightly de- pressed	Battery voltage		
E57	1	Ground	pedal	Fully released	Approx. 0		Ν
Is the inspe	ction requ	lt norma	12	T dify Teleased	Approx. 0		
	· GO TO 2		<u>1 :</u>			JPBIA4953ZZ	0
	• GO TO 2						0
20.dete	CT MALF	UNCTIO	NING PAF	ЯΤ			
Check the f							Ρ
Joint coni		4 E56					
 Harness 	or open o	r short b	etween sto	op lamp switch	n and stop lamp	relay-1	
Is the inspe			<u> ?</u>				
YES >>	GO TO 2					harness or connectors	

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

EC-185

21. CHECK STOP LAMP RELAY-1 POWER SUPPLY CIRCUIT

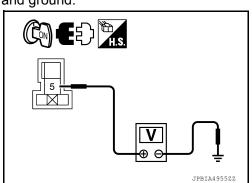
- 1. Check the voltage between stop lamp relay-1 harness connector and ground.
- 2. Check the voltage between stop lamp relay-1 harness connector and ground.

Stop lamp relay-1		Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E57	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 22.

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



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22.CHECK STOP LAMP RELAY-1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay-1 harness connector.
- 3. Check the continuity between stop lamp relay-1 harness connector and ECM harness connector.

EC	М	Stop lamp	o relay-1	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	106	E57	3	Existed

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

Is the inspection result normal?

YES >> GO TO 24.

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

23. CHECK STOP LAMP SWITCH

Refer to EC-188, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

- YES >> GO TO 25.
- NO >> Replace stop lamp switch. Refer to <u>BR-17</u>, "Removal and Installation".

24.CHECK STOP LAMP RELAY-1

Refer to EC-188, "Component Inspection (Stop Lamp Relay-1)".

Is the inspection result normal?

YES >> GO TO 25.

NO >> Replace stop lamp relay-1. For the relay number, refer to <u>EC-288, "Wiring Diagram — ENGINE</u> <u>CONTROL SYSTEM —</u>". For the relay arrangement, refer to <u>PG-34, "Harness Layout"</u> (coupe models) or <u>PG-103, "Harness Layout"</u> (sedan models).

25.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection (ASCD Brake Switch)

1.CHECK ASCD BRAKE SWITCH-I

1. Turn ignition switch OFF.

2. Disconnect ASCD brake switch harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
	Brake pedal	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

- 1. Adjust ASCD brake switch installation. Refer to BR-13, "Inspection and Adjustment".
- 2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
	Diake peual	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch. Refer to <u>BR-17, "Removal</u> and Installation".

Component Inspection (ASCD Clutch Switch)

1.CHECK ASCD CLUTCH SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD clutch switch harness connector.
- 3. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
	Clutch pedal	Slightly depressed	Not existed

Is the inspection result normal?

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

2.CHECK ASCD CLUTCH SWITCH-II

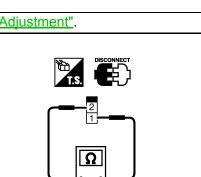
- 1. Adjust ASCD clutch switch installation. Refer to CL-6, "Inspection and Adjustment".
- Check the continuity between ASCD clutch switch terminals 2. under the following conditions.

Terminals	Condition		Continuity
1 and 2	Clutch pedal	Fully released	Existed
	Clutch pedal	Slightly depressed	Not existed

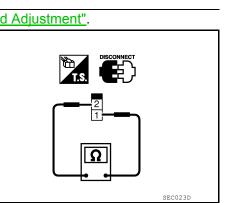
Is the inspection result normal?

YES >> INSPECTION END

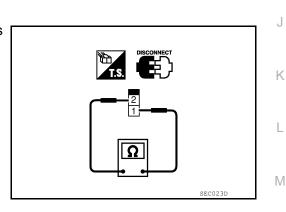
>> Replace ASCD clutch switch. Refer to CL-9, "Removal NO and Installation".

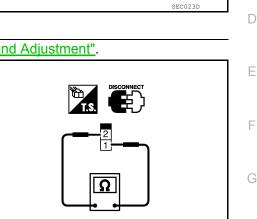


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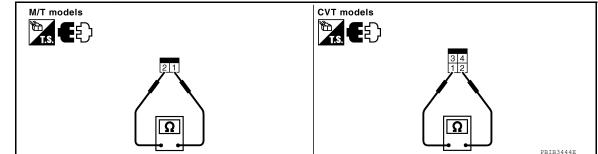
Component Inspection (Stop Lamp Switch)

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[QR25DE]

1.CHECK STOP LAMP SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check the continuity between stop lamp switch terminals under the following conditions.



Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
i anu z	Diake pedal	Slightly depressed	Existed

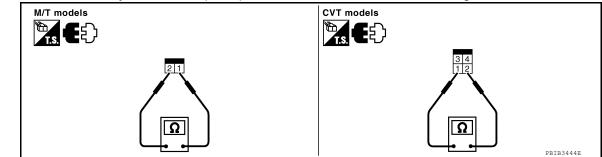
Is the inspection result normal?

YES >> INSPECTION END

2.CHECK STOP LAMP SWITCH-II

2.

- 1. Adjust stop lamp switch installation. Refer to <u>BR-13</u>, "Inspection and Adjustment".
- 2. Check the continuity between stop lamp switch terminals under the following conditions.



Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
	brake pedar	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-17, "Removal and Installation"</u>.

Component Inspection (Stop Lamp Relay-1)

INFOID:000000007420511

1. STOP LAMP RELAY-1

1. Turn ignition switch OFF.

 Remove stop lamp relay-1. For the relay number, refer to <u>EC-288</u>, "Wiring Diagram — ENGINE CON-<u>TROL SYSTEM —</u>". For the relay arrangement, refer to <u>PG-34</u>, "Harness Layout" (coupe models) or <u>PG-103</u>, "Harness Layout" (sedan models).

< DTC/CIRCUIT DIAGNOSIS >

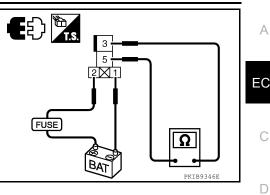
3. Check continuity between stop lamp relay-1 terminals under the following conditions.

Stop lamp relay-1		Conditions	Continuity
Terr	ninal	Conditions	Continuity
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp relay-1.



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P1574 ASCD VEHICLE SPEED SENSOR

Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to <u>EC-57</u>, "System Description" for ASCD functions.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-119, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to <u>EC-120, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to <u>EC-152</u>, "<u>DTC Logic</u>"
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-159, "DTC Logic"</u>

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	 Harness or connectors (The CAN communication line is open or shorted.) (Combination meter circuit is open or shorted.) Combination meter ABS actuator and electric unit (control unit) Wheel sensor TCM (CVT models) ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive the vehicle at more than 40 km/h (25 MPH).
- CAUTION:

Always drive vehicle at a safe speed.

NOTÉ:

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

- 3. Check DTC.
- Is DTC detected?
- YES >> Go to <u>EC-190, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-286, "CONSULT Function (TRANSMISSION)".

Is the inspection result normal?

YES >> GO TO 2.

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P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[QR25DE]
NO >> Perform trouble shooting relevant to DTC indicated.	
2. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"	A
Refer to BRC-15, "CONSULT Function (ABS)" or BRC-81, "CONSULT Function (ABS)".	
Is the inspection result normal?	EC
YES >> GO TO 3.	
NO >> Repair or replace.	
3. CHECK COMBINATION METER	С
Check combination meter function. Refer to <u>MWI-28, "CONSULT Function (METER/M&A)"</u> .	D
>> INSPECTION END	D
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P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1715 INPUT SPEED SENSOR

Description

ECM receives input shaft revolution signal from TCM through 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 U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-119</u>, "<u>DTC Logic</u>".
- If DTC P1715 is displayed with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to <u>EC-120, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-159, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to <u>EC-144, "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-148, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (TCM output)	Input shaft revolution signal is different from the theoretical value calculated by ECM from output shaft revolution signal and engine rpm signal.	 Harness or connectors (The CAN communication line is open or short- ed) Harness or connectors (Input speed sensor circuit is open or shorted) TCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
- 3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-192, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420517

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-286, "CONSULT Function (TRANSMISSION)".

OK or NG

- OK >> GO TO 2.
- NG >> Perform trouble shooting relevant to DTC indicated.

2.REPLACE TCM

Replace TCM. Refer to TM-420, "Removal and Installation".

>> INSPECTION END

P1805 BRAKE SWITCH

Description

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

DTC Logic

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INFOID:000000007420518

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DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805	Brake switch	A brake switch signal is not sent to ECM for ex- tremely long time while the vehicle is driving.	 Harness or connectors (Stop lamp switch circuit is open or shorted.) Stop lamp switch
	NFIRMATION PF	ROCEDURE	
1 .PERFC	ORM DTC CONFI	RMATION PROCEDURE	
 Fully (Erase 	gnition switch ON depress the brake the DTC. < 1st trip DTC.	pedal for at least 5 seconds.	
YES >	<u>DTC detected?</u> ▹ Go to <u>EC-193, '</u> ▷ INSPECTION E	' <u>Diagnosis Procedure"</u> . :ND	
Diagnos	is Procedure		INFOID:00000007420520
	K STOP LAMP SV	VITCH CIRCUIT	
I.CHEU			
1. Turn i	gnition switch OFI < the stop lamp wł	= hen depressing and releasing the brake pe	edal.
1. Turn i 2. Checł			edal.
1. Turn i 2. Checł	the stop lamp wh	nen depressing and releasing the brake pe	edal.
1. Turn i 2. Check Fully releas Slightly dep	k the stop lamp wh Brake pedal sed pressed	Stop lamp Not illuminated	edal.
1. Turn i 2. Check Fully releas Slightly dep Is the insp YES-1 > YES-2 >	k the stop lamp wh Brake pedal sed	Stop lamp Not illuminated Illuminated DTO 4.	edal.
1. Turn i 2. Check Fully releas Slightly dep <u>Slightly dep</u> YES-1 > YES-2 > NO >	the stop lamp wh Brake pedal sed pressed <u>ection result norm</u> > M/T models: GC > CVT models: G > GO TO 2.	Stop lamp Not illuminated Illuminated DTO 4.	edal.
1. Turn i 2. Check Fully releas Slightly dep YES-1 > YES-2 > NO > 2.CHECk 1. Turn i 2. Disco	k the stop lamp wh Brake pedal sed pressed > M/T models: G(> CVT models: G > GO TO 2. K STOP LAMP SV gnition switch OFI nnect stop lamp s	Stop lamp Not illuminated Illuminated D TO 4. O TO 6. VITCH POWER SUPPLY CIRCUIT	
1. Turn i 2. Check Fully releas Slightly dep YES-1 > YES-2 > NO > 2. CHECK 1. Turn i 2. Disco 3. Check	k the stop lamp wh Brake pedal sed pressed > M/T models: G(> CVT models: G > GO TO 2. K STOP LAMP SV gnition switch OFI nnect stop lamp s	Stop lamp Not illuminated Illuminated nal? O TO 4. O TO 6. VITCH POWER SUPPLY CIRCUIT	and ground.

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< DTC/CIRCUIT DIAGNOSIS >

Stop lam	o switch	Ground	Voltage
Connector	Terminal	Ground	vollage
E38	1	Ground	Battery voltage

Is the inspection result normal?

YES-1 >> M/T models: GO TO 4. YES-2 >> CVT models: GO TO 6.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

Junction block connector E6

• 10 A fuse (No. 7)

· Harness for open or short between stop lamp switch and battery

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

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ECM harness connector and stop lamp switch harness connector.

EC	М	Stop lam	p switch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	106	E38	2	Existed

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- Junction block connector E44, E45
- Harness for open or short between ECM and stop lamp switch

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

6.CHECK STOP LAMP RELAY-1 GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay-1 harness connector.
- Check the continuity between stop lamp relay-1 harness connector and ground.

Stop lamp	o relay-1	Ground	Continuity
Connector	Terminal	Ground	Continuity
E57	2	Ground	Existed

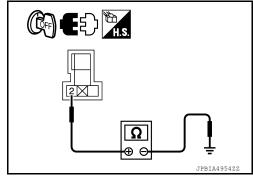
Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Connect stop lamp switch harness connector.

2. Turn ignition switch ON.



< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between stop lamp relay-1 harness connector and ground.

Stop lam	p relay-1	Ground	C	ondition	Voltage (V)
Connector	Terminal	Ground	0	onution	voltage (v)
E57	1	Ground	Brake pedal	Slightly de- pressed	Battery voltage
			peuai	Fully released	Approx. 0

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART

Check the following.

- Joint connector E-14 E56
- Harness for open or short between stop lamp switch and stop lamp relay-1

Is the inspection result normal?

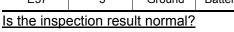
YES >> GO TO 11.

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

9.CHECK STOP LAMP RELAY-1 POWER SUPPLY CIRCUIT

1. Check the voltage between stop lamp relay-1 harness connector and ground.

Stop lam	p relay-1	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E57	5	Ground	Battery voltage



YES >> GO TO 10.

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

10. CHECK STOP LAMP RELAY-1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay-1 harness connector.
- 3. Check the continuity between stop lamp relay-1 harness connector and ECM harness connector.

EC	M	Stop lamp	o relay-1	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	106	E57	3	Existed

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

Is the inspection result normal?

YES >> GO TO 12.

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

11.CHECK STOP LAMP SWITCH

Refer to EC-196, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace stop lamp switch. Refer to <u>BR-17, "Removal and Installation"</u>.

12.CHECK STOP LAMP RELAY-1

Refer to <u>EC-197</u>, "Component Inspection (Stop Lamp Relay-1)". <u>Is the inspection result normal?</u>

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< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 13.

NO >> Replace stop lamp relay-1. For the relay number, refer to <u>EC-288, "Wiring Diagram — ENGINE</u> <u>CONTROL SYSTEM —</u>". For the relay arrangement, refer to <u>PG-34, "Harness Layout"</u> (coupe models) or <u>PG-103, "Harness Layout"</u> (sedan models).

13. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

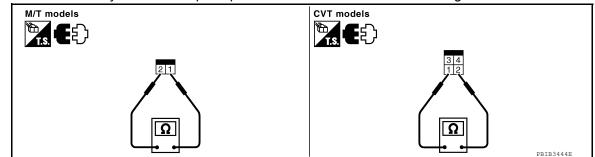
Component Inspection (Stop Lamp Switch)

INFOID:000000007420521

[QR25DE]

1.CHECK STOP LAMP SWITCH-I

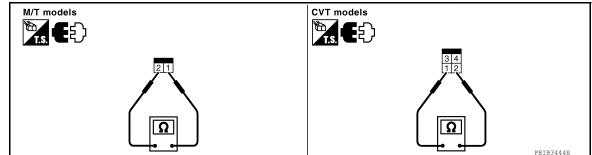
- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check the continuity between stop lamp switch terminals under the following conditions.



Terminals	С	Condition	Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

- 1. Adjust stop lamp switch installation. Refer to <u>BR-13</u>, "Inspection and Adjustment".
- 2. Check the continuity between stop lamp switch terminals under the following conditions.



Terminals	C	Condition	Continuity
1 and 2	Brake pedal	Fully released	Not existed
	Diake pedal	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-17, "Removal and Installation"</u>.

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection (Stop Lamp Relay-1)

[QR25DE]

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1. STOP LAMP RELAY-1

1. Turn ignition switch OFF.

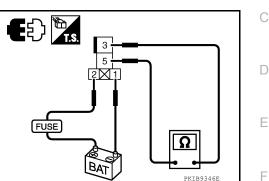
Is the inspection result normal?

YES NO >> INSPECTION END

>> Replace stop lamp relay-1.

- Remove stop lamp relay-1. For the relay number, refer to <u>EC-288, "Wiring Diagram ENGINE CON-TROL SYSTEM —"</u>. For the relay arrangement, refer to <u>PG-34, "Harness Layout"</u> (coupe models) or <u>PG-103, "Harness Layout"</u> (sedan models).
- 3. Check continuity between stop lamp relay-1 terminals under the following conditions.

Stop lan	np relay-1	Conditions	Continuity
Terr	ninal	Conditions	Continuity
3	5	12 V direct current supply between terminals 1 and 2	Existed
		No current supply	Not existed







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P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Description

INFOID:000000007420523

[QR25DE]

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

DTC Logic

INFOID:000000007420524

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	 Harness or connectors (Throttle control motor relay circuit is open) Throttle control motor relay
P2103	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	 Harness or connectors (Throttle control motor relay circuit is shorted) Throttle control motor relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

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-198, "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 <u>EC-198, "Diagnosis Procedure"</u>. NO >> INSPECTION END

NO >> INSPECTION EN

Diagnosis Procedure

INFOID:000000007420525

1.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Disconnect IPDM E/R harness connector F10.
- 4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

Connector	M	IPDN	VIE/R	Continuit
	Terminal	Connector	Terminal	Continuity
F14	15	F10	70	Existed
Also ch	neck harne	ess for short	t to ground	and short
<u>he inspe</u>	ection resu	<u>ilt normal?</u>		
-	GO TO 2			
		pen circuit c		
2. CHECK	THROTTI	LE CONTR	OL MOTO	R RELAY I
1. Check	the contin	uity betwee	n ECM hai	ness conn
EC	M	IPDM	I E/R	Continuit
Connector	Terminal	Connector	Terminal	Continuity
F14	2	F10	54	Existed
2. Also ch	neck harne	ess for shor	t to around	and short
Is the inspe				
	• GO TO 3			
		,. pen circuit c	or short to o	ground or s
3.снеск				-
) from IDD	
	15A fuse	fuse (No. 42 for blown		IVI E/K.
Is the inspe				
	• GO TO 4			
	 Replace 			
4.CHECK				
Defente C			lont"	
-	otion		<u>dent"</u> .	
Refer to <u>GI</u> Is the inspe		ilt normal?		
Is the inspendent of the Island Strength of t	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Island Stress >>	Replace	ilt normal?	Refer to <u>P</u>	
Is the inspendent of the Island Strength of t	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Inspendent Strength Str	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspective YES >>	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Inspendent Strength Str	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspective YES >>	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspective YES >>	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Inspendent Strength Str	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Island Strength of t	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	
Is the inspendent of the Inspendent Strength Str	Replace	<u>Ilt normal?</u> IPDM E/R.	Refer to <u>P</u>	

Revision: February 2013

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< DTC/CIRCUIT DIAGNOSIS >

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000007420526

[QR25DE]

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000007420527

DTC DETECTION LOGIC

NOTE: If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to <u>EC-198, "DTC Logic"</u> or <u>EC-206, "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.	 Harness or connectors (Throttle control motor circuit is open or shorted) Electric throttle control actuator

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

Is DTC detected?

YES >> Go to <u>EC-200, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420528

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

< DTC/CIRCUIT DIAGNOSIS >

1. Check the voltage between ECM harness connector and ground.

EC	CM	Ground	Condition	Voltage
Connector	Terminal	Cround	Condition	voltage
F14	2	Ground	Ignition switch OFF	Approx. 0V
F 14	2	Giouna	Ignition switch ON	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

${\bf 3.}$ check throttle control motor relay power supply circuit

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

IPDN	/IE/R	EC	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F10	70	F14	15	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

- **4.**CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II
- 1. Check the continuity between ECM harness connector and IPDM E/R harness connector.

IPDM	IE/R	E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F10	54	F14	2	Existed
		aaa far aha		ماميما مام

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

Is the inspection result normal?

YES >> GO TO 5.

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

CHECK FUSE

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

2. Check 15A fuse for blown.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace 15A fuse.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".

NO >> Repair or replace harness or connectors.

I.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

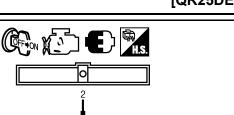
1. Turn ignition switch OFF.

2. Disconnect electric throttle control actuator harness connector.

3. Disconnect ECM harness connector.

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





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< DTC/CIRCUIT DIAGNOSIS >

Electric throttle c	control actuator	ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	5	F14	5	Not existed	
F57	5		6	Existed	
1.57	F57		5	Existed	
	6		6	Not existed	

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

Is the inspection result normal?

YES >> GO TO 8.

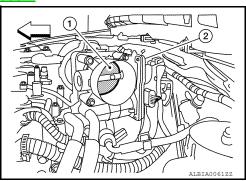
NO >> Repair or replace.

8. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Remove the intake air duct. Refer to EM-25, "Removal and Installation".
- 2. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - 2. Electric throttle control actuator
 - <□ : Vehicle front

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.



9. CHECK THROTTLE CONTROL MOTOR

Refer to EC-202, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace harness or connectors.

11. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace malfunction electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

Component Inspection

1.CHECK THROTTLE CONTROL MOTOR

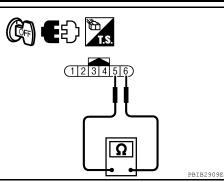
1. Disconnect electric throttle control actuator harness connector.

INFOID:000000007420529

< DTC/CIRCUIT DIAGNOSIS >

2. Check resistance between electric throttle control actuator terminals as follows.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25 °C (77°F)]
Is the insp	pection result normal?
YES >	>> INSPECTION END
NO >	>> GO TO 2.



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2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END



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P2118 THROTTLE CONTROL MOTOR

Description

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000007420532

INFOID:000000007420533

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.	 Harness or connectors (Throttle control motor circuit is shorted.) Electric throttle control actuator (Throttle control motor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

Is DTC detected?

- YES >> Go to EC-204, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK THROTTLE 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.

Electric throttle c	ontrol actuator	ol actuator EC		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	5		5	Not existed
F57	5	F14	6	Existed
157	6		5	Existed
	0		6	Not existed



INFOID:000000007420531

P2118 THROTTLE CONTROL MOTOR

P2118 THROTTLE CONTROL MOTOR	
< DTC/CIRCUIT DIAGNOSIS > [QR25DE]	
4. Also check harness for short to ground and short to power.	
Is the inspection result normal?	А
YES >> GO TO 3. NO >> Repair or replace.	
3. CHECK THROTTLE CONTROL MOTOR	EC
Refer to EC-205, "Component Inspection".	
Is the inspection result normal?	C
YES >> GO TO 4. NO >> GO TO 5.	C
4. CHECK INTERMITTENT INCIDENT	D
Refer to GI-42, "Intermittent Incident".	
Is the inspection result normal?	Е
YES >> GO TO 5.	
NO >> Repair or replace harness or connectors.	
5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	F
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".	
>> INSPECTION END	G
Component Inspection	
1.CHECK THROTTLE CONTROL MOTOR	Н
Disconnect electric throttle control actuator harness connector.	
Check resistance between electric throttle control actuator termi-	1
nals as follows.	
Terminals Resistance (1)2(3)4(5)6)	J
5 and 6 Approx. 1 - 15 Ω [at 25 °C (77°F)]	
Is the inspection result normal?	
YES >> INSPECTION END	K
NO >> GO TO 2.	
	L
2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR	
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".	Ъ. Л
	M
>> INSPECTION END	
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P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:000000007420536

[QR25DE]

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

DTC Logic

INFOID:000000007420537

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
	Electric throttle control	A)	Electric throttle control actuator does not func- tion properly due to the return spring malfunc- tion.	
P2119	actuator	B)	Throttle valve opening angle in fail-safe mode is not in specified range.	Electric throttle control actuator
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
- 3. Set shift lever to P (CVT) or Neutral (M/T) position.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON and wait at least 1 second.
- 6. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
- 7. Set shift lever to P (CVT) or Neutral (M/T) position.
- 8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- 9. Check DTC.

Is DTC detected?

- YES >> Go to EC-206, "Diagnosis Procedure".
- NO >> GO TO 3.

\mathbf{3}. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Set shift lever to D (CVT) or 1st (M/T) position and wait at least 3 seconds.
- 3. Set shift lever to N, P (CVT) or Neutral (M/T) position.
- 4. Start engine and let it idle for 3 seconds.
- 5. Check DTC.

Is DTC detected?

- YES >> Go to EC-206, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

INFOID:000000007420538

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-25, "Removal and Installation".
- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - 2. Electric throttle control actuator
 - └□ : Vehicle front

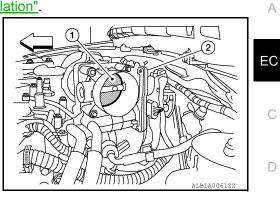
Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside.

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END



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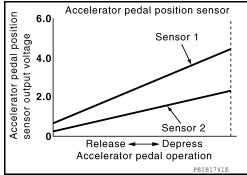
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P2122, P2123 APP SENSOR

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



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-161, "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 sensor 1 is sent to ECM.	Harness or connectors (APP sensor 1 circuit is open or shorted.)
P2123	Accelerator pedal posi- tion sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	 Accelerator pedal position sensor (APP sensor 1)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to EC-208, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.



[QR25DE]

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INFOID:000000007420542

2012 Altima GCC

<pre>< DTC/CIRCUI NO >> Rep </pre>		ice ground o	[QR2	
- '	•	•	SUPPLY CIRCUIT	
 Disconnect Turn ignitior 			tion (APP) sensor harness connector.	
•			sensor harness connector and	
ground.	-			
APP sensor	Ground	Voltage	(6154321)	
Connector Termi		vollage		
E40 5	Ground	Approx. 5V		
s the inspection	result nori	<u>mal?</u>		
YES >> GO				
		cuit or sho	ort to ground or short to power	9607J
-			CIRCUIT FOR OPEN AND SHORT	
Turn ignitior Disconnect			lor.	
			or. P sensor harness connector and ECM harness connector.	
APP sensor		ECM		
Connector Termi	nal Connec		- Continuity	
Connector Termi E40 4	nal Connec E10		- Continuity Existed	
E40 4	E10	tor Terminal 84	Existed	
E40 4 4. Also check	E10 narness for	tor Terminal 84 r short to gro		
E40 4 4. Also check Is the inspection	E10 narness for result norr	tor Terminal 84 r short to gro	Existed	
E40 4 4. Also check ls the inspection YES >> GO	E10 narness for result norn TO 4.	tor Terminal 84 short to gro mal?	Existed	
E40 4 4. Also check s the inspection YES >> GO NO >> Rep	E10 narness for result norn TO 4. air open ci	tor Terminal 84 r short to gro mal? rcuit or shor	Existed ound and short to power.	
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E40 4 4. Also check s the inspection YES >> GO NO >> Rep 4.CHECK APP 1. Check the c APP sensor Connector Termi	E10 narness for result norn TO 4. air open ci SENSOR ontinuity be	tor Terminal 84 short to gro mal? rcuit or shor INPUT SIGI etween APF ECM tor Terminal	Existed ound and short to power. rt to ground or short to power in harness or connectors. NAL CIRCUIT FOR OPEN AND SHORT P sensor harness connector and ECM harness connector.	
E4044. Also check $(s the inspection)$ YESYESYESNO>> Rep 4. CHECK APP1. Check the constructionAPP sensorConnectorConnectorTerminE403	E10 narness for result norn TO 4. air open ci SENSOR ontinuity bo nal Connec E10	tor Terminal 84 r short to gro mal? rcuit or shor INPUT SIGI etween APF ECM tor Terminal 81	Existed ound and short to power. rt to ground or short to power in harness or connectors. NAL CIRCUIT FOR OPEN AND SHORT P sensor harness connector and ECM harness connector. Continuity Existed	
E4044. Also checkIs the inspectionYESYESYESNO>> Rep4.CHECK APP1. Check the constructionAPP sensorConnectorConnectorTermineE4032. Also check	E10 narness for result norn TO 4. air open ci SENSOR ontinuity be nal Connec E10 narness for	tor Terminal 84 short to gro mal? rcuit or shor INPUT SIGI etween APF ECM tor Terminal 81 short to gro	Existed ound and short to power. rt to ground or short to power in harness or connectors. NAL CIRCUIT FOR OPEN AND SHORT P sensor harness connector and ECM harness connector.	
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P2122, P2123 APP SENSOR

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

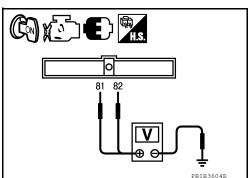
>> INSPECTION END

Component Inspection

$1. {\sf CHECK} \ {\sf ACCELERATOR} \ {\sf PEDAL} \ {\sf POSITION} \ {\sf SENSOR}$

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

ECM		Ground	C	Condition		
Connector	Terminal	Ground	Condition		Voltage	
	81			Fully released	0.5 - 1.0V	
E10	(APP sensor 1 signal)	Ground	Accelerator	Fully depressed	4.2 - 4.8V	
LIU	82		Fully released	0.25 - 0.5V		
	(APP sensor 2 signal)			Fully depressed	2.0 - 2.5V	



Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.Replace accelerator pedal assembly

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> INSPECTION END

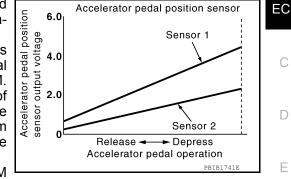
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P2127, P2128 APP SENSOR

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



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

DTC Logic

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DTC DETECTION LOGIC

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.) [Crankshaft position sensor (POS) circuit	
P2128	Accelerator pedal posi- tion sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	 is shorted.] (Refrigerant pressure sensor circuit is shorted.) Accelerator pedal position sensor (APP sensor 2) Crankshaft position sensor (POS) Refrigerant pressure sensor 	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Go to EC-211, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1.CHECK GROUND CONNECTION

Turn ignition switch OFF. 1.

Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2.

Is the inspection result normal?

YES >> GO TO 2. INFOID:000000007420547

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P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace ground connection.

2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

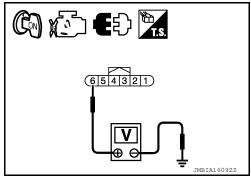
1. Disconnect accelerator pedal position (APP) sensor harness connector.

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

APP s	ensor	Ground	Voltage	
Connector Terminal		Ground	voltage	
E40	6	Ground	Approx. 5V	

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 3.



3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP sensor		EC	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E40	6	E10	87	Existed

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

EC	M	Sensor		
Connector	Terminal	Name	Connector	Terminal
F13	72	Refrigerant pressure sensor	E219	1
115	76	CKP sensor (POS)	F30	1
E10	87	APP sensor	E40	6

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK COMPONENTS

Check the following.

• Crankshaft position sensor (POS) (Refer to EC-147, "Component Inspection".)

• Refrigerant pressure sensor (Refer to <u>EC-271, "Diagnosis Procedure"</u>.)

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning component.

$\mathbf{6}$. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E40	2	E10	100	Existed

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

Is the inspection result normal?

YES >> GO TO 7.

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

I.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

APP sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E40	1	E10	82	Existed

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

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK APP SENSOR

Refer to EC-213. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to <u>ACC-4, "Removal and Installation"</u>.

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1. CHECK ACCELERATOR PEDAL POSITION SENSOR

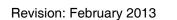
1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.

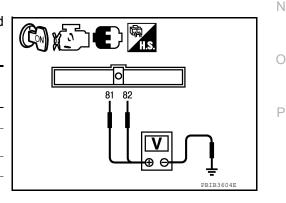
Check the voltage between ECM harness connector and ground.

E	ECM		C	ondition	Voltage
Connector	Terminal	Ground	Condition		voltage
	81			Fully released	0.5 - 1.0V
`	(APP sensor 1 signal)	Ground Accelerator pedal	Accelerator	Fully depressed	4.2 - 4.8V
LIU	82		Fully released	0.25 - 0.5V	
	(APP sensor 2 signal)			Fully depressed	2.0 - 2.5V

Is the inspection result normal?



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

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> INSPECTION END

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 signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC DETECTION LOGIC

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-161. "DTC Logic"

	<u>TE Logic</u> .		
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135	Throttle position sensor circuit range/perfor-	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1	 Harness or connector (TP sensor 1 and 2 circuit is open or shorted.)

and TP sensor 2.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

mance

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

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

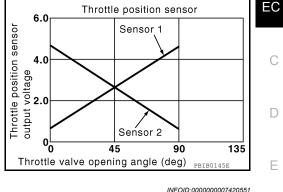
>> GO TO 2.	L
2.PERFORM DTC CONFIRMATION PROCEDURE	
 Start engine and let it idle for 1 second. Check DTC. 	M
Is DTC detected?	
YES >> Go to <u>EC-215. "Diagnosis Procedure"</u> . NO >> INSPECTION END	Ν
Diagnosis Procedure	20552
1. CHECK GROUND CONNECTION	
 Turn ignition switch OFF. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>. 	Р
Is the inspection result normal?	
YES >> GO TO 2.	
NO >> Repair or replace ground connection.	
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT	
1. Disconnect electric throttle control actuator harness connector.	_

Revision: February 2013

EC-215

2012 Altima GCC

[QR25DE]



Electric throttle control actuator

(TP sensor 1 and 2)

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P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle of	control actuator	Ground	Voltage
Connector	ector Terminal		Voltage
F57	1	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.

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

${\bf 3.}$ CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F57	4	F13	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F57	2	F13	37	Existed
	3		38	

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-217, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7. NO

>> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

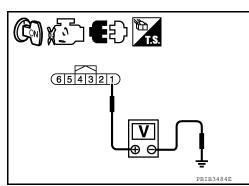
Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

1.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END



P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

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1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-20, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 4. Turn ignition switch ON.
- 5. Set shift lever to D (CVT) or 1st (M/T) position.
- 6. Check the voltage between ECM harness connector and ground.

E	ECM	Ground	C	ondition	Voltage
Connector	Terminal	Giounu			vollage
	37 (TD concer 1			Fully released	More than 0.36V
F13	(TP sensor 1 signal)	Ground	Accelerator	Fully depressed	Less than 4.75V
F13	38 (TP sensor 2	Ground	pedal	Fully released	Less than 4.75V
	signal)			Fully depressed	More than 0.36V
Is the insp	ection result	normal?	2		1
	> INSPECTI	ON END)		
NO >:	> GO TO 2.				

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace electric throttle control actuator. Refer to EM-26, "Removal and Installation".

>> INSPECTION END

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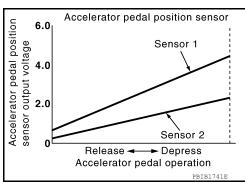
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P2138 APP SENSOR

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 potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



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-161, "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.	 Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) Accelerator pedal position sensor (APP sensor 1 and 2) Crankshaft position sensor (POS) Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

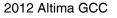
YES >> Go to EC-218, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

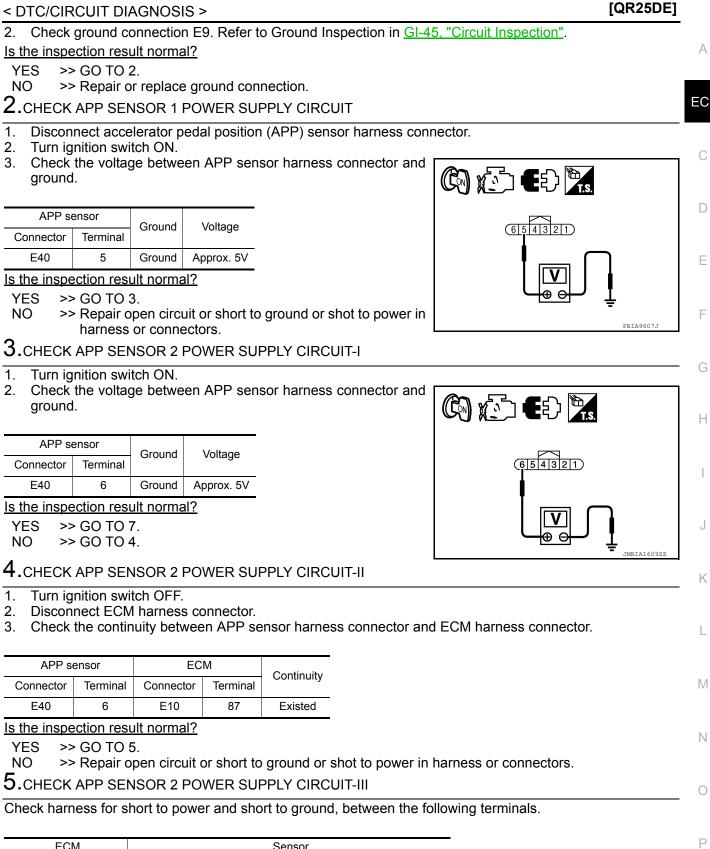


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P2138 APP SENSOR



EC	M	Sensor		
Connector	Terminal	Name	Connector	Terminal
F13	72	Refrigerant pressure sensor	E219	1
115	76	CKP sensor (POS)	F30	1
E10	87	APP sensor	E40	6
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Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 6.

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

6.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to EC-147, "Component Inspection".)
- Refrigerant pressure sensor (Refer to <u>EC-271, "Diagnosis Procedure".)</u>

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning component.

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between APP sensor harness connector and ECM harness connector as follows.

APP s	ensor	EC	М	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E40	2	E10	100	Existed
E40	4	EIU	84	Existed

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

Is the inspection result normal?

YES >> GO TO 8.

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

 $\mathbf{8}$. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

APP s	ensor	EC	М	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E40	1	E10	82	Existed
L40	3		81	LAISIEU

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

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK APP SENSOR

Refer to EC-221. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

P2138 APP SENSOR

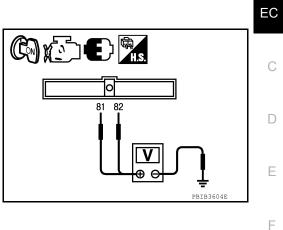
< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

$1. {\sf check\ accelerator\ pedal\ position\ sensor}$

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

E	ECM	Ground	C	ondition	Voltage
Connector	Terminal	orodina	0	Shallon	voltage
	81			Fully released	0.5 - 1.0V
E10	(APP sensor 1 signal)	Ground	Accelerator	Fully depressed	4.2 - 4.8V
L10	82	Giouna	pedal	Fully released	0.25 - 0.5V
	(APP sensor 2 signal)			Fully depressed	2.0 - 2.5V



Is the inspection result normal? YES >> INSPECTION END

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to <u>ACC-4</u>, "Removal and Installation".

>> INSPECTION END

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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 this input of two kinds (ON/OFF signal). Refer to <u>EC-57</u>, "System Description" for the ASCD function.

Component Function Check

1. CHECK FOR ASCD BRAKE SWITCH FUNCTION

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	Condition		Indication
BRAKE SW1	Brake pedal (CVT)	Slightly depressed	OFF
DIVARE SWI	Brake pedal and clutch pedal (M/T)	Fully released	ON

Without CONSULT

1. Turn ignition switch ON.

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

EC	M	Ground	C	ondition	Voltage
Connector	Terminal	Cround	0	onation	voltage
	110		Brake pedal	Slightly depressed	Approx. 0V
E10	(ASCD brake switch signal)	Ground	(CVT) Brake pedal and clutch pedal (M/T)	Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Refer to EC-222, "Diagnosis Procedure".

Diagnosis Procedure

1.CHECK OVERALL FUNCTION-I

Check which type of transmission the vehicle is equipped with.

CVT or M/T?

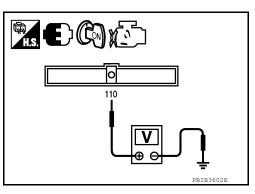
CVT >> GO TO 2. M/T >> GO TO 6.

2. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ASCD brake switch harness connector.

3. Turn ignition switch ON.



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< DTC/CIRCUIT DIAGNOSIS >

 Check the voltage between ASCD brake switch harness connector and ground.

ASCD bra	ke switch	Ground	Voltage
Connector	Terminal	Giodila	voltage
E37	1	Ground	Battery voltage

Is the inspection result normal?

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

3.DETECT MALFUNCTIONING PART

- Check the following.
- Fuse block (J/B) connector E6
- 10A fuse (No. 3)
- · Harness for open or short between ASCD brake switch and fuse
 - >> Repair open circuit or short to ground or short to power in harness or connectors.

${f 4}.$ CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

ASCD bra	ke switch	EC	М	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E37	2	E10	110	Existed

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

Is the inspection result normal?	

YES >> GO TO 5.

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

5.CHECK ASCD BRAKE SWITCH

Refer to EC-225, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch. Refer to <u>BR-17, "Removal and Installation"</u>.

6.CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ASCD clutch switch harness connector.

3. Turn ignition switch ON.

4. Check the continuity between ASCD clutch switch harness connector and ground.

ASCD clui	tch switch	Ground	Condition		Voltage (V)
Connector	Terminal			Sonation	voltage (v)
E39	1	Ground	Brake pedal	Slightly depressed	Approx. 0
L09	1	Ground	Drake pedal	Fully released	Battery voltage

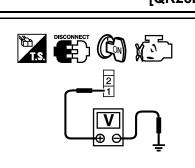
5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 7.

I.CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT



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< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD bra	ke switch	Ground	Voltage
Connector	Terminal	Ground	voltage
E37	1	Ground	Battery voltage

Is the inspection result normal?

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

8. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 10A fuse (No. 3)
- · Harness for open or short between ASCD brake switch and fuse

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

9.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Check the continuity between ASCD brake switch harness connector and ASCD clutch switch harness connector.

ASCD brake switch		ASCD clut	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E37	2	E39	1	Existed

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

Is the inspection result normal?

YES >> GO TO 10.

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

10.CHECK ASCD BRAKE SWITCH

Refer to EC-225, "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace ASCD brake switch. Refer to <u>BR-17, "Removal and Installation"</u>.

11. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

ASCD clutch switch		EC	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E39	2	E10	110	Existed

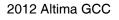
4. Also check harness for short to ground and short to power.

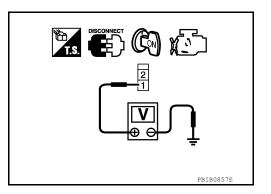
Is the inspection result normal?

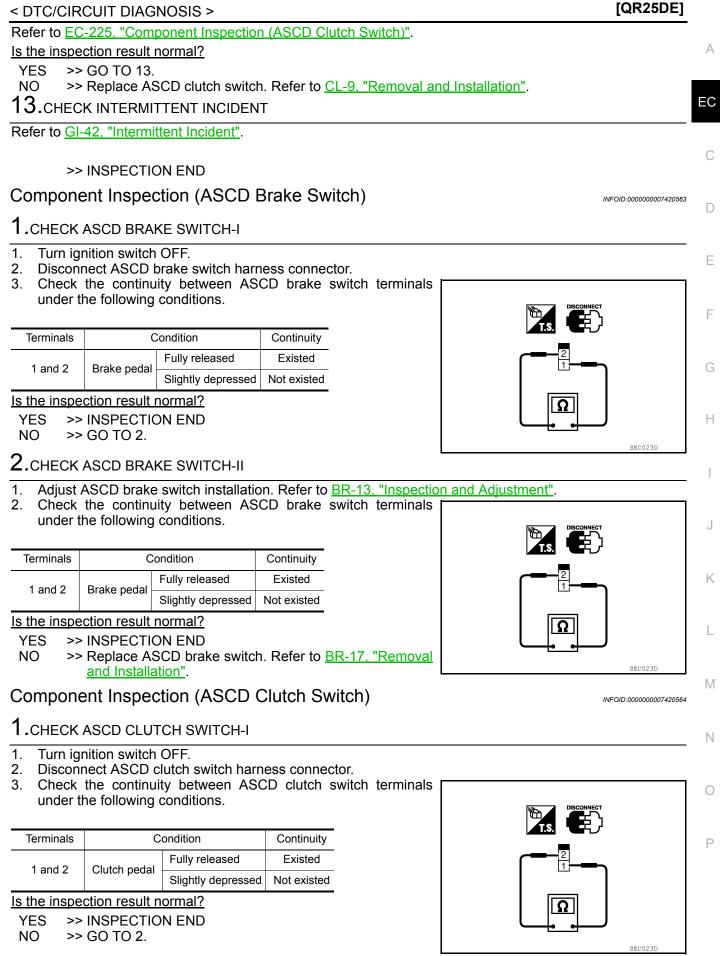
YES >> GO TO 12.

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

12. CHECK ASCD CLUTCH SWITCH







< DTC/CIRCUIT DIAGNOSIS >

2.CHECK ASCD CLUTCH SWITCH-II

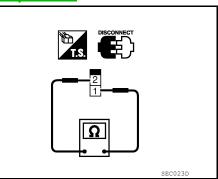
- 1. Adjust ASCD clutch switch installation. Refer to CL-6, "Inspection and Adjustment".
- 2. Check the continuity between ASCD clutch switch terminals under the following conditions.

Terminals	С	ondition	Continuity
1 and 2	Clutch pedal	Fully released	Existed
i anu z		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD clutch switch. Refer to <u>CL-9</u>, "<u>Removal</u> <u>and Installation</u>".



ASCD INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

ASCD INDICATOR

Description

The ASCD operation status is indicated by two indicators, (CRUISE and SET on the information display) on the combination meter.

CRUISE indicator is displayed to indicate that ASCD system is ready for operation when MAIN switch on ASCD steering switch is turned ON.

SET indicator is displayed when the following conditions are met.

- CRUISE indicator is displayed.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator is displayed during ASCD control.

Refer to <u>EC-57, "System Description"</u> for the ASCD function.

Component Function Check

1.ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITIO	N	SPECIFICATION
CRUISE	Ignition switch: ON	 MAIN switch: Pressed at the 1st time → at the 2nd time 	$ON\toOFF$
	MAIN switch: ON	ASCD: Operating	ON
SET	When vehicle speed: Between 40 km/h (25 MPH) and 180 km/h (112 MPH)	ASCD: Not operating	OFF
Is the inspection re	sult normal?		
	CTION END		
NO >> Go to I	<u>EC-227, "Diagnosis Procedure"</u> .		
Diagnosis Proc	cedure		INFOID:000000007420567
1.снеск ртс			
	1000 or U1001 is not displayed.		
Is the inspection re			
YES >> GO TO NO >> Perfor	n trouble diagnosis for DTC U1000,	U1001 Refer to EC-119 "DT	C Logic"
•	NATION METER OPERATION		<u>o Logio</u> .
	CONSULT Function (METER/M&A)	1	
Is the inspection re		·	
YES >> GO TO			
	combination meter circuit. Refer to	MWI-5, "METER SYSTEM : S	ystem Diagram".
~			
	ermittent Incident".		
	ermittent moldent.		
>> INSPF	CTION END		

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< DTC/CIRCUIT DIAGNOSIS >

A/F SENSOR 1

Description

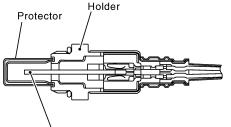
The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

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 λ range.

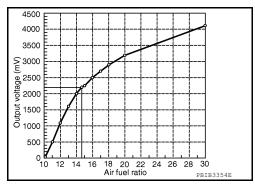
The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the

sensor to ensure the required operating temperature of about 800°C (1,472°F).



Zirconia element



Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK-I

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F ALPHA-B1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F ALPHA-B1" indication with engine idling.

A/F ALPHA-B1 indication: Remain between 75 - 125 %

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to EC-228, "Diagnosis Procedure".

2. PERFORM COMPONENT FUNCTION CHECK-II

1. Select "A/F SEN1(B1)" in "DATA MONITOR" mode with CONSULT.

2. Check "A/F SEN1(B1)" indication with engine idling.

A/F SEN1(B1) indication: Fluctuates between 2.0 - 2.3 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-228. "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

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[QR25DE]

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A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

$\overline{2}$. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

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

A/F se	ensor 1	Ground	Voltage
Connector	Terminal	Ground	voltage
F44	4	Ground	Battery voltage

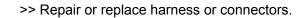
Is the inspection result normal?

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

3. DETECT MALFUNCTIONING PART

Check the following.

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



${f 4}$. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

A/F ser	nsor 1	EC	М	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F44	1	F13	45	Existed
F44	2	FIJ	49	Existed

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

A/F sensor 1		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal	Giouna	Continuity
E44	1	E12	45	Ground	Not ovisted
F44	2	F13	49	Ground	Not existed

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

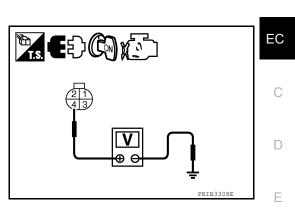
NO >> Repair or replace.

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

Replace air fuel ratio (A/F) sensor 1. Refer to EM-30, "Removal and Installation".

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.



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A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

 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

A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

A/F SENSOR 1 HEATER

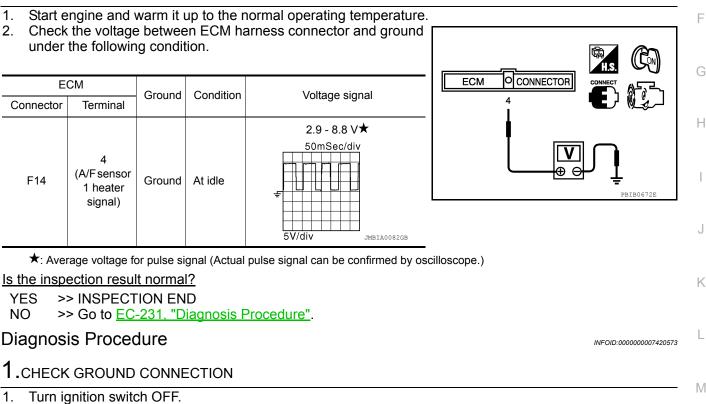
Description

		(
r fuel ratio (A/F) sensor 1	Air fuel ratio (A/F) sensor 1	
	riedici	
	r control	r control heater

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

Component Function Check

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



2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

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

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

2. Turn ignition switch ON.

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A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

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

3. DETECT MALFUNCTIONING PART

Check the following.

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

>> Repair or replace harness or connectors.

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

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

A/F s	/F sensor 1 ECM			Continuity
Connector	Terminal	Connector	Terminal	Continuity
F44	3	F14	4	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK A/F SENSOR 1 HEATER

Refer to EC-233, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

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

Replace air fuel ratio (A/F) sensor 1. Refer to EM-30. "Removal and Installation".

CAUTION:

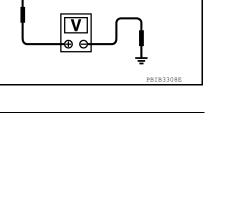
- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)]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

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

>> Repair or replace.



[QR25DE]

A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

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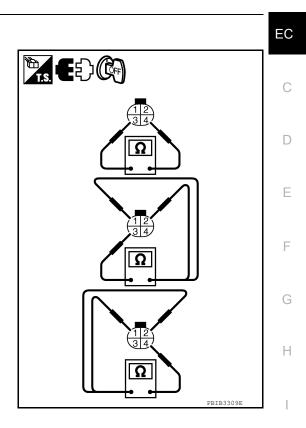
1.CHECK AIR FUEL RATIO (A/F) SENSOR 1

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

Terminals	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	Ω∞
4 and 1, 2	(Continuity should not exist)

Is the inspection result normal?

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



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

Replace air fuel ratio (A/F) sensor 1. Refer to EM-30, "Removal and Installation".

- 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

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

COOLING FAN

Description

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[QR25DE]

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

COOLING FAN MOTOR

The cooling fan operates at each speed when the current flows in the cooling fan motor as follows.

Cooling fan speed	Cooling fan motor terminals		
Cooling fair speed	(+)	(-)	
	1	3 and 4	
Middle (MID)	2	3 and 4	
	1 and 2	3	
	1 and 2	4	
High (HI)	1 and 2	3 and 4	

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under middle speed condition.

Refer to EC-67, "System Diagram".

Component Function Check

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1.CHECK COOLING FAN LOW SPEED FUNCTION

(I) With CONSULT

- 1. Turn ignition switch ON.
- Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT and touch "LOW" "MID" "HI" on the CONSULT screen.
- 3. Check that cooling fan operates.

Without CONSULT

 Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-11, "Diagnosis</u> <u>Description"</u>.

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Go to EC-234, "Diagnosis Procedure".

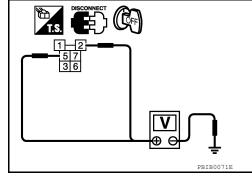
Diagnosis Procedure

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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.
- Check the voltage between cooling fan relays-2, -3 harness connectors and ground.

Cooling fan relay		Ground	Voltage	
Connector	Terminal	Giouna	vollage	
E42	2			
(cooling fan relay-2)	5	Ground	Battery voltage	
E43	2	Giouna	Dattery voltage	
(cooling fan relay-3)	5			



Is the inspection result normal?

YES >> GO TO 3.

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2						
2. DETECT MALFUNCTIONING PART				А		
Check the following.						
 10 A fuse (No. 33) 	• 10 A fuse (No. 33)					EC
 40 A fusible link (letter K) IPDM E/R harness connector E18 					LO	
 Harness for open or short between cooling fan relay-2 and battery 						
 Harness for open or 	r short betwee	n cooling fan re	elay-3 and batt	ery		С
 Harness for open of Harness for open of 						
						D
>> Repair op	oen circuit, sho	ort to ground or	short to powe	r in harness or o	connectors.	D
3.CHECK COOLING	FAN RELAY	OUTPUT SIGN	NAL CIRCUIT			
1. Turn ignition swit	ch OFF.					E
2. Disconnect IPDN	I E/R harness					
Check the contin tor.	uity between c	cooling fan rela	y-2, -3 harness	s connectors an	d IPDM E/R harness connec-	F
Cooling fan	relay	IPD)M E/R	Continuity	-	
Connector	Terminal	Connector	Terminal	Continuity		G
E42	1	E17	42		-	
(cooling fan relay-2)				Existed		Н
E43 (cooling fan relay-3)	1	E18	34			
4. Also check harness for short to ground and short to power.						1
Is the inspection resu		5	·			I
YES >> GO TO 5						
NO >> GO TO 4						J
4.DETECT MALFUN	ICTIONING P	ART				
Check the following.						K
 Harness for open of Harness for open of 						K
				// 、		
>> Repair or	oen circuit, sho	ort to ground or	short to powe	r in harness or o	connectors.	
5. CHECK COOLING	FAN MOTOF	R POWER SUF	PLY CIRCUIT			
1. Disconnect coolir						М
2. Check the voltage	je between co			con-		IVI
nector and groun	d.					
Cooling fan m	otor 1			—		Ν
Connector	Terminal	Ground	Voltage		34	
Connector	1			_		0
E220	2	Ground	Battery voltag	e		0
Is the inspection resu				_ _		
YES >> GO TO 7						Ρ
NO >> GO TO 6				L	PBIB1670E	
6.DETECT MALFUN	ICTIONING P	ART				
Check the following						

Check the following.

- 40 A fusible link (letter M)
- Harness connector E12, E203
- Harness for open or short between cooling fan motor-1 and battery

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

7. CHECK COOLING FAN MOTOR CIRCUIT-I

- 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.

Cooling fan relay		Cooling fan motor		Continuity	
Connector	Terminal	Connector Termina			
E42	3	E221 (Cooling fan motor-2)	2		
(cooling fan relay-2)	7	E220 (Cooling fan motor-1)	3	Existed	
E43	3	E221 (Cooling fan motor-2)	1	Existed	
(cooling fan relay-3)	7	E220 (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 9. NO

>> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

Harness connector E12, E203

· Harness for open or short between cooling fan motor-1 and 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.

9. CHECK COOLING FAN MOTOR CIRCUIT-II

1. Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

IPDI	I E/R Cooling fan motor		Cooling fan motor		
Connector	Terminal	Connector	Terminal	Continuity	
E18	35	E220 (Cooling fan motor-1)	4	Existed	
LIU	38	E221 (Cooling fan motor-2)	1	LABLEU	

2. 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.

Harness connector E12, E203

· Harness for open or short between cooling fan motor-1 and IPDM E/R

Harness for open or short between cooling fan motor-2 and IPDM E/R

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

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

11. CHECK COOLING FAN MOTOR CIRCUIT-III А 1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground. Cooling fan motor EC Ground Continuity Connector Terminal E42 6 (cooling fan relay-2) Ground Existed E43 6 (cooling fan relay-3) 2. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 12. Ε >> Repair open circuit, short to ground or short to power in harness or connectors. NO 12. CHECK COOLING FAN MOTOR CIRCUIT-IV Check the continuity between cooling fan motor-2 harness connector and ground. F Cooling fan motor-2 Ground Continuity Connector Terminal 3 E221 Ground Existed 4 Н 2. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 13. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 13. CHECK COOLING FAN RELAY-2 AND -3 Refer to EC-238, "Component Inspection (Cooling Fan Relay)". Is the inspection result normal? YES >> GO TO 14. Κ >> Replace malfunctioning cooling fan relay. NO 14.CHECK COOLING FAN MOTORS-1 AND -2 Refer to EC-238, "Component Inspection (Cooling Fan Relay)". Is the inspection result normal? YES >> GO TO 15. M NO >> Replace malfunctioning cooling fan motor. Refer to CO-17, "Removal and Installation". 15. CHECK INTERMITTENT INCIDENT Perform GI-42, "Intermittent Incident". Ν Is the inspection result normal? YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation". NO >> Repair or replace harness connectors. Component Inspection (Cooling Fan Motor) INFOID:000000007420578 **1**.CHECK COOLING FAN MOTORS Turn ignition switch OFF. 1.

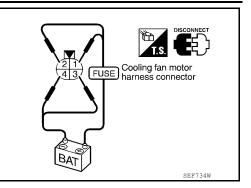
2. Disconnect cooling fan motor-1 and -2 harness connectors.

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

3. Supply cooling fan motor terminals with battery voltage and check operation.

	Condition	Terminals		
	Condition	(+)	()	
Cooling fan motor		1	3 and 4	
	A	2	3 and 4	
		1 and 2	3	
		1 and 2	4	
	В	1 and 2	3 and 4	



Check that cooling fan speed of condition B is higher than that of A. Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan motor. Refer to <u>CO-17, "Removal and Installation"</u>.

Component Inspection (Cooling Fan Relay)

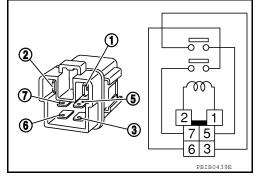
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[QR25DE]

1. CHECK COOLING FAN RELAYS

- 1. Turn ignition switch OFF.
- 2. Remove cooling fan relay -2, -3.
- 3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12V direct current supply between terminals 1 and 2	Existed
5 and 5	No current supply	Not existed
6 and 7	12V direct current supply between terminals 1 and 2	Existed
o and 7	No current supply	Not existed



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.

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 through the CAN communication line.

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
LOAD SIGNAL		Rear window defogger switch	ON	ON
		Real window delogger switch	OFF	OFF
Is the inspection result normal?				
YES	S >> GO TO 2.			
NO	>> Go to EC-239, "Diagnosis Procedure".			

2. CHECK LIGHTING SWITCH FUNCTION

Check "LOAD SIGNAL" indication under the following conditions.

Monitor item	Co	Indication	
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
	Lighting switch	OFF	OFF

Is the inspection result normal?

YES	>> GO TO 3.	
NO	>> Go to EC-239, "Diagnosis Procedure".	

$\mathbf{3}$.check heater fan control switch function

Select "HEATER FAN SW" and check indication under the following conditions.

Monitor item	Monitor item Condition		Indication
HEATER FAN SW	Heater fan control switch	ON	ON
HEATERTAN OW		OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-239, "Diagnosis Procedure".

Diagnosis Procedure

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to <u>EC-239, "Compo-</u> nent Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2.

Headlamp>>GO TO 3.

Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to BCS-17, "REAR WINDOW DEFOGGER : CONSULT Function (BCM - REAR DEFOGGER)".

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ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

 $3. {\sf CHECK} \, {\sf HEADLAMP} \, {\sf SYSTEM}$

Refer to EXL-7, "System Diagram" (XENON TYPE) or EXL-9, "System Diagram" (HALOGEN TYPE).

>> INSPECTION END

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to <u>HAC-4</u>, "Work Flow" (AUTO A/C) or <u>HAC-107</u>, "Work Flow" (MANUAL A/C).

>> INSPECTION END

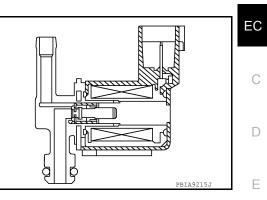
EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

The EVAP canister purge volume control solenoid valve uses a ON/ OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



Component Function Check

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[QR25DE]

INFOID:000000007420583

1.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE FUNCTION

With CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
- 3. Start engine and let it idle.
- 4. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode wit CONSULT.
- 5. Touch "Qu" and "Qd" on CONSULT screen to adjust "PURG VOL CONT/V" and check vacuum existence under the following conditions.

PURG VOL CONT/V	Vacuum
100%	Existed
0 %	Not existed

Without CONSULT

- 1. Turn ignition switch OFF.
- Disconnect the EVAP purge hose from EVAP canister purge volume control solenoid valve (EVAP canister side).
- 3. Start engine and let it idle for at least 100 seconds.
- 4. Check vacuum existence under the following conditions.

Condition	Vacuum
At idle	Not existed
About 2,000 rpm	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to <u>EC-241. "Diagnosis Procedure"</u>.

Diagnosis Procedure

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.

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EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

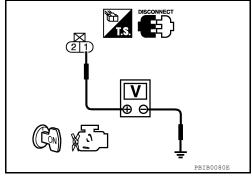
4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

EVAP canister purge volume control solenoid valve		Ground	Voltage
Connector	Terminal		
F29	1	Ground	Battery voltage

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING PART



[QR25DE]

Check the following.

- Harness connectors E11, F2
- · Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- · Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

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

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

	r purge volume lenoid valve	ECM		Continuity
Connector	Terminal	Connector Terminal		
F29	2	F14 25		Existed

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

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 4.

YES-2 >> Without CONSULT: GO TO 5.

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

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine.
- 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

Is the inspection result normal?

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

NO >> GO TO 5.

5.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-243, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-24</u>, <u>"Component Parts Location"</u>.

6.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident".

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[QR25DE]

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>> INSPECTION END

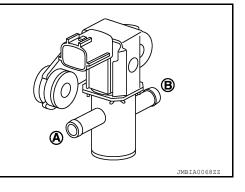
Component Inspection

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 CONT/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)
100%	Existed
0%	Not existed



Without CONSULT

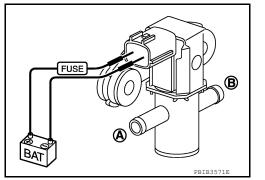
- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals 1 and 2	Existed
No supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EC-24, "Component Parts Location"</u>.



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EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

EVAP CANISTER VENT CONTROL VALVE

Description

The EVAP canister vent control valve is located on the EVAP canister.

This solenoid valve is not used for engine control, and always remains open.

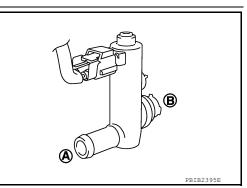
If the vent is closed by any reason under EVAP purge conditions, the evaporative emission control system is depressurized and EVAP canister may be damaged.

To atmosphere -Terminal Valve Coil Spring O-ring Plunger Canister side PBTB1263

Component Function Check

1. CHECK EVAP CANISTER VENT CONTROL VALVE FUNCTION

- 1. Turn ignition switch OFF.
- Remove EVAP canister vent control valve with its harness con-2. nector connected from EVAP canister. Refer to FL-17, "Removal and Installation".
- Start engine. 3.
- Blow air into port (A) and check that it flows freely out of port (B). 4.
- YES >> INSPECTION END
- NO >> Go to EC-244, "Diagnosis Procedure".



INFOID:000000007420589

1.CHECK VACUUM LINE

Diagnosis Procedure

- 1. Turn ignition switch OFF.
- Check vacuum line between EVAP canister purge volume control solenoid valve and intake manifold col-2. lector for crack, clogging, improper connection or disconnection. Refer to EC-23. "System Diagram".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace.

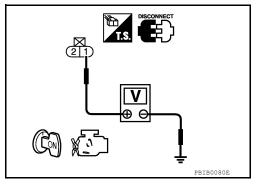
2.CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between EVAP canister vent control valve harness connector and ground.

EVAP canister vent control valve		Ground	Voltage	
Connector		Terminal		
B39		1	Ground	Battery voltage
Is the ir	nspe	ction result r	normal?	
YES >> GO TO 4.				
NO	>>	GO TO 3.		

3.DETECT MALFUNCTIONING PART

Check the following.



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Revision: February 2013

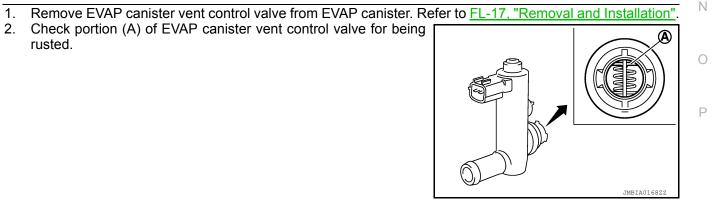


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EVAP CANISTER VENT CONTROL VALVE < DTC/CIRCUIT DIAGNOSIS > [QR25DE] • Harness connectors E29, B10 • Harness connectors F2, E11 • Harness for open or short between EVAP canister vent control valve and IPDM E/R

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

4 . CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT 1. Turn ignition switch OFF. 2. Disconnect ECM harness connector. 3. Check the continuity between EVAP canister vent control valve harness connector and ECM harness connector. D EVAP canister vent control ECM valve Continuity Ε Connector Terminal Connector Terminal B39 2 E10 109 Existed Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 6. NO >> GO TO 5. **5.**DETECT MALFUNCTIONING PART Check the following. Н · Harness connectors E29, B10 Harness for open or short between EVAP canister vent control valve and ECM >> Repair open circuit or short to ground or short to power in harness or connectors. **O**.CHECK EVAP CANISTER VENT CONTROL VALVE Refer to EC-245, "Component Inspection". Is the inspection result normal? YES >> GO TO 7. NO >> Replace EVAP canister vent control valve. Refer to FL-17, "Removal and Installation". Κ **I**.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". L >> INSPECTION END **Component Inspection** M INFOID:000000007420590 1.CHECK EVAP CANISTER VENT CONTROL VALVE



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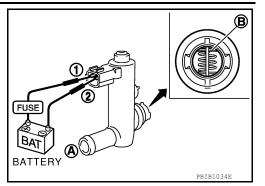
EC

EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

Check air passage continuity and operation delay time under the following conditions.
 Make sure new O-ring is installed properly.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between ter- minals (1) and (2)	No
OFF	Yes



[QR25DE]

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve. Refer to <u>FL-17</u>, <u>"Removal and Installation"</u>.

If OK, go to next step.

- 4. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 5. Perform step 3 again.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP canister vent control valve. Refer to FL-17. "Removal and Installation".

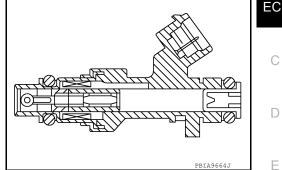
FUEL INJECTOR

< 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

1.INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to EC-247, "Diagnosis Procedure".

2.CHECK FUEL INJECTOR FUNCTION

With CONSULT

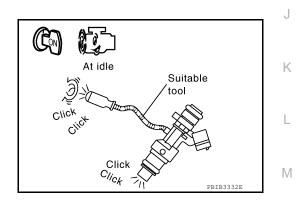
- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Make sure that each circuit produces a momentary engine speed drop.
- Without CONSULT
- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

Is the inspection result normal?

YES	>> INSPECTION END
-----	-------------------

NO >> Go to EC-247, "Diagnosis Procedure".



Diagnosis Procedure

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector harness connector.
- 3. Turn ignition switch ON.

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FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between fuel injector harness connector and ground.

Fuel injector			Ground	Voltage	
Cylinder	Connector	Terminal	Giouna	voltage	
1	F17	1			
2	F18	1	Ground	Battery voltage	
3	F19	1	Ground	Ballery Vollage	
4	F20	1			

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 10A fuse (No. 35)
- · Harness for open or short between fuel injector and fuse

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

 $\mathbf{3}$. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.

3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector		ECM		Continuity	
Cylinder	Connector	Terminal	Connector Terminal		Continuity
1	F17	2		32	
2	F18	2	F14	31	Existed
3	F19	2	Г 14	30	Existed
4	F20	2		29	

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK FUEL INJECTOR

Refer to EC-248, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning fuel injector. Refer to EM-37, "Removal and Installation".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-45. "Removal and Installation".

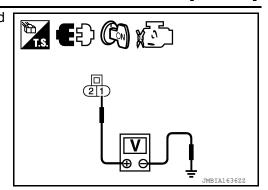
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

Component Inspection

INFOID:000000007420594

1.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.



[QR25DE]

FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

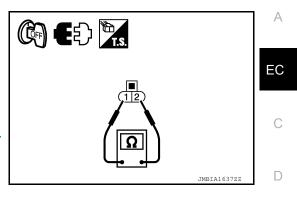
- 2. Disconnect fuel injector harness connector.
- 3. Check resistance between fuel injector terminals as follows.

Terminals	Resistance	
1 and 2	10.4 - 15.3Ω [at 10 -60°C (50 - 140°F)]	
le the inerestion result normal?		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector. Refer to <u>EM-37</u>. <u>"Removal and Installation"</u>.



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< DTC/CIRCUIT DIAGNOSIS > FUEL PUMP

Description

[QR25DE]

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓
Battery	Battery voltage*	*	Fuel pump

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

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation	
Ignition switch is turned to ON.	Operates for 1 second.	
Engine running and cranking	Operates.	
When engine is stopped	Stops in 1.5 seconds.	
Except as shown above	Stops.	

Component Function Check

1.CHECK FUEL PUMP FUNCTION

- 1. Turn ignition switch ON.
- 2. Pinch fuel feed hose (2) with two fingers.
 - 1 : Air cleaner assembly

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?

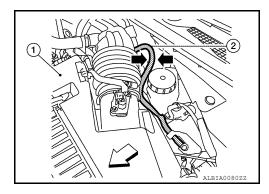
- YES >> INSPECTION END
- NO >> EC-250, "Diagnosis Procedure".

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.

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FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between ECM harness connector and ground.

ECM		Ground	Voltage	
Connector	Terminal	Cround	vollage	
F14	14	Ground	Battery voltage	

Is the inspection result normal?

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

2.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

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

IPDM E/R		Ground	Voltage	
Connector	Terminal	Ground	vollage	
F10	77	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 10.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector F10
- Harness for open or short between IPDM E/R and ECM

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

- 4.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III
- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- Turn ignition switch ON. 4.
- Check the voltage between "fuel level sensor unit and fuel 5. pump" harness connector and ground.

	sensor unit el pump	Ground	Voltage	
Connector	Terminal			
B42	1	Ground	Battery voltage should exist 1 second after ignition switch is turn ON.	

Is the inspection result normal?

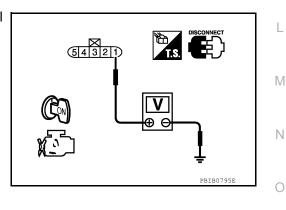
YES >> GO TO 8.

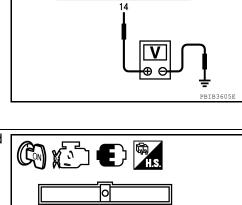
NO >> GO TO 5.

5.CHECK 15A FUSE

- 1. Turn ignition switch OFF.
- 2. Disconnect 15 A fuse (No. 32) from IPDM E/R.
- Check 15 A fuse. 3.
- Is the inspection result normal?
- YES >> GO TO 6.
- NO >> Replace15 A fuse.

O.CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV





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FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect IPDM E/R harness connector E18.
- 2. Check the continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.

IPDI	/I E/R	Fuel level sensor unit and fuel pump		Continuity
Connector	Terminal	Connector	Terminal	
E18	13	B42	1	Existed

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

Is the inspection result normal?

YES >> GO TO 10. NO

>> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- IPDM E/R connectors E18
- Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

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

8.CHECK FUEL PUMP GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- Check the continuity between "fuel level sensor unit and fuel pump" and ground. 2.

Fuel level sensor unit and fuel pump		Ground	Continuity	
Connector	Terminal			
B42	3	Ground	Existed	

Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 10. NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

· Harness connectors E29 (with rear view monitor), B10 (with rear view monitor)

IPDM E/R connector E18

Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

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

10.CHECK FUEL PUMP

Refer to EC-253, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-6, "Removal and Installation"</u>.

11.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

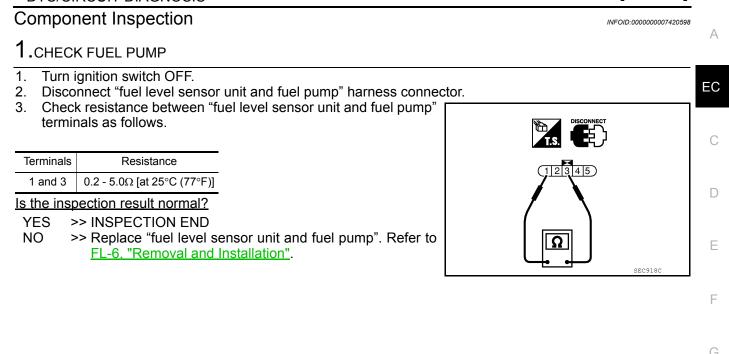
YFS >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".

NO >> Repair or replace harness or connectors.

FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

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< DTC/CIRCUIT DIAGNOSIS >

HO2S2

Description

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristic of the air fuel ratio (A/F) sensor 1 is shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK-I

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector and ground under the following condition.

ECM		Ground	Condition	Voltage
Connector	Terminal	Cround	Condition	voltage
F13	33 (HO2S2 signal)	Ground	Revving up to 4,000 rpm un- der no load at least 10 times	The voltage does not remain in the range of 0.2 - 0.4V.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK-II

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

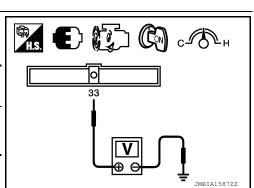
ConnectorTerminalCroundConnectorTerminalF1333 (HO2S2 signal)GroundKeeping engine speed at idle for 10 minutesThe voltage does not remain in the range of 0.2 - 0.4V.	ECM		Ground	Condition	Voltage	
F13 (HO2S2 Ground Keeping engine speed at not remain in the	Connector	Terminal	Ground	Condition	vollage	
	F13	(HO2S2	Ground		not remain in the	

Is the inspection result normal?

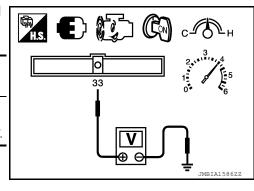
YES >> INSPECTION END

NO >> GO TO 3.

3.PERFORM COMPONENT FUNCTION CHECK-III



Heater pad Heater pad Holder Lirconia tube



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< DTC/CIRCUIT DIAGNOSIS > Check the voltage between ECM harness connector and ground under the following condition.

EC	М	Ground	Condition	Voltage	
Connector	Terminal	Cround	Condition	voitage	
F13	33 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage does not remain in the range of 0.2 - 0.4V.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-255, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2	HO2S2 ECM			Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F42	1	F13	35	Existed	

Also check harness for short to ground and short to power. 5.

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

HO2	S2	EC	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F42	4	F13	33	Existed

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

HO2S2		ECM		Ground	Continuity
Connector	Terminal	Connector	Terminal	Ground	Continuity
F42	4	F13	33	Ground	Not existed

Also check harness for short to power.

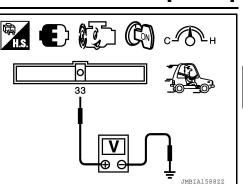
Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK HEATED OXYGEN SENSOR 2

Refer to EC-256, "Component Inspection".



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Is the inspection result normal?

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

5.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to EC-24, "Component Parts Location".

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 heated 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

6.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

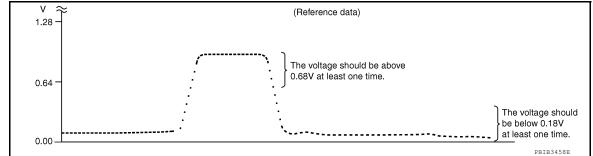
YES >> GO TO 2.

NO >> GO TO 3.

2.CHECK HEATED OXYGEN SENSOR 2

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. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT.
- 7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to ±25%.



"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

Is the inspection result normal?

YES >> INSPECTION END NO >> GO TO 6. **3.**CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.

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HO2S2

< DTC/CIRCUIT DIAGNOSIS >

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.

Voltage

The voltage should be above

The voltage should be below

0.68V at least once during

0.18V at least once during

this procedure.

this procedure.

Let engine idle for 1 minute. 4.

Terminal

33

(HO2S2

signal)

Check the voltage between ECM harness connector and ground 5. under the following condition.

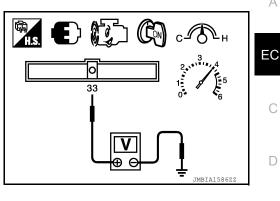
Condition

Revving up to

4,000 rpm under

no load at least

10 times



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Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

ECM

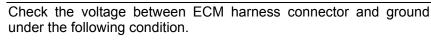
Connector

F13

4.CHECK HEATED OXYGEN SENSOR 2-II

Ground

Ground



EC	M				F
Connector	Terminal	Ground	Condition	Voltage	
F13	33 (HO2S2 signal)	Ground	Keeping engine speed at idle for 10 minutes	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure.	

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Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

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

 EC	М	Ground	Condition	Voltage	
 Connector	Terminal	Ground	Condition	voltage	
F13	33 (HO2S2 signal)	Ground	Coasting from 80 km/h (50 MPH) in D position (CVT), 4th gear position (M/T)	The voltage should be above 0.68V at least once during this procedure. The voltage should be below 0.18V at least once during this procedure.	

Is the inspection result normal?

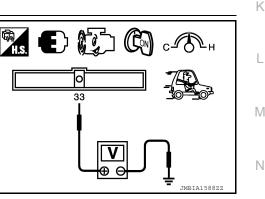
YES >> INSPECTION END

NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to EC-24, "Component Parts Location". 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 heated 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).



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>> INSPECTION END

HO2S2 HEATER

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HO2S2 HEATER

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SYSTEM DESCRIPTION

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

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

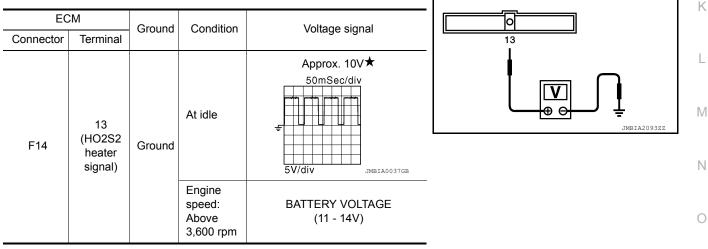
OPERATION

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

Component Function Check

1. CHECK HEATED OXYGEN SENSOR 2 HEATER FUNCTION

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector and ground under the following condition.



★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-259. "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK GROUND CONNECTION

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HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

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

HO	2S2	Ground	Voltage	
Connector	Terminal	Oround	voltage	
F42	2	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector F10
- 15A fuse (No. 37)

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

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

4.CHECK H02S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

HC	0282	E	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F42	3	F14	13	Existed	

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-261. "Component Inspection".

Is the inspection result normal?

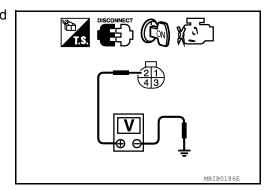
YES >> GO TO 7. NO >> GO TO 6.

6.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to EC-24, "Component Parts Location".

CAUTION:

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



HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

7. CHECK INTERMITTENT INCIDENT

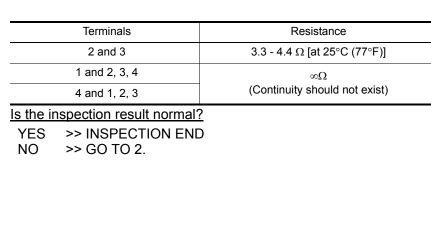
Refer to GI-42, "Intermittent Incident".

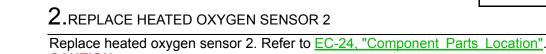
Component Inspection

1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.

- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Check resistance between HO2S2 terminals as follows.





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

>> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

IAT SENSOR

Description

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

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

PBTA9559.1

<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 terminal 50 (Intake air temperature sensor) and ground.

CAUTION:

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

Component Function Check

1. CHECK INTAKE AIR TEMPERATURE SENSOR FUNCTION

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

ECM		Ground	Voltage	
Connector Terminal			voltage	
F13	50	Ground	Approx. 0 - 4.8V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-262, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

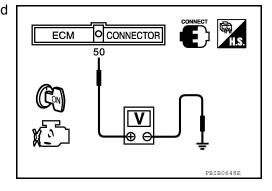
2.CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

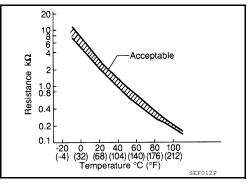
1. Disconnect mass air flow sensor (with intake air temperature sensor) harness connector.

2. Turn ignition switch ON.

EC-262







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IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

MAF	MAF sensor Connector Terminal		Voltage
Connector			
F31	5	Ground	Approx. 5V

Is the inspection result normal?

YES >> GO TO 3.

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

	CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
•	
<u> </u>	

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

MAF sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F31	6	F13	56	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-263, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-25, "Removal and Installation".

5. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "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.

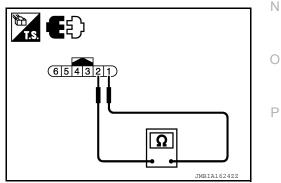
3. Check resistance between mass air flow sensor terminals as follows.

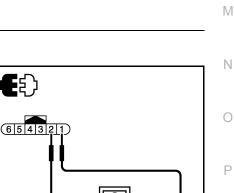
Terminals	Condition		Resistance $k\Omega$
1 and 2	Intake air temperature °C (°F)	25 (77)	1.800 - 2.200

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-25, "Removal and Installation".





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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 <u>EC-264, "Diagnosis Procedure"</u>.

