

SECTION CHG

CHARGING SYSTEM

CONTENTS

BASIC INSPECTION	3	Diagnosis Procedure	17
DIAGNOSIS AND REPAIR WORK FLOW	3	S TERMINAL CIRCUIT	18
Work Flow(With EXP-800 NI or GR8-1200 NI)	3	Description	18
Work Flow(Without EXP-800 NI or GR8-1200 NI).....	7	Diagnosis Procedure	18
SYSTEM DESCRIPTION	10	CHARGING SYSTEM	19
CHARGING SYSTEM	10	Wiring Diagram - CHARGING SYSTEM -	19
System Diagram	10	SYMPTOM DIAGNOSIS	24
System Description	10	CHARGING SYSTEM	24
VQ37VHR	10	Symptom Table	24
VQ37VHR : Component Parts Location	10	PRECAUTION	25
VK50VE	11	PRECAUTIONS	25
VK50VE : Component Parts Location	11	Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	25
Component Description	11	Precaution for Procedure without Cowl Top Cover.....	25
POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM	12	Precautions For Xenon Headlamp Service	25
System Diagram	12	Precaution for Power Generation Voltage Variable Control System	26
System Description	12	Precautions for Removing Battery Terminal	26
VQ37VHR	12	PREPARATION	27
VQ37VHR : Component Parts Location	12	PREPARATION	27
VK50VE	12	Special Service Tools	27
VK50VE : Component Parts Location	13	Commercial Service Tools	27
Component Description	13	PERIODIC MAINTENANCE	28
DTC/CIRCUIT DIAGNOSIS	14	CHARGING SYSTEM PRELIMINARY INSPECTION	28
B TERMINAL CIRCUIT	14	Inspection Procedure	28
Description	14	POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION	29
Diagnosis Procedure	14	Inspection Procedure	29
L TERMINAL CIRCUIT (OPEN)	15		
Description	15		
Diagnosis Procedure	15		
L TERMINAL CIRCUIT (SHORT)	17		
Description	17		

REMOVAL AND INSTALLATION	31	VK50VE : Exploded View	34
ALTERNATOR	31	VK50VE : Removal and Installation	36
VQ37VHR	31	VK50VE : Inspection	37
VQ37VHR : Exploded View	31	SERVICE DATA AND SPECIFICATIONS	
VQ37VHR : Removal and Installation (2WD)	32	(SDS)	38
VQ37VHR : Removal and Installation (AWD)	33	SERVICE DATA AND SPECIFICATIONS	
VQ37VHR : Inspection	34	(SDS)	38
VK50VE	34	Alternator	38

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow(With EXP-800 NI or GR8-1200 NI)

INFOID:0000000010576817

CHARGING SYSTEM DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

To test the charging system, use the following special service tools:

- EXP-800 NI Battery and electrical diagnostic analyzer
- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the applicable Instruction Manual for proper charging system diagnosis procedures.

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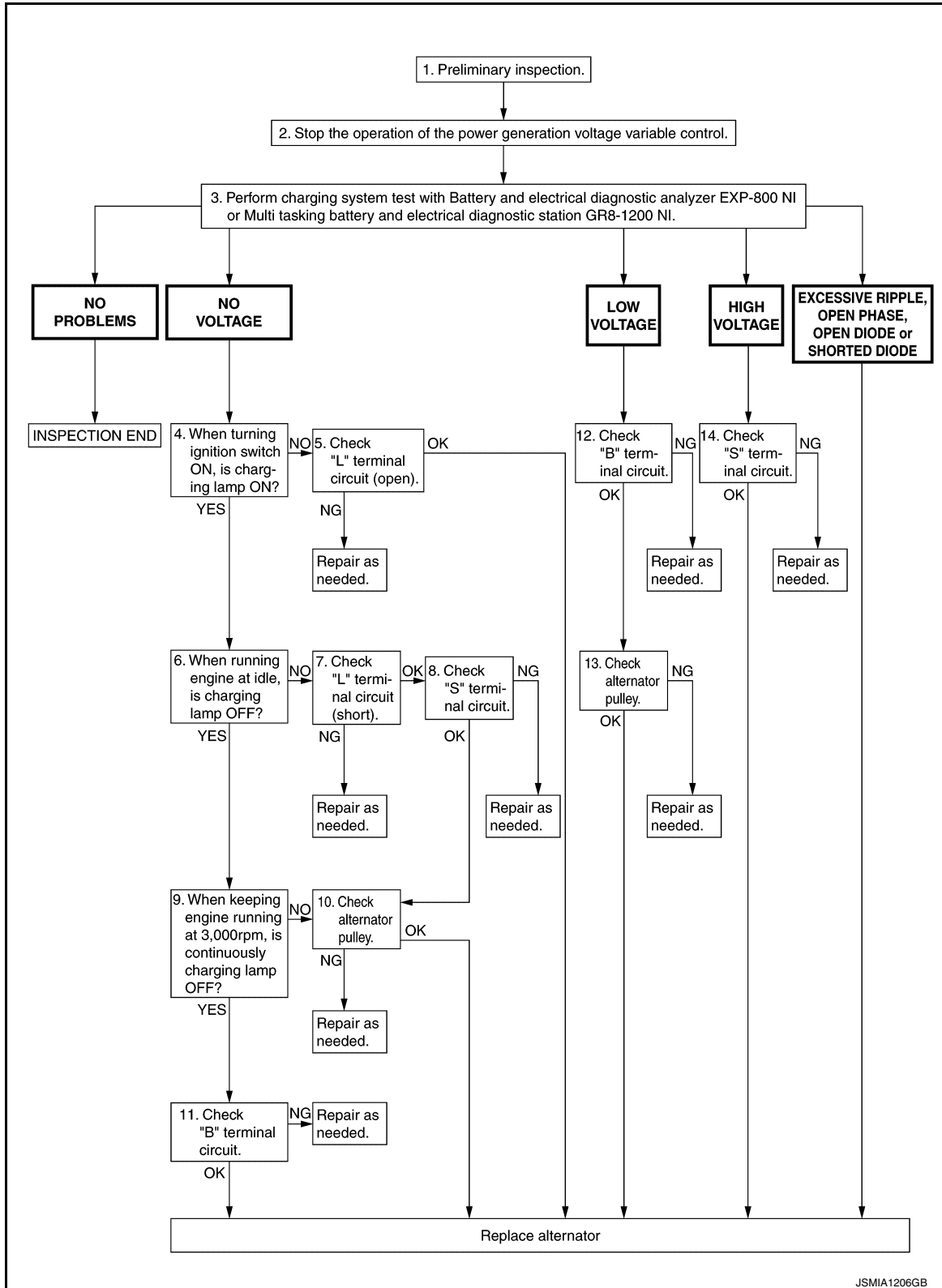
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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