2. IGNITION SIGNAL FUNCTION

With CONSULT

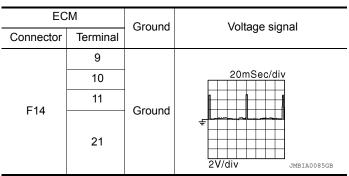
- 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 2. Make sure that each circuit produces a momentary engine speed drop.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-264, "Diagnosis Procedure".
- **3.** IGNITION SIGNAL FUNCTION

Without CONSULT

- 1. Let engine idle.
- 2. Read the voltage signal between ECM harness connector and ground.



NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

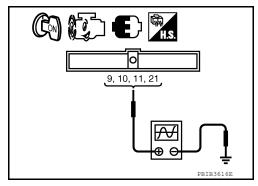
YES >> INSPECTION END

NO >> Go to EC-264, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.



INFOID:000000007420611

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IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

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

ECM		Ground	Voltage	
 Connector	Connector Terminal		Voltage	
E10	105	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 2.

>> Go to EC-115, "Diagnosis Procedure". NO

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-2 harness connector.
- Turn ignition switch ON. 3.
- Check the voltage between condenser-2 harness connector and 4. around.

Condenser-2		Ground	Voltage	
Connector	Terminal	Giouna	vollage	
F26	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R harness connector F10.
- 3. Check the continuity between IPDM E/R harness connector and condenser-2 harness connector.

IPDM	E/R	Condenser-2		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F10	53	F24	1	Existed

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

Is the inspection result normal?

YES >> Go to EC-115, "Diagnosis Procedure".

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

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

Turn ignition switch OFF. 1.

2. Check the continuity between condenser-2 harness connector and ground.

Condenser-2		Ground	Continuity
Connector	Terminal	Ground	Continuity
F24	2	Ground	Existed

Also check harness for short to power. 3.

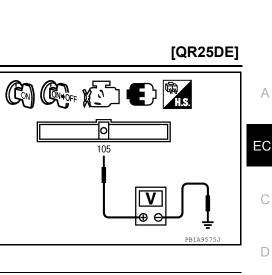
Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK CONDENSER-2

Refer to EC-268, "Component Inspection (Condenser-2)" Is the inspection result normal?



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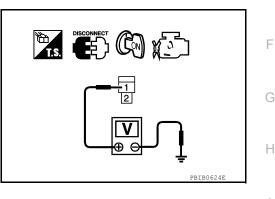
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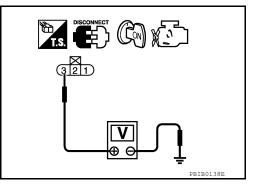
YES >> GO TO 6.

NO >> Replace condenser.

6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

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

Ignition coil		Ground	Voltage	
Cylinder	Connector	Terminal	Cround	voltage
1	F34	3		Battery voltage
2	F35	3	Ground	
3	F36	3		Dattery voltage
4	F37	3		



Is the inspection result normal?

YES >> GO TO 7.

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

7.CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between ignition coil harness connector and ground.

Ignition coil		Ground	Continuity	
Cylinder	Connector	Connector Terminal		Continuity
1	F34	2		Existed
2	F35	2	Ground	
3	F36	2	Giouna	
4	F37	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ECM harness connector and ignition coil harness connector.

	Ignition coil ECM		Continuity		
Cylinder	Connector	Terminal	Connector Terminal		Continuity
1	F34	1		11	
2	F35	1	F14	10	Existed
3	F36	1	Г 14	9	Existed
4	F37	1		21	

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

Is the inspection result normal?

YES >> GO TO 9.

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

9.CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-267, "Component Inspection (Ignition Coil with Power Transistor)".

IGNITION SIGNAL

	<u> </u>
Is the inspection result normal?	A
YES >> GO TO 10. NO >> Replace malfunctioning ignition coil with power transistor.	A Refer to EM 26. "Removal and Installa
tion".	Relei to <u>Elvi-30, Removal and Instalia-</u>
10.check intermittent incident	EC
Refer to GI-42, "Intermittent Incident".	
	С
>> INSPECTION END	
Component Inspection (Ignition Coil with Power Transi	istor) INFOID:000000007420614
1. CHECK IGNITION COIL WITH POWER TRANSISTOR-I	D
1. Turn ignition switch OFF.	
2. Disconnect ignition coil harness connector.	E
3. Check resistance between ignition coil terminals as follows.	
Terminals Resistance Ω [at 25°C (77°F)]	
1 and 2 Except 0 or ∞	
1 and 3	
2 and 3 Except 0	
s the inspection result normal?	
YES >> GO TO 2.	Ω Η
NO >> Replace malfunctioning ignition coil with power transis-	
tor. Refer to EM-36, "Removal and Installation".	FBLDUO4/E
2.CHECK IGNITION COIL WITH POWER TRANSISTOR-II	1
CAUTION:	
Do the following procedure in the place where ventilation is good	d without the combustible.
1. Turn ignition switch OFF.	J
 Reconnect all harness connectors disconnected. Remove fuel pump fuse in IPDM E/R to release fuel pressure. 	
NOTE:	K
Do not use CONSULT to release fuel pressure, or fuel pressure a	applies again during the following proce-
dure.	
 Start engine. After engine stalls, crank it two or three times to release all fuel pr 	
5. Turn ignition switch OFF.	
7. Remove all ignition coil harness connectors to avoid the electrical	l discharge from the ignition coils.
Remove ignition coil and spark plug of the cylinder to be checked.	. Refer to EM-36, "Removal and Installa- M
tion". 9. Crank engine for 5 seconds or more to remove combustion gas ir	a 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 -	N
0.66 in) between the edge of the spark plug and grounded metal	
portion as shown in the figure.	angri
12. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal	I III O
portion.	
	P.
Spark should be generated.	13 - 17 mm
CAUTION:	Grounded metal portion
• Do not approach to the spark plug and the ignition coil	(Cylinder head, cylinder block, etc.)
within 50 cm (19.7 in). Be careful not to get an electrical	JMBIA0066GB
shock while checking, because the electrical discharge voltage becomes 20kV or more.	
 It might cause to damage the ignition coil if the gap of more 	a than 17 mm 0 66 in) is takon

• It might cause to damage the ignition coil if the gap of more than 17 mm 0.66 in) is taken.

< DTC/CIRCUIT DIAGNOSIS >

IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is mal-functioning.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning ignition coil with power transistor. Refer to <u>EM-36</u>, "<u>Removal and Installa-</u> <u>tion</u>".

Component Inspection (Condenser-2)

INFOID:000000007420615

1.CHECK CONDENSER-2

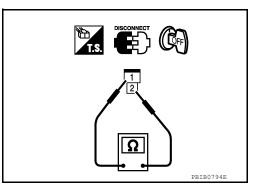
- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-2 harness connector.
- 3. Check resistance between condenser-2 terminals as follows.

Terminals	Resistance
1 and 2	Above 1 MΩ [at 25°C (77°F)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser-2.



MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

MALFUNCTION INDICATOR LAMP

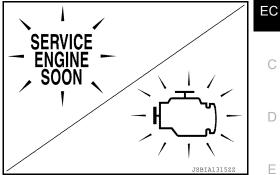
Description

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

For details, refer to EC-269, "Diagnosis Procedure".



Component Function Check

1. CHECK MIL FUNCTION	F
 Turn ignition switch ON. Make sure that MIL lights up. <u>Is the inspection result normal?</u> YES >> INSPECTION END NO >> Go to <u>EC-269. "Diagnosis Procedure"</u>. 	G
Diagnosis Procedure	H
1.снеск отс	Ι
Check that DTC U1000 or U1001 is not displayed.	
<u>Is the inspection result normal?</u> YES >> GO TO 2. NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-119, "Diagnosis Procedure"</u> .	J
2.CHECK DTC WITH METER	K
Refer to MWI-28, "CONSULT Function (METER/M&A)".	. r
Is the inspection result normal?	
YES >> GO TO 3. NO >> Repair or replace.	
3. CHECK INTERMITTENT INCIDENT	
Refer to GI-42, "Intermittent Incident".	M
Is the inspection result normal?	
 YES >> Replace combination meter. Refer to <u>MWI-139</u>, "<u>Removal and Installation</u>". NO >> Repair or replace. 	Ν
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INFOID:000000007420617

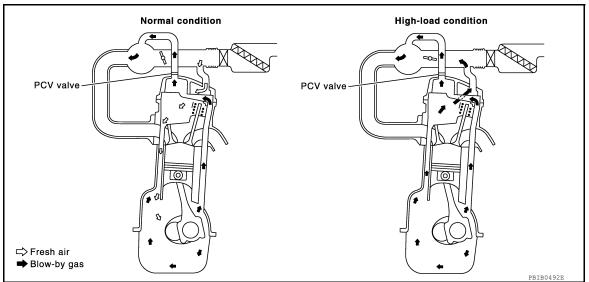
< DTC/CIRCUIT DIAGNOSIS >

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000007420619

[QR25DE]



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

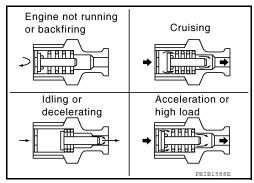
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



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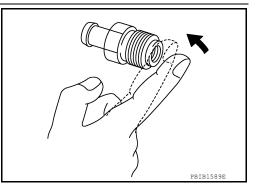
Component Inspection

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.

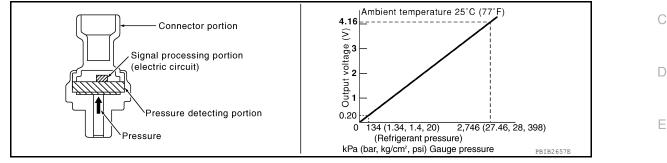


< DTC/CIRCUIT DIAGNOSIS >

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

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- Turn A/C switch and blower fan switch ON. 2.
- Check the voltage between ECM harness connector and 3 ground.

ECM		Ground	Voltage
Connector Terminal		Ground	voltage
E219	39 (Refrigerant pressure sensor signal)	Ground	1.0 - 4.0V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-271, "Diagnosis Procedure".

Diagnosis Procedure

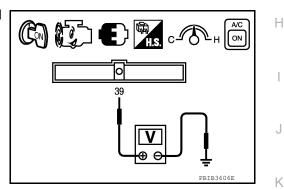
1. CHECK GROUND CONNECTION

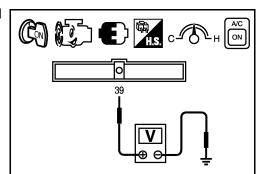
- 1. Turn A/C switch and blower fan switch OFF.
- 2. Stop engine.
- 3. Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 4.

Is the inspection result normal?

YES	>> GO	TO 2.

- NO >> Repair or replace ground connection.
- 2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT
- 1. Disconnect refrigerant pressure sensor harness connector.
- 2. Turn ignition switch ON.





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REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pre	essure sensor	Ground	Voltage
Connector Terminal		Ground	voltage
E219	1	Ground	Approx. 5V

Is the inspection result normal?

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

3. DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors F1, E3

· Harness for open or short between ECM and refrigerant pressure sensor

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

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
E219	3	F13	40	Existed

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F1, E3

· Harness for open or short between ECM and refrigerant pressure sensor

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

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between ECM harness connector and refrigerant pressure sensor harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
E219	2	F13	39	Existed

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

1.DETECT MALFUNCTIONING PART

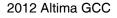
Check the following.

• Harness connectors F1, E3

• Harness for open or short between ECM and refrigerant pressure sensor

Revision: February 2013

EC-272



REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

8 CHE	>> Repair open circuit or short to ground or short to power in harness or connectors. ECK INTERMITTENT INCIDENT	А
		EC
	nspection result normal?	
YES	>> Replace refrigerant pressure sensor. Refer to <u>HA-43</u> , "Removal and Installation for Refrigerant <u>Pressure Sensor"</u> .	С
NO	>> Repair or replace.	0
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ECU DIAGNOSIS INFORMATION ECM

Reference Value

INFOID:000000007420624

[QR25DE]

VALUES ON THE DIAGNOSIS TOOL

Remarks:

• Specification data are reference values.

• Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	C	ondition	Values/Status
ENG SPEED	Run engine and compare CONSU	ILT value with the tachometer indication.	Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-108, "Diagnosis Procedure"		
B/FUEL SCHDL	See EC-108, "Diagnosis Procedure"		
A/F ALPHA-B1	See EC-108, "Diagnosis Procedure"		
COOLAN TEMP/S	Engine: After warming up		More than 70°C (158°F)
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	 Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	 Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		LEAN ←→ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT value with the speedometer indi- cation.		Almost the same speed as speedometer indication
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0V
AGGEL GEN I	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8V
ACCEL SEN 2*1	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0V
ACCEL SEN 2	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8V
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36V
TP SEN 1-B1	(Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully depressed	Less than 4.75V
	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36V
TP SEN 2-B1* ¹	(Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully depressed	Less than 4.75V
INT/A TEMP SE	Ignition switch: ON	1	Indicates intake air tempera- ture
START SIGNAL	• Ignition switch: $ON \rightarrow START \rightarrow O$	N	$OFF\toON\toOFF$
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Fully released	ON
OLOD THE FUO	(Engine stopped)	Accelerator pedal: Slightly depressed	OFF
	• Engine: Afterwarming up idle the	Air conditioner switch: OFF	OFF
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates.)	ON

< ECU DIAGNOSIS INFORMATION >

Monitor Item	C	ondition	Values/Status	
		Shift lever: P or N (CVT), Neutral (M/T)	ON	
P/N POSI SW	Ignition switch: ON	Selector lever: Except above	OFF	
	• Engine: After warming up, idle the	Steering wheel: Not being turned	OFF	
PW/ST SIGNAL	engine	Steering wheel: Being turned	ON	
LOAD SIGNAL		Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON	
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch and lighting switch: OFF	OFF	
GNITION SW	• Ignition switch: $ON \rightarrow OFF \rightarrow ON$		$ON \rightarrow OFF \rightarrow ON$	
	• Engine: After warming up, idle the	Heater fan switch: ON	ON	
HEATER FAN SW	engine	Heater fan switch: OFF	OFF	
		Brake pedal: Fully released	OFF	
3RAKE SW	Ignition switch: ON	Brake pedal: Slightly depressed	ON	
	Engine: After warming up	Idle	2.0 - 3.0 msec	
NJ PULSE-B1	 Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	2,000 rpm	1.9 - 2.9 msec	
	Engine: After warming up	Idle	10° - 20° BTDC	
GN TIMING	 Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	2,000 rpm	25° - 45° BTDC	
	Engine: After warming up	Idle	0%	
PURG VOL C/V	 Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	2,000 rpm	20% - 90%	
	Engine: After warming up	Idle	–5° - 5°CA	
NT/V TIM(B1)	 Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	2,000 rpm	Approx. 0° - 20°CA	
	Engine: After warming up	Idle	0%	
NT/V SOL(B1)	 Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	2,000 rpm	Approx. 0% - 60%	
		Air conditioner switch: OFF	OFF	
AIR COND RLY	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates)	ON	
FUEL PUMP RLY	 For 1 seconds after turning ignition Engine running or cranking 	n switch: ON	ON	
	Except above		OFF	_
/ENT CONT/V	Ignition switch: ON		OFF	
THRTL RELAY	Ignition switch: ON		ON	

< ECU DIAGNOSIS INFORMATION >

Monitor Item	C	ondition	Values/Status
		Engine coolant temperature is 97°C (207°F) or less	OFF
	 Engine: After warming up, idle the engine Air conditioner switch: OFF 	Engine coolant temperature between 98°C (208°F) and 99°C (210°F) or more	LOW
COOLING FAN		Engine coolant temperature between 100°C (212°F) or more	HIGH
COOLING FAN	Engine: After warming up, idle the engine	Engine coolant temperature is 97°C (207°F) or less	ON
	Air conditioner switch: ONRefrigerant pressure is less than	Engine coolant temperature between 97°C (207°F) and 99°C (210°F) or more	MID
	1,280 kPa (12.80 bar, 13.05 kg/ cm ² , 185.6 psi)	Engine coolant temperature between 100°C (212°F) or more	HIGH
HO2S2 HTR (B1)	 Engine speed: Below 3,600 rpm a Engine: After warming up Keeping the engine speed betwee idle for 1 minute under no load 	fter the following conditions are met. n 3,500 and 4,000 rpm for 1 minute and at	ON
	Engine speed: Above 3,600 rpm		OFF
I/P PULLY SPD	Vehicle speed: More than 20 km/h	(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
		Idle air volume learning has not been per- formed yet.	YET
IDL A/V LEARN	Engine: running	Idle air volume learning has already been performed successfully.	CMPLT
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has turned ON.	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%
AC PRESS SEN	Engine: IdleBoth A/C switch and blower fan sw	vitch: ON (Compressor operates)	1.0 - 4.0V
VHCL SPEED SE	 Turn drive wheels and compare C cation. 	ONSULT value with the speedometer indi-	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 SW		MAIN switch: Released	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
NEGOME/AGG GW	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	Ignition switch: ON	 Brake pedal: Fully released (CVT) Brake pedal and clutch pedal: Fully released (M/T) 	ON
(ASCD brake switch)		 Brake pedal: Slightly depressed (CVT) Brake pedal and/or clutch pedal: Slight- ly depressed (M/T) 	OFF

< ECU DIAGNOSIS INFORMATION >

[QR25DE]

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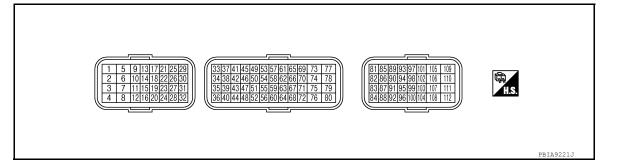
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Monitor Item	C	Condition	Values/Status	
BRAKE SW2		Brake pedal: Fully released	OFF	A
(Stop lamp switch)	Ignition switch: ON	Brake pedal: Slightly depressed	ON	_
VHCL SPD CUT	Ignition switch: ON	L	NON	EC
LO SPEED CUT	Ignition switch: ON		NON	
AT OD MONITOR	Ignition switch: ON		OFF	
AT OD CANCEL	Ignition switch: ON		OFF	С
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	D
SET LAMP	When vehicle speed: Between 40 km/h (25 MPH) and 180 km/h (112 MPH)	ASCD: Not operating	OFF	E
A/F ADJ B1	Engine: running	1	-0.330 - 0.330	

*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT.

CAUTION:

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

Term	inal No.	Wire	Description			Value	M
+	-	color	Signal name	Input/ Output	Condition	(Approx.)	
2	Ground	L	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)	Ν
4	Ground	LG	A/F sensor 1 heater	Output	[Engine is running]Warm-up conditionIdle speed	2.9 - 8.8V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div JMEIA0082GB	O P

< ECU DIAGNOSIS INFORMATION >

Termi	inal No.	Miro	Description			Value	
+	_	Wire color	Signal name	Input/ Output	Condition	(Approx.)	
5	Ground	GR	Throttle control motor (Open)	Output	 [Ignition switch: ON] Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed 	0 - 14V 1mSec/div 5V/div JMBIA0083GB	
6	Ground	BR	Throttle control motor (Close)	Output	 [Ignition switch: ON] Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released 	0 - 14V★ 1mSec/div € 5V/div JMBIA0084GB	
9 10	Canad	O LG	Ignition signal No. 3 Ignition signal No. 2	Output	 [Engine is running] Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	0 - 0.1V★ 20mSec/div 20mSec/div 2V/div JMBIA0085GB	
11 21	Ground	Y BR	Ignition signal No. 1 Ignition signal No. 4	Output	[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	0 - 0.2V★ 20mSec/div	
12 16	Ground	GR B	ECM ground	_	[Engine is running] • Idle speed	Body ground	
13	Ground	Y	Heated oxygen sensor 2 heater	Output	 [Engine is running] Engine speed: Below 3,600 rpm after the following conditions are met Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	10V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div JMBIA0037GB	
					[Ignition switch: ON] • Engine stopped [Engine is running] • Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14V)	
14	Ground	B/R	Fuel pump relay	Output	 [Ignition switch: ON] For 1 second after turning ignition switch ON [Engine is running] 	0 - 1.0V	
					[Engine is running]More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)	

< ECU DIAGNOSIS INFORMATION >

Term	inal No.	Wire	Description			Value	٥
+	-	color	Signal name	Input/ Output	Condition	(Approx.)	A
15	Ground	R	Throttle control motor relay	Output	[Ignition switch: $ON \rightarrow OFF$]	0 - 1.0V ↓ BATTERY VOLTAGE (11 - 14V) ↓ 0V	EC C
					[Ignition switch: ON]	0 - 1.0V	
24	Ground	SB	ECM relay (Self shut-off)	Output	[Engine is running][Ignition switch: OFF]A few seconds after turning ignition switch OFF	0 - 1.0V	D
					[Ignition switch: OFF]More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)	E
						BATTERY VOLTAGE (11 - 14V)★ 50mSec/div	F
					[Engine is running] • Idle speed	£	G
25	Ground	Ρ	EVAP canister purge volume control solenoid valve	Output		20V/div JMBIA0087GB BATTERY VOLTAGE (11 - 14V)★	I
					 [Engine is running] Engine speed: About 2,000 rpm (More than 100 seconds after starting engine.) 	50mSec/div	J
						BATTERY VOLTAGE	
					[Engine is running] • Warm-up condition • Idle speed	(11 - 14V)★ 50mSec/div	L
29		LG	Fuel injector No. 4		NOTE: The pulse cycle changes depend- ing on rpm at idle		Μ
30 31	Ground	W O	Fuel injector No. 3 Fuel injector No. 2	Output		BATTERY VOLTAGE	Ν
32		V	Fuel injector No. 1		[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	(11 - 14V)★ 50mSec/div	O
						10V/div JMBIA0090GB	

< ECU DIAGNOSIS INFORMATION >

Term	inal No.	Description				
+	-	Wire color	Signal name	Input/ Output	Condition	Value (Approx.)
33	Ground	BR	Heated oxygen sensor 2	Input	 [Engine is running] Revving engine from idle to 3,000 rpm quickly after the following conditions are met Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 1.0V
35	Ground	В	Sensor ground (Heated oxygen sensor 2)	_	[Engine is running]Warm-up conditionIdle speed	0V
36	Ground	G	Sensor ground (Throttle position sen- sor)	_	[Engine is running]Warm-up conditionIdle speed	0V
			Throttle position sensor		 [Ignition switch: ON] Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released 	More than 0.36V
37	Ground	В	1	Input	 [Ignition switch: ON] Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed 	Less than 4.75V
		_	Throttle position sensor		[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75V
38	Ground	R	2	Input	 [Ignition switch: ON] Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed 	More than 0.36V
39	Ground	L	Refrigerant pressure sensor	Input	 [Engine is running] Warm-up condition Both A/C switch and blower fan motor switch: ON (Compressor operates) 	1.0 - 4.0V
40	Ground	GR	Sensor ground (Refrigerant pressure sensor)	_	[Engine is running]Warm-up conditionIdle speed	0V
			Power steering pressure	_	[Engine is running] Steering wheel: Being turned 	0.5 - 4.0V
41	Ground	SB	sensor	Output	[Engine is running] Steering wheel: Not being turned	0.4 - 0.8V
42	Ground	Y	Battery current sensor	Input	[Engine is running]	0 - 4.8V
44	Ground	В	Sensor ground (Battery current sensor)	_	[Engine is running]Warm-up conditionIdle speed	0V
45	Ground	G	A/F sensor 1	Input	[Ignition switch: ON]	2.2V
46	Ground	Ρ	Engine coolant temper- ature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with en- gine coolant temperature.
47	Ground	W	Sensor power supply (Throttle position sen- sor)	_	[Ignition switch: ON]	5V

< ECU DIAGNOSIS INFORMATION >

Term	inal No.	\\/iro	Description			Value	
+	-	Wire color	Signal name	Input/ Output	Condition	Value (Approx.)	A
48	Ground	LG	Sensor ground (Power steering pres- sure sensor)	_	[Engine is running]Warm-up conditionIdle speed	0V	EC
49	Ground	L	A/F sensor 1	Input	[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	1.8V Output voltage varies with air fuel ratio.	С
50	Ground	0	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with intake air temperature.	D
51	Ground	BR	Sensor power supply (Battery current sensor)	-	[Ignition switch: ON]	5V	Е
52	Ground	SB	Sensor ground (Engine coolant temper- ature sensor)	_	[Engine is running]Warm-up conditionIdle speed	0V	
55	Ground	Y	Sensor power supply (Power steering pres- sure sensor)	_	[Ignition switch: ON]	5V	F
56	Ground	R	Sensor ground (Mass air flow sensor, Intake air temperature sensor)		[Engine is running]Warm-up conditionIdle speed	0V	G
58	Ground	GR	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.1V	1
					[Engine is running]Warm-up conditionEngine speed: 2,500 rpm	1.4 - 1.7V	
59	Ground	0	Sensor power supply [Camshaft position sen- sor (PHASE)]	_	[Ignition switch: ON]	5V	J
60	Ground	W	Sensor ground [Crankshaft position sensor (POS)]	_	[Engine is running]Warm-up conditionIdle speed	0V	K
61	Ground	W	Knock sensor	Input	[Engine is running] Idle speed 	2.5V	L
64	Ground	L	Sensor ground [Camshaft position sen- sor (PHASE)]		[Engine is running]Warm-up conditionIdle speed	0V	M
65	Ground	R	Crankshaft position sen-	Input	 [Engine is running] Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	3.0V★ 1mSec/div 2V/div JMBIA0091GB	N
60	Ground	ĸ	sor (POS)	mput	[Engine is running] • Engine speed: 2,000 rpm	3.0V★ 1mSec/div € 2V/div JMBIA0092GB	Ρ

< ECU DIAGNOSIS INFORMATION >

Term	erminal No. Description				Value	
+	_	color	Signal name	Input/ Output	Condition	Value (Approx.)
67	Ground	—	Sensor ground (Knock sensor)		[Engine is running]Warm-up conditionIdle speed	0V
69	Ground	Y	Camshaft position sen-	Input	 [Engine is running] Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	1.0 - 4.0★ 10mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
	Clound	·	sor (PHASE)	input	[Engine is running] • Engine speed is 2,000 rpm	1.0 - 4.0★ 10mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
72	Ground	V	Sensor power supply (Refrigerant pressure sensor)	_	[Ignition switch: ON]	5V
76	Ground	L	Sensor power supply [Crankshaft position sensor (POS)]	_	[Ignition switch: ON]	5V
77	Ground	LG	Power supply for ECM (Back-up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)
					[Engine is running]Warm-up conditionIdle speed	0V
78	Ground	Ρ	Intake valve timing con- trol solenoid valve	Output	[Engine is running]Warm-up conditionEngine speed: 2,000rpm	7 - 10V★ 2mSec/div 5V/div JMBIA0095GB
			Accelerator pedal posi-		[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully released	0.5 - 1.0V
81	Ground	W	tion sensor 1	Input	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully depressed	4.2 - 4.8V
			Accelerator pedal posi-		[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully released	0.25 - 0.5V
82	Ground	0	tion sensor 2	Input	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully depressed	2.0 - 2.5V

< ECU DIAGNOSIS INFORMATION >

Term	inal No.	Wire	Description			Value	
+	_	color	Signal name	Input/ Output	Condition	Value (Approx.)	_
83	Ground	GR	Sensor power supply (Accelerator pedal posi- tion sensor 1)	_	[Ignition switch: ON]	5V	
84	Ground	В	Sensor ground (Accelerator pedal posi- tion sensor 1)	_	[Engine is running]Warm-up conditionIdle speed	0V	
					[Ignition switch: ON] • ASCD steering switch: OFF	4V	
					[Ignition switch: ON] • MAIN switch: Pressed	0V	
85	Ground	G/Y	ASCD steering switch	Input	[Ignition switch: ON] • CANCEL switch: Pressed	1V	
					[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3V	
					[Ignition switch: ON] • SET/COAST switch: Pressed	2V	
87	Ground	BR	Sensor power supply (Accelerator pedal posi- tion sensor 2)	_	[Ignition switch: ON]	5V	
88	_	0	Data link connector	Input/ Output	_	_	
92	Ground	R	Sensor ground (ASCD steering switch)		[Engine is running]Warm-up conditionIdle speed	0V	
					[Ignition switch: OFF]	0V	
93	Ground	Y	Ignition switch	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)	
94		GR	Engine speed signal output	Output	_	_	
95	Ground	Y	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8V Output voltage varies with fuel tank temperature.	
97		Р	CAN communication line	Input/ Output	_	_	
98		L	CAN communication line	Input/ Output	_	_	
100	Ground	G	Sensor ground (Accelerator pedal posi- tion sensor 2)	_	[Engine is running]Warm-up conditionIdle speed	0V	
102	Ground	R/B	PNP signal	Input	 [Ignition switch: ON] Shift lever: P or N (CVT), Neutral (M/T) 	BATTERY VOLTAGE (11 - 14V)	
					[Ignition switch: ON] • Shift lever: Except above	0V	
104	Ground	Р	Sensor ground (Fuel tank temperature sensor)	_	[Engine is running]Warm-up conditionIdle speed	0V	
105	Ground	V	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)	

< ECU DIAGNOSIS INFORMATION >

Termi	inal No.	Wire	Description			Value
+	_	color	Signal name	Input/ Output	Condition	(Approx.)
106	Ground	SB	Stop lamp switch	loput	[Ignition switch: OFF] • Brake pedal: Fully released	0V
100	Ground	30	Stop lamp Switch	Input	[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
107 108	Ground	B B	ECM ground	_	[Engine is running] • Idle speed	Body ground
109	Ground	W	EVAP canister vent con- trol valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
110	Cround	C/P	ASCD broke owitch	logut	 [Ignition switch: ON] Brake pedal: Slightly depressed (CVT) Brake pedal and clutch pedal: Slightly depressed (M/T) 	0V
110	Ground	G/B	ASCD brake switch	Input	 [Ignition switch: ON] Brake pedal: Fully released (CVT) Brake pedal and/or clutch pedal: Fully released (M/T) 	BATTERY VOLTAGE (11 - 14V)
111 112	Ground	B B	ECM ground		[Engine is running] • Idle speed	Body ground

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Fail Safe

INFOID:000000007420625

NON DTC RELATED ITEM

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 lighting up MIL when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.	<u>EC-269</u>

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0011	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

< ECU DIAGNOSIS INFORMATION >

DTC No.	Detected items	Engine operating condition in fail-safe mode				
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition. CONSULT displays the engine coolant 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 engine 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 engine coolant temperature sensor is activated, the cooling fan operates while engine is running.				
P0122 P0123 P0222	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal				
P0223 P2135		condition. So, the acceleration will be poor.				
P0500	Vehicle speed sensor	The cooling fan operates (High) while engine is running.				
P0643	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.				
P0605	ECM	(When ECM calculation function is malfunctioning:) ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.				
P1805	Brake switch	ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.				
		Vehicle condition	Driving condition			
		When engine is idling	Normal			
		When accelerating	Poor acceleration			
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.				
P2101	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.				
P2118	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.				
P2119	Electric throttle control 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. 				
		(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.				
		engine stalls.	ve is stuck open:) down gradually by fuel cut. After the vehicle stops, the VT), Neutral (M/T) position, and engine speed will not			
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.				

DTC Inspection Priority Chart

INFOID:000000007420626

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	 U1000 U1001 CAN communication line U1010 CAN communication P0102 P0103 Mass air flow sensor P0117 P0118 Engine coolant temperature sensor P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor P0327 P0328 Knock sensor P0335 Crankshaft position sensor (POS) P0340 Camshaft position sensor (PHASE) P0500 Vehicle speed sensor P0643 Sensor power supply P0605 ECM P0850 Park/neutral position (PNP) switch P1610 - P1615 NATS P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	 P0075 Intake valve timing control solenoid valve P0550 Power steering pressure sensor P0603 ECM power supply P1217 Engine over temperature (OVERHEAT) P1805 Brake switch P2101 Electric throttle control function P2118 Throttle control motor P2100 P2103 Throttle control motor relay
3	 P0011 Intake valve timing control P1564 ASCD steering switch P1572 ASCD brake switch P1574 ASCD vehicle speed sensor P1715 Input speed sensor P2119 Electric throttle control actuator

DTC Index

INFOID:000000007420627

×:Applicable —: Not applicable

DTC	<u>></u> *1	Items (CONSULT screen terms)	Trip	MIL	Reference page	
CONSULT	ECM* ²				i telefenete page	
U1000	1000 ^{*3}	CAN COMM CIRCUIT	2	—	<u>EC-119</u>	
U1001	1001 ^{*3}	CAN COMM CIRCUIT	2	_	<u>EC-119</u>	
U1010	1010	CONTROL UNIT(CAN)	2	_	EC-120	
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	_	_	-	
P0011	0011	INT/V TIM CONT-B1	2	_	<u>EC-121</u>	
P0075	0075	INT/V TIM V/CIR-B1	2	×	<u>EC-125</u>	
P0102	0102	MAF SEN/CIRCUIT-B1	1	×	<u>EC-128</u>	
P0103	0103	MAF SEN/CIRCUIT-B1	1	×	<u>EC-128</u>	
P0117	0117	ECT SEN/CIRC	2	×	<u>EC-133</u>	
P0118	0118	ECT SEN/CIRC	2	×	<u>EC-133</u>	
P0122	0122	TP SEN 2/CIRC-B1	1	×	EC-136	
P0123	0123	TP SEN 2/CIRC-B1	1	×	EC-136	
P0222	0222	TP SEN 1/CIRC-B1	1	×	EC-139	
P0223	0223	TP SEN 1/CIRC-B1	1	×	EC-139	

< ECU DIAGNOSIS INFORMATION >

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0200	Reference page	А
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2	<u>EC-142</u>	
2	<u>EC-142</u>	EC
ŀ	<u>EC-144</u>	
3	<u>EC-148</u>	С
2	<u>EC-152</u>	C
ŀ	<u>EC-154</u>	
7	<u>EC-157</u>	D
}	<u>EC-159</u>	
L	<u>EC-161</u>	F
ŀ	<u>EC-164</u>	E
7	<u>EC-167</u>	
3	<u>EC-168</u>	F
2	<u>EC-172</u>	
Ł	<u>EC-174</u>	
<u>}</u>	<u>EC-176</u>	G
2	<u>EC-179</u>	
)	<u>EC-190</u>	Н
1	<u>SEC-281</u>	
<u>6</u>	<u>SEC-286</u>	
7	<u>SEC-287</u>	
<u>5</u>	<u>SEC-285</u>	
2	<u>EC-192</u>	J
3	<u>EC-193</u>	0
3	<u>EC-198</u>	
)	<u>EC-200</u>	Κ
3	<u>EC-198</u>	
ŀ	<u>EC-204</u>	
<u>ì</u>	<u>EC-206</u>	L
3	<u>EC-208</u>	
3	<u>EC-208</u>	M
	<u>EC-211</u>	
	<u>EC-211</u>	
5	<u>EC-215</u>	Ν
3	<u>EC-218</u>	

*1: 1st trip DTC No. is the same as DTC No.

*2: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*3: The troubleshooting for this DTC needs CONSULT.

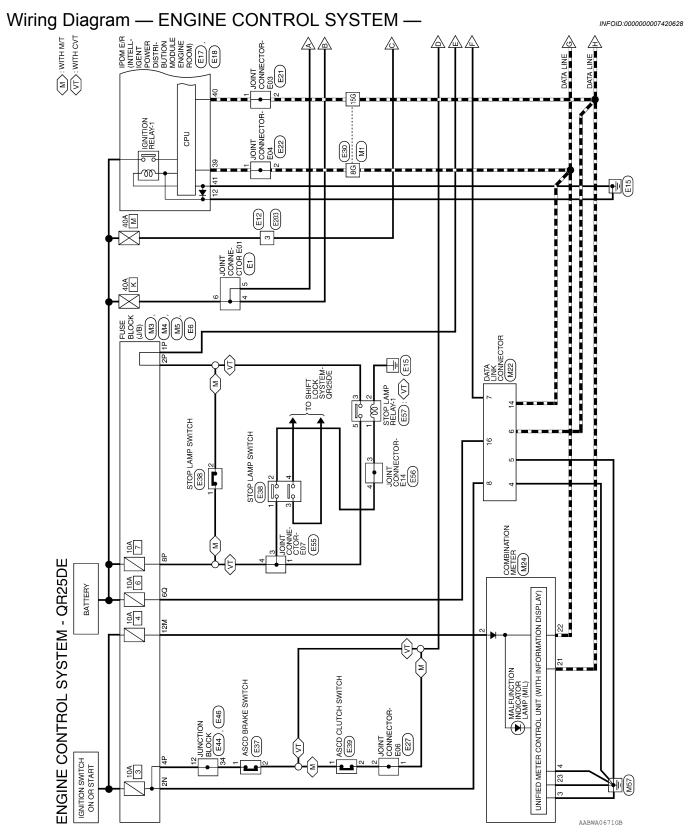
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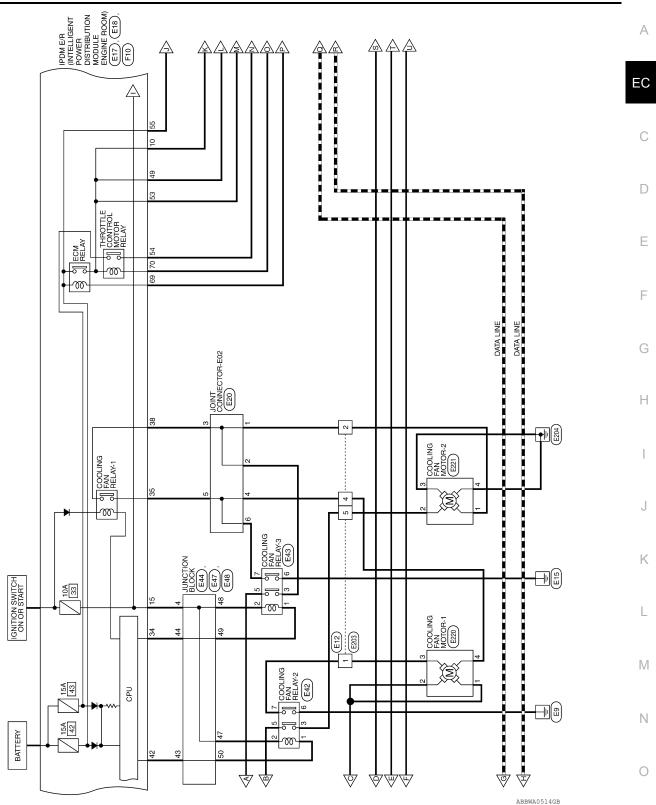
WIRING DIAGRAM

ENGINE CONTROL SYSTEM

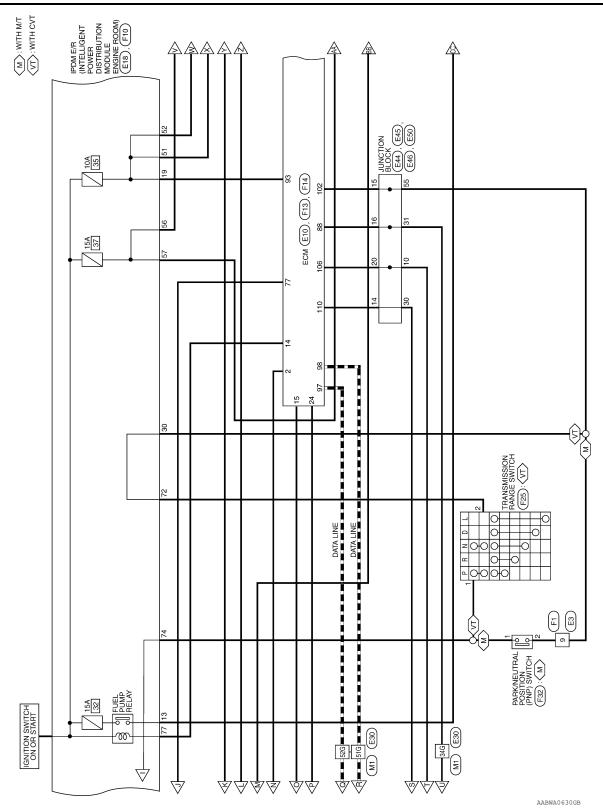


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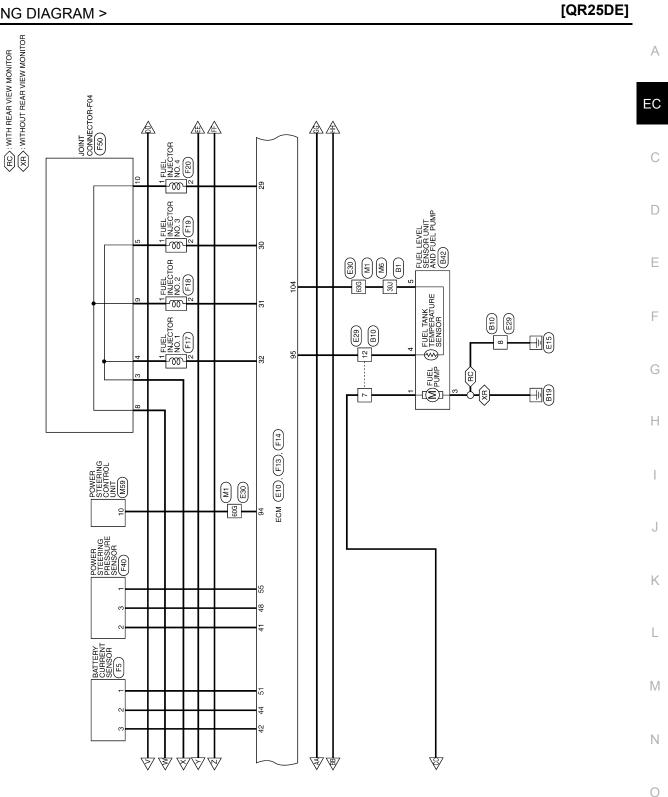
[QR25DE]



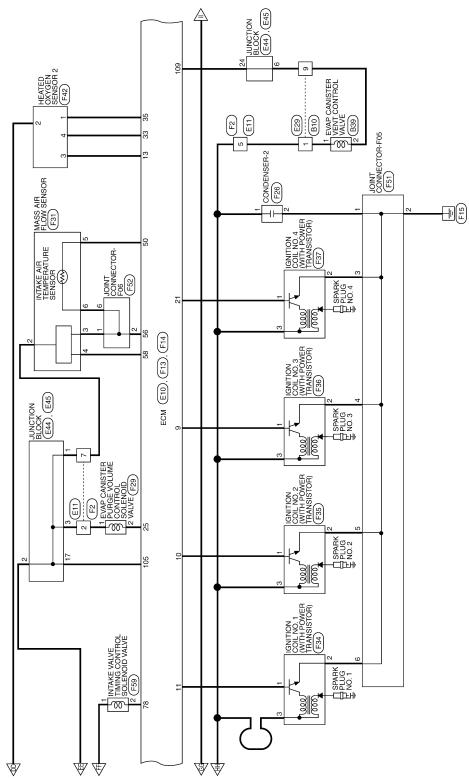
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< WIRING DIAGRAM >

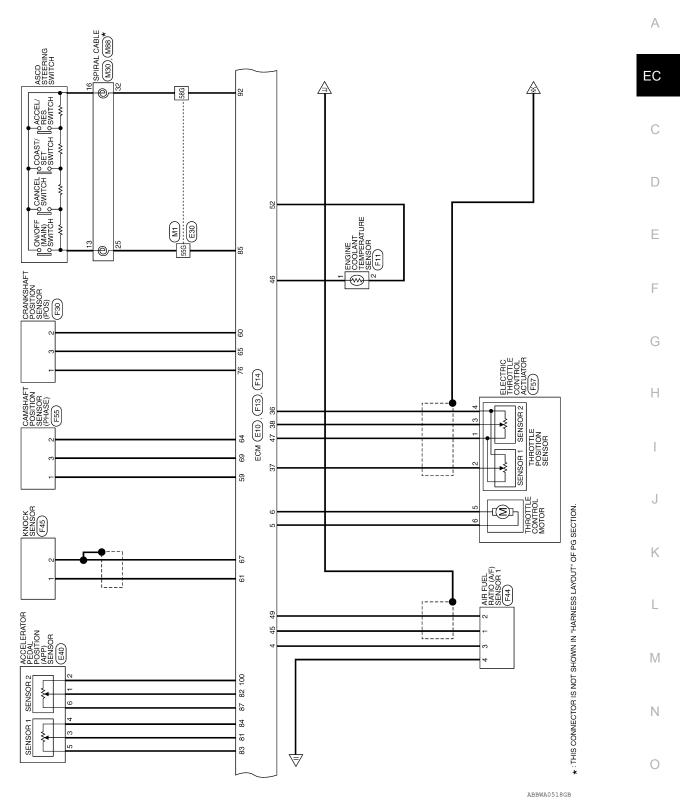


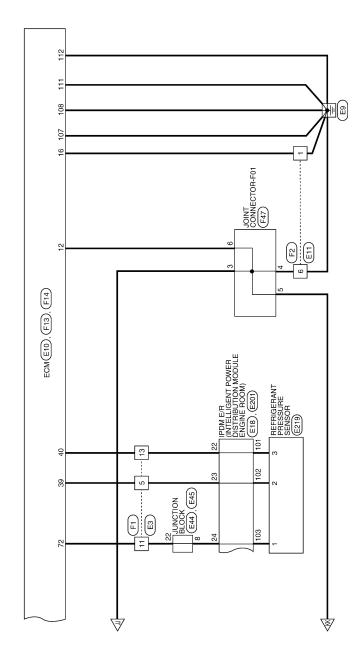
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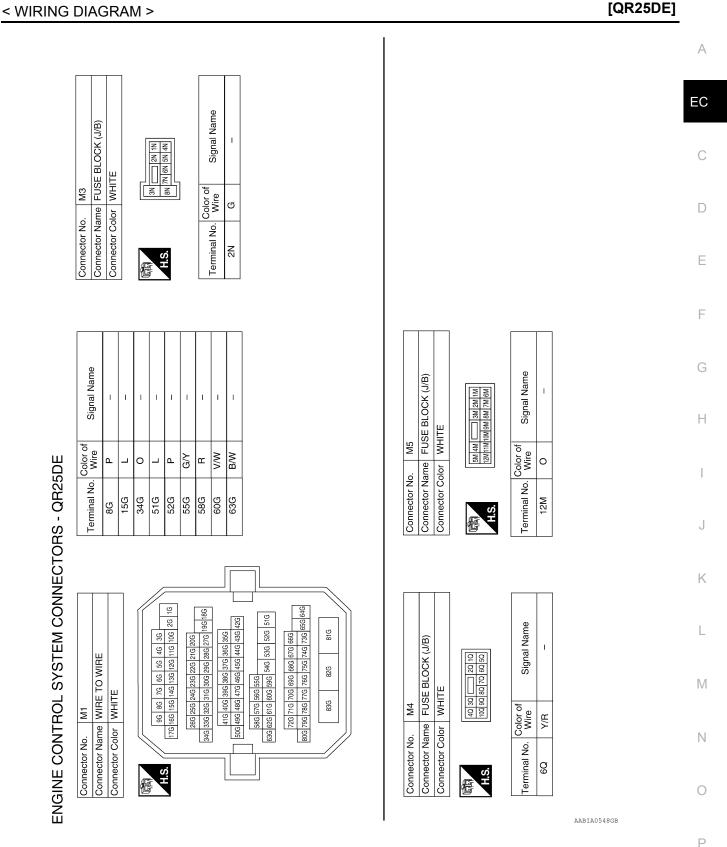
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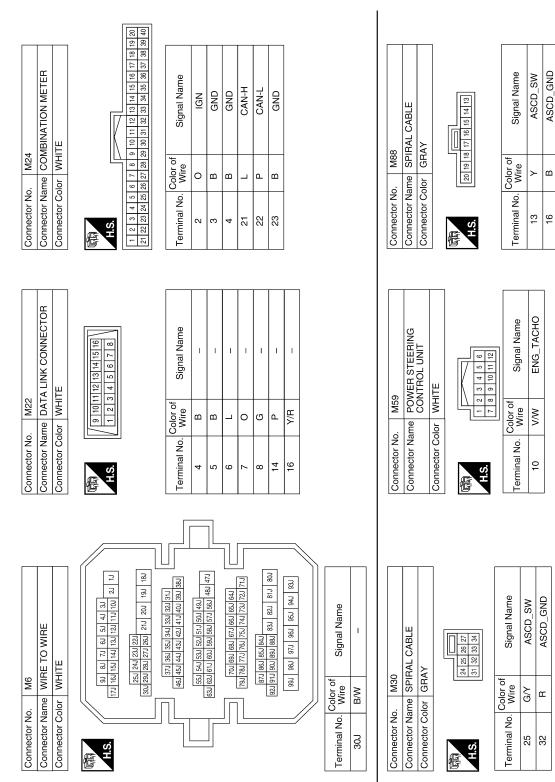




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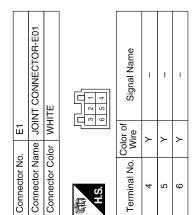
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	IG DIAGRAM >	
Connector No. E6 Connector Name FUSE BLOCK (J/B) Connector Color WHITE Connector No Signal Name P - AP P - AP P - Connector No E11 Color of Signal Name Connector No E11 Connector No Connector No E11 - Connector No WIRE TO WIRE - Connector No WIRE TO WIRE - Connector No Signal Name - T - - - Connector No WIRE TO WIRE - - T - - - - T - - - - T - - - - T - - - - -	Inector No. E6 nector Name FUSE BLOCK (J/B) nector Name FUSE BLOCK (J/B) nector Color WHITE Ip Sp 1P Sgnal Name 1P Sgnal Name 1P Sb 2P - 2P <td>No. Color of Wire O Wire O O O B A L L L L L L L L L L L L L L L L L L</td>	No. Color of Wire O Wire O O O B A L L L L L L L L L L L L L L L L L L

Connector No.	E3
Connector Name WIRE TO WIRE	WIRE TO WIRE
Connector Color WHITE	WHITE
国 H.S.	8 9 10 11 12 13 4 5 6 7
Cold	Color of

	Signal Name	I	I	I	I
	Color of Wire	GR	BR	GR	SB
H.S.	Terminal No.	5	6	11	13

Signal Name	GNDA-ASCDSW	IGNSW	TACHO (CABIN)	TF	I	CAN-L	CAN-H	I	GNDA-APS2	I	NEUT-H	I	GNDA-TF	VBR	BRAKE	GND	GND	CDCV	BNCSW	GND	GND
Color of Wire	BR	٢	GR	≻	I	٩	L	I	σ	I	æ	I	٩	>	SB	в	В	3	σ	В	в
Terminal No.	92	93	94	95	96	97	98	66	100	101	102	103	104	105	106	107	108	109	110	111	112



Connector No. E10 Connector Name ECM Connector Color BLACK
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			_						_			
	Signal Name	4PS1	APS2	AVCC1-APS1	GNDA-APS1	ASCDSW	-	AVCC2-APS2	KLINE	-	-	I
84 88 32	Color of Wire	Ν	0	GR	ш	≻	I	BR	0	T	I	I
J	Terminal No.	81	82	83	84	85	86	87	88	89	06	91

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ENGINE CONTROL SYSTEM

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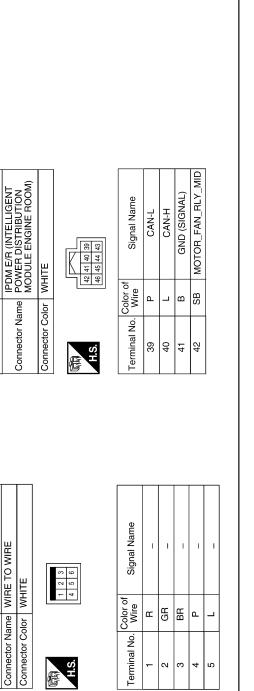
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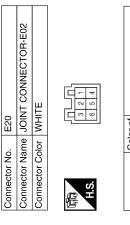
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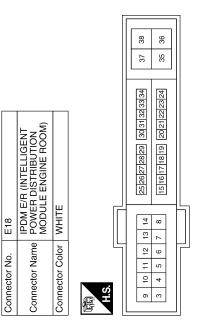
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Signal Name	Ι	-	I	-	-	-
Color of Wire	GR	GR	GR	Р	٩	٩
Terminal No. Wire	-	2	ę	4	5	9

Signal Name	ECM VB	GND (POWER)	FUEL PUMP	START IG-E/R	BCM IGNSW	PD SENS GND-E/R	PD SENS SIG-E/R	PD SENS PWR-E/R	CLUTCH I/L SW	MOTOR FAN RLY HI	MOTOR FAN LO	F/L MOTOR FAN
Color of Wire	ВВ	B	SB	×	≻	W/R	B/B	BR/W	BR	0	Ч	GR
Terminal No.	10	12	13	15	19	22	23	24	30	34	35	38



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E17

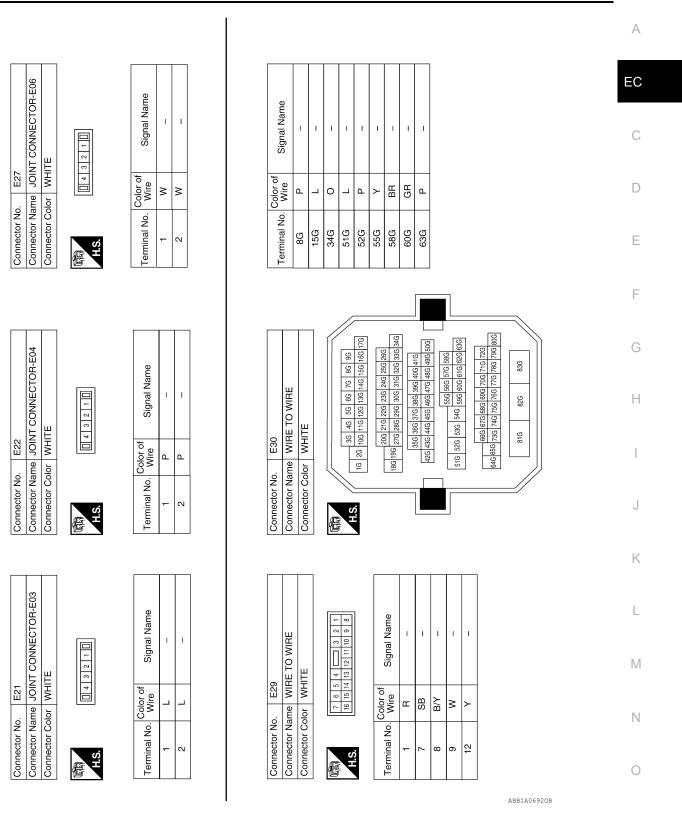
Connector No.

E12

Connector No.

< WIRING DIAGRAM >

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Connector No Connector No Conne	Interview Inter	Image: Signal Name Image: Signal Name Image: Signal Name Image: Signal Name <th>Connector Color WHITE Connector Color WHITE Terminal No. Color of Write Terminal No. Color of Write Terminal No. Color of Write Terminal No. Color of Write Terminal No. Connector Name Connector Name Connector Name Terminal No. Connector Name Signal Name Terminal No. Signal Name Signal Name Signal Name Signal Name Signal Name S</th> <th>E38 ne STOP LAMP SWITCH (WITH M/T) Dr BLACK</th> <th>Color of Signal Name Wire LG LG - LG</th> <th>E42 le COOLING FAN RELAY-2 l BROWN</th> <th>Color of Signal Name Write SB - Color of B - Color of Color</th>	Connector Color WHITE Connector Color WHITE Terminal No. Color of Write Terminal No. Color of Write Terminal No. Color of Write Terminal No. Color of Write Terminal No. Connector Name Connector Name Connector Name Terminal No. Connector Name Signal Name Terminal No. Signal Name Signal Name Signal Name Signal Name Signal Name S	E38 ne STOP LAMP SWITCH (WITH M/T) Dr BLACK	Color of Signal Name Wire LG LG - LG	E42 le COOLING FAN RELAY-2 l BROWN	Color of Signal Name Write SB - Color of B - Color of Color
		Terminal No. Color Terminal No. Color Termin	Connector No.	Connector Nor. Connector Nam Connector Cole		Connector No. Connector Nam Connector Colo	
E E E E E E E E E E E E E E E E E E E		Lettinial No. Color Terminal No. Col	Connector No. 5 G B B	E38 STOP LAMP SWITCH (WITH CVT) WHITE	Signal Name	ELERATOR PEDAL TION (APP) SENSOR K	Signal Name APS2 GND-A2 APS1 GND-A1 AVCC1
					erminal No. Color of 1 R H 2 LG 3 V		

< WIRING DIAGRAM >

			A
×	e e e e		EC
Connector No. E45 Connector Name JUNCTION BLOCK Connector Color WHITE 24 22 21 20 19 18	Signal Name	Connector No. E48 Connector Name JUNCTION BLOCK Connector Color WHITE MAI Image: Color of trained of	С
Connector No. E45 Connector Name JUNCT Connector Color WHITE	o. Color of Wire € B S S < 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Io. E48 Io. E48 Io. Io. Io.	D
Connector No. Connector Nam Connector Colo	Terminal No. 14 15 16 17 20 22 22 22	Connector Name Connector Name Connector Name Connector Name Terminal No. Col 47 0 48 4 49 4 50 50 50 50 50 50 50 50 50 50 50 50 50 5	E
			F
	e l		G
NN 100 BLOCH 1 0 0 BLOCH	Signal Name	E47 JUNCTION BLOCK WHITE 48 45 44 43 48 45 44 43 8	Н
0. E44 ame JUNCTION olor BROWN	- Color of Wire of SB G W W C		I
Connector No. E44 Connector Name JUNCTION BLOCK Connector Color BROWN	Terminal No. 2 3 4 4 6 8 8 10 12	Connector No. Connector Name Connector Color Terminal No. Wi 43 81 44 Colo	J
			K
ELAY-3	<u>و</u>		L
E43 COOLING FAN RELAY. BROWN	Signal Name	E46 JUNCTION BLOCK WHITE al 20 20 20 20 20 20 20 20 20 20 20 20 20	M
	Color of Wire Wire O		Ν
Connector No. Connector Name Connector Color	Terminal No.	Connector No. Connector Name Connector Name Terminal No. 31 31 31 31 31 31 31 31 31 31	0

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ENGINE CONTROL SYSTEM

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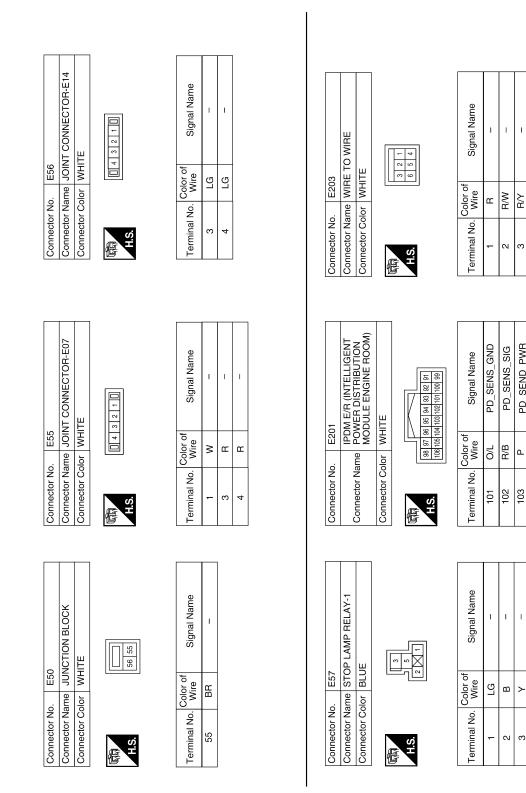
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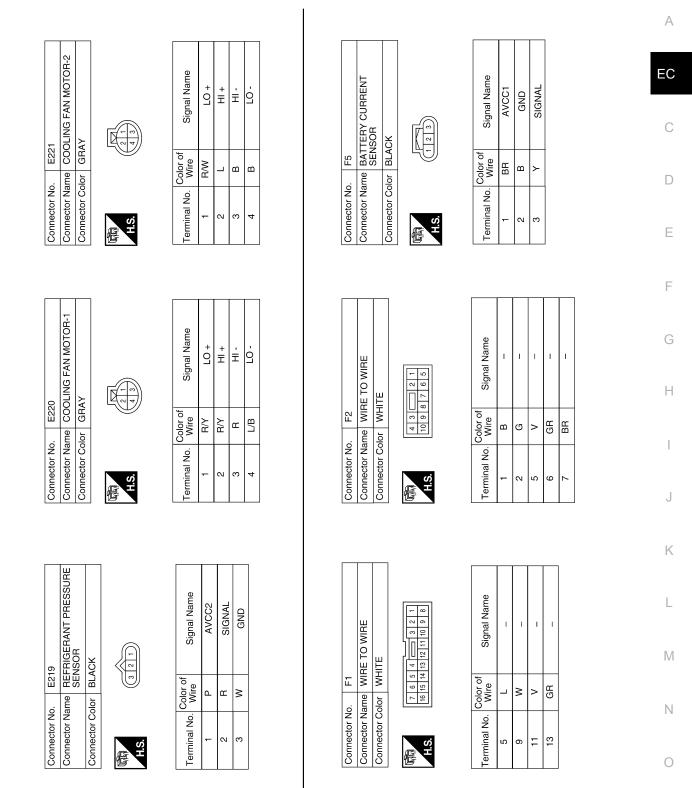
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Connector Name ENGINE COOLANT TEMPERATURE SENSOR

F11

Connector No.

GRAY

Connector Color

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		Signal Name		M	GND			Signal Name	I	Η	GND-PHASE#1	POS	I	GNDA-KNK 1	I	PHASE#1	I	I	AVCC2-PDPRES	
		Color of		r	SB			Color of Wire	I	I	Γ	В	I	SHIELD	I	Y	I	I	^	
		Terminal No.		-	2			Terminal No.	62	63	64	65	99	67	68	69	70	71	72	
	L		•																	
BAT	NS #1	NS #2)FF	RLY	SW	IG EGI	œ	Name		URSEN	F.	>	rps-B1	SPRES	·1	1	OURSEN	A-TW		

Signal Name	ENG SOL	INJECTOR #1	INJECTOR #2	ENG SOL	ETC	ECM BAT	O2 SENS #1	O2 SENS #2	SSOFF	MOTRLY	NPSW	START IG EGI	FPR	
Color of Wire	>	SB	≻	^	GR	Ľ	н	0	SB	g	M	L	B/B	
Terminal No.	49	51	52	53	54	55	56	22	69	02	72	74	27	

Signal Name	I	GNDA-CURSEN	AF+1	WT	AVCC1-TPS-B1	GNDA-PSPRES	AF-1	TA1	AVCC1-CURSEN	GNDA-TW	1	I	AVCC1-PSPRES	GNDA-TA1	1	QA1+	AVCC1-PHASE#1	GND-POS	KNK1	
Color of Wire	I	B	J	٩	3	ГG	L	0	BR	SB	I	I	≻	æ	I	GR	0	Μ	Ν	
Terminal No.	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	69	60	61	

D		4	Ω.	Ω.	5	5	С	Ω.	Ω.	e	2	7	~	
											<u>3767778</u> 81 82	5666768 79 80 E		
	DM E/B (INTELLIGENT	Connector Name POWER DISTRIBUTION	MODULE ENGINE HOOM)	WHITE					Γ		58 6970717273 7475767778	52 5960616263 6465666768		
	<u><u> </u></u>	Connector Name	Z	Connector Color W	á		H.S.				53 54 55 56 57	47 48 49 50 51		

67 68			
64 65 66 67 68			
59 60 61 62 63			
	5		
52		F13	
51 52		ш.,	
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47 48 49		scto	
47		Connector No.	Consister Name
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Connector No.	F13
Connector Name ECM	ECM
Connector Color BROWN	BROWN

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7	-			_	2)			
	7	78	79	80					
	73	74	75	76			Signal Name		
		70	71	72			Za	OSR1	
	69 99	99	67	68		L.	g	S	
	61	62	3	64			igi		
	57	58	59	60			ം		
	53	54	55	56		7			
	49	50	51	52					
	45	46	4	48			, e		
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	33 37 41 45 49 53	38	ଞ				Color of Wire	ш	
	g	34	35	36					-
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	ЧS						Ē	ო	C
	7						Terminal No.		
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Signal Name	OSR1	I	GNDA-O2SR2	GNDA-TPS-B1	TPS1-B1	TPS2-B1	PDPRES	GNDA-PDPRES	PSPRES	CURSEN	
Color of Wire	BR	I	В	g	В	В	Г	GR	SB	Y	
Terminal No.	33	34	35	36	37	38	39	40	41	42	

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AVCC2-POS BATT

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CVTC#1

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F10

Connector No.

	[[1		I		
9 13 17 21 25 29 10 14 18 22 26 30 11 15 19 22 21 31 12 16 24 28 32	Signal Name	I	VMOT-B1	I	AFH1	MOTOR1-B1	MOTOR2-B1			FUEL INJECTOR NO. 1	АҮ			
4 3 0 1 1	Color of Wire	-	Г	I	LG	GR	BR		F17		or GRAY		G	2
H.S.	Terminal No.	1	2	З	4	5	9		Connector No.	Connector Name	Connector Color		E	H.S.

	Ι	IGN #4	Ι	I	SSOF	EVAP	Η	Η	Ι	INJ #4	INJ #3	INJ #2	INJ #1
VIIE	Ι	BR	1	I	SB	Р	Ι	I	Ι	ГG	W	0	٧
	20	21	22	23	24	25	26	27	28	29	30	31	32
		I		-	r			-		I	I	[
	I	I	IGN #3	1GN #2	IGN #1	GND	02HR1	HPR	18-YJTRA-B1	GND	1	-	I
υ						~		~					

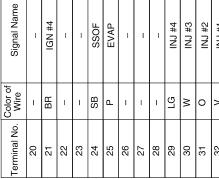
Signal Name	I	I	IGN #3	IGN #2	IGN #1	GND	02HR1	FPR	MOTRLY-B1	GND	I	I	I
Color of Wire	I	1	0	Ъ	≻	GR	۲	B/R	н	ш	I	I	I
Terminal No.	7	ω	6	10	11	12	13	14	15	16	17	18	19

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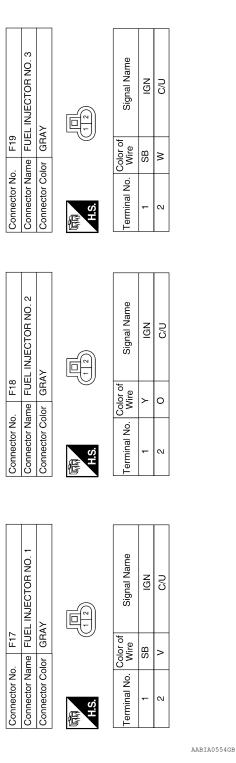
Connector Color GRAY Connector Name ECM

F14

Connector No.



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Connector Color GRAY	Connector No. F25 Connector Name TRANS Connector Color BLACK	F25 TRANSMISSION RANGE SWITCH BLACK 2 6 5 1 2 6 5 1	Connector No. F26 Connector Name CONDE Connector Color WHITE	F26 CONDENSER-2 WHITE
Terminal No. Color of Signal Name 1 Y IGN 2 LG C/U	Terminal No. Color of Mire 2 W	Signal Name - -	Terminal No. Color of Wire 1 V	Signal Name VBR GND
Connector No. F29 Connector Name EVAP CANISTER PURGE Connector Name SOLENOID VALVE Connector Color BLUE	Connector No. F30 Connector Name CRA SEN Connector Color BLA	F30 CRANKSHAFT POSITION SENSOR (POS) BLACK	Connector No. F31 Connector Name MASS Connector Color BLACK	F31 MASS AIR FLOW SENSOR BLACK
Terminal No. Color of Signal Name 1 G VBR 2 P C/U	Terminal No.Color of Wire1L2W3R	Signal Name AVCC2 GND POS	Terminal No.Color of Wire2BR3R4GR50	Signal Name VB GND GA+ TA+

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F35 IGNITION COIL NO. 2 (WITH POWER TRANSISTOR) GRAY	Signal Name SIGNAL GND VBR	F40 PPOWER STEERING PRESSURE SENSOR BLACK	Signal Name AVCC1 OUTPUT GND	
Connector No. F35 Connector Name IGNITIC POWEI Connector Color GRAY	Terminal No. Color of Mire 1 LG 3 V	Connector No. F40 Connector Name POWEF POWEF PRESS Connector Color BLACK	Terminal No. Color of Wire 2 SB 3 LG	
F34 IGNITION COIL NO. 1 (WITH POWER TRANSISTOR) GRAY	Signal Name SIGNAL GND VBR	F37 IGNITION COIL NO. 4 (WITH POWER TRANSISTOR) GRAY	Signal Name SIGNAL GND VBR	
Connector No. F34 Connector Name IGNITI POWE Connector Color GRAY	Terminal No. Color of Wire 1 Y Y 3 V	Connector No. F37 Connector Name IGN POW Connector Color GRA	Terminal No. Color of 1 BR 2 B 3 V	
F32 PARKNEUTRAL POSITION (PNP) SWITCH BLACK	Signal Name	R TRANSISTOR)	Signal Name SIGNAL GND VBR	
ctor No. ctor Name ctor Color	Terminal No. Color of Wire 2 W	ctor No. ctor Name ctor Color	Terminal No. Color of Wire 2 B B 3 V	
Conne Conne Conne	Term	Conne Conne H.S.		

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Revision: February 2013

PLACK PLACK a content of signal Name a sensor(-) A HEATER(+) HEATER(+) A HEATER(-) R SENSOR(-) BLACK BLACK C Signal Name a content of signal Name C CONNECTOR-F01 C CONNECTOR-F01 C CONNECTOR-F01 C CONNECTOR-F01 C CONNECTOR-F01 C CONNECTOR-F01 C CONNECTOR-F01 C C CONNECTOR-F01 C C CONNECTOR-F01 C C C CONNECTOR-F01 C C C C C C C C C C C C C C C C C C C

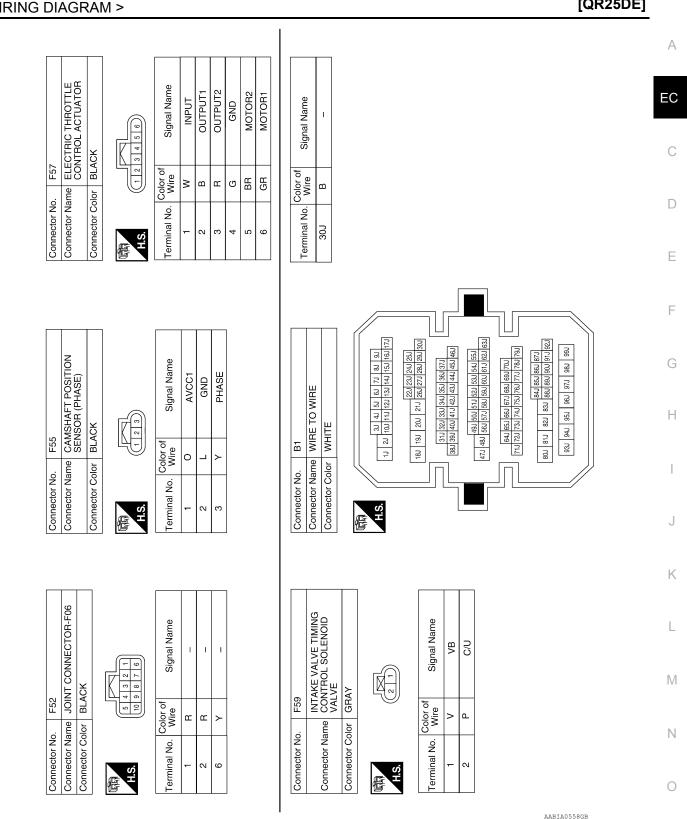
Revision: February 2013

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2012 Altima GCC

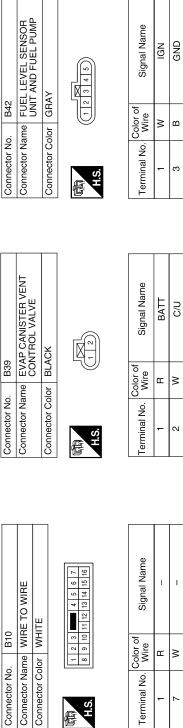
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Color of Wire ш ≥ ш ≥ ≻

Terminal No.

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Connector Name Connector No.

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

SYSTEM — BASIC ENGINE CONTROL SYSTEM

							S`	YMPT	ОМ							С
		4)				NOI					HIGH					D
		RT (EXCP. HA)		LAT SPOT	TION	ACCELERATION				DLE	MPERATURE	UMPTION	CONSUMPTION	R CHARGE)		E
		START/RESTART		URGING/F	K/DETONA	'ER/POOR	N IDLE	HUNTING	NOI	URN TO II	VATER TE	JEL CONS	OIL CONSU	D (UNDEF	Reference page	F
		HARD/NO STA	ENGINE STALL	HESITATION/SURGING/FLAT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE O	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-250</u>	
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<u>EC-322</u>	
	Fuel injector circuit	1	1	2	3	2		2	2			2			<u>EC-247</u>	
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<u>EC-241</u>	
Air	Positive crankcase ventilation sys- tem	3	3	4	4	4	4	4	4	4		4	1		<u>EC-270</u>	J
	Incorrect idle speed adjustment						1	1	1	1		1			<u>EC-15</u>	K
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<u>EC-200</u> <u>EC-206</u>	r.
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<u>EC-15</u>	
	Ignition circuit	1	1	2	2	2		2	2			2			<u>EC-264</u>	_
Main po	wer supply and ground circuit	2	2	3	3	3		3	3		2	3			EC-115	
Mass ai	Mass air flow sensor circuit				2										EC-128	M
Engine	Engine coolant temperature sensor circuit				3		3	1		3					EC-133	
Air fuel	ratio (A/F) sensor 1 circuit				3			1							EC-228	N
Throttle position sensor circuit		1		2		2	2	2	2	2		2			EC-136 EC-139 EC-172 EC-174 EC-215	0
Accelerator pedal position sensor circuit				3	2	1									EC-208 EC-211 EC-218	Ρ
Knock s	ensor circuit			2								3			<u>EC-142</u>	
Cranksh	naft position sensor (POS) circuit	2	2												<u>EC-144</u>	
Camsha	aft position sensor (PHASE) circuit	3	2												<u>EC-148</u>	
Vehicle	speed signal circuit		2	3		3						3			<u>EC-152</u>	
Power s	steering pressure sensor circuit		2					3	3						<u>EC-154</u>	

Revision: February 2013

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< SYMPTOM DIAGNOSIS >

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	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 symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
ECM	2	2	3	3	3	3	3	3	3	3	3			<u>EC-157</u> <u>EC-159</u>
Intake valve timing control solenoid valve cir- cuit		3	2		1	3	2	2	3		3			<u>EC-125</u>
PNP signal circuit			3		3		3	3			3			<u>EC-164</u>
Refrigerant pressure sensor circuit		2				3			3		4			<u>EC-271</u>
Electrical load signal circuit							3							<u>EC-239</u>
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<u>HAC-4</u> <u>HAC-107</u>
ABS actuator and electric unit (control unit)			4											<u>BRC-15</u> BRC-81

1 - 6: The numbers refer to the order of inspection.

(continued on next table)

SYSTEM — ENGINE MECHANICAL & OTHER

< SYMPTOM DIAGNOSIS >

[QR25DE]

	ptom code	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION				DLE	APERATURE HIGH	UMPTION	IPTION	CHARGE)		EC
Fuel Fu		HARD/NO S	INE ST/	~	ð	OWER	-OW IDLE	ROUGH IDLE/HUNTING	RATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE	EXCESSIVE FUEL CONSUMPTION	OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page	C
Fuel Fu			ENG	HESITATIO	SPARK KNC	LACK OF PO	HIGH IDLE/LOW IDLE	ROUGH IDL	IDLING VIBRATION	SLOW/NO F	OVERHEAT	EXCESSIVE	EXCESSIVE	BATTERY D		E
	ual tank	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		F
	Fuel piping	5		5	5	5		5	5			5			<u>FL-13</u> <u>EM-37</u>	
Va	/apor lock		5													G
P	/alve deposit Poor fuel (Heavy weight gasoline, .ow octane)	5		5	5	5		5	5			5				Н
Air Ai	Air duct														<u>EM-25</u>	
Ai	Air cleaner														<u>EM-25</u>	
(N	Air leakage from air duct Mass air flow sensor — electric hrottle control actuator)		5	5	5	5		5	5			5			<u>EM-25</u>	
E	Electric throttle control actuator	5					5			5					<u>EM-26</u>	0
	Air leakage from intake manifold/ Collector/Gasket														page FL-13 EM-37 	K
Cranking Ba	Battery	1	1	1		1		1	1					1	<u>PG-140</u>	
	Generator circuit					•			•							
	Starter circuit	3	-									1				L
Si	Signal plate	6	-													
P	PNP signal	4														M
Ū	Cylinder head Cylinder head gasket	5	5	5	5	5		5	5		4	5	3		<u>EM-70</u>	N
C	Cylinder block															
	Piston												4			-
	Piston ring	6	6	6	6	6		6	6			6		,	<u>EM-78</u>	0
	Connecting rod															
	Bearing Crankshaft															Ρ
Valve Ti mecha- nism C	Timing chain Camshaft														<u>EM-42</u>	
In	ntake valve timing control ntake valve Exhaust valve	5	5	5	5	5		5	5			5	3		<u>EM-54</u> <u>EM-54</u>	

< SYMPTOM DIAGNOSIS >

							S١	(MPT)	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH 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-30</u> <u>EX-5</u>
	Three way catalyst														<u>EA-3</u>
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			EM-32 LU-11 LU-13 LU-16
	Oil level (Low)/Filthy oil														<u>LU-9</u>
Cooling	Radiator/Hose/Radiator filler cap														<u>CO-15</u>
	Thermostat	5								5					<u>CO-20</u>
	Water pump														<u>CO-18</u>
	Water gallery		5	5	5	5		5	5		4	5			<u>CO-11</u>
	Cooling fan														<u>CO-17</u>
	Coolant level (Low)/Contaminat- ed coolant									5					<u>CO-11</u>
NATS (Nis	san Anti-Theft System)	1	1												SEC-222

1 - 6: The numbers refer to the order of inspection.

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:000000007420630 FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED) EC If the engine speed is above 1,800 rpm under no load (for example, the selector lever position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. С Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled. NOTE: This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, EC-31, D "System Description". Ε F Н

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< PRECAUTION > PRECAUTION PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

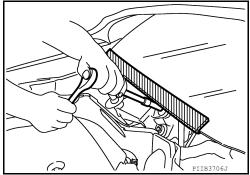
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

INFOID:000000007628450

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 Xenon Headlamp Service

INFOID:000000007628451

WARNING:

Comply with the following warnings to prevent any serious accident.

- Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector.

PRECAUTIONS

(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:

< PRECAUTION >

- 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.).

On Board Diagnostic (OBD) System of Engine

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration. **CAUTION:**

- Be sure to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to <u>PG-57, "Description"</u> (COUPE) or <u>PG-129, "Description"</u> (SEDAN).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- · Be sure to connect rubber tubes properly after work.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM before returning the vehicle to the customer.

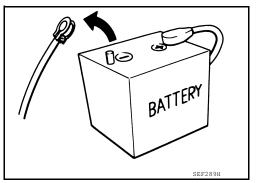
EC-317

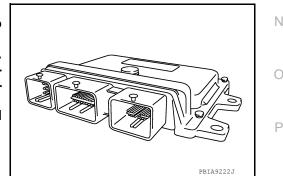
General Precautions

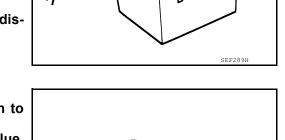
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.
- Do not disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value.

The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.

- If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data







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PRECAUTIONS

< PRECAUTION >

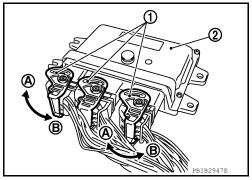
[QR25DE]

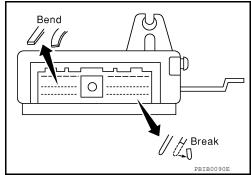
- When connecting ECM harness connector (1), fasten (B) it securely with a lever as far as it will go as shown in the figure.
 - 2. ECM
 - A. Loosen

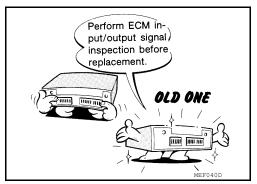
• When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).

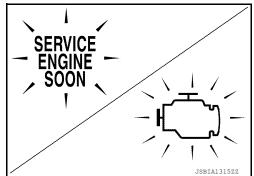
Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.

- Securely connect ECM harness connectors.
 A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to <u>EC-274</u>, "<u>Reference Value</u>".
- Handle mass air flow sensor carefully to avoid damage.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Component Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.









PRECAUTIONS

< PRECAUTION >

ily.

- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

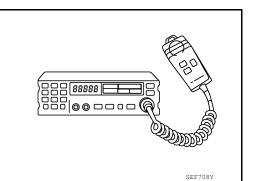
· Do not depress accelerator pedal when starting.

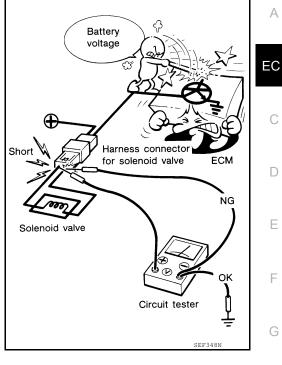
• Do not rev up engine just prior to shutdown.

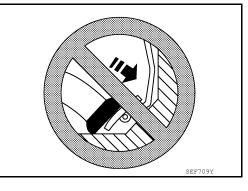
• When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.

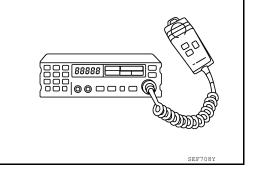
· Immediately after starting, do not rev up engine unnecessar-

- Keep the antenna as far as possible from the electronic control units.
- Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.
- Do not let them run parallel for a long distance.
- Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.









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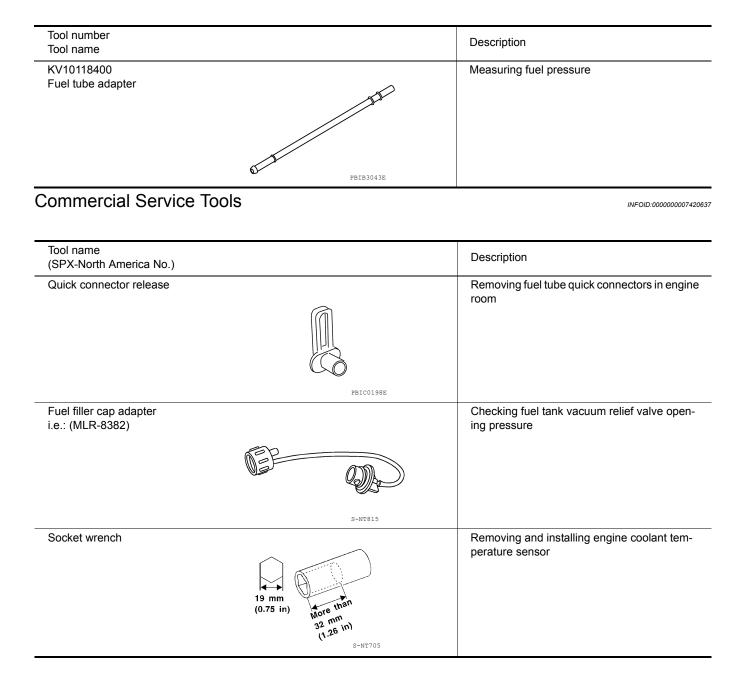
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PREPARATION

Special Service Tools

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[QR25DE]



PREPARATION

< PREPARATION >

[QR25DE]

	Description	А
a b Surface shave	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zir-	EC
Flutes	b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor	С
	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.	D
S-NT779		E
	surface shave cylinder Flutes AEM488	a b Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor

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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 two or three times to release all fuel pressure.
- 5. Turn ignition switch OFF.

With CONSULT

- 1. Remove fuel pump fuse located in IPDM E/R.
- 2. Start engine.
- 3. After engine stalls, crank it two or three times to release all fuel pressure.
- 4. Turn ignition switch OFF.
- 5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

CAUTION:

• Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger. NOTE:

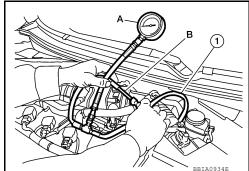
- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because L32 models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains sealability.

EC-322

- Use fuel pressure gauge and fuel pressure adapter [SST: (KV10118400)] to check fuel pressure.
- 1. Release fuel pressure to zero.
- 2. Remove fuel hose using quick connector release (commercial service tool).
 - Do not twist or kink fuel hose because it is plastic hose.
 - Do not remove fuel hose from quick connector.
 - Keep fuel hose connections clean.
- 3. Install fuel pressure adapter [SST: (KV10118400)] (B) and fuel pressure gauge (A) as shown in figure.
 - Do not distort or bend fuel rail tube when installing fuel pressure adapter [SST: (KV10118400)].
 - When reconnecting fuel hose (1), check the original fuel hose for damage and abnormality.
- Turn ignition switch ON (reactivate fuel pump), and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- 6. Read the indication of fuel pressure gauge.
 - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm², 51 psi)

- 7. If result is unsatisfactory, go to next step.
- 8. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for clogging



2012 Altima GCC

INFOID:000000007420638

FUEL PRESSURE

< PERIODIC MAINTENANCE >

If OK, replace "fuel filter and fuel pump assembly". Refer to <u>FL-6, "Removal and Installation"</u>. If NG, repair or replace.

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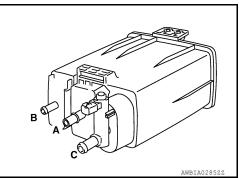
EVAPORATIVE EMISSION SYSTEM

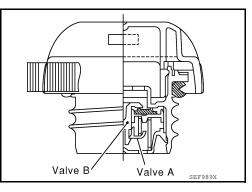
< PERIODIC MAINTENANCE >

EVAPORATIVE EMISSION SYSTEM

Inspection

- 1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
- 2. Check EVAP canister as follows:
- a. Block port (B).
- b. Blow air into port (A) and check that it flows freely out of port (C).
- c. Release blocked port (B).
- d. Apply vacuum pressure to port (B) and check that vacuum pressure exists at the ports (A) and (C).
- e. Block port (A) and (B).
- f. Apply pressure to port (C) and check that there is no leakage.
- 3. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.
- a. Wipe clean valve housing.

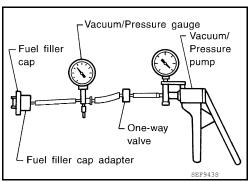




b. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 -0.204 kg/cm², 2.22 - 2.90 psi) Vacuum: -6.0 to -3.3 kPa (-0.060 to -0.033 bar, -0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

c. If out of specification, replace fuel filler cap as an assembly.





SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

Transmission	Condition	Specification	0
CVT	No load* (in P or N position)	$650\pm50~\text{rpm}$	
M/T	No load* (in Neutral position)	$650\pm50~\text{rpm}$	
*: Under the following conditions			D

*: 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

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Transmission	Condition	Specification	
CVT	No load* (in P or N position)	$15\pm5^\circ$ BTDC	
M/T	No load* (in Neutral position)	$15\pm5^\circ$ BTDC	G
* Under the following conditions			

*: Under the following conditions

· A/C switch: OFF

• Electric load: OFF (Lights, heater fan & rear window defogger)

· Steering wheel: Kept in straight-ahead position

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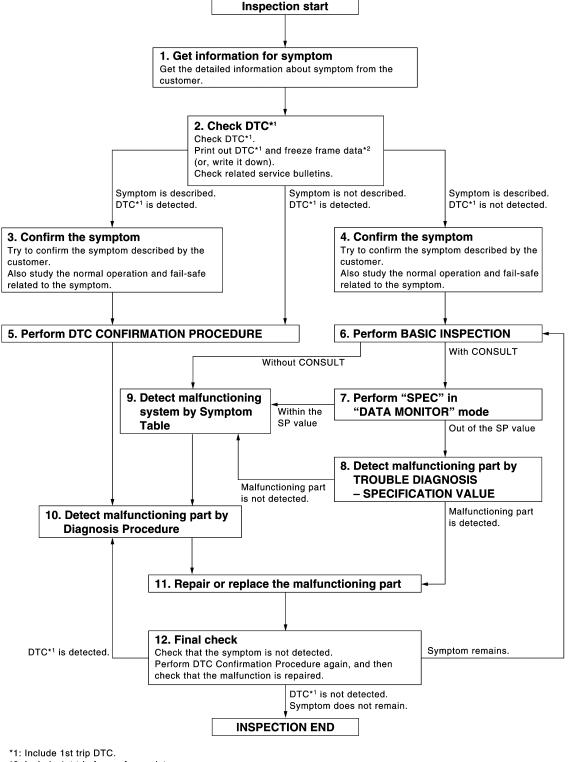
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EC

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

OVERALL SEQUENCE



*2: Include 1st trip freeze frame data.

DETAILED FLOW

JSBTA1228GB

[VQ35DE]

INFOID:000000007420642

Revision: February 2013

< BASIC INSPECTION >

[VQ35DE]

1.GET INFORMATION FOR SYMPTOM	
Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to <u>EC-328</u> , " <u>Diagnostic Work Sheet</u> ".)	
>> GO TO 2.	
2.CHECK DTC	C
 Check DTC. Perform the following procedure if DTC is displayed. Record DTC and freeze frame data. (Print them out with CONSULT.) Erase DTC. (Refer to <u>EC-419</u>, <u>"On Board Diagnosis Function"</u> or <u>EC-422</u>, <u>"CONSULT Function"</u>.) Study the relationship between the cause detected by DTC and the symptom described by the customer (Symptom Table is useful. Refer to <u>EC-688</u>, <u>"Symptom Table"</u>.) 	- C r. E
3. Check related service bulletins for information.	
Is any symptom described and any DTC detected? Symptom is described, DTC is displayed>>GO TO 3. Symptom is described, DTC is not displayed>>GO TO 4. Symptom is not described, DTC is displayed>>GO TO 5.	F
3.CONFIRM THE SYMPTOM	(.
Try to confirm the symptom described by the customer (except MIL ON). Also study the normal operation and fail safe related to the symptom. Refer to <u>EC-692</u> , " <u>Description</u> " and <u>EC 655</u> , " <u>Fail-safe</u> ". Diagnosis Work Sheet is useful to verify the incident. Verify relation between the symptom and the condition when the symptom is detected.	- - -
>> GO TO 5.	
4.CONFIRM THE SYMPTOM	
Try to confirm the symptom described by the customer. Also study the normal operation and fail safe related to the symptom. Refer to <u>EC-692</u> , " <u>Description</u> " and <u>EC 655</u> . " <u>Fail-safe</u> ". Diagnosis Work Sheet is useful to verify the incident. Verify relation between the symptom and the condition when the symptom is detected.	- J
>> GO TO 6.	L
5. PERFORM DTC CONFIRMATION PROCEDURE	
Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.	IV
If two or more DTCs are detected, refer to <u>EC-657, "DTC Inspection Priority Chart"</u> and determine trouble diagnosis order. NOTE:	e N
 Freeze frame data is useful if the DTC is not detected. Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check. If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR MATION PROCEDURE. 	g (
Is DTC detected?	F
YES >> GO TO 10. NO >> Check according to <u>GI-42. "Intermittent Incident"</u> .	
6.PERFORM BASIC INSPECTION	
Perform EC-330, "BASIC INSPECTION : Special Repair Requirement".	-
Do you have CONSULT?	

< BASIC INSPECTION >

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

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

() With CONSULT

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL", and "A/F ALPHA-B1", "A/F ALPHA-B2" are within the SP value using CONSULT in "SPEC" of "DATA MONITOR" mode. Refer to <u>EC-429</u>, "<u>Component Function</u> <u>Check</u>".

Are they within the SP value?

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

NO --- GO 10 8.

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

Detect malfunctioning part according to EC-430, "Diagnosis Procedure".

Is malfunctioning part detected?

YES >> GO TO 11.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to <u>EC-688, "Symptom Table"</u> based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.

NOTE:

The Diagnostic Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to Circuit Inspection in <u>GI-45</u>, "Circuit Inspection".

Is malfunctioning part detected?

- YES >> GO TO 11.
- NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CON-SULT. Refer to <u>EC-642, "Reference Value"</u>.

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

- 1. Repair or replace the malfunctioning part.
- 2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
- Check DTC. If DTC is displayed, erase it, refer to <u>EC-419</u>, "<u>On Board Diagnosis Function</u>" or <u>EC-422</u>, "<u>CONSULT Function</u>".

>> GO TO 12.

12.FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Overall Function Check again, and then make sure that the malfunction have been repaired securely.

When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

Is DTC detected and does symptom remain?

- YES-1 >> DTC is detected: GO TO 10.
- YES-2 >> Symptom remains: GO TO 6.
- NO >> Before returning the vehicle to the customer, make sure to erase unnecessary DTC in ECM. (Refer to EC-419, "On Board Diagnosis Function" or EC-422, "CONSULT Function".)

Diagnostic Work Sheet

INFOID:000000007420643

DESCRIPTION

Revision: February 2013

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

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

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

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

KEY POINTS

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

WORKSHEET SAMPLE

Customer nar	me MR/MS	Model & Year	VIN	
Engine #		Trans.	Mileage	
Incident Date	•	Manuf. Date	In Service Date	
Fuel and fuel	filler cap	 Vehicle ran out of fuel causing misfire Fuel filler cap was left off or incorrectly screwed on. 		
	☐ Startability	 Impossible to start No combustion affected by the partial combustion NOT affected in Partial combustion NOT affected in Possible but hard to start 	hrottle position d by throttle position	
Symptoms	Idling	No fast idle Unstable High idle Low idle Others []		
	Driveability	Stumble Surge Knock Lack of power Intake backfire Exhaust backfire Others []		
	Engine stall	At the time of start While idling While accelerating While dece Just after stopping While load	elerating	
Incident occu	irrence	☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime		
Frequency	equency		ditions 🗌 Sometimes	
Weather cond	ditions	Not affected		
Weather Fine Raining Snowing		Others []		
	Temperature	🗌 Hot 🗌 Warm 🗌 Cool 🗌] Cold 🔲 Humid °F	
		Cold During warm-up	After warm-up	
Engine condit	tions	Engine speed 0 2,000		
Road conditions In town In suburbs I Highway Off road (up/down)		nhway 🗌 Off road (up/down)		
Driving conditions		 Not affected At starting While idling At racing While accelerating While cruising While decelerating While turning (RH/LH) 		
		Vehicle speed	<u>, , , , </u> 30 40 50 60 MPH	
Malfunction ir	ndicator lamp	Turned on Not turned on		

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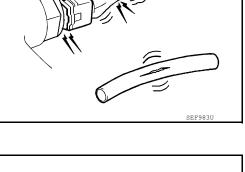
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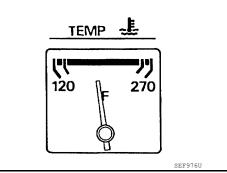
INSPECTION AND ADJUSTMENT BASIC INSPECTION

BASIC INSPECTION : Special Repair Requirement

1.INSPECTION START

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

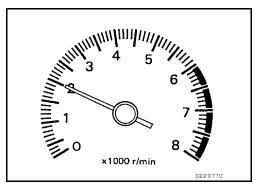




- 5. Run engine at about 2,000 rpm for about 2 minutes under no load.
- Make sure that no DTC is displayed with CONSULT or ECM [Diagnostic Test Mode II (self-diagnostic results)].

Is any DTC detected?

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



2.REPAIR OR REPLACE

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

>> GO TO 3

3.CHECK TARGET IDLE SPEED

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

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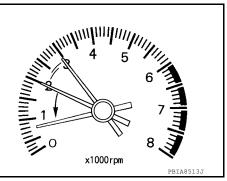
< BASIC INSPECTION >

Rev engine (2,000 to 3,000 rpm) two or three times under no 2. load, then run engine at idle speed for about 1 minute.

3. Check idle speed. For procedure, refer to EC-333, "IDLE SPEED : Special Repair Requirement". For specification, refer to EC-703, "Idle Speed".

Is the inspection result normal?

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



	x1000rpm
4.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEAF	
 Stop engine. Perform <u>EC-334</u>, "ACCELERATOR PEDAL RELEASED POSITIO <u>ment"</u>. 	N LEARNING : Special Repair Require-
>> GO TO 5. $5.$ Perform throttle value closed position learning	F
Perform EC-335, "THROTTLE VALVE CLOSED POSITION LEARNIN	G : Special Repair Requirement".
>> GO TO 6. 6. PERFORM IDLE AIR VOLUME LEARNING	F
Perform EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Re	equirement".
Is Idle Air Volume Learning carried out successfully?YES>> GO TO 7.NO>> Follow the instruction of Idle Air Volume Learning. Then G	60 TO 4.
7.CHECK TARGET IDLE SPEED AGAIN	
 Start engine and warm it up to normal operating temperature. Check idle speed. For procedure, refer to <u>EC-333</u>, "IDLE <u>SPEED</u> : <u>Special Repair Re</u> For specification, refer to <u>EC-703</u>, "Idle <u>Speed</u>". Is the inspection result normal? 	<mark>equirement"</mark> .
YES >> GO TO 10. NO >> GO TO 8.	L
8.DETECT MALFUNCTIONING PART	
 Check the Following. Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-50</u> Check crankshaft position sensor (POS) and circuit. Refer to <u>EC-500</u> 	
Is the inspection result normal? YES >> GO TO 9. NO >> 1. Repair or replace. 2. GO TO 4.	N
9.CHECK ECM FUNCTION	
 Substitute another known-good ECM to check ECM function. (EC this is a rare case.) Perform initialization of NATS system and registration of all NA <u>"ECM RE-COMMUNICATING FUNCTION : Special Repair Reguined in the system in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration of all NA "ECM RE-COMMUNICATING FUNCTION : Special Repair Regulation in the system and registration in the system and system</u>	TS ignition key IDs. Refer to <u>SEC-13.</u>

- "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement" (SEDAN models).
 - >> GO TO 4.

10.CHECK IGNITION TIMING

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< BASIC INSPECTION >

- 1. Run engine at idle.
- Check ignition timing with a timing light. For procedure, refer to <u>EC-334</u>, "IGNITION TIMING : Special Repair Requirement". For specification, refer to <u>EC-703</u>, "Ignition Timing".
- Is the inspection result normal?
- YES >> INSPECTION END

NO >> GO TO 11.

11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- 1. Stop engine.
- Perform <u>EC-334</u>, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 12.

12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

Is Idle Air Volume Learning carried out successfully?

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

14.CHECK TARGET IDLE SPEED AGAIN

- 1. Start engine and warm it up to normal operating temperature.
- Check idle speed. For procedure, refer to <u>EC-333</u>, "IDLE <u>SPEED</u> : <u>Special Repair Requirement</u>". For specification, refer to <u>EC-703</u>, "Idle <u>Speed</u>".

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> GO TO 17.
- 15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.

 Check ignition timing with a timing light. For procedure, refer to <u>EC-334</u>, "IGNITION TIMING : Special Repair Requirement". For specification, refer to <u>EC-703</u>, "Ignition Timing".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 16.

16.CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-174, "Installation".

Is the inspection result normal?

YES >> GO TO 17.

- NO >> 1. Repair the timing chain installation.
 - 2. GO TO 4.

17.DETECT MALFUNCTIONING PART

Check the following.

· Check camshaft position sensor (PHASE) and circuit. Refer to EC-504, "Diagnosis Procedure".

Check crankshaft position sensor (POS) and circuit. Refer to EC-500, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 18.

< BASIC INSPECTION > [VQ35DE]	
NO >> 1. Repair or replace. 2. GO TO 4.	
18. CHECK ECM FUNCTION	
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but	E
this is a rare case.) 2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-333.	
"ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".	
>> GO TO 4.	
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT	
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description	
INFOID:00000007420645	
When replacing ECM, this procedure must be performed.	
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Re-	
quirement	
1. PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS	
Refer to <u>SEC-13, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"</u> (COUPE models) or <u>SEC-227, "ECM RE-COMMUNICATING FUNCTION : Special Repair Requirement"</u> (SEDAN models).	
>> GO TO 2.	
2.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING	
Refer to EC-334, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Require- ment".	
>> GO TO 3.	
3. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	
Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".	
>> GO TO 4. 4. PERFORM IDLE AIR VOLUME LEARNING	
Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".	
>> 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	
With CONSULT Check idle speed in "DATA MONITOR" mode with CONSULT.	

Without CONSULT

Check idle speed by installing the pulse type tachometer clamp on the loop wire or on suitable high-tension wire which installed between No. 1 ignition coil and No. 1 Spark plug.

< BASIC INSPECTION >

>> INSPECTION END

IGNITION TIMING : Description

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

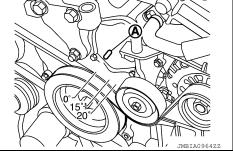
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IGNITION TIMING : Special Repair Requirement

1.CHECK IGNITION TIMING

- 1. Slide the harness protector of ignition coil No.1 (2) to clear the wires.
 - 1 : Intake manifold collector
 - 3 : Timing light pick-up lead
- 2. Attach timing light to the ignition coil No.1 wires as shown in the figure.
- 3. Check ignition timing.
 - A : Timing indicator

>> INSPECTION END



ACCELERATOR PEDAL RELEASED POSITION LEARNING

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description INFOLD:00000007420651

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

ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Reguirement

1.START

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

>> END THROTTLE VALVE CLOSED POSITION LEARNING



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< BASIC INSPECTION >

THROTTLE VALVE CLOSED POSITION LEARNING : Description

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

THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement

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1.start	С
 Make sure that accelerator pedal is fully released. Turn ignition switch ON. Turn ignition switch OFF and wait at least 10 seconds. Make sure that throttle valve moves during above 10 seconds by confirming the operating sound. 	D
>> END IDLE AIR VOLUME LEARNING	
IDLE AIR VOLUME LEARNING : Description	F
 Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps engine idle speed within the specific range. It must be performed under any of the following conditions: Each time electric throttle control actuator or ECM is replaced. Idle speed or ignition timing is out of specification. 	G
IDLE AIR VOLUME LEARNING : Special Repair Requirement	Η
1.PRECONDITIONING	I
 Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment. Battery voltage: More than 12.9V (At idle) Engine coolant temperature: 70 - 100°C (158 - 212°F) Selector lever: P or N 	J
 Electric load switch: OFF (Air conditioner, headlamp, rear window defogger) Steering wheel: Neutral (Straight-ahead position) Vehicle speed: Stopped Transmission: Warmed-up With CONSULT: Drive vehicle until "ATF TEMP SE" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9V. 	K
Without CONSULT: Drive vehicle for 10 minutes.	M
Do you have CONSULT? YES >> GO TO 2. NO >> GO TO 3.	
2.PERFORM IDLE AIR VOLUME LEARNING	Ν
 With CONSULT Perform <u>EC-334</u>. "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement". Perform <u>EC-335</u>. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement". 	0
 Start engine and warm it up to normal operating temperature. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode. Touch "START" and wait 20 seconds. 	Ρ
Is "CMPLT" displayed on CONSULT screen? YES >> GO TO 4. NO >> GO TO 5. 3.PERFORM IDLE AIR VOLUME LEARNING	

EC-335

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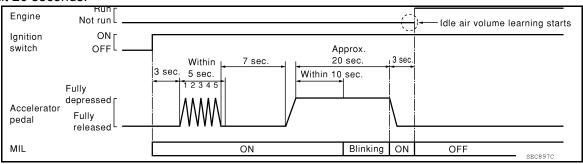
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< BASIC INSPECTION >

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-334</u>, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".
- 2. Perform EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".
- 3. Start engine and warm it up to normal operating temperature.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 6. Repeat the following procedure quickly five times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- 7. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
- 8. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



>> GO TO 4.

4.CHECK IDLE SPEED AND IGNITION TIMING

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

For procedure, refer to <u>EC-333</u>, "IDLE SPEED : Special Repair Requirement" and <u>EC-334</u>, "IGNITION TIM-ING : Special Repair Requirement".

For specification, refer to EC-703, "Idle Speed" and EC-703, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART-I

Check the following

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning part.

6.DETECT MALFUNCTIONING PART-II

When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to <u>EC-429</u>. "Description". If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:

Engine stalls.

• Erroneous idle.

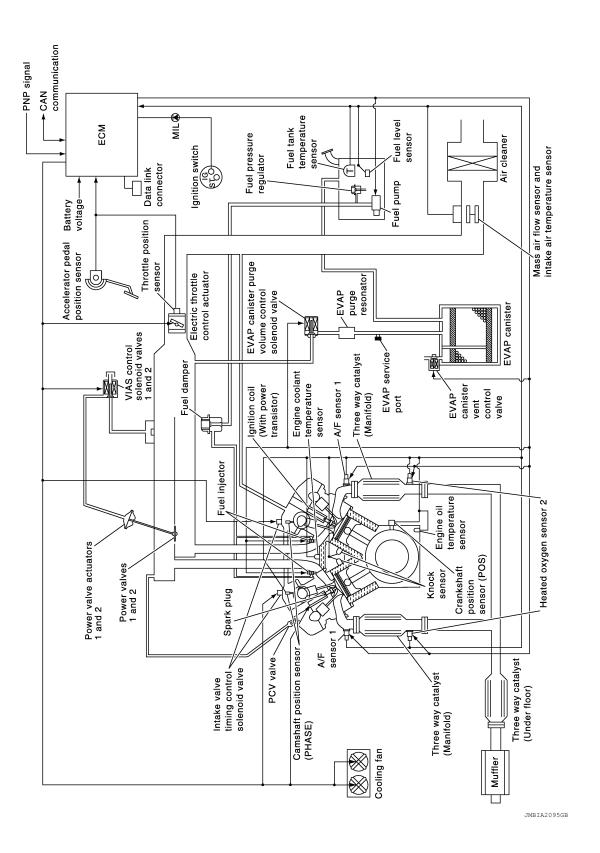
< BASIC INSPECTION >

>> INSPECTION END MIXTURE RATIO SELF-LEARNING VALUE CLEAR	А
MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Description	EC
This describes show to erase the mixture ratio self-learning value. For the actual procedure, follow the instruc- tions in "Diagnosis Procedure". MIXTURE RATIO SELF-LEARNING VALUE CLEAR : Special Repair Requirement	С
	D
1.start	D
 With CONSULT Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT. Clear mixture ratio self-learning value by touching "CLEAR". 	E
 Without CONSULT Start engine and warm it up to normal operating temperature. 	F
 Turn ignition switch OFF. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed. Stop engine and reconnect mass air flow sensor harness connector. 	G
 Make sure that DTC P0102 is displayed. Erase the DTC memory. Refer to EC-419, "On Board Diagnosis Function". Make sure that DTC P0000 is displayed. 	Н
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SYSTEM DESCRIPTION ENGINE CONTROL SYSTEM

System Diagram

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System Description

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

Component Parts Location

1. Power valve actuator 1	1
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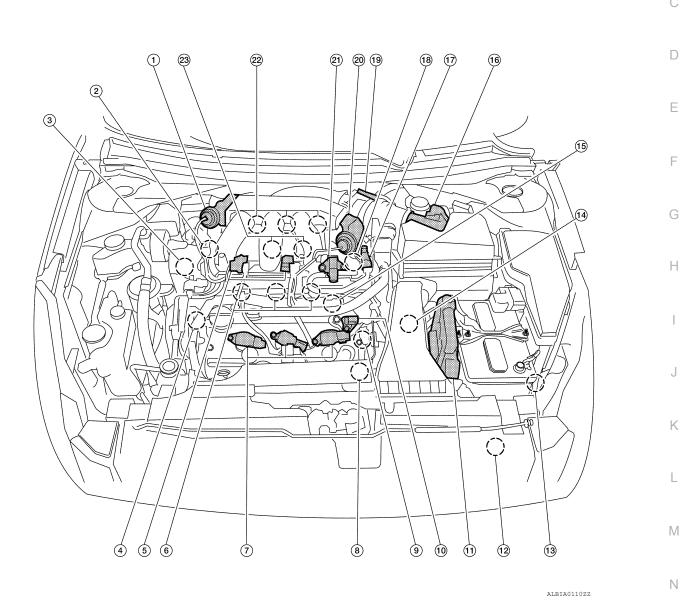
- 4. Intake valve timing control solenoid valve (bank 2)
- 7. Ignition coil (with power transistor) and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)

- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- Crankshaft position sensor (POS) 8.
- 11. ECM
- 14. Transmission range switch

- Power steering pressure sensor
- Fuel injector (bank 2)
- 9. Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2
- 18. Camshaft position sensor (PHASE) (bank 1)

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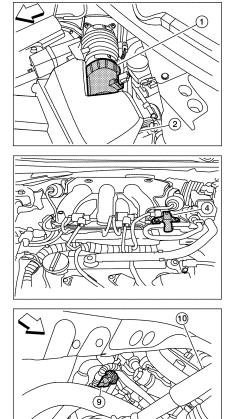
ENGINE CONTROL SYSTEM

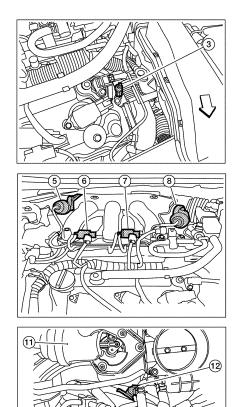
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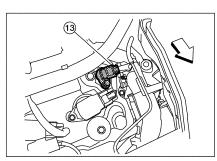
- 19. Electric throttle control actuator
- 20. Power valve actuator 2
- 21. EVAP canister purge volume control solenoid valve

[VQ35DE]

22. Ignition coil (with power transistor) 23. Knock sensor and spark plug (bank 1)







8.

- Mass air flow sensor (with intake air 2. 1. temperature sensor)
- EVAP canister purge volume control 5. 4. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- ∠ : Vehicle front

- Air cleaner case
- Power valve actuator 1
- Power valve actuator 2
- 11. Power valve actuator 2

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- Engine coolant temperature sensor 3.
- VIAS control solenoid valve 1 6.
- Power steering pressure sensor 9.
- 12. Camshaft position sensor (PHASE) (bank 1)

ENGINE CONTROL SYSTEM

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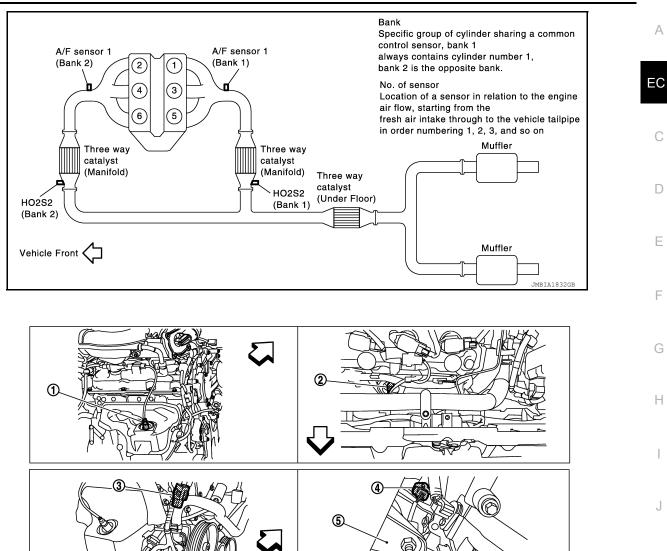
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A/F sensor 1 (bank 1) 2. HO2S2 (bank 2) harness connector 5.

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- - Front engine mount
- A/F sensor 1 (bank 2)

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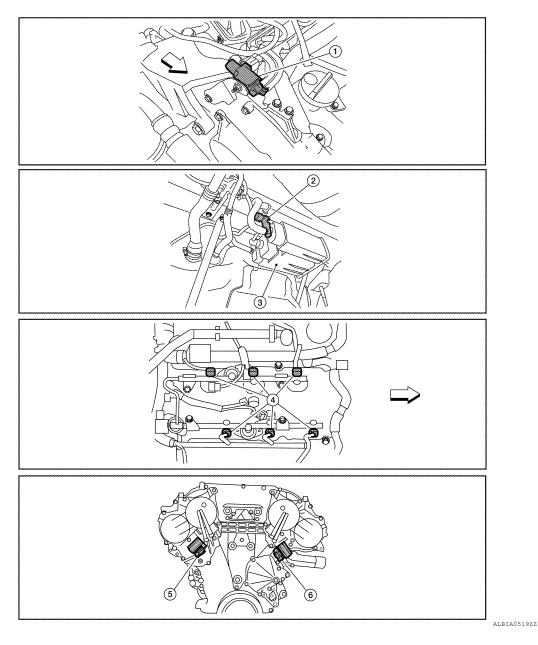
- 3. HO2S2 (bank 1) harness connector Crankshaft position sensor (POS) 6.

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: Vehicle front

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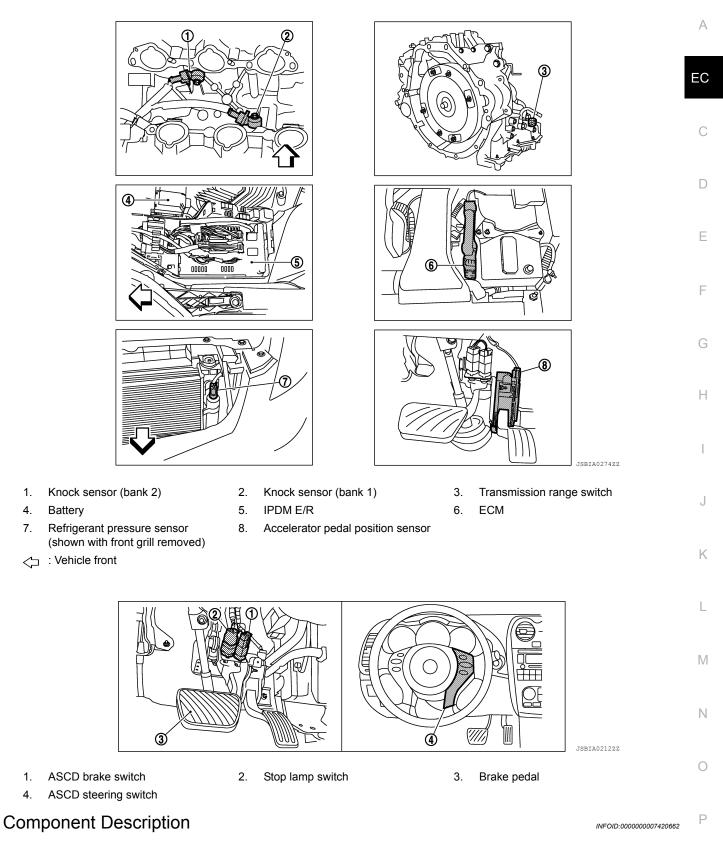
- 1. Electronic controlled engine mount control solenoid valve
- EVAP canister vent control valve 3. (view with rear suspension member removed)
- 4. Fuel injector harness connector
- Intake valve timing control solenoid 6. valve (bank 1)
- EVAP canister
- Intake valve timing control solenoid valve (bank 2)

C : Vehicle front

ENGINE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[VQ35DE]



Component	Reference
A/F sensor 1	EC-470, "Description"
A/F sensor 1 heater	EC-446. "Description"
Accelerator pedal position sensor	EC-584, "Description"

Revision: February 2013

2012 Altima GCC

ENGINE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

Component	Reference
ASCD brake switch	EC-550, "Description"
ASCD steering switch	EC-547, "Description"
Battery current sensor	EC-535. "Description"
Camshaft position sensor (PHASE)	EC-503, "Description"
Cooling fan motor	EC-602, "Description"
Crankshaft position sensor (POS)	EC-499. "Description"
Electric throttle control actuator	EC-582, "Description"
Electronic controlled engine mount	EC-609, "Description"
Engine coolant temperature sensor	EC-464, "Description"
EVAP canister purge volume control solenoid valve	EC-507, "Description"
Fuel injector	EC-615. "Description"
Fuel pump	EC-618, "Description"
Heated oxygen sensor 2	EC-622. "Description"
Heated oxygen sensor 2 heater	EC-455. "Description"
Ignition signal	EC-628, "Description"
Intake air temperature sensor	EC-464, "Description"
Intake valve timing control solenoid valve	EC-452. "Description"
Knock sensor	EC-496. "Description"
Mass air flow sensor	EC-455, "Description"
PCV valve	EC-634. "Description"
Power steering pressure sensor	EC-512. "Description"
Power valves 1 and 2	EC-638, "Description"
Refrigerant pressure sensor	EC-635, "Description"
Stop lamp switch	EC-569. "Description"
ТСМ	EC-523. "Description"
Throttle control motor	EC-579, "Description"
Throttle control motor relay	EC-573. "Description"
Throttle position sensor	EC-467, "Description"
VIAS control solenoid valve 1	EC-564, "Description"
VIAS control solenoid valve 2	EC-566, "Description"

< SYSTEM DESCRIPTION >

MULTIPORT FUEL INJECTION SYSTEM

System Diagram

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[VQ35DE]

Crankshaft position sensor	Engine speed ^{*2} & Piston position				
Camshaft position sensor					
Mass air flow sensor	Amount of intake air				
Intake air temperature sensor	Intake air temperature				
Engine coolant temperature sensor	Engine coolant temperature				
	Density of oxygen in exhaust gas				
Air fuel ratio (A/F) sensor 1	, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,	Þ			
Throttle position sensor	Throttle position		Fuel injection &		
Accelerator pedal position sensor	Accelerator pedal position	•	mixture ratio control		
ТСМ	Gear position	ECM		Fuel injector	
Battery	Battery voltage ^{*2}				
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				
Unified meter and A/C amp.	Air conditioner operation & Vehicle speed				
*1 . This concer is not used to actival the ar	aning quatern under normal conditions]		
 *1 : This sensor is not used to control the er *2 : ECM determines the start signal status 	by the signals of engine speed and battery vo	ltage.			
===>: This signal is sent via the CAN con		0		JMBIA1534GB	

System Description

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	-
Crankshaft position sensor (POS)	Engine speed* ³			_
Camshaft position sensor (PHASE)	Piston position			
Mass air flow sensor	Amount of intake air			
Intake air temperature sensor	Intake air temperature			
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			
Unified mater and A/C amp	Air conditioner operation* ²			
Unified meter and A/C amp.	Vehicle speed* ²			

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

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



< 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.

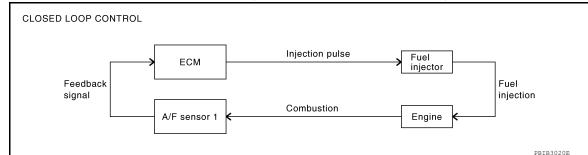
<Fuel increase>

- 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 drivability 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-470</u>, "<u>Description</u>". This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

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

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

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback 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-346

< SYSTEM DESCRIPTION >

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

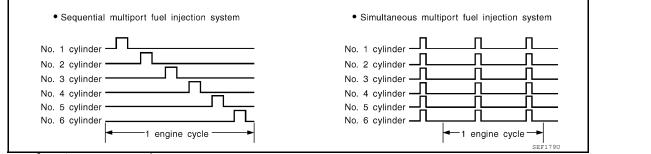
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

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

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

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

FUEL INJECTION TIMING



Two types of systems are used.

 Sequential 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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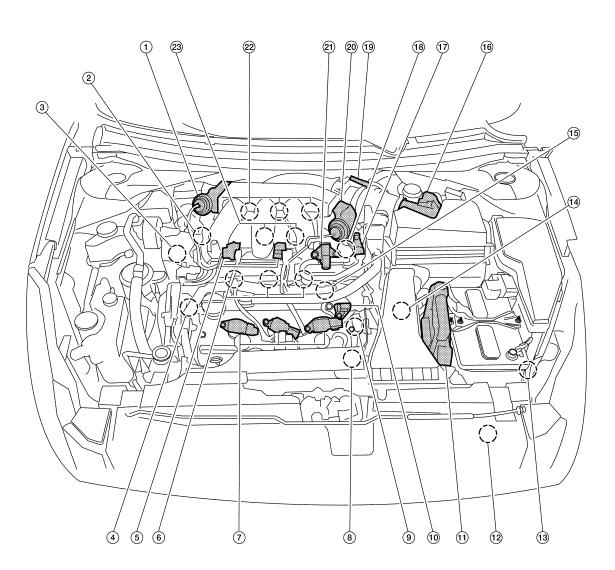
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< SYSTEM DESCRIPTION >

Component Parts Location



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- 1. Power valve actuator 1
- 4. Intake valve timing control solenoid valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch
- 20. Power valve actuator 2
- 23. Knock sensor

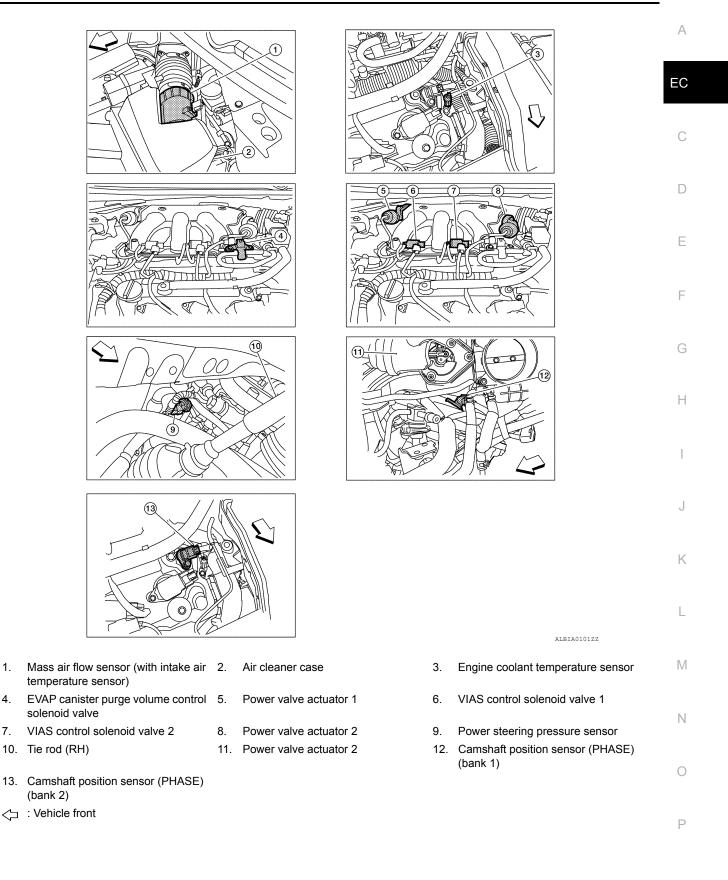
- Power steering pressure sensor
- Fuel injector (bank 2)
- Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2

9.

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

< SYSTEM DESCRIPTION >

[VQ35DE]



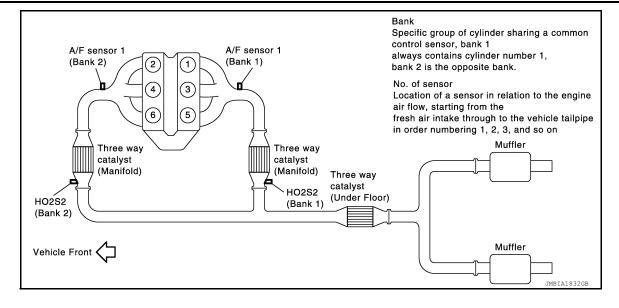
(bank 2)

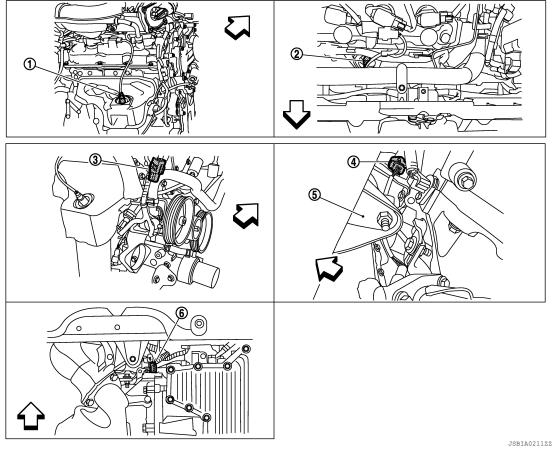
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< SYSTEM DESCRIPTION >





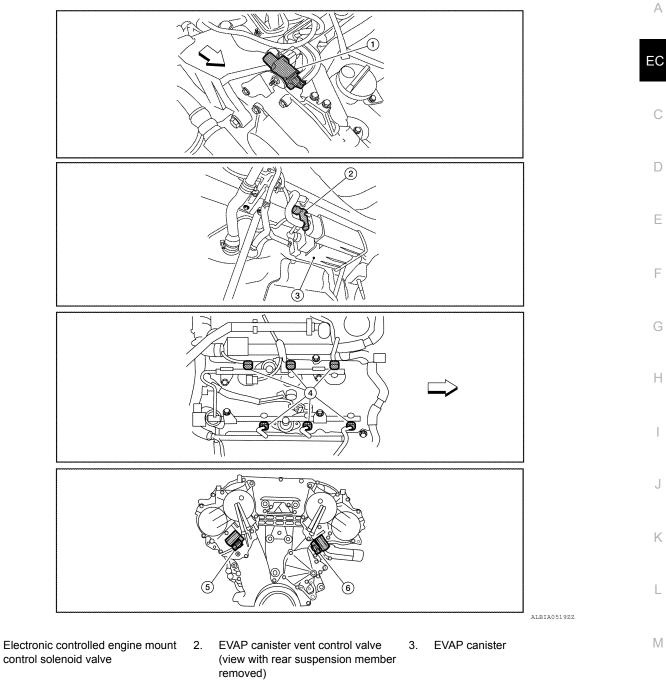
- 1. A/F sensor 1 (bank 1)
- 2.
- HO2S2 (bank 2) harness connector 5. 4.
- A/F sensor 1 (bank 2)
 - Front engine mount

- 3. HO2S2 (bank 1) harness connector
- Crankshaft position sensor (POS) 6.

: Vehicle front

< SYSTEM DESCRIPTION >

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- 4. Fuel injector harness connector

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removed) Intake valve timing control solenoid 6. valve (bank 1)

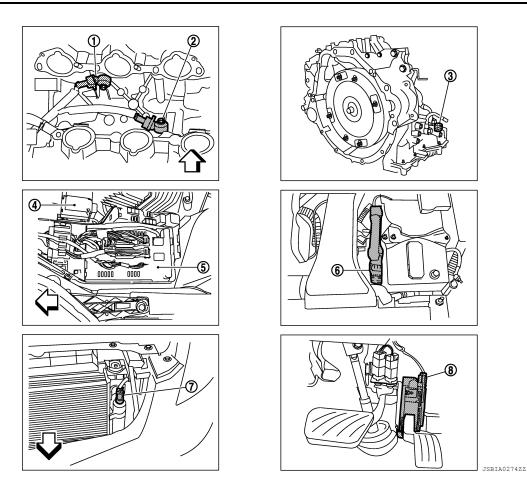
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- Intake valve timing control solenoid valve (bank 2) $\hfill N$
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MULTIPORT FUEL INJECTION SYSTEM

< SYSTEM DESCRIPTION >



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

- 4. Battery
- 7. Refrigerant pressure sensor (shown with front grill removed)
- : Vehicle front

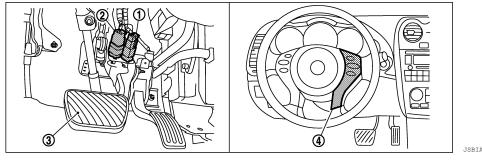
- Knock sensor (bank 1)
- 5. IPDM E/R

2.

- 8. Accelerator pedal position sensor
- Transmission range switch 3.
- 6. ECM

3.

Brake pedal



JSBIA0212ZZ

ASCD brake switch 1.

4.

ASCD steering switch

Component Description

INFOID:000000007420666

Component	Reference
A/F sensor 1	EC-470. "Description"
Accelerator pedal position sensor	EC-584. "Description"
Camshaft position sensor (PHASE)	EC-503, "Description"

Stop lamp switch



2012 Altima GCC

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Mass air flow sensor

Throttle position sensor

Power steering pressure sensor

< SYSTEM DESCRIPTION >		[VQ35DE]	
Component	Reference		
Crankshaft position sensor (POS)	EC-499, "Description"		А
Engine coolant temperature sensor	EC-464, "Description"		
Fuel injector	EC-615. "Description"		EC
Heated oxygen sensor 2	EC-622. "Description"		
Intake air temperature sensor	EC-461, "Description"		
Knock sensor	EC-496, "Description"		С

EC-455, "Description"

EC-512, "Description"

EC-523, "Description"

EC-467, "Description"

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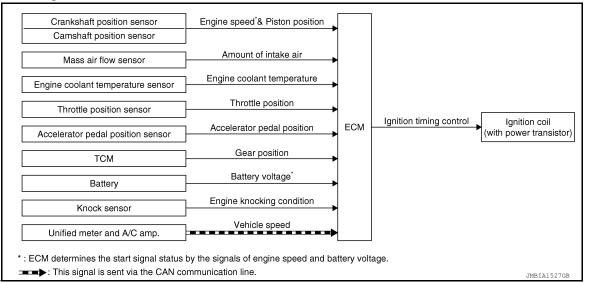
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< SYSTEM DESCRIPTION >

ELECTRIC IGNITION SYSTEM

System Diagram



System Description

INFOID:000000007420668

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed* ²		
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position	Ignition timing	Ignition coil
Accelerator pedal position sensor	Accelerator pedal position	control	(with power transistor)
ТСМ	Gear position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Unified meter and A/C amp.	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

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< SYSTEM DESCRIPTION >

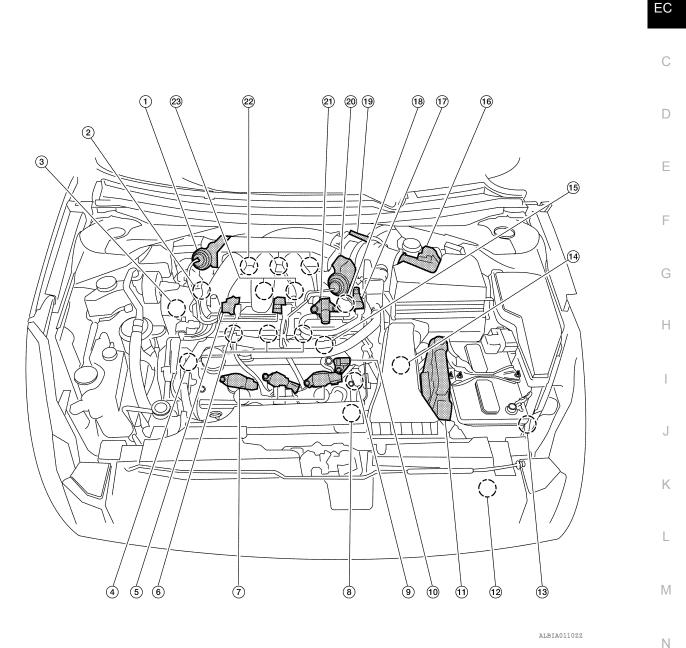
[VQ35DE]

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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



1. Power	valve actuator 1	
----------	------------------	--

- Intake valve timing control solenoid 4. valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)

- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch

- Power steering pressure sensor Fuel injector (bank 2) Ο Engine coolant temperature sensor Ρ Refrigerant pressure sensor
- 15. Condenser-2

9.

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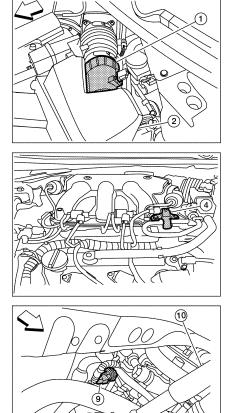
18. Camshaft position sensor (PHASE) (bank 1)

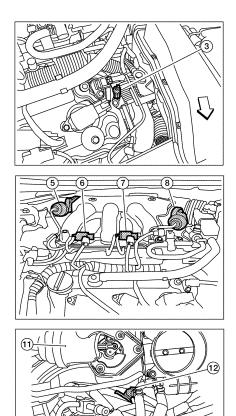
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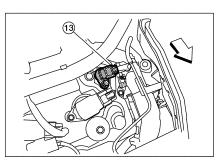
- 19. Electric throttle control actuator
- 20. Power valve actuator 2
- 21. EVAP canister purge volume control solenoid valve

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22. Ignition coil (with power transistor) 23. Knock sensor and spark plug (bank 1)







8.

- Mass air flow sensor (with intake air 2. 1. temperature sensor)
- EVAP canister purge volume control 5. 4. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- ∠ : Vehicle front

- Air cleaner case
- Power valve actuator 1
- Power valve actuator 2
- 11. Power valve actuator 2

- ALBIA0101ZZ
- Engine coolant temperature sensor 3.
- VIAS control solenoid valve 1 6.
- Power steering pressure sensor 9.
- 12. Camshaft position sensor (PHASE) (bank 1)

< SYSTEM DESCRIPTION >

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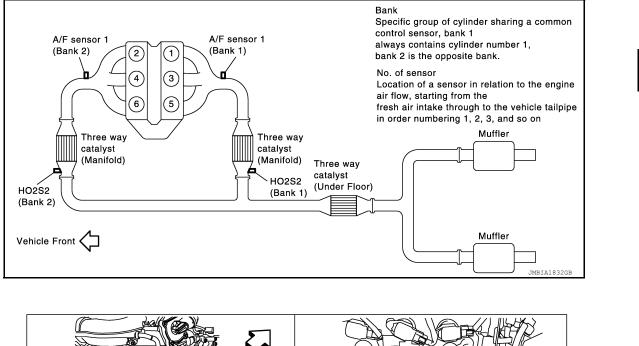
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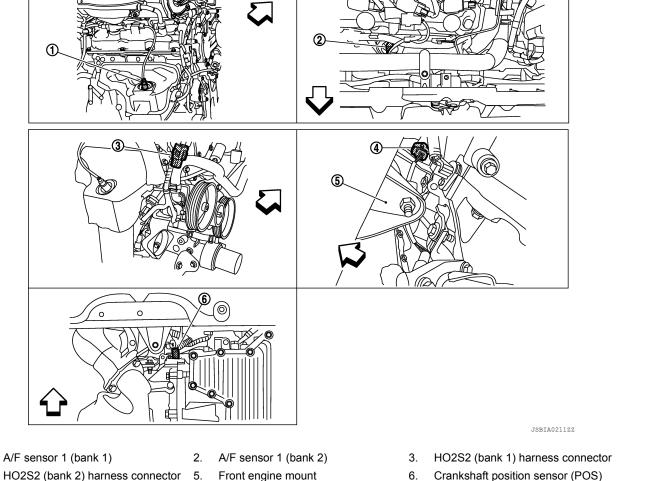
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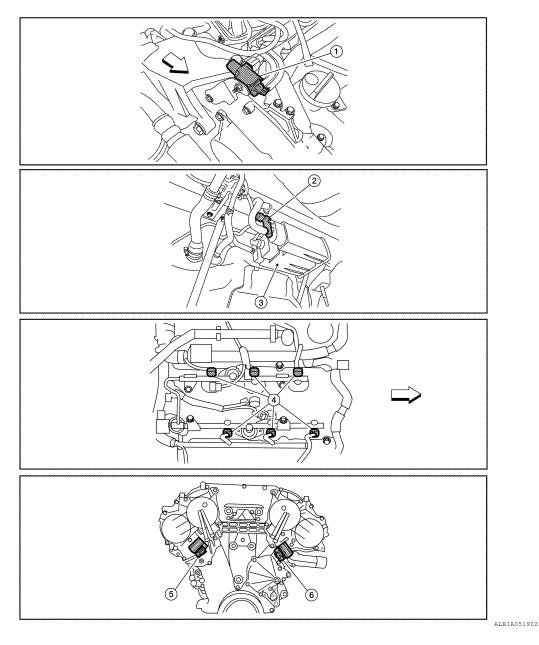


Crankshaft position sensor (POS) 6.

: Vehicle front

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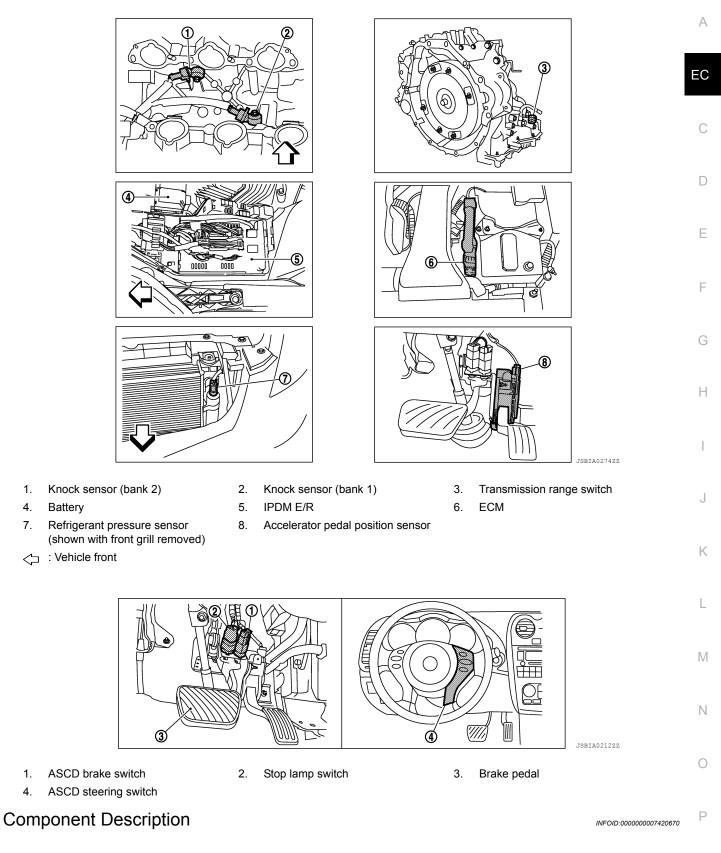


- 1. Electronic controlled engine mount control solenoid valve
- EVAP canister vent control valve 3. (view with rear suspension member removed)
- 4. Fuel injector harness connector
- 5. Intake valve timing control solenoid 6. valve (bank 1)
- EVAP canister
 - Intake valve timing control solenoid valve (bank 2)

C : Vehicle front

< SYSTEM DESCRIPTION >

[VQ35DE]



Component	Reference
Accelerator pedal position sensor	EC-584. "Description"
Camshaft position sensor (PHASE)	EC-503. "Description"
Crankshaft position sensor (POS)	EC-499, "Description"

Revision: February 2013

EC-359

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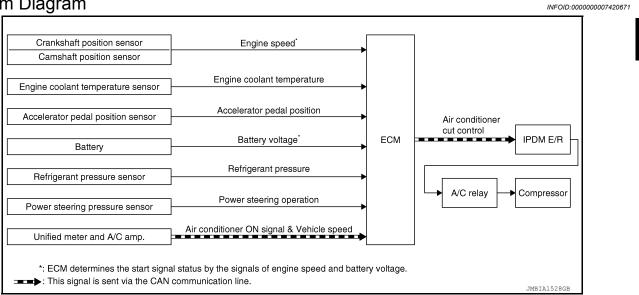
< SYSTEM DESCRIPTION >

Component	Reference
Engine coolant temperature sensor	EC-464, "Description"
Ignition signal	EC-628, "Description"
Knock sensor	EC-496. "Description"
Mass air flow sensor	EC-455. "Description"
TCM	EC-523, "Description"
Throttle position sensor	EC-467. "Description"

< SYSTEM DESCRIPTION >

AIR CONDITIONING CUT CONTROL

System Diagram



System Description

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	
	Air conditioner ON signal* ¹			
Unified meter and A/C amp.	Vehicle speed* ¹			

*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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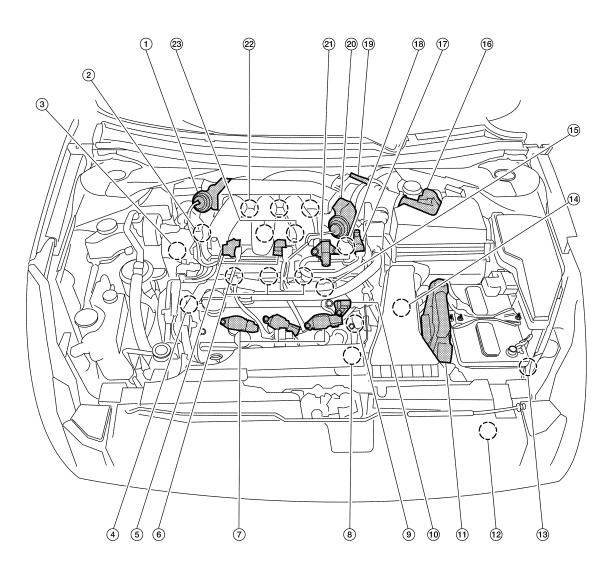
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< SYSTEM DESCRIPTION >

Component Parts Location



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- 1. Power valve actuator 1
- 4. Intake valve timing control solenoid valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

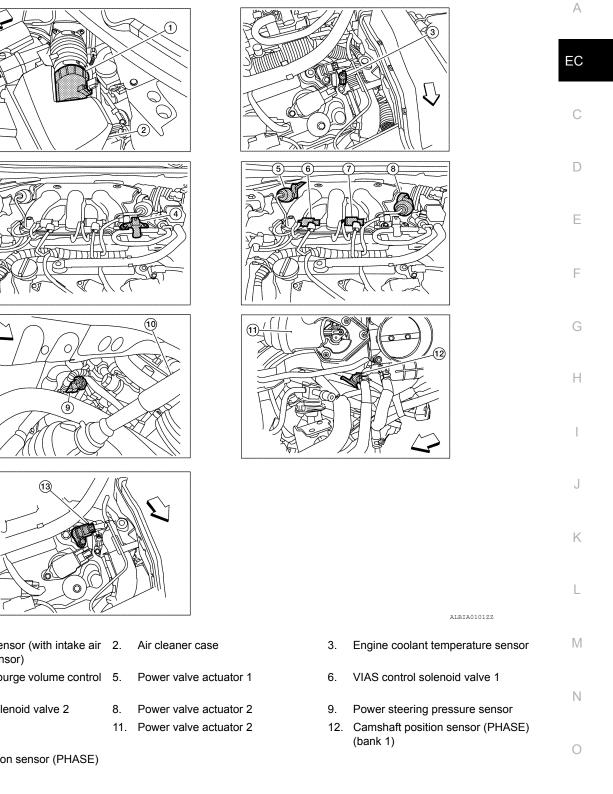
- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch
- 20. Power valve actuator 2
- 23. Knock sensor

- Power steering pressure sensor
- Fuel injector (bank 2)
- Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

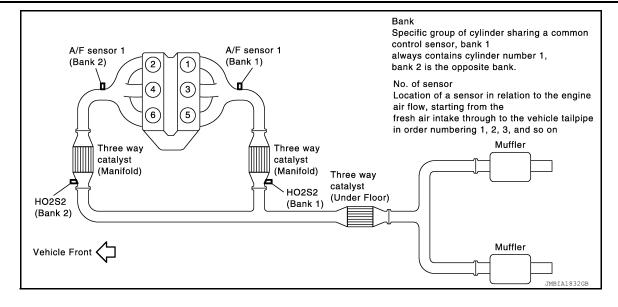
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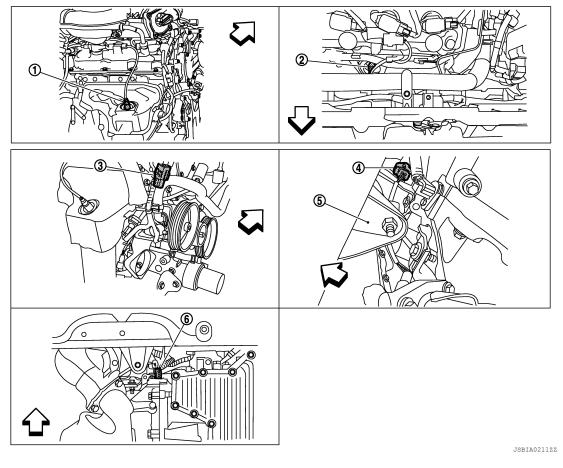
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- 1. Mass air flow sensor (with intake air 2. temperature sensor)
- EVAP canister purge volume control 5. 4. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- : Vehicle front

< SYSTEM DESCRIPTION >



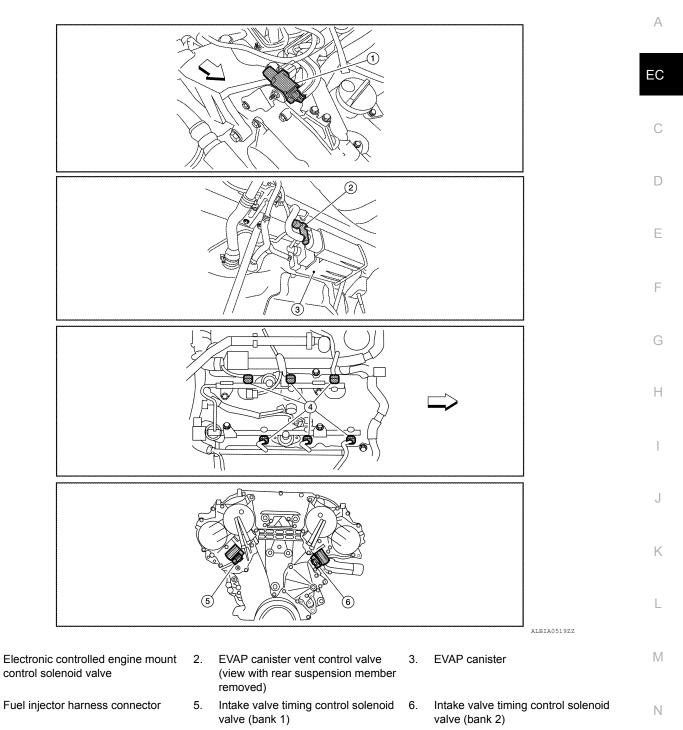


- 1. A/F sensor 1 (bank 1)
- 2. A
- 4. HO2S2 (bank 2) harness connector 5.
- A/F sensor 1 (bank 2)
- Front engine mount
- 3. HO2S2 (bank 1) harness connector
- 6. Crankshaft position sensor (POS)

Revision: February 2013

< SYSTEM DESCRIPTION >

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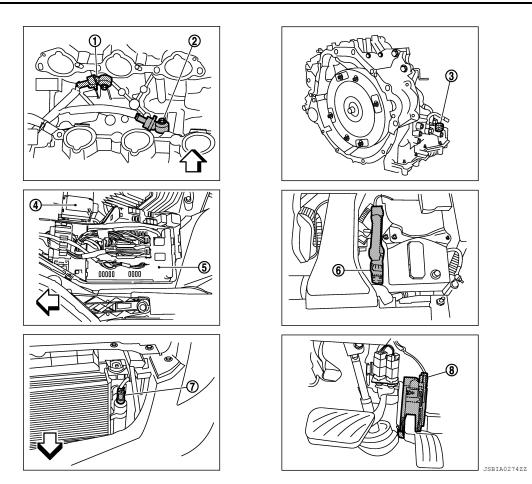
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- Knock sensor (bank 2) 1.
- 2.

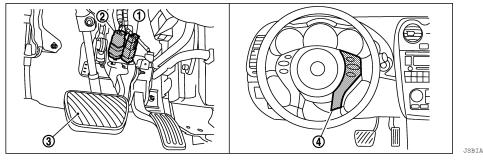
2.

- 4. Battery
- 7. Refrigerant pressure sensor (shown with front grill removed)
- : Vehicle front

- Knock sensor (bank 1)
- 5. IPDM E/R
- 8. Accelerator pedal position sensor
- Transmission range switch 3.
- 6. ECM

3.

Brake pedal



JSBIA0212ZZ

ASCD brake switch 1.

4.

ASCD steering switch

Component Description

INFOID:000000007420674

Component	Reference
Accelerator pedal position sensor	EC-584. "Description"
Camshaft position sensor (PHASE)	EC-503. "Description"
Crankshaft position sensor (POS)	EC-499, "Description"

Stop lamp switch

Revision: February 2013



2012 Altima GCC

< SYSTEM DESCRIPTION >

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Component	Reference	A
Engine coolant temperature sensor	EC-464, "Description"	A
Power steering pressure sensor	EC-512, "Description"	
Refrigerant pressure sensor	EC-635. "Description"	EC

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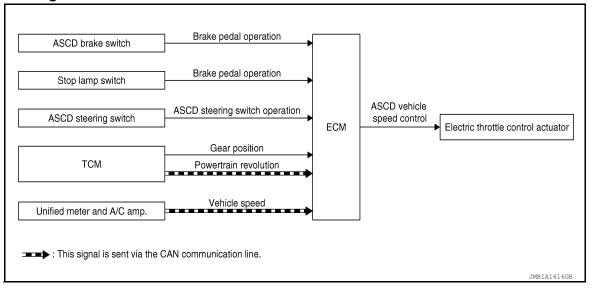
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< SYSTEM DESCRIPTION >

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Diagram



System Description

INFOID:000000007420676

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
ASCD brake switch	Brake pedal operation			
Stop lamp switch	Brake pedal operation		Electric throttle control	
ASCD steering switch	ASCD steering switch operation	ASCD vehicle speed		
ТСМ	Gear position	control	actuator	
TCM	Powertrain revolution*			
Unified meter and A/C amp.	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 210 km/h (130 MPH).

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

The ASCD operation status is indicated by two indicators (CRUISE and SET on the information display) on the combination meter. If any malfunction occurs in the ASCD system, SET indicator blinks and ASCD control is deactivated.

NOTE:

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

SET OPERATION

Press MAIN switch. (CRUISE is indicated on the information display.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 210 km/h (130 MPH), press SET/COAST switch. (Then SET is indicated on the information display in combination meter.)

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

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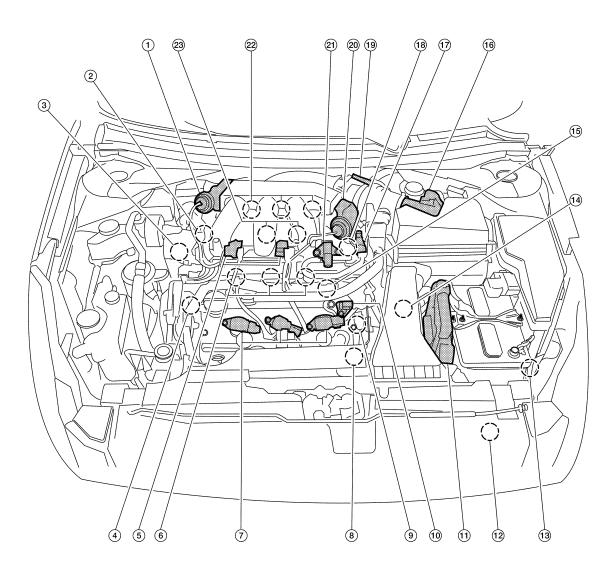
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< SYSTEM DESCRIPTION > [VQ35DE]
 When any of following conditions exist, cruise operation will be canceled. CANCEL switch is pressed More than 2 switches on ASCD steering switch are pressed at the same time (Set speed will be cleared) 	A
 Brake pedal is depressed Selector lever position is changed to N, P or R Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed TCS system is operated 	EC
 TCS system is operated CVT control system has a malfunction. Refer to <u>EC-560, "Description"</u>. When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inforr the driver by blinking indicators. 	m C
 Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE indicator ma blink slowly. When the engine coolant temperature decreases to the normal operating temperature, CRUISE indicator with the engine coolant temperature decreases to the normal operating temperature. 	D
 stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME ACCELERATE switch. Malfunction for some self-diagnoses regarding ASCD control: SET indicator will blink quickly. 	
If MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations will be canceled and vehicl speed memory will be erased.	
COAST OPERATION When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until th switch is released. And then ASCD will maintain the new set speed.	F
RESUME OPERATION When the RESUME/ACCELERATE switch is pressed after canceling operation other than pressing the MAII	
switch, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must mee following conditions.Brake pedal is released	et ⊢
 Selector lever position is other than P and N Vehicle speed is greater than 40 km/h (25 MPH) and less than 210 km/h (130 MPH) 	I
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< SYSTEM DESCRIPTION >

Component Parts Location

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ALBIA0110ZZ

- 1. Power valve actuator 1
- 4. Intake valve timing control solenoid valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

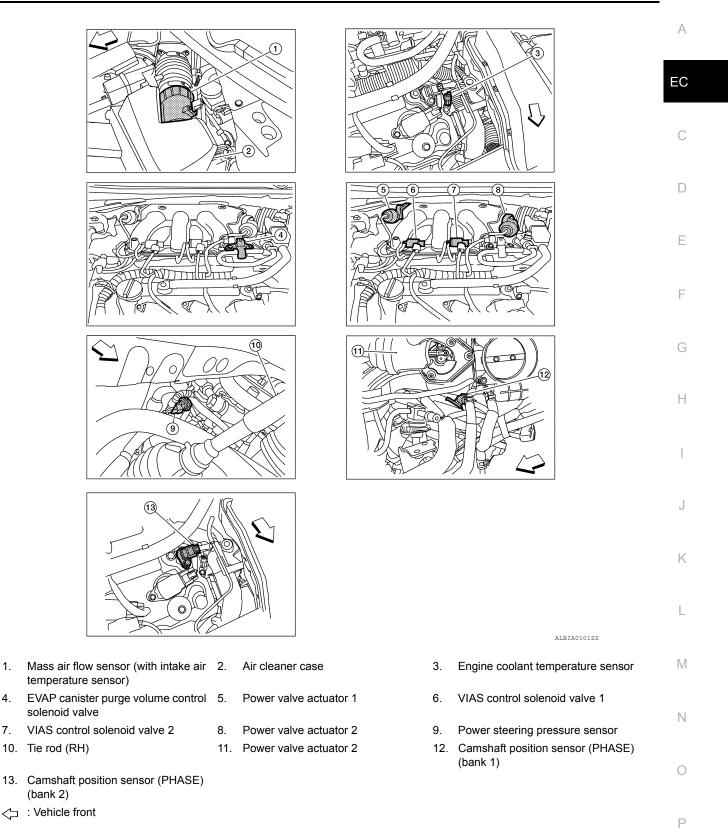
- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch
- 20. Power valve actuator 2
- 23. Knock sensor

- Power steering pressure sensor
- Fuel injector (bank 2)
- Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

< SYSTEM DESCRIPTION >

[VQ35DE]



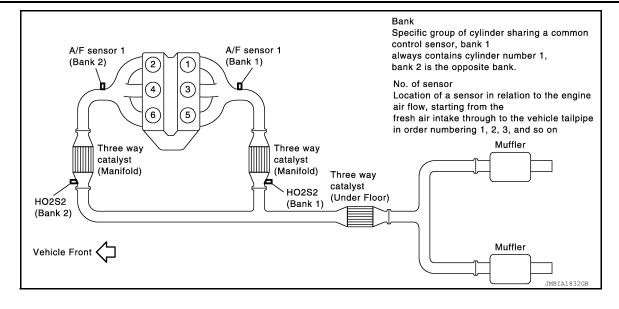
(bank 2) : Vehicle front

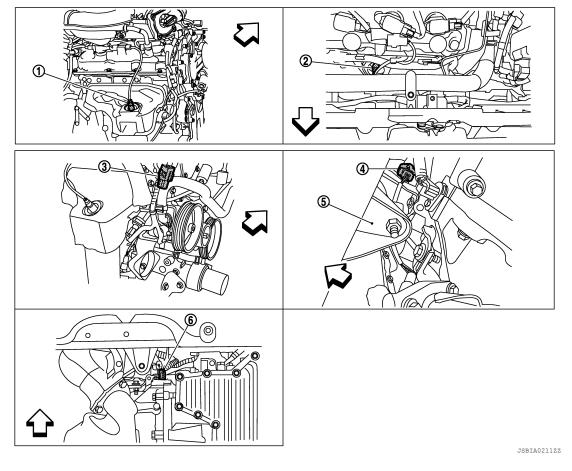
10. Tie rod (RH)

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< SYSTEM DESCRIPTION >



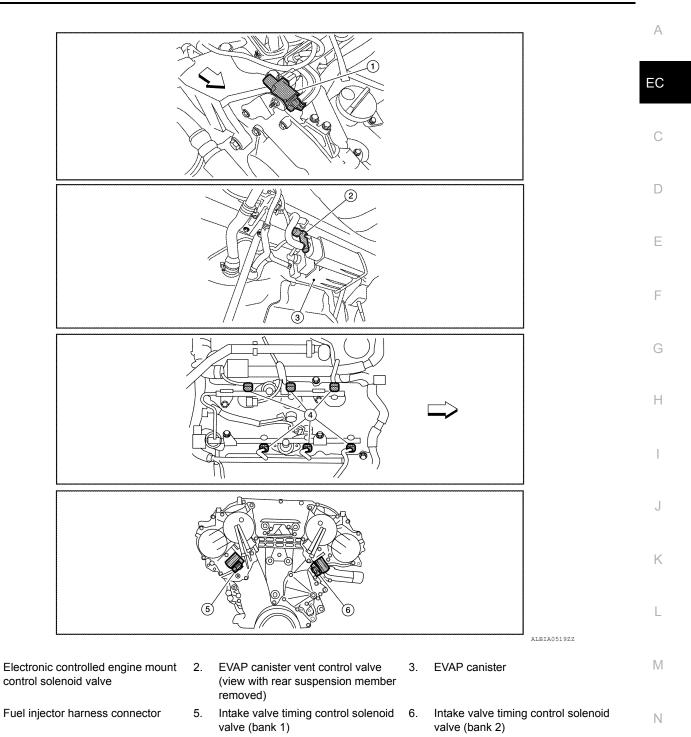


- 1. A/F sensor 1 (bank 1)
- (bank 1) 2.
- 4. HO2S2 (bank 2) harness connector 5.
- A/F sensor 1 (bank 2)
 - . Front engine mount
- 3. HO2S2 (bank 1) harness connector
- 6. Crankshaft position sensor (POS)

 \triangleleft : Vehicle front

< SYSTEM DESCRIPTION >

[VQ35DE]



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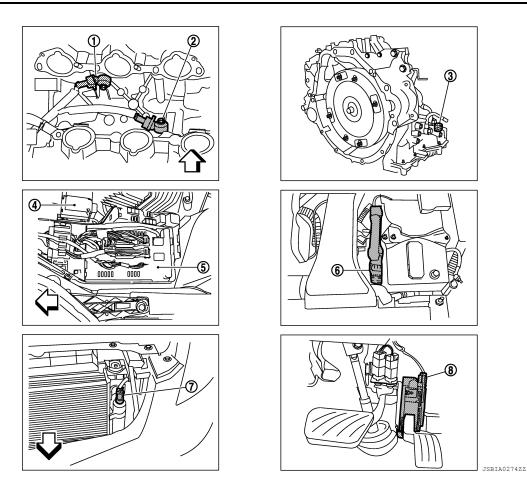
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[VQ35DE]

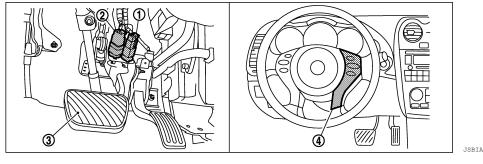
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SYSTEM DESCRIPTION >



- 1. Knock sensor (bank 2)
- 4. Battery
- 7. Refrigerant pressure sensor (shown with front grill removed)
- ⟨→ : Vehicle front

- 2. Knock sensor (bank 1)
- 5. IPDM E/R
- 8. Accelerator pedal position sensor
- 3. Transmission range switch
- 6. ECM



JSBIA0212ZZ

- 1. ASCD brake switch
- Stop lamp switch

3. Brake pedal

4. ASCD steering switch

Component Description

INFOID:000000007420678

Component	Reference
ASCD brake switch	EC-550. "Description"
ASCD indicator	EC-601, "Description"
ASCD steering switch	EC-547, "Description"

Revision: February 2013

EC-374

2012 Altima GCC

< SYSTEM DESCRIPTION >

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Component	Reference	
Electric throttle control actuator	EC-582, "Description"	A
Stop lamp switch	EC-569. "Description"	
ТСМ	EC-523. "Description"	EC

CAN COMMUNICATION

System 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.

Refer to LAN-24, "CAN Communication Signal Chart", about CAN communication for detail.

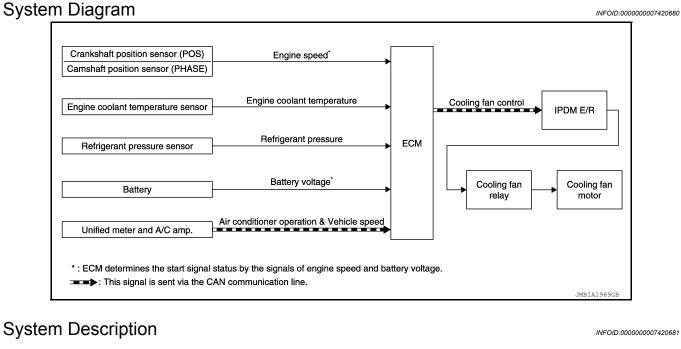
INFOID:000000007420679

[VQ35DE]

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

COOLING FAN CONTROL



INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed ^{*1}			
Engine coolant temperature sensor	Engine coolant temperature		IPDM E/R	
Refrigerant pressure sensor	Refrigerant pressure	Cooling fan	↓ Cooling fan relay	
Battery	Battery voltage*1		↓ J	
Unified mater and A/C amp	Air conditioner ON signal* ²		Cooling fan motor	
Unified meter and A/C amp.	Vehicle speed*2			

*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 Μ pressure, and air conditioner ON signal. The control system has 4-step control [HIGH/MIDDLE/LOW/OFF].