To ensure a complete and thorough diagnosis, the battery, starter and alternator test segments must be done as a set from start to finish.

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-29, "Inspection Procedure"](#).

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

>> GO TO 2.

2. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Stop the operation of the power generation voltage variable control in either of the following procedures.

- After selecting "ENGINE" of "SELECT SYSTEM" using CONSULT, set the DUTY value of "ALTERNATOR DUTY" to 0 % by selecting "ALTERNATOR DUTY" of "Active Test". Continue "Active Test" until the end of inspection. (When the DUTY value is 0 or 100 %, the normal power generation is performed according to the characteristic of the IC voltage regulator of the alternator.)
- Turn the ignition switch OFF, and disconnect the battery current sensor connector. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnosis results history of the engine using CONSULT.]

>> GO TO 3.

3. DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

Perform the charging system test using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI. Refer to the applicable Instruction Manual for proper testing procedures.

Test result

NO PROBLEMS>>Charging system is normal and will also show "DIODE RIPPLE" test result.

NO VOLTAGE>>GO TO 4.

LOW VOLTAGE>>GO TO 12.

HIGH VOLTAGE>>GO TO 14.

EXCESSIVE RIPPLE, OPEN PHASE, OPEN DIODE or SHORTED DIODE>>Replace the alternator. Perform "DIODE RIPPLE" test again using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI to confirm repair.

4. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 6.

NO >> GO TO 5.

5. "L" TERMINAL CIRCUIT (OPEN) INSPECTION

Check "L" terminal circuit (open). Refer to [CHG-15, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).

NO >> Repair as needed.

6. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 9.

NO >> GO TO 7.

7. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to [CHG-17, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-18, "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

- YES >> GO TO 10.
NO >> Repair as needed.

9.INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 3,000 RPM)

Increase and maintain the engine speed at 3,000 rpm.

Does the charge warning lamp remain off?

- YES >> GO TO 11.
NO >> GO TO 10.

10.INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-34, "VQ37VHR : Inspection"](#) (For VQ37VHR) or [CHG-37, "VK50VE : Inspection"](#) (For VK50VE).

Is alternator pulley normal?

- YES >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).
NO >> Repair as needed.

11."B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-14, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

- YES >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).
NO >> Repair as needed.

12."B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-14, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

- YES >> GO TO 13.
NO >> Repair as needed.

13.INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-34, "VQ37VHR : Inspection"](#) (For VQ37VHR) or [CHG-37, "VK50VE : Inspection"](#) (For VK50VE).

Is alternator pulley normal?

- YES >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).
NO >> Repair as needed.

14."S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-18, "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

- YES >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).
NO >> Repair as needed.