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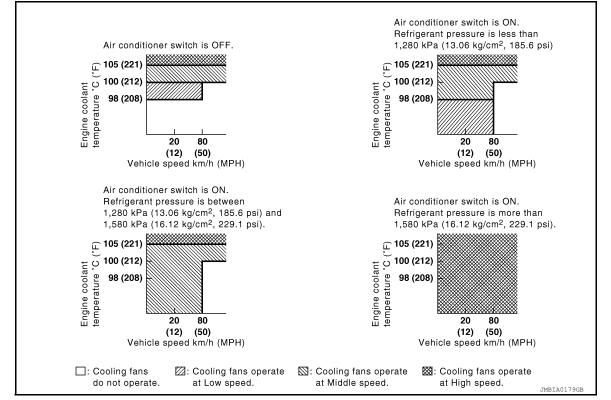
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COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

Cooling Fan Operation



Cooling Fan Relay Operation

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

	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	

< SYSTEM DESCRIPTION >

Component Parts Location

[VQ35DE]

INFOID:000000007420682

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				ALBIA0110ZZ
actuator 1	2.	Intake valve timing control solenoid valve (bank 1)	3.	Power steering pressure sensor
iming control solenoid	5.	VIAS control solenoid valves 1 and 2	6.	Fuel injector (bank 2)
with power transistor) ig (bank 2)	8.	Crankshaft position sensor (POS)	9.	Engine coolant temperature sensor
sition sensor (PHASE)	11.	ECM	12.	Refrigerant pressure sensor
nt sensor	14.	Transmission range switch	15.	Condenser-2

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

1.	Power valve actuator 1

- 4. Intake valve tin valve (bank 2)
- 7. Ignition coil (wi and spark plug
- 10. Camshaft posi (bank 2)
- 13. Battery current
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

- 20. Power valve actuator 2
- 23. Knock sensor

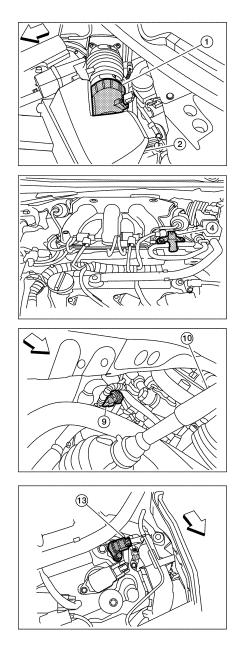


COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

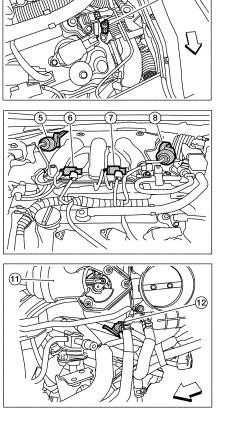
[VQ35DE]

3



- 1. Mass air flow sensor (with intake air 2. temperature sensor)
- 4. EVAP canister purge volume control 5. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- \triangleleft : Vehicle front

- Air cleaner case
- Power valve actuator 1
- 8. Power valve actuator 2
- 11. Power valve actuator 2



ALBIA0101ZZ

- 3. Engine coolant temperature sensor
- 6. VIAS control solenoid valve 1
- 9. Power steering pressure sensor
- 12. Camshaft position sensor (PHASE) (bank 1)

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[VQ35DE]

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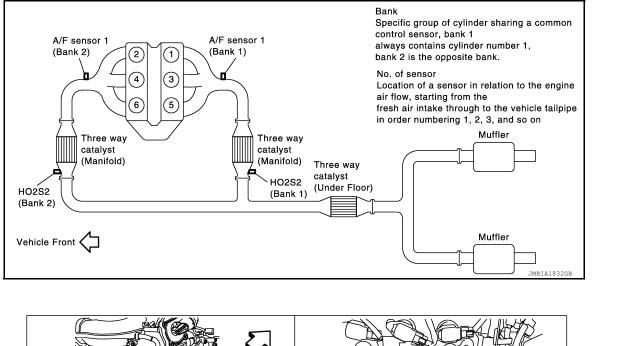
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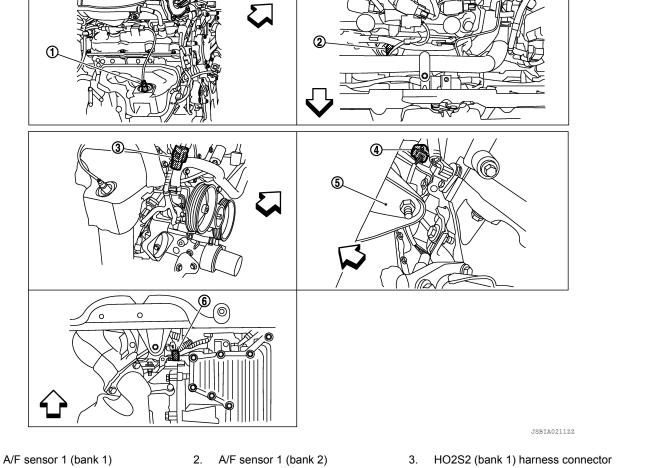
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6. Crankshaft position sensor (POS)

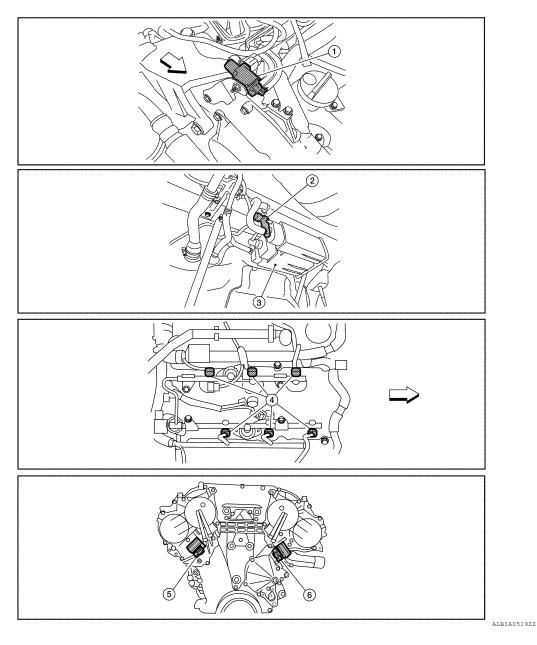
HO2S2 (bank 2) harness connector 5.

1.

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EC-381

Front engine mount



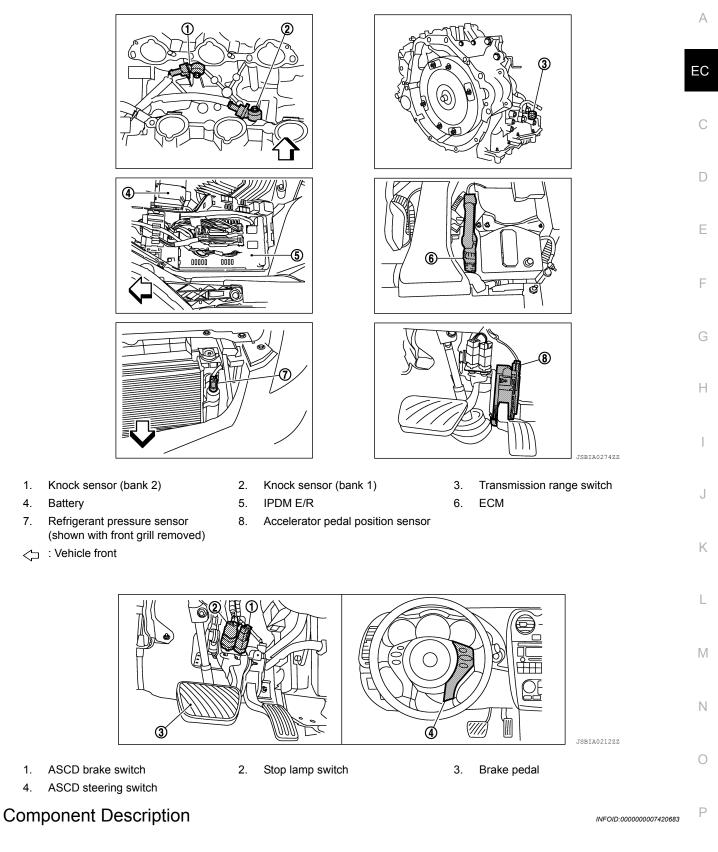
- 1. Electronic controlled engine mount control solenoid valve
 - Fuel injector harness connector 5. Ir
- EVAP canister vent control valve 3. (view with rear suspension member removed)
 - Intake valve timing control solenoid 6. valve (bank 1)
- EVAP canister
 - Intake valve timing control solenoid valve (bank 2)

C : Vehicle front

COOLING FAN CONTROL

< SYSTEM DESCRIPTION >

[VQ35DE]



Component	Reference
Camshaft position sensor (PHASE)	EC-503, "Description"
Crankshaft position sensor (POS)	EC-499. "Description"
Cooling fan motor	EC-602, "Description"

1.

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COOLING FAN CONTROL

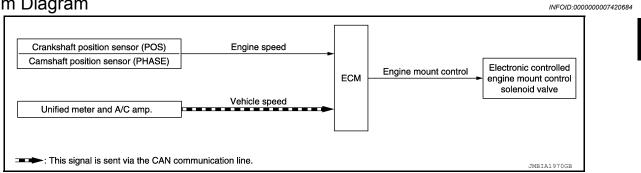
< SYSTEM DESCRIPTION >

Component	Reference		
Engine coolant temperature sensor	EC-464, "Description"		
Refrigerant pressure sensor	EC-635, "Description"		

< SYSTEM DESCRIPTION >

ELECTRONIC CONTROLLED ENGINE MOUNT

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount	Electronic controlled en- gine mount control solenoid	G
Unified meter and A/C amp.	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	J
Except above conditions	Hard	-

ELECTRONIC CONTROLLED ENGINE MOUNT LINE DRAWING

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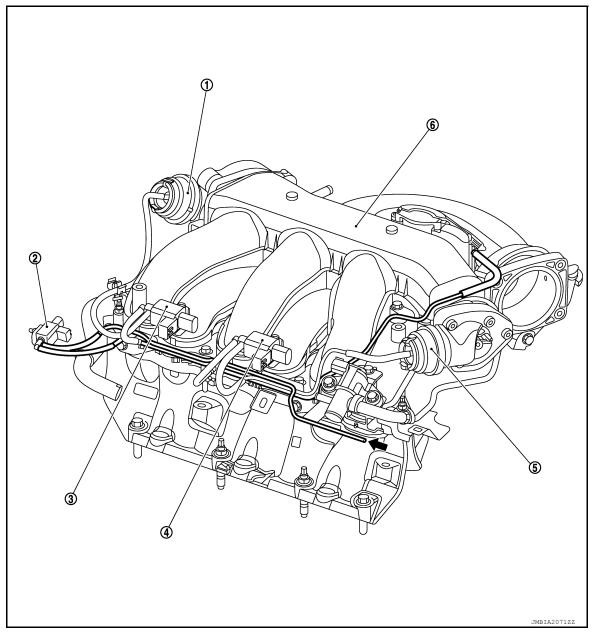
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< SYSTEM DESCRIPTION >

[VQ35DE]

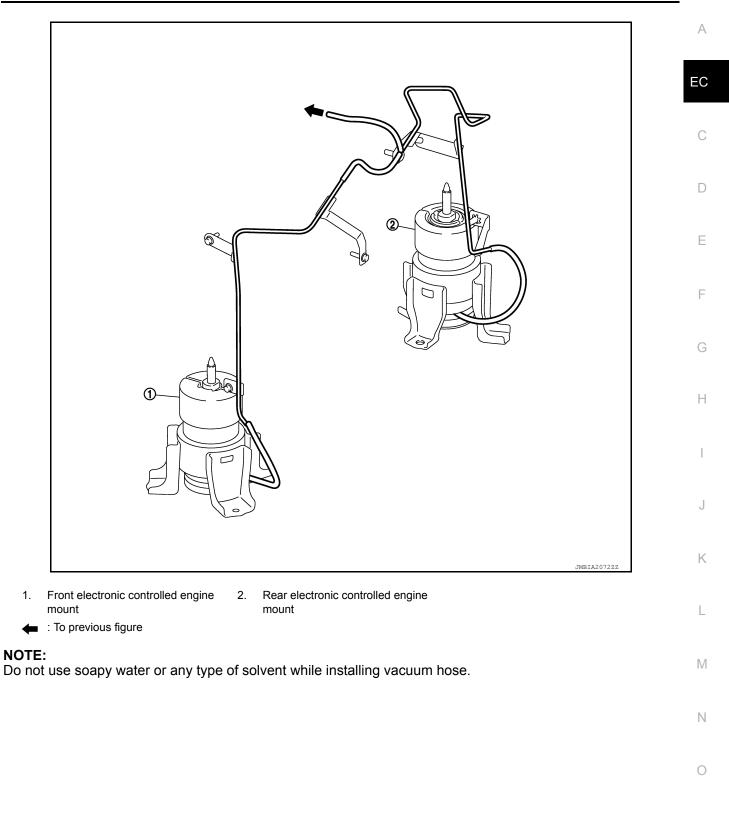


- Power valve actuator 1 1.
- 2. Electronic controlled engine mount 3. VIAS control solenoid valve 1 control solenoid valve
- VIAS control solenoid valve 2 5. Power valve actuator 2 4
- : From next figure

- 6. Intake manifold collector

< SYSTEM DESCRIPTION >

[VQ35DE]



< SYSTEM DESCRIPTION >

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Component Parts Location

(23) (22) (21) (20) (19) $(\mathbf{1})$ (18) (17) (16) (2)

- (15) (7)(8) ٩ 10 (11) (12) 5 (4) (6) (13)
 - ALBIA0110ZZ

- 1. Power valve actuator 1
- 4. Intake valve timing control solenoid valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch
- 20. Power valve actuator 2
- 23. Knock sensor

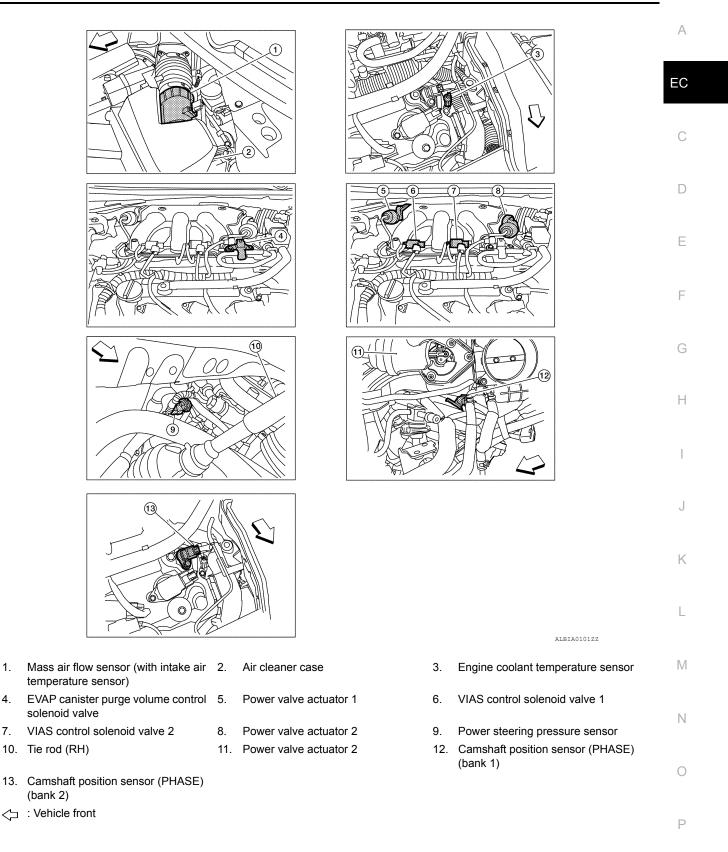
- Power steering pressure sensor
- Fuel injector (bank 2)
- Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve



< SYSTEM DESCRIPTION >

[VQ35DE]



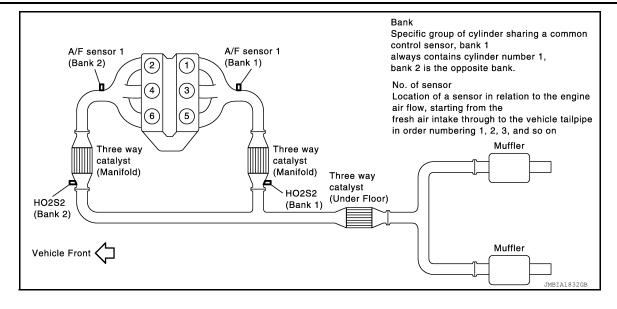
Revision: February 2013

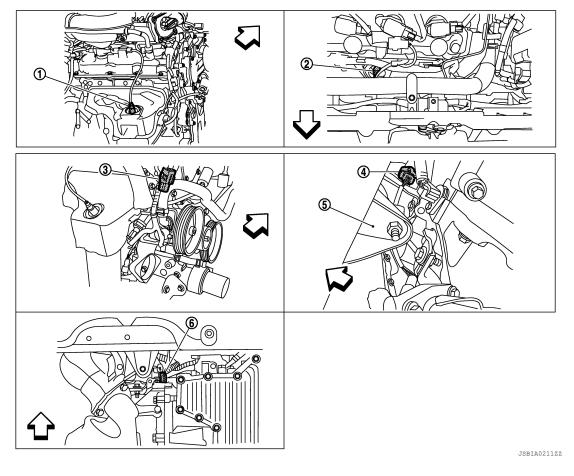
(bank 2)

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< SYSTEM DESCRIPTION >



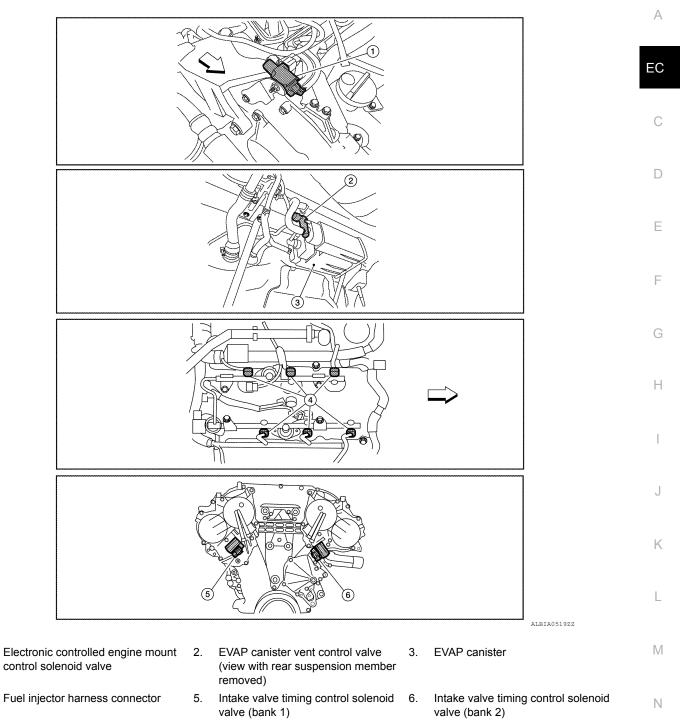


- 1. A/F sensor 1 (bank 1)
- ank 1) 2.
- 4. HO2S2 (bank 2) harness connector 5.
- A/F sensor 1 (bank 2)
 - 5. Front engine mount
- 3. HO2S2 (bank 1) harness connector
- 6. Crankshaft position sensor (POS)

 \triangleleft : Vehicle front

< SYSTEM DESCRIPTION >

[VQ35DE]



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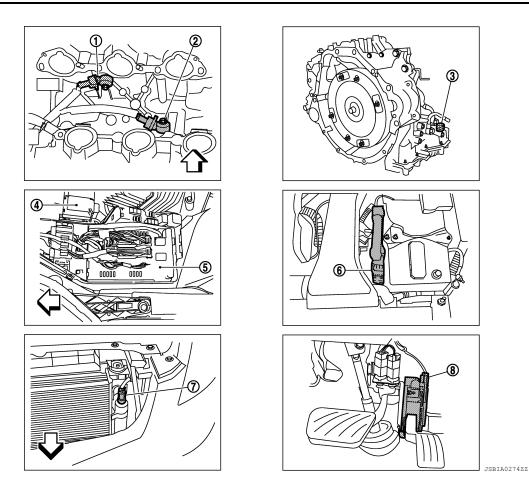
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[VQ35DE]

ELECTRONIC CONTROLLED ENGINE MOUNT

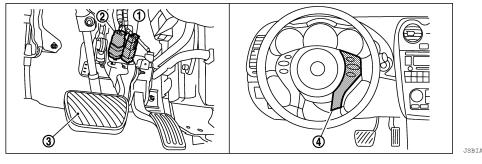
< SYSTEM DESCRIPTION >



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

- 4. Battery
- 7. Refrigerant pressure sensor (shown with front grill removed)
- : Vehicle front

- 5. IPDM E/R
- 8. Accelerator pedal position sensor
- Transmission range switch 3.
- 6. ECM



JSBIA0212ZZ

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

3. Brake pedal

ASCD steering switch 4.

Component Description

INFOID:000000007420687

Component	Reference		
Camshaft position sensor (PHASE)	EC-503. "Description"		
Crankshaft position sensor (POS)	EC-499. "Description"		
Electronic controlled engine mount control solenoid valve	EC-609, "Description"		

EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

EVAPORATIVE EMISSION SYSTEM

System Diagram

Crankshaft position sensor	Engine speed [*] & Piston position		
Camshaft position sensor			
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		EVAP canister
Throttle position sensor	Throttle position	ECM	EVAP canister purge flow control control solenoid
·	Accelerator pedal position		valve
Accelerator pedal position sensor			
Battery	Battery voltage		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Unified meter and A/C amp.	Vehicle speed		

System Description

INFOID:000000007420689

INPUT/OUTPUT SIGNAL CHART

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

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

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

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.

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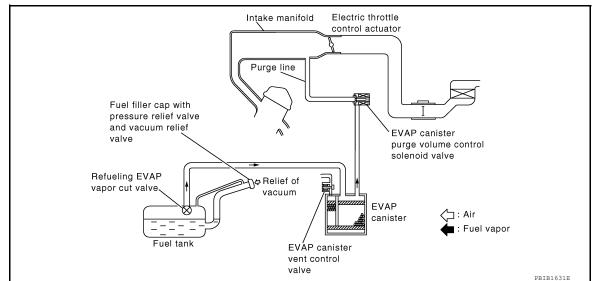
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EVAPORATIVE EMISSION SYSTEM

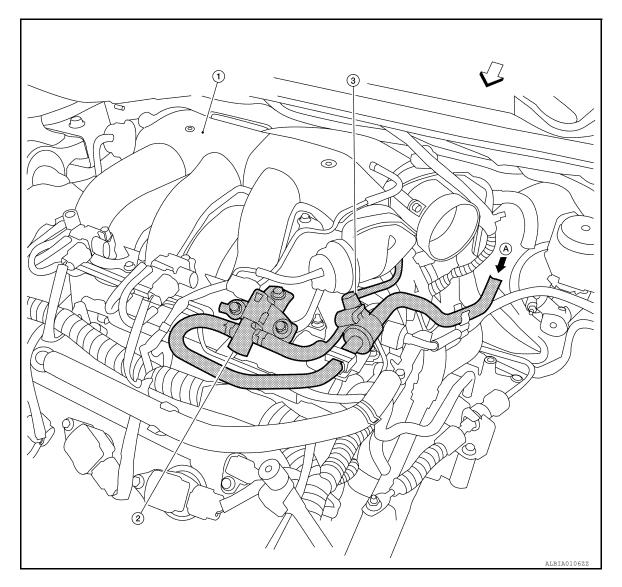
< SYSTEM DESCRIPTION >

[VQ35DE]

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



EVAPORATIVE EMISSION LINE DRAWING

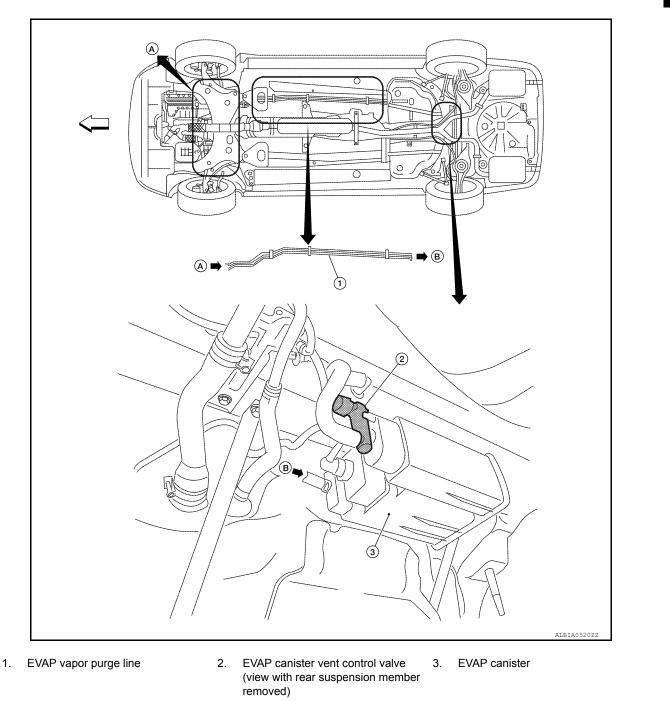


EVAPORATIVE EMISSION SYSTEM

< SYSTEM DESCRIPTION >

[VQ35DE]

- 1. Intake manifold collector
- 2. EVAP canister purge volume control 3. EVAP service port solenoid valve
- A. From EVAP canister



- A. To previous figure
- B. To/From B in this figure

- : Vehicle front
- 🕳 : To previous figure

NOTE:

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

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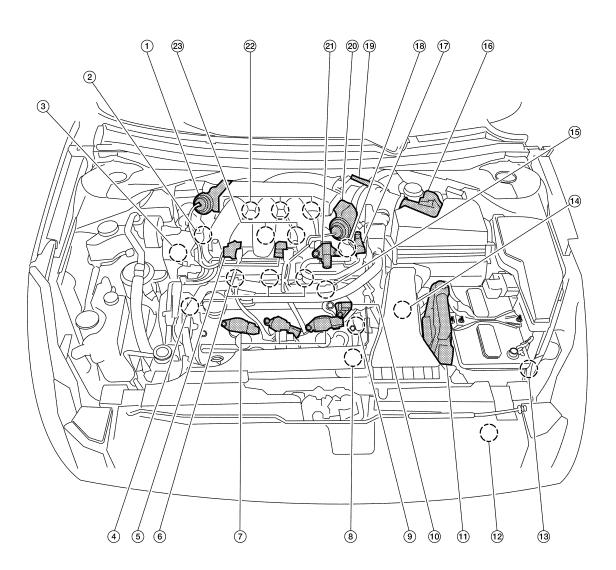
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< SYSTEM DESCRIPTION >

Component Parts Location



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- 1. Power valve actuator 1
- 4. Intake valve timing control solenoid valve (bank 2)
- Ignition coil (with power transistor) 7. and spark plug (bank 2)
- 10. Camshaft position sensor (PHASE) (bank 2)
- 13. Battery current sensor
- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)

- 2. Intake valve timing control solenoid 3. valve (bank 1)
- 5. VIAS control solenoid valves 1 and 2 6.
- 8. Crankshaft position sensor (POS)
- 11. ECM
- 14. Transmission range switch
- 20. Power valve actuator 2
- 23. Knock sensor

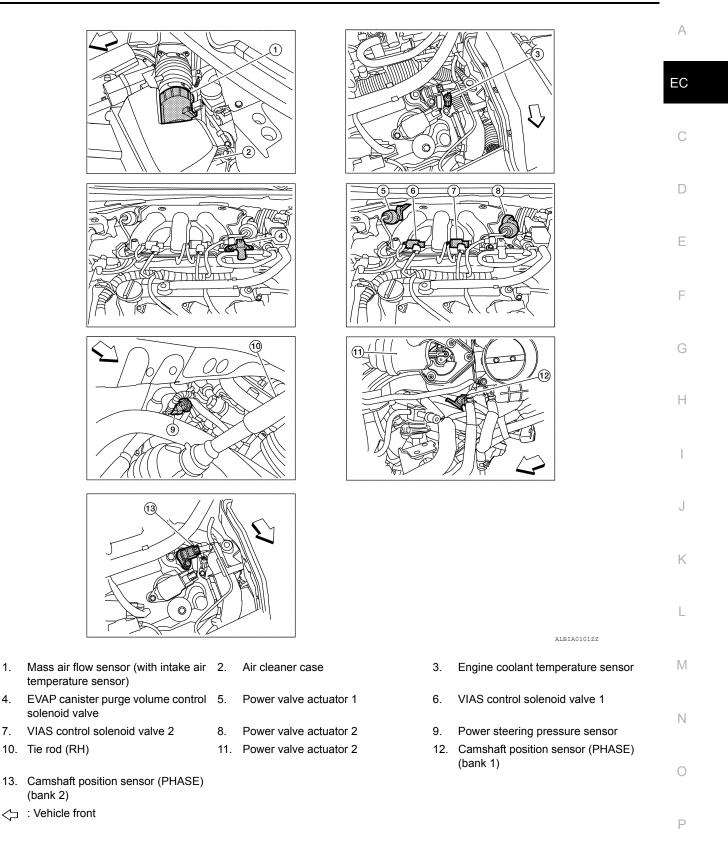
- Power steering pressure sensor
- Fuel injector (bank 2)
- Engine coolant temperature sensor
- 12. Refrigerant pressure sensor
- 15. Condenser-2

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve



< SYSTEM DESCRIPTION >

[VQ35DE]



Revision: February 2013

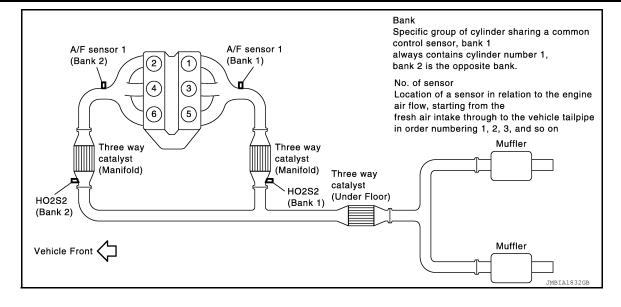
(bank 2)

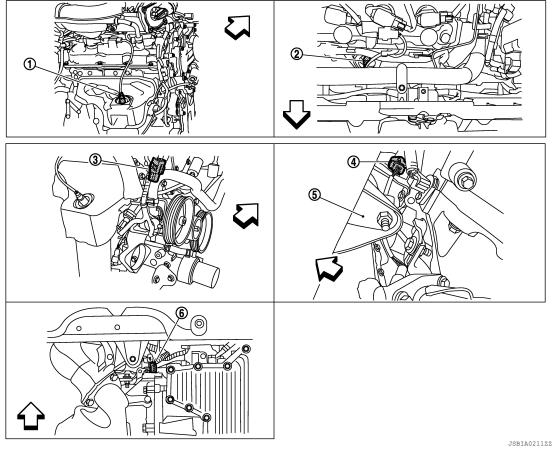
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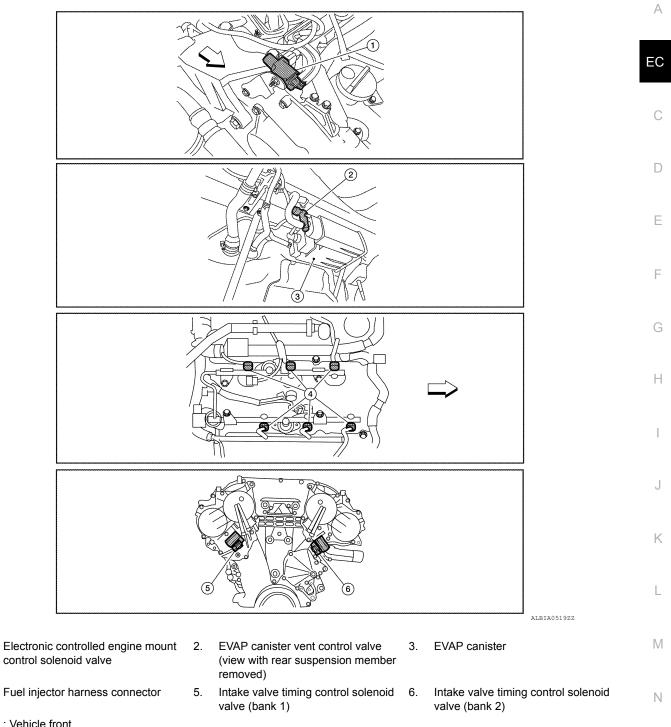


- 1. A/F sensor 1 (bank 1)
- 2. *I*
- 4. HO2S2 (bank 2) harness connector 5.
 <□ : Vehicle front
- A/F sensor 1 (bank 2)
 - Front engine mount

-
- 3. HO2S2 (bank 1) harness connector
- 6. Crankshaft position sensor (POS)

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[VQ35DE]



C : Vehicle front

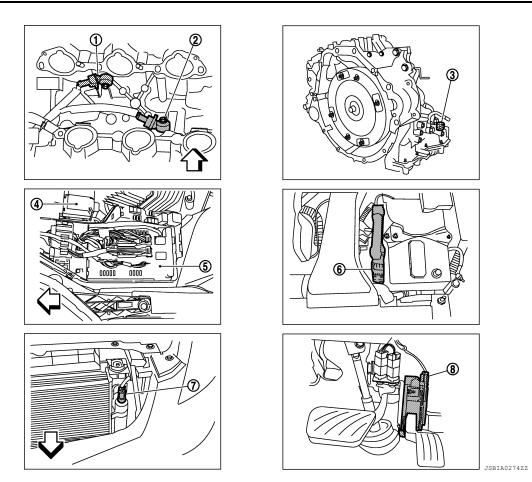
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< SYSTEM DESCRIPTION >

[VQ35DE]



- 1. Knock sensor (bank 2)
- 4. Battery
- 7. Refrigerant pressure sensor (shown with front grill removed)
- ∠ : Vehicle front

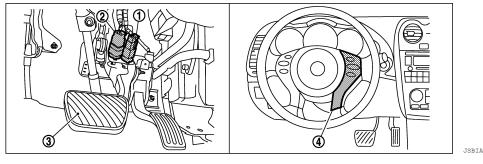
- 2. Knock sensor (bank 1)
- 5. IPDM E/R

2.

- 8. Accelerator pedal position sensor
- 3. Transmission range switch
- 6. ECM

3.

Brake pedal



JSBIA0212ZZ

1. ASCD brake switch

4.

ASCD steering switch

Component Description

INFOID:000000007420691

Component	Reference
A/F sensor 1	EC-470. "Description"
Accelerator pedal position sensor	EC-584. "Description"
Camshaft position sensor (PHASE)	EC-503, "Description"

Stop lamp switch

Revision: February 2013



2012 Altima GCC

< SYSTEM DESCRIPTION >

[VQ35DE]

Component	Reference	_
Crankshaft position sensor (POS)	EC-499, "Description"	A
Engine coolant temperature sensor	EC-464, "Description"	
EVAP canister purge volume control solenoid valve	EC-507, "Description"	EC
Mass air flow sensor	EC-455. "Description"	
Throttle position sensor	EC-467, "Description"	
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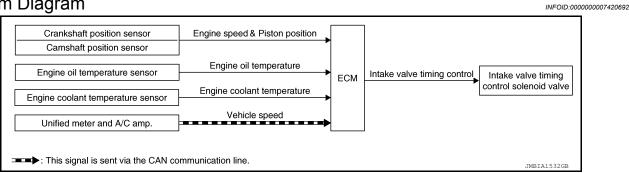
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< SYSTEM DESCRIPTION >

INTAKE VALVE TIMING CONTROL

System Diagram



System Description

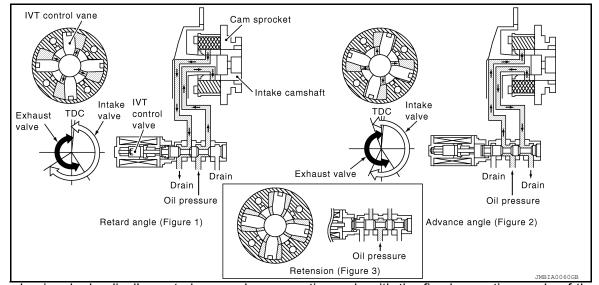
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INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	 Engine speed and piston position 			
Camshaft position sensor (PHASE)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve	
Engine oil temperature sensor	Engine oil temperature			
Engine coolant temperature sensor	Engine coolant temperature			
Unified meter and A/C amp.	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.

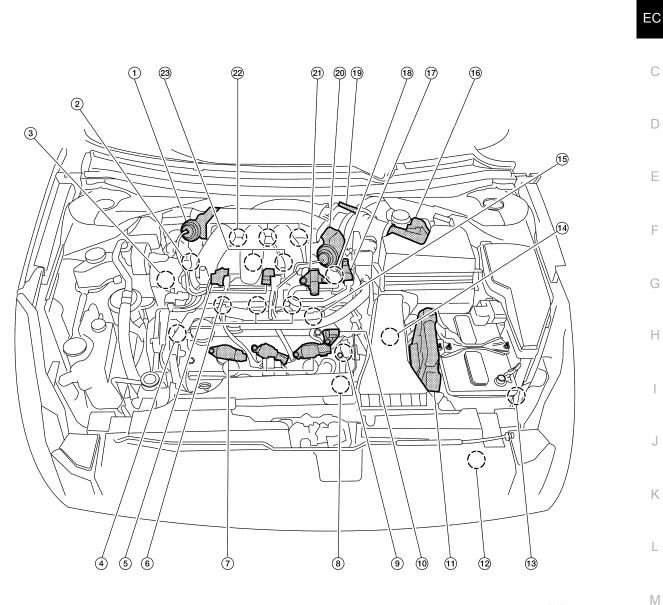
The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control solenoid valve depending on driving status. This makes it possible to control the shut/open timing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

< SYSTEM DESCRIPTION >

Component Parts Location

[VQ35DE]

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1.	Power valve actuator 1	2.	Intake valve timing control solenoid valve (bank 1)	3.	Power steering pressure sensor
4.	Intake valve timing control solenoid valve (bank 2)	5.	VIAS control solenoid valves 1 and 2	6.	Fuel injector (bank 2)
7.	Ignition coil (with power transistor) and spark plug (bank 2)	8.	Crankshaft position sensor (POS)	9.	Engine coolant temperature sensor
10.	Camshaft position sensor (PHASE)	11.	ECM	12.	Refrigerant pressure sensor

- 14. Transmission range switch
- 16. Mass air flow sensor (with intake air 17. EVAP service port
 - 20. Power valve actuator 2
 - 23. Knock sensor

- 15. Condenser-2
- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

(bank 2)

13. Battery current sensor

temperature sensor)

19. Electric throttle control actuator

and spark plug (bank 1)

22. Ignition coil (with power transistor)



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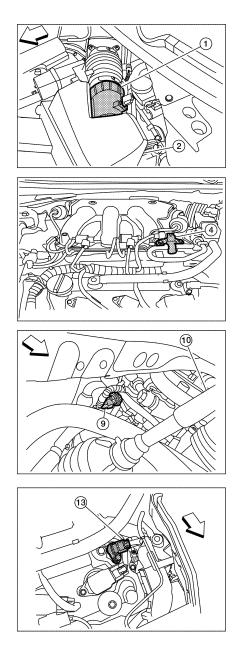
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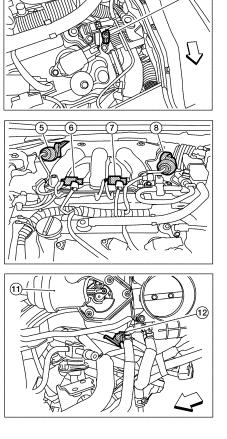
[VQ35DE]

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- 1. Mass air flow sensor (with intake air 2. temperature sensor)
- 4. EVAP canister purge volume control 5. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- \triangleleft : Vehicle front

- Air cleaner case
- Power valve actuator 1
- 8. Power valve actuator 2
- 11. Power valve actuator 2

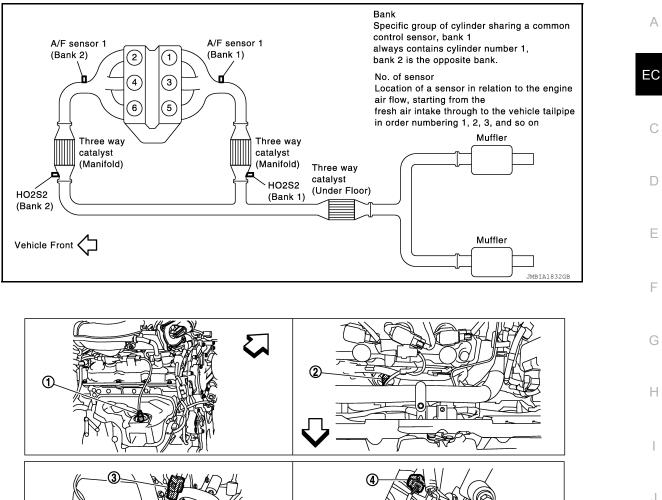


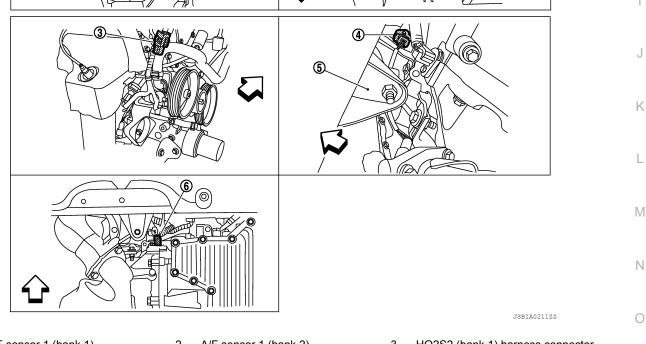
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- 3. Engine coolant temperature sensor
- 6. VIAS control solenoid valve 1
- 9. Power steering pressure sensor
- 12. Camshaft position sensor (PHASE) (bank 1)

< SYSTEM DESCRIPTION >

[VQ35DE]



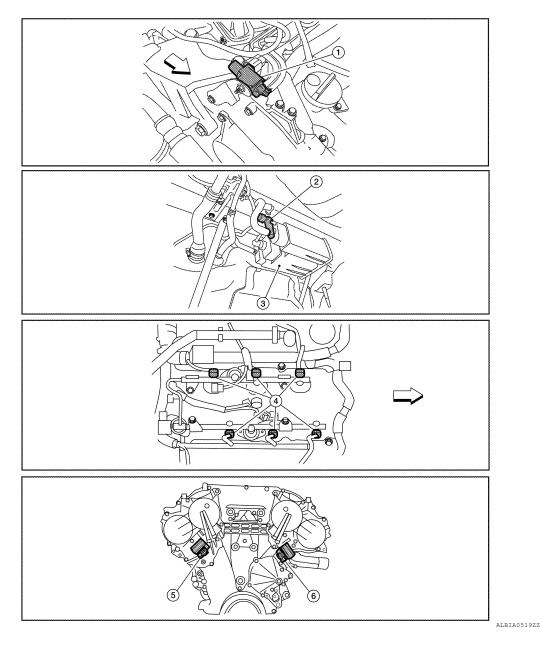


1. A/F sensor 1 (bank 1)

: Vehicle front

- 2.
- HO2S2 (bank 2) harness connector 5. 4.
- A/F sensor 1 (bank 2)
 - Front engine mount
- 3. HO2S2 (bank 1) harness connector Crankshaft position sensor (POS) 6.
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< SYSTEM DESCRIPTION >

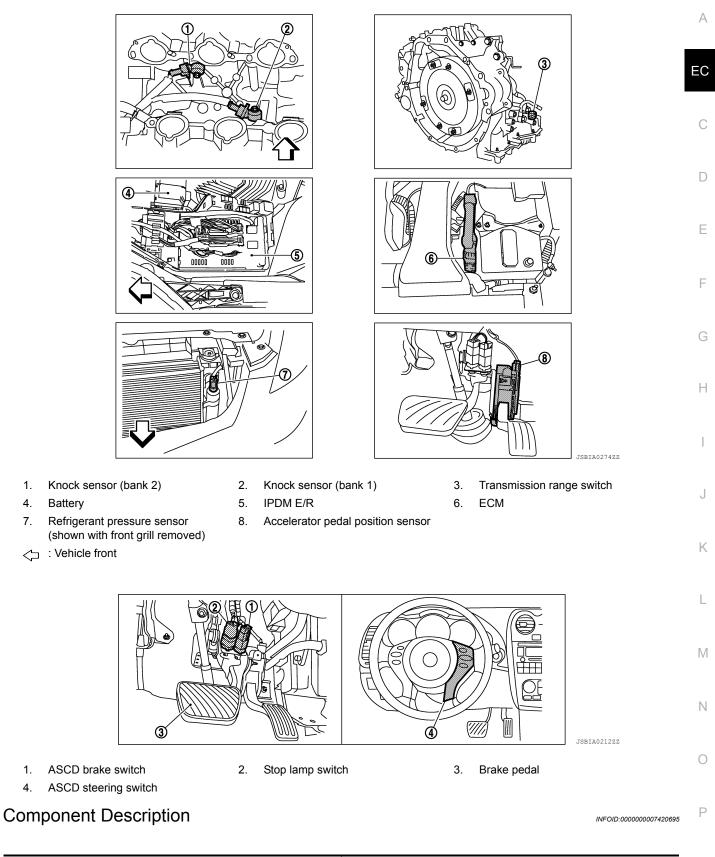


- 1. Electronic controlled engine mount control solenoid valve
- EVAP canister vent control valve 3. (view with rear suspension member removed)
- 4. Fuel injector harness connector
- removed)5. Intake valve timing control solenoid 6. valve (bank 1)
- EVAP canister
 - Intake valve timing control solenoid valve (bank 2)

C : Vehicle front

< SYSTEM DESCRIPTION >

[VQ35DE]



Component	Reference
Camshaft position sensor (PHASE)	EC-503, "Description"
Crankshaft position sensor (POS)	EC-499. "Description"

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EC-407

2012 Altima GCC

< SYSTEM DESCRIPTION >

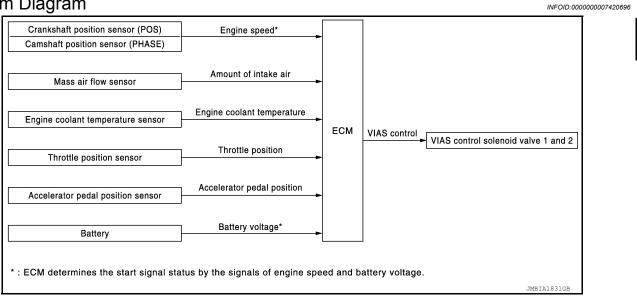
[VQ35DE]

Component	Reference
Engine coolant temperature sensor	EC-464, "Description"
Intake valve timing control solenoid valve	EC-452, "Description"

< SYSTEM DESCRIPTION >

VARIABLE INDUCTION AIR SYSTEM

System Diagram



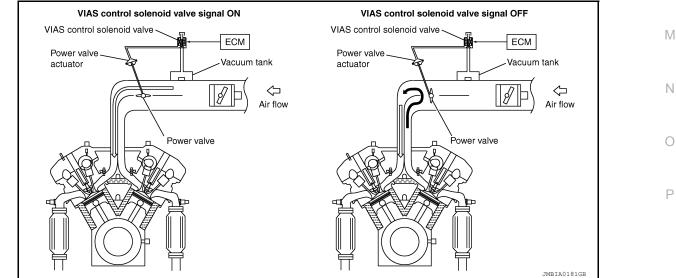
System Description

INPUT/OUTPUT SIGNAL CHART

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

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

SYSTEM DESCRIPTION



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

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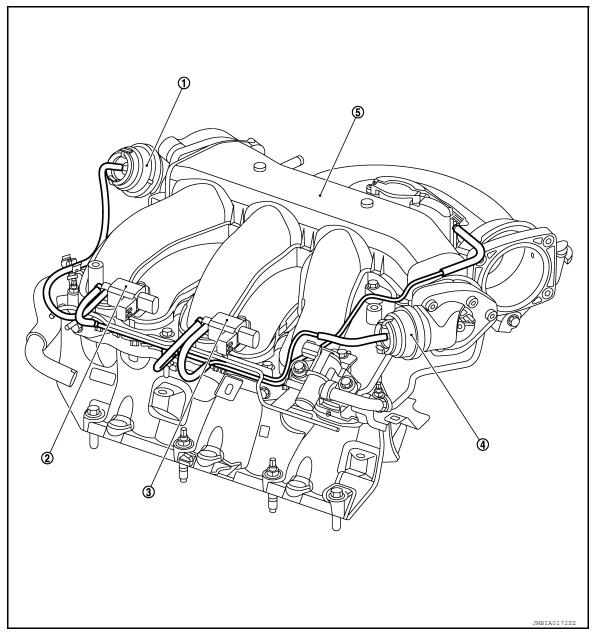
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Under this condition, the pressure waves of the exhaust stroke do not disturb the pressure waves of the intake stroke of each opposite bank. Therefore, charging efficiency is increased together with the effect of the long intake passage.

However, in the high speed range, the ECM sends the OFF signal to the VIAS control solenoid valve and the power valves 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
- 4. Power valve actuator 2
- VIAS control solenoid valve 1
 Intake manifold collector
- 3. VIAS control solenoid valve 2

(21)

(20) (19)

(18) (17)

< SYSTEM DESCRIPTION >

Component Parts Location

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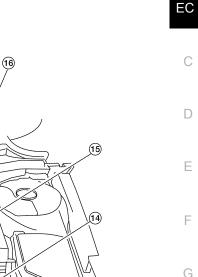
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Power valve actuator 1	2.	Intake valve timing control solenoid valve (bank 1)	3. Power steering pressure sensor
Intake valve timing control solenoid valve (bank 2)	5.	VIAS control solenoid valves 1 and 2	6. Fuel injector (bank 2)
Ignition coil (with power transistor) and spark plug (bank 2)	8.	Crankshaft position sensor (POS)	9. Engine coolant temperature sensor
Camshaft position sensor (PHASE) (bank 2)	11.	ECM	12. Refrigerant pressure sensor
Battery current sensor	14.	Transmission range switch	15. Condenser-2
Mass air flow sensor (with intake air	17	EVAP service port	18 Camshaft position sensor (PHASE)

- 18. Camshaft position sensor (PHASE) (bank 1)
- 21. EVAP canister purge volume control solenoid valve

- 4. Intake valve timing valve (bank 2)
- 7. Ignition coil (with p and spark plug (ba
- 10. Camshaft position (bank 2)
- 13. Battery current ser

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- 16. Mass air flow sensor (with intake air 17. EVAP service port temperature sensor)
- 19. Electric throttle control actuator
- 22. Ignition coil (with power transistor) and spark plug (bank 1)
- 20. Power valve actuator 2
- 23. Knock sensor

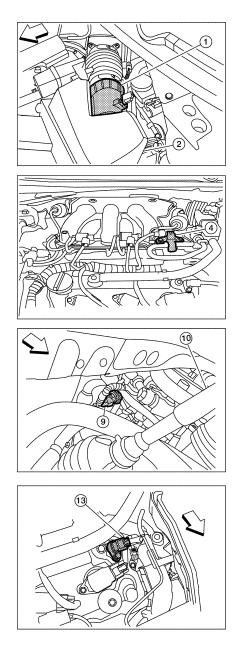


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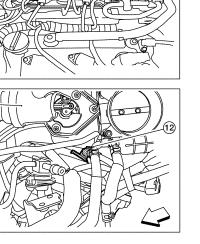
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- 1. Mass air flow sensor (with intake air 2. temperature sensor)
- 4. EVAP canister purge volume control 5. solenoid valve
- 7. VIAS control solenoid valve 2
- 10. Tie rod (RH)
- 13. Camshaft position sensor (PHASE) (bank 2)
- \triangleleft : Vehicle front

- Air cleaner case
- Power valve actuator 1
- 8. Power valve actuator 2
- 11. Power valve actuator 2

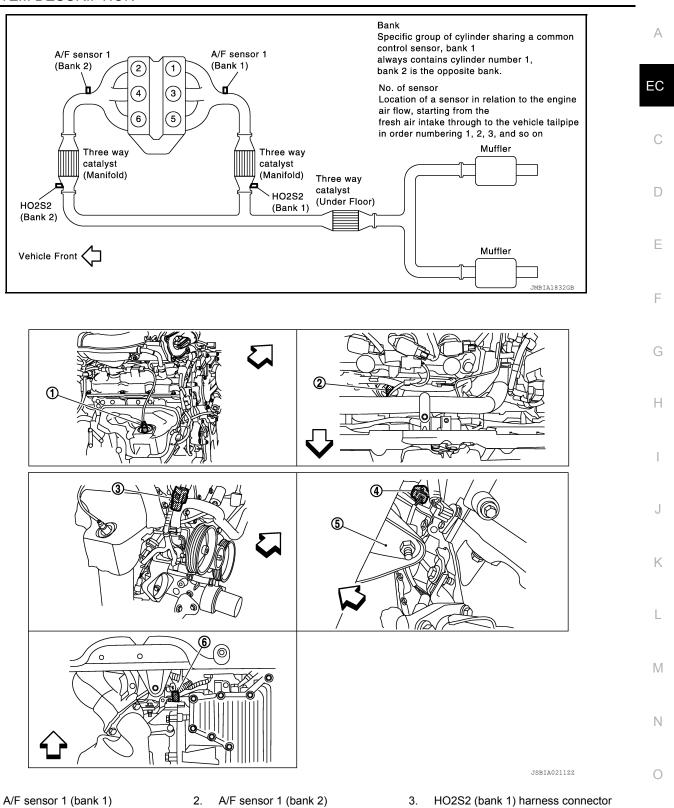


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- 3. Engine coolant temperature sensor
- 6. VIAS control solenoid valve 1
- 9. Power steering pressure sensor
- 12. Camshaft position sensor (PHASE) (bank 1)

< SYSTEM DESCRIPTION >





6. Crankshaft position sensor (POS)

HO2S2 (bank 2) harness connector 5.

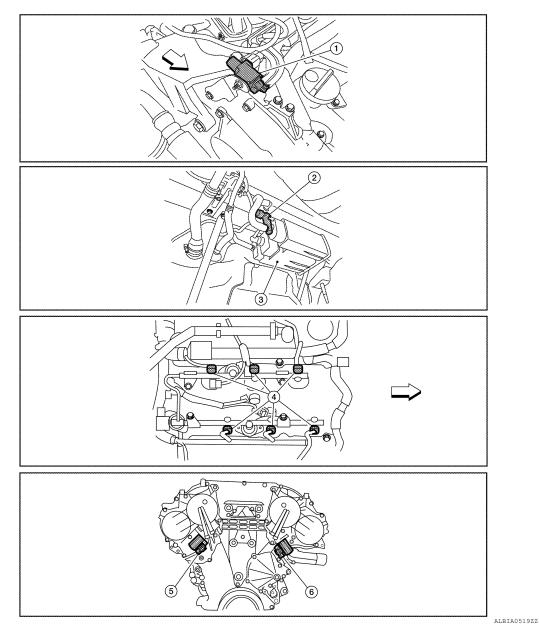
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Front engine mount

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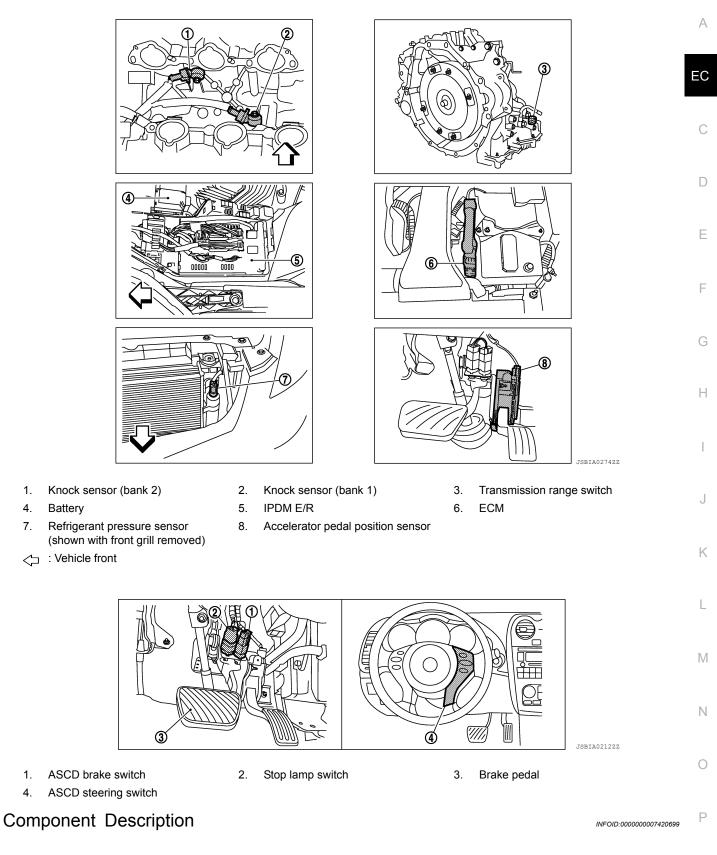


- 1. Electronic controlled engine mount control solenoid valve
- EVAP canister vent control valve 3. (view with rear suspension member removed)
- 4. Fuel injector harness connector
- 5. Intake valve timing control solenoid 6. valve (bank 1)
- EVAP canister
- Intake valve timing control solenoid valve (bank 2)

C : Vehicle front

< SYSTEM DESCRIPTION >

[VQ35DE]



Component	Reference
Accelerator pedal position sensor	EC-584. "Description"
Camshaft position sensor (PHASE)	EC-503. "Description"
Crankshaft position sensor (POS)	EC-499, "Description"

Revision: February 2013

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2012 Altima GCC

< SYSTEM DESCRIPTION >

Component	Reference
Engine coolant temperature sensor	EC-464, "Description"
Mass air flow sensor	EC-455, "Description"
Power valve 1 and 2	EC-638, "Description"
Throttle position sensor	EC-467, "Description"
VIAS control solenoid valve 1	EC-564, "Description"
VIAS control solenoid valve 2	EC-566, "Description"

< 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).

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DIAGNOSIS SYSTEM (ECM) DIAGNOSIS DESCRIPTION

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

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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

		MIL			D	ТС	1st trip DTC	
Items	1s	1st trip 2nd trip		1st trip	2nd trip	1st trip	2nd trip	
	Blinking	Illuminate	Blinking	Illuminate	displaying	displaying	displaying	displaying
One trip detection diagnoses (Re- fer to <u>EC-658, "DTC Index"</u> .)		×	_	_	×		_	_
Two trip detection diagnoses (Refer to <u>EC-658</u> , "DTC Index".)	_	_	_	×	_	×	×	_

DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:000000007420702

DTC AND 1ST TRIP DTC

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

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

For malfunctions in which 1st trip DTCs are displayed, refer to <u>EC-658</u>. "<u>DTC Index</u>". These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT.

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 <u>EC-326</u>, "Work Flow". Then perform DTC Confirmation Procedure or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

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

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen.

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.

< SYSTEM DESCRIPTION >

Priority		Items	/-
1	Freeze frame data	Misfire — DTC: P0300 - P0308	
2		Except the above items	
3	1st trip freeze frame da	ata	E

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 : Malfunction Indicator Lamp (MIL)

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

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

NOTE:

Check the MIL circuit if MIL does not illuminate. Refer to <u>EC-</u> 633, "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 ^J J^{35BIA131522} 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

ON BOARD DIAGNOSIS ITEM

The on board diagnostic system has the following functions.

Diagnostic test mode	Function
Bulb check	MIL can be checked.
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-334, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Description".
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to EC-335, "THROTTLE VALVE CLOSED PO- SITION LEARNING : Description".
Idle air volume learning	ECM can learn the idle air volume. Refer to EC-335. "IDLE AIR VOLUME LEARNING : Description".
Mixture ratio self-learning value clear	Mixture ratio self-learning value can be erased. Refer to <u>EC-337</u> , "MIXTURE RATIO SELF-LEARN- ING VALUE CLEAR : Description".

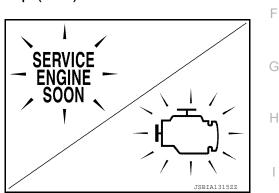
BLUB CHECK MODE

Description

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

Operation Procedure

1. Turn ignition switch ON.



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The MIL on the instrument panel should stay ON. If it remains OFF, check MIL circuit. Refer to <u>EC-633, "Diagnosis Procedure"</u>.

MALFUNCTION WARNING MODE

Description

2.

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

Operation Procedure

- 1. Turn ignition switch ON.
- Check that MIL illuminates. If it remains OFF, check MIL circuit. Refer to <u>EC-633, "Diagnosis Procedure"</u>.
- 3. Start engine and let it idle.
 - For two trip detection logic diagnoses, ECM turns on MIL when it detects the same malfunction twice in the two consecutive driving cycles.
 - For 1st trip detection logic diagnoses, ECM turns on MIL when it detects a malfunction in one driving cycle.
 - ECM blinks MIL when it detects a malfunction that may damage the three way catalyst (misfire).

SELF-DIAGNOSTIC RESULTS MODE

Description

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

How to Set Self-diagnostic Results Mode

NOTE:

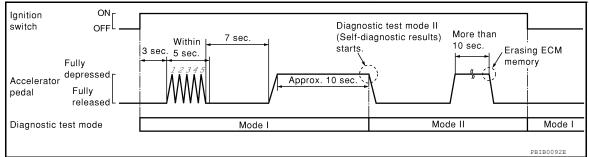
- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- After ignition switch is turned off, ECM is always released from the "Self-diagnostic results" mode.
- 1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 2. Repeat the following procedure quickly five times within 5 seconds.
 - Fully depress the accelerator pedal.
 - Fully release the accelerator pedal.
- 3. Wait 7 seconds, fully depress the accelerator pedal and keep it depressed for approx. 10 seconds until the MIL starts blinking.

NOTE:

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

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

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



How to Read Self-diagnostic Results

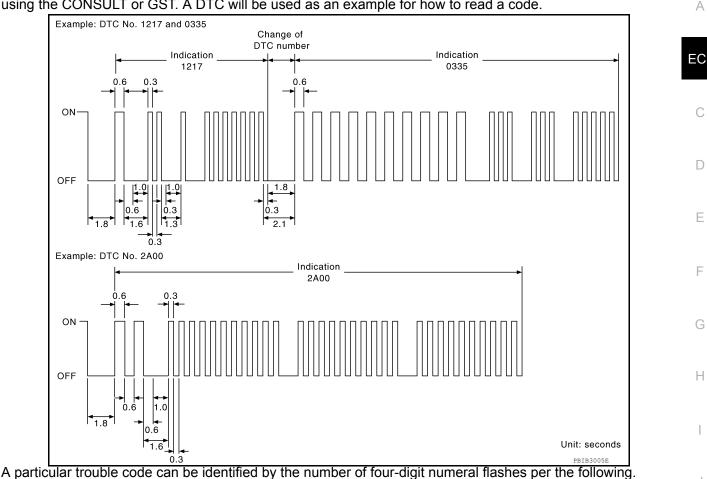
The DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below.

The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in "malfunction warning" mode, it is a DTC; if two or more codes are displayed, they may be either

< SYSTEM DESCRIPTION >

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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.



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.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to <u>EC-658, "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.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- 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.

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- 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

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FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECU Identification	ECM part number can be read.

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

· Diagnostic trouble codes

- · 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data

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
TARGET IDLE RPM ADJ*	IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	IDLE CONDITION	When adjusting target ignition tim- ing

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

SELF-DIAG RESULTS MODE

Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to <u>EC-658. "DTC Index"</u>.)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to <u>EC-658, "DTC Index"</u> .)

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Freeze frame data item*	Description	A
FUEL SYS-B1	"Fuel injection system status" at the moment a malfunction is detected is displayed.	
FUEL SYS-B2	 One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop 	EC
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.	C
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.	Г
L-FUEL TRM-B1 [%]	"Long-term fuel trim" at the moment a malfunction is detected is displayed.	L
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.	E
S-FUEL TRM-B2 [%]	The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel sched- ule.	
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.	F
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.	G
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.	F
INT MANI PRES [kPa]		_
COMBUST CONDI- TION	These items are displayed but are not applicable to this model.	

DATA MONITOR MODE

Monitored Item

			×: Applicable
Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	 Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	 Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	 The signal voltage of the mass air flow sensor is displayed. 	 When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC".
B/FUEL SCHDL	ms	"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.	 value is indicated. This data also includes the data for the air-fuel ratio learning control. When engine is running specification range is indicated in "SPEC".
COOLAN TEMP/S	°C or °F	 The engine coolant temperature (determined by the signal voltage of the engine coolant tempera- ture sensor) is displayed. 	 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.

< SYSTEM DESCRIPTION >

[VQ35DE]

Monitored item	Unit	Description	Remarks
A/F SEN1 (B1)	V	• The A/F signal computed from the input signal of	
A/F SEN1 (B2)		the air fuel ratio (A/F) sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2	
HO2S2 (B2)		is displayed.	
HO2S2 MNTR(B1) HO2S2 MNTR(B2)	RICH/LEAN	 Display of heated oxygen sensor 2 signal: RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three 	 When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	 way catalyst is relatively large. 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 sen- sor) is indicated. 	
EVAP SYS PRES	V	• The signal voltage of EVAP control system pres- sure sensor is displayed.	
START SIGNAL	ON/OFF	 Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	 After starting the engine, [OFF] is dis- played regardless of the starter sig- nal.
CLSD THL POS	ON/OFF	 Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal. 	
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	 Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and light- ing switch are OFF. 	
IGNITION SW	ON/OFF	 Indicates [ON/OFF] condition from ignition switch signal. 	
HEATER FAN SW	ON/OFF	 Indicates [ON/OFF] condition from the heater fan switch signal. 	
BRAKE SW	ON/OFF	 Indicates [ON/OFF] condition from the stop lamp switch signal. 	

< SYSTEM DESCRIPTION >

[VQ35DE]

Monitored item	Unit	Description	Remarks	
INJ PULSE-B1		Indicates the actual fuel injection pulse width	• When the engine is stopped, a certain	A
INJ PULSE-B2	msec	compensated by ECM according to the input sig- nals.	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.	EC
MASS AIRFLOW	g/s	• Indicates the mass air flow computed by ECM ac- cording to the signal voltage of the mass air flow sensor.		С
PURG VOL C/V	%	 Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 		D
INT/V TIM (B1)	004	Indicates [°CA] of intake camshaft advance an-		E
INT/V TIM (B2)	°CA	gle.		
INT/V SOL(B1)		The control value of the intake valve timing con-		F
INT/V SOL(B2)	%	trol solenoid valve (determined by ECM according to the input signals) is indicated.The advance angle becomes larger as the value increases.		F
VIAS S/V-1	ON/OFF	 The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the in- put signals) is indicated. ON: VIAS control solenoid valve 1 is operating. OFF: VIAS control solenoid valve 1 is not operat- ing. 		Η
VIAS S/V-2	ON/OFF	 The control condition of the VIAS control solenoid valve 2 (determined by ECM according to the in- put signals) is indicated. ON: VIAS control solenoid valve 2 is operating. OFF: VIAS control solenoid valve 2 is not operat- ing. 		J
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (deter- mined by ECM according to the input signals) is indicated.		K
ENGINE MOUNT	IDLE/TRVL	 The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated. IDLE: Engine speed is below 950 rpm TRVL: Engine speed is above 950 rpm 		L
FUEL PUMP RLY	ON/OFF	 Indicates the fuel pump relay control condition determined by ECM according to the input sig- nals. 		Μ
VENT CONT/V	ON/OFF	 The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 		N
THRTL RELAY	ON/OFF	 Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 		Р
COOLING FAN	HI/MID/LOW/ OFF	 The control condition of the cooling fan (determined by ECM according to the input signals) is indicated. HI: High speed operation MID: Middle speed operation LOW: Low speed operation OFF: Stop 		

< SYSTEM DESCRIPTION >

[VQ35DE]

Monitored item	Unit	Description	Remarks
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.	
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	 Display the condition of idle air volume learning YET: Idle Air Volume Learning has not been per- formed yet. CMPLT: Idle Air Volume Learning has already been performed successfully. 	
ENG OIL TEMP	°C or °F	 The engine oil temperature (determined by the signal voltage of the engine oil temperature sen- sor) 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	
A/F S1 HTR(B2)	%	computed by ECM according to the input signals.The current flow to the heater becomes larger as the value increases.	
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 dis- played. 	
SET VHCL SPD	km/h or mph	The preset vehicle speed is displayed.	
MAIN SW	ON/OFF	 Indicates [ON/OFF] condition from MAIN switch signal. 	
CANCEL SW	ON/OFF	 Indicates [ON/OFF] condition from CANCEL switch signal. 	
RESUME/ACC SW	ON/OFF	 Indicates [ON/OFF] condition from RESUME/AC- CELERATE switch signal. 	
SET SW	ON/OFF	 Indicates [ON/OFF] condition from SET/COAST switch signal. 	
BRAKE SW1	ON/OFF	 Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2	ON/OFF	 Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT	NON/CUT	 Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off. 	
LO SPEED CUT	NON/CUT	 Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off. 	
AT OD MONITOR	ON/OFF	 Indicates [ON/OFF] condition of A/T O/D accord- ing to the input signal from the TCM. 	
AT OD CANCEL	ON/OFF	 Indicates [ON/OFF] condition of A/T O/D cancel request signal. 	
CRUISE LAMP	ON/OFF	 Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. 	
SET LAMP	ON/OFF	 Indicates [ON/OFF] condition of SET lamp deter- mined by the ECM according to the input signals. 	

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< SYSTEM DESCRIPTION >

[VQ35DE]

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Monitored item	Unit	Description	Remarks	
ALT DUTY SIG	ON/OFF	 The control condition of the power generation voltage variable control (determined by ECM ac- cording to the input signals) is indicated. ON: Power generation voltage variable control is active. OFF: Power generation voltage variable control is inactive. 		EC
A/F ADJ-B1		Indicates the correction of factor stored in ECM.		С
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.		D
ALT DUTY	%	Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal.		E
I/P PULLY SPD	rpm	Indicates the engine speed computed from the in- put speed sensor signal.		_

NOTE:

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

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJEC- TION	 Engine: Return to the original trouble condition Change the amount of fuel injec- tion using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIM- ING	 Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
POWER BAL- ANCE	 Engine: After warming up, idle the engine. A/C switch OFF Selector lever: P or N Cut off each injector signal one at a time using CONSULT. 	Engine runs rough or dies.	 Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil
COOLING FAN*	 Ignition switch: ON Turn the cooling fan "HI", "MID", "LOW" and "OFF" using CON- SULT. 	Cooling fan moves and stops.	 Harness and connectors Cooling fan motor IPDM E/R
ENG COOLANT TEMP	 Engine: Return to the original trouble condition Change the engine coolant tem- perature using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Engine coolant temperature sensor Fuel injector
FUEL PUMP RE- LAY	 Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound. 	Fuel pump relay makes the operat- ing sound.	Harness and connectorsFuel pump relay
VIAS SOL VALVE	 Ignition switch: ON Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound. 	Solenoid valve makes the operating sound.	Harness and connectorsSolenoid valve

< SYSTEM DESCRIPTION >

[VQ35DE]

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)	
VIAS S/V-B2	 Ignition switch: ON Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound. 	Solenoid valve makes the operating sound.	Harness and connectorsSolenoid valve	
ENGINE MOUNTING	 Ignition switch: ON Turn electronic controlled engine mount "IDLE" and "TRVL" with the CONSULT. 	Electronic controlled engine mount makes the operating sound.	Harness and connectorsElectronic controlled engine mount	
PURG VOL CONT/V	 Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CON-SULT. 	Engine speed changes according to the opening percent.	Harness and connectorsSolenoid valve	
FUEL/T TEMP SEN	Change the fuel tank temperature using CONSULT.			
VENT CON- TROL/V	 Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound. 	Solenoid valve makes an operating sound.	Harness and connectorsSolenoid valve	
V/T ASSIGN AN- GLE	 Engine: Return to the original trouble condition Change intake valve timing using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	 Harness and connectors Intake valve timing control solenoid valve 	
ALTERNATOR DUTY	 Engine: Idle Change duty ratio using CON- SULT. 	Battery voltage changes.	Harness and connectorsIPDM E/RAlternator	

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

"DATA MONITOR" mode is NOT within the SP value, the Engine Control System may have one or more mal-

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

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONI-TOR" mode of CONSULT during normal operation of the Engine Control System. When the value in "SPEC" in

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

Make sure that all of the following conditions are satisfied. • Vehicle driven distance: More than 5,000 km (3,107 miles) • Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm², 14.25 - 15.12 psi) • Atmospheric temperature: 20 - 30°C (68 - 86°F) • Engine coolant temperature: 75 - 95°C (167 - 203°F) • Transmission: Warmed-up • After the engine is warmed up to normal operating temperature, drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V. • 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-330, "BASIC INSPECTION : Special Repair Requirement".

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.
 Make sure that monitor items are within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Go to EC-430, "Diagnosis Procedure".

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TROUBLE DIAGNOSIS - SPECIFICATION VALUE

DTC/CIRCUIT DIAGNOSIS

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

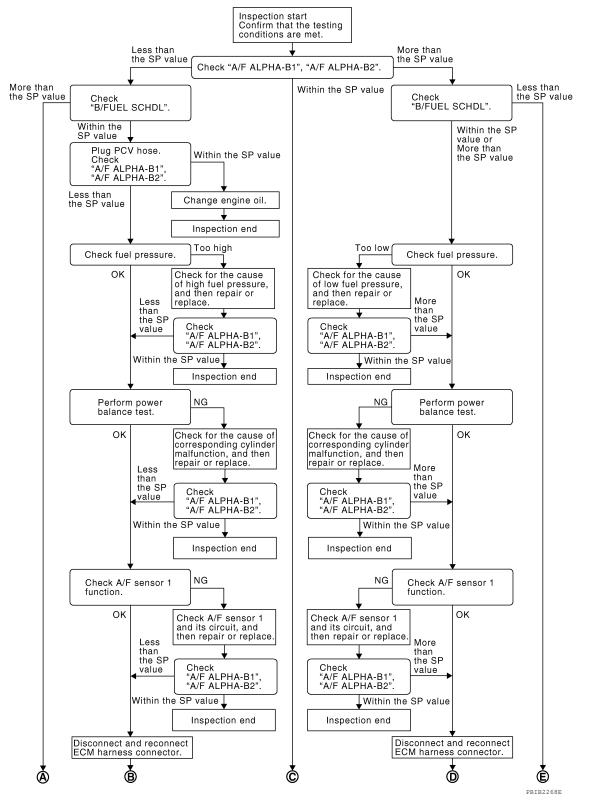
< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000007420708

[VQ35DE]

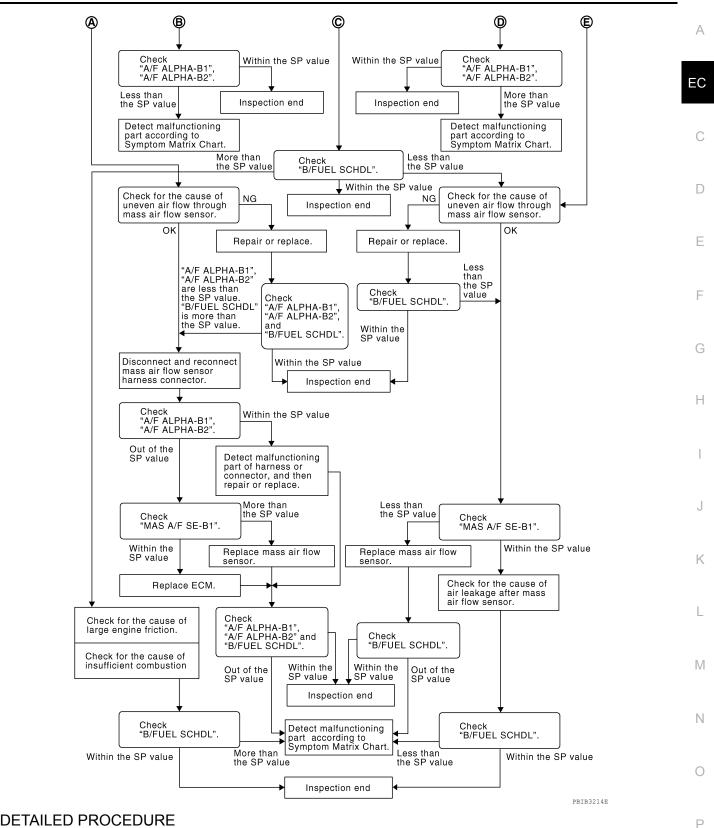
OVERALL SEQUENCE



TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



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-429, "Component Function Check".
- 3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and make sure that the each indication is within the SP value.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

NOTE:

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

Is the measurement value within the SP value?

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

2.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> GO TO 4.

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

3.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> GO TO 6.

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

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

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

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

Is the measurement value within the SP value?

YES >> GO TO 5.

NO >> GO TO 6.

5.CHANGE ENGINE OIL

- 1. Stop the engine.
- 2. Change engine oil. Refer to LU-26, "Changing Engine Oil".

NOTE:

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

>> INSPECTION END

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-700, "Inspection".)

Is the inspection result normal?

YES >> GO TO 9.

NO-1 >> Fuel pressure is too high: Replace "fuel filter and fuel pump assembly", refer to <u>FL-6</u>, "<u>Exploded</u> <u>View</u>", and then. GO TO 8.

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

1.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-6. "Exploded View"</u>, and then GO TO 8. >> Repair or replace and then GO TO 8.

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >	
B. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	
 Start engine. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and ma each indication is within the SP value. 	ake sure that the
s the measurement value within the SP value? YES >> INSPECTION END NO >> GO TO 9.	I
9. PERFORM POWER BALANCE TEST	
 Perform "POWER BALANCE" in "ACTIVE TEST" mode. Make sure that the each cylinder produces a momentary engine speed drop. 	
s the inspection result normal?	
YES >> GO TO 12. NO >> GO TO 10.	
10. DETECT MALFUNCTIONING PART	
Check the following.	
 Ignition coil and its circuit (Refer to <u>EC-628, "Component Function Check"</u>.) Fuel injector and its circuit (Refer to <u>EC-615, "Component Function Check"</u>.) 	
 Intake air leakage Low compression pressure (Refer to <u>EM-131, "On-Vehicle Service"</u>.) 	
<u>s the inspection result normal?</u> YES >> Replace fuel injector, refer to <u>EM-152, "Removal and Installation"</u> , and then GO T NO >> Repair or replace malfunctioning part and then GO TO 11.	O 11.
11.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	
 Start engine. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and ma each indication is within the SP value. 	ake sure that the
s 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 <u>EC-470, "DTC Logic"</u>. For DTC P0131, P0151, refer to <u>EC-474, "DTC Logic"</u>. 	
• For DTC P0132, P0152, refer to $\underline{\text{EC-478}}$, "DTC Logic".	
s any DTC detected?	
YES >> GO TO 15. NO >> GO TO 13.	
13. CHECK A/F SENSOR 1 CIRCUIT	
Perform Diagnostic Procedure according to corresponding DTC.	
>> GO TO 14.	
14. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	
 Start engine. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and ma each indication is within the SP value. 	ake sure that the
s the measurement value within the SP value?	
YES >> INSPECTION END NO >> GO TO 15.	
15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR	
1. Stop the engine.	

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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

>> GO TO 16.

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

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

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-688. "Symptom Table"</u>.

17.CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> INSPECTION END

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

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

18. DETECT MALFUNCTIONING PART

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

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

19.CHECK INTAKE SYSTEM

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

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

Is the inspection result normal?

YES >> GO TO 21.

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

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

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

Is the measurement value within the SP value?

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

 $21. {\tt DISCONNECT} \text{ and Reconnect} \text{ mass air flow sensor harness connector}$

1. Stop the engine.

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

[VQ35DE] < DTC/CIRCUIT DIAGNOSIS > **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 make sure that the 2. each indication is within the SP value. EC Is the measurement value within the SP value? YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-456, "Diagnosis Procedure". Then GO TO 29. NO >> GO TO 23. 23.CHECK "MAS A/F SE-B1" Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the D SP value. Is the measurement value within the SP value? Ε YES >> GO TO 24. NO >> More than the SP value: Replace mass air flow sensor, refer to EM-132, "Removal and Installation", and then GO TO 29. 24.REPLACE ECM Replace ECM. 1. 2. Refer to EC-333, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement". >> GO TO 29. Н 25. CHECK INTAKE SYSTEM Check for the cause of uneven air flow through mass air flow sensor. Refer to the following. Crushed air ducts Malfunctioning seal of air cleaner element Uneven dirt of air cleaner element Improper specification of intake air system Is the inspection result normal? YES >> GO TO 27. NO >> Repair or replace malfunctioning part, and then GO TO 26. Κ 26. CHECK "B/FUEL SCHDL" Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value. L Is the measurement value within the SP value? YES >> INSPECTION END NO >> Less than the SP value: GO TO 27. M 27.CHECK "MAS A/F SE-B1" Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the Ν SP value. Is the measurement value within the SP value? YES >> GO TO 28. >> Less than the SP value: Replace mass air flow sensor, refer to EM-132, "Removal and Installa-NO tion", and then GO TO 30. 28. CHECK INTAKE SYSTEM P

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

- Disconnection, looseness, and cracks in air duct
- · Looseness of oil filler cap
- · Disconnection of oil level gauge
- · Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve

< DTC/CIRCUIT DIAGNOSIS >

- · Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

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

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to <u>EC-688, "Symptom Table"</u>.

30. CHECK "B/FUEL SCHDL"

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

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to <u>EC-688, "Symptom Table"</u>.

	POV		LY AND GROUI	ND CIRCUIT		
< DTC/CIRCUI					[VQ35DE]	
POWER SU	JPPLY AND) GROUN	D CIRCUIT			А
Diagnosis Pr	rocedure				INFOID:000000007420709	/ \
1.CHECK GRO	OUND CONNEC	TION				EC
	n switch OFF.	0 Defer to Cr	aund Inanastion in Cl	I-45, "Circuit Inspection".		
Is the inspection			Junu inspection in G	<u>1-45, Circuit Inspection</u> .		С
YES >> GO	TO 2.					
-	pair or replace gr					D
			EN AND SHORT			L
	ECM harness co continuity betwee		ss connector and gro	ound.		E
	ECM		2 1			
Connector	т	erminal	Ground	Continuity		F
F14		12				
		16				(
		107 108	Ground	Existed		
E10		111				ŀ
		112				1
3. Also check	harness for shor	t to power.				
is the inspection						
YES >> GO NO >> GO	-					
3.DETECT MA	LFUNCTIONING	G PART				,
Check the follow	ving.					
Harness conneHarness for op		veen ECM and	around			k
			0			
			er in harness or con	nectors.		L
4.CHECK ECM						
	ECM harness co n switch OFF and					N
	voltage between		connectors.			
				() x 🔁 🕑 🖻	I.S.	ľ
	ECM					1
Connector	+ Terminal	– Terminal	Voltage	93	112	
E10	93	112	Battery voltage			(
Is the inspection					, T	
YES >> GO	TO 6.					F
NO >> GO	TO 5.				JMBIA1875ZZ	

5. DETECT MALFUNCTIONING PART

- Check the following. IPDM E/R connector E18
- 10 A fuse (No. 35)
- Harness for open or short between ECM and IPDM E/R

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

6.CHECK ECM POWER SUPPLY CIRCUIT-II

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

	ECM				
Connector	+	-	Voltage		
Connector	Terminal	Terminal			
E10	105	112	After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop to approximately 0 V.		

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 9.

7.CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch ON.

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

IPDN	/I E/R	Ground	Voltage
Connector	Terminal	Ground	voltage
F10	49	Ground	Battery voltage
110	53	Ground	Dattery Voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".