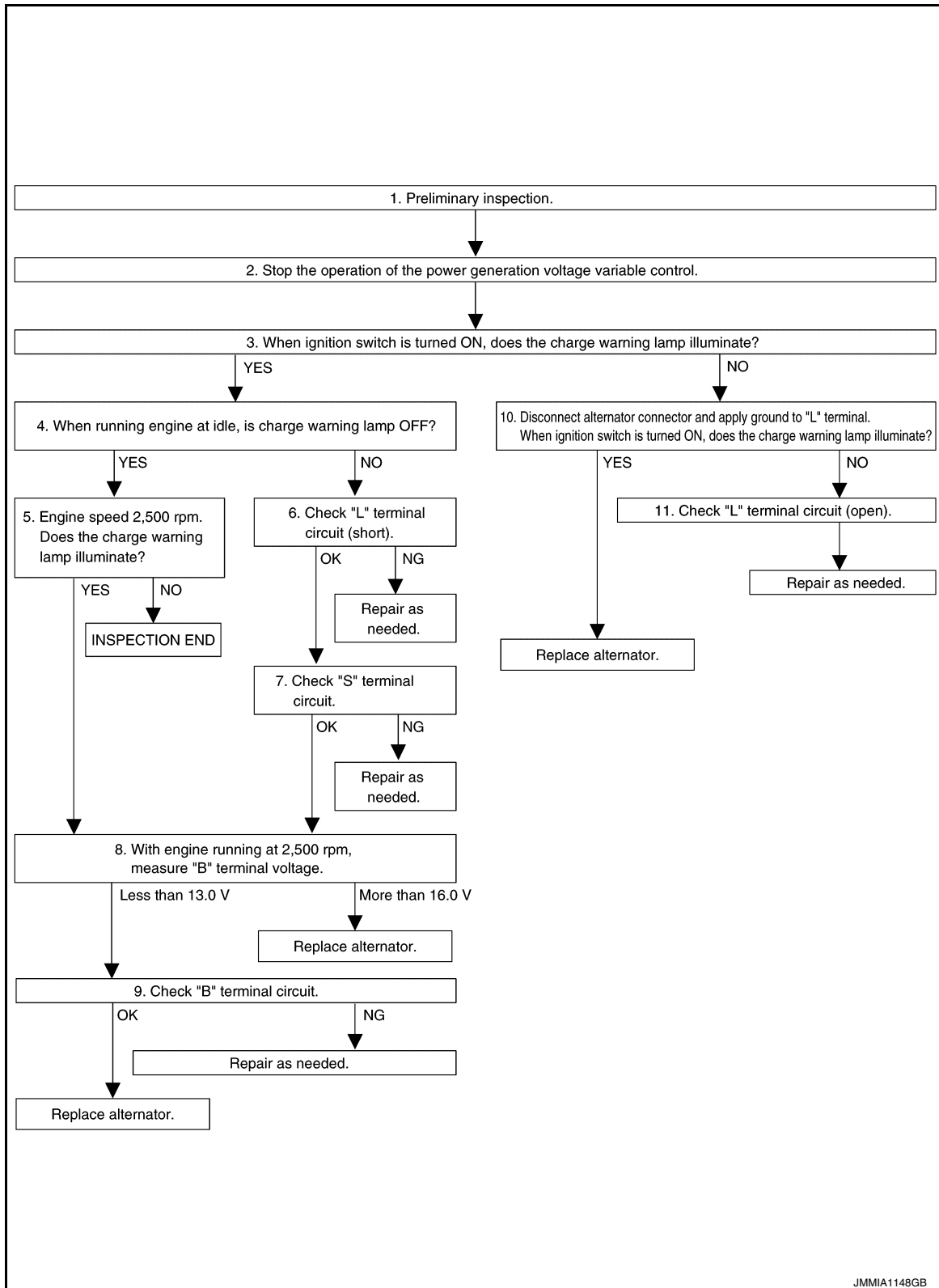
DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

Work Flow(Without EXP-800 NI or GR8-1200 NI)

INFOID:0000000010576818

OVERALL SEQUENCE



DETAILED FLOW

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-29, "Inspection Procedure"](#).

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

>> GO TO 2.

2. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Stop the operation of the power generation voltage variable control in either of the following procedures.

- After selecting "ENGINE" of "SELECT SYSTEM" using CONSULT, set the DUTY value of "ALTERNATOR DUTY" to 0 % by selecting "ALTERNATOR DUTY" of "Active Test". Continue "Active Test" until the end of inspection. (When the DUTY value is 0 or 100 %, the normal power generation is performed according to the characteristic of the IC voltage regulator of the alternator.)
- Turn the ignition switch OFF, and disconnect the battery current sensor connector. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnosis results history of the engine using CONSULT.]

>> GO TO 3.

3. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS TURNED ON)

When ignition switch is turned ON

Does the charge warning lamp illuminate?

YES >> GO TO 4.

NO >> GO TO 10.

4. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 5.

NO >> GO TO 6.

5. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp illuminate?

YES >> GO TO 8.

NO >> INSPECTION END

6. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to [CHG-17, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair as needed.

7. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-18, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. MEASURE "B" TERMINAL VOLTAGE

Start engine. With engine running at 2,500 rpm, measure "B" terminal voltage.

What voltage does the measurement result show?

Less than 13.0 V >> GO TO 9.

More than 16.0 V >> Replace alternator. Refer to [CHG-32, "VQ37VHR : Removal and Installation \(2WD\)"](#) (VQ37VHR[2WD]), [CHG-33, "VQ37VHR : Removal and Installation \(AWD\)"](#) (VQ37VHR[AWD]) or [CHG-36, "VK50VE : Removal and Installation"](#) (VK50VE).

9. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-14, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace alternator.

NO >> Repair as needed.

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

10.INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

1. Disconnect alternator connector and apply ground to "L" terminal.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> Replace alternator.

NO >> GO TO 11.

11.CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (open). Refer to [CHG-15. "Diagnosis Procedure"](#).

>> Repair as needed.