8.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

9. CHECK ECM POWER SUPPLY CIRCUIT-IV

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

-		E			
	-	+		_	Voltage
-	Connector	Terminal	Connector	Terminal	
	F14	24	E10	112	Battery voltage

Is the inspection result normal?

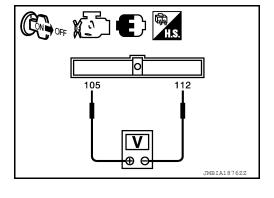
YES >> GO TO 12.

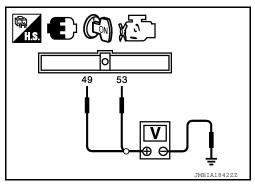
NO >> GO TO 10.

10. CHECK ECM POWER SUPPLY CIRCUIT-V

- 1 Disconnect ECM harness connector.
- 2. Disconnect IPDM E/R harness connector.

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





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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

EC	CM	IPDN	1 E/R		А
Connector	Terminal	Connector	Terminal	- Continuity	
F14	24	F10	69	Existed	EC
4. Also che	ck harness fo	or short to gro	und and sho	ort to power.	LC
Is the inspect	tion result no	rmal?			
	GO TO 11.				С
		circuit, snort to	o ground or s	short to power in harness or connectors.	
11.снеск					D
1. Disconne 2. Check 18		(No. 42) from	IPDM E/R.		
Is the inspect		rmal?			
	GO TO 13.				E
NO >> F	Replace 15 A				
12.снеск	ECM POWE	ER SUPPLY C	IRCUIT-VI		F
		ness connecto			1
		harness con			
3. Check th	e continuity i	between ECIV	narness co	onnector and IPDM E/R harness connector.	G
F(СМ	IPDA	1 E/R		
Connector	Terminal	Connector	Terminal	- Continuity	Н
E10	105	E18	10	Existed	
4. Also che	ck harness fo	or short to gro	und and sho	ort to power.	
Is the inspect		-			
	GO TO 13.				
			-	short to power in harness or connectors.	J
13.CHECK	INTERMITT	ENT INCIDE	NT		
Refer to GI-4	2, "Intermitte	nt Incident".			
Is the inspect	tion result no	rmal?			K
				"Removal and Installation".	
NO >> F	Repair or repl	ace harness	or connector	IS.	L
					M
					Ν
					IN
					0
					Р
					I

< DTC/CIRCUIT DIAGNOSIS >

U1000, U1001 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:000000007420711

INFOID:000000007420712

DTC DETECTION LOGIC

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

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-440, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

Go to LAN-15, "Trouble Diagnosis Flow Chart".

< DTC/CIRCUIT DIAGNOSIS >

P0011, P0021 IVT CONTROL

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P0011 or P0021 is displayed with DTC P0075, P0081, first perform the trouble diagnosis for <u>EC-</u> <u>452, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0011	intake valve timing control performance (bank 1) Intake valve timing	There is a gap between angle of target and phase-control angle degree.	 Crankshaft position sensor (POS) Camshaft position sensor (PHASE) Intake valve control solenoid valve Accumulation of debris to the signal pick-up portion of the camshaft
P0021	control performance (bank 2)		 Timing chain installation Foreign matter caught in the oil groove for in- take valve timing control
	NFIRMATION PR	OCEDURE	
1. INSPE	CTION START		
	SULT be used?		
	SULT be used?		
	>> GO TO 2. >> GO TO 5.		
~	ONDITIONING		
			vays turn ignition switch OFF and wait at
TESTING Before pe	CONDITION: erforming the follo	owing procedure, confirm that batter	y voltage is between 10 V and 16 V at
TESTING Before pe idle.	 > GO TO 3. 		y voltage is between 10 V and 16 V at
TESTING Before pe idle. 3.PERFC	 > GO TO 3. > RM DTC CONFIR 	wing procedure, confirm that batter	y voltage is between 10 V and 16 V at
TESTING Before period idle.	 > GO TO 3. > GO TO CONFIR > ONSULT > gnition switch ON a engine and warm it 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature	CONSULT.
TESTING Before period idle.	 > GO TO 3. > GO TO 3. > DRM DTC CONFIR ONSULT Ignition switch ON a engine and warm it ain the following co ssible. 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature	CONSULT.
TESTING Before period idle. 3.PERFC With Co 1. Turn i 2. Start e 3. Mainta as po	 > GO TO 3. > GO TO 3. > DRM DTC CONFIR ONSULT Ignition switch ON a engine and warm it ain the following co ssible. EED SE 100 - 100	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive second	CONSULT.
TESTING Before period idle. 3. PERFC With Co 1. Turn i 2. Start e 3. Mainta as po VHCL SPE	 > GO TO 3. > GO TO 3. > DRM DTC CONFIR ONSULT ignition switch ON a engine and warm it ain the following co ssible. EED SE 100 - 7 ED 1,200 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive secon	CONSULT.
TESTING Before period idle. 3.PERFC 0. Turn i 2. Start e 3. Mainta as po VHCL SPE ENG SPEE	 > GO TO 3. > GO TO 3. > DRM DTC CONFIR ONSULT Ignition switch ON a engine and warm it ain the following co ssible. ED SE 100 - 2 ED 1,200 TEMP/S More to 100 - 1 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive secon	CONSULT.
Before period idle. 3.PERFC With Co 1. Turn i 2. Start e 3. Mainta as po VHCL SPE ENG SPEE COOLAN	 > GO TO 3. > GO TO 3. > DRM DTC CONFIR ONSULT Ignition switch ON a engine and warm it ain the following cossible. EED SE 100 - 7 ED SE 100 - 7 	MATION PROCEDURE-I and select "DATA MONITOR" mode with up to the normal operating temperature nditions for at least 6 consecutive secon 20 km/h (63 - 75 mph) - 4,000 rpm han 60°C (140°F) han 7.3 msec	CONSULT.

Is 1st trip DTC detected?

YES >> Go to EC-443, "Diagnosis Procedure"

NO >> GO TO 4.

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< DTC/CIRCUIT DIAGNOSIS >

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Select "DATA MONITOR" mode with CONSULT.

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

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

CAUTION:

Always drive at a safe speed.

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-443, "Diagnosis Procedure".

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-442. "Component Function Check".

NOTE:

Use component function check to check the overall function of intake valve timing control system. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

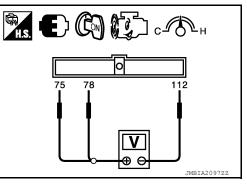
NO >> Go to EC-443, "Diagnosis Procedure".

Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK

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. Start engine and let it idle.
- Check the voltage between ECM harness connector and ground under the following condition.



< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		ECM				A	
DTC	Connec- tor	Terminal	Connec- tor	Terminal	Condition	Voltage signal	
					At idle	BATTERY VOLTAGE (11 - 14 V)	
P0011	- F13	78 [IVT control solenoid valve (bank 1)]	E10	112	When revving engine up to 2,000 rpm	7 - 12 V★ C F F SV/div JMBIA0038GB E	
					At idle	BATTERY VOLTAGE (11 - 14 V) 7 - 12 V★ F	
P0021		75 [IVT control solenoid valve (bank 2)]			When revving engine up to 2,000 rpm	G SV/div JMBIA0038GB	
★: Ave	★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)						
Is the insp	ection res	sult normal?				1	
		CTION END EC-443, "Diagnosis	Procedu	°0"		I	
Diagnos		-	FICEUU	<u> </u>		INFOID:000000007420715	
1. CHEC	K OIL PRI	ESSURE WARNIN	g lamp				
		sure warning lam	p and co	nfirm it is	not illumi-	K	
		ning lamp illuminat	ed?				
2	PBIA8559J						
	2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE						
Refer to <u>EC-444, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 3. NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-163, "Removal</u> <u>and Installation"</u> .							
3.CHECH	3. CHECK CRANKSHAFT POSITION SENSOR (POS)						
Refer to E	<u>C-502, "(</u>	Component Inspect					
	ection re: > GO TO	<u>sult normal?</u> 4.					

Revision: February 2013

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

NO >> Replace crankshaft position sensor (POS). Refer to EM-144. "Exploded View".

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-505, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-157, "Exploded View".

5.CHECK CAMSHAFT (INTAKE)

Check the following.

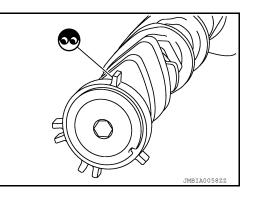
Accumulation of debris to the signal plate of camshaft rear end

Chipping signal plate of camshaft rear end

Is the inspection result normal?

YES >> GO TO 6.

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-184.</u> <u>"Removal and Installation"</u>.



6. CHECK TIMING CHAIN INSTALLATION

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

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

YES >> Check timing chain installation. Refer to EM-174, "Installation".

NO >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to EM-192, "Inspection after Installation".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Clean lubrication line.

8.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

INFOID:000000007420716

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

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

2. Check resistance between intake valve timing control solenoid valve terminals as follows.

Terminals	Resistance
1 and 2	7.1 - 7.7Ω [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-163, "Removal</u> <u>and Installation"</u>.

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

1. Remove intake valve timing control solenoid valve. Refer to EM-163, "Removal and Installation".

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

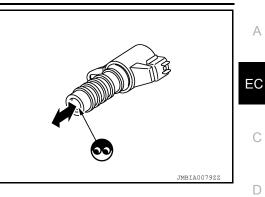
Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-163</u>, "<u>Removal</u> <u>and Installation</u>".



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

< DTC/CIRCUIT DIAGNOSIS >

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

Description

INFOID:000000007420717

[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 control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		neater

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

DTC Logic

INFOID:000000007420718

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.)	 Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) A/F sensor 1 heater
P0032	Air fuel ratio (A/F) sensor 1 heater (bank 1) control circuit high	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.)	 Harness or connectors (The A/F sensor 1 heater circuit is shorted.) A/F sensor 1 heater
P0051	Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit low	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.)	 Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) A/F sensor 1 heater
P0052	Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit high	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.)	 Harness or connectors (The A/F sensor 1 heater circuit is shorted.) A/F sensor 1 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 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 <u>EC-446, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-38, "Work Flow".

EC-446

) TO 2. pair or re	place grou	nd conneo	ction.			
	•				ER SUPPLY CIF	RCUIT	
. Disconnect	t air fuel r	atio (A/F) s	sensor 1 h	arness c	onnector.		
Turn ignitio			- sensor 1	harness	connector and		
ground.	_					⅀ℴ℄⅌℗ℷ⅀	
DTO		A/F sensor 1		Oneverd			
DTC	Bank	Connector	Terminal	Ground	Voltage (V)	$\begin{pmatrix} 2 \\ 4 \\ 3 \end{pmatrix}$	
P0031, P0032	1	F12	4	Ground	Battery voltage		- I
20051, P0052	2	F61	4		, , , , , , , , , , , , , , , , , , , ,		
<u>the inspectio</u> ′ES >> GC	<u>n result n</u>) TO 4.	ormal?					÷
	D TO 3.						PBIB3308E
DETECT MA	ALFUNC ⁻	FIONING F	PART				
eck the follo							<u>.</u>
PDM E/R ha	rness cor	nnector F10	0				
5 A fuse (No	o. 37)						
15 A fuse (No	o. 37)			isor 1 an	d fuse		
15 A fuse (No	o. 37)			isor 1 an	d fuse		
15 A fuse (No Harness for o	o. 37) open or sl		en A/F ser		d fuse		
15 A fuse (No Harness for o >> Re	o. 37) open or sł pair or re	nort betwee place harn	en A/F ser ess or cor	nectors.			
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio	o. 37) open or sh pair or re SENSOI on switch	nort betwee place harn R 1 HEATE OFF.	en A/F ser ess or cor ER OUTPL	nectors.			
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect	o. 37) pen or sh pair or re SENSOI n switch t ECM ha	nort betwee place harn R 1 HEATE OFF. rness conr	en A/F ser ess or cor ER OUTPL nector.	nectors. JT SIGN	AL CIRCUIT		
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect	o. 37) pen or sh pair or re SENSOI n switch t ECM ha	nort betwee place harn R 1 HEATE OFF. rness conr	en A/F ser ess or cor ER OUTPL nector.	nectors. JT SIGN	AL CIRCUIT	or and ECM harness connec	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr	o. 37) pen or sh pair or re SENSOI n switch t ECM ha	nort betwee place harn R 1 HEATE OFF. rness conr	en A/F ser ess or cor R OUTPL nector. reen A/F s	nectors. JT SIGN	AL CIRCUIT		tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect	o. 37) pen or sh pair or re SENSOI n switch t ECM ha	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw	en A/F ser ess or cor R OUTPL nector. veen A/F s	Inectors. JT SIGN/ ensor 1 h	AL CIRCUIT	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr	o. 37) pen or sh pair or re SENSOF n switch t ECM ha ness cont	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F sensc	en A/F ser ess or cor R OUTPL nector. veen A/F s	nnectors. JT SIGN/ ensor 1 h	AL CIRCUIT	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC -	b. 37) pen or sk pair or re SENSOF n switch t ECM ha ness cont Bank	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F sensc Connect	en A/F ser ess or cor ER OUTPL nector. reen A/F s or 1 or Termi	nnectors. JT SIGN/ ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC - 20031, P0032 20051, P0052	o. 37) pen or sh pair or re SENSOI on switch t ECM ha bess cont Bank 1 2	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso Connect F12 F61	en A/F ser ess or cor ER OUTPL nector. reen A/F s or 1 or Termi 3 3	nnectors. JT SIGN/ ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC - P0031, P0032 P0051, P0052 Also check	o. 37) pen or sh pair or re SENSOF on switch t ECM ha ness cont Bank 1 2 harness	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso A/F senso Connect F12 F61 for short to	en A/F ser ess or cor ER OUTPL nector. reen A/F s or 1 or Termi 3 3	nnectors. JT SIGN/ ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC 	o. 37) pen or sh pair or re SENSOF on switch t ECM ha ness cont Bank 1 2 harness	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso A/F senso Connect F12 F61 for short to	en A/F ser ess or cor ER OUTPL nector. reen A/F s or 1 or Termi 3 3	nnectors. JT SIGN/ ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8	Bank	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC - P0031, P0032 P0051, P0052 Also check the inspectio (ES >> GC	0. 37) pen or sh pair or re SENSOF n switch t ECM ha ness cont Bank 1 2 harness n result n 0 TO 5.	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso Connect F12 F61 for short to ormal?	en A/F ser ess or cor R OUTPU nector. reen A/F s or 1 or Termi 3 o ground a	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank	tor.
15 A fuse (No Harness for o >> Re CHECK A/F Turn ignitio Disconnect Check harr DTC - 20031, P0032 20051, P0052 Also check the inspectio (ES >> GC NO >> Re	b. 37) pen or sh pair or re SENSOF on switch t ECM han hess cont Bank 1 2 harness <u>n result n</u> 0 TO 5. pair oper	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso A/F senso Connect F12 F61 for short to ormal?	en A/F ser ess or cor R OUTPL nector. /een A/F s or 1 or Termi 3 o ground a short to gr	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank al Existed	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC - - - - - - - - - - - - - - - - - - -	 b. 37) pen or sh pair or re SENSOF In switch ECM hat be cont Bank 1 2 harness n result n D TO 5. pair oper SENSOF 	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso A/F senso Connect F12 F61 for short to ormal?	en A/F ser ess or cor R OUTPL nector. /een A/F s or 1 or Termi 3 o ground a short to gr	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank al Existed	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC P0031, P0032 P0051, P0052 Also check the inspectio (ES >> GC NO >> Re .CHECK A/F efer to <u>EC-44</u>	o. 37) pen or sh pair or re SENSOF on switch t ECM ha ness cont Bank 1 2 harness n result n 0 TO 5. pair oper SENSOF 8, "Comp	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F sensc Connect F12 F61 for short to ormal? circuit or s R 1 HEATE	en A/F ser ess or cor R OUTPL nector. /een A/F s or 1 or Termi 3 o ground a short to gr	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank al Existed	tor.
CHECK A/F Turn ignitio Disconnect Check harr DTC P0031, P0032 P0051, P0052 Also check the inspectio YES >> GC OCHECK A/F efer to EC-44 the inspectio YES >> GC	 b. 37) pen or sh pair or re SENSOF m switch t ECM hat t ECM hat<	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F sensc Connect F12 F61 for short to ormal? circuit or s R 1 HEATE	en A/F ser ess or cor R OUTPL nector. /een A/F s or 1 or Termi 3 o ground a short to gr	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank al Existed	tor.
15 A fuse (No Harness for o >> Re .CHECK A/F Turn ignitio Disconnect Check harr DTC P0031, P0032 P0051, P0052 Also check the inspectio YES >> GC NO >> Re .CHECK A/F efer to EC-44 the inspectio YES >> GC	 b. 37) pen or sh pair or re SENSOF on switch t ECM hat t ECM hat t ecss cont Bank 1 2 harness n result n t oper SENSOF 8. "Comp n result n t of 7. t of 6. 	nort betwee place harn R 1 HEATE OFF. rness conr inuity betw A/F senso Connect F12 F61 for short to ormal? circuit or s R 1 HEATE onent Insp ormal?	en A/F ser ess or cor R OUTPL nector. veen A/F s or 1 or Termi 3 o ground a short to gr R ection".	ensor 1 h	AL CIRCUIT narness connect ECM nnector Termina F14 4 8 to power.	Bank al Existed	tor.

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

hard surface such as a concrete floor; use a new one.
Before installing new A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

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

< DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

>> Repair or replace.

Component Inspection

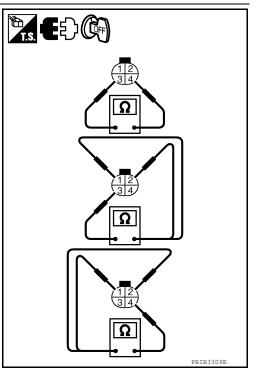
1.CHECK AIR FUEL RATIO (A/F) SENSOR 1

Check resistance between A/F sensor terminals as follows.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω at 25°C (77°F)
3 and 1, 2	Ω∞
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 <u>EM-140, "Removal and Installation (LH)"</u>. CAUTION:

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

>> INSPECTION END

INFOID:000000007420720

[VQ35DE]

P0037, P0038, P0057, P0058 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

P0037, P0038, P0057, P0058 HO2S2 HEATER

Description

SYSTEM DESCRIPTION

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

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	
 Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON	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.)	 Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) Heated oxygen sensor 2 heater
P0038	Heated oxygen sensor 2 heater (bank 1) control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	 Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) Heated oxygen sensor 2 heater
P0057	Heated oxygen sensor 2 heater (bank 2) control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	 Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) Heated oxygen sensor 2 heater
P0058	Heated oxygen sensor 2 heater (bank 2) control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	 Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) Heated oxygen sensor 2 heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

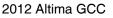
Before performing the following procedure, confirm that battery voltage is between 11 V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

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



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P0037, P0038, P0057, P0058 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

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 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-450, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E9. Refer to Ground Inspection in GI-38, "Work Flow".

Is the inspection result normal?

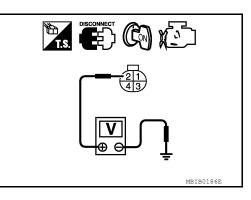
YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK HO2S2 POWER SUPPLY CIRCUIT

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

DTC		HO2S2	Ground	Voltage (V)		
ыю	Bank	Connector	Terminal	Ground	voltage (v)	
P0037, P0038	1	F62	2	Ground	Battery voltage	
P0057, P0058	2	F56	2	Gibuna	Ballery Vollage	



[VQ35DE]

INFOID:000000007420723

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R connector F10
- 15 A fuse (No. 37)
- · 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.
- 2. Disconnect ECM harness connector.

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

DTC		HO2S2		EC	Continuity	
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0037, P0038	1	F62	3	F14	13	Existed
P0057, P0058	2	F56	3	F 14	17	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-451, "Component Inspection".

P003	7, P0038, P0057, P0058 H	O2S2 HEATER	
< DTC/CIRCUIT DIAGNOSIS	>	[VQ35DE]	
Is the inspection result normal	2		
YES >> GO TO 7. NO >> GO TO 6.		, A	Ą
6.REPLACE HEATED OXYG	EN SENSOR 2		
Replace malfunctioning heated	l oxygen sensor 2. Refer to EM-14	1. "Removal and Installation (RH)".	С
CAUTION:		ed from a height of more than 0.5 m (19.7	
in) onto a hard surface suc	h as a concrete floor; use a new	one.	С
		m threads using Oxygen Sensor Thread 97-12)] and approved anti-seize lubricant	
(commercial service tool).		/- ···	D
	N		
>> INSPECTION END 7.CHECK INTERMITTENT IN		E	
Refer to <u>GI-42</u> , "Intermittent In			
	<u>sident</u> .	E	F
>> INSPECTION END)	1	
Component Inspection		INFOID:00000007420724	_
1.CHECK HEATED OXYGEN	SENSOR 2 HEATER		G
	ited oxygen sensor 2 terminals as	fol-	
lows.			-
Terminal No.	Resistance		
2 and 3	3.4 - 4.4 Ω [at 25°C (77°F)]		
1 and 2, 3, 4		[<u>Ω</u>]	
4 and 1, 2, 3	(Continuity should not exist)		J
Is the inspection result normal	2		
YES >> INSPECTION END)	34	K
NO >> GO TO 2.			
		Ω	
			VI
			N
•		PBIB3310E	

2.REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-141, "Removal and Installation (RH)</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 tool [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> INSPECTION END

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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 angle.

The shorter pulse width retards valve angle.

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



DTC DETECTION LOGIC

INFOID:000000007420726

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.)Intake valve timing control solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO 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 <u>EC-452</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

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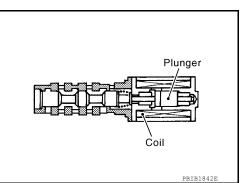
$1. \mathsf{CHECK} \text{ intake valve timing control solenoid valve power supply circuit}$

- 1. Turn ignition switch OFF.
- 2. Disconnect intake valve timing control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between intake valve timing control solenoid valve harness connector and ground with CONSULT or tester.

DTC	IVT co	ontrol solenoi	d valve	Ground	Voltage (V)	
DIC	Bank	Connector	Terminal	Oround		
P0075	1	F67	2	Ground	Battery voltage	
P0081	2 F66		2	Giouna	Dattery voltage	

Is the inspection result normal?

YES >> GO TO 2.





2012 Altima GCC

[VQ35DE]

P0075, P0081 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

< DTC/CIR		GNOSIS >						
NO >>	Repair op	oen circuit, s	short to gro	und or shoi	rt to power	in harness or o	connectors.	
2. CHECK	INTAKE V	ALVE TIMI	NG CONT	ROL SOLEI		/E OUTPUT S	IGNAL CIRCUIT FOR OPEN	А
AND SHOP								
	nition swite							EC
		harness co						LC
	the continu onnector.	uity betweel	n intake va	ive timing c	ontrol soler	nold valve harr	ness connector and ECM har-	
1000 0								С
570	IVT c	ontrol solenoid	l valve	EC	CM	0 11 11	-	
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity		D
P0075	1	F67	1	F 40	78	Eviate d	_	D
P0081	2	F66	1	F13	75	Existed		
4. Also ch	neck harne	ss for short	to ground	and short to	o power.		-	Е
Is the inspe	ection resu	<u>lt normal?</u>						
	> GO TO 3							_
^						in harness or o	connectors.	F
J.CHECK	INTAKE V	ALVE TIMI	NG CONTF	ROL SOLEN	NOID VALV	E		
		mponent Ins	<u>spection"</u> .					G
Is the inspe								
-	> GO TO 4		ina intako	valvo timin	a control s	olonoid valvo	Refer to EM-163, "Removal	
NO	and Insta		ing intake		y control s	olenolu valve.	Relei lo <u>Elvi-103, Rellioval</u>	Н
4.CHECK			IDENT					
		nittent Incid						
	<u>42, inten</u>		<u>ont</u> .					
>>	> INSPECT	ION END						
Compone	ont Inch	ection						J
		COUDIT					INFOID:00000007420728	
1.CHECK	INTAKE V	ALVE TIMI	NG CONTF	ROL SOLEN	NOID VALV	E-I		K
1. Discon	nect intake	e valve timir	ng control s	olenoid val	ve harness	connector.		
2. Check	resistance	between in	take valve	timing cont	rol solenoio	d valve termina	als as follows.	
								L
Termin			tance					
1 and	2	7.1 - 7.7Ω [at						Μ
1 or 2 and	ground	(Continuity sh	Ω ould not exist)				
Is the inspe	ection resu	It normal?						Ν
	> GO TO 2							T N
NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-163</u> , " <u>Removal</u> <u>and Installation</u> ".								
								0
							contracted to the Contract	
1. Remov	intake va	aive timing (enola valve.	Refer to E	<u>IVI-163, "Remo</u>	val and Installation".	Р
								Г

P0075, P0081 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

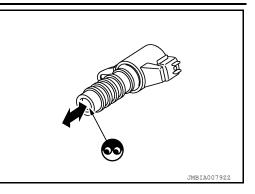
Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-163</u>, "<u>Removal</u> <u>and Installation</u>".



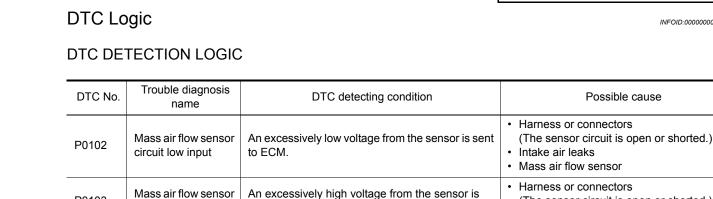
< DTC/CIRCUIT DIAGNOSIS >

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.



DTC CONFIRMATION PROCEDURE

circuit high input

1.PRECONDITIONING

P0103

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

Which DTC is detected?

P0102 >> GO TO 2. P0103 >> GO TO 3.

 ${
m 2.}$ PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

sent to ECM.

1. Start engine and wait at least 5 seconds.

2. Check DTC.

Is DTC detected?

- YES >> Go to EC-456, "Diagnosis Procedure". NO >> INSPECTION END 3. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I Turn ignition switch ON and wait at least 5 seconds. 1 2. Check DTC. Is DTC detected? YES >> Go to EC-456, "Diagnosis Procedure". NO >> GO TO 4. **4.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II 1. Start engine and wait at least 5 seconds. 2. Check DTC.
- Is DTC detected?
- >> Go to EC-456, "Diagnosis Procedure". YES

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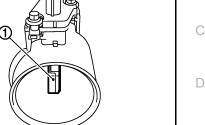
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(The sensor circuit is open or shorted.)

· Mass air flow sensor

NO >> INSPECTION END

Diagnosis Procedure

1.INSPECTION START

Confirm the detected DTC.

Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses

Intake air passage between air duct to intake manifold

Is the inspection result normal?

YES >> GO TO 3.

NO >> Reconnect the parts.

 $\mathbf{3}$.check ground connection

- 1. Turn ignition switch OFF.
- 2. Check ground connection E9. Refer to Ground Inspection in GI-38, "Work Flow".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace ground connection.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

- 1. Disconnect mass air flow (MAF) sensor harness connector.
- 2. Turn ignition switch ON.
- Check the voltage between MAF sensor harness connector and ground.

MAF sensor		Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
F31	2	Ground	Battery voltage

Is the inspection result normal?

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

5.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E11, F2

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

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

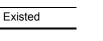
>> Repair open circuit, short to ground or short to power in harness or connectors.

6.CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

EC-456

MAF sensor		ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F31	3	F13	56	Existed	



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P0102, P0103 MAF SENSOR

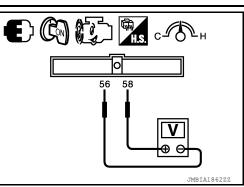
< DTC/CIRCUIT DIAGNOSIS > 4. Also check harness for short to ground and short to power. Is the inspection result normal?	[VQ35	DE]
Is the inspection result normal?		
YES >> GO TO 7. NO >> Repair open circuit, short to ground or short to power in harnes	s or connectors	F
7.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHO		
 Check the continuity between MAF sensor harness connector and ECN 	A harness connector.	
MAF sensor ECM		
Connector Terminal Connector Terminal Continuity		
F31 4 F13 58 Existed		
2. Also check harness for short to ground and short to power.		
Is the inspection result normal?		
YES >> GO TO 8.		
NO >> Repair open circuit, short to ground or short to power in harnes	s or connectors.	
B .CHECK MASS AIR FLOW SENSOR		
Refer to EC-457, "Component Inspection".		
Refer to <u>EC-457, "Component Inspection"</u> . Is the inspection result normal?		
Refer to EC-457, "Component Inspection".	Installation".	
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u>	Installation".	
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9.CHECK INTERMITTENT INCIDENT	Installation".	
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9.	Installation".	
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9. CHECK INTERMITTENT INCIDENT	Installation".	
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9. CHECK INTERMITTENT INCIDENT Refer to <u>GI-42, "Intermittent Incident"</u> . >> INSPECTION END		07400720
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9. CHECK INTERMITTENT INCIDENT Refer to <u>GI-42, "Intermittent Incident"</u> . >> INSPECTION END Component Inspection	Installation".	07420732
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9. CHECK INTERMITTENT INCIDENT Refer to <u>GI-42, "Intermittent Incident"</u> . >> INSPECTION END Component Inspection		07420732
Refer to <u>EC-457, "Component Inspection"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to <u>EM-132, "Removal and</u> 9. CHECK INTERMITTENT INCIDENT Refer to <u>GI-42, "Intermittent Incident"</u> . >> INSPECTION END Component Inspection 1. CHECK MASS AIR FLOW SENSOR-I		07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 1.CHECK MASS AIR FLOW SENSOR-I With CONSULT 1. Reconnect all harness connectors disconnected.		07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 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.		07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9.CHECK INTERMITTENT INCIDENT Refer to GI-42. "Intermittent Incident". >> INSPECTION END Component Inspection 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.	INFOID:0000000	07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 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.	INFOID:0000000	07420732
Refer to EC-457, "Component Inspection". <u>s the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9. CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 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.	INFOID:0000000	07420732
Refer to EC-457, "Component Inspection". <u>s the inspection result normal?</u> YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9. CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 1. CHECK MASS AIR FLOW SENSOR-I 1. CHECK MASS AIR FLOW SENSOR-I 1. CHECK MASS AIR FLOW SENSOR-I 1. CHECK MASS AIR FLOW SENSOR-I 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 cond	INFOID:0000000	07420732
Refer to EC-457, "Component Inspection". is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9. CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 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 cond Monitor item Condition Ignition switch ON (Engine stopped.) Idle (Engine is warmed-up to normal operating temperature.)	INFOID:0000000	07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9.CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 1.CHECK MASS AIR FLOW SENSOR-I Image: 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 cond Monitor item Condition	litions. MAS A/F SE-B1 (V) Approx. 0.4	07420732
Refer to EC-457, "Component Inspection". Is the inspection result normal? YES >> GO TO 9. NO >> Replace mass air flow sensor. Refer to EM-132, "Removal and 9. CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection 1. CHECK MASS AIR FLOW SENSOR-I Image: Point Consult Pwith 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 cond Monitor item Condition Idle (Engine is warmed-up to normal operating temperature.)	litions. <u>MAS A/F SE-B1 (V)</u> <u>Approx. 0.4</u> 0.9 - 1.2	07420732

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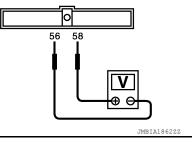
P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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



	ECM			
Con-	+	-	Condition	Voltage (V)
nector Terminal		Terminal		
			Ignition switch ON (Engine stopped.)	Approx. 0.4
F13	58 (MAF	56	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
1 15	sensor 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*



[VQ35DE]

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

Is the inspection result normal?

NO >> GO TO 2.

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

Check for the cause of uneven air flow via the 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.

>> GO TO 3. NO

3.CHECK MASS AIR FLOW SENSOR-II

With CONSULT

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

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

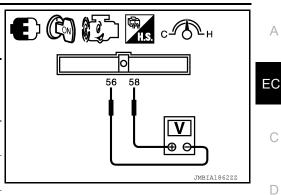
Without CONSULT

- Repair or replace malfunctioning part. 1.
- 2. Start engine and warm it up to normal operating temperature.

P0102, P0103 MAF SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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



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	ECM				<u> </u>
Con-	+	-	– Condition Voltage (V	Voltage (V)	56 58
nector	Terminal	Terminal			
			Ignition switch ON (Engine stopped.)	Approx. 0.4	
58 (MAF (Sensor	56 (Sensor	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2	JMBIA1862ZZ	
115	sensor signal)	ground)	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9	
			Idle to approximately 4,000 rpm	0.9 - 1.2 to Approx. 2.4*	

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4.CHECK MASS AIR FLOW SENSOR-III

(P)With CONSULT

- Turn ignition switch OFF.
- 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.

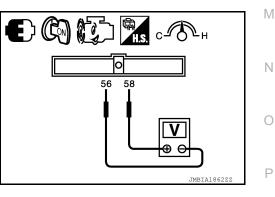
Monitor item	Condition	MAS A/F SE-B1 (V)
	Ignition switch ON (Engine stopped.)	Approx. 0.4
	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
MAS A/F SE-B1	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
	Idle to approximately 4,000 rpm	0.9 - 1.2 to Approx. 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.
- 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			
Con-	+	-	Condition	Voltage (V)
nector	Terminal	Terminal		
	58 56 (MAF (Sensor sensor ground)	Ignition switch ON (Engine stopped.)	Approx. 0.4	
E13		(MAF 56	Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
1 13		•	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?



< DTC/CIRCUIT DIAGNOSIS >

- YES >> INSPECTION END
- NO >> Clean or replace mass air flow sensor. Refer to EM-132, "Removal and Installation".

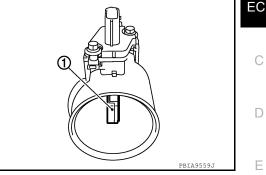
< DTC/CIRCUIT DIAGNOSIS >

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.

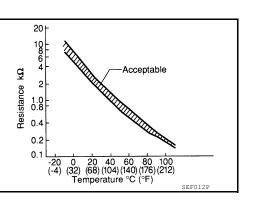
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

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

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



INFOID:000000007420734

DTC DETECTION LOGIC

DTC Logic

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.	Harness or connectors (The sensor circuit is open or shorted.)	ĸ
P0113	Intake air tempera- ture sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	Intake air temperature sensor	L

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-462, "Diagnosis Procedure".
- NO >> INSPECTION END

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P0112, P0113 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in <u>GI-38. "Work Flow"</u>.

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

MAF	sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
F31	5	Ground	Approx. 5V	

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 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 Connector Terminal		ECM Continuity	
	Connector	Terminal			Continuity	
	F31	6	F13	56	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-462, "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-132, "Removal</u> and Installation".

5.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

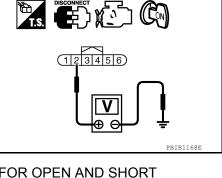
>> INSPECTION END

Component Inspection

1. CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.



2012 Altima GCC

P0112, P0113 IAT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

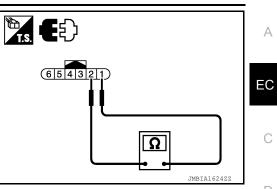
3. Check resistance between mass air flow sensor terminals as follows.

Terminal	Condition	Resistance (k Ω)	
1 and 2	Temperature [°C (°F)]	25 (77)	1.800 - 2.200

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to EM-132, "Removal and Installation".



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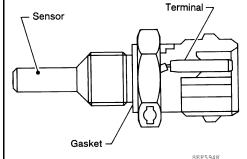
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< DTC/CIRCUIT DIAGNOSIS >

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 Ω)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

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

DTC Logic

INFOID:000000007420738

DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
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.)
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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Go to EC-465, "Diagnosis Procedure".
- NO >> INSPECTION END

P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

1. CHECK GROUND CONNECTION

- 1. Turn ignition switch OFF.
- 2. Check ground connection E9. Refer to Ground Inspection in <u>GI-38, "Work Flow"</u>.

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.
- Check the voltage between ECT sensor harness connector and ground.

ECT	sensor	Ground	Voltage (V)
Connector	Connector Terminal		voltage (v)
F11	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.

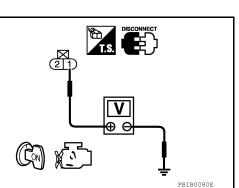
$\mathbf{3}$.check ect sensor ground circuit for open and short

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

ECT s	sensor	EC	M	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F11	2	F13	52	Existed	
4. Also chec	ck harness for	short to grour	nd and short t	o power.	
Is the inspecti		nal?			
	GO TO 4.	ouit obort to a	around or obc	rt to nowor in	approxima
4. CHECK E	• •	cuit, short to g		•	connectors.
				ISUR	
Refer to <u>EC-4</u>	-	-	<u>.</u> .		
Is the inspecti YES >> G	ion result norr 60 TO 5.	<u>nal?</u>			
		e coolant temp	erature sens	or. Refer to <u>C</u>	loded View".
5.CHECK IN				_	
Refer to GI-42	2. "Intermitten	t Incident".			
>>	SPECTION I	END			
Componen	it Inspectio	n			INFOID:00000007420740
	•				
I.CHECK EN	NGINE COOL	ANT TEMPER	RATURE SEN	ISOR	
•	ion switch OF			rpass coppas	

2. Disconnect engine coolant temperature sensor harness connector.

Remove engine coolant temperature sensor. Refer to <u>CO-50, "Exploded View"</u>.





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P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

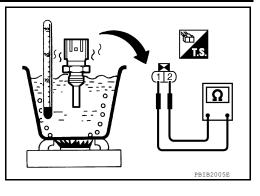
4. Check resistance between engine coolant temperature sensor terminals as follows.

Terminals	Condition	Resistance (k Ω)	
		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-50, "Exploded View"</u>.



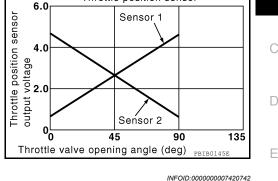
< DTC/CIRCUIT DIAGNOSIS >

P0122, P0123 TP SENSOR

Description

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

The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal 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 condition via the throttle control motor.



Throttle position sensor

DTC Logic

DTC DETECTION LOGIC

NOTE: If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-520, "DTC Logic"</u>.

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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 inputAn excessively high voltage from the TP sensor 2 is sent to ECM.		Electric throttle control actuator (TP sensor 2)	
DTC CON	FIRMATION PROCE	EDURE		
1.PRECO	NDITIONING			
If DTC Cor	firmation Procedure h	has been previously conducted, always	turn ignition switch OFF and wait at	

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second. M Check DTC. 2. Is DTC detected? YES >> Go to EC-467, "Diagnosis Procedure". Ν NO >> INSPECTION END Diagnosis Procedure INFOID:000000007420743 1. CHECK GROUND CONNECTION Turn ignition switch OFF. 1. Ρ 2. Check ground connection E9. Refer to Ground Inspection in GI-38, "Work Flow". Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace ground connection. 2.CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT 1 Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch ON.

Revision: February 2013

EC-467

[VQ35DE]

INFOID:000000007420741

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P0122, P0123 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle	control actuator	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
F57	1	Ground	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 THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

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

Electric throttle	control actuator	ECM Connector Terminal		Continuity
Connector	Terminal			Continuity
F57	4	F13	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

Electric throttle	control actuator	ECM Connector Terminal		Continuity
Connector	Terminal			Continuity
F51	3	F13	38	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-469, "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-133. "Removal and Installation".

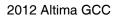
2. Refer to EC-469, "Special Repair Requirement".

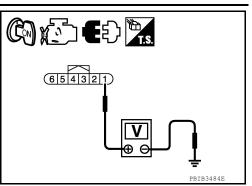
>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END





Condition

4. Set selector lever position to D position. 5.

_

1. CHECK THROTTLE POSITION SENSOR

Reconnect all harness connectors disconnected.

Turn ignition switch OFF.

ECM

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1.

2.

3.

Con-

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

							_
nector	Terminal	Terminal					E
	37 (TP sensor			Fully released	More than 0.36 V		
F13	F13 1 signal) 36 (Sensor		Accelera-	Fully depressed	Less than 4.75 V		F
38 gr	ground)	tor pedal	Fully released	Less than 4.75 V	JMBIA1953ZZ		
	(TP sensor 2 signal)			Fully depressed	More than 0.36 V		G
Is the inspection result normal?							
YES	>> INSPE(ND				
NO	>> GO TO						Н
Z .REP	LACE ELEC	TRIC TH	IROTTLE	CONTROL AC	TUATOR		
					EM-133, "Remo	oval and Installation".	1
2. Go	to <u>EC-469, '</u>	"Special I	Repair Re	<u>quirement"</u> .			I
	>> INSPE(STION EI	ND				J
Specia	al Repair	Require	ement			INFOID:00000007420745	
1.per	FORM THR	OTTLE V	ALVE CL	OSED POSITIO	ON LEARNING		K
Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"							
Relefico		<u>'HROTTL</u>	E VALVE	CLOSED POS	ITION LEARNIN	IG : Special Repair Requirement"	
Relefilo	<u></u>	HROTTL	<u>E VALVE</u>	CLOSED POS	ITION LEARNIN	IG : Special Repair Requirement"	
	>> GO TO		<u>E VALVE</u>	<u>CLOSED POS</u>	ITION LEARNIN	IG : Special Repair Requirement"	L
•		2.			ITION LEARNIN	IG : Special Repair Requirement"	L
2.per	>> GO TO FORM IDLE	2. E AIR VOI	LUME LE	ARNING			L
2.per	>> GO TO FORM IDLE	2. E AIR VOI	LUME LE	ARNING	ITION LEARNIN		L
2.per	>> GO TO FORM IDLE	2. E AIR VOI	LUME LE	ARNING			L
2.per	>> GO TO FORM IDLE <u>EC-335, "II</u>	2. E AIR VOI	LUME LE	ARNING			L M
2.per	>> GO TO FORM IDLE <u>EC-335, "II</u>	2. E AIR VOI	LUME LE	ARNING			
2.per	>> GO TO FORM IDLE <u>EC-335, "II</u>	2. E AIR VOI	LUME LE	ARNING			Ν
2.per	>> GO TO FORM IDLE <u>EC-335, "II</u>	2. E AIR VOI	LUME LE	ARNING			

Voltage

P0122, P0123 TP SENSOR

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INFOID:000000007420744

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36 37 38 А

EC

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P0130, P0150 A/F SENSOR 1

Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement λ = 1, but also in the lean and rich range. Together with its control electronics, the sensor

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

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 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 fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0130	Air fuel ratio (A/F) sensor 1 (bank 1) circuit	The A/F signal computed by ECM from the A/F	 Harness or connectors (The A/F sensor 1 circuit is open
P0150	Air fuel ratio (A/F) sensor 1 (bank 2) circuit	sensor 1 signal is constantly approx. 2.2V.	or shorted.) • A/F sensor 1

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-470, "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.

EC-470

Is the inspection result normal?

YES >> INSPECTION END

>> Go to EC-471, "Diagnosis Procedure". NO

Component Function Check

1.INSPECTION START

Will CONSULT be used? Will CONSULT be used?

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

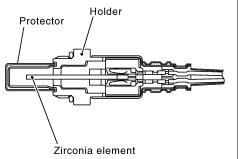
Revision: February 2013

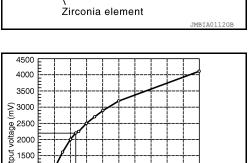
INFOID:000000007420748

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INFOID:000000007420747





18

Air fuel ratio

20 22 24 26 28

o 1000 500 0⊾ 10

12 14 16

P0130, P0150 A/F SENSOR 1

[VQ35DE] < DTC/CIRCUIT DIAGNOSIS > $\overline{2.}$ CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION With CONSULT Start engine and warm it up to normal operating temperature. 1. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT. 2. EC 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication. Does the indication fluctuates around 2.2V? YES >> GO TO 3. NO >> Go to EC-471, "Diagnosis Procedure". 3. PERFORM COMPONENT FUNCTION CHECK Turn ignition switch OFF and wait at least 10 seconds. 1. D 2. Start engine and warm it up to normal operating temperature. 3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position. 4. Shift the selector lever to the D position, then release the accelerator pedal fully until the vehicle speed E decreases to 50 km/h (31 MPH). CAUTION: Always drive vehicle at a safe speed. NOTE: Never apply brake during releasing the accelerator pedal. 5. Repeat steps 3 to 4 for five times. Stop the vehicle and turn ignition switch OFF. 6 7. Wait at least 10 seconds and restart engine. Repeat steps 3 to 4 for five times. Stop the vehicle. Н 10. Check 1st trip DTC. Is 1st trip DTC detected? YES >> Go to EC-471, "Diagnosis Procedure". NO >> INSPECTION END Diagnosis Procedure INFOID-000000007420749 1. CHECK GROUND CONNECTION 1. Turn ignition switch OFF. 2. Check ground connection E9. Refer to Ground Inspection in GI-38, "Work Flow". Κ Is the inspection result normal? YFS >> 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. M 2. Turn ignition switch ON. Check the voltage between A/F sensor 1 harness connector and 3. **XE**D (CH) X ground. Ν A/F sensor 1 DTC Ground Voltage Bank Connector Terminal F12 P0130 1 4 Ground Battery voltage P0150 2 F61 4

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

• IPDM E/R harness connector F10

15 A fuse (No. 37)

PBIB3308E

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P0130, P0150 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

• Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

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

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

DTC	A/F sensor 1			E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0130	1	1 F12	1	F10	45	Eviated
F0130	I	F IZ	2		49	
P0150	2 561		1	F13	53	Existed
P0150	2	2 F61 -	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
P0130	1	F12	1		Not existed
F 0 1 3 0	I	1 12	2	Ground	
P0150	2	F61	1	Ground	NUL EXISTED
F 0 1 3 0	2	101	2		

DTC	EC	CM	Ground	Continuity	
DIC	Connector	Connector Terminal		Continuity	
P0130		45			
F0130	F13	49	Ground	Not existed	
P0150	FIJ	53	Ground		
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-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to <u>EM-140, "Removal and Installation (LH)</u>". CAUTION:

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

P0130, P0150 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

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Revision: February 2013

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 loan and rish range. Together with its control electronics, the sensor

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

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

DTC Logic

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause	
P0131	Air fuel ratio (A/F) sensor 1 (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. 0V.	shorted.) • A/F sensor 1	

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

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

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

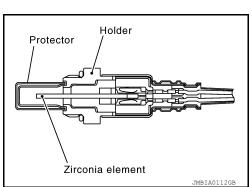
TESTING CONDITION:

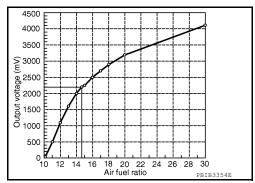
Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 3.

3.CHECK A/F SENSOR FUNCTION

With CONSULT





INFOID:000000007420750

P0131, P0151 A/F SENSOR 1

	P0131, P0151 A/F SENSOR 1	
< DTC/CIRCUIT DIAG	GNOSIS >	[VQ35DE]
 Select "Ă/F SEN1 Check "A/F SEN1 	rarm it up to normal operating temperature. (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CON (B1)" or "A/F SEN1 (B2)" indication.	SULT.
Is the indication consta	- · · · · · · · · · · · · · · · · · · ·	
YES >> Go to EC_4 NO >> GO TO 4.	476, "Diagnosis Procedure".	E
	ONFIRMATION PROCEDURE	
 Turn ignition switch Drive and accelera CAUTION: Always drive vehi 	n OFF, wait at least 10 seconds and then restart engine. Ite vehicle to more than 40 km/h (25 MPH) within 20 seconds a icle at a safe speed.	fter restarting engine.
3. Maintain the follow	ing conditions for about 20 consecutive seconds.	
ENG SPEED	1,000 - 3,200 rpm	
VHCL SPEED SE	More than 40 km/h (25 mph)	
B/FUEL SCHDL	1.5 - 9.0 msec	
Selector lever	Suitable position	
 If this procedure 1. 	erator pedal as steady as possible during the cruising. e is not completed within 1 minute after restarting engine a	it step 1, return to step
 Check 1st trip DTC <u>Ist trip DTC detected</u> 		
•	<u>ur</u> 476, "Diagnosis Procedure".	
NO >> INSPECTI		
5. PERFORM COMPC	DNENT FUNCTION CHECK	
Perform component fur	nction check. Refer to <u>EC-475, "Component Function Check"</u> .	
NOTE: Use component function 1st trip DTC might not 1	on check to check the overall function of the A/F sensor 1 circ be confirmed.	uit. During this check, a
Is the inspection result	normal?	
YES >> INSPECTI		
	476, "Diagnosis Procedure".	
Component Funct	ion Check	INFOID:000000007420752
1.PERFORM COMPC	DNENT FUNCTION CHECK	
 Turn ignition switch Drive and accelera CAUTION: Always drive vehi 	varm it up to normal operating temperature. In OFF, wait at least 10 seconds and then restart engine. Inte vehicle to more than 40 km/h (25 MPH) within 20 seconds a icle at a safe speed. Iring conditions for about 20 consecutive seconds.	fter restarting engine.
Engine speed	1,000 - 3,200 rpm	
Vehicle speed	More than 40 km/h (25 MPH)	
Selector lever	Suitable position	
Driving condition	Driving at level road (To avoid overloading will help maintain the driving conditions required for this test.)	

NOTE:

• Keep the accelerator pedal as steady as possible during the cruising.

P0131, P0151 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

• If this procedure is not completed within 1 minute after restarting engine at step 2, return to step 2.

- 5. Repeat steps 2 to 4.
- 6. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-476, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

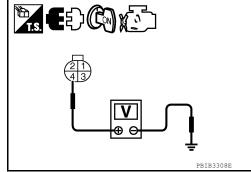
NO >> Repair or replace ground connection.

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

1. Disconnect A/F sensor 1 harness connector.

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

DTC		A/F sensor 1		Ground	Voltage
DIC	Bank Connector Terminal		Oround	vollage	
P0131	1	F12	4	Ground	Battery voltage
P0151	2	F61	4	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 harness connector F10
- 15 A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

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

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

DTC	A/F sensor 1			E	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
D0121	1	F12	1		45	Existed
P0131	I	F IZ	2	F40	49	
D0151	P0151 2		1	F13	53	Existed
P0151	2 F61	2		57	+	

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

P0131, P0151 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1	Ground	Continuity	
DIC	Bank	Connector	Terminal	Ground	Continuity
P0131	131 1 F12		1		
FUIJI	I	F 12	2	Ground	Not existed
D0151	2 F61		1	Ground	NUL EXISTEN
P0151 2		F01	2	1	

DTC	E	CM	Ground	Continuity
DIC	Connector	Connector Terminal		Continuity
P0131		45		Not existed
FUIJI	F40	49	Ground	
P0151	F13	53	Giouna	
PUIDI		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-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to <u>EM-140. "Removal and Installation (LH)"</u>. CAUTION:

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

>> INSPECTION END

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P0132, P0152 A/F SENSOR 1

Description

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor

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

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

DTC Logic

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132	Air fuel ratio (A/F) sensor 1 (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. 5V.	shorted.) • A/F sensor 1

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES	>> GO TO 2.
NO	>> GO TO 5.
2.PRE	CONDITIONING

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

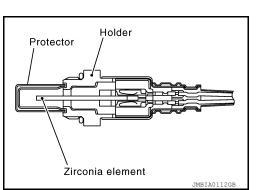
TESTING CONDITION:

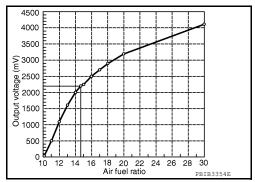
Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 3.

3.CHECK A/F SENSOR FUNCTION

With CONSULT





INFOID:000000007420755

P0132, P0152 A/F SENSOR 1

	P0132, P0152 A/F SENSOR 1	
< DTC/CIRCI	T DIAGNOSIS >	[VQ35DE]
2. Select "Å/ 3. Check "Å/	e and warm it up to normal operating temperature. SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT. SEN1 (B1)" or "A/F SEN1 (B2)" indication.	
	constantly approx. 5V?	
	to <u>EC-480, "Diagnosis Procedure"</u> . TO 4.	
	TO 4. DTC CONFIRMATION PROCEDURE	
2. Drive and CAUTION	n switch OFF, wait at least 10 seconds and then restart engine. ccelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restart ve vehicle at a safe speed.	ing engine.
3. Maintain t	e following conditions for about 20 consecutive seconds.	
ENG SPEED	1,000 - 3,200 rpm	
VHCL SPEED S	More than 40 km/h (25 mph)	
B/FUEL SCHDL	1.5 - 9.0 msec	
Selector lever	Suitable position	
 If this p 1. 	accelerator pedal as steady as possible during the cruising. ocedure is not completed within 1 minute after restarting engine at step 1, r	eturn to step
4. Check 1s		
<u>s 1st trip DTC</u> YES >> G	to <u>EC-480, "Diagnosis Procedure"</u> .	
	PECTION END	
5.PERFORM	COMPONENT FUNCTION CHECK	
	nent function check. Refer to EC-479, "Component Function Check".	
NOTE: Use compone	function check to check the overall function of the A/F sensor 1 circuit. During	this check, a
•	n result normal?	
	PECTION END	
	to <u>EC-480, "Diagnosis Procedure"</u> .	
Componen	Function Check	INFOID:000000007420756
1.PERFORM	COMPONENT FUNCTION CHECK	
Without C	ISULT	
 Start engi Turn igniti Drive and CAUTION Always d 	e and warm it up to normal operating temperature. In switch OFF, wait at least 10 seconds and then restart engine. ccelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restart ve vehicle at a safe speed.	ing engine.
4. Maintain t	e following conditions for about 20 consecutive seconds.	
Engine speed	1,000 - 3,200 rpm	
Vehicle speed	More than 40 km/h (25 MPH)	
Selector lever	Suitable position	
Driving conditio	Driving at level road (To avoid overloading will help maintain the driving conditions required for this test.)	

NOTE:

• Keep the accelerator pedal as steady as possible during the cruising.

P0132, P0152 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

• If this procedure is not completed within 1 minute after restarting engine at step 2, return to step 2.

- 5. Repeat steps 2 to 4.
- 6. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-480, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

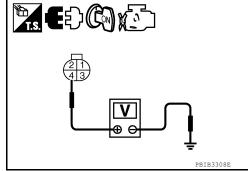
NO >> Repair or replace ground connection.

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

1. Disconnect A/F sensor 1 harness connector.

- 2. Turn ignition switch ON.
- 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
P0132	1	F12	4	Ground	Battery voltage
P0152	2	F61	4	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 harness connector F10
- 15 A fuse (No. 37)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

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

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

DTC		A/F sensor 1		E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0132	1	F12	1		45	
P0132	I	F IZ	2	F13	49	Existed
P0152	2	F61	1	FIJ	53	Existed
F0152	Z	FOI	2		57	+

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

P0132, P0152 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1		Ground	Continuity
DIC	Bank	Connector	Terminal	Giouna	Continuity
P0132	1	F12	1		
F0132	I	F 12	2	Ground	Not existed
P0152	2	F61	1	Giouna	NUL EXISIEU
P0152	2	FOI	2		

DTC	E	CM	Ground	Continuity		
DIC	Connector	Terminal	Giouna	Continuity		
P0132		45				
P0132	F12	49	Ground	Not evicted		
D0150	F13	53	Ground	Not existed		
P0152		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-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace.

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

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to <u>EM-140, "Removal and Installation (LH)"</u>. CAUTION:

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

>> INSPECTION END

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P0138, P0158 H02S2

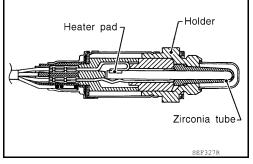
Description

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:000000007420759

DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/ F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.

	ОК	NG
1	.2V	
		PBIB1848E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138	Heated oxygen sensor 2 (bank 1) circuit high volt- age		 Harness or connectors (The sensor circuit is open or shorted)
P0158	Heated oxygen sensor 2 (bank 2) circuit high volt- age	sor is sent to ECM.	Heated oxygen sensor 2

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-483, "Diagnosis Procedure".

P0138, P0158 HO2S2

			F	0100, FU	130 1104		
< DTC/CIF		AGNOSIS		÷			[VQ35DE]
NO >	> INSPEC	TION END					
Diagnos	is Proce	dure					INFOID:00000007420760
1. CHECK	GROUNE		TION				
1. Turn iç	gnition swit	tch OFF.					
	•		9. Refer to	o Ground In	spection in	<u>GI-45, "Circ</u>	<u>uit Inspection"</u> .
Is the insp							
	> GO TO 2 > Repair o	2. r replace g	round conr	nection.			
-	•	ONNECTO					
					rness conne	ector.	
2. Check	that water	r is not insi					
		<u>ult normal?</u>					
	> GO TO 3 > Repair o		arness or o	connectors.			
•	•	•				т	
2. Discor	nnect ECM	harness c	onnector.				
3. Check	the contin	uity betwe	en HO2S2	harness co	onnector and	d ECM harne	ess connector.
		HO2S2		E	CM		
DTC	Bank	Connector	Terminal	Connector		Continuity	
P0138	1	F62	1	Connector	Terrinia		
P0158	2	F56	1	F13	35	Existed	
4. Also c	heck harne	ess for sho	rt to groun	d and short	Implementation Implementation Ind Inspection in GI-45. "Circuit Inspection". Ind Inspection in GI-45. "Circuit Inspection". Interference Interference <tr< td=""></tr<>		
		<u>ult normal?</u>	-				
	> GO TO4					u in houses	
4	•	•	•		•		or connectors.
T. Check	the contin	iuity betwee	en HO252	namess co	onnector and	a ECIVI name	ess connector.
		HO2S2		E	СМ		
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0138	1	F62	4	E40	33	Eviate d	
P0158	2	F56	4	F13 -	34	EXISTED	
		nuity betwe	en HO2S	2 harness o	connector a	and ground,	or ECM harness connector and
ground	d.						
		HO2S2				_	
DTC	Bank	Connector	Terminal	Ground	Continuity		
P0138	1	F62	4			_	
P0158	2	F56	4	Ground	Not existed	1	
	_		-			_	

DTC	E	CM	Ground	Continuity	
DIC	Connector	Terminal	Cround	Continuity	
P0138	F13	33	Ground	Not existed	
P0158	FIJ	34	Ground	NUL EXISIEU	

3. Also check harness for short to power.

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-484, "Component Inspection".

Is the inspection result normal?

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

6.REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-141, "Removal and Installation (RH)"</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 tool [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-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1.INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

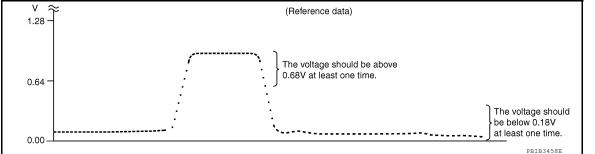
YES >> GO TO 2. NO >> GO TO 3.

NO == 00 10 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.
- 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%.

ls	the	inspe	ction	result	normal?

P0138, P0158 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 6.

3. CHECK HEATED OXYGEN SENSOR 2-I

Without CONSULT

- Start engine and warm it up to the normal operating temperature. 1.
- Turn ignition switch OFF and wait at least 10 seconds. 2.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 3. 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

ECM					<u> </u>		
Con- nector	+	-	Condition	Voltage	34 33	3	35
	Terminal	Terminal					
F13 -	33 [HO2S2 (bank 1) signal]	35 (Sensor	Revving up to 4,000	The voltage should be above 0.68 V at least once during this proce- dure.		▼ ⊕	J
	34 [HO2S2 (bank 2) signal]	ground)	rpm under no load at least 10 times	The voltage should be below 0.18 V at least once during this proce- dure.			

Is the inspection result normal?

>> INSPECTION END YES

4.CHECK HEATED OXYGEN SENSOR 2-II

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

-				
ECM				
Con-	+	-	Condition	Voltage
nector	Terminal	Terminal		
F13	33 [HO2S2 (bank 1) signal]	35 (Sensor	above 0.68 V at leas	The voltage should be above 0.68 V at least once during this proce- dure.
1 13	34 [HO2S2 (bank 2) signal]	ground)	idle for 10 minutes	The voltage should be below 0.18 V at least once during this proce- dure.

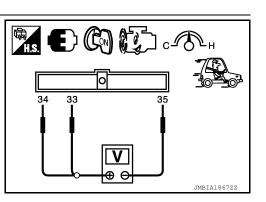
Is the inspection result normal?

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.



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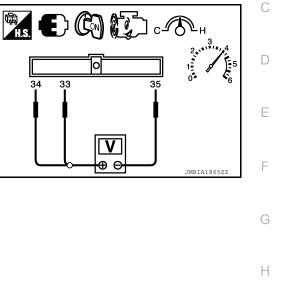
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P0138, P0158 HO2S2

< DTC/CIRCUIT DIAGNOSIS >

ECM				
Con-	+	-	Condition	Voltage
nector	Terminal	Terminal		
F13	33 [HO2S2 (bank 1) signal]	35 (Sensor	Coasting from 80 km/ h (50 MPH) while se-	The voltage should be above 0.68 V at least once during this proce- dure.
FIS	34 [HO2S2 (bank 2) signal]	(Sensor around) h (50 M	lector lever is in the D position	The voltage should be below 0.18 V at least once during this proce- dure.

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-141, "Removal and Installation (RH)"</u>. **CAUTION:**

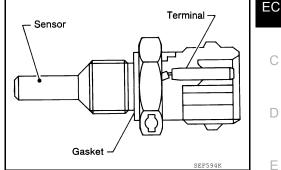
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18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

>> INSPECTION END

P0196 EOT SENSOR

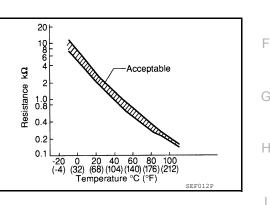
Description

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



<Reference data>

Engine oil temperature [°C (°F)]	Voltage* (V)	Resistance (k Ω)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260
110 (230)	0.6	0.143 - 0.153



*: These data are reference values and are measured between ECM terminals 54 (Engine oil temperature sensor) and 52 (Sensor ground).

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P0196 is displayed with P0197 or P0198, first perform the trouble diagnosis for DTC P0197, K P0198. Refer to <u>EC-490, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	L
P0196	Engine oil temperature sensor range/perfor- mance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and in- take air temperature sensor.	(The sensor circuit is open or shorted)	M

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO ⁻	TO 2.
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2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-491, "Diagnosis Procedure".

NO >> INSPECTION END

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P0196 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK EOT SENSOR POWER SUPPLY CIRCUIT

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

EOT	sensor	Ground	Voltage	
Connector Terminal		Ground	voltage	
F68	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 eot sensor ground circuit for open and short

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

EOT sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F68	2	F13	52	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK ENGINE OIL TEMPERATURE SENSOR

Refer to EC-491, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace engine oil temperature sensor.

5.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

1. CHECK ENGINE OIL TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect engine oil temperature sensor harness connector.

3. Remove engine oil temperature sensor. Refer to <u>CO-50, "Exploded View"</u>.

P0196 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

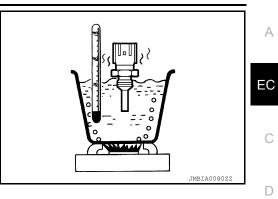
Check resistance between engine oil temperature sensor termi-4. nals by heating with hot water as shown in the figure.

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.



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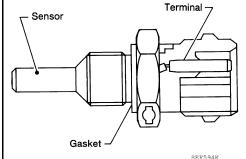
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P0197, P0198 EOT SENSOR

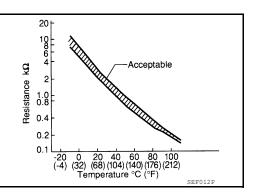
Description

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 Ω)
-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.	 Harness or connectors (The sensor circuit is open or shorted.)
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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-491, "Diagnosis Procedure".

NO >> INSPECTION END

INFOID:000000007420766

P0197, P0198 EOT SENSOR

P0197, P0198 EOT SENSOR	
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Diagnosis Procedure	INFOID:000000007420768
1. CHECK GROUND CONNECTION	
 Turn ignition switch OFF. Check ground connection E9. Refer to Ground Inspection in <u>GI-45. "Circuit Inspection"</u>. 	=
Is the inspection result normal?	
YES >> GO TO 2.	
NO >> Repair or replace ground connection. 2.CHECK EOT SENSOR POWER SUPPLY CIRCUIT	
1. Disconnect engine oil temperature (EOT) sensor harness connector.	
2. Turn ignition switch ON.	
3. Check the voltage between EOT sensor harness connector and ground.	
EOT sensor	
Connector Terminal Ground Voltage	
F68 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.	
3. CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch OFF.	
 Disconnect ECM harness connector. Check the continuity between EOT sensor harness connector and ECM harness connect 	or
EOT sensor ECM Continuity	
Connector Terminal Connector Terminal	
F68 2 F13 52 Existed 4. Also check harness for short to ground and short to power.	
Is the inspection result normal?	
YES >> GO TO 4.	
NO >> Repair open circuit, short to ground or short to power in harness or connectors.	
4. CHECK ENGINE OIL TEMPERATURE SENSOR	
Refer to <u>EC-491, "Component Inspection"</u> . Is the inspection result normal?	
YES >> GO TO 5.	
NO >> Replace engine oil temperature sensor.	
5.CHECK INTERMITTENT INCIDENT	
Refer to <u>GI-42, "Intermittent Incident"</u> .	
>> INSPECTION END	
Component Inspection	INFOID:000000007420769
1.CHECK ENGINE OIL TEMPERATURE SENSOR	
 Turn ignition switch OFF. Disconnect engine oil temperature sensor harness connector. Remove engine oil temperature sensor 	

Remove engine oil temperature sensor.

P0197, P0198 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

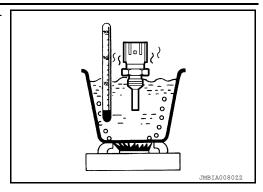
4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

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.

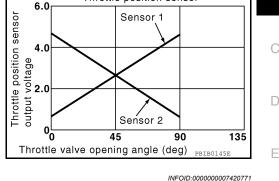


P0222, P0223 TP SENSOR

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 potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal 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 condition via the throttle control motor.



Throttle position sensor

DTC Logic

NOTE: If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-520, "DTC Logic".

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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

DTC DETECTION LOGIC

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

Start engine and let it idle for 1 second. 1. M Check DTC. 2. Is DTC detected? YES >> Go to EC-493, "Diagnosis Procedure". Ν NO >> INSPECTION END Diagnosis Procedure INFOID:000000007420772 1. CHECK GROUND CONNECTION Turn ignition switch OFF. 1. Ρ 2. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>. Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace ground connection. 2.CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I 1 Disconnect electric throttle control actuator harness connector. 2. Turn ignition switch ON.

Revision: February 2013

P0222, P0223 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle	control actuator	Ground	Voltage
Connector Terminal		Ground	voltage
F57	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 THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

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

Electric throttle	control actuator	E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F51	4	F13	36	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

Electric throttle	control actuator	E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F51	2	F13	37	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK THROTTLE POSITION SENSOR

Refer to EC-495, "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-133, "Removal and Installation".

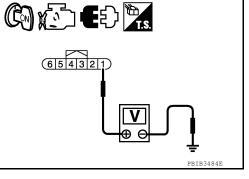
2. Refer to EC-495, "Special Repair Requirement".

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END



Refer to EC-335. "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement" >> GO TO 2. 2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation".

>> GO TO 2.

Go to EC-469, "Special Repair Requirement". 2.

>> INSPECTION END

>> INSPECTION END

Special	Repair	Requirement	Ċ

1	.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING	

P0222, P0223 TP SENSOR

Voltage

More than 0.36 V

Less than 4.75 V

Less than 4.75 V

More than 0.36 V

< DTC/CIRCUIT DIAGNOSIS > **Component Inspection**

1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-469, "Special Repair Requirement".
- 4. Turn ignition switch ON.

ECM

+

Terminal 37

(TP sensor

1 signal)

38

(TP sensor

2 signal) Is the inspection result normal?

Con-

nector

F13

YES

NO

5. Set selector lever position to D position.

_

Terminal

36

(Sensor

ground)

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

Accelera-

tor pedal

2.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Condition

Fully released

Fully depressed

Fully released

Fully depressed

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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:000000007420776

INFOID:000000007420775

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.	Harness or connectors (The sensor circuit is open or shorted.)
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 turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and run it for at least 5 seconds at idle speed.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to <u>EC-496, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

 ${f 2}.$ 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]

		Knock sensor		EC	CM	•	
DTC -	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0327, P0328	1	F202	2	F40	07	E-date d	
P0332, P0333	2	F203	2	F13	67	Existed	
3. Also chec	k harness	for short to	ground a	nd short to	power.		
Is the inspecti	on result r	normal?					
NO >> G	0 TO 4. 0 TO 3.						
3.DETECT N	IALFUNC	TIONING F	PART				
Check the foll • Harness cor • Harness for	nnectors F		en knock s	ensor and	ECM		
>> R	epair opei	n circuit or s	short to po	wer in harr	ness or co	nnectors.	
4. CHECK KN	NOCK SEI	NSOR INP	JT SIGNA	L CIRCUIT	FOR OPE	EN AND SHOR	Т
1. Check the	e continuit	y between	knock sen	sor harnes	s connecto	or and ECM har	ness connector.
DTC		Knock sensor		EC	CM	Continuity	
	Bank	Connector	Terminal	Connector	Terminal		
P0327, P0328	1	F202	1	F13	61	Existed	
P0332, P0333	2	F203	1		62		
2. Also chec			o ground a	ind short to	power.		
Is the inspecti		normal?					
	O TO 6. O TO 5.						
5.DETECT N		TIONING F	ART				
Check the foll							
· Harness cor	nnectors F						
 Harness for 	open or s	hort betwee	en knock s	ensor and	ECM		
		i 11 - 1					
^			ort to grou	ind or shor	to power	in harness or c	onnectors.
6.CHECK KN							
Refer to EC-4			ection".				
Is the inspecti		normal?					
	O TO 7. eplace ma	alfunctionin	a knock se	ensor. Refe	r to EM-21	4. "Disassemb	y and Assembly".
7.CHECK IN	-		-				<u>,</u>
Refer to GI-42							
1 CICI 10 GI-42			<u></u> .				
>>	ISPECTIC	ON END					
Componen							INFOID:000000007420778
1. СНЕСК КМ	NOCK SEI	NSOR					

2. Disconnect knock sensor harness connector.

P0327, P0328, P0332, P0333 KS

< DTC/CIRCUIT DIAGNOSIS >

3. Check resistance between knock sensor terminal as follows. NOTE: 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)]

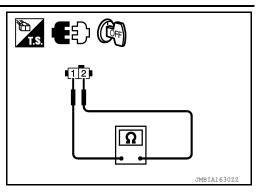
CAUTION:

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 EM-214, "Disassembly and Assembly".



[VQ35DE]

< 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.

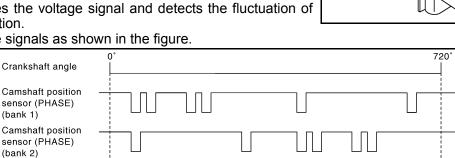
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.

Crankshaft position

sensor (POS)



NOTE: Camshaft position sensor (PHASE) signal timing varies with intake valve timing control.

DTC Logic

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0335	Crankshaft position sen- sor (POS) circuit	 The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine run- ning. 	 Harness or connectors [CKP sensor (POS) circuit is open or shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) Crankshaft position sensor (POS) Accelerator pedal position sensor Refrigerant pressure sensor Signal plate 	K L M

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

If engine does not start, crank engine for at least 2 seconds.

Check 1st trip DTC. 2.

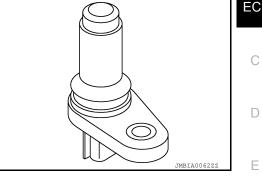
Is 1st trip DTC detected?



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< DTC/CIRCUIT DIAGNOSIS >

YES >> Go to EC-500, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2.

OK or NG

OK >> GO TO 2.

>> Repair or replace ground connection. NG

2.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

- Disconnect crankshaft position (CKP) sensor (POS) harness connector. 1.
- Turn ignition switch ON. 2.
- 3. Check the voltage between CKP sensor (POS) harness connector and ground.

CKP sen	sor (POS)	Ground	Voltage (V)
Connector Terminal		Ground	voltage (v)
F30	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 3.

 ${\it 3.}$ check crankshaft position (CKP) sensor (POS) power supply circuit-II

1. Turn ignition switch ON.

- 2. Disconnect ECM harness connector.
- Check the continuity between CKP sensor (POS) harness connector and ECM harness connector. 3.

CKP sen	sor (POS)	E	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
F30	1	F13	76	Existed	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit.

4.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-III

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

EC	M	Sensor					
Connector	Terminal	Name	Connector	Terminal			
F13	72	E219	1				
115	76	CKP sensor (POS)	F30	1			
E10	87	APP sensor	E40	6			

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK REFRIGERANT PRESSURE SENSOR

Check the following.

Refrigerant pressure sensor (Refer to <u>EC-635, "Diagnosis Procedure"</u>.)

Is the inspection result normal?

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YES >> G	O TO 6.	010 >			[10002]
NO >> R			sensor. Ref	er to <u>HA-43, "F</u>	Removal and Installation for Refrigerant
6.снеск AI		<u>.</u> .			
Refer to EC-5	86, "Compon	ent Inspection			
s the inspect	ion result nor	mal?			
	O TO 12.				
					A Control I
		edal assembly. cial Repair Red		C-4, "Exploded	<u>view"</u> .
•	SPECTION				
3. CHECK C	KP SENSOR	(POS) GROUN	ND CIRCUIT	FOR OPEN AN	ID SHORT
	ion switch OF				
		ess connector. etween CKP se	ensor (POS)	harness conner	ctor and ECM harness connector.
	s continuity b				
CKP sen	sor (POS)	EC	М	Continuity	_
Connector	Terminal	Connector	Terminal	Continuity	
F30	2	F13	60	Existed	—
. Check the	e continuity b	etween CKP se	ensor (POS)	harness connec	ctor and ECM harness connector.
CKP sen	sor (POS)	EC	М		-
Connector	Terminal	Connector	Terminal	Continuity	
F30	3	F13	65	Existed	_
2. Also cheo	k harness for	r short to grour	id and short t	o power.	_
	ion result nor	mal?			
	60 TO 10. Jenair open ci	rouit short to c	round or sho	rt to power in b	arness or connectors.
-		FT POSITION			
		ent Inspection'		55)	
	ion result nor		•		
•	60 TO 11.				
NO >> R	eplace crank		ensor (POS)	. Refer to <u>EM-1</u>	44, "Exploded View".
1.CHECK	GEAR TOOT	Н			
isually checl	k for chipping	signal plate ge	ear tooth.		
•	ion result nor	mal?			
	O TO 12.	anal plata Dof	er to EM 214	"Disassombly	and Assembly".
		ENT INCIDENT		, אומטאפאפות	
Refer to GI-42					

< DTC/CIRCUIT DIAGNOSIS >

< DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

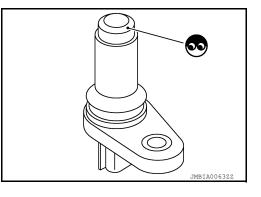
Component Inspection

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. Refer to EM-144, "Exploded View".
- 4. Visually check the sensor for chipping.

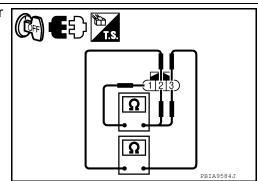
Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-</u> <u>144, "Exploded View"</u>.



$2. {\sf CHECK \ CRANKSHAFT \ POSITION \ SENSOR \ (POS)-II}$

Check resistance crankshaft position sensor (POS) terminals as per the following.



Terminal No. (Polarity)	Resistance
1 (+) - 2 (-)	
1 (+) - 3 (-)	Except 0 or ∞ Ω [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-</u> <u>144, "Exploded View"</u>.

P0340, P0345 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

P0340, P0345 CMP SENSOR (PHASE)

Description

The camshaft position sensor (PHASE) senses the retraction of camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

Crankshaft angle Camshaft position sensor (PHASE) (bank 1)

Camshaft position sensor (PHASE) (bank 2)

Crankshaft position sensor (POS)

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes. ECM receives the signals as shown in the figure.

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DTC Logic

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-520, "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	 The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not sent to ECM 	Camsnatt position sensor (PHASE)	L
P0345	Camshaft position sen- sor (PHASE) (bank 2) circuit	during engine running.	 Camshaft (INT) Starter motor (Refer to <u>STR-38</u>.) Starting system circuit (Refer to <u>STR-38</u>.) Dead (Weak) battery 	Μ

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

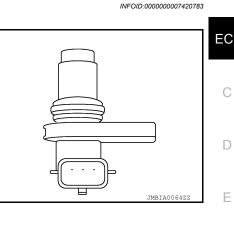
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- Start engine and let it idle for at least 5 seconds. If engine does not start, crank engine for at least 2 seconds.
- 2. Check 1st trip DTC.



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< DTC/CIRC		GNOSIS	>		0	[VQ35DE]
Is 1st trip DT						
	Go to <u>EC</u> GO TO 3	<u>-504, "Diac</u>	<u>gnosis Pro</u>	<u>cedure"</u> .		
3.PERFOR					F-I	
					n for at least 5	seconds
	st trip DT					
<u>Is 1st trip DT</u>						
		<u>-504, "Diag</u> FION END	<u>gnosis Pro</u>	<u>cedure"</u> .		
Diagnosis	Proce	dure				INFOID:000000007420785
1. CHECK 8	STARTIN	G SYSTEN	Λ			
Turn ignition						
Does the en	-		s the start	er motor	<u>operate?</u>	
NO >>					<u>-32, "Work Flo</u>	w (With GR8-1200 NI)" or STR-36, "Work
2.CHECK (GROUNE	CONNEC	TION	-		
1. Turn ign	ition swit	ch OFF.				
-			9. Refer to	Ground	Inspection in C	61-45, "Circuit Inspection".
Is the inspec						
	GO TO 3 Repair or	[.] replace gr	ound conr	nection.		
-	-				R (PHASE) PC	WER SUPPLY CIRCUIT
					HASE) harness	
	ition swit					
	nd groun		CMP sens	SOF (PHA	SE) harness co	
				1 1		
DTC		P sensor (PHA		Ground	Voltage (V)	(321)
P0340	Bank 1	Connector F55	Terminal 1			
P0340	2	F55 F60	1	Ground	5 V	
Is the inspec			Į			
	GO TO 4					÷
NO >>	Repair op	pen circuit,		round or	short to power	in PBIB3312E
		or connecto		UND CIF	RCUIT FOR OF	PEN AND SHORT
1. Turn ign			, 0.10	5		
		harness co	onnector			

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CM	P sensor (PH)	ASE)	ECM		Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F55	2	F13	64	Existed
P0345	2	F60	2	115	68	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

EC-504

P0340, P0345 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

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

5.CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CMP sensor (PHASE) harness connector and ECM harness connector.

DTC	CMP sensor (PHASE)			EC	Continuity	
	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0340	1	F55	3	F13	70	Existed
P0345	2	F60	3	115	69	LAISted

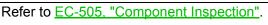
2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

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

6.CHECK CAMSHAFT POSITION SENSOR (PHASE)



Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-157, "Exploded View".

7.CHECK CAMSHAFT (INT)

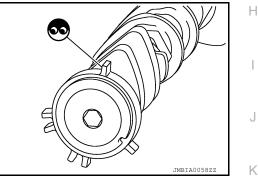
Check the following.

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-184</u>, <u>"Removal and Installation"</u>.



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8. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

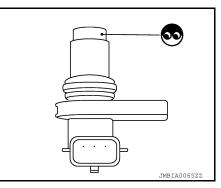
1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor. Refer to EM-157, "Exploded View".
- 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-157, "Exploded View"</u>.



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P0340, P0345 CMP SENSOR (PHASE)

< DTC/CIRCUIT DIAGNOSIS >

 $\overline{2.}$ CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

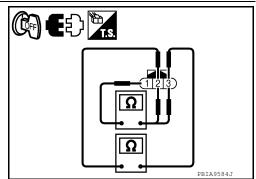
Check resistance camshaft position sensor (PHASE) terminals as per the following.

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-157, "Exploded View".



P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

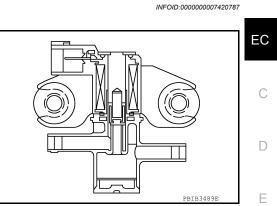
The EVAP canister purge volume control solenoid valve is used to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

DTC Logic

DTC DETECTION LOGIC

DTC No.	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 via the valve	 Harness or connectors (The solenoid valve circuit is open or shorted.) EVAP canister purge volume control so- lenoid valve
DTC CON	FIRMATION PROCEDU	RE	
1.condi	TIONING		
least 10 se TESTING Before pe	econds before conducting th CONDITION: rforming the following pro		urn ignition switch OFF and wait at s more than 11 V at idle.
-	> GO TO 2.		
Z .PERFO	RM DTC CONFIRMATION	PROCEDURE	
2. Check <u>Is 1st trip [</u>	engine and let it idle for at le 1st trip DTC. <u>DTC detected?</u>		
	> Go to <u>EC-507, "Diagnosis</u> > INSPECTION END	<u>Procedure"</u> .	
Diagnos	is Procedure		INFOID:00000007420789
		VOLUME CONTROL SOLENOID	ALVE POWER SUPPLY CIRCUIT
1.снеск	EVAP CANISTER PURGE		
1. Turn ig 2. Discor	gnition switch OFF.	volume control solenoid valve harne	

EC-507



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INFOID:000000007420788

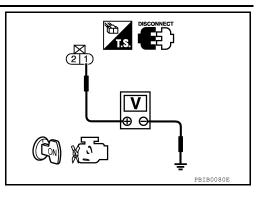
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P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

	rge volume control id valve	Ground	Voltage (V)				
Connector	Terminal						
F29	1	Ground	Battery voltage				
Is the inspection	result normal?						
YES >> GO	TO 3.						
NO >> GO TO 2.							
2. DETECT MA	LFUNCTIONING	PART					



[VQ35DE]

Check the following.

Harness connectors E11, F2

- · 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		E	Continuity	
Connector	Terminal	Connector Terminal		
F29	2	F14	25	Existed

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

Is the inspection result normal?

YES-1 >> With CONSULT: 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 CONT/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

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

5.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-509, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EM-26, "Removal and</u> <u>Installation"</u>.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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>> INSPECTION END

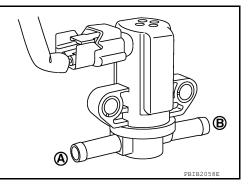
Component Inspection

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 CONT/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL CONT/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between (A) and (B)		
100%	Existed		
0%	Not existed		



Without CONSULT

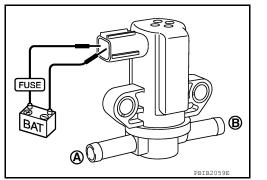
- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under 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>EM-26, "Removal and Installation"</u>.



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P0500 VSS

Description

The vehicle speed signal is sent to the combination meter from the "ABS actuator and electric unit (control unit)" via the CAN communication line. The combination meter then sends a signal to the ECM via the CAN communication line.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-440, "DTC Logic"</u>.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	The vehicle speed signal sent to ECM is almost 0 km/h (0 MPH) even when vehicle is being driven.	 Harness or connectors (The CAN communication line is open or short- ed) Harness or connectors (The vehicle speed signal circuit is open or shorted) Wheel sensor Unified meter and A/C amp. ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES \rightarrow GO TO 2. NO \rightarrow GO TO 5. 2.PRECONDITIONING

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

>> GO TO 3.

3.CHECK VEHICLE SPEED SIGNAL

NOTE:

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

With CONSULT

- 1. Start engine (VDC switch OFF).
- 2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT. The vehicle speed on CONSULT should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

Is the inspection result normal?

NO >> Go to <u>EC-511</u>, "Diagnosis Procedure".

4.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Select "DATA MONITOR" mode with CONSULT.
- 2. Warm engine up to normal operating temperature.
- 3. Maintain the following conditions for at least 50 consecutive seconds. CAUTION:

INFOID:000000007420791

Always drive vehicle at a safe speed. А ENG SPEED 1,600 - 6,000 rpm COOLAN TEMP/S More than 70°C (158°F) EC **B/FUEL SCHDL** 5.5 - 31.8 msec Selector lever Except P or N position **PW/ST SIGNAL** OFF Check 1st trip DTC. 4. Is 1st trip DTC detected? D YES >> Go to EC-511, "Diagnosis Procedure". NO >> INSPECTION END 5. PERFORM COMPONENT FUNCTION CHECK Ε Perform component function check. Refer to EC-511, "Component Function Check". Use component function check to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed. F Is the inspection result normal? YES >> INSPECTION END >> Go to EC-511, "Diagnosis Procedure". NO Component Function Check INFOID:000000007420793 1.PERFORM COMPONENT FUNCTION CHECK Н Without CONSULT 1. Lift up drive wheels. 2. Start engine. Check vehicle speed of speedometer. 3. The vehicle speed should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position. Is the inspection result normal? YES >> INSPECTION END NO >> Go to EC-511, "Diagnosis Procedure". Κ Diagnosis Procedure INFOID:000000007420794 1. CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)" L Refer to BRC-45, "DTC No. Index" (Without TCS) or BRC-115, "DTC No. Index" (With TCS). Is the inspection result normal? M YES >> GO TO 2. NO >> Repair or replace. 2.CHECK COMBINATION METER FUNCTION Ν Refer to MWI-4, "Work Flow". >> INSPECTION END

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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:000000007420796

DTC DETECTION LOGIC

NOTE:

If DTC P0550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-520, "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.	 Harness or connectors (The sensor circuit is open or shorted) Power steering pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 5 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-512, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

- 1. Disconnect power steering pressure (PSP) sensor harness connector.
- 2. Turn ignition switch ON.

INFOID:000000007420797

P0550 PSP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between PSP sensor harness connector and ground.

PSP	sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voluge (v)	
F40	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.

3.CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

	PSP sensor		ECM		Continuity
	nnector	Terminal	Connector	Terminal	Continuity
_	F40	3	F13	48	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

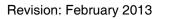
4. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

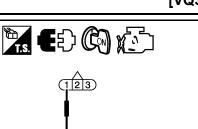
1. Check the continuity between PSP sensor harness connector and ECM harness connector.

PSP sensor ECM		Questionity			
Connector	Terminal	Connector	Terminal	Continuity	
F40	2	F13	41	Existed	
2. Also chec	k harness for	short to grour	nd and short t	o power.	
Is the inspecti		nal?			
	iO TO 5. enair onen ciu	rcuit short to c	around or sho	rt to power in harness or	connectors
5.CHECK PS					
Refer to EC-5		ent Inspection			
Is the inspecti					
•	O TO 6.				
					onent Parts Location - 17 Inch
<u> </u>			Q35DE: Com	ponent Parts Location -	<u>18 Inch Tire".</u>
6.CHECK IN					
Refer to GI-42	2, "Intermitten	<u>t Incident"</u> .			
>> IN	SPECTION I				
Componen	t Inspectio	n			INFOID:00000007420798
1. CHECK PC	OWER STEEL	RING PRESSI	JRE SENSOI	R	

1. Reconnect all harness connectors disconnected.

2. Start engine and let it idle.





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P0550 PSP SENSOR

Condition

Steering wheel: Being

Steering wheel: Not

being turned.

turned.

< DTC/CIRCUIT DIAGNOSIS >

ECM +

Terminal

41

(Power steering

pressure sensor

signal)

3. Check the voltage between ECM terminals under the following conditions.

_

Terminal

48

(Sensor

ground)

following	
Voltage	
0.5 - 4.5 V	
0.4 - 0.8 V	

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Is the inspection result normal?

Connector

F13

- YES >> INSPECTION END
- NO >> Replace power steering pressure sensor. Refer to ST-22, "VQ35DE : VQ35DE: Component Parts Location - 17 Inch Tire", or ST-24, "VQ35DE : VQ35DE: Component Parts Location - 18 Inch Tire".

P0603 ECM POWER SUPPLY

Description

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

DTC Logic

DTC No.

DTC DETECTION LOGIC

Trouble diagnosis name

ECM power supply cir-

P0603 cuit properly. open or shorted.] • ECM DTC CONFIRMATION PROCEDURE

DTC detecting condition

ECM back-up RAM system does not function

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 5 minutes.
- Turn ignition switch ON, wait at least 10 seconds. 3.
- 4. Repeat steps 2 and 3 for five times.

5. Check 1st trip DTC.

- Is 1st trip DTC detected?
- YES >> Go to EC-515, "Diagnosis Procedure".
- >> INSPECTION END NO

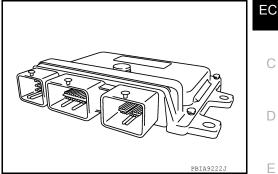
Diagnosis Procedure

1.CHECK ECM POWER SUPPLY

Turn ignition switch OFF. 1.

Disconnect ECM harness connector. 2.

INFOID:000000007420801



Possible cause

[ECM power supply (back-up) circuit is

Harness or connectors

INFOID:000000007420799

INFOID:000000007420800



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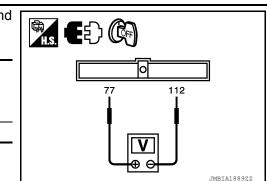
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P0603 ECM POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

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



[VQ35DE]

-					
	-	+	-		Voltage (V)
	Connector	Terminal	Connector	Terminal	
	F13	77	E10	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. 42)
- IPDM E/R harness connector F10
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connectors.

4.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "SELF-DIAG RESULTS" mode with CONSULT.
- 3. Touch "ERASE".
- 4. **Perform DTC CONFIRMATION PROCEDURE.** See <u>EC-515, "DTC Logic"</u>.

Without CONSULT

- 1. Turn ignition switch ON.
- 2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-515, "DTC Logic"</u>.

Is the 1st trip DTC P0603 displayed again?

- YES >> GO TO 5.
- NO >> INSPECTION END

5.REPLACE ECM

- 1. Replace ECM.
- 2. Go to EC-333, "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	G
		A)	ECM calculation function is malfunctioning.		0
P0605	Engine control module	B)	ECM EEP-ROM system is malfunctioning.	• ECM	
		C)	ECM self shut-off function is malfunctioning.		Н
	FIRMATION PROC	EDU	RE		

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A	K
 Turn ignition switch ON. Check 1st trip DTC. 	IX.
Is 1st trip DTC detected?	L
YES >> Go to <u>EC-518, "Diagnosis Procedure"</u> . NO >> GO TO 3.	
3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B	\mathbb{M}
 Turn ignition switch ON and wait at least 1 second. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON. Check 1st trip DTC. 	Ν
Is 1st trip DTC detected?	
YES >> Go to <u>EC-518, "Diagnosis Procedure"</u> . NO >> GO TO 4.	0
4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C	
 Turn ignition switch ON and wait at least 1 second. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON. Repeat step 2 for 32 times. Check 1st trip DTC. 	Ρ
Is 1st trip DTC detected?	
YES >> Go to <u>EC-518, "Diagnosis Procedure"</u> .	

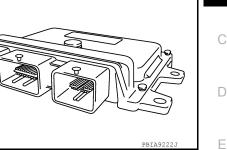
NO >> INSPECTION END А

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INFOID:000000007420803



Diagnosis Procedure

[VQ35DE] INFOID:000000007420804

1.INSPECTION START

With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "SELF-DIAG RESULTS" mode with CONSULT.
- 3. Touch "ERASE".
- 4. **Perform DTC CONFIRMATION PROCEDURE.** See <u>EC-517, "DTC Logic"</u>.

Without CONSULT

- 1. Turn ignition switch ON.
- 2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-517</u>, "DTC Logic".

Is the 1st trip DTC P0605 displayed again?

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

2.REPLACE ECM

- 1. Replace ECM.
- 2. Go to EC-333. "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement".

>> INSPECTION END

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 diagno- sis of CAN controller of ECM.	• ECM
DTC CON	FIRMATION PROCED	URE	
1 .PERFOR	RM DTC CONFIRMATIO	N PROCEDURE	
1. Turn ig 2. Check	nition switch ON.		
s DTC dete			
YES >>	Go to EC-519, "Diagnos	sis Procedure".	
NO >>	INSPECTION END		
Diagnosi	s Procedure		INFOID:000000007420807
1.INSPEC	TION START		
1. Turn ig	nition switch ON.		
2. Erase [DTC.		
	n DTC CONFIRMATION C-519, "DTC Logic".	PROCEDORE.	
4. Check	DTC.		
	P0607 displayed again?		
	· GO TO 2. · INSPECTION END		
2.REPLAC	CE ECM		
1. Replac	e ECM.		
	EC-333, "ADDITIONAL S	ERVICE WHEN REPLACING CONTRO	DL UNIT : Special Repair Require-
<u>ment"</u> .			
>>	INSPECTION END		

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P0643 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000007420808

[VQ35DE]

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	 Harness or connectors (APP sensor 1 circuit is shorted.) (TP sensor circuit is shorted.) [CMP sensor (PHASE) circuit is shorted.) (PSP sensor circuit is shorted.) (Battery current sensor circuit is shorted.) Accelerator pedal position sensor Throttle position sensor Camshaft position sensor (PHASE) Power steering pressure sensor Battery current sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Start engine and let it idle for 1 second.
- 3. Check DTC

Is DTC detected?

YES >> Go to EC-520, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

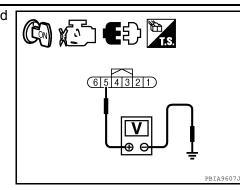
2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

- 1. Disconnect accelerator pedal position (APP) sensor harness connector.
- 2. Turn ignition switch ON.

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between APP sensor harness connector and ground.



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APP	sensor	Ground	Voltage (V)	
Connector	Connector Terminal		voltage (v)	
E40	5	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 3.

3.CHECK SENSOR POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.

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

ECM		Sensor		
Connector	Terminal	Name	Connector	Terminal
	47	TP sensor	F57	1
-	51	Battery current sensor	F5	1
F13	55	PSP sensor	F40	1
	59	CMP sensor (PHASE) (bank 1)	F55	1
-	63	CMP sensor (PHASE) (bank 2)	F60	1
E10	83	APP sensor	E40	5

YES >> GO TO 4.

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

4.CHECK COMPONENTS

Check the following.	

- Camshaft position sensor (PHASE) (Refer to <u>EC-505</u>, "Component Inspection".)
- Battery current sensor (Refer to <u>EC-536, "Component Inspection"</u>.)

Power steering pressure sensor (Refer to <u>EC-513</u>, "Component Inspection".)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

5. CHECK BATTERY CURRENT SENSOR-I

- 1. Disconnect battery current sensor harness connector.
- 2. Remove the sensor. Refer to CHG-9, "System Diagram".
- 3. Check resistance battery current sensor terminals as follows.

Terminal No.	Resistance
1 - 2	F 10 0
1 - 3	Except 0 Ω

Is the inspection result normal?

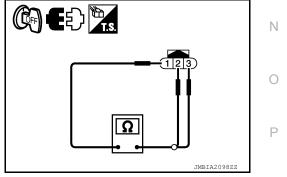
YES >> GO TO 6.

NO >> Replace battery current sensor. Refer to <u>CHG-9, "System Diagram"</u>.

6.CHECK TP SENSOR

Refer to <u>EC-469. "Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 10.



P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 7.

7.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation".
- 2. Go to EC-469, "Special Repair Requirement".

>> INSPECTION END

8.CHECK APP SENSOR

Refer to EC-586. "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. Go to EC-586, "Special Repair Requirement".

>> INSPECTION END

10.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P0850 PNP SWITCH

Description

When the selector lever position is P or N park/neutral position (PNP) signal is ON.

DTC Logic

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INFOID:000000007420810

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 is not changed in the process of engine starting and driving.	 Harness or connectors (The sensor circuit is open or shorted.) TCM
DTC CON	FIRMATION PROC	EDURE	
1.INSPEC	CTION START		
Will CONS	ULT be used?		
Will CONS	ULT be used?		
	> GO TO 2.		
~	> GO TO 5.		
	NDITIONING		
		has been previously conducted, always	turn ignition switch OFF and wait at
Cast 10 Se	conds before conduct	ווש נווב וובגו נבטו.	
>:	> GO TO 3.		
~	PNP SIGNAL		
With CC			
	nition switch ON.		
		ATA MONITOR" mode with CONSULT. T	hen check the "P/N POSI SW" signal
under	the following conditior	IS.	
Pos	ition (Selector lever)	Known-good signal	
N or P posit		ON	
Except abov	ve position	OFF	
Is the inspe	ection result normal?		
YES >	> GO TO 4.		
	> Go to <u>EC-524</u> , "Diag		
4. PERFO	RM DTC CONFIRMA	TION PROCEDURE	
	"DATA MONITOR" m		
		to normal operating temperature.	
S. Mainta CAUT		ions for at least 50 consecutive seconds	.
	s drive vehicle at a s	afe speed.	
ENG SPEE		0 - 6,375 rpm	
	EMP/S More	e than 70°C (158°F)	
COOLAN T		· · ·	
COOLAN T B/FUEL SC	HDL 4.0 -	31.8 msec	
	HDL 4.0 - ED SE More	· · ·	

Selector lever

Suitable position

EC

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Is 1st trip DTC detected?

YES >> Go to EC-524, "Diagnosis Procedure".

NO >> INSPECTION END

5.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-524, "Component Function Check".

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 EC-524, "Diagnosis Procedure".

Component Function Check

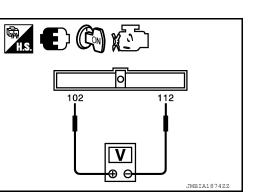
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1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connectors.

ECM						
Connector	+	_	Condition		Condition Voltage (V	Voltage (V)
Connector	Terminal	Terminal				
E10	102	112	Selector lever P or N		Battery voltage	
LIU	102	112	position	Except above	Approx. 0	



Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-524, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:000000007420813

1.CHECK DTC WITH TCM

Refer to EC-658, "DTC Index".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2.CHECK PNP 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.

ТСМ		IPDM E/R		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
F16	20	F10	72	Existed	

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

Is the inspection result normal?

YES >> GO TO 3.

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

3. CHECK PNP SIGNAL CIRCUIT FOR OPEN AND SHORT-II

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

P0850 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Connector Terminal Connector Existed Also check harness for short to ground and short to power. Stated Also check harness for short to ground and short to power in harness or connectors. CHECK INTERMITTENT INCIDENT VEN > Repair open circuit, short to ground or short to power in harness or connectors. CHECK INTERMITTENT INCIDENT Were to GL-42. "Intermittent Incident". State inspection result normal? VES > Replace IPDM RIP. VES > Replace IPDM RIP. VES > Replaci or replace malfunctioning part.	E	CM	IPDN	1 E/R	Continuity	
 Also check harness for short to ground and short to power. a the inspection result normal? YES >> GO TO 4. NO >> Repair open circuit, short to ground or short to power in harness or connectors. CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". a the inspection result normal? YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation". 	Connector	Terminal	Connector	Terminal	Continuity	_
s the inspection result normal? YES >> GO TO 4. NO >> Repair open circuit, short to ground or short to power in harness or connectors. • CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". • the inspection result normal? YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".						E
Refer to <u>GI-42, "Intermittent Incident"</u> . <u>s the inspection result normal?</u> YES >> Replace IPDM E/R. Refer to <u>PCS-45, "Removal and Installation"</u> .	<u>s the inspections the inspections of the inspections of the second seco</u>	on result norma O TO 4. epair open circ	al? uit, short to gro			(
<u>the inspection result normal?</u> YES >> Replace IPDM E/R. Refer to <u>PCS-45, "Removal and Installation"</u> .						
YES >> Replace IPDM E/R. Refer to <u>PCS-45, "Removal and Installation"</u> .						
	YES >> R	eplace IPDM E	/R. Refer to PC	<u>CS-45, "Remo</u> g part.	val and Installation".	I
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P1212 TCS COMMUNICATION LINE

Description

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)".

Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

DTC Logic

INFOID:000000007420815

DTC DETECTION LOGIC

NOTE:

- If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-440, "DTC Logic"</u>.
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "DTC Logic"</u>.

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212	TCS communication line	ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously.	 Harness or connectors (The CAN communication line is open or short- ed.) ABS actuator and electric unit (control unit) Dead (Weak) battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is 1st trip DTC detected?

YES >> Go to <u>EC-526, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

Go to BRC-7, "Work Flow".

INFOID:000000007420816

P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

P1217 ENGINE OVER TEMPERATURE

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-440</u>, "DTC Logic".
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "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)	 Cooling fan does not operate properly (Overheat). Cooling fan system does not operate properly (Overheat). Engine coolant was not added to the system using the proper filling method. Engine coolant is not within the specified range. 	 Harness or connectors (The cooling fan circuit is open or short- ed.) IPDM E/R (Cooling fan relays) Cooling fan motor Radiator hose Radiator Radiator cap Water pump Thermostat 	

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to <u>CO-36, "Changing Engine</u> <u>Coolant"</u>. Also, replace the engine oil. Refer to <u>LU-26, "Changing Engine Oil"</u>.

- 1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "SAE Viscosity Number".
- 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 <u>EC-527, "Component Function Check"</u>. **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 <u>EC-528</u>, "Diagnosis Procedure".

Component Function Check

1.PERFORM COMPONENT FUNCTION CHECK-I

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator. For the location of the radiaor cap, refer to <u>CO-39</u>, "<u>Exploded</u> <u>View</u>".

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up P pressure to escape. Then turn the cap all the way off.

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[VQ35DE]

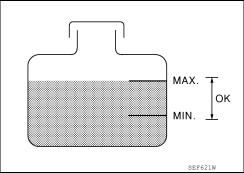
P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Check the coolant level in the reservoir tank and radiator. Allow engine to cool before checking coolant level. Is the coolant level in the reservoir tank and/or radiator below the proper range? YES >> Go to EC-528, "Diagnosis Procedure".

NO >> GO TO 2.



2. PERFORM COMPONENT FUNCTION CHECK-II

Confirm whether customer filled the coolant or not.

Did customer fill the coolant?

YES >> Go to EC-528, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM COMPONENT FUNCTION CHECK-III

With CONSULT

- Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.
- 3. Make sure that cooling fan motors-1 and -2 operate at each speed (LOW/MID/HI).

Without CONSULT

Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-11, "Diagnosis</u> <u>Description"</u>.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to <u>EC-528</u>, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK COOLING FAN OPERATION

(I) With CONSULT

- 1. Turn ignition switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that cooling fans-1 and -2 operate at each speed (LOW/MID/HI).

Without CONSULT

- Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-11, "Diagnosis</u> <u>Description"</u>.
- 2. Check that cooling fans-1 and -2 operate at each speed (Low/Middle/High).

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Go to <u>EC-602</u>, "Diagnosis Procedure".

2.CHECK COOLING SYSTEM FOR LEAK-I

Check cooling system for leak. Refer to CO-35. "System Inspection".

Is leakage detected?

YES >> GO TO 3.

3.CHECK COOLING SYSTEM FOR LEAK-II

Check the following for leak.

- Hose
- Radiator
- Water pump

P1217 ENGINE OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
>> Repair or replace malfunctioning part.		
4.CHECK RADIATOR CAP	ŀ	Ą
Check radiator cap. Refer to CO-35, "System Inspection".		
Is the inspection result normal?	E	С
YES >> GO TO 5.		Ŭ
NO >> Replace radiator cap. Refer to <u>CO-39, "Exploded View"</u> .		
5.CHECK THERMOSTAT	(С
Check thermostat. Refer to CO-48. "Removal and Installation".		
Is the inspection result normal?	r	
YES >> GO TO 6.	L	
NO >> Replace thermostat. Refer to <u>CO-48, "Exploded View"</u> .		
6 .CHECK ENGINE COOLANT TEMPERATURE SENSOR	F	E
Refer to EC-465, "Component Inspection".		
Is the inspection result normal?		
YES >> GO TO 7.	F	F
NO >> Replace engine coolant temperature sensor. Refer to <u>CO-50, "Exploded View"</u> .		
7		

1.CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	 Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper 	• Visual	No blocking	_
-	2	Coolant mixture	Coolant tester	MA-12, "SAE Viscosity Nu	mber"
-	3	Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-36, "Changing Engine Coolant"
-	4	Radiator cap	Pressure tester	CO-35, "System Inspection	<u>י"</u>
ON* ²	5	Coolant leaks	• Visual	No leaks	CO-35, "System Inspec- tion"
ON* ²	6	Thermostat	 Touch the upper and lower radiator hoses 	Both hoses should be hot	CO-48, "Removal and In- stallation"
ON* ¹	7	Cooling fan	CONSULT	Operating	EC-602, "Component Function Check"
OFF	8	Combustion gas leak	Color checker chemical tester 4 Gas analyzer	Negative	_
ON* ³	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	CO-36, "Changing Engine Coolant"
OFF* ⁴	10	Coolant return from res- ervoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-36, "Changing Engine Coolant"
OFF	11	Cylinder head	 Straight gauge feeler gauge 	0.1 mm (0.004 in) Maxi- mum distortion (warping)	EM-202, "Inspection After Disassembly"
ŀ	12	Cylinder block and pis- tons	• Visual	No scuffing on cylinder walls or piston	EM-225, "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.

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For more information, refer to CO-33, "Troubleshooting Chart".

>> INSPECTION END

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 potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal 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 condition via the throttle control motor.

sively low

6.0 Sensor 1 4.0 etition 2.0 4.0 bitsout 2.0 0 4.0 Sensor 2 0 4.0 Sensor 2 0 135 Throttle valve opening angle (deg) PBIR0145E

Possible cause

Electric throttle control actuator

(TP sensor 1 and 2)

Throttle position sensor

DTC detecting condition

Closed throttle position learning value is exces-

DTC DETECTION LOGIC

DTC Logic

DTC No.

P1225

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	learning performance			
DTC CON	FIRMATION PROC	EDURE		Н
1.PRECO	NDITIONING			
	firmation Procedure conduct	nas been previously conducted, always ing the next test.	turn ignition switch OFF and wait at	

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

Trouble diagnosis name Closed throttle position

learning performance

- 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 <u>EC-531, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.

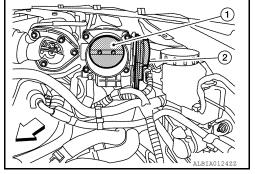
2. Remove the intake air duct. Refer to EM-132, "Removal and Installation".

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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. Refer to <u>EM-133. "Removal and Installation"</u>.



2.Replace electric throttle control actuator

- 1. Replace electric throttle control actuator. Refer to <u>EM-133</u>, "Removal and Installation".
- 2. Go to EC-532. "Special Repair Requirement"

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420823

[VQ35DE]

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.perform idle air volume learning

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

P1226 TP SENSOR

Description

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

The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal 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 condition via the throttle control motor.

Throttle position sensor 4.0 output voltage Seńsor 2 0^L0 45 90 135 Throttle valve opening angle (deg) PBTB0145F

6.0

Throttle position sensor

Sensor 1

Possible cause

DTC Logic

DTC DETECTION LOGIC

DTC No. Trouble diagnosis name

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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)	
4	FIRMATION PROC	EDURE		Н

DTC detecting condition

I.PRECONDITIONING

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

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

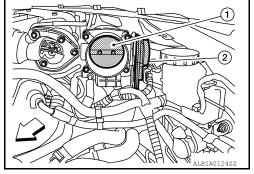
1. Turn ignition switch ON.	
 Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 	
4. Repeat steps 2 and 3 for 32 times.	
5. Check 1st trip DTC.	
Is 1st trip DTC detected?	M
YES >> Go to <u>EC-533, "Diagnosis Procedure"</u> . NO >> INSPECTION END	
Diagnosis Procedure	Ν
1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY	
 Turn ignition switch OFF. Remove the intake air duct. Refer to <u>EM-132, "Removal and Installation"</u>. 	0

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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. Refer to <u>EM-133. "Removal and Installation"</u>.



2.Replace electric throttle control actuator

- 1. Replace electric throttle control actuator. Refer to <u>EM-133</u>, "Removal and Installation".
- 2. Go to EC-532. "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420827

[VQ35DE]

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.perform idle air volume learning

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1550 BATTERY CURRENT SENSOR

Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-9</u>, <u>"System Description"</u>.

CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000007420829

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-520, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	Ц
P1550	Battery current sensor circuit range/performance	The output voltage of the battery current sensor remains within the specified range while engine is running.	 Harness or connectors (The sensor circuit is open or shorted.) Battery current sensor 	П

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-535, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.

2. Turn ignition switch ON.

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P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check the voltage between battery current sensor harness connector and ground.

Battery current sensor Connector Terminal		Ground	Voltage (V)
		Ground	voltage (v)
F5	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.

3.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Battery current sensor		ECM		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
F5	2	F13	44	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery current sensor		ECM		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
F5	3	F13	42	Existed	

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK BATTERY CURRENT SENSOR

Refer to EC-536, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

O.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

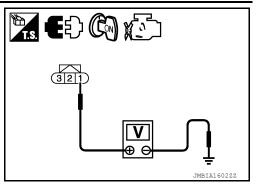
>> INSPECTION END

Component Inspection

1. CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

2. Reconnect harness connectors disconnected.

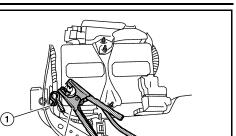


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P1550 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- : Vehicle front _
- _
- To body ground
 Install jumper cable (A) between battery negative terminal and 4. body ground.
- Turn ignition switch ON. 5.



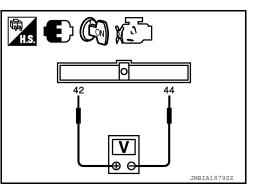
6. Check the voltage between ECM harness connector terminals under the following conditions.

Connector	+	-	Voltage (V)
Connector	Terminal	Terminal	
F13	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" (COUPE models) or PG-71, "How to Handle Battery" (SEDAN models).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.



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P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1551, P1552 BATTERY CURRENT SENSOR

Description

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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-9</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:000000007420833

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-520, "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 sensor circuit is open or shorted.)
P1552	Battery current sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Go to EC-538. "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

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

Is the inspection result normal?

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

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

EC-538

INFOID:000000007420834

[VQ35DE]

P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect battery current sensor harness connector.
- 2. Turn ignition switch ON.
- Check the voltage between battery current sensor harness connector and ground.

Battery cur	rrent sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
F5	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.

3.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

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

Battery current sensor		EC	ECM	Continuity	
Connector	Terminal	Connector	Terminal	·	
F5	2	F13	44	Existed	
. Also check	harness for sh	nort to ground a	nd short to po	wer.	
	<u>n result norma</u>	<u>l?</u>			
) TO 4.	it chout to our			
4	• •	-		power in harnes	
					OPEN AND SHORT
1. Check the	continuity betw	een battery cu	rrent sensor ha	arness connector	and ECM harness connector.
				1	
-	rent sensor	EC		Continuity	
Connector	Terminal	Connector	Terminal		
F5	3	F13	42	Existed	
NO >> Re 5.CHECK BAT Refer to <u>EC-53</u>		ENT SENSOR	ind or short to	power in harnes	or connectors.
Is the inspectio					
	D TO 6.				
^		egative cable a	issembly.		
O. CHECK INT	ERMITTENT I	NCIDENT			
Refer to <u>GI-42.</u>	"Intermittent Ir	ncident".			
>> INS	SPECTION EN	D			
Component	Inspection				INFOID:00000007420835
		ENT SENSOR			
	n switch OFF.				
Reconnect	narness conn	ectors disconne	ected.		



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P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- <⊐: Vehicle front -
- _
- To body ground
 Install jumper cable (A) between battery negative terminal and 4. body ground.
- 5. Turn ignition switch ON.

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[VQ35DE]

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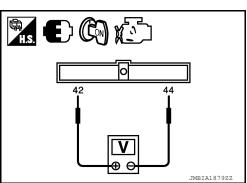
6. Check the voltage between ECM harness connector terminals under the following conditions.

Connector	+	-	Voltage (V)
Connector	Terminal	Terminal	
F13	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" (COUPE models) or PG-71. "How to Handle Battery" (SEDAN models).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.



Revision: February 2013

P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1553 BATTERY CURRENT SENSOR

Description

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator. The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery. Based on the sensor signal, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R. For the details of the power generation voltage variable control, refer to <u>CHG-9</u>, <u>"System Description"</u>.

CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then battery discharge may occur.

DTC Logic

INFOID:000000007420837

DTC DETECTION LOGIC

NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-520, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	Ц
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.	 Harness or connectors (The sensor circuit is open or shorted.) Battery current sensor 	П

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-541, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace ground connection.

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect battery current sensor harness connector.

2. Turn ignition switch ON.

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P1553 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check the voltage between battery current sensor harness connector and ground.

Battery cur	rrent sensor	Ground	Voltage (V)
Connector	Terminal	Ground	
F5	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.
- Disconnect ECM harness connector. 2.
- 3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	rrent sensor	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F5	2	F13	44	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, 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	E	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F5	3	F13	42	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK BATTERY CURRENT SENSOR

Refer to EC-536, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

>> Replace battery negative cable assembly. NO

O.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

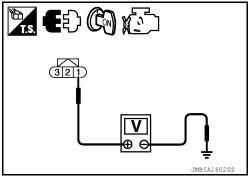
>> INSPECTION END

Component Inspection

1.CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

Reconnect harness connectors disconnected. 2.



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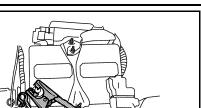
[VQ35DE]

P1553 BATTERY CURRENT SENSOR

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< DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable (1).
- : Vehicle front _
- _
- To body ground
 Install jumper cable (A) between battery negative terminal and 4. body ground.
- Turn ignition switch ON. 5.



[VQ35DE]

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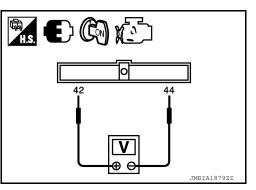
6. Check the voltage between ECM harness connector terminals under the following conditions.

Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F13	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" (COUPE models) or PG-71, "How to Handle Battery" (SEDAN models).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.



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EC-543

P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1554 BATTERY CURRENT SENSOR

Description

INFOID:000000007420840

IVQ35DE1

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-9</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:000000007420841

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-520, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
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.	Harness or connectors (The sensor circuit is open or shorted.)Battery current sensor

DTC CONFIRMATION PROCEDURE

1.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-544, "Component Function Check".

NOTE:

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

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Go to EC-545, "Diagnosis Procedure".

Component Function Check

INFOID:000000007420842

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 2,300 mV at least once.

Without CONSULT

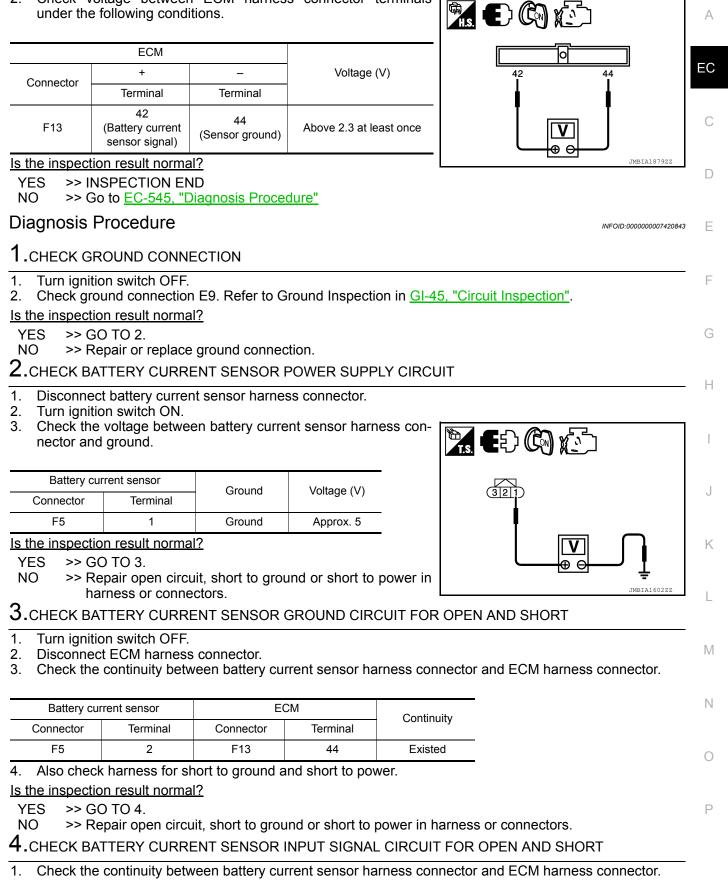
1. Start engine and let it idle.



< DTC/CIRCUIT DIAGNOSIS >

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





P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

INFOID:000000007420844

Battery cur	ery current sensor ECM		ECM	
Connector	Terminal	Connector	Terminal	Continuity
F5	3	F13	42	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK BATTERY CURRENT SENSOR

Refer to EC-536, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace battery negative cable assembly.

6.CHECK INTERMITTENT INCIDENT

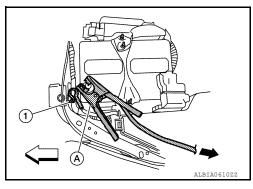
Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

Component Inspection

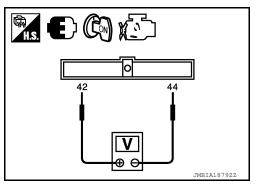
1. CHECK BATTERY CURRENT SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect harness connectors disconnected.
- 3. Disconnect battery negative cable (1).
- <>: Vehicle front
- **(**: To body ground
- 4. Install jumper cable (A) between battery negative terminal and body ground.
- 5. Turn ignition switch ON.



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

Connector	+	-	Voltage (V)
Connector	Terminal	Terminal	
F13	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 <u>PG-3</u>, "<u>How to Handle Battery</u>" (COUPE models) or <u>PG-71</u>, "<u>How to</u> <u>Handle Battery</u>" (SEDAN models).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery negative cable assembly.

CONSULT.

2.

< DTC/CIRCUIT DIAGNOSIS >

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 EC-368, "System Diagram" 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 EC-517, "DTC Logic".

P1564	ASCD steering switch	 An excessively high voltage signal from the ASCD steering switch is sent to ECM. ECM detects that input signal from the ASCD steering switch is out of the specified range. ECM detects that the ASCD steering switch is stuck ON. 	 Harness or connectors (The switch circuit is open or shorted.) ASCD steering switch ECM
	FIRMATION PRO	DCEDURE	
1.PRECO	NDITIONING		
		re has been previously conducted, alw ucting the next test.	ays turn ignition switch OFF and wait at
		ucting the next test.	
>>	• GO TO 2.		
2.PERFOR	RM DTC CONFIRM	MATION PROCEDURE	
 Press M Press C 	MAIN switch for at CANCEL switch for	nd wait at least 10 seconds. least 10 seconds, then release it and w r at least 10 seconds, then release it an ERATE switch for at least 10 seconds,	
		n for at least 10 seconds, then release i	t and wait at least 10 seconds.
Is DTC dete			
	So to <u>EC-547, "D</u> INSPECTION EN	<u>iagnosis Procedure"</u> . D	
Diagnosi	s Procedure		INFOID:00000007420847
1.снеск	GROUND CONNE	ECTION	
	nition switch OFF.		
	ground connection	I E9. Refer to Ground Inspection in <u>GI-4</u>	15. "Circuit Inspection".
	GO TO 2.	<u></u>	
NO >>	Repair or replace	ground connection.	
		SWITCH CIRCUIT	

EC-547

Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with

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P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

3. Check each item indication under the following conditions.

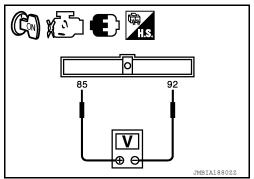
Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
MAIN SW	MAIN SWICH	Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
CANCEL SW		Released	OFF
RESUME/ACC SW	RESUME/ACCEL-	Pressed	ON
RESUME/ACC SW	ERATE switch	Released	OFF
SET SW		Pressed	ON
3E1 3W	SET/COAST switch	Released	OFF

Without CONSULT

T. Turn ignition switch ON.

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

	ECM			
Connector	+	_	Condition	Voltage (V)
Connector	Terminal	Terminal		
			MAIN switch: Pressed	Approx. 0
			CANCEL switch: Pressed	Approx. 1
E10	85 92 (ASCD (ASCD steering steering	SET/COAST switch: Pressed	Approx. 2	
	switch signal)	switch ground)	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.

Combination switch	E	Continuity	
Terminal	Connector Terminal		Continuity
16	E10	92	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E30, M1

Combination switch (spiral cable)

· Harness for open and short between ECM and combination switch

-	RCUIT DIA	AGNOSIS >	P1564 ASCD S1			VQ35DE]
>			short to ground or sh	ort to power in h	arness or connectors.	
	•	•	-	•	R OPEN AND SHORT	
. Chec	k the contin	uity betweer	n combination switch	and ECM harne	ess connector.	
Combinati	ion switch	EC	M			
Term	ninal	Connector	Terminal	ntinuity		
1	3	E10	85 Ex	disted		
. Also d	check harne	ess for short	to ground and short	to power.		
s the insp	pection resu	<u>ilt normal?</u>				
	>> GO TO 7					
•	>> GO TO 6					
		NCTIONING	PARI			
	e following. s connector	~ E30 M1				
		s ⊑so, wii n (spiral cabl	e)			
			ween ECM and com	bination switch		
	-	-	-	ort to power in h	arness or connectors.	
.CHECI	K ASCD ST	TEERING SV	VITCH			
Refer to E	<u>-549, "Co</u>	omponent Ins	spection".			
<u>s the insp</u>	pection resu	ult normal?				
	>> GO TO 8					
-		ASCD steer	•			
5. CHEC	K INTERMI	TTENT INCI	DENT			
Refer to C	GI-42, "Inter	mittent Incid	<u>ent"</u> .			
	>> INSPEC	TION END				
>						
	nent insp	ection			INFOI	ID:000000007420848
Compor	-				INFOI	'D:000000007420848
Compor 1.CHEC	K ASCD ST	EERING SV	VITCH		INFO	D:000000007420848
Compor 1.CHECI	K ASCD ST	TEERING SV			INF01	D:000000007420848
Compor 1.CHECI 1. Turn i 2. Disco	K ASCD ST ignition swit	TEERING SV tch OFF. pination swite	ch (spiral cable) harı			D:000000007420848
Compor 1.CHECI 1. Turn i 2. Disco 3. Checl	K ASCD ST ignition swit innect comb k resistance	TEERING SV tch OFF. pination swite	ch (spiral cable) hari ombination switch ha			0:000000007420848
Compor 1.CHECI 1. Turn i 2. Disco 3. Checl	K ASCD ST ignition swit innect comb k resistance	TEERING SV tch OFF. pination swite between co	ch (spiral cable) hari ombination switch ha			1D:000000007420848
Compor .CHECI . Turn i . Disco . Checl tor ter	K ASCD ST ignition swit innect comb k resistance	TEERING SV tch OFF. pination swite between co	ch (spiral cable) harı ombination switch ha ving.	arness connec-		ID:000000007420848
Compor .CHECI . Turn i 2. Disco 3. Checl tor ter	K ASCD ST ignition swit nnect comb k resistance rminals as p ation switch	TEERING SV tch OFF. pination swite between co	ch (spiral cable) hari ombination switch ha			1D:000000007420848
Compor .CHECI . Turn i Disco . Checl tor ter	K ASCD ST ignition swit nnect comb k resistance rminals as p ation switch	TEERING SV tch OFF. pination swite between co	ch (spiral cable) harr ombination switch ha ving. Condition	arness connec-		ID:00000007420848
Compor CHECI Turn i Disco Checl tor ter Combina	K ASCD ST ignition swit nnect comb k resistance rminals as p ation switch	TEERING SV tch OFF. pination swite between co per the follow	ch (spiral cable) harr ombination switch ha ving. Condition Pressed	arness connec-		
Compor .CHECI . Turn i Disco . Checl tor ter Combina Connector	K ASCD ST ignition swit innect comb k resistance rminals as p ition switch Terminals	TEERING SV tch OFF. Dination swite between ca Der the follow MAIN switch: CANCEL swit	ch (spiral cable) harr ombination switch ha ving. Condition Pressed	Resistance (Ω) Approx. 0		D:00000007420848
Compor 1.CHECI 1. Turn i 2. Disco 3. Checl tor ter Combina	K ASCD ST ignition swit nnect comb k resistance rminals as p ation switch	TEERING SV tch OFF. Dination switch between co Der the follow MAIN switch: CANCEL switch SET/COAST	ch (spiral cable) harr ombination switch ha ving. Condition Pressed ch: Pressed	Resistance (Ω) Approx. 0 Approx. 250		D:00000007420848

YES >> INSPECTION END NO >> Replace ASCD steering switch

< DTC/CIRCUIT DIAGNOSIS >

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 this input of two kinds (ON/OFF signal). Refer to <u>EC-368</u>, "System Diagram" 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-517, "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 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.	 Harness or connectors (The stop lamp switch circuit is shorted.) Harness or connectors (The ASCD brake switch circuit is shorted.) 	
P1572	ASCD brake switch	B)	ASCD brake switch signal is not sent to ECM for extremely long time while the ve- hicle is driving.	 Stop lamp switch ASCD brake switch Incorrect stop lamp switch installation Incorrect ASCD brake switch installation ECM 	

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

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

2.PRECONDITIONING

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

NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A-I

- 1. Start engine (VDC switch OFF).
- 2. Select "DATA MONITOR" mode with CONSULT.
- 3. Press MAIN switch and make sure that CRUISE lamp lights up.
- 4. Drive the vehicle for at least 5 consecutive seconds under the following conditions.
 - CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

INFOID:000000007420849

INFOID:000000007420850

VHCL S	PEED SE		More tha	ın 30 km/h (19	mph)	
Selector				Suitable position		
	eck 1st trip		Outuble	poolion		
	ip DTC de					
YES			, "Diagnosis Pro	cedure".		
NO	>> GO T		_			
.PER	FORM DT	C CONF	IRMATION PRO	CEDURE A	\-	
CA Alw NO	<mark>UTION:</mark> /ays drive TE:	e vehicle	at a safe speed	d.		lowing conditions. d in the shop or by driving the vehicle.
			cted to be easie			
VHCL S	PEED SE		More that	ın 30 km/h (19	mph)	
Selector	lever		Suitable	position		
Driving I	ocation		five seco		al for more than to come off from ehicle speed.	
2. Che	eck 1st trip	DTC.				
<u>s 1st tri</u>	ip DTC de					
YES NO	>> Go to >> INSP		<u>, "Diagnosis Prod</u>	<u>cedure"</u> .		
'erform	i compone	ent function	on check. Refer	to <u>EC-551, '</u>	Component Fi	unction Check".
	nponent fu	unction c	heck to check th	e overall fui	nction of ASCE	D brake switch. During this check, a DTC
•	ot be confi					
	spection r					
YES NO	>> INSP >> Go to		END , "Diagnosis Pro	cedure"		
			-	<u>ocuare</u> .		
Jomp	onent F	unctior	Спеск			INFOID:000000007420851
.PER	FORM CC	MPONE	NT FUNCTION	CHECK		
	n ignition s					
			ween ECM harn	ess connect	ors.	
	ECM					
Con-	+	_	Conditi	on	Voltage	
nector	Terminal	Terminal				\mathbf{I}
	110 (ASCD			Slightly	Approx. 0 V	
E10	(ASCD brake	112	Brake pedal	depressed		
	switch signal)			Fully re- leased	Battery voltage	
	spection r					
YES	>> INSP		END			
NO	>> GO T	02.				

 $2. {\tt perform \ component \ function \ check-ii}$

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between ECM harness connectors.

ECM						
Con-	+	_	Condition		Voltage	<u> </u>
nector	Terminal	Terminal				106 112
F 10	106 (Stop	44.0	Deska sa dal	Slightly depressed	Battery voltage	
E10	lamp switch signal)	112	Brake pedal Fully re leased		Approx. 0 V	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-552, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:000000007420852

[VQ35DE]

1.CHECK OVERALL FUNCTION-I

(I) With CONSULT

- Turn ignition switch ON.
 Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Condition	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
BRAKE SWI		Fully released	ON

Without CONSULT Turn ignition switch

- Turn ignition switch ON.
- 2. Check the voltage between ECM harness connectors.

						H.S. 🕒 (CR) X 🗋
	ECM					
Con-	+	_	Condition		Voltage	
nector	Terminal	Terminal				110 112
	110 (ASCD	44.0	Deal a sector	Slightly depressed	Approx. 0 V	
E10	brake switch signal)	112	Brake pedal	Fully re- leased	Battery voltage	

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

(R) With CONSULT

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

Monitor item	Condition	Indication	
BRAKE SW2	Brake pedal	Slightly depressed	ON
BRAKE SW2	Втаке редаг	Fully released	OFF

Without CONSULT

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between ECM harness connectors

Check the voltage between ECM harness connectors.						А		
	ECM							
Con-	+	_		Condition	า	Voltage		
nector	Terminal	Terminal					106 112	EC
E10	106 (Stop lamp	112	Brake ped	al	Slightly depressed	Battery voltage		С
210	switch signal)	112	Brane pea		Fully re- leased	Approx. 0 V		
Is the inspection result normal?								D
YES NO	>> GO >> GO							
-			SWITCH		R SUPPLY			Е
				FOWLF	SUFFLI	CIRCON		
	rn ignition			harness	connector			_
	rn ignition							F
	eck the v		etween At	SCD bra	ke switch	harness con-		
								G
	ASCD bral	ke switch	(oltage	2	
Cor	nnector	Termina	al Ground V		V	Jilage		Н
	E37	1	Ground		Batter	ry voltage		
	nspection		mal?				└── ® ⊖┘ Į́	
YES NO	>> GO >> GO							
							PBIB0857E	
4. DE1	TECT MAI	FUNCTI	ONING PA	٩RT				J
	the follow block (J/E		tor E6					
	fuse (No.							K
			rt betweei	n ASCD	brake swite	ch and fuse		Γ
	_		, .				_	
5		•		-			arness or connectors.	L
				INPUI	SIGNAL CI	RCUIT FOR O	PEN AND SHORT	
	rn ignition sconnect I			ector				M
					ke switch l	harness conne	ctor and ECM harness connector.	
		-						
AS	CD brake sv	vitch	E	СМ	0	Continuity		Ν
Conne	ector Te	erminal	Connector	Termir	nal			
E3	37	2	E10	110		Existed		0
				ground a	and short to	o power.		
	nspection		mal?					
YES NO	>> GO >> Rep		ircuit sho	ort to arou	und or shor	rt to power in h	arness or connectors	Р
NO >> Repair open circuit, short to ground or short to power in harness or connectors. 6.CHECK ASCD BRAKE SWITCH								
					SCD Brake	Switch)"		
			<u>ione mope</u>			<u>, ownorry</u> .		

Is the inspection result normal?

YES >> GO TO 9.

>> Replace ASCD brake switch. Refer to <u>BR-17, "Exploded View"</u>. NO

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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7. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- Check the voltage between stop lamp switch harness connector 3. and ground.

Stop lan	np switch	Ground	Voltage	
Connector	Terminal	Ground		
E38	1	Ground	Battery voltage	

Is the inspection result normal?

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

8. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E6
- 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.

$9. {\sf CHECK \ STOP \ LAMP \ RELAY-1 \ GROUND \ CIRCUIT}$

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay-1 harness connector.
- Check the continuity between stop lamp relay-1 harness con-3. nector and ground.

Stop lamp	o relay-1	Ground	Continuity	
Connector	Connector Terminal		Continuity	
E57 2		Ground	Existed	

Is the inspection result normal?

YES >> GO TO 10. NO

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

10. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

- 1. Connect stop lamp switch harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between stop lamp relay-1 harness connector and ground.

Stop lamp relay-1		Ground	Condition		Voltage (V)	
Connector	Terminal	Ground	Condition vol		voltage (v)	
E57	1	Ground	Brake pedal	Slightly de- pressed	Battery voltage	
			pedal	Fully released	Approx. 0	

Is the inspection result normal?

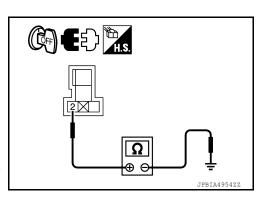
YES >> GO TO 12. >> GO TO 11.

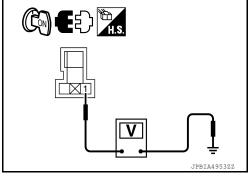
NO

11. DETECT MALFUNCTIONING PART

Check the following.

Joint connector-E14 E56





P15/2 ASCD BRAKE SWITC	A					
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]					
 Harness for open or short between stop lamp switch and stop lamp relay-1 						
Is the inspection result normal?	А					
YES >> GO TO 14.						
NO >> Repair open circuit or short to ground or short to power in ha	EC					
12. CHECK STOP LAMP RELAY-1 POWER SUPPLY CIRCUIT						
 Check the voltage between stop lamp relay-1 harness connector and Check the voltage between stop lamp relay-1 harness connector 	l ground.					
and ground.						
Stop lamp relay-1						
Connector Terminal Ground Voltage (V)						
E57 5 Ground Battery voltage						
Is the inspection result normal?						
YES >> GO TO 13.						
NO >> Repair open circuit or short to ground or short to power in harness or connectors.	JPBIA49552Z					
13. CHECK STOP LAMP RELAY-1 INPUT SIGNAL CIRCUIT FOR OPE	I					
 Turn ignition switch OFF. Disconnect stop lamp relay-1 harness connector. 	G					
3. Check the continuity between stop lamp relay-1 harness connector a	nd ECM harness connector.					
	н					
ECM Stop lamp relay-1 Continuity	11					
Connector Terminal Connector Terminal						
E10 106 E57 3 Existed	I					
4. Also check harness for short to ground and short to power.						
Is the inspection result normal?	J					
YES >> GO TO 15. NO >> Repair open circuit or short to ground or short to power in ha						
14.CHECK STOP LAMP SWITCH						
	K					
Refer to <u>EC-556</u> , "Component Inspection (Stop Lamp Switch)".						
<u>Is the inspection result normal?</u> YES >> GO TO 16.						
NO >> Replace stop lamp switch.	L					
15.CHECK STOP LAMP RELAY-1						
Refer to EC-557, "Component Inspection (Stop Lamp Relay-1)".						
Is the inspection result normal?						
YES >> GO TO 16.	Ν					
NO >> Replace stop lamp relay-1.	14					
16.CHECK INTERMITTENT INCIDENT						
Refer to GI-42, "Intermittent Incident".	0					
>> INSPECTION END	Р					
Component Inspection (ASCD Brake Switch)						
1. CHECK ASCD BRAKE SWITCH-I						
1. Turn ignition switch OFE						

1. Turn ignition switch OFF.

2. Disconnect ASCD brake switch harness connector.

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	1 and 2 Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

- 1. Adjust ASCD brake switch installation. Refer to BR-13, "Inspection and Adjustment".
- 2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
T and 2	Diake pedai	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch. Refer to <u>BR-17</u>, "Exploded View".

Component Inspection (Stop Lamp Switch)

1.CHECK STOP LAMP SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check harness continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
	Drake pedal	Slightly depressed	Existed

Is the inspection result normal?

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

2.CHECK STOP LAMP SWITCH-II

- Adjust stop lamp switch installation. Refer to BR-13, "Inspection and Adjustment". 1.
- Check harness continuity between stop lamp switch terminals 2. under the following conditions.

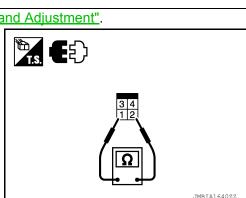
Terminals	Condition		Continuity	
1 and 2	Brake pedal	Fully released	Not existed	
T anu z		Slightly depressed	Existed	
Is the inspection result normal?				

YES >> INSPECTION END

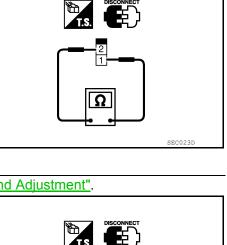
NO >> Replace stop lamp switch. Refer to BR-17, "Exploded View".

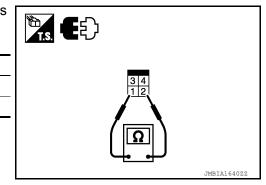


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Revision: February 2013







< DTC/CIRCUIT DIAGNOSIS >

Component Inspection (Stop Lamp Relay-1)

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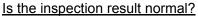
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1. STOP LAMP RELAY-1

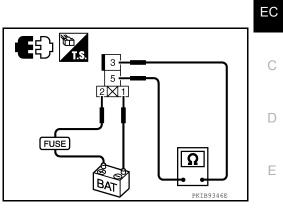
- 1. Turn ignition switch OFF.
- 2. Remove stop lamp relay-1.
- 3. Check continuity between stop lamp relay-1 terminals under the following conditions.

Stop lamp relay-1		Conditions	Continuity	
Terr	ninal	Conditions	Continuity	
3	5	12 V direct current supply between terminals 1 and 2	Existed	
		No current supply	Not existed	





NO >> Replace stop lamp relay-1.



< DTC/CIRCUIT DIAGNOSIS >

P1574 ASCD VEHICLE SPEED SENSOR

Description

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to <u>EC-368</u>, "System Diagram" for ASCD functions.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-440, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to <u>EC-510, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-517, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	 Harness or connectors (The CAN communication line is open or shorted.) Combination meter ABS actuator and electric unit (control unit) Wheel sensor TCM ECM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine (ESP switch OFF).
- 2. Drive the vehicle at more than 40 km/h (25 MPH).

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

3. Check DTC.

Is DTC detected?

YES >> Go to <u>EC-558</u>, "<u>Diagnosis Procedure</u>". NO >> INSPECTION END

Diagnosis Procedure

1. СНЕСК DTC WITH TCM

Check DTC with TCM. Refer to TM-196. "DTC Index".

Is the inspection result normal?

YES >> GO TO 2.

INFOID:000000007420858

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P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
NO >> Perform trouble shooting relevant to DTC indicated.		
2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"		А
Refer to BRC-45, "DTC No. Index" (Without TCS) or BRC-115, "DTC No. Index" (With TCS).		
Is the inspection result normal?		EC
YES >> GO TO 3.		
NO >> Repair or replace.		
3. CHECK COMBINATION METER FUNCTION		С
Refer to <u>MWI-4, "Work Flow"</u> .		
>> INSPECTION END		D
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< DTC/CIRCUIT DIAGNOSIS >

P1700 CVT CONTROL SYSTEM

Description

INFOID:000000007420859

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for corresponding DTC. Refer to <u>EC-658</u>, "<u>DTC Index</u>". When this DTC is detected, the ASCD control is canceled.

P1715 INPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1715 INPUT SPEED SENSOR

Description

ECM receives input speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, D
 U1001. Refer to <u>EC-440, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to <u>EC-499, "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-503, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-517, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "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.	 Harness or connectors (The CAN communication line is open or short- ed) Harness or connectors (Input speed sensor circuit is open or shorted) TCM 	Н

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

L Start engine. 1. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds. 2. 3. Check 1st trip DTC. M Is 1st trip DTC detected? YES >> Go to EC-561, "Diagnosis Procedure". NO >> INSPECTION END Ν Diagnosis Procedure INFOID:000000007420862 CHECK DTC WITH TCM Check DTC with TCM. Refer to TM-196, "DTC Index". OK or NG Ρ OK >> GO TO 2. NG >> Perform trouble shooting relevant to DTC indicated. 2.REPLACE TCM

Replace TCM. Refer to TM-238, "Removal and Installation".

>> INSPECTION END

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INFOID-000000007420861

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< DTC/CIRCUIT DIAGNOSIS >

P1720 VSS

Description

INFOID:000000007420863

ECM receives two vehicle speed signals via CAN communication line. One is sent from "ABS actuator and electric unit (control unit)" via combination meter, and the other is from TCM (Transmission control module). ECM uses these signals for engine control.

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC P1720 is displayed with DTC U1000, U1001 first perform the trouble diagnosis for DTC U1000, U1001. Refer to <u>EC-440, "DTC Logic"</u>.
- If DTC P1720 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-519, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1720	Vehicle speed sensor (TCM output)	A difference between two vehicle speed signals is out of the specified range.	 Harness or connectors (Output speed sensor circuit is open or short- ed.) Harness or connectors (Wheel sensor circuit is open or shorted.) TCM Output speed sensor ABS actuator and electric unit (control unit) Wheel sensor Combination meter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive vehicle at a 20 km/h (12 MPH) or more for at least 5 seconds without brake pedal depressing.
- 3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to <u>EC-562, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420865

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to <u>TM-196, "DTC Index"</u>.

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)"

Refer to BRC-45, "DTC No. Index" (Without TCS) or BRC-115, "DTC No. Index" (With TCS).

<u>OK or NG</u>

OK >> GO TO 3.

NG >> perform trouble shooting relevant to DTC indicated.

INFOID:000000007420864

< DTC/CIRCUIT DIAGNOSIS >	
3. CHECK COMBINATION METER FUNCTION	
Refer to <u>GI-38, "Work Flow"</u> .	
>> INSPECTION END	

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P1800 VIAS CONTROL SOLENOID VALVE 1

< DTC/CIRCUIT DIAGNOSIS >

P1800 VIAS CONTROL SOLENOID VALVE 1

Description

INFOID:000000007420866

IVQ35DE1

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:000000007420867

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.	 Harness or connectors (The solenoid valve 1 circuit is open or shorted.) VIAS control solenoid valve 1

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 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-564, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420868

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.
- Check the voltage between VIAS control solenoid valve 1 harness connector and ground.

VIAS control s	VIAS control solenoid valve 1 Ground		Voltage (V)
Connector	Terminal	Ground	voltage (v)
F63	2	Ground	Battery voltage

Is the inspection result normal?

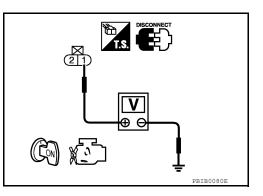
YES >> GO TO 2.

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.
- Check the continuity between VIAS control solenoid valve 1 harness connector and ECM harness connector.





P1800 VIAS CONTROL SOLENOID VALVE 1

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	valve 1 EC	M	Continuity		
Connector Ter	minal Connector	Terminal	Continuity		
F63	1 F14	27	Existed	E	
4. Also check harnes	ss for short to ground an	d short to powe	∍r.		
Is the inspection result	<u>: normal?</u>				
YES >> GO TO 3. NO >> Repair op	en circuit, short to groun	d or short to pr	wer in harness or conn	ectors	
• ' '	TROL SOLENOID VAL				
Refer to EC-565, "Con					
Is the inspection result					
YES >> GO TO 4.					
NO >> Replace V 4.CHECK INTERMIT	/IAS control solenoid val	ve 1. Refer to <u>t</u>	<u>-C-339, "Component P</u>	arts Location".	
Refer to <u>GI-42, "Interm</u>	<u>littent Incident"</u> .				
>> INSPECT	ION END				
Component Inspe	ection			INFOID:00000007420869	
				INFOID.000000007420809	
1. CHECK VIAS CON	TROL SOLENOID VAL	/E 1			
 Turn ignition switc Reconnect all harr 	n OFF. ness connectors disconr	nected.			
3. Disconnect VIAS	purge hoses connected		solenoid valve 1.		
 Turn ignition switc Select "VIAS S/V" 	h ON. 1" in "ACTIVE TEST" mo	ode with CONS	UIT		
6. Check air passage	e continuity and operatio				
following condition	IS.				
Condition	Air passage continuity				
		Air passage cor			
(VIAS S/V 1)	between (A) and (B)	Air passage cor between (A) ar	ntinuity		
	between (A) and (B) Existed		ntinuity nd (C)		
(VIAS S/V 1)		between (A) ar	ntinuity nd (C)		
(VIAS S/V 1) ON	Existed	between (A) ar Not existe	ntinuity nd (C)		
(VIAS S/V 1)	Existed	between (A) ar Not existe	ntinuity nd (C)		
(VIAS S/V 1) ON OFF	Existed Not existed	between (A) ar Not existe	ntinuity nd (C)		
(VIAS S/V 1) ON	Existed Not existed	between (A) ar Not existe	ntinuity nd (C)		
(VIAS S/V 1) ON OFF Without CONSULT 1. Turn ignition switc 2. Disconnect VIAS of	Existed Not existed	between (A) ar Not existed Existed	ctor.	JMBIA01802Z	
(VIAS S/V 1) ON OFF Without CONSULT 1. Turn ignition switc 2. Disconnect VIAS of 3. Disconnect VIAS p	Existed Not existed h OFF. control solenoid valve 1 purge hoses connected	between (A) ar Not existe Existed harness connecto VIAS volume	ctor.	1.	
(VIAS S/V 1) ON OFF Without CONSULT 1. Turn ignition switc 2. Disconnect VIAS of 3. Disconnect VIAS p	Existed Not existed	between (A) ar Not existe Existed harness connecto VIAS volume	ctor.	JMBIA018022	
(VIAS S/V 1) ON OFF Without CONSULT 1. Turn ignition switc 2. Disconnect VIAS of 3. Disconnect VIAS p	Existed Not existed h OFF. control solenoid valve 1 purge hoses connected	between (A) ar Not existe Existed harness connecto VIAS volume	ctor. e control solenoid valve	1.	
(VIAS S/V 1) ON OFF Without CONSULT 1. Turn ignition switc 2. Disconnect VIAS of 3. Disconnect VIAS of 4. Check air passage	Existed Not existed h OFF. control solenoid valve 1 purge hoses connected e continuity and operatio Air passage continuity between (A) and (B)	between (A) ar Not existed Existed harness connecto VIAS volume on delay time ur	ctor. e control solenoid valve nder the following condi	1. tions.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 1. Refer to EC-339, "Component Parts Location".

EC-565

P1801 VIAS CONTROL SOLENOID VALVE 2

< DTC/CIRCUIT DIAGNOSIS >

P1801 VIAS CONTROL SOLENOID VALVE 2

Description

INFOID:000000007420870

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:000000007420871

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.	 Harness or connectors (The solenoid valve 2 circuit is open or shorted.) VIAS control solenoid valve 2

DTC CONFIRMATION PROCEDURE

1.CONDITIONING

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

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 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-566, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007420872

1. CHECK VIAS CONTROL SOLENOID VALVE 2 POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Turn ignition switch ON.
- Check the voltage between VIAS control solenoid valve 2 harness connector and ground.

VIAS control s	olenoid valve 2	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
F65	2	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 2.

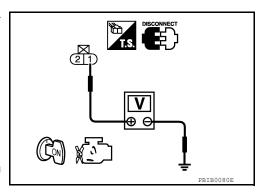
NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.DETECT MALFUNCTIONING PART

Check harness for open or short between VIAS control solenoid valve 2 and IPDM E/R

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

EC-566



P1801 VIAS CONTROL SOLENOID VALVE 2

< DTC/CIRCUIT DIAGNOSIS >

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3. CHECK VIAS CONTROL SOLENOID VALVE 2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

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

VIAS control soleno	id valve 2	EC	M			C
Connector	Terminal	Connector	Terminal	Continuity		C
F65	1	F14	26	Existed		
4. Also check harr Is the inspection res	ult normal?	-	d short to pow	er.		D
YES >> GO TO NO >> Repair of 4.CHECK VIAS CO	open circuit	•		ower in harness	or connectors.	E
Refer to EC-567, "C		nspection".				F
Is the inspection res YES >> GO TO NO >> Replace 5.CHECK INTERM	5. e VIAS cont		ve 2. Refer to	<u>EC-339. "Comp</u>	onent Parts Location".	G
Refer to GI-42, "Inte	ermittent Inc	ident".				Н
>> INSPE(
Component Ins					INFCID:000000007420873	
1. CHECK VIAS CO			/⊑ 0			
	JNTROL SC	JEINOID VALV				J
1. Turn ignition sw						
 Reconnect all h Disconnect VIA Turn ignition sw 	S purge hos ritch ON.	ses connected	to VIAS contro		2.	K
 Select "VIAS S/ Check air passa following condit 	age continui					L
0			A :			
Condition (VIAS S/V 2)		ssage continuity en (A) and (B)	Air passage co between (A) a		1 LES	M
ON		Existed	Not existe	ed		
OFF	١	lot existed	Existed			N
					B	
					JMBIA0180ZZ	0

Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Disconnect VIAS purge hoses connected to VIAS volume control solenoid valve 2.
- 4. Check air passage continuity and operation delay time under the following conditions.

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P1801 VIAS CONTROL SOLENOID VALVE 2

< DTC/CIRCUIT DIAGNOSIS >

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 EC-339, "Component Parts Location".

Description

Brake switch signal is applied to the ECM via the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driven.

DTC Logic

INFOID:000000007420875

INFOID:000000007420874

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC	c detecting condition	Possible cause	
P1805	Brake switch		signal is not sent to ECM for ex- ne while the vehicle is driving.	 Harness or connectors (Stop lamp switch circuit is open or short- ed.) Stop lamp switch 	E
DTC CON	FIRMATION PROC	EDURE			_
1.PERFO	RM DTC CONFIRMA	TION PROCE	DURE		F
 Fully d Erase 	nition switch ON. epress the brake ped the DTC with CONSL 1st trip DTC.	al for at least 5 ILT.	seconds.		C
YES >>	• <u>TC detected?</u> • Go to <u>EC-569, "Diac</u> • INSPECTION END	nosis Procedu	<u>ıre"</u> .		ŀ
Diagnosi	s Procedure			INFOID:000000007420876	I
1.снеск	STOP LAMP SWITC	H CIRCUIT			
	nition switch OFF.				,
2. Check	the stop lamp when o	lepressing and	I releasing the brake peda	l.	
Brake	e pedal St	op lamp			ŀ
Fully r	eleased Not	lluminated			
Slightly	depressed Illu	iminated			
	ection result normal?				
	• GO TO 11. • GO TO 2.				ľ
•	STOP LAMP SWITC	H POWER SL	IPPLY CIRCUIT		
-	nect stop lamp switch				h
2. Check	the voltage between		ch harness connector		Ν
and gro	bund.				
Sto	op lamp switch			413	(
Connecto	or Terminal	Ground	Voltage	4 3 2 1	
E38	1	Ground	Battery voltage	I I	F
	ection result normal?				
	• GO TO 4. • GO TO 3.			└╋╺╋┙ Ī	
•			L	PBIB1184E	
J .DETEC	T MALFUNCTIONING	S PART			

Check the following.

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< DTC/CIRCUIT DIAGNOSIS >

- Fuse block (J/B) connector E6
- 10 A fuse (No. 7)
- · Harness for open or short between battery and stop lamp switch

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

4. CHECK STOP LAMP RELAY-1 GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay-1 harness connector.
- Check the continuity between stop lamp relay-1 harness connector and ground.

Stop lamp	o relay-1	Ground	Continuity
Connector	Terminal	Orbuna	Continuity
E57	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

- 1. Connect stop lamp switch harness connector.
- 2. Turn ignition switch ON.
- Check the voltage between stop lamp relay-1 harness connector and ground.

Stop lamp relay-1		Ground Condition		ondition	Voltage (V)
Connector	Terminal	Ground	Condition		voltage (v)
E57	1	Ground	Brake pedal	Slightly de- pressed	Battery voltage
			pedal	Fully released	Approx. 0

Is the inspection result normal?

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

6.DETECT MALFUNCTIONING PART

Check the following.

Joint connector-E14 E56

· Harness for open or short between stop lamp switch and stop lamp relay-1

Is the inspection result normal?

YES >> GO TO 9.

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

7.CHECK STOP LAMP RELAY-1 POWER SUPPLY CIRCUIT

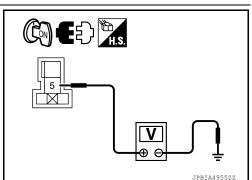
Check the voltage between stop lamp relay-1 harness connector and ground.

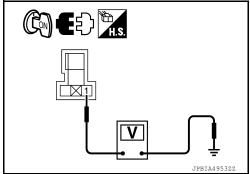
Stop lam	p relay-1	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E57	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

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





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$\mathbf{8}$. CHECK STOP LAMP RELAY-1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

< DTC/CIRCUIT DIAGNOSIS >

- Disconnect stop lamp relay-1 harness connector. 2.
- Cheel

3. Check t	he continu	uity betwee	en stop lam	p relay-1	harness connect	or and ECM harness o	connector.	EC
EC	M	Stop lar	np relay-1	Continuit	<u> </u>			
Connector	Terminal	Connector	- Terminal	Continuit	У			С
E10	106	E57	3	Existed				
4. Also ch	eck harne	ss for sho	rt to ground	and shor	t to power.			_
Is the inspe	ction resu	It normal?						D
-	GO TO 1	-						
^			-	ground or	short to power in	harness or connector	ſS.	E
9.CHECK	STOP LAI	MP SWITC	H					_
			nspection (S	Stop Lamp	<u>o Switch)"</u> .			
Is the inspe								F
-	GO TO 1 [°] Replace s	1. stop lamp :	switch					
10.снес	•	• •						G
				<u> </u>				-
			nspection (S	stop Lamp	<u>o Relay-1)"</u> .			
<u>ls the inspe</u> YES >>	GO TO 1 [°]							F
		stop lamp	relay-1.					
11.снесн	•	• •	•					1
Refer to GI-								-
	12, 11(011		<u>uone</u> .					
>>	INSPECT	ION END						J
Compone	nt Insp	ection (S	Stop Lam	n Switc	h)		INFOID:000000007420877	7
	-				,		INFOID.000000007420877	, K
1.CHECK	STOP LA	MP SWITC	CH-I					
	nition swite							-
			h harness c					
		ig conditio		op lamp s	witch terminals			
		J	-					N
Terminals		Con	dition		Continuity			1 V
1 cm d 0	Declas		ully released		Not existed	34		
1 and 2	Brake pe		ightly depress	be	Evisted		ί.	N

Existed

Is the inspection result normal?

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

2.CHECK STOP LAMP SWITCH-II

1. Adjust stop lamp switch installation. Refer to BR-13, "Inspection and Adjustment".

Slightly depressed

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< DTC/CIRCUIT DIAGNOSIS >

2. Check harness continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
	Brake pedar	Slightly depressed	Existed

Is the inspection result normal?

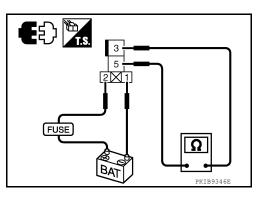
YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-17</u>, "Exploded <u>View"</u>.

Component Inspection (Stop Lamp Relay-1)

- **1.** STOP LAMP RELAY-1
- 1. Turn ignition switch OFF.
- 2. Remove stop lamp relay-1.
- 3. Check continuity between stop lamp relay-1 terminals under the following conditions.

Stop lan	np relay-1	Conditions	Continuity	
Terr	ninal	Conditions		
3	5	12 V direct current supply between terminals 1 and 2	Existed	
		No current supply	Not existed	



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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp relay-1.

INFOID:000000007420878

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P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Description

Power supply for the throttle control motor is provided to the ECM via the 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:000000007420880

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DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100	Throttle control motor relay circuit openECM detects a voltage of power source for throttle control motor is excessively low.(Throttle control open)		 Harness or connectors (Throttle control motor relay circuit is open) Throttle control motor relay
P2103	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	 Harness or connectors (Throttle control motor relay circuit is shorted) Throttle control motor relay
DTC CON	IFIRMATION PROCI	EDURE	
1.PRECO	NDITIONING		
least 10 se TESTING 0 Before per Witch DTC P2100 >> P2103 >>	conds before conduct CONDITION: rforming the followin is detected? > GO TO 2. > GO TO 3.	g procedure, confirm that battery vol	
2.PERFO	RM DTC CONFIRMAT	TION PROCEDURE FOR DTC P2100	
2. Start e 3. Check Is DTC det YES >>	ngine and let it idle for DTC.		
3.PERFO	RM DTC CONFIRMAT	TION PROCEDURE FOR DTC P2103	
2. Check Is DTC det YES >>	DTC.	wait at least 1 second. nosis Procedure".	
Diagnosi	is Procedure		INFOID:00000007420881
1.снеск	THROTTLE CONTRO	OL MOTOR RELAY POWER SUPPLY (CIRCUIT
1. Turn ig 2. Discon	nition switch OFF. Inect ECM harness co Inect IPDM E/R harnes	nnector.	

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

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P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

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IPDI	M E/R	E	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F10	70	F14	15	Existed	

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

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.

2. Disconnect IPDM E/R harness connector F10.

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

IPDM E/R		E	Continuity	
Connector Terminal		Connector Terminal		
F10 54		F14	2	Existed

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

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK FUSE

1. Disconnect 15 A fuse (No. 43) from IPDM E/R.

2. Check 15 A fuse for blown.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace 15A fuse.

4.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to PCS-45. "Removal and Installation".
- NO >> Repair or replace harness or connectors.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

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 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:000000007420883

DTC DETECTION LOGIC

NOTE: If DTC P2101 is displayed with DTC P2100 or 2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to <u>EC-573, "DTC Logic"</u> or <u>EC-582, "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.	 Harness or connectors (Throttle control motor circuit is open or shorted) Electric throttle control actuator
DTC CON	IFIRMATION PROCE	EDURE	
1.PRECC	NDITIONING		
least 10 se TESTING	conds before conducti CONDITION: rforming the followi	nas been previously conducted, always ng the next test. ng procedure, confirm that battery	
>	> GO TO 2.		
2.PERFO	RM DTC CONFIRMAT	TION PROCEDURE	
1. Turn id	nition owitch ON and y		
2. Start e 3. Check Is DTC def YES >	ngine and let it idle for DTC.		
2. Start e 3. Check Is DTC def YES > NO >	ngine and let it idle for DTC. <u>ected?</u> > Go to <u>EC-575, "Diag</u>	5 seconds.	INFOID:00000007420884
2. Start e 3. Check Is DTC def YES > NO > Diagnos	ngine and let it idle for DTC. <u>ected?</u> > Go to <u>EC-575, "Diag</u> > INSPECTION END	5 seconds. nosis Procedure".	INFOID:00000007420884
2. Start e 3. Check <u>Is DTC def</u> YES > NO > Diagnos 1. CHECK 1. Turn ig	ingine and let it idle for DTC. Sected? So to <u>EC-575, "Diag</u> INSPECTION END is Procedure GROUND CONNECT	5 seconds. nosis Procedure".	
2. Start e 3. Check <u>Is DTC def</u> YES >: NO >: Diagnos 1.CHECK 1. Turn iç 2. Check <u>Is the insp</u>	ingine and let it idle for DTC. Sected? So to <u>EC-575, "Diag</u> INSPECTION END is Procedure GROUND CONNECT gnition switch OFF. ground connection E9 ection result normal?	5 seconds. nosis Procedure". TION	
2. Start e 3. Check <u>Is DTC def</u> YES > NO > Diagnos 1.CHECK 1. Turn ig 2. Check <u>Is the insp</u> YES >	ingine and let it idle for DTC. Sected? So to <u>EC-575, "Diag</u> INSPECTION END IS Procedure GROUND CONNECT INITION SWITCH OFF.	⁻ 5 seconds. nosis Procedure". TION 9. Refer to Ground Inspection in <u>GI-45, "</u>	

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P2101 ELECTRIC THROTTLE CONTROL FUNCTION

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< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between ECM harness connectors.

ECM			Condition	Voltage (V)		
+ –		o				
Connector	Terminal	Connector	Terminal			2 112 I I
F14	2	E10	112	lgnition switch OFF	Approx. 0	
F 14	2		112	Ignition switch ON	Battery voltage	
le the increastion recult remained					JMBIA1883ZZ	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

3.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect IPDM E/R harness connector F10.

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

IPDN	II E/R	E	Continuity		
Connector	Terminal	Connector Termina		Continuity	
F10	70	F14	15	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

4.CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.

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

-	IPDN	/I E/R	E	Continuity	
_	Connector Terminal		Connector	Terminal	Continuity
	F10	54	F14	2	Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK FUSE

- 1. Disconnect 15 A fuse (No. 43) from IPDM E/R.
- 2. Check 15 A fuse for blown.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace 15 A fuse.

6.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-45. "Removal and Installation".

NO >> Repair or replace harness or connectors.

1.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

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P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle	control actuator	ECI	M		
Connector	Terminal	Connector	Continuity Terminal		
	-		5	Not existed	
F51 -	5	F14	6	6 Existed	
FOI	6	F 14	5	Existed	
	0		6	Not existed	

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

Is the inspection result normal?

YES >> GO TO 8.

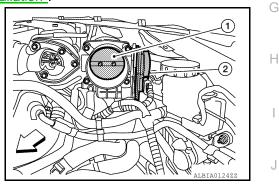
NO >> Repair or replace.

8.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- Remove the intake air duct. Refer to EM-132, "Removal and Installation". 1.
- 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 EM-133, "Removal and Installation".



9. CHECK THROTTLE CONTROL MOTOR

Refer to EC-577, "Component Inspection".		K
Is the inspection result normal?		
YES >> GO TO 10.		
NO >> GO TO 11.		L
10.CHECK INTERMITTENT INCIDENT		
Refer to GI-42, "Intermittent Incident".		M
Is the inspection result normal?		
YES >> GO TO 11.		
NO >> Repair or replace harness or connectors.		Ν
11.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR		
1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation".		
2. Refer to EC-578, "Special Repair Requirement".		0
>> INSPECTION END		Р
Component Inspection	INFOID:000000007420885	
1. CHECK THROTTLE CONTROL MOTOR		

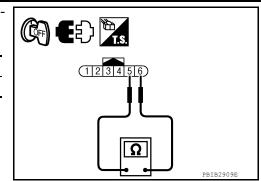
Turn ignition switch OFF. 1.

Disconnect electric throttle control actuator harness connector. 2.

P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

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)]
L. 0 1	10

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-133, "Removal and Installation".
- 2. Go to EC-578, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420886

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1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

>> END

< DTC/CIRCUIT DIAGNOSIS >

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 it provides feedback to the ECM, when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

DTC Logic

INFOID:000000007420888

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.	 Harness or connectors (Throttle control motor circuit is shorted.) Electric throttle control actuator (Throttle control motor) 	F

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn ignition switch ON and wait at least 2 seconds. 1. 2. Start engine and let it idle for 5 seconds. Check DTC. 3 Is DTC detected? YES >> Go to EC-579, "Diagnosis Procedure". NO >> INSPECTION END Κ **Diagnosis** Procedure INFOID:000000007420889 1. CHECK GROUND CONNECTIONS L
- 1. Turn ignition switch OFF.
- Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

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.

Electric throttle	control actuator	ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	5	F14	5	Not existed
F51	5	F1/	6	Existed
151	6	1 14	5	Existed
	0		6	Not existed

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P2118 THROTTLE CONTROL MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace.

3.check throttle control motor

Refer to EC-580, "Component Inspection".

Is the inspection result normal?

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

4. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation".

2. Go to EC-580, "Special Repair Requirement".

>> INSPECTION END

Component Inspection

INFOID:000000007420890

1. CHECK THROTTLE CONTROL MOTOR

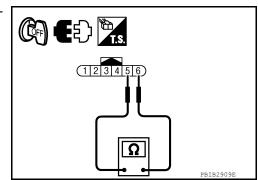
- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- Check resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25°C (77°F)]
le the inenestion result	normal?

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-133, "Removal and Installation".

Go to EC-578, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420891

1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"

>> GO TO 2.

2. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335. "IDLE AIR VOLUME LEARNING : Special Repair Requirement"

P2118 THROTTLE CONTROL MOTOR

Revision: February 2013

581	2012 Altima GCC

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P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Description

INFOID:000000007420892

IVQ35DE1

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

INFOID:000000007420893

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
	Electric throttle control	A)	Electric throttle control actuator does not func- tion properly due to the return spring malfunc- tion.	
P2119	actuator	B)	Throttle valve opening angle in fail-safe mode is not in specified range.	Electric throttle control actuator
		C)	ECM detect the throttle valve is stuck open.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever position to D position and wait at least 3 seconds.
- 3. Shift selector lever position to P position.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON and wait at least 1 second.
- 6. Shift selector lever position to D position and wait at least 3 seconds.
- 7. Shift selector lever position to P position.
- 8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- 9. Check DTC.

Is DTC detected?

- YES >> Go to EC-582, "Diagnosis Procedure".
- NO >> GO TO 3.

\mathbf{3}. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever position to D position and wait at least 3 seconds.
- 3. Shift selector lever position to N, P or neutral position.
- 4. Start engine and let it idle for 3 seconds.
- 5. Check DTC.

Is DTC detected?

YES >> Go to EC-582, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

INFOID:000000007420894

P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

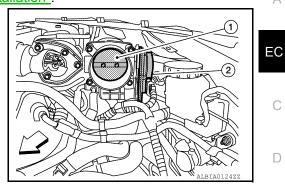
< DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.

- 2. Remove the intake air duct. Refer to EM-132, "Removal and Installation".
- 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. Refer to EM-133, "Removal and Installation".



[VQ35DE]

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2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR Е 1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation". 2. Go to EC-532, "Special Repair Requirement". F >> INSPECTION END Special Repair Requirement INFOID:000000007420895 1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement" Н >> GO TO 2. 2. PERFORM IDLE AIR VOLUME LEARNING Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement" >> END

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< 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 signal to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

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

DTC Logic

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-520, "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 sensor 1 is sent to ECM.	 Harness or connectors (APP sensor 1 circuit is open or shorted.)
P2123	Accelerator pedal posi- tion sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	 Accelerator pedal position sensor (APP sensor 1)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

2. Check DTC.

Is DTC detected?

YES >> Go to <u>EC-584, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

1.CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

2. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection".

Is the inspection result normal?

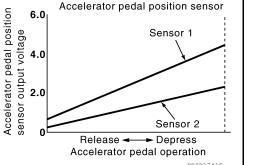
YES >> GO TO 2.

NO >> Repair or replace ground connection.

EC-584

2012 Altima GCC

INFOID:000000007420898



INFOID:000000007420896

INFOID:000000007420897

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

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

APP	sensor	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E40	5	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.

$\mathbf{3}$.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	APP sensor		ECM	
Connector	Terminal	Connector	Terminal	Continuity
E40	4	E10	84	Existed

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

Is the inspection result normal?

YES >> GO TO 4.

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

${f 4}$.CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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

Continuity	ECM			APP sensor		
Continuity Terminal	Connector	Terminal	Connector			
Existed	81	E10	3	E40		

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-586, "Component Inspection".

Is the inspection result normal?

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

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

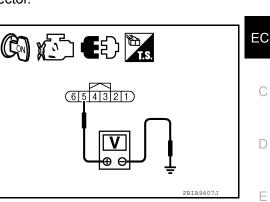
1. Replace accelerator pedal assembly. Refer to ACC-4, "Exploded View".

2. Refer to EC-586, "Special Repair Requirement".

>> INSPECTION END

7.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".



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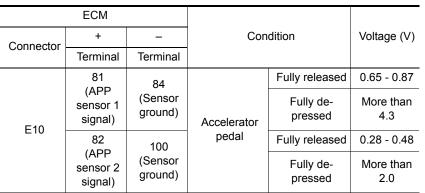
< DTC/CIRCUIT DIAGNOSIS >

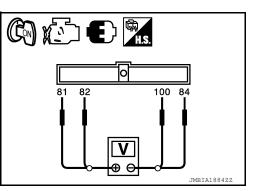
>> INSPECTION END

Component Inspection

$1. {\sf CHECK} \ {\sf ACCELERATOR} \ {\sf PEDAL} \ {\sf POSITION} \ {\sf SENSOR}$

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.





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-586, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420900

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-334, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

[VQ35DE]

INFOID:000000007420899

< DTC/CIRCUIT DIAGNOSIS >

P2127, P2128 APP SENSOR

Description

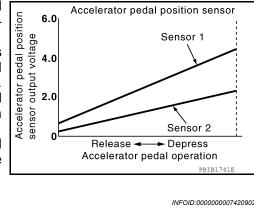
The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

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 signal to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

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

DTC Logic

DTC DETECTION LOGIC



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.	 (Refrigerant pressure sensor circuit is shorted.) Accelerator pedal position sensor (APP sensor 2) Crankshaft position sensor (POS) Refrigerant pressure sensor 	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

TESTING CONDITION:

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE M 1. Start engine and let it idle for 1 second. 2. Check DTC. Ν Is DTC detected? YES >> Go to EC-587, "Diagnosis Procedure". >> INSPECTION END NO Diagnosis Procedure INFOID:000000007420903 1.CHECK GROUND CONNECTION P 1. Turn ignition switch OFF. Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2. Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace ground connection.

2.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

INFOID:000000007420901

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Accelerator pedal position sensor

Sensor 1

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P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

- 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	Connector Terminal		voltage (v)	
E40	6	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

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

-	APP s	sensor	E	Continuity	
	Connector	Terminal	Connector	Terminal	Continuity
-	E40	6	E10	87	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

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

ECM		Sensor		
Connector	Terminal	Name	Terminal	
F13 72 76		Refrigerant pressure sensor	E219	1
		CKP sensor (POS)	F30	1
E10	87	APP sensor	E40	6

Is the inspection result normal?

YES >> GO TO 5.

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

5.CHECK COMPONENTS

Check the following.

Crankshaft position sensor (POS) (Refer to EC-502, "Component Inspection".)

Refrigerant pressure sensor (Refer to <u>EC-635, "Diagnosis Procedure"</u>.)

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning components.

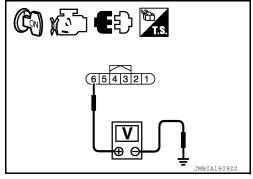
$\mathbf{6}$.CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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

APP sensor		E	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
E40	2	E10	100	Existed	



P2127,	P2128	APP	SENSOR
--------	-------	-----	--------

			P2127	′, P2128 A	NPP SENS	SOR	
< DTC/CIF		AGNOSIS	S >			[VQ35DE]	
4. Also ch	neck harn	ess for sh	ort to ground	and short to	power.		
Is the inspe	ection res	ult normal	<u>?</u>				А
	SO TO						
_		•	-			harness or connectors.	EC
I.CHECK	APP SE	NSOR 2 IN	NPUT SIGNA	L CIRCUIT F	OR OPEN A	AND SHORT	LO
1. Check	the contir	nuity betw	een APP sen	sor harness of	connector an	nd ECM harness connector.	
							С
	P sensor		ECM	c	ontinuity		
Connector	_			erminal			
E40	1		E10	-	Existed		D
			ort to ground	and short to	power.		
Is the inspe			<u>?</u>				Е
-	> GO TO (> Renair c	-	it short to are	und or short	to nower in I	harness or connectors.	
8.CHECK	•	•	it, short to git			namess of connectors.	
							F
			Inspection".				
Is the inspe	SO TO		<u> </u>				G
	> GO TO 9 > GO TO 9						0
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			l assembly. R <u>Repair Requ</u>			<u>i view</u> .	
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>>	> INSPEC	TION ENI	D				I
10 .CHEC	K INTER	MITTENT	INCIDENT				
Refer to GI	-42 "Inte	rmittent In	cident"				J
	12, 1110		<u>oldont</u> .				
>>	> INSPEC	TION ENI	D				LZ.
Compon	ont Incr	action					K
Compon	ent mor	Jection				INFOID:000000007420904	
1. CHECK	ACCELE	RATOR P	EDAL POSI	ION SENSO	R		L
1. Recon	nect all ha	arness cor	nnectors disc	onnected.			
2. Turn ig	nition swi	tch ON.					
		ge betwee ing conditi	en ECM harr	ness connect	or terminals		Μ
under			0115.				
	ECM						Ν
	+	_	Cor	dition	Voltage (V)		
Connector	Terminal	Terminal			voltage (v)		
	81			Fully released	0.65 - 0.87		0
	(APP	84 (Sensor		-			
	sensor 1 signal)	ground)		Fully de- pressed	More than 4.3		Р
E10	82		Accelerator pedal	Fully released		JMBIA1884ZZ	۲
		100	P	i uny released	0.20 - 0.40		

Is the inspection result normal? YES >> INSPECTION END

(APP

sensor 2

signal)

(Sensor

ground)

NO

>> GO TO 2.

Fully de-

pressed

More than

2.0

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

 $\overline{2}$.Replace accelerator pedal assembly

- 1. Replace accelerator pedal assembly. Refer to <u>ACC-4, "Exploded View"</u>.
- 2. Go to EC-586, "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

INFOID:000000007420905

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-334, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

< 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 signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



DTC DETECTION LOGIC

NOTE:

P2135

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to E

)TC Logic".	bro r 0040, mst perform the trouble	
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
	Throttle position sensor	Rationally incorrect voltage is sent to ECM	Harness or connector (TP sensor 1 and 2 circuit is open or

compared with the signals from TP sensor 1

and TP sensor 2.

DTC CONFIRMATION PROCEDUR	
	\L

circuit range/perfor-

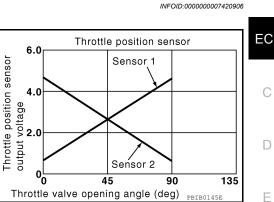
1.PRECONDITIONING

mance

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

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

>> GO TO 2.		L
2. PERFORM DTC CONFIRMATION PROCEDURE		
 Start engine and let it idle for 1 second. Check DTC. 		M
Is DTC detected?		
YES >> Go to <u>EC-591, "Diagnosis Procedure"</u> . NO >> INSPECTION END		Ν
Diagnosis Procedure	INFOID:000000007420908	0
1. CHECK GROUND CONNECTION		
 Turn ignition switch OFF. Check ground connection E9. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>. 		Ρ
Is the inspection result normal?		
YES >> GO TO 2.		
NO >> Repair or replace ground connection.		
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I		
1. Disconnect electric throttle control actuator harness connector.		



shorted.)

Electric throttle control actuator

(TP sensor 1 and 2)

[VQ35DE]

INFOID:000000007420907

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P2135 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

Electric throttle	control actuator	Ground	Voltage (V)	
Connector	Connector Terminal		voltage (v)	
F51	1	Ground	Battery voltage	

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 throttle position sensor ground circuit for open and short
- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle	control actuator	E	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
F51	4	F13	36	Existed	

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

Is the inspection result normal?

YES >> GO TO 4.

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

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

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

Electric throttle control actuator		E	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F51	2	F13	37	Existed	
151	3	115	38		

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-593, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

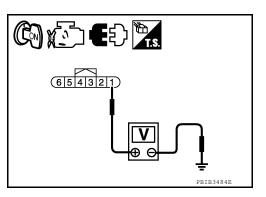
1. Replace electric throttle control actuator. Refer to EM-133, "Removal and Installation".

2. Refer to EC-593. "Special Repair Requirement"

>> INSPECTION END

I.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".



>> INSPECTION END								
Compo	onent Ins	pection	ı			INFOID:00	000000007420909	А
	CK THROT			NSOR				EC
 Rec Perf Turr Set 	form <u>EC-46</u> n ignition sv selector lev	narness c <u>9, "Specia</u> vitch ON. ver positic	onnectors <u>al Repair I</u> on to D pos		ector terminals			С
	er the follow			namess conn			D	D
	ECM							_
Con-	+	_	С	ondition	Voltage		M	Е
nector	Terminal	Terminal						
	37 (TP sensor			Fully released	More than 0.36 V	│		F
F13	1 signal)	36 (Sensor	Accelera- tor pedal	Fully depressed	Less than 4.75 V		$\langle \rangle \rangle$	
	38 (TP sensor	ground)		Fully released			JMBIA1953ZZ	G
	2 signal) Fully depressed More than 0.36 V Is the inspection result normal?							
<u>Is the in</u> YES NO	spection res >> INSPE >> GO TO	CTION E						Η
2.REPI	ACE ELEC		IROTTLE	CONTROL AC	TUATOR			I
	lace electri to <u>EC-469,</u>				EM-133, "Remo	oval and Installation".		
2. 601	.0 <u>EC-409.</u>	Special	<u>Repair Re</u>	<u>quirement</u> .				J
	>> INSPE	CTION E	ND					0
Specia	l Repair	Require	ement			INFOID:00	000000007420910	K
1.PERF	ORM THR		ALVE CL	OSED POSITIO	ON LEARNING			N
1.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement"								
							_	L
>> GO TO 2.								
						M		
Refer to	<u>EC-335, "II</u>	DLE AIR	VOLUME	LEARNING : S	pecial Repair Re	<u>equirement"</u>		
>> END						Ν		
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Revision: February 2013

< DTC/CIRCUIT DIAGNOSIS >

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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 signal to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

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

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-520, "DTC Logic".

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.	 Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) Accelerator pedal position sensor (APP sensor 1 and 2) Crankshaft position sensor (POS) Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

Check DTC. 2.

Is DTC detected?

YES >> Go to EC-594, "Diagnosis Procedure". NO >> INSPECTION END

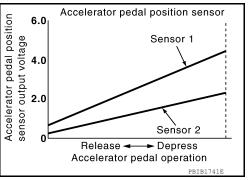
Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection E9. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2.

Is the inspection result normal?



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INFOID-000000007420913



INFOID:000000007420911

P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2. NO >> Repair or replace ground connection. А 2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT 1. Disconnect accelerator pedal position (APP) sensor harness connector. EC Turn ignition switch ON. 2. Check the voltage between APP sensor harness connector and 3. (R) (C) (C) (C) ground. APP sensor (615413211) Ground Voltage (V) Connector Terminal D E40 5 Ground Approx. 5 Is the inspection result normal? YES >> GO TO 3. Ε NO >> Repair open circuit, short to ground or short to power in PBTA9607J 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 (G) () EP (), ground. APP sensor Ground Voltage (V) Н 654321 Connector Terminal E40 6 Ground Approx. 5 Is the inspection result normal? YES >> GO TO 7. NO >> GO TO 4. TMBTA16097 4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II 1. Turn ignition switch OFF. 2. Disconnect ECM harness connector. Κ 3. Check the continuity between APP sensor harness connector and ECM harness connector. APP sensor ECM Continuity Connector Terminal Connector Terminal E40 6 E10 87 Existed M Is the inspection result normal? YES >> GO TO 5. NO >> Repair open circuit. Ν 5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III Check harness for short to power and short to ground, between the following terminals. ECM Sensor Connector Terminal Name Connector Terminal Ρ 72 Refrigerant pressure sensor E219 1 F13 76 F30 CKP sensor (POS) 1 E10 87 APP sensor E40 6

Is the inspection result normal?

YES >> GO TO 6.

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



< DTC/CIRCUIT DIAGNOSIS >

6.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to <u>EC-502, "Component Inspection"</u>.)
 Refrigerant pressure sensor (Refer to <u>EC-635, "Diagnosis Procedure"</u>.)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning components.

7.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

Disconnect ECM harness connector. 2.

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

APP	APP sensor		ECM		
Connector	Terminal	Connector Terminal		Continuity	
E40	4	E10	84	Existed	
L40	2		100	LAISted	

Also check harness for short to ground and short to power. 4.

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 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	Terminal	Connector	Terminal	Continuity	
E40	3	E10	81	Existed	
L40	1	L 10	82	LAISIEU	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to EC-597, "Component Inspection",

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to EM-133, "Removal and Installation". 1.

Refer to EC-597, "Special Repair Requirement". 2.

>> INSPECTION END

11.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

P2138 APP SENSOR

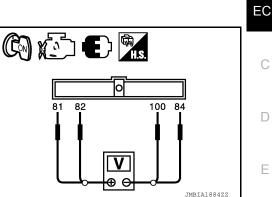
< DTC/CIRCUIT DIAGNOSIS >

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.

	ECM				
Connector	+ – Condition		dition	Voltage (V)	
Connector	Terminal	Terminal			
	81	84		Fully released	0.65 - 0.87
E10	(APP sensor 1 signal)	(Sensor ground)	Accelerator	Fully de- pressed	More than 4.3
LIU	82	100	pedal	Fully released	0.28 - 0.48
	(APP sensor 2 signal) (Sensor ground)			Fully de- pressed	More than 2.0



Is the inspection result normal?

YES	>> INSPECTION END
	00 T 0 0

NO >> GO TO 2.

2.REPLACE ACCELERATOR PEDAL ASSEMBLY

- 1. Replace accelerator pedal assembly. Refer to ACC-4, "Exploded View".
- 2. Go to EC-586. "Special Repair Requirement".

>> INSPECTION END

Special Repair Requirement

1.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to EC-334, "ACCELERATOR PEDAL RELEASED POSITION LEARNING : Special Repair Requirement".

>> GO TO 2.

2. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to EC-335, "THROTTLE VALVE CLOSED POSITION LEARNING : Special Repair Requirement".

>> GO TO 3.

3.PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-335, "IDLE AIR VOLUME LEARNING : Special Repair Requirement".

>> END

[VQ35DE]

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INFOID:000000007420915

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 this input of two kinds (ON/OFF signal). Refer to <u>EC-368</u>, "System Diagram" for the ASCD function.

Component Function Check

1.CHECK ASCD BRAKE SWITCH FUNCTION

- 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	Condition	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
DRARE SWI	brake pedal	Fully released	ON

Without CONSULT

- $\widetilde{1.}$ Turn ignition switch ON.
- 2. Check the voltage between ECM harness connectors.

		-				
	ECM					
Con-	+	-	Condition	า	Voltage	 o
nector	Terminal	Terminal				110 112
= / 0	110 (ASCD			Slightly depressed	Approx. 0 V	
E10	brake switch signal)	112	Brake pedal	Fully re- leased	Battery voltage	
			10	1		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-598, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD bra	ake switch	Ground	Voltage (V)	
Connector	Terminal	Ground		
E37	1	Ground	Battery voltage	

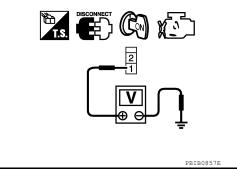
Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following. • Fuse block (J/B) connector E6



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EC-598

ASCD BRAKE SWITCH

			AOOD L		711		
< DTC/CIRCI	JIT DIAGNO)SIS >				[VQ35DE]	
• 10 A fuse (N	lo. 3)						
 Harness for 	open or sho	rt between A	ASCD brake	e switch and fuse			
•	· ·		-	•	harness or connectors.		
3. CHECK AS	SCD BRAKE	SWITCH IN	IPUT SIGN	AL CIRCUIT FOR	OPEN AND SHORT	I	
	ion switch Ol						
	ct ECM harn						
 Check the 	e continuity b	etween AS	JD brake s	witch narness conr	nector and ECM harness	connector.	
ASCD brak	o owitch	EC	N A		_		
		-		Continuity			
Connector	Terminal	Connector	Terminal	Eviete d	_		
E37	2	E10	110	Existed	_		
		-	ound and s	hort to power.			
Is the inspecti		<u>mai?</u>					
	iO TO 4. Jepair open c	ircuit short	to around o	or short to power in	harness or connectors.		
4.CHECK AS			to ground o				
	•	•	ion (ASCD	Brake Switch)"			
Is the inspecti		<u>mai ?</u>					
5.CHECK IN	•				<u></u> .		
Refer to <u>GI-42</u>			•				
Relei lo <u>01-42</u>		<u>it incluent</u> .					
1 <<	SPECTION	END					
) Droka (() witch			
Componen	n inspectio	JII (ASUL	D Brake S	Switch)		INFOID:000000007420919	
1.CHECK AS	SCD BRAKE	SWITCH-I					
1 Turn ignit	ion switch OI	FF					
	ct ASCD bra		arness conr	nector.			
			SCD brak	e switch terminals	s		
under the	following co	naitions.					
Terminals		Condition		Continuity	T.S.	〔〕	
Terminais			od	Continuity	2		
1 and 2	Brake pedal	Fully release		Existed		ר - ר	
		Slightly dep	ressed	Not existed			
Is the inspecti					Ω		
	SPECTION	END					
NU 2217	iO TO 2						
-	io to 2.					SEC023D	
NO >> G 2.снеск аз		SWITCH-II				SEC023D	
2.CHECK AS	SCD BRAKE		ition. Refer	to BR-13, "Inspect	tion and Adjustment".	SEC023D	

ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

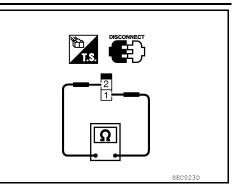
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals		Condition	Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch. Refer to <u>BR-17</u>, "Exploded <u>View"</u>.



ASCD INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

ASCD INDICATOR

Description

The ASCD operation status is indicated by two indicators, (CRUISE and SET on the information display) on the combination meter.

CRUISE indicator is displayed to indicate that ASCD system is ready for operation when MAIN switch on ASCD steering switch is turned ON.

SET indicator is displayed when the following conditions are met.

- CRUISE indicator is displayed.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator is displayed during ASCD control.

Refer to <u>EC-368</u>, "System Description" for the ASCD function.

Component Function Check

1.CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CON	DITION	SPECIFICATION
CRUISE	Ignition switch: ON	 MAIN switch: Pressed at the 1st time → at the 2nd time 	$ON \rightarrow OFF$
	MAIN switch: ON	ASCD: Operating	ON
SET	When vehicle speed is be- tween 40 km/h (25 MPH) and 210 km/h (130 MPH)	ASCD: Not operating	OFF
Is the inspection result nor	mal?		
YES >> INSPECTION			
	, "Diagnosis Procedure".		
Diagnosis Procedure)		INFOID:00000007420922
1.снеск отс			
Check that DTC U1000 or	U1001 is not displayed.		
Is the inspection result nor	mal?		
YES >> GO TO 2. NO >> Perform troubl	le diagnosis for DTC 111000	U1001. Refer to <u>EC-440, "Dia</u>	annosis Procedure"
2.CHECK COMBINATION			<u>agnosis i roccuare</u> .
Refer to <u>MWI-4</u> , <u>"Work Flo</u> Is the inspection result nor			
YES >> GO TO 3.	<u></u>		
	ation meter circuit. Refer to	EC-440, "Diagnosis Procedur	<u>e"</u> .
3. CHECK INTERMITTEN	IT INCIDENT		
Refer to GI-42, "Intermitter	nt Incident".		
>> INSPECTION			

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COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

COOLING FAN

Description

INFOID:000000007420923

[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 follows.

Cooling fan speed	Cooling fan motor terminals			
Cooling fair speed	(+)	(-)		
	1	3 and 4		
Middle (MID)	2	3 and 4		
	1 and 2	3		
	1 and 2	4		
High (HI)	1 and 2	3 and 4		

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under middle speed condition.

Refer to EC-377, "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 speed varies according to the percent.

Without CONSULT

- Perform IPDM E/R auto active test and check cooling fan motors operation, refer to <u>PCS-11</u>, "<u>Diagnosis</u> <u>Description</u>".
- 2. Check that cooling fan operates.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-602, "Diagnosis Procedure".

Diagnosis Procedure

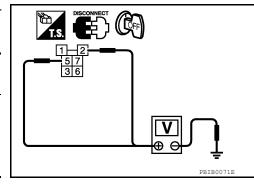
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1. CHECK COOLING FAN RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect cooling fan relays-2, -3.
- 3. Turn ignition switch ON.
- Check the voltage between cooling fan relays-2, -3 harness connectors and ground.

Cooling fan rel	Ground	Voltage		
Connector	Terminal	Ground	voltage	
E42	2			
(cooling fan relay-2)	5	Ground	Battery voltage	
E43	2	Ground	Dattery voltage	
(cooling fan relay-3)	5			



Is the inspection result normal?

YES >> GO TO 3.

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.						Δ
2.DETECT MALFUNG	CTIONING PAR	RT				A
Check the following.10 A fuse (No. 33)40 A fusible link (letter	er K)					EC
• IPDM E/R harness c	onnector E18					_
Harness for open orHarness for open or						C
Harness for open or						C
Harness for open or	short between	cooling fan re	lay-3 and IPDI	M E/R		
	,					D
		-		in harness or c	onnectors.	
3.CHECK COOLING		UTPUT SIGN				Е
 Turn ignition switch Disconnect IPDM 		onnectors				
			/-2, -3 harness	connectors and	d IPDM E/R harness connec-	
tor.						F
Occilian for a					-	
Cooling fan r	Terminal	Connector	M E/R Terminal	Continuity		G
E42	lemina	Connector	Terminal		-	
(cooling fan relay-2)	1	E17	42	Eviated		Ш
E43 (cooling fan relay-3)	1	E18	34	Existed	_	Η
4. Also check harnes	s for short to g	round and she	ort to power.		-	
Is the inspection result	normal?					
YES >> GO TO 5. NO >> GO TO 4.						
4.DETECT MALFUNG		эт				J
Check the following.Harness for open or	short between	cooling fan re	lay-2 and IPDI	M E/R		K
Harness for open or	short between	cooling fan re	lay-3 and IPDI	M E/R		
						I.
		-		in harness or c	onnectors.	L
5.CHECK COOLING						
 Disconnect cooling Check the voltage 						M
nector and ground		ning ian mole				
Ũ					◙ ┓ _┪ ╴╴╰╲┓ ⋈	Ν
Cooling fan mot	or-1	Ground	Voltage			14
Connector	Terminal	Ground	vollage		_	
E220	1	Ground	Battery voltage	<u></u>		0
	2	Cround	Buttery voltage			
Is the inspection result	normal?				=	Р
YES >> GO TO 7. NO >> GO TO 6.					PBIB1670E	-
6.DETECT MALFUNG	יזאם האוואור באי	эт				
C.DETECT WALFUNG	S I OINING PAR	NI				

Check the following.

- 40 A fusible link (letter M)
- Harness connector E12, E203
- Harness for open or short between cooling fan motor-1 and battery

>> Repair open circuit, short to ground or short to power in harness or connectors.

7. CHECK COOLING FAN MOTOR CIRCUIT-I

- 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.

Cooling fan re	elay	Cooling fan motor Terminal Connector Terminal		Continuity
Connector	Terminal			Continuity
E42	3	E221 (Cooling fan motor-2)	2	
cooling fan relay-2)	7	E220 (Cooling fan motor-1)	3	Existed
E43	3	E221 (Cooling fan motor-2)	1	Existed
(cooling fan relay-3)	7	E220 (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 9. NO

>> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

Harness connector E12, E203

Harness for open or short between cooling fan motor-1 and 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.

9. CHECK COOLING FAN MOTOR CIRCUIT-II

Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connec-1. tor.

IPDI	M E/R	Cooling fan motor		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
E18	35	E220 (Cooling fan motor-1)	4	Existed	
210	38	E221 (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 11.

NO >> GO TO 10.

10. 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.

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

11. CHECK COOLING FAN MOTOR CIRCUIT-III А 1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground. Cooling fan motor EC Ground Continuity Connector Terminal E42 6 (cooling fan relay-2) Ground Existed E43 6 (cooling fan relay-3) 2. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 12. Ε NO >> Repair open circuit, short to ground or short to power in harness or connectors. 12. CHECK COOLING FAN MOTOR CIRCUIT-IV Check the continuity between cooling fan motor-2 harness connector and ground. F Cooling fan motor-2 Ground Continuity Connector Terminal 3 E221 Ground Existed 4 Н 2. Also check harness for short to ground and short to power. Is the inspection result normal? YES >> GO TO 13. NO >> Repair open circuit, short to ground or short to power in harness or connectors. 13. CHECK COOLING FAN RELAYS-2 AND -3 Refer to EC-606, "Component Inspection (Cooling Fan Relay)". Is the inspection result normal? YES >> GO TO 14. Κ >> Replace malfunctioning cooling fan relay. NO 14.CHECK COOLING FAN MOTORS-1 AND -2 Refer to EC-605, "Component Inspection (Cooling Fan Motor)". Is the inspection result normal? YES >> GO TO 15. M NO >> Replace malfunctioning cooling fan motor. Refer to CO-41, "Exploded View". 15. CHECK INTERMITTENT INCIDENT Perform GI-42, "Intermittent Incident". Ν Is the inspection result normal? YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation". NO >> Repair or replace harness connectors. Component Inspection (Cooling Fan Motor) INFOID:000000007420926 1. CHECK COOLING FAN MOTOR Turn ignition switch OFF. 1.

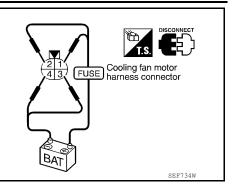
2. Disconnect cooling fan motor harness connector.

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

3. Supply cooling fan motor terminals with battery voltage and check operation.

	Condition	Term	ninals
	Condition	+	_
		1	3 and 4
		2	3 and 4
Cooling fan motor	A	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. Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan motor. Refer to <u>CO-41, "Exploded View"</u>.

Component Inspection (Cooling Fan Relay)

INFOID:000000007420927

[VQ35DE]

1. CHECK COOLING FAN RELAY

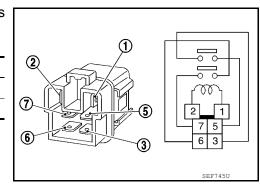
- 1. Disconnect cooling fan relays -2, -3 harness connectors.
- 2. Check continuity between cooling fan relay -2, -3 terminals under the following conditions.

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.



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	•		
LOAD SIGNAL	Door window do	foggor owitch	ON	ON	-	
LUAD SIGNAL	Rear window de	logger switch	OFF	OFF	-	
Is the inspection	on result norma	<u>al?</u>			-	
YES >> GO	D TO 2.					
NO >> Go	o to <u>EC-607, "E</u>	Diagnosis Pro	ocedu	re".		
2.CHECK LIG	HTING SWIT	CH FUNCTIO	ON			
Check "LOAD	SIGNAL" indic	ation under t	he foll	owing con	ditions.	
Monitor item	Co	ondition		Indication		
ON at 2nd position ON						
LOAD SIGNAL Lighting switch OFF OFF						
Is the inspection	on result norma	al?				
YES >> GO	D TO 3.					

NO >> Go to EC-607. "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
HEATERTANOW	rieater fan control switch	OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-607, "Diagnosis Procedure".

Diagnosis Procedure

1.INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to <u>EC-607, "Compo-</u> nent Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2. Headlamp>>GO TO 3.

Heater fan>>GO TO 3.

2. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to DEF-3, "Work Flow".

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ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

 $3. {\sf CHECK} {\sf HEADLAMP} {\sf SYSTEM}$

Refer to EXL-4, "Work Flow".

>> INSPECTION END

>> INSPECTION END

4.CHECK HEATER FAN CONTROL SYSTEM

Refer to HAC-4, "Work Flow" (Automatic air conditioner) or HAC-107, "Work Flow" (Manual air conditioner).

>> INSPECTION END

ELECTRONIC CONTROLLED ENGINE MOUNT

< DTC/CIRCUIT DIAGNOSIS >

ELECTRONIC CONTROLLED ENGINE MOUNT

Description

The electronic controlled engine mount control solenoid valve controls the intake manifold vacuum signal for electronic controlled engine mount. The electronic controlled engine mount control solenoid valve is moved by ON/OFF signal from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the solenoid is ON, the intake manifold vacuum signal is sent to the electronic controlled engine mount.

Component Function Check

1.CHECK OVERALL FUNCTION

With CONSULT

- Start engine and warm it up to normal operating temperature. 1
- 2. Select "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT and touch "ON/OFF" on the CON-SULT screen.
- 3. Check that the motor operating sound is heard from front electronic controlled engine mount and rear electronic controlled engine mount for about 0.5 seconds according to the switching condition of "ENGINE MOUNTING".

Without CONSULT

- Make sure that gear position is P or N.
- Start engine and let it idle. 2.
- Change the engine speed from idle to more than 1,000 rpm and then return to idle (with vehicle stopped).
- Check that the motor operating sound is heard from front electronic controlled engine mount for and rear Н electronic controlled engine mount about 0.5 seconds when changing engine speed. It is better to hear the operating sound around the left side front wheel house.

Is the inspection result normal?

YES	>> INSPECTION END
NO	

>> EC-609, "Diagnosis Procedure". NO

Diagnosis Procedure

1.CHECK VACUUM SOURCE

- 1 Turn ignition switch OFF.
- 2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hose connected to electronic controlled engine mount.
- 4. Start engine and let it idle.
- 5. Check vacuum hose for vacuum existence.

Vacuum should exist.

Is the inspection result normal?

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-385. 2. "System Description".

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace vacuum hoses and vacuum gallery.

${\it 3.}$ 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. INFOID:000000007420931

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ELECTRONIC CONTROLLED ENGINE MOUNT

< DTC/CIRCUIT DIAGNOSIS >

3. Check the voltage between front electronic controlled engine mount harness connector and ground.

Electronic controlled engine mount control solenoid valve		Ground	Voltage				
Connector		Terminal					
F64		1	Ground	Battery voltage			
Is the ir	nspection	result normal?					
YES >> GO TO 5.							
NO	NO >> GO TO 4.						

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Check the following.

10 A fuse (No. 3)

Fuse block (J/B) connector E6

4. DETECT MALFUNCTIONING PART

Harness connectors E3, F1

· Harness for open or short between electronic controlled engine mount control solenoid valve and fuse

>> Repair open circuit, short to ground or short to power in harness or connectors.

5.CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and electronic controlled engine mount control solenoid valve harness connector.

ECM		Electronic controlled engine mount control solenoid valve		Continuity
Connector	Terminal	Connector	Terminal	
F14	28	F64	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit, short to ground or short to power in harness connectors.

6.CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Refer to EC-611, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace electronic controlled engine mount control solenoid valve.

7. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

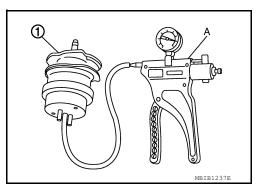
- 1. Turn ignition switch OFF.
- Install vacuum pump (A) to electronic controlled engine mount (1).
- Check that a vacuum is maintained when applying the vacuum of -40 kPa (-0.41 kg/cm², -5.8 psi) to electronic controlled engine mount.
- 4. Also visually check electronic controlled engine mount.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace electronic controlled engine mount.

8. CHECK INTERMITTENT INCIDENT



ELECTRONIC CONTROLLED ENGINE MOUNT

< DTC/CIRCUIT DIAGNOSIS >

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace intake manifold collector. Refer to EM-133, "Removal and Installation".
- NO >> Repair or replace malfunctioning part.

Component Inspection

1. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

(P) With CONSULT

- Turn ignition switch OFF. 1.
- 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.

- Disconnect electronic controlled engine mount control solenoid valve harness connector.
- 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.

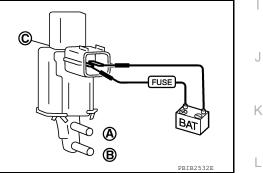
Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO

>> Replace electronic controlled engine mount control solenoid valve.



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EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

EVAP CANISTER VENT CONTROL VALVE

Description

The EVAP canister vent control valve is located on the EVAP canister.

This solenoid value is not used for engine control, and always remains open.

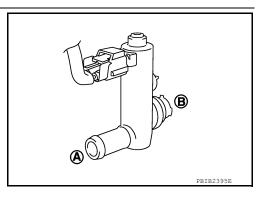
If the vent is closed by any reason under EVAP purge conditions, the evaporative emission control system is depressurized and EVAP canister may be damaged.

To atmosphere Valve Coil O-ring Canister side PBIB1263E

Component Function Check

1. CHECK EVAP CANISTER VENT CONTROL VALVE FUNCTION

- 1. Turn ignition switch OFF.
- Remove EVAP canister vent control valve with its harness connector connected from EVAP canister.
- 3. Start engine.
- 4. Blow air into port A and check that it flows freely out of port B.



YES >> INSPECTION END NO >> Go to <u>EC-612</u>, "Diagnosis Procedure".

Diagnosis Procedure

1.CHECK VACUUM LINE

- 1. Turn ignition switch OFF.
- Check vacuum line between EVAP canister purge volume control solenoid valve and intake manifold collector for crack, clogging, improper connection or disconnection. Refer to <u>EC-393</u>, "System Diagram".

Is the inspection result normal?

YES >> GO TO 2.

2. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

- 1. Disconnect EVAP canister vent control valve harness connector.
- 2. Turn ignition switch ON.

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EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

Check voltage between EVAP canister vent control valve harness connector and ground.

EVAP canister vent control valve		Ground	Voltage
Connector	Terminal		_
B39	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E29, B10
- Harness connectors F2, E11

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.

4. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP canister vent control valve harness connector and ECM harness connector.

EVAP caniste ume control se		ECM		Continuity
Connector	Terminal	Connector	Terminal	
B39	2	E10	109	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E29, B10

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.

ΰ.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-613, "Component Inspection".	
Is the inspection result normal?	
YES >> GO TO 7.	0
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-17</u> , " <u>Removal and Installation</u> ".	
7.CHECK INTERMITTENT INCIDENT	_
Refer to GI-42, "Intermittent Incident".	P
>> INSPECTION END	

Component Inspection

1. CHECK EVAP CANISTER VENT CONTROL VALVE

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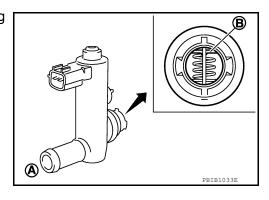
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EVAP CANISTER VENT CONTROL VALVE

< DTC/CIRCUIT DIAGNOSIS >

- 1. Remove EVAP canister vent control valve from EVAP canister.
- 2. Check portion B of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.

Make sure new O-ring is installed properly.

Condition	Air passage continuity between A and B
12 V direct current supply between ter- minals 1 and 2	No
OFF	Yes

FUSE BATTERY

Operation takes less than 1 second. If NG, go to next step.

- Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.
- 5. Perform step 3 again.

Is the inspection result normal?

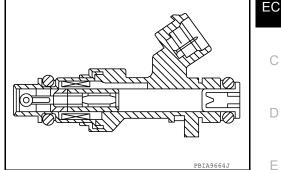
- YES >> INSPECTION END
- NO >> Replace EVAP canister vent control solenoid valve. Refer to FL-17, "Removal and Installation".

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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

1.INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

YES >> GO TO 2.

NO >> Go to EC-615, "Diagnosis Procedure".

2.CHECK FUEL INJECTOR FUNCTION

With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- Make sure that each circuit produces a momentary engine speed drop. 3.

Without CONSULT

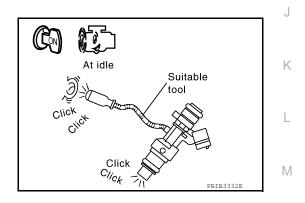
- 1. Start engine.
- 2. Listen to each fuel injector operating sound.

Clicking sound should be heard.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-615, "Diagnosis Procedure".



Diagnosis Procedure

1. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- Disconnect fuel injector harness connector. 2.
- 3. Turn ignition switch ON.

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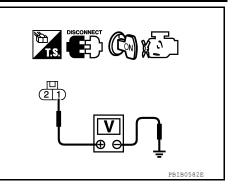
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FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between fuel injector harness connector and ground.

	Fuel injector		Ground	Voltage (V)
Cylinder	Connector	Terminal	Giouna	vollage (v)
1	F17	1		
2	F18	1	Ground Battery	Detter veltere
3	F19	1		
4	F20	1		Battery voltage
5	F21	1		
6	F22	1		



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Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

10 A fuse (No. 35)

IPDM E/R harness connector F10

· Harness for open or short between fuel injector and fuse

>> Repair open circuit, short to ground or short to power in harness or connectors.

$\mathbf{3}$.check fuel injector output signal circuit for open and short

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between fuel injector harness connector and ECM harness connector.

Fuel injector		ECM		Continuity	
Cylinder	Connector	Terminal	Connector	Terminal	Continuity
1	F17	2		32	
2	F18	2	•	31	*
3	F19	2	F14	30	Existed
4	F20	2	1 14	29	LAISIEU
5	F21	2		3	1
6	F22	2	•	1	1

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

4.CHECK FUEL INJECTOR

Refer to EC-617, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning fuel injector. Refer to EM-152, "Removal and Installation".

5.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

OK or NG

OK >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".

NG >> INSPECTION END

FUEL INJECTOR

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

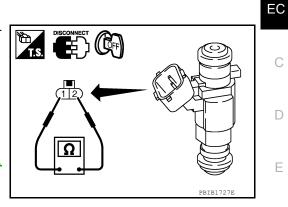
1. CHECK FUEL INJECTOR

- 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-152</u>. <u>"Removal and Installation"</u>.



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< DTC/CIRCUIT DIAGNOSIS > FUEL PUMP

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Description

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay ↓
Battery	Battery voltage*	†	Fuel pump

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation	
Ignition switch is turned to ON.	Operates for 1 second.	
Engine running and cranking Operates.		
When engine is stopped	Stops in 1.5 seconds.	
Except as shown above	Stops.	

Component Function Check

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-618, "Diagnosis Procedure".



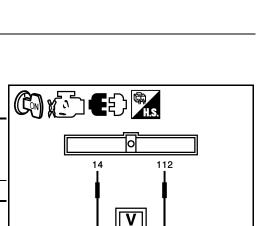
1. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connectors.

ECM				
+		-	_	Voltage
Connector	Terminal	Connector	Terminal	
F14	14	E10	112	Battery voltage

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 2.



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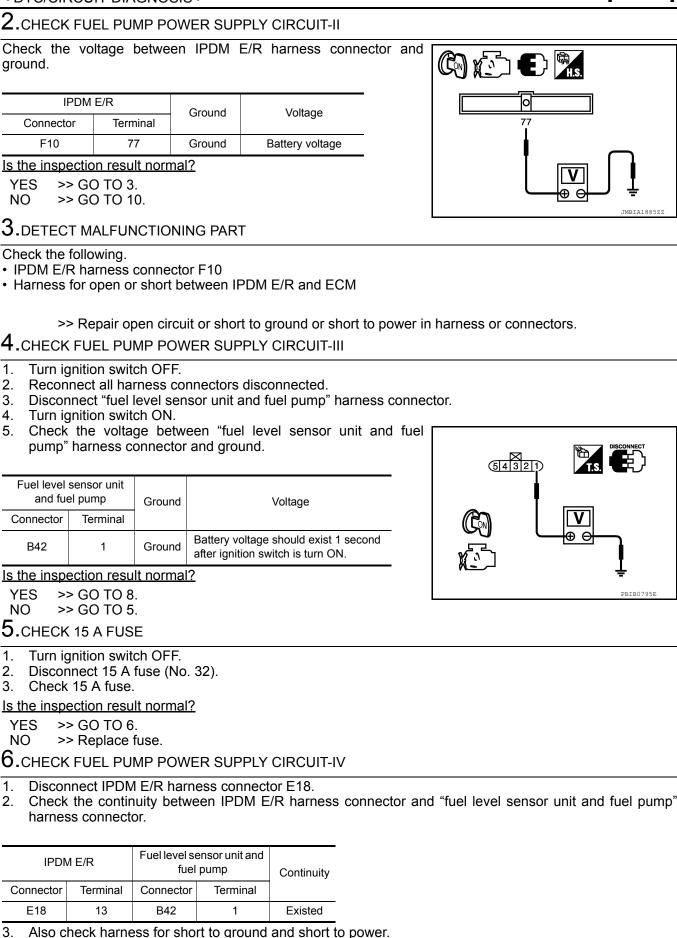
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YES >> GO TO 10. NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

· Harness connectors B10, E29

- IPDM E/R harness connector E18
- Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

>> Repair open circuit or short to power in harness or connectors.

8.CHECK FUEL PUMP GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Check the continuity between "fuel level sensor unit and fuel pump" and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B42	3	Ground	Existed

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 10. NO >> GO TO 9.

NO >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors B10, E29

IPDM E/R harness connector E18

• Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

>> Repair open circuit or short to power in harness or connectors.

10.CHECK FUEL PUMP

Refer to EC-620, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace "fuel level sensor unit and fuel pump". Refer to <u>FL-6, "Removal and Installation"</u>.

11.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-45, "Removal and Installation".

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.

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FUEL PUMP

< DTC/CIRCUIT DIAGNOSIS >

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 <u>FL-6. "Exploded View"</u>.

Component	Inspection	(Condenser-1))
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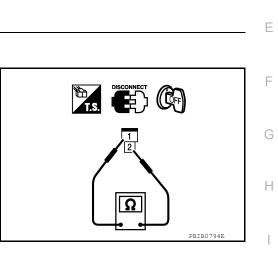
1. CHECK CONDENSER

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-1 harness connector.
- 3. Check resistance between condenser-1 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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HO2S2

Description

The heated oxygen sensor 2, after three way catalyst 1, 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.

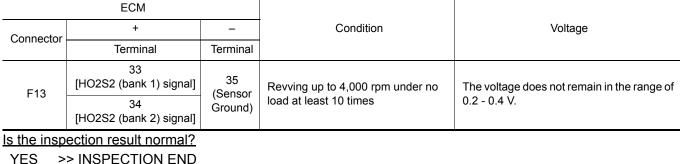
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

Component Function Check

1.CHECK HEATED OXYGEN SENSOR 2 FUNCTION-I

- 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.

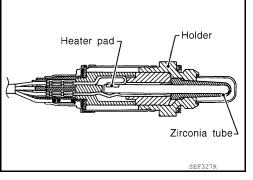


NO >> GO TO 2.

2.CHECK HEATED OXYGEN SENSOR 2 FUNCTION-II

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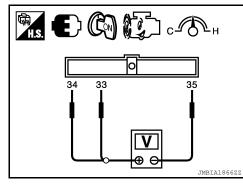


INFOID:00000007420949 for at least 1 minute under no load.

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Check the voltage between ECM harness connector and ground under the following condition.



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	ECM				E
Connector	+	_	Condition	Voltage	E
Connector	Terminal	Terminal			
F13	33 [HO2S2 (bank 1) signal]	35 (Sensor	Keeping engine at idle for 10 minutes	The voltage does not remain in the range of	F
1 15	34 [HO2S2 (bank 2) signal]	(Sensor Ground)		0.2 - 0.4 V.	(.

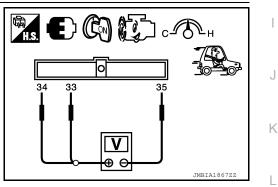
Is the inspection result normal?

>> INSPECTION END YES

NO >> GO TO 3.

3.CHECK HEATED OXYGEN SENSOR 2 FUNCTION-III

Check the voltage between ECM harness connector and ground under the following condition.



	ECM				M
Connector	+	_	Condition	Voltage	
Connector	Terminal	Terminal			
F13	33 [HO2S2 (bank 1) signal]	35 (Sensor	Coasting from 80 km/h (50 MPH) in D	The voltage does not remain in the range of	Ν
115	34 [HO2S2 (bank 2) signal]	Ground)	position	0.2 - 0.4 V.	0

Is the inspection result normal?

YES >> INSPECTION END NO >> Go to EC-623, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK GROUND CONNECTION

1. Turn ignition switch OFF.

Check ground connection M95. Refer to Ground Inspection in GI-45, "Circuit Inspection". 2.

Is the inspection result normal?

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YES >> GO TO 2.

NO >> Repair or replace ground connection.

2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect heated oxygen sensor 2 (HO2S2) harness connector.

3. Disconnect ECM harness connector.

4. Check the continuity between HO2S2 harness connector and ECM harness connector.

	HO2S2		EC	M	Continuity
Bank	Connector	Terminal	Connector	Terminal	Continuity
1	F62	1	F13	35	Existed
2	F56	1	1 15	55	LAISIEU

5. 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 HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

HO2S2			EC	М	Continuity
Bank	Connector	Terminal	Connector	Terminal	Continuity
1	F62	4	F13	33	Existed
2	F56	4	FIJ	34	Existed

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

	HO2S2	Ground	Continuity	
Bank	Connector Terminal		Giouna	Continuity
1	F62	4	Ground	Not existed
2	F56	4	Ground	Not existed

EC	М	Ground	Continuity	
Connector	Connector Terminal		Continuity	
F13	33	Ground	Not existed	
115	34	Ground	NOT EXISTED	

3. 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 HEATED OXYGEN SENSOR 2

Refer to EC-625, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5.REPLACE HEATED OXYGEN SENSOR 2

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-141, "Removal and Installation (RH)"</u>. CAUTION:

HO2S2

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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 [commercial service tool (J-

43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

EC >> INSPECTION END **6.**CHECK INTERMITTENT INCIDENT Refer to GI-42, "Intermittent Incident". >> INSPECTION END Component Inspection INFOID:000000007420951 **1.**INSPECTION START Ε Will CONSULT be used? Will CONSULT be used? YES >> GO TO 2. NO >> GO TO 3. 2.CHECK HEATED OXYGEN SENSOR 2 (P)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. Н 3. Turn ignition switch OFF and wait at least 10 seconds. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 4. 5. Let engine idle for 1 minute. 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 $\pm 25\%$. (Reference data) 1.28 Κ The voltage should be above 0.68V at least one time. 0.64 The voltage should be below 0.18V at least one time. 0.00 "HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is + 25%. M "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 Ν NO >> GO TO 6. 3.CHECK HEATED OXYGEN SENSOR 2-I Without CONSULT Start engine and warm it up to the normal operating temperature. 1.

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.

< DTC/CIRCUIT DIAGNOSIS >

HO2S2

dure.

below 0.18 V at least

once during this proce-

< DTC/CIRCUIT DIAGNOSIS >

ECM +

Terminal

33

[HO2S2

(bank 1)

signal]

34

[HO2S2

(bank 2) signal]

Connector

F13

Check the voltage between ECM harness connector terminals [5. under the following conditions.

Condition

Revving up to 4,000

rpm under no load at

least 10 times

	Г С С С с С н
Voltage	
The voltage should be above 0.68 V at least once during this proce- dure.	
The voltage should be	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4.CHECK HEATED OXYGEN SENSOR 2-II

Terminal

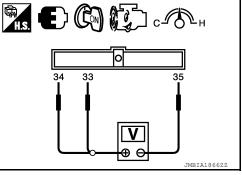
35

(Sensor

ground)

Check the voltage between ECM harness connector terminals under the following conditions.

ECM				
Con-	+	_	Condition	Voltage
nector	Terminal	Terminal	•	
F13	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 proce- dure. The voltage should be below 0.18 V at least once during this proce- dure.



[VQ35DE]

Is the inspection result normal?

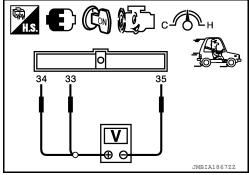
YES >> INSPECTION END

NO >> GO TO 5.

5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Con-	+	_	Condition	Voltage
nector	Terminal	Terminal		
F13	33 [HO2S2 (bank 1) signal] 34 [HO2S2 (bank 2) signal]	35 (Sensor ground)	Coasting from 80 km/ h (50 MPH) while se- lector lever is in the D position	The voltage should be above 0.68 V at least once during this proce- dure. The voltage should be below 0.18 V at least once during this proce- dure.



Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6. 0

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D. REPLACE HEAT	ED OXYGEN SENSOR 2
------------------------	--------------------

Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-141, "Removal and Installation (RH)</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

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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 <u>EC-628</u>, "Diagnosis Procedure".

2.CHECK IGNITION SIGNAL FUNCTION

With CONSULT

- 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 2. Make sure that each circuit produces a momentary engine speed drop.

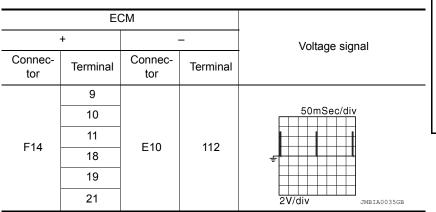
Is the inspection result normal?

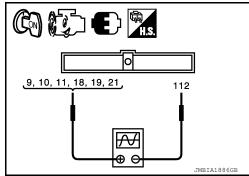
- YES >> INSPECTION END
- NO >> Go to EC-628, "Diagnosis Procedure".

\mathbf{3}. CHECK IGNITION SIGNAL FUNCTION

Without CONSULT

- 1. Let engine idle.
- 2. Read the voltage signal between ECM harness connector terminals with an oscilloscope.





NOTE:

The pulse cycle changes depending on rpm at idle.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-628, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.

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IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

2. Check the voltage between ECM harness connector terminals.

	ECM		
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
E10	105	112	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refer to EC-628. "Diagnosis Procedure".

2.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-2 harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between condenser-2 harness connector and ground.

Conde	enser-2	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
F26	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.

- 2. Disconnect IPDM E/R harness connector F10.
- 3. Check the continuity between IPDM E/R harness connector and condenser-2 harness connector.

IPDN	/I E/R	Conde	Condenser-2		
Connector	Terminal	Connector	Terminal	Continuity	
F10	49	F26	1	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Refer to EC-628, "Diagnosis Procedure".

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

4.CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Check the continuity between condenser-2 harness connector and ground.

Conde	enser-2	Ground	Continuity	
Connector	Terminal	Ground	Continuity	
F26	2	Ground	Existed	

3. Also check harness for short to power.

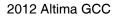
Is the inspection result normal?

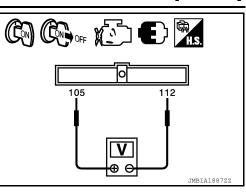
YES >> GO TO 5.

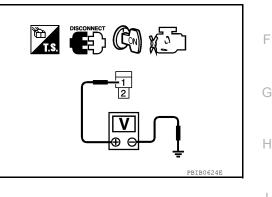
NO >> Repair open circuit or short to power in harness or connectors.

5.CHECK CONDENSER-2

Refer to <u>EC-632</u>, "Component Inspection (Condenser-2)" Is the inspection result normal?







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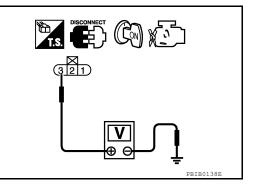
Ρ

- YES >> GO TO 6.
- NO >> Replace condenser-2.

6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

- 1. Reconnect all harness connectors disconnected.
- 2. Disconnect ignition coil harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ignition coil harness connector and ground.

	Ignition coil		Ground	Voltage (V)
Cylinder	Connector	Terminal	Ground	voltage (v)
1	F34	3		
2	F35	3	Ground	Battery voltage
3	F36	3		
4	F37	3	Giouna	Ballery Vollage
5	F38	3		
6	F39	3		



Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness or connectors.

I.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	Ground	Continuity
1	F34	2		
2	F35	2	Ground	Existed
3	F36	2		
4	F37	2	Ground	
5	F38	2	_	
6	F39	2		

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit or short to power in harness or connectors.

 $\mathbf{8}$. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.

2. Check the continuity between ignition coil harness connector and ECM harness connector.

	Ignition coil		ECM		Continuity
Cylinder	Connector	Terminal	Connector	Terminal	Continuity
1	F34	1		11	
2	F35	1	F14	10	
3	F36	1		9	Existed
4	F37	1		21	Existed
5	F38	1		19	
6	F39	1		18	

IGNITION SIGNAL

	IGNITION SIGNAL			
< DTC/CIRCUIT DIAGNOS	IS >	[VQ35DE]		
3. Also check harness for s	short to ground and short to power.			
Is the inspection result norm	al?	A		
YES >> GO TO 9.				
^	cuit, short to ground or short to power in harness or conne	ectors. EC		
	WITH POWER TRANSISTOR			
	nt Inspection (Ignition Coil with Power Transistor)".			
Is the inspection result norm		С		
YES >> GO TO 10. NO >> Replace malfund	ctioning ignition coil with power transistor. Refer to EM-15	in "Exploded View"		
10. CHECK INTERMITTEN		D		
Refer to <u>GI-42</u> , "Intermittent				
Refer to <u>GI-42, Intermittent</u>				
>> INSPECTION E	ND	E		
Component Inspection	(Ignition Coil with Power Transistor)	INFOID:00000007420955		
	, ,	F		
1. CHECK IGNITION COIL	WITH POWER TRANSISTOR-I			
1. Turn ignition switch OFF		0		
 Disconnect ignition coil I Check resistance between 	narness connector.	G		
lowing.				
Ū				
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]			
1 and 2	Except 0 or ∞			
1 and 3	Except 0			
2 and 3				
Is the inspection result norm		J		
YES >> GO TO 2. NO >> Replace malfun	ctioning ignition coil with power transis-	PBIB0847E		
	-150, "Exploded View".	IZ.		
2. CHECK IGNITION COIL	WITH POWER TRANSISTOR-II	K		
CAUTION:				
Perform the following proc	edure in the place where ventilation is good without	the combustible.		
 Turn ignition switch OFF Reconnect all harness c 				
 Reconnect all harness connectors disconnected. Remove fuel pump fuse in IPDM E/R to release fuel pressure. Refer to <u>PG-64, "Fuse, Connector and Ter-</u> 				
minal Arrangement"				
NOTE: Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following proce-				
dure.				
4. Start engine.	cit two or three times to release all fuel proceure			
 After engine stalls, cranl Turn ignition switch OFF 	k it two or three times to release all fuel pressure.	0		
7. Remove all ignition coil	harness connectors to avoid the electrical discharge from			
	I spark plug of the cylinder to be checked. Refer to <u>EM-1</u> nds or more to remove combustion gas in the cylinder.	50, "Exploded View".		
	harness connector to ignition coil.	Р		
· -				

IGNITION SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

- 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.
- Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

CAUTION:

- Never place the spark plug and the ignition coil within 50 cm (19.7 in) each other. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV 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 >> INSPECTION END

NO >> Replace malfunctioning ignition coil with power transistor. Refer to <u>EM-150, "Exploded View"</u>.

Component Inspection (Condenser-2)

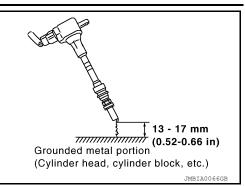
1.CHECK CONDENSER-2

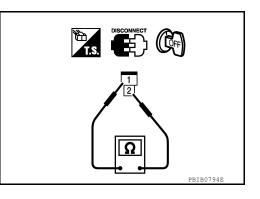
- 1. Turn ignition switch OFF.
- 2. Disconnect condenser-2 harness connector.
- Check resistance between condenser-2 terminals as per the following.

Terminals	Resistance
1 and 2	Above 1 M Ω [at 25C $^{\circ}$ (77C $^{\circ}$)]

<u>OK or NG</u>

- OK >> INSPECTION END
- NG >> Replace condenser-2.







[VQ35DE]

INFOID:000000007420956

MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

MALFUNCTION INDICATOR LAMP

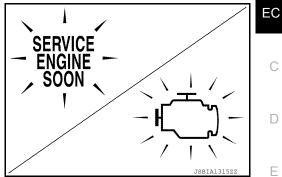
Description

The Malfunction Indicator Lamp (MIL) is located on the combination meter.

The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

When the engine is started, the MIL should turn off. If the MIL remains illuminated, the on board diagnostic system has detected an engine system malfunction.

For details, refer to <u>EC-419</u>, "<u>DIAGNOSIS DESCRIPTION</u> : <u>Malfunc-</u> tion Indicator Lamp (MIL)".



Component Function Check

1. CHECK MIL FUNCTION		F
 Turn ignition switch ON. Make sure that MIL lights up. <u>Is the inspection result normal?</u> YES >> INSPECTION END NO >> Go to EC-633, "Diagnosis Procedure". 		G
Diagnosis Procedure	INFOID:000000007420959	Η
1.снеск отс		
Check that DTC U1000 or U1001 is not displayed. Is the inspection result normal? YES >> GO TO 2. NO >> Perform trouble diagnosis for DTC U1000, U1001. Refer to EC-440, "Description". 2.CHECK COMBINATION METER FUNCTION		J
Refer to <u>MWI-4, "Work Flow"</u> .		K
Is the inspection result normal? YES >> GO TO 3. NO >> Repair or replace. 3. CHECK INTERMITTENT INCIDENT		L
Refer to GI-42, "Intermittent Incident".		M
<u>Is the inspection result normal?</u> YES >> Replace combination meter. Refer to <u>MWI-139, "Removal and Installation"</u> . NO >> Repair or replace.		Ν
		0

[VQ35DE]

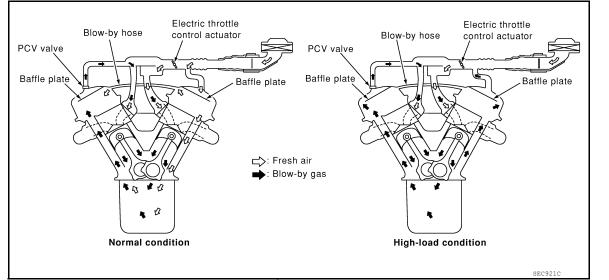
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POSITIVE CRANKCASE VENTILATION

Description



This system returns blow-by gas to the intake manifold.

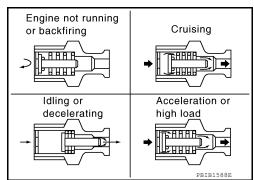
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

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 in let 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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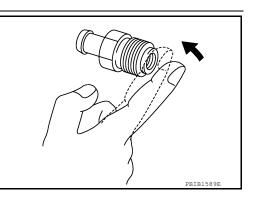
Component Inspection

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-26</u>, "<u>Removal and</u> <u>Installation</u>".



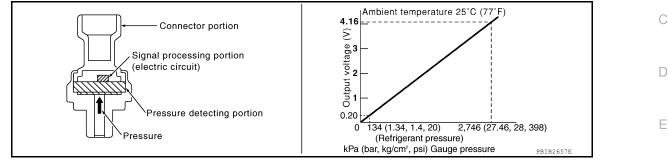
[VQ35DE]

INFOID:000000007420960

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:000000007420963

1. CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- Turn A/C switch and blower fan switch ON. 2.
- Check the voltage between ECM harness connector terminals 3. under the following conditions.

ECM			
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	*
F13	39 (Refrigerant pressure sensor signal)	40 (Sensor ground)	1.0 - 4.0

Is the inspection result normal?

YES >> INSPECTION END

>> Go to EC-635, "Diagnosis Procedure". NO

Diagnosis Procedure

1. CHECK GROUND CONNECTION

- 1. Turn A/C switch and blower fan switch OFF.
- Stop engine. 2.

Turn ignition switch OFF. 3.

Check ground connection E9. Refer to Ground Inspection in GI-45. "Circuit Inspection". 4.

Is the inspection result normal?

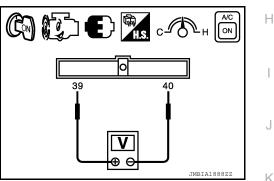
YES >> GO TO 2.

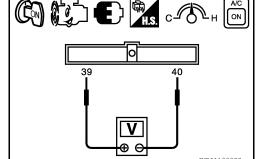
NO >> Repair or replace ground connection.

2.check refrigerant pressure sensor power supply circuit

1. Disconnect refrigerant pressure sensor harness connector.

Turn ignition switch ON. 2.





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EC

[VQ35DE]

REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check the voltage between refrigerant pressure sensor harness connector and ground.

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[VQ35DE]

Refrigerant pressure sensor		Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E219	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E3
- IPDM E/R harness connectors E18, E201

· Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit, 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	
E219	3	F13	40	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors F1, E3

IPDM E/R harness connectors E18, E201

• Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit, short to ground or short to power in harness or connectors.

6.CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

 Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pressure sensor		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E219	2	F13	39	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.

REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
 Harness connectors F1, E3 IPDM E/R harness connectors E18, E201 Harness for open or short between ECM and refrigerant pressure sensor 	A
>> Repair open circuit, short to ground or short to power in harness or connectors 8 .CHECK INTERMITTENT INCIDENT	EC
Refer to GI-42, "Intermittent Incident".	С
Is the inspection result normal?	0
 YES >> Replace refrigerant pressure sensor. Refer to <u>HA-29, "Component"</u>. NO >> Repair or replace. 	D
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VARIABLE INDUCTION AIR SYSTEM

Description

Power Valves 1 and 2

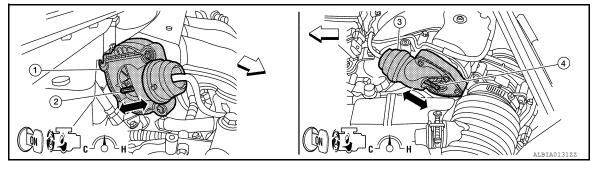
The power valves 1 and 2 are installed in intake manifold collector and used to control the suction passage of the variable induction air control system. They are set in the fully closed or fully opened position by the power valve actuators 1 and 2 operated by the vacuum stored in the vacuum tank. The vacuum to power valve actuators is controlled by the VIAS control solenoid valves 1 and 2.

Component Function Check

1.CHECK OVERALL FUNCTION-I

(I) With CONSULT

- 1. Start engine and let it idle.
- 2. Perform "VIAS S/V 1" in "ACTIVE TEST" mode with CONSULT.
- Turn VIAS control solenoid valve 1 "ON" and "OFF", and make sure that power valve actuator 1 rod moves.



- 1. Power valve actuator 1
- Power valve actuator 1 rod 3. Power valve actuator 2
- 4. Power valve actuator 2 rod
- ∠ : Vehicle front

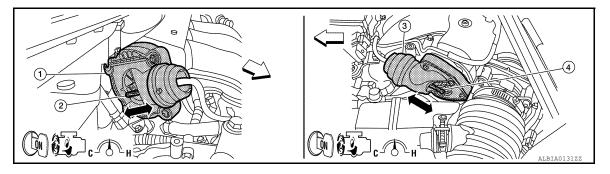
Without CONSULT

1. Start engine and warm it up to the normal operating temperature.

2.

2

- 2. Rev engine quickly up to approximately 5000 rpm.
- 3. Check that power valve actuator 1 rod moves.



- 1. Power valve actuator 1
- Power valve actuator 1 rod
- Power valve actuator 2

3

- 4. Power valve actuator 2 rod

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> <u>EC-639</u>, "Diagnosis Procedure".
- 2.CHECK OVERALL FUNCTION-II

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INFOID-000000007420966

VARIABLE INDUCTION AIR SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

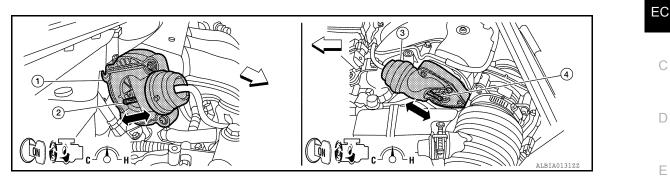
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(P) With CONSULT

- Perform "VIAS S/V B2" in "ACTIVE TEST" mode with CONSULT. 1.
- Turn VIAS control solenoid valve 2 "ON" and "OFF", and make sure that power valve actuator 2 rod 2. moves.



3.

Power valve actuator 2

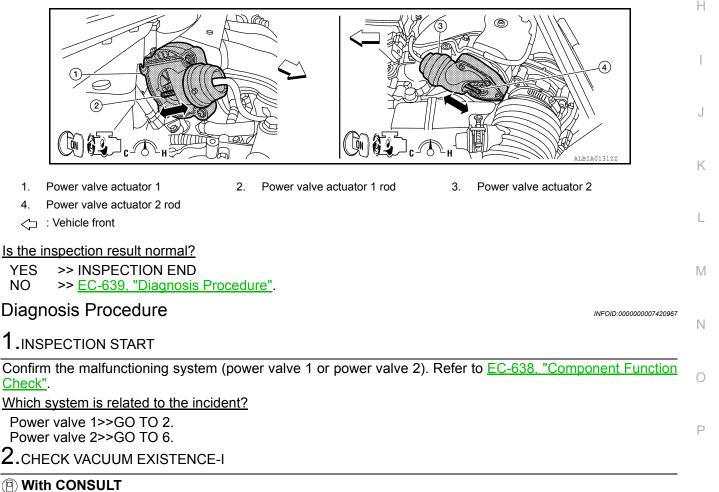
Power valve actuator 1 1.

2. Power valve actuator 1 rod

- Power valve actuator 2 rod 4
- : Vehicle front

Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- Rev engine quickly up to approximately 5000 rpm. 2.
- 3. Check that power valve actuator 2 rod moves.



- Stop engine and disconnect vacuum hose connected to power valve actuator 1. 1.
- 2. Start engine and let it idle.
- Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT. 3.

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VARIABLE INDUCTION AIR SYSTEM

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4. Turn VIAS control solenoid valve 1 ON and OFF, and check vacuum existence under the following conditions.

VIAS SOL VALVE	Vacuum	
ON	Existed	
OFF	Not existed	

Without CONSULT

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1. Refer to <u>EC-339</u>, <u>"Component Parts Location"</u>.
- 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 EC-339, "Component Parts Location".

NO >> GO TO 3.

3.CHECK VACUUM TANK

- 1. Stop engine and disconnect vacuum hose connected to intake manifold collector.
- 2. Start engine and let it idle.
- 3. Check vacuum existence from intake manifold collector.

Does vacuum existence from the intake manifold collector?

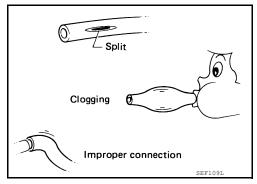
- YES >> GO TO 4.
- NO >> Replace intake manifold collector.

4.CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for cracks, clogging, improper connection or disconnection. Refer to <u>EC-409, "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-565, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Replace VIAS control solenoid valve 1.
- **6.**CHECK VACUUM EXISTENCE-II

With CONSULT

- 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 B2" in "ACTIVE TEST" mode with CONSULT.
- Turn VIAS control solenoid valve 2 ON and OFF, and check vacuum existence under the following conditions.



[VQ35DE]

VARIABLE INDUCTION AIR SYSTEM

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VIAS S/V B2	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	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 2. Refer to <u>EC-339. "Component Parts Location"</u>. NO >> GO TO 7.

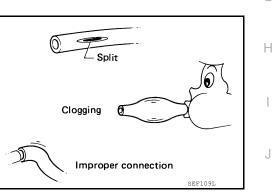
7. CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for cracks, clogging, improper connection or disconnection. Refer to <u>EC-409, "System Diagram"</u>.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair hoses or tubes.



8. CHECK VIAS CONTROL SOLENOID VALVE 2	10
Refer to EC-567, "Component Inspection".	
Is the inspection result normal?	

YES >> GO TO 9.

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NO >> Replace VIAS control solenoid valve 2.

9. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

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ECU DIAGNOSIS INFORMATION ECM

Reference Value

INFOID:000000007420968

[VQ35DE]

VALUES ON THE DIAGNOSIS TOOL

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector. * Specification data may not be directly related to their components signals/values/operations.
- I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIM-ING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	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-429, "Description".		1
B/FUEL SCHDL	See EC-429, "Description".		
A/F ALPHA-B1	See EC-429, "Description".		
A/F ALPHA-B2	See EC-429, "Description".		
COOLAN TEMP/S	Engine: After warming up		More than 70°C (158°F)
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
A/F SEN1 (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	 Revving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 (B2)	 Revving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)	 Revving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		LEAN $\leftarrow \rightarrow RICH$
HO2S2 MNTR (B2)	 Revving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		LEAN $\leftarrow \rightarrow$ RICH
VHCL SPEED SE	• Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as speedometer indication
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14 V
	Ignition switch: ON	Accelerator pedal: Fully released	0.65 - 0.87 V
ACCEL SEN 1	(Engine stopped)	Accelerator pedal: Fully depressed	More than 4.3 V
	Ignition switch: ON	Accelerator pedal: Fully released	0.56 - 0.96 V
ACCEL SEN 2*1	(Engine stopped)	Accelerator pedal: Fully depressed	More than 4.0 V

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[VQ35DE]

Monitor Item	C	ondition	Values/Status
	Ignition switch: ON (Engine standed)	Accelerator pedal: Fully released	More than 0.36 V
TP SEN 1-B1	(Engine stopped)Selector lever position: D	Accelerator pedal: Fully depressed	Less than 4.75 V
TP SEN 2-B1* ¹	Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V
	(Engine stopped)Selector lever position: D	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
START SIGNAL	• Ignition switch: $ON \rightarrow START \rightarrow C$	DN	$OFF \rightarrow ON \rightarrow OFF$
CLSD THL POS	Ignition switch: ON	Accelerator pedal: Fully released	ON
SEGD THE TOO	(Engine stopped)	Accelerator pedal: Slightly depressed	OFF
	Engine: After warming up, idle the	Air conditioner switch: OFF	OFF
AIR COND SIG	engine	Air conditioner switch: ON (Compressor operates.)	ON
	- Ignition quitab: ON	Selector lever position: P or N	ON
P/N POSI SW	Ignition switch: ON	Selector lever position: Except above	OFF
	Engine: After warming up, idle the	Steering wheel: Not being turned	OFF
PW/ST SIGNAL	engine	Steering wheel: Being turned	ON
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	• Ignition switch: $ON \rightarrow OFF \rightarrow ON$		$ON\toOFF\toON$
HEATER FAN SW	• Engine: After warming up, idle the	Heater fan switch: ON	ON
HEATER FAIN SW	engine	Heater fan switch: OFF	OFF
BRAKE SW	Ignition switch: ON	Brake pedal: Fully released	OFF
DRAKE SW		Brake pedal: Slightly depressed	ON
	Engine: After warming up	Idle	2.0 - 3.0 msec
NJ PULSE-B1	 Selector lever position: P or N Air conditioner switch: OFF No load 	2,000 rpm	1.9 - 2.9 msec
	Engine: After warming up	Idle	2.0 - 3.0 msec
NJ PULSE-B2	 Selector lever position: P or N Air conditioner switch: OFF No load 	2,000 rpm	1.9 - 2.9 msec
	Engine: After warming up	Idle	7 - 17° BTDC
IGN TIMING	Selector lever position: P or N Air conditioner switch: OFF No load	2,000 rpm	25 - 45° BTDC
	Engine: After warming up	Idle	2.0 - 6.0 g/s
MASS AIRFLOW	 Selector lever position: P or N Air conditioner switch: OFF No load 	2,500 rpm	7.0 - 20.0 g/s
PURG VOL C/V	 Engine: After warming up Selector lever position: P or N Air conditioner switch: OFF 	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%
	No load	2,000 rpm	_

< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

Monitor Item	C	ondition	Values/Status
INT/V TIM (B1)	Engine: After warming up Selector lever position: P or N	Idle	–5 - 5°CA
. ,	 Air conditioner switch: OFF No load	2,000 rpm	Approx. 0 - 30°CA
	 Engine: After warming up Selector lever position: P or N 	Idle	–5 - 5°CA
INT/V TIM (B2)	Air conditioner switch: OFF No load	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	0 - 2%
INT/V SOL (B1)	 Selector lever position: P or N Air conditioner switch: OFF No load 	2,000 rpm	Approx. 0 - 50%
	Engine: After warming up	Idle	0 - 2%
INT/V SOL (B2)	 Selector lever position: P or N Air conditioner switch: OFF No load 	2,000 rpm	Approx. 0 - 50%
VIAS S/V-1	 Engine: After warming up Selector lever position: P or N Air conditioner switch: OFF No load 	Rev engine quickly up to approximately 5,000 rpm	$OFF \rightarrow ON \rightarrow OFF$
VIAS S/V-2	 Engine: After warming up Selector lever position: P or N Air conditioner switch: OFF No load 	Rev engine quickly up to approximately 5,000 rpm	$OFF \rightarrow ON \rightarrow OFF$
	Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
AIR COND RLY		Air conditioner switch: ON (Compressor operates)	ON
		Idle (With vehicle stopped)	IDLE
ENGINE MOUNT	Engine: After warming up	Except above conditions	TRVL
FUEL PUMP RLY	 For 1 second after turning ignition Engine running or cranking 	For 1 second after turning ignition switch: ON Engine running or cranking	
	Except above		OFF
VENT CONT/V	Ignition switch: ON		OFF
THRTL RELAY	Ignition switch: ON		ON
	 Engine: After warming up, idle the engine Air conditioner switch: OFF 	Engine coolant temperature: 97°C (206°F) or less	OFF
COOLING FAN		Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	Low
		Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	Mid
		Engine coolant temperature: 105°C (221°F) or more	Hi
HO2S2 HTR (B1)	 Engine speed: Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		ON
	Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B2)	- Engine: After warming up	- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at	
	Engine speed: Above 3,600 rpm		OFF
VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indi- cation.		Almost the same speed as the speedometer indication

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[VQ35DE]

Monitor Item	C	Values/Status	
IDL A/V LEARN		Idle air volume learning has not been per- formed yet.	YET
	Engine: Running	Idle air volume learning has already been performed successfully.	CMPLT
ENG OIL TEMP	Engine: After warming up	l	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	Engine: IdleBoth A/C switch and blower fan sw	1.0 - 4.0 V	
VHCL SPEED SE	Turn drive wheels and compare C cation.	ONSULT value with the speedometer indi-	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
UNIVEL 3W	· Ignition Switch. ON	CANCEL switch: Released	OFF
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
RESUME/ACC SW		RESUME/ACCELERATE switch: Re- leased	OFF
SET SW	Ignition switch: ON	SET/COAST switch: Pressed	ON
SET 5W		SET/COAST switch: Released	OFF
BRAKE SW1	Ignition switch: ON	Brake pedal: Fully released	ON
(ASCD brake switch)		Brake pedal: Slightly depressed	OFF
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	OFF
(Stop lamp switch)		Brake pedal: Slightly depressed	ON
VHCL SPD CUT	Ignition switch: ON		NON
LO SPEED CUT	Ignition switch: ON		NON
AT OD MONITOR	Ignition switch: ON		OFF
AT OD CANCEL	Ignition switch: ON		OFF
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at the 1st time \rightarrow at the 2nd time	$ON \rightarrow OFF$
	MAIN switch: ON	ASCD: Operating	ON
SET LAMP	 When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) 	ASCD: Not operating	OFF
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
	Power generation voltage variable	control: Operating	ON
ALT DUTY SIG	Power generation voltage variable control: Not operating		OFF
I/P PULLY SPD	Vehicle speed: More than 20 km/h	Almost the same speed as the tachometer indication	

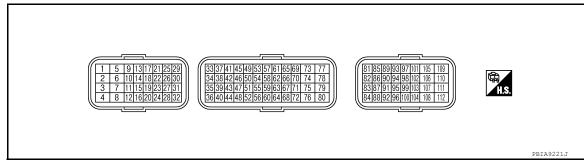
*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.



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*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

· ECM is located in the engine room left side near battery.

• Specification data are reference values.

· Pulse signal is measured by CONSULT.