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CHARGING SYSTEM

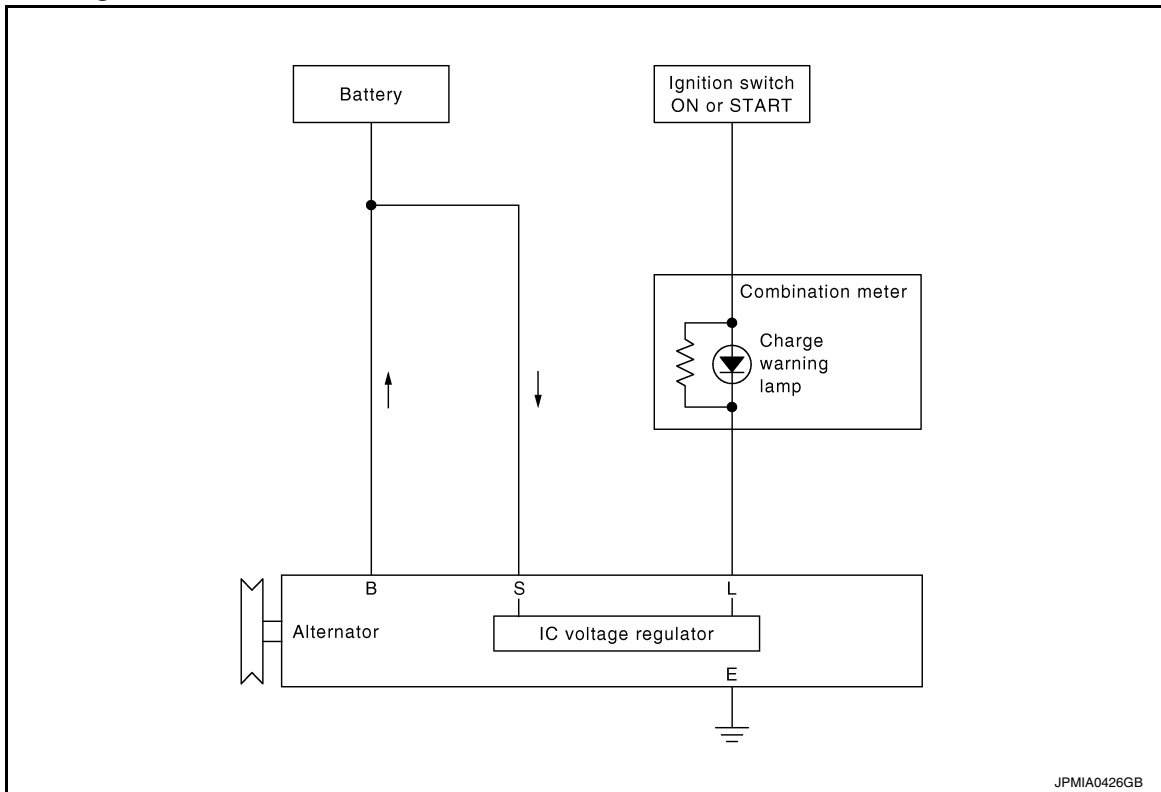
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SYSTEM DESCRIPTION

CHARGING SYSTEM

System Diagram

INFOID:0000000010576819



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System Description

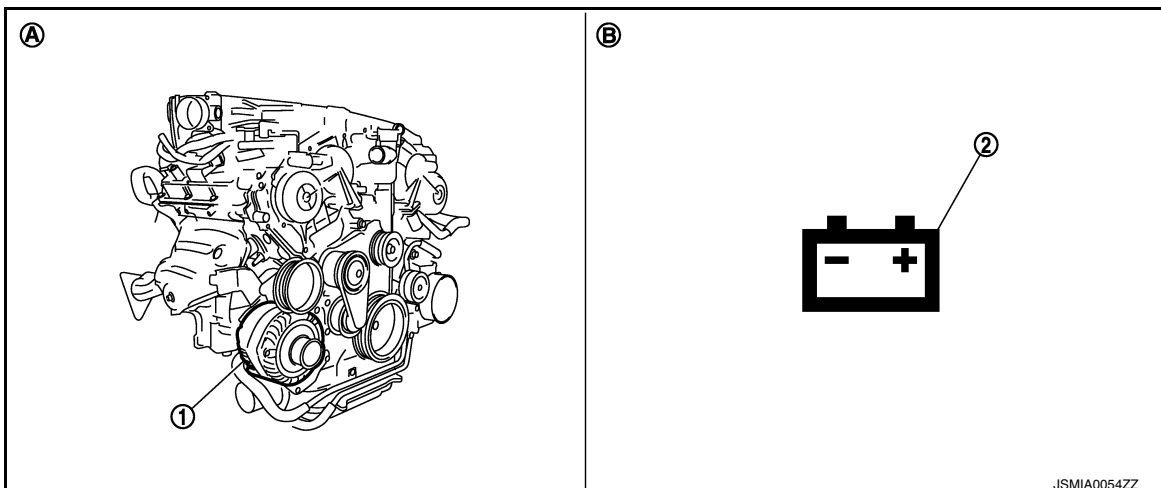
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The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC voltage regulator.

VQ37VHR

VQ37VHR : Component Parts Location

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- | | |
|---------------------------------|------------------------|
| 1. Alternator | 2. Charge warning lamp |
| A. Cylinder block (bank 1) side | B. Combination meter |

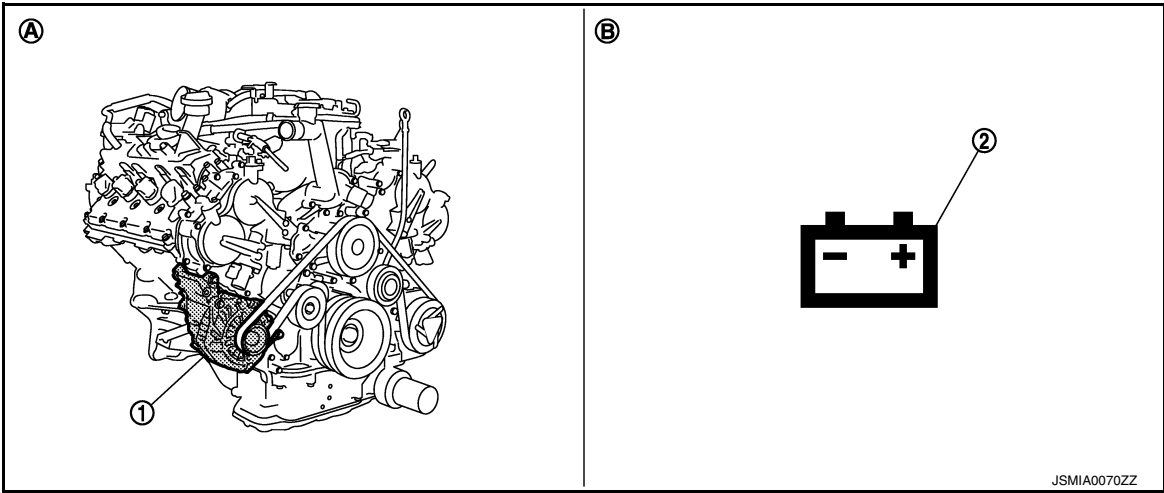
CHARGING SYSTEM

< SYSTEM DESCRIPTION >

VK50VE

VK50VE : Component Parts Location

INFOID:000000010576822



1. Alternator
2. Charge warning lamp
- A. Cylinder block (bank 1) side
- B. Combination meter

Component Description

INFOID:000000010576823

Component part	Description
Alternator	The alternator provides DC voltage to operate the vehicle electrical system and to keep the battery charged.
Combination meter (Charge warning lamp)	The IC voltage regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while alternator is operating: - Excessive voltage is produced. - No voltage is produced.

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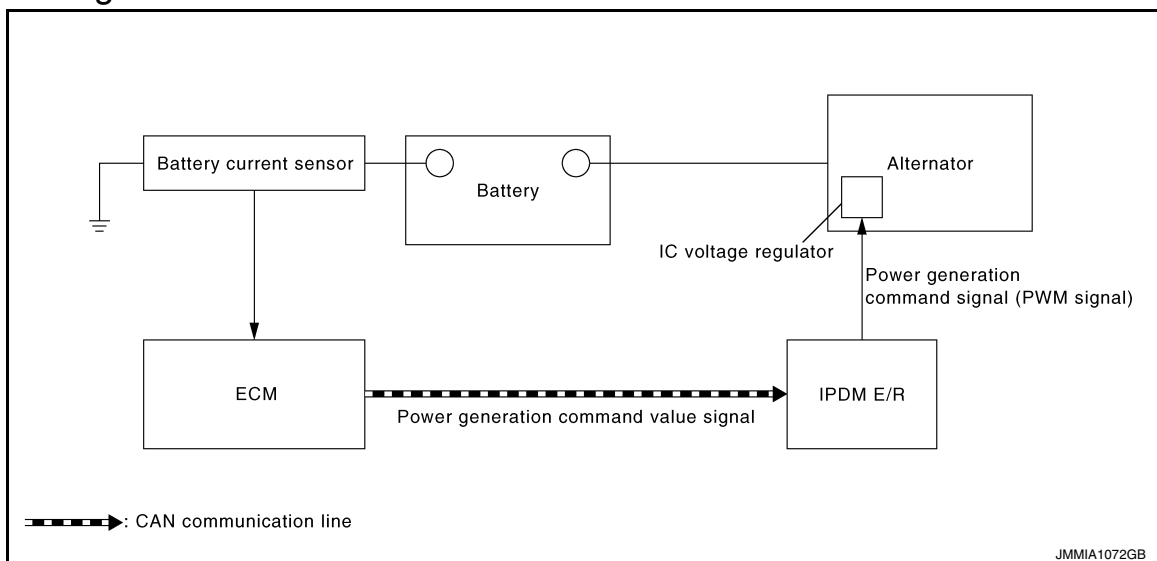
POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

System Diagram

INFOID:000000010576824



System Description

INFOID:000000010576825

By performing the power generation voltage variable control, the engine load due to the power generation of the alternator is reduced and fuel consumption is decreased.

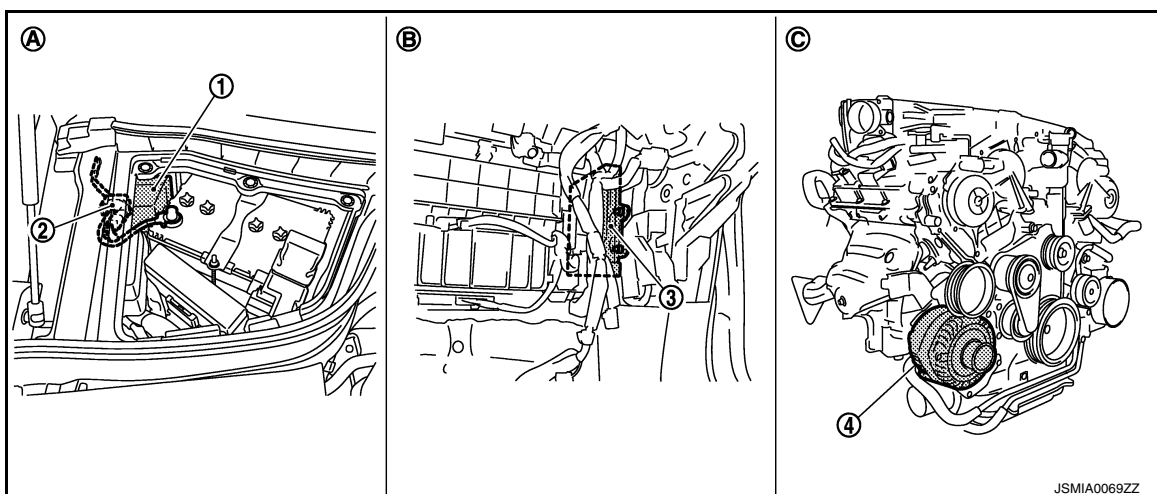
NOTE:

When any malfunction is detected in the power generation voltage variable control system, the power generation is performed according to the characteristic of the IC voltage regulator of the alternator.