Terminal No.		Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
1 (P)		Fuel injector No. 6	Output -	 [Engine is running] Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	BATTERY VOLTAGE (11 - 14 V)★
3 (Y)		Fuel injector No. 5			50mSec/div
29 (LG)	112	Fuel injector No. 4			E MARKAN AND AND AND AND AND AND AND AND AND A
30 (O)	(B)	Fuel injector No. 3			BATTERY VOLTAGE (11 - 14 V)★
31 (SB)		Fuel injector No. 2		[Engine is running] Warm-up condition 	50mSec/div
32 (V)		Fuel injector No. 1		 Warm-up condition Engine speed: 2,000 rpm 	TOV/div JMBIA0048GB
2 (GR)	112 (B)	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4 (V)	112 (B)	A/F sensor 1 heater (bank 1)	Output	 [Engine is running] Warm-up condition Idle speed (More than 140 seconds after starting engine) 	2.9 - 8.8 V★ 50mSec/div € 50/div JMBIA0902GB

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[VQ35DE]

Termir	nal No.	Description			Volue		
+		Signal name	Input/ Output	Condition	Value (Approx.)	A	
5	112	Throttle control motor (Open)	Output	 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully depressed 	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div	EC C	
(R)	(B)			 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully released 	0 - 14 V★ 500µSec/div 	E	
6 (BR)	112 (B)	Throttle control motor (Close)	Output	 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully released 	0 - 14 V★ 500µSec/div 	G	
8 (SB)	112 (B)	A/F sensor 1 heater (bank 2)	Output	 [Engine is running] Warm-up condition Idle speed (More than 140 seconds after starting engine) 	2.9 - 8.8 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div	J	
9 (P)	112 (B)	Ignition signal No. 3	Output	[Engine is running]	0 - 0.2 V★ 50mSec/div	L	
10 (G) 11 (Y)		Ignition signal No. 2 Ignition signal No. 1			 Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	2V/div JMBIA0035GB	Μ
18 (L)		Ignition signal No. 6			0.1 - 0.4 V★ 50mSec/div	Ν	
19 (R) 21		Ignition signal No. 5 Ignition signal No. 4		[Engine is running]Warm-up conditionEngine speed: 2,000 rpm		0	
(GR) 12 (B)		ECM ground			2V/div JMBIA0036GB	Ρ	

< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

Terminal No.		Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
13 (O)	112 (B)	Heated oxygen sensor 2 heat- er (bank 1)	Output	 [Engine is running] Engine speed: Below 3,600 rpm after the following condi- tions are met Engine: after warming up Keeping the engine speed be- tween 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	10 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div
				 [Ignition switch: ON] Engine stopped [Engine is running] Engine speed: Above 3,600 rpm 	BATTERY VOLTAGE (11 - 14 V)
14 (B/R)	112 (В)	Fuel pump relay	Output	 [Ignition switch: ON] For 1 second after turning ignition switch ON [Engine is running] 	0 - 1.5 V
				[Ignition switch: ON]More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)
15 (R)	112 (B)	Throttle control motor relay	Output	[Ignition switch: $ON \rightarrow OFF$]	0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
				[Ignition switch: ON]	0 - 1.0 V
16 (B)	—	ECM ground	—	_	_
17 (G)	112 (B)	Heated oxygen sensor 2 heat- er (bank 2)	Output	 [Engine is running] Engine speed: Below 3,600 rpm after the following conditions are met Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	10 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div mBIA0902GB
				 [Ignition switch: ON] Engine stopped [Engine is running] Engine speed: Above 3,600 rpm 	BATTERY VOLTAGE (11 - 14 V)
24 (SB)	112 (B)	,	Output	 [Engine is running] [Ignition switch: OFF] A few seconds after turning ignition switch OFF [Ignition switch: OFF] 	0 - 1.5 V
				 [Ignition switch: OFF] More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)

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Termir	nal No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	A
25	112	EVAP canister purge volume	Output	 [Engine is running] Idle speed Accelerator pedal: Not depressed even slightly, after engine starting 	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div ⊊ 10V/div JMEIA0039GB	EC C D
(W)	(B)	control solenoid valve	Output	 [Engine is running] Engine speed: approximately 2,000 rpm (More than 100 seconds after starting engine) 	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div 50mSec/div 10V/div JMBIA0040GB	E F G
26 (B)	112 (B)	VIAS control solenoid valve 2	Output	 [Engine is running] Warm-up condition Idle speed [Engine is running] Warm-up condition When revving engine up to 5,000 rpm quickly 	BATTERY VOLTAGE (11 - 14 V) BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V)	H
27 (B/W)	112 (B)	VIAS control solenoid valve 1	Output	 [Engine is running] Warm-up condition Idle speed [Engine is running] Warm-up condition When revving engine up to 5,000 rpm quickly 	BATTERY VOLTAGE (11 - 14 V) BATTERY VOLTAGE (11 - 14 V) \downarrow 0 - 1.0 V \downarrow BATTERY VOLTAGE (11 - 14 V)	J
28 (BR)	112 (B)	Electronic controlled engine mount control solenoid valve	Output	 [Engine is running] Engine speed: For 2 seconds after reaching 950 rpm or less [Engine is running] Engine speed: After a lapse of 2 seconds after reaching 950 rpm or less 	0 - 1.0 V 2.0 - 3.0 V	M
				[Engine is running]Engine speed: 950 rpm or more	BATTERY VOLTAGE (11 - 14 V)	Ν
33 (Y)	35 (B)	Heated oxygen sensor 2 (bank 1)	Input	 [Engine is running] Revving engine from idle to 3,000 rpm quickly after the following conditions are met Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 1.0 V	O

< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

Termir	nal No.	Description				
+		Signal name	Input/ Output	Condition	Value (Approx.)	
34 (V)	35 (B)	Heated oxygen sensor 2 (bank 2)	Input	 [Engine is running] Revving engine from idle to 3,000 rpm quickly after the following conditions are met Engine: after warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 1.0 V	
35 (B)	_	Sensor ground (Heated oxygen sensor 2)		_	-	
36 (G)	_	Sensor ground (Throttle position sensor)		_	_	
37	36	Throttle position sensor 1	Input	 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully released 	More than 0.36 V	
(B)	 (B) (G) Inrottle position sensor 1 Input [Ignition switch: ON] Engine stopped Selector lever position: Accelerator pedal: Fully 		Less than 4.75 V			
38	36	Throttle position consor 2	Input	 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully released 	Less than 4.75 V	
(R)	(R) (G) Throttle position sensor 2			input	 [Ignition switch: ON] Engine stopped Selector lever position: D Accelerator pedal: Fully depressed 	More than 0.36 V
39 (O)	40 (SB)	Refrigerant pressure sensor	Input	 [Engine is running] Warm-up condition Both A/C switch and blower fan motor switch: ON (Com- pressor operates) 	1.0 - 4.0 V	
40 (SB)		Sensor ground (Refrigerant pressure sensor)	_	_	_	
41 (SB)	48 (GR)	Power steering pressure sen- sor	Input	 [Engine is running] Steering wheel: Being turned [Engine is running] Steering wheel: Not being turned 	0.5 - 4.5 V 0.4 - 0.8 V	
42 (G)	44 (O)	Battery current sensor	Input	[Engine is running] • Battery: Fully charged* ² • Idle speed	2.6 - 3.5 V	
44 (O)	_	Sensor ground (Battery current sensor)		_	_	
45 (L)	49 (G)	A/F sensor 1 (bank 1)	Input	[Ignition switch: ON]	2.2 V	
46 (P)	52 (L)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.	

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Termir	nal No.	Description			Mahaa	
+		Signal name	Input/ Output	Condition	Value (Approx.)	A
47 (W)	36 (G)	Sensor power supply (Throttle position sensor)		[Ignition switch: ON]	5 V	EC
48 (GR)		Sensor ground (Power steering pressure sensor)	_	_	_	С
49 (G)	112 (B)	A/F sensor 1 (bank 1)	Input	[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	1.8 V Output voltage varies with air fuel ratio.	D
50 (O)	56 (Y)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.	Е
51 (P)	44 (O)	Sensor power supply (Battery current sensor)	—	[Ignition switch: ON]	5 V	E
52 (L)	_	Sensor ground (Engine coolant temperature sensor/Engine oil tempera- ture sensor)	_	_	_	F
53 (V)	112 (B)	A/F sensor 1 (bank 2)	Input	[Ignition switch: ON]	2.2 V	G
54 (GR)	52 (L)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine oil temperature.	Н
55 (LG)	48 (GR)	Sensor power supply (Power steering pressure sensor)	_	[Ignition switch: ON]	5 V	
56 (Y)	_	Sensor ground (Mass air flow sensor/Intake air temperature sensor)	_	_	_	J
57 (LG)	112 (B)	A/F sensor 1 (bank 2)	Input	[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	1.8 V Output voltage varies with air fuel ratio.	K
58	56	Mass air flow sensor	Input	[Engine is running]Warm-up conditionIdle speed	0.9 - 1.2 V	L
(BR)	(Y)		input	[Engine is running]Warm-up conditionEngine speed: 2,500 rpm	1.6 - 1.9 V	M
59 (L)	64 (BR)	Sensor power supply [Camshaft position sensor (PHASE) (bank 1)]	_	[Ignition switch: ON]	5 V	
60 (W)	_	Sensor ground [Crankshaft position sensor (POS)]	_	_	_	Ν
61 (GR)	67 (BR)	Knock sensor (bank 1)	Input	[Engine is running] • Idle speed	2.5 V* ¹	0
62 (W)	67 (BR)	Knock sensor (bank 2)	Input	[Engine is running] • Idle speed	2.5 V* ¹	Р
63 (O)	68 (V)	Sensor power supply [Camshaft position sensor (PHASE) (bank 2)]	_	[Ignition switch: ON]	5 V	
64 (BR)	_	Sensor ground [Camshaft position sensor (PHASE) (bank 1)]	_	_	-	

< ECU DIAGNOSIS INFORMATION >

Description

Terminal No.

+

65

(R)

67

(GR)

68

(V)

69

(P)

70

(Y)

Condition Input/ (Approx.) Signal name Output 4.0 - 5.0 ∨★ [Engine is running] 1mSec/div · Warm-up condition · Idle speed NOTE: The pulse cycle changes depending on rpm at idle 2V/div JMBIA0041GB 60 Crankshaft position sensor Input (W) (POS) 4.0 - 5.0 V★ 1mSec/div [Engine is running] • Engine speed: 2,000 rpm 2V/div JMBIA0042GB Sensor ground ____ (Knock sensor) Sensor ground [Camshaft position sensor (PHASE) (bank 2)] 3.0 - 5.0 V★ [Engine is running] 20mSec/div · Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 2V/div JMBIA0045GB 68 Camshaft position sensor Input (V) (PHASE) (bank 2) 3.0 - 5.0 V**★** 20mSec/div [Engine is running] Engine speed is 2,000 rpm 2V/div JMBIA0046GB 3.0 - 5.0 V 🖈 [Engine is running] 20mSec/div · Warm-up condition · Idle speed NOTE: The pulse cycle changes depending on rpm at idle 64 Camshaft position sensor 2V/div JMBIA0045GB Input (BR) (PHASE) (bank 1) 3.0 - 5.0 V 🖈 20mSec/div [Engine is running] Engine speed is 2,000 rpm

[VQ35DE]

Value

JMBIA0046GB

2V/div

< ECU DIAGNOSIS INFORMATION >

Terminal No.		Description			Value	0	
+		Signal name	Input/ Output	Condition	(Approx.)	A	
72 (R)	40 (SB)	Sensor power supply (Refrigerant pressure sensor)		[Ignition switch: ON]	5 V	EC	
				[Engine is running]Warm-up conditionIdle speed	BATTERY VOLTAGE (11 - 14 V)	С	
75 (Y)	112 (B)	Intake valve timing control so- lenoid valve (bank 2)	Output	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	7 - 12 V★	D	
76 (BR)	60 (W)	Sensor power supply [Crankshaft position sensor (POS)]	_	[Ignition switch: ON]	5 V	F	
77 (LG)	112 (B)	Power supply for ECM (Back- up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)	G	
				[Engine is running]Warm-up conditionIdle speed	BATTERY VOLTAGE (11 - 14 V)	Н	
78 (L)	112 Intake valve timing control so- (B) Ienoid valve (bank 1) Output				[Engine is running]Warm-up conditionEngine speed: 2,000 rpm	7 - 12 V★	J
81	84	Accelerator pedal position	loot	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully released	0.65 - 0.87 V	K	
(W)	(B)	sensor 1	Input	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully depressed	More than 4.3 V	L	
82	100	Accelerator pedal position	loout	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully released	0.28 - 0.48 V	M	
(O)	(G)	sensor 2	Input	[Ignition switch: ON]Engine stoppedAccelerator pedal: Fully depressed	More than 2.0 V	0	
83 (GR)	84 (B)	Sensor power supply (Accelerator pedal position sensor 1)		[Ignition switch: ON]	5 V	Р	
84 (B)		Sensor ground (Accelerator pedal position sensor 1)	_	_	_		

< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

Termir	nal No.	Description			Value
+		Signal name	Input/ Output	Condition	Value (Approx.)
				[Ignition switch: ON] • ASCD steering switch: OFF	4 V
				[Ignition switch: ON] • MAIN switch: Pressed	0 V
85 (Y)	92 (R)	ASCD steering switch	Input	[Ignition switch: ON] • CANCEL switch: Pressed	1 V
(.,	(14)			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3 V
				[Ignition switch: ON] • SET/COAST switch: Pressed	2 V
87 (BR)	100 (G)	Sensor power supply (Accelerator pedal position sensor 2)	_	[Ignition switch: ON]	5 V
88 (O)		Data link connector	Input/ Output	_	_
92 (BR)	_	Sensor ground (ASCD steering switch)		_	_
93	112			[Ignition switch: OFF]	0 V
93 (Y)	(B)	Ignition switch	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
94	112	Engine speed output signal	Output	 [Engine is running] Warm-up condition Idle speed NOTE: The pulse cycle changes depending on rpm at idle 	1 V★ 10mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
(GR)	(B)		oupu	[Engine is running] • Engine speed: 2,000 rpm	1 V★ 10mSec/div f f f 2V/div JMBIA0077GB
95 (Y)	104 (P)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.
97 (P)	_	CAN communication line	Input/ Output	_	-
98 (L)	_	CAN communication line	Input/ Output	_	-
100 (G)	_	Sensor ground (Accelerator pedal position sensor 2)	_	_	_
102	112			[Ignition switch: ON] • Selector lever position: P or N	BATTERY VOLTAGE (11 - 14 V)
(R)	(B)	PNP signal	Input	[Ignition switch: ON]Selector lever position: Except above	0 V

Revision: February 2013

< ECU DIAGNOSIS INFORMATION >

Termir	nal No.	Description			Value	Δ
+		Signal name	Input/ Output	Condition	(Approx.)	A
104 (P)	_	Sensor ground (Fuel tank temperature sen- sor)	_	_	_	EC
105 (V)	112 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	С
106	112			[Ignition switch: OFF] • Brake pedal: Fully released	0 V	
(SB)	(B)	Stop lamp switch	Input	[Ignition switch: OFF]Brake pedal: Slightly de- pressed	BATTERY VOLTAGE (11 - 14 V)	D
107 (B) 108 (B)	_	ECM ground	_	_	_	E
109 (W)	112 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	F
110 (G)	112 (B)	ASCD brake switch	Input	[Ignition switch: ON]Brake pedal: Slightly depressed	0 V	G
(0)	(6)			[Ignition switch: ON] • Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14 V)	Н
111 (B) 112 (B)		ECM ground	_	_	_	I

★: 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 PG-3. "How to Handle Battery".

Fail-safe

INFOID:000000007420969

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Κ

NON DTC RELATED ITEM

Engine operating condi- tion in fail-safe mode	Detected items	Remarks	Reference page	L
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up MIL when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.	<u>EC-633</u>	N

DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0011 P0021	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.	
P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	

< ECU DIAGNOSIS INFORMATION >

DTC No.	Detected items	Engine opera	ating condition in fail-safe mode	
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 engine 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	tle control actuator in regulating the throttle opening in in +10 degrees. eed of the throttle valve to be slower than the normal	
P0196 P0197 P0198	Engine oil temperaturesen- sor	Intake valve timing control does not function.		
P0500	Vehicle speed sensor	When the fail-safe system for vehic (Highest) while engine is running.	le speed sensor is activated, the cooling fan operates	
P0605	ECM	(When ECM calculation function is ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I ECM deactivates ASCD operation.	rol actuator control, throttle valve is maintained at a by the return spring.	
P0643	Sensor power supply	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I	rol actuator control, throttle valve is maintained at a by the return spring.	
P1805	Brake switch	ECM controls the electric throttle co small range. Therefore, acceleration will be poor	ontrol actuator by regulating the throttle opening to a r.	
		Vehicle condition	Driving condition	
		When engine is idling	Normal	
		When accelerating	Poor acceleration	
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.		
P2101	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.		
P2118	Throttle control motor	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I	trol actuator control, throttle valve is maintained at a by the return spring.	

< ECU DIAGNOSIS INFORMATION >

-	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. 	EC
		(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.	C
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.	D
	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.	E

DTC Inspection Priority Chart

INFOID:000000007420970

[VQ35DE]

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)	
1	U1000 U1001 CAN communication line	
	P0102 P0103 Mass air flow sensor	
	P0112 P0113 Intake air temperature sensor	
	P0117 P0118 Engine coolant temperature sensor	
	P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor	
	 P0196 P0197 P0198 Engine oil temperature sensor P0327 P0328 P0332 P0333 Knock sensor 	
	 P0327 P0328 P0332 P0333 Kilock selisol P0335 Crankshaft position sensor (POS) 	
	P0340 P0345 Camshaft position sensor (PHASE)	
	P0500 Vehicle speed sensor	
	• P0605 P0607 ECM	
	P0643 Sensor power supply	
	P0705 Transmission range switch	
	P0850 Park/Neutral position (PNP) switch	
	P1550 P1551 P1552 P1553 P1554 Battery current sensor	
	P1610 - P1615 NATS P1700 OVE control contacts	
	 P1700 CVT control system P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor 	

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< ECU DIAGNOSIS INFORMATION >

Priority	Detected items (DTC)
2	 P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater P0075 P0081 Intake valve timing control solenoid valve P0130 P0131 P0132 P0150 P0151 P0152 Air fuel ratio (A/F) sensor 1 P0138 P0158 Heated oxygen sensor 2 P0444 EVAP canister purge volume control solenoid valve P0550 Power steering pressure sensor P0603 ECM power supply P0710 P0715 P0720 P0740 P0745 P0746 P0776 P0778 P0840 P0845 P1740 CVT related sensors, solenoid valvesand switches P1217 Engine over temperature (OVERHEAT) P1720 Vehicle speed sensor P1805 Brake switch P2101 Electric throttle control function P2108 Throttle control motor relay
3	 P0011 P0021 Intake valve timing control P1212 TCS communication line P1564 ASCD steering switch P1572 ASCD brake switch P1574 ASCD vehicle speed sensor P1715 Input speed sensor P1800 P1801 VIAS control solenoid valve P2119 Electric throttle control actuator

DTC Index

INFOID:000000007420971

×:Applicable —: Not applicable

DTC)* ¹	Items	Trip	MIL	Reference
CONSULT	ECM* ²	(CONSULT screen terms)	(CONSULT screen terms)		page
U1000	1000* ³	CAN COMM CIRCUIT	2	—	<u>EC-440</u>
U1001	1001* ³	CAN COMM CIRCUIT	2	—	<u>EC-440</u>
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	_	_	_
P0011	0011	INT/V TIM CONT-B1	2	—	<u>EC-441</u>
P0021	0021	INT/V TIM CONT-B2	2	—	<u>EC-441</u>
P0031	0031	A/F SEN1 HTR (B1)	2	×	<u>EC-446</u>
P0032	0032	A/F SEN1 HTR (B1)	2	×	<u>EC-446</u>
P0037	0037	HO2S2 HTR (B1)	2	×	<u>EC-449</u>
P0038	0038	HO2S2 HTR (B1)	2	×	<u>EC-449</u>
P0051	0051	A/F SEN1 HTR (B2)	2	×	<u>EC-446</u>
P0052	0052	A/F SEN1 HTR (B2)	2	×	<u>EC-446</u>
P0057	0057	HO2S2 HTR (B2)	2	×	<u>EC-449</u>
P0058	0058	HO2S2 HTR (B2)	2	×	<u>EC-449</u>
P0075	0075	INT/V TIM V/CIR-B1	2	×	<u>EC-452</u>
P0081	0081	INT/V TIM V/CIR-B2	2	×	<u>EC-452</u>
P0102	0102	MAF SEN/CIRCUIT-B1	1	×	<u>EC-455</u>
P0103	0103	MAF SEN/CIRCUIT-B1	1	×	<u>EC-455</u>
P0112	0112	IAT SEN/CIRCUIT-B1	2	×	<u>EC-461</u>
P0113	0113	IAT SEN/CIRCUIT-B1	2	×	<u>EC-461</u>
P0117	0117	ECT SEN/CIRC	2	×	<u>EC-464</u>

< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

DT	C* ¹	Items	Trip	MIL	Reference	А
CONSULT	ECM* ²	(CONSULT screen terms)	mp	IVIL	page	/ \
P0118	0118	ECT SEN/CIRC	2	×	EC-464	-
P0122	0122	TP SEN 2/CIRC-B1	1	×	EC-467	EC
P0123	0123	TP SEN 2/CIRC-B1	1	×	EC-467	
P0130	0130	A/F SENSOR1 (B1)	2	×	<u>EC-470</u>	С
P0131	0131	A/F SENSOR1 (B1)	2	×	<u>EC-474</u>	0
P0132	0132	A/F SENSOR1 (B1)	2	×	<u>EC-478</u>	_
P0138	0138	HO2S2 (B1)	2	×	<u>EC-482</u>	D
P0150	0150	A/F SENSOR1 (B2)	2	×	<u>EC-470</u>	_
P0151	0151	A/F SENSOR1 (B2)	2	×	<u>EC-474</u>	- E
P0152	0152	A/F SENSOR1 (B2)	2	×	<u>EC-478</u>	
P0158	0158	HO2S2 (B2)	2	×	<u>EC-482</u>	_
P0196	0196	EOT SEN/CIRC	2		<u>EC-487</u>	F
P0197	0197	EOT SEN/CIRC	2	×	<u>EC-490</u>	_
P0198	0198	EOT SEN/CIRC	2	×	<u>EC-490</u>	
P0222	0222	TP SEN 1/CIRC-B1	1	×	<u>EC-493</u>	G
P0223	0223	TP SEN 1/CIRC-B1	1	×	<u>EC-493</u>	_
P0327	0327	KNOCK SEN/CIRC-B1	2	—	<u>EC-496</u>	Н
P0328	0328	KNOCK SEN/CIRC-B1	2	—	<u>EC-496</u>	_
P0332	0332	KNOCK SEN/CIRC-B2	2	—	<u>EC-496</u>	_
P0333	0333	KNOCK SEN/CIRC-B2	2	—	<u>EC-496</u>	_
P0335	0335	CKP SEN/CIRCUIT	2	×	<u>EC-499</u>	_
P0340	0340	CMP SEN/CIRC-B1	2	×	<u>EC-503</u>	J
P0345	0345	CMP SEN/CIRC-B2	2	×	<u>EC-503</u>	_
P0444	0444	PURG VOLUME CONT/V	2	×	<u>EC-507</u>	_
P0500	0500	VEH SPEED SEN/CIRC	2	×	<u>EC-510</u>	K
P0550	0550	PW ST P SEN/CIRC	2	—	<u>EC-512</u>	_
P0603	0603	ECM BACK UP/CIRCUIT	2	×	<u>EC-515</u>	_
P0605	0605	ECM	1 or 2	× or —	<u>EC-517</u>	_
P0607	0607	ECM	2	—	<u>EC-519</u>	_
P0643	0643	SENSOR POWER/CIRC	1	×	<u>EC-520</u>	M
P0705	0705	T/M RANGE SENSOR A	2	—	<u>TM-135</u>	_
P0710	0710	FLUID TEMP SENSOR A	2	_	<u>TM-138</u>	N
P0715	0715	INPUT SPEED SENSOR A	2	_	<u>TM-141</u>	-
P0720	0720	OUTPUT SPEED SENSOR*4	2	—	<u>TM-144</u>	
P0740	0740	TORQUE CONVERTER	2	_	<u>TM-150</u>	0
P0745	0745	PC SOLENOID A	2	—	<u>TM-154</u>	_
P0746	0746	PC SOLENOID A	2	—	<u>TM-156</u>	
P0776	0776	PC SOLENOID B	2		<u>TM-158</u>	P
P0778	0778	PC SOLENOID B	2		<u>TM-160</u>	_
P0840	0840	FLUID PRESS SEN/SW A	2	—	<u>TM-165</u>	_
P0850	0850	P-N POS SW/CIRCUIT	2	×	<u>EC-523</u>	_
P1212	1212	TCS/CIRC	2	—	<u>EC-526</u>	_
P1217	1217	ENG OVER TEMP	1	×	<u>EC-527</u>	_

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< ECU DIAGNOSIS INFORMATION >

[VQ35DE]

DTC* ¹		Items			Reference
CONSULT	ECM* ²	(CONSULT screen terms)	Trip	MIL	page
P1225	1225	CTP LEARNING-B1	2		EC-531
P1226	1226	CTP LEARNING-B1	2	_	<u>EC-533</u>
P1550	1550	BAT CURRENT SENSOR	2	_	<u>EC-535</u>
P1551	1551	BAT CURRENT SENSOR	2	_	<u>EC-538</u>
P1552	1552	BAT CURRENT SENSOR	2	_	<u>EC-538</u>
P1553	1553	BAT CURRENT SENSOR	2	_	<u>EC-541</u>
P1554	1554	BAT CURRENT SENSOR	2	_	<u>EC-544</u>
P1564	1564	ASCD SW	1	_	<u>EC-547</u>
P1572	1572	ASCD BRAKE SW	1	_	<u>EC-550</u>
P1574	1574	ASCD VHL SPD SEN	1	_	<u>EC-558</u>
P1610	1610	LOCK MODE	2	_	SEC-65 (COUPE) or SEC-281 (SE- DAN)
P1611	1611	ID DISCORD, IMMU-ECM	2	_	SEC-70 (COUPE) or SEC-286 (SE- DAN)
P1612	1612	CHAIN OF ECM-IMMU	2	_	<u>SEC-</u> 71(COUPE) or <u>SEC-287</u> (SEDAN)
P1615	1615	DIFFERENCE OF KEY	2	_	<u>SEC-</u> <u>69</u> (COUPE) or <u>SEC-285</u> (SEDAN)
P1700	1700	CVT C/U FUNCT	2	_	<u>EC-560</u>
P1715	1715	IN PULY SPEED	2	-	<u>EC-561</u>
P1720	1720	V/SP SEN (A/T OUT)	2	-	<u>EC-562</u>
P1740	1740	SLCT SOLENOID	2	_	<u>TM-181</u>
P1777	1777	STEP MOTOR	2	_	<u>TM-184</u>
P1778	1778	STEP MOTOR	2	-	<u>TM-187</u>
P1800	1800	VIAS S/V-1	2	_	<u>EC-564</u>
P1801	1801	VIAS S/V-2	2	_	<u>EC-566</u>
P1805	1805	BRAKE SW/CIRCUIT	1	×	<u>EC-569</u>
P2100	2100	ETC MOT PWR-B1	1	×	<u>EC-573</u>
P2101	2101	ETC FNCTN/CIRC-B1	1	×	<u>EC-575</u>
P2103	2103	ETC MOT PWR	1	×	<u>EC-573</u>
P2118	2118	ETC MOT-B1	1	×	<u>EC-579</u>
P2119	2119	ETC ACTR-B1	1	×	<u>EC-582</u>
P2122	2122	APP SEN 1/CIRC	1	×	<u>EC-584</u>
P2123	2123	APP SEN 1/CIRC	1	×	<u>EC-584</u>
P2127	2127	APP SEN 2/CIRC	1	×	<u>EC-587</u>
P2128	2128	APP SEN 2/CIRC	1	×	<u>EC-587</u>
P2135	2135	TP SENSOR-B1	1	×	<u>EC-591</u>
P2138	2138	APP SENSOR	1	×	<u>EC-594</u>

*1: 1st trip DTC No. is the same as DTC No.

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< ECU DIAGNOSIS INFORMATION >

*2: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

*3: The troubleshooting for this DTC needs CONSULT.

*4: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

[VQ35DE]

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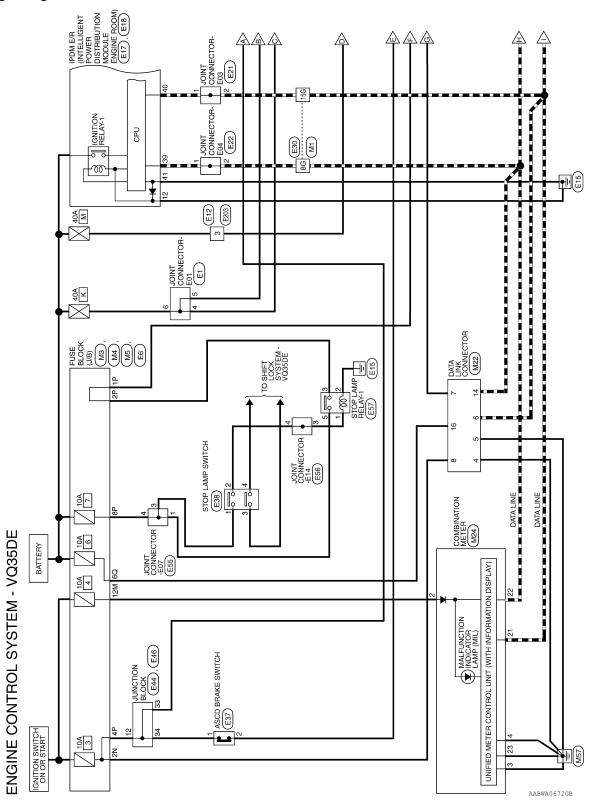
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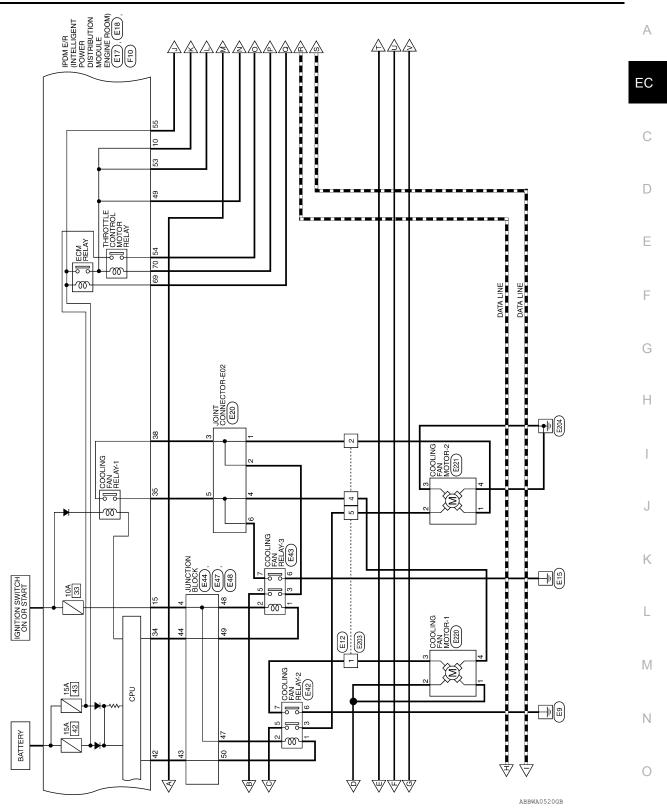
WIRING DIAGRAM ENGINE CONTROL SYSTEM

Wiring Diagram



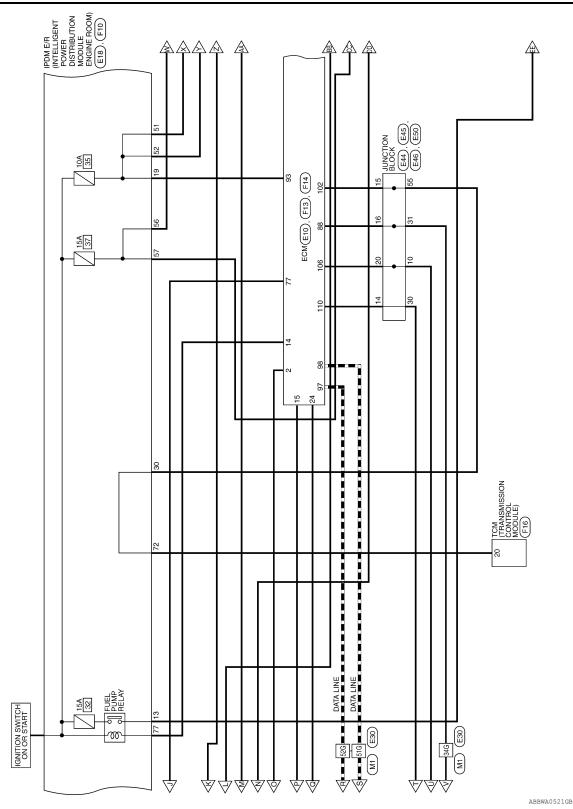


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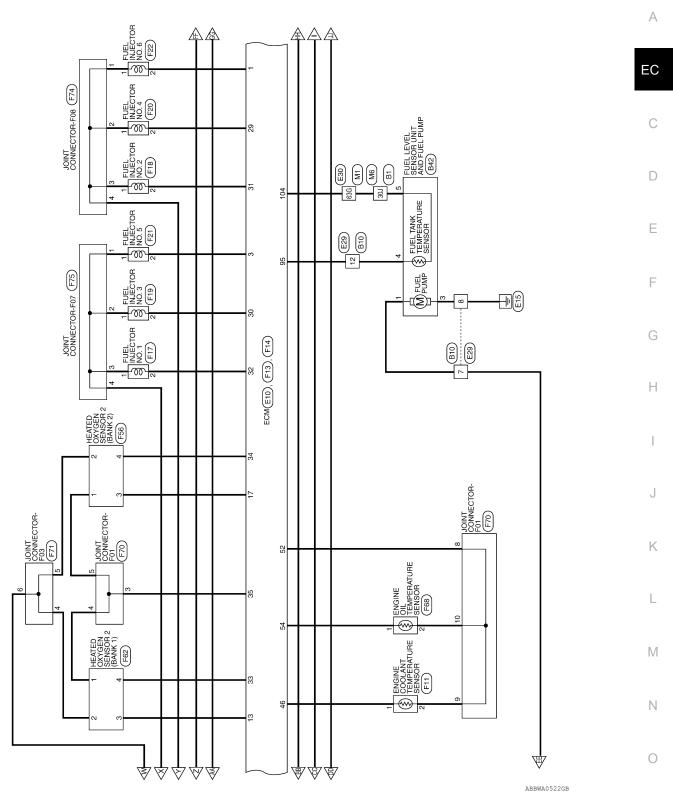


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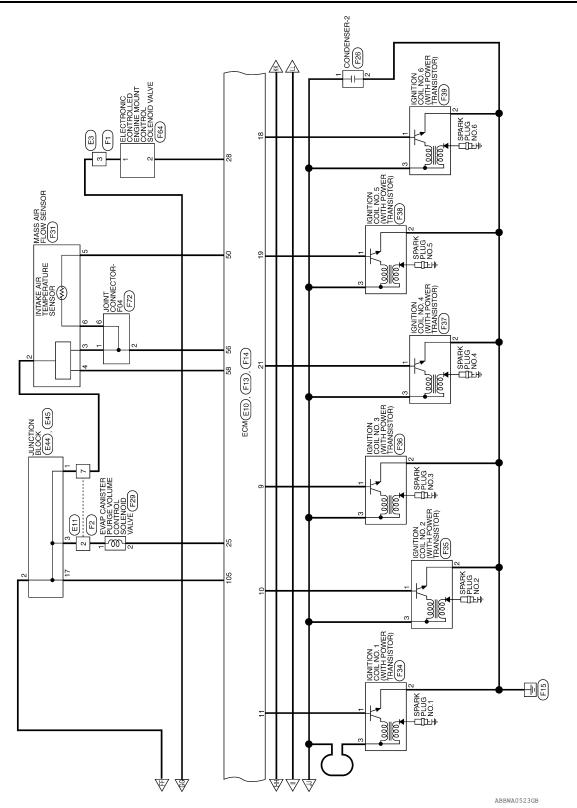
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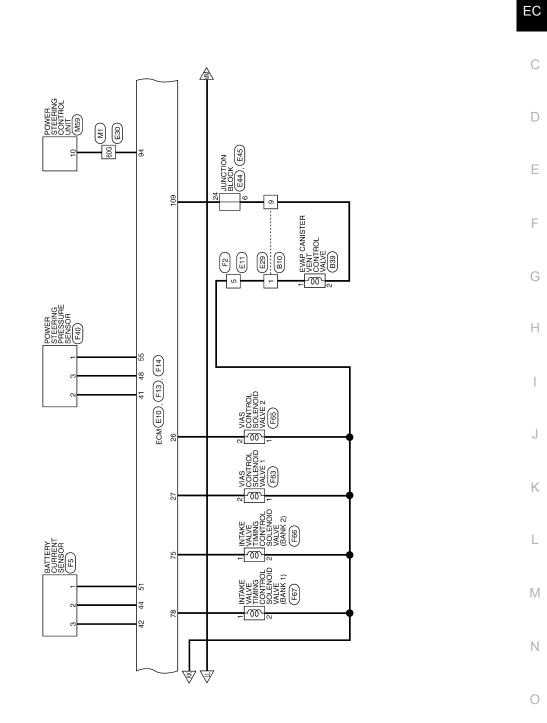
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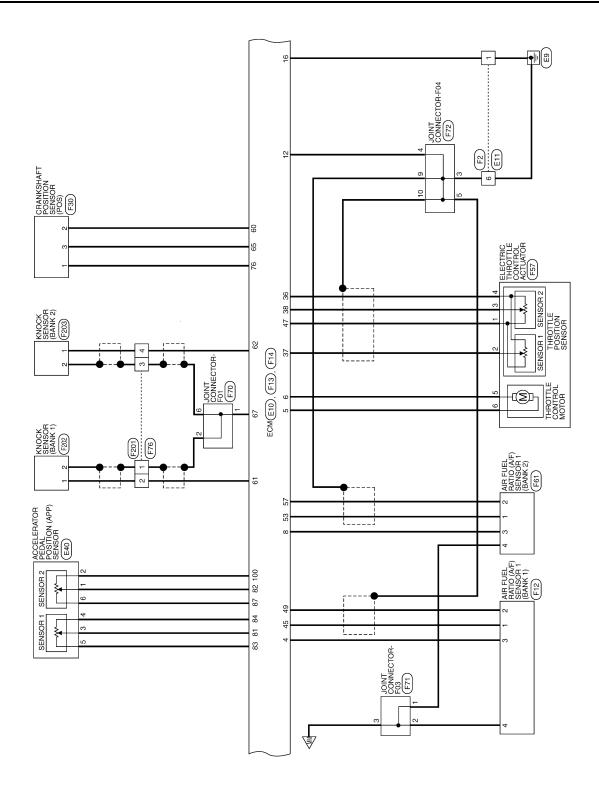
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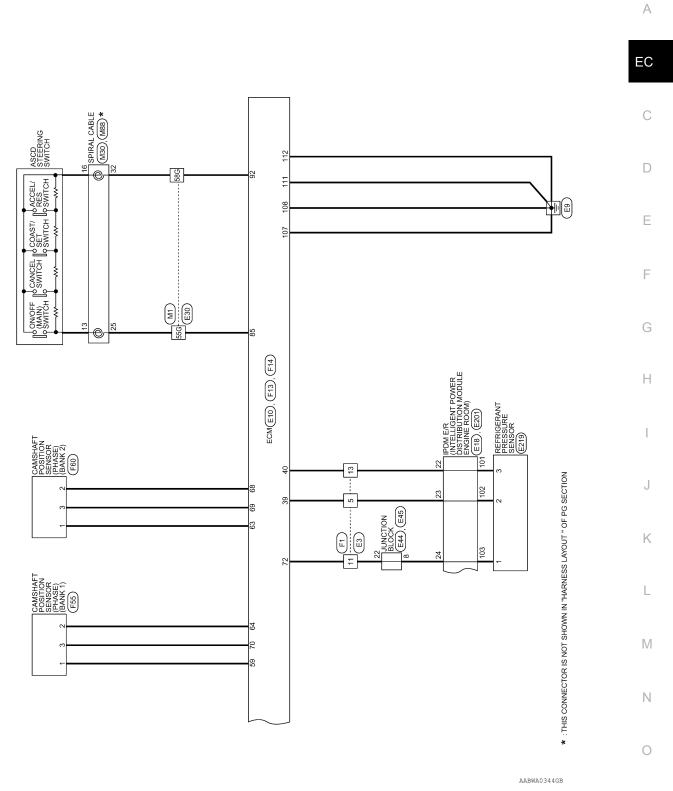
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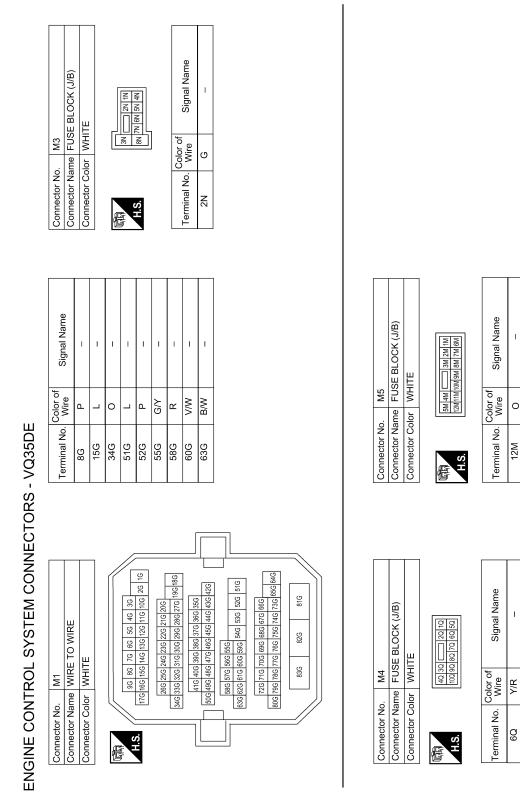


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< WIRING DIAGRAM >

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M24

Connector No.

M22

Connector No.

M6

Connector No.

H.S.

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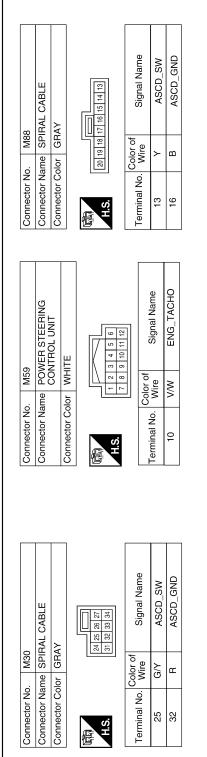
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 Connector Name COMBINATION METER Signal Name CAN-H CAN-L GND GND GND IGN Connector Color | WHITE Color of Wire 0 m ш m _ ۵. Terminal No. 23 21 22 N С 4 H.S. 厝 Connector Name DATA LINK CONNECTOR Signal Name
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 ī Т T I. I. I I Connector Color WHITE Color of Wire Ϋ́́́́ ശ ٩ ш ш _ 0 Terminal No. 4 16 4 ß 9 ω H.S. E 2J 1J 25J 24J 23J 22J 30J 29J 28J 27J 26J 21J 20J 19J 18J
 55.1
 54.1
 53.1
 52.1
 51.1
 50.1
 49.1

 63.3
 62.1
 61.1
 60.1
 59.1
 56.1
 48.1
 47.1
 87J 86J 85J 84J 92J 91J 90J 88J 88J 83J 82J 81J 80J
 37J
 36J
 35J
 34J
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 32J
 31J

 46J
 45J
 44J
 43J
 42J
 41J
 40J
 38J
 38J
 93J 70J 69J 68J 67J 66J 65J 64J 79J 78J 77J 76J 75J 74J 73J 72J 94J 9.0 8.0 7.1 6.0 5.1 4.1 3.1 17.1 16.1 15.1 14.1 13.1 12.1 11.0 96J 95J Signal Name Connector Name WIRE TO WIRE 60 JBU 97J Connector Color | WHITE Color of Wire B/V Terminal No.



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[VQ35DE]

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< WIRING DIAGRAM >

ENGINE CONTROL SYSTEM

[VQ35DE]

I No. Color of Signal Name	- -	GR –	GR –	SB –
Terminal No.	е	5	11	13

Connector No. E3	E3
Connector Name WIRE TO WIRE	WIRE TO WIRE
Connector Color WHITE	WHITE
	0 11 12 13 14

Connector Name JOINT CONNECTOR-E01

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Connector No.

Connector Color WHITE

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6 5 4	Signal Name	I	I	I
	Color of Wire	٢	Y	٢
С. Ч	Terminal No.	4	£	9

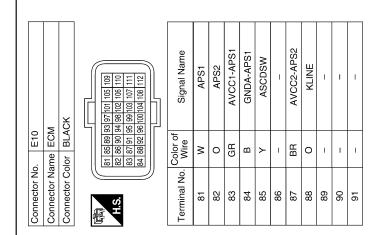
E6	Connector Name FUSE BLOCK (J/B)	WHITE	
Connector No.	Connector Name	Connector Color	

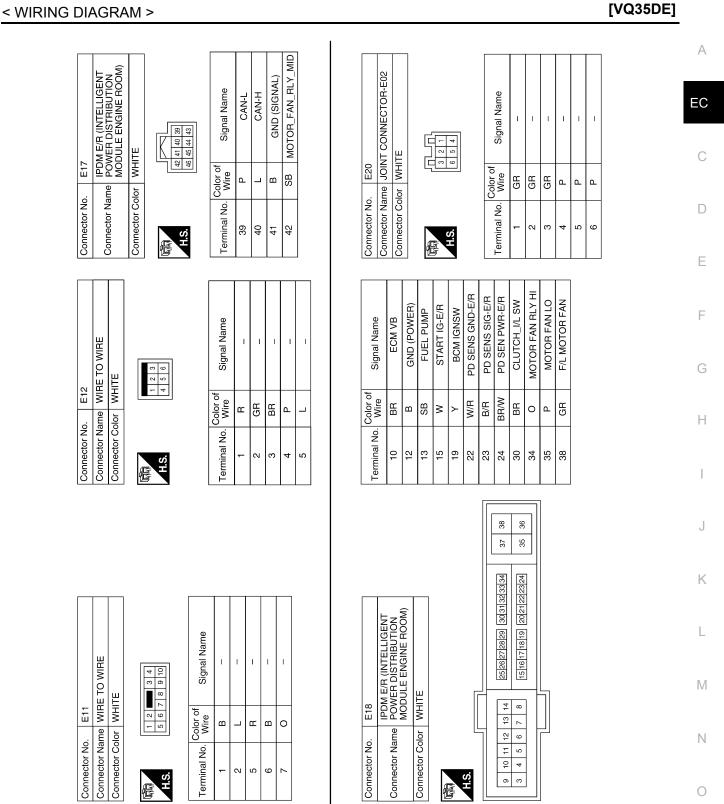
Г		_	1
	ŧΡ	В	
	2P	9P	
	ЗР	10P	
	Π	11P	
	Ш	12P	
	4P	13P	
	5Р	14P	
	6Р	15P	
	7P	16P	
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Signal Name	I	I	I	I
Color of Wire	SB	Р	Р	н
Terminal No.	1P	2P	4P	8P

AAB	ΤA	0!	53	5GB

Signal Name	GNDA-ASCDSW	IGNSW	TACHO(CABIN)	TF	I	CAN-L	CAN-H	I	GNDA-APS2	I	NEUT-H	I	GNDA-TF	VBR	BRAKE	GND	GND	CDCV	BNCSW	GND	GND
Color of Wire	BR	≻	GR	۲	I	٩	_	I	U	I	н	I	٩	>	SB	в	в	Μ	თ	в	в
Terminal No.	92	93	94	95	96	67	98	66	100	101	102	103	104	105	106	107	108	109	110	111	112





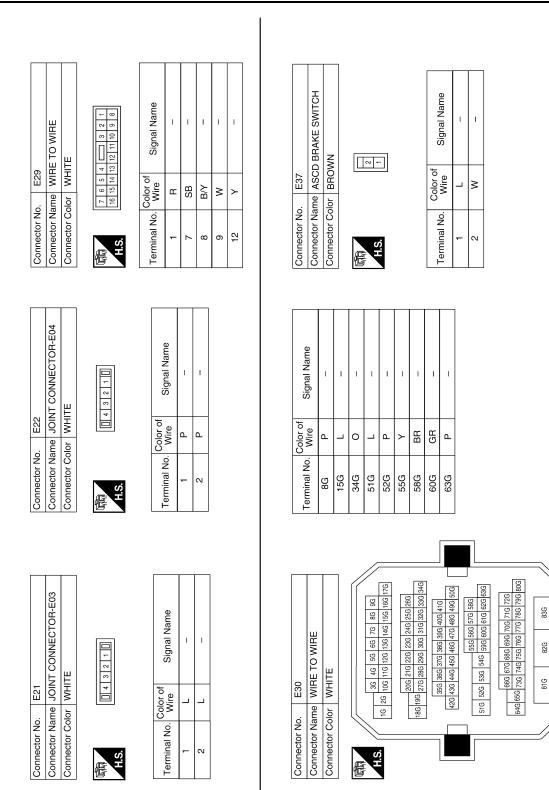
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Revision: February 2013

< WIRING DIAGRAM >

[VQ35DE]



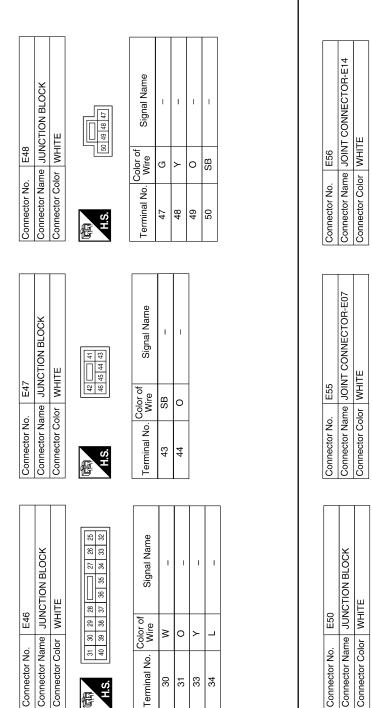
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										-									_		
E42 COOLING FAN RELAY-2 BROWN		Signal Name	I		1	ļ	1		BLOCK		14 13 19 18	Signal Name	1	-	I	I		1			
			m					E45	Connector Name JUNCTION BLOCK Connector Color WHITE		17 16 15 14 13 24 23 22 21 20 19 18	Color of Si Wire Si	G	В	0	>	SB GB	×			
Connector No. Connector Name Connector Color		ŏ-	SB	ບ –		B	ш	or No.	Connector Name Connector Color			I No. Col		_							
Connector No. Connector Name Connector Color	H.S.	Terminal No.	-	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	a a	9	7	Connector No.	Connect		品.S.H	Terminal No.	14	15	16	17	50	24			
В]											
E40 ACCELERATOR PEDAL POSITION (APP) SENSOR BLACK	4 5 6	Signal Name	APS2	GND-A2	GND-A1	AVCC1	AVCC2		TION BLOCK		9 8 7 6	Signal Name	1	I	I	I	I	I	1		
	-	Color of Wire	0	ۍ ع	s m	GR	BR	E44	ne JUNCTIC or BROWN		5 4 1 12 11 10 9	Color of Wire	0	BR	_	>	≥ (s BS	٩		
Connector No. Connector Name Connector Color	品.S.H	Terminal No.	-	∾ 0	0 4	5	9	Connector No.	Connector Name JUNCTION BLOCK Connector Color BROWN		品. H.S.	Terminal No.	-	5	ю	4	9 a	- 0	12		
						1															
Connector No. E38 Connector Name STOP LAMP SWITCH Connector Color WHITE		Signal Name	I	1 1	1				COOLING FAN RELAY-3 BROWN		F am	Signal Name	I	1	1	I	I	1			
E38 STOP L WHITE	3 4	Color of Wire	ш	- LG				E43				Color of Wire	0	≻	GR	7	<u>е</u>	_			
Connector No. Connector Name Connector Color		al No. Co						Connector No.	Connector Name Connector Color			al No. Co						-			
Connector No. Connector Nam Connector Colc	HIN.	Terminal No.	-	CN (*	0 4			Connec	Connec		H.S.	Terminal No.	-	N	3	5	1 0				

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< WIRING DIAGRAM >

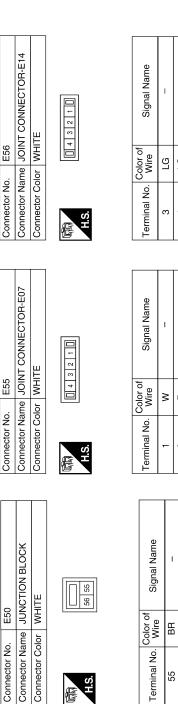


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H.S.

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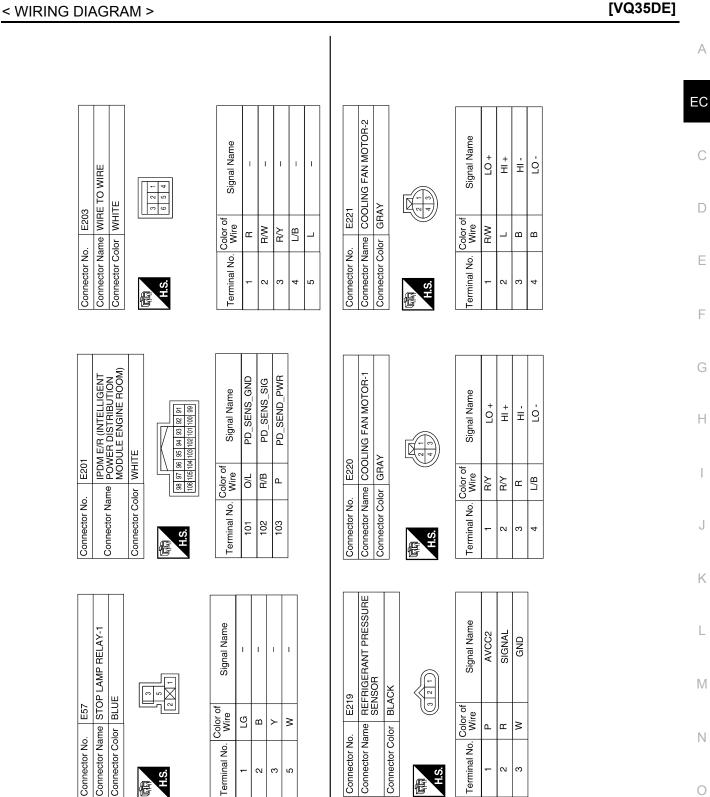
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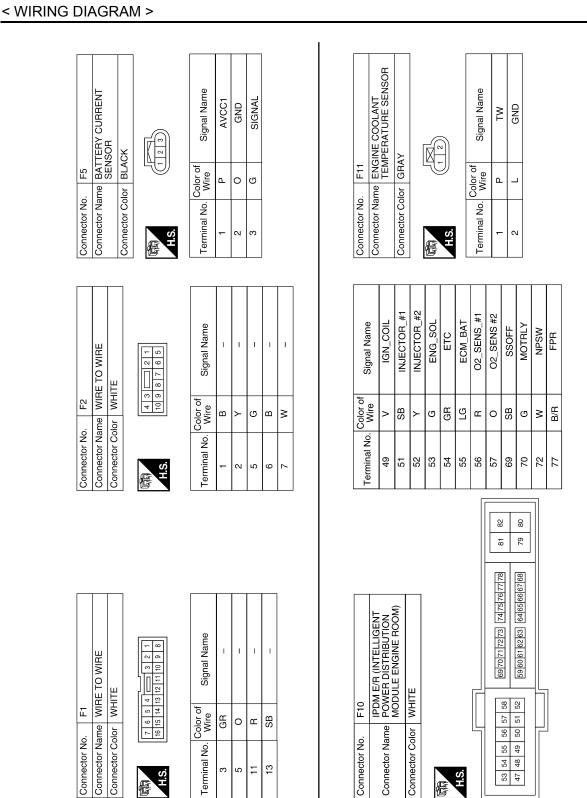
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Revision: February 2013



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Revision: February 2013

< WIRING DIAGRAM >

HEATER (-) HEATER (+)

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- N N 4

Connector Name AIR FUEL RATIO (A/F) SENSOR 1 (BANK 1)

Connector No. F12

GRAY

Connector Color

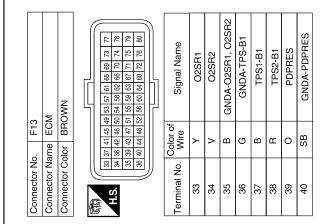
Signal Name AF (+) AF (-)

Color of Wire

Terminal No.

Signal Name	AVCC1-PHASE 1	GND-POS	KNK1	KNK2	AVCC1-PHASE 2, E-PHASE#2	AVCC1-PHASE 1, E-PHASE#1	POS	I	GNDA-KNK 1, KNK 2	GND-PHASE 2, E-PHASE#2	PHASE 2	PHASE 1	I	AVCC2-PDPRES	I	Ι	CVTC#2	AVCC2-POS	BATT	CVTC#1	I	I
Color of Wire	L	M	GR	M	0	BR	В	I	GR	>	Р	Y	I	В	Ι	I	Y	BR	ГG	L	I	-
Terminal No.	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	62	80

Signal Name	PSPRES	CURSEN	I	GNDA-CURSEN, INTPRES1	AF+1	ΤW	AVCC1-TPS-B1	GNDA-PSPRES	AF-1	TA1	AVCC1-CURSEN, INTPRES1	GNDA-TW, T01	AF+2	T01	AVCC1-PSPRES	QA1, GNDA-TA1	AF-2	QA1+
Color of Wire	SB	σ	I	0	_	٩	Ν	GR	σ	0	Ч	Γ	>	GR	ГG	≻	ГG	BR
Terminal No.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58



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[VQ35DE]

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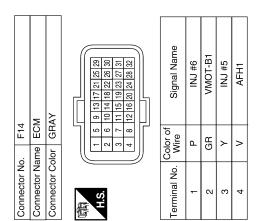
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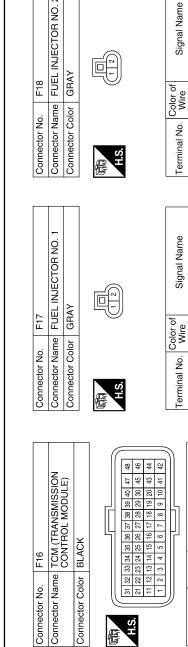
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EM	ſN	# CNI	# CNI	1H UNI
BR	ŋ	0	ß	>
28	29	30	31	32
	BR	LG BR	O LG BR	

Signal Name	MOTOR1-B1	MOTOR2-B1	I	AFH2	IGN #3	IGN #2	IGN #1	GND	02HR1	FPR	MOTRLY-B1	GND	O2HR2	IGN #6
Color of Wire	щ	BR	I	SB	٩	ß	×	в	0	B/R	н	в	თ	_
Terminal No.	5	9	7	8	6	10	11	12	13	14	15	16	17	18



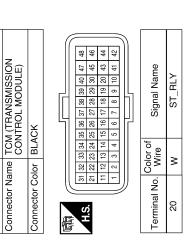


Color of Wire	Y	SB	
Terminal No.	Ŧ	2	
Signal Name	IGN	GND	

SB >

N

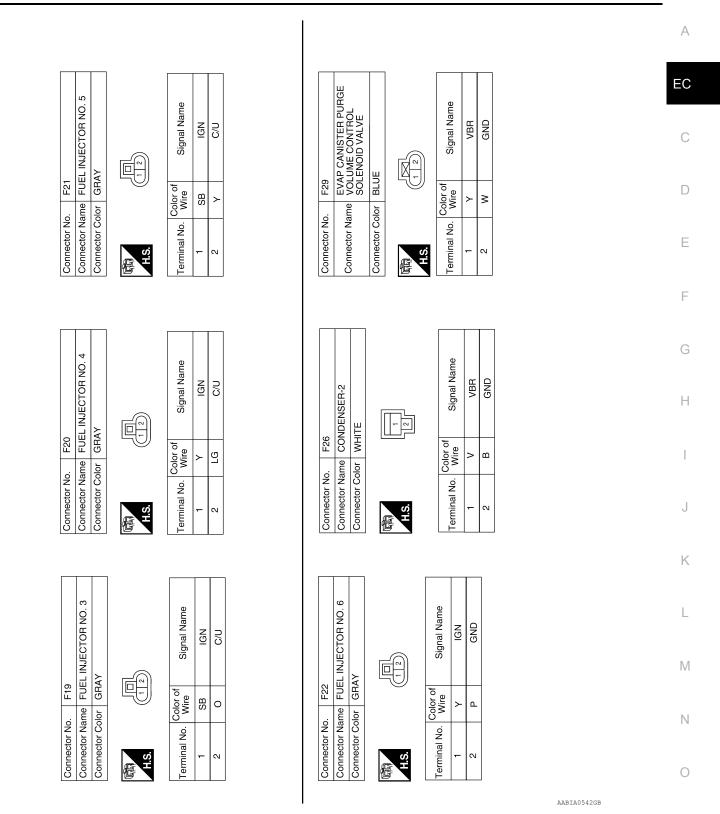
Ю C/U

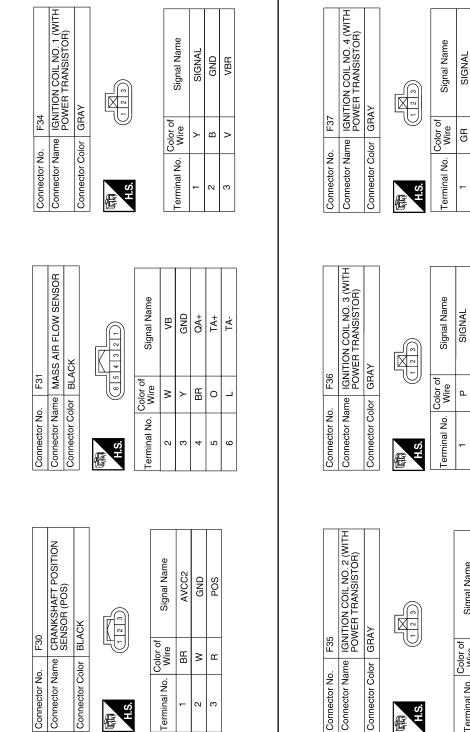




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< WIRING DIAGRAM >





Terminal No.Color of
WireSignal Name1GSIGNAL2BGND3VVBR

GND VBR

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GND

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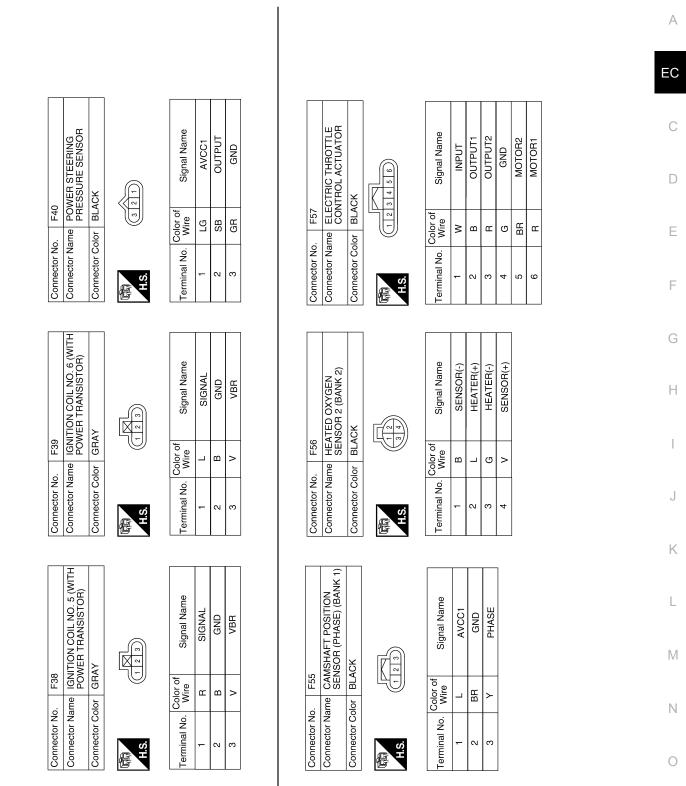
VBR

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Revision: February 2013

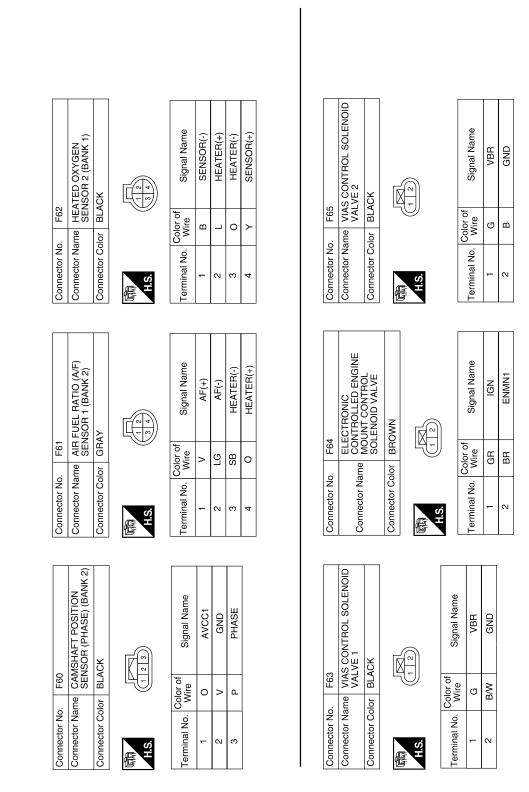
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[VQ35DE]



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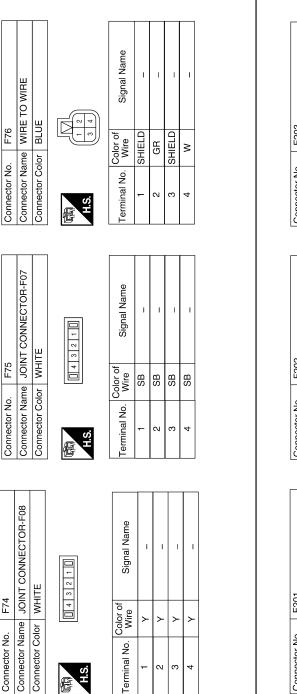
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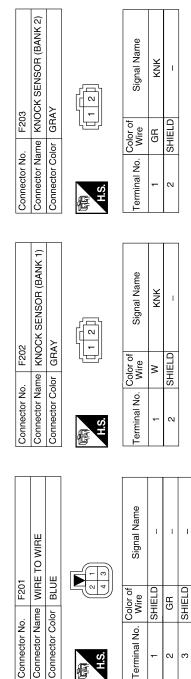
DIAGRAM				
F68 ENGINE OIL TEMPERATURE SENSOR GRAY		Signal Name TO GND	F72 JOINT CONNECTOR-F04 BLACK e e f f f f f f f f f f f f f f f f f	1
		2. Color of Wire GR	Older O	SHIELD
Connector No. Connector Name Connector Color	H.S.	Terminal No.	Connector No. Connector Name Connector Color A. Connector Color 1 Color 3 E 5 SHI	0
F67 INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 1) GREEN		Signal Name CVTC VBR	F71 JOINT CONNECTOR-F03 GREEN e e B B B B B B B B B B B B B B B B B	
		a. Color of Wire of G		
Connector No. Connector Name Connector Color	印 H.S.	Terminal No.	Connector No. Connector Name Connector Color HIS Terminal No. 2 3 4 4 6 7 6 7 6	
		[]		T T]
F66 INTAKE VALVE TIMING CONTROL SOLENOID VALVE (BANK 2) GREEN	-	Signal Name CVTC VBR	F70 JOINT CONNECTOR-F01 BLACK BLACK Signal Name C C C C C C C C C C C C C	
		Color of Vire C	Colo Colo Colo Colo Colo Colo Colo Colo	
Connector No. Connector Name Connector Color	品 H.S.	Terminal No. 1 2	Connector No. Connector Name Connector Color H.S. Terminal No. 2 3 1 4 4 4 4 1 5 5 1 8	o 1
			AAE	BIA0546GB

ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

Revision: February 2013





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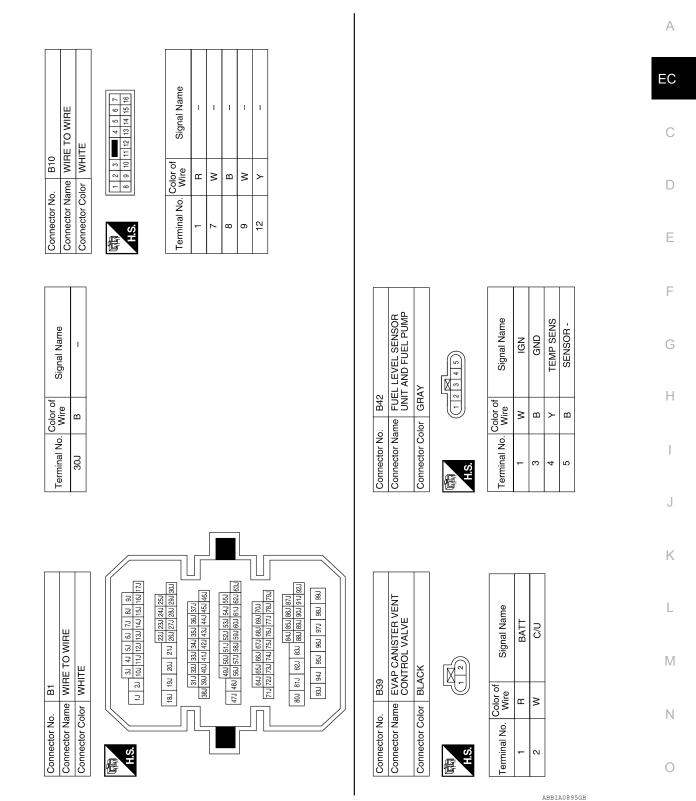
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ENGINE CONTROL SYSTEM



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< SYMPTOM DIAGNOSIS >

[VQ35DE]

SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

Symptom Table

INFOID:000000007420973

SYSTEM — BASIC ENGINE CONTROL SYSTEM

							S	MPT	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDTE/TOM IDTE	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
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-618</u>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<u>EC-700</u>
	Fuel injector circuit	1	1	2	3	2		2	2			2			<u>EC-615</u>
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<u>EC-393</u>
Air	Positive crankcase ventilation sys- tem	3	3	4	4	4	4	4	4	4		4	1		<u>EC-634</u>
	Incorrect idle speed adjustment						1	1	1	1		1			<u>EC-330</u>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<u>EC-575,</u> <u>EC-582</u>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-330
	Ignition circuit	1	1	2	2	2		2	2			2			EC-628
Power s	upply and ground circuit	2	2	3	3	3		3	3		2	3			<u>EC-437</u>
Mass ai	r flow sensor circuit	1			2										<u>EC-455</u>
Engine	coolant temperature sensor circuit						3			3					<u>EC-464</u>
Air fuel ı	ratio (A/F) sensor 1 circuit		1	2	3	2		2	2			2			<u>EC-470,</u> <u>EC-474,</u> <u>EC-478</u>
Throttle	position sensor circuit					† 	2			2					EC-467, EC-493, EC-531, EC-533, EC-591
Accelera	ator pedal position sensor circuit			3	2	1									<u>EC-520,</u> <u>EC-584,</u> <u>EC-587,</u> <u>EC-594</u>
Knock s	ensor circuit			2								3			<u>EC-496</u>
Cranksh	aft position sensor (POS) circuit	2	2												<u>EC-499</u>
Camsha	ft position sensor (PHASE) circuit	3	2												EC-503

Revision: February 2013

< SYMPTOM DIAGNOSIS >

[VQ35DE]

		SYMPTOM						Λ							
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	DLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page	A EC C
	HAR	ENGI	HESI	SPAF	LACK	HIGH	ROUG	IDLIN	SLOV	OVEF	EXCE	EXCE	BATT		E
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		_
Vehicle speed signal circuit		2	3		3						3			<u>EC-510</u>	F
Power steering pressure sensor circuit		2					3	3						EC-512	
ECM	2	2	3	3	3	3	3	3	3	3	3			<u>EC-515,</u> <u>EC-517</u>	G
Intake valve timing control solenoid valve cir- cuit		3	2		1	3	2	2	3		3			<u>EC-452</u>	Н
PNP signal circuit			3		3		3	3			3			<u>EC-523</u>	
VIAS control solenoid valve 1 circuit					1									<u>EC-564</u>	
VIAS control solenoid valve 2 circuit					1									<u>EC-566</u>	
Refrigerant pressure sensor circuit		2				3			3		4			<u>EC-635</u>	
Electrical load signal circuit							3							<u>EC-607</u>	1
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<u>HAC-4,</u> <u>HAC-107</u>	J
ABS actuator and electric unit (control unit)			4											<u>BRC-7,</u> <u>BRC-69,</u> <u>BRC-141</u>	K

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

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< SYMPTOM DIAGNOSIS >

[VQ35DE]

							S١	YMPT	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty s	symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													<u>FL-13</u>
	Fuel piping	5		5	5	5		5	5			5			<u>FL-5</u>
	Vapor lock		5												—
	Valve deposit							_							_
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5			_
Air	Air duct														EM-132
	Air cleaner														<u>EM-126</u>
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5		-	5			<u>EM-132</u>
	Electric throttle control actuator	5			5		5			5					<u>EM-133</u>
	Air leakage from intake manifold/ Collector/Gasket														<u>EM-133</u> , <u>EM-136</u>
Cranking	Battery	1	1	1		1		1	1					1	<u>PG-3, PG-</u> <u>71</u>
	Generator circuit														CHG-2
	Starter circuit	3										1			<u>STR-32</u>
	Signal plate	6													<u>EM-225</u>
	PNP signal circuit	4													<u>TM-22,</u> <u>TM-136</u>
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-197
	Cylinder head gasket	5	5	5	5	5		5	5		4	5	3		<u>121VI-197</u>
	Cylinder block														
	Piston												4		
	Piston ring	6	6	6	6	6		6	6			6			<u>EM-225</u>
	Connecting rod	5	5					0							
	Bearing														
	Crankshaft														

< SYMPTOM DIAGNOSIS >

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							S١	(MPT)	SYMPTOM										
		IA)				TION					E HIGH					A			
		XCP. H		SPOT		ELERA					RATURI	TION	NC	RGE)		EC			
		HARD/NO START/RESTART (EXCP. HA)		HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	LE	TING	_	N TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page	С			
		IO START/F	STALL	TION/SURG	KNOCK/DE	F POWER/	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	DLING VIBRATION	SLOW/NO RETURN TO IDLE	EATS/WATH	SIVE FUEL	SIVE OIL C	ky dead (L		D			
		HARD/N	ENGINE STALL	HESITA	SPARK	LACK O	HIGH ID	ROUGH	IDLING	SLOW/N	OVERH	EXCES	EXCES	BATTEF		Ε			
Warranty s	symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA					
Valve	Timing chain														<u>EM-174</u>	F			
mecha- nism	Camshaft								5						<u>EM-184</u>				
	Intake valve timing control	5	5	5	5	5		5				5			<u>EM-174</u>	G			
	Intake valve													3		EM-197			
	Exhaust valve															5		<u>LIM-137</u>	
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			<u>EM-140,</u> <u>EX-12</u>	Н			
	Three way catalyst																		
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<u>LU-25, LU-</u> <u>27, LU-29,</u> <u>LU-32</u>	I			
	Oil level (Low)/Filthy oil														<u>LU-25</u>	J			
Cooling	Radiator/Hose/Radiator filler cap														<u>CO-39</u>				
	Thermostat									5	1				<u>CO-48</u>	K			
	Water pump										-				<u>CO-43</u>	r.			
	Water gallery	5	5	5	5	5		5	5		4	5			<u>CO-50</u>				
	Cooling fan										1				<u>CO-41</u>	L			
	Coolant level (Low)/Contaminat- ed coolant									5					<u>CO-35</u>				
NATS (Nis	san Anti-theft System)	1	1												<u>SEC-20,</u> <u>SEC-234</u>	Μ			

1 - 6: The numbers refer to the order of inspection.

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NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

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 P or N and engine speed is over 2,000 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,000 rpm, then fuel cut will be cancelled. **NOTE:**

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, <u>EC-345.</u> "System Description".

PRECAUTION PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

When performing the procedure after removing cowl top cover, cover

the lower end of windshield with urethane, etc to prevent damage to



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Precautions For Xenon Headlamp Service

WARNING:

windshield.

Comply with the following warnings to prevent any serious accident.

- Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector.

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< PRECAUTION >

- (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.).

On Board Diagnostic (OBD) System of Engine and CVT

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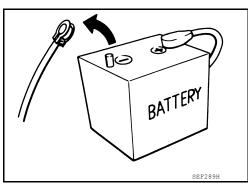
The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- 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 light up.
- Always to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Always 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 <u>PG-57</u>, "<u>Description</u>" (COUPE models) or <u>PG-129</u>, "<u>Description</u>" (SEDAN models).
- Always to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Always to erase the unnecessary malfunction information (repairs completed) from the ECM 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 running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.



• Never disassemble ECM (2).

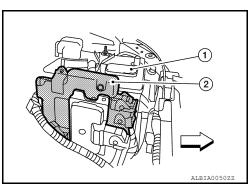
1 : Battery

 \triangleleft : Vehicle front

• If a battery cable is disconnected, the memory will return to the ECM value.

The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. 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



< PRECAUTION >

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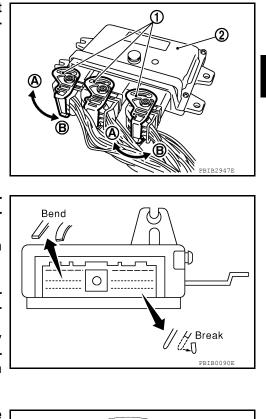
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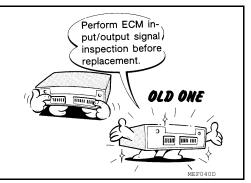
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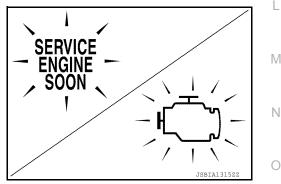
- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.
 - 2 : ECM
 - A : Loosen
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).

Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.

- Securely connect ECM harness connectors.
 A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- · Keep engine control system parts and harness dry.
- Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to <u>EC-642</u>, "Reference Value".
- 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 leak 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.





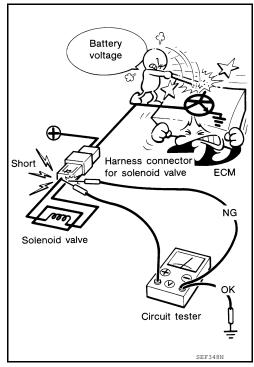


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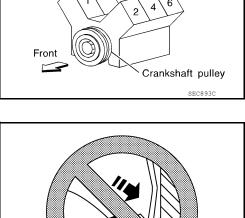
the figure.

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· When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



Cylinder number and Bank layout Bank 1 Bank 2 6 4 Front Crankshaft pulley SEC893C



- Never depress accelerator pedal when starting.
- · Immediately after starting, never rev up engine unnecessarily.

• B1 indicates the bank 1, B2 indicates the bank 2 as shown in

Never operate fuel pump when there is no fuel in lines.

• Tighten fuel hose clamps to the specified torque.

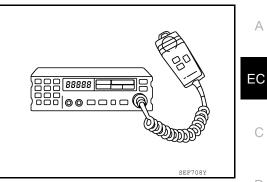
· Never rev up engine just prior to shutdown.

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< PRECAUTION >

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- 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 con-trol 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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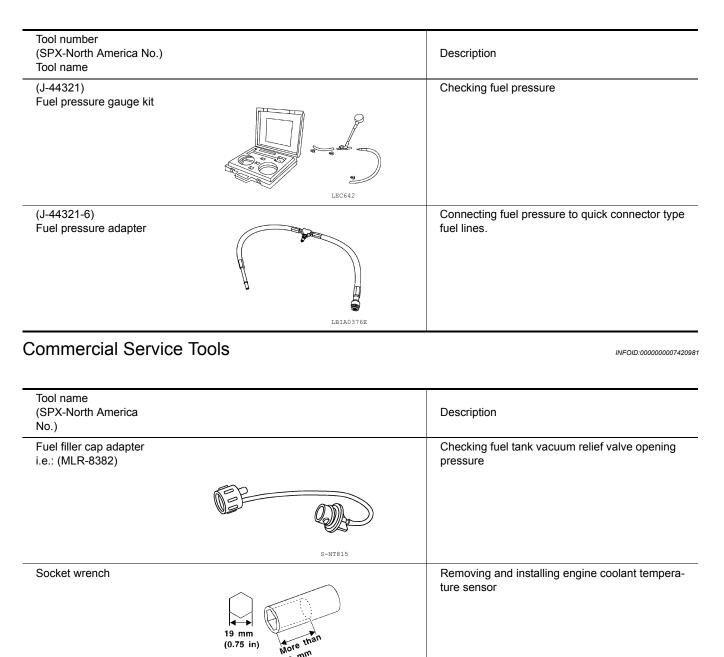
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PREPARATION

Special Service Tools

INFOID:000000007420980



(0.75 in)

32 mm (1.26 in)

S-NT705

PREPARATION

< PREPARATION >

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Tool name (SPX-North America No.)		Description	A
Oxygen sensor thread cleaner i.e.: (J-43897-18)	a b Mating	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti- seize lubricant shown below.	EC
(J-43897-12)	surface shave cylinder	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	С
Anti-seize lubricant i.e.: (Permatex TM 133AR or equivalent		Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.	D
meeting MIL specifica- tion MIL-A-907)			E
	S-NT779		F

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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 two or three times to release all fuel pressure.
- 5. Turn ignition switch OFF.

Without CONSULT

- 1. Remove fuel pump fuse located in IPDM E/R. Refer to <u>PG-64, "Fuse, Connector and Terminal Arrange-</u> ment" or <u>PG-136, "Fuse, Connector and Terminal Arrangement"</u>.
- 2. Start engine.
- 3. After engine stalls, crank it two or three times to release all fuel pressure.
- 4. Turn ignition switch OFF.
- 5. Reinstall fuel pump fuse after servicing fuel system.

FUEL PRESSURE CHECK

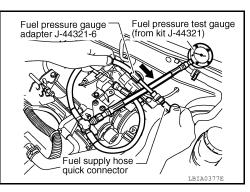
CAUTION:

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger. NOTE:

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because L32 models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains 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. Refer to EM-152, "Removal and Installation".
- 3. Install Fuel Pressure Adapter [SST (J-44321-6)] and Fuel Pressure Gauge [SST (J-44321)] as shown in figure.
 - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
 - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
- 4. Turn ignition switch ON (reactivate fuel pump) and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- 6. Read the indication of fuel pressure gauge.
 - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

At idling : Approximately 350 kPa (3.5 bar, 3.57 kg/cm², 51 psi)

- 7. If result is unsatisfactory, go to next step.
- 8. Check the following.
 - · Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for clogging
- 9. If OK, replace fuel pressure regulator.



FUEL PRESSURE

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If NG, repair or replace.

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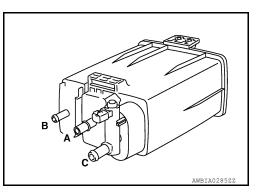
EVAPORATIVE EMISSION SYSTEM

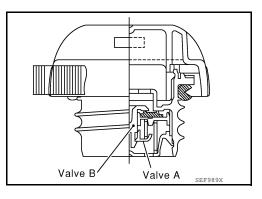
< PERIODIC MAINTENANCE >

EVAPORATIVE EMISSION SYSTEM

Inspection

- 1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
- 2. Check EVAP canister as follows:
- a. Block port (B).
- b. Blow air into port (A) and check that it flows freely out of port (C).
- c. Release blocked port (B).
- d. Apply vacuum pressure to port (B) and check that vacuum pressure exists at the ports (A) and (C).
- e. Block port (A) and (B).
- f. Apply pressure to port (C) and check that there is no leakage.
- 3. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.
- a. Wipe clean valve housing.

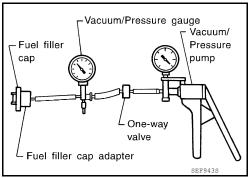




b. Check valve opening pressure and vacuum.

Pressure: 15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 -0.204 kg/cm², 2.22 - 2.90 psi) Vacuum: -6.0 to -3.3 kPa (-0.060 to -0.033 bar, -0.061 to -0.034 kg/cm², -0.87 to -0.48 psi)

c. If out of specification, replace fuel filler cap as an assembly. Refer to <u>FL-10, "Exploded View"</u>.



SERVICE DATA AND SPECIFICATIONS (SDS) < SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

Idle Speed

Idle Speed	INFCID:00000007420984
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 	
gnition Timing	INFCID:000000007420985
Condition	Specification
No load* (in P or N position)	18 ± 2°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	

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