VQ37VHR

VQ37VHR : Component Parts Location

INFOID:000000010576826



1. IPDM E/R
4. Alternator

2. Battery current sensor

3. ECM

A. Engine room dash panel RH

B. Behind glove box

C. Cylinder block (bank 1) side

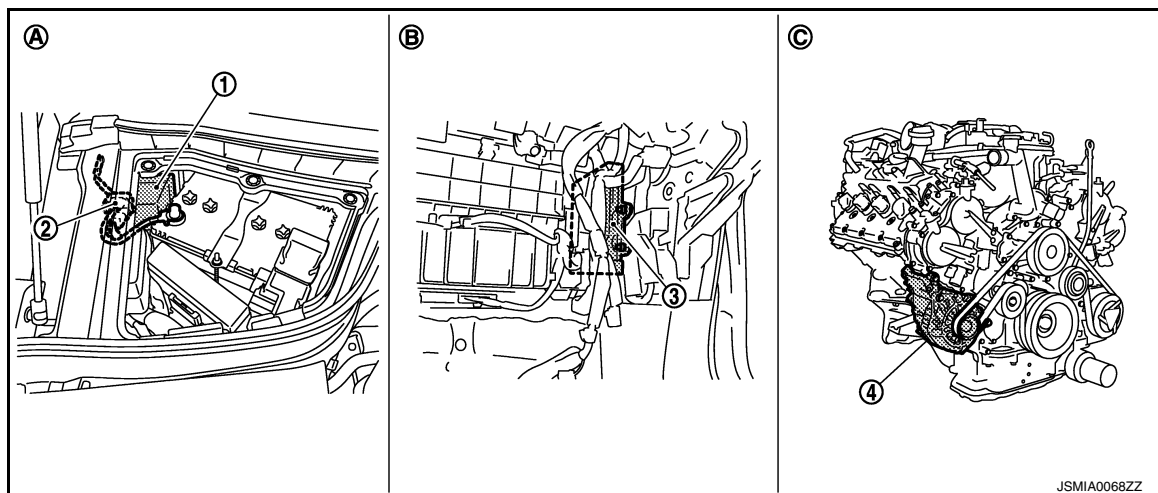
VK50VE

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

VK50VE : Component Parts Location

INFOID:0000000010576827



1. IPDM E/R

2. Battery current sensor

3. ECM

4. Alternator

A. Engine room dash panel RH

B. Behind glove box

C. Cylinder block (bank 1) side

Component Description

INFOID:0000000010576828

Component part	Description
Battery current sensor	Battery current sensor is installed to the battery cable at the negative terminal, and it detects the charging/discharging current of the battery and sends the voltage signal to ECM according to the current value.
ECM	Battery current sensor detects the charging/discharging current of the battery. ECM judges the battery condition based on this signal. ECM judges whether to perform the power generation voltage variable control according to the battery condition. When performing the power generation voltage variable control, ECM calculates the target power generation voltage according to the battery condition and sends the calculated value as the power generation command value to IPDM E/R.
IPDM E/R	IPDM E/R converts the received power generation command value into the power generation command signal (PWM signal) and sends it to the IC voltage regulator.
Alternator (IC voltage regulator)	IC voltage regulator controls the power generation voltage by the target power generation voltage based on the received power generation command signal. When there is no power generation command signal, the alternator performs the normal power generation according to the characteristic of the IC voltage regulator.

CHG

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000010576829

"B" terminal circuit supplies power to charge the battery and to operate the vehicle's electrical system.

Diagnosis Procedure

INFOID:0000000010576830

1.CHECK "B" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check that "B" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "B" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2.CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

(+) Alternator		(-)	Voltage
Connector	Terminal		
E203	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check harness for open between alternator and fusible link.

3.CHECK "B" TERMINAL CONNECTION (VOLTAGE DROP TEST)

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and alternator "B" terminal.

(+) Battery positive terminal	(-) Alternator		Voltage (V) (Approx.)
	Connector	Terminal	
	E203	1	
Battery positive terminal	E203	1	Less than 0.2

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to [CHG-3, "Work Flow\(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-7, "Work Flow\(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> Check harness between battery and alternator for poor continuity.

L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:0000000010576831

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000010576832

1.CHECK "L" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check that "L" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "L" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2.CHECK "L" TERMINAL CIRCUIT (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator harness connector terminal.
3. Check condition of the charge warning lamp with the ignition switch in the ON position.

(+)		(-)	Condition	Charge warning lamp
Alternator				
Connector	Terminal			
F36	2	Ground	Ignition switch ON	Illuminte

Does it illuminate?

YES >> "L" terminal circuit is normal. Refer to [CHG-3. "Work Flow\(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-7. "Work Flow\(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> GO TO 3.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the combination meter connector.
3. Check continuity between alternator harness connector and combination meter harness connector.

Alternator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F36	2	M53	6	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the harness or connector.

4.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check continuity between combination meter harness connector and fuse block (J/B).

Combination meter		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M53	21	M3	12C	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the harness or connector.

L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

5. CHECK POWER SUPPLY CIRCUIT

1. Connect the battery cable to the negative terminal.
2. Check voltage between combination meter harness connector and ground.

(+)		(-)	Condition	Voltage
Combination meter				
Connector	Terminal			
M53	21	Ground	Ignition switch ON	Battery voltage

Is the inspection result normal?

- YES >> Replace combination meter.
- NO >> Inspect the power supply circuit. Refer to [PG-50. "Wiring Diagram - IGNITION POWER SUPPLY - "](#)

L TERMINAL CIRCUIT (SHORT)

< DTC/CIRCUIT DIAGNOSIS >

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:0000000010576833

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000010576834

1.CHECK "L" TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-3. "Work Flow\(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-7. "Work Flow\(Without EXP-800 NI or GR8-1200 NI\)"](#).

2.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

1. Turn the ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect combination meter connector.
4. Check continuity between combination meter harness connector and ground.

Combination meter		Ground	Continuity
Connector	Terminal		
M53	6		Not existed

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair the harness or connector.

CHG

S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

S TERMINAL CIRCUIT

Description

INFOID:0000000010576835

The output voltage of the alternator is controlled by the IC voltage regulator at the "S" terminal detecting the input voltage.

The "S" terminal circuit detects the battery voltage to adjust the alternator output voltage with the IC voltage regulator.

Diagnosis Procedure

INFOID:0000000010576836

1. CHECK "S" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "S" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "S" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK "S" TERMINAL CIRCUIT

Check voltage between alternator harness connector and ground.

(+)		(-)	Voltage
Alternator			
Connector	Terminal		
F36	3	Ground	Battery voltage

Is the inspection result normal?

YES >> Refer to [CHG-3. "Work Flow\(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-7. "Work Flow\(Without EXP-800 NI or GR8-1200 NI\)"](#).

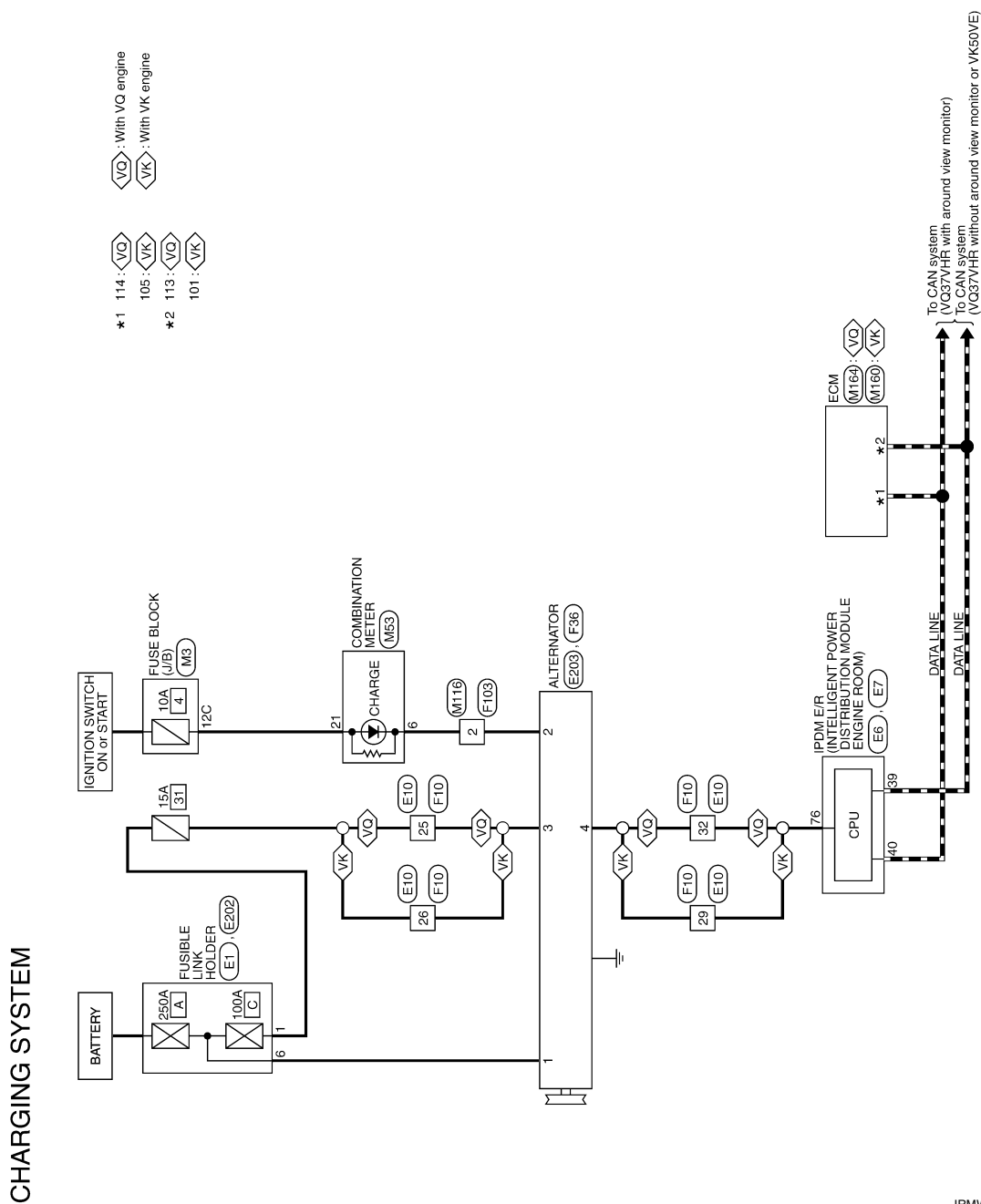
NO >> Check harness for open between alternator and fuse.

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CHARGING SYSTEM

Wiring Diagram - CHARGING SYSTEM -

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CHARGING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

CHARGING SYSTEM

Connector No.	E1
Connector Name	FUSIBLE LINK HOLDER
Connector Type	L02FBR-MC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	W	-

Connector No.	E6
Connector Name	IPDM ER INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	T40BFM-M4



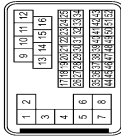
Terminal No.	Color Of Wire	Signal Name [Specification]
39	P	-
40	L	-
41	B	-
42	Y	-
43	SB	-
44	W	-
45	G	-
46	BR	-

Connector No.	E7
Connector Name	IPDM ER INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	T420IFM-CS12-M4



Terminal No.	Color Of Wire	Signal Name [Specification]
48	L	-
49	SB	- [With VQ engine]
50	W	- [With VK engine]
51	G	-
52	W	-
53	W	-
54	R	-
55	BR	-
56	BG	- [With VK engine]
57	LG	- [With VQ engine]
58	Y	-
59	W	-
60	BG	-
74	G	-
75	Y	-
76	P	- [With VK engine]
77	V	- [With VQ engine]
78	B	- [With VK engine]
79	L	- [With VQ engine]
80	W	-

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Type	SA336MB-RS9-SH28



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	- [With VQ engine]
2	SHIELD	- [With VK engine]
3	SHIELD	- [With VK engine]
4	BR	- [With VQ engine]
5	G	- [With VK engine]
6	BR	- [With VQ engine]
7	W	- [With VK engine]
8	SHIELD	- [With VQ engine]
9	W	- [With VK engine]
10	G	- [With VQ engine]
11	R	- [With VK engine]
12	BR	- [With VQ engine]
13	L	- [With VK engine]
14	LG	- [With VQ engine]
15	BG	- [With VK engine]
16	V	- [With VQ engine]
17	P	- [With VK engine]
18	W	-
19	W	-
20	BR	-
21	SB	- [With VK engine]

21	Y	- [With VQ engine]
22	G	- [With VK engine]
23	W	- [With VQ engine]
24	R	- [With VK engine]
25	V	- [With VQ engine]
26	G	- [With VK engine]
27	LG	-
28	GR	- [With VQ engine]
29	GR	- [With VK engine]
30	P	- [With VQ engine]
31	L	- [With VK engine]
32	W	- [With VQ engine]
33	G	- [With VK engine]
34	BR	- [With VQ engine]
35	W	- [With VK engine]
36	BG	-
37	R	-
38	SHIELD	- [With VQ engine]
39	SHIELD	- [With VK engine]
40	Y	- [With VQ engine]
41	W	- [With VK engine]
42	L	- [With VQ engine]
43	LG	- [With VK engine]
44	G	- [With VQ engine]
45	W	- [With VK engine]
46	G	-
47	L	-
48	SHIELD	- [With VQ engine]
49	B	- [With VK engine]
50	W	- [With VQ engine]
51	BR	- [With VK engine]
52	R	- [With VQ engine]
53	G	- [With VK engine]
54	W	- [With VQ engine]
55	BR	- [With VK engine]
56	G	- [With VQ engine]
57	L	- [With VK engine]
58	LG	- [With VQ engine]
59	W	- [With VK engine]
60	BR	- [With VQ engine]
61	R	- [With VK engine]
62	G	- [With VQ engine]
63	L	- [With VK engine]
64	W	- [With VQ engine]
65	G	-
66	L	-
67	SHIELD	- [With VQ engine]
68	G	- [With VK engine]
69	W	- [With VQ engine]
70	R	- [With VK engine]
71	LG	- [With VQ engine]
72	BG	- [With VK engine]
73	V	- [With VQ engine]
74	P	- [With VK engine]
75	W	-
76	BR	-
77	SB	- [With VK engine]

CHARGING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

CHARGING SYSTEM

50	B	- [With VQ engine]
51	G	- [With VK engine]
51	B	- [With VK engine]
51	SB	- [With VQ engine]
52	R	-

Connector No.	E202
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24340-79905



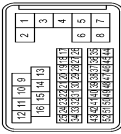
Terminal No.	6
Wire	B/Y
Signal Name [Specification]	-

Connector No.	E203
Connector Name	ALTERNATOR
Connector Type	24340-65F-45



Terminal No.	1
Wire	B/Y
Signal Name [Specification]	B

Connector No.	F10
Connector Name	WIRE TO WIRE
Connector Type	SAA36FB-RS9-SH23



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	- [With VQ engine]
1	SHIELD	- [With VK engine]
2	SHIELD	- [With VQ engine]
2	Y	- [With VK engine]
3	BR	- [With VQ engine]
3	G	- [With VK engine]
4	BR	- [With VQ engine]
4	SHIELD	- [With VK engine]
5	B	- [With VQ engine]
5	BR	- [With VK engine]
6	R	- [With VQ engine]
6	W	- [With VK engine]
7	G	- [With VQ engine]
7	R	- [With VK engine]
8	SHIELD	- [With VQ engine]
8	W	- [With VK engine]
9	W	-
10	G	-
11	R	- [With VQ engine]
11	Y	- [With VK engine]
12	P	- [With VQ engine]
12	V	- [With VK engine]
13	L	- [With VQ engine]
13	P	- [With VK engine]
14	L	- [With VQ engine]
14	LG	- [With VK engine]
15	O	- [With VQ engine]
15	R	- [With VK engine]
16	R	- [With VQ engine]
16	Y	- [With VK engine]
17	GR	- [With VQ engine]
17	G	- [With VK engine]
18	O	-
20	R	- [With VQ engine]
21	V	- [With VK engine]
21	Y	- [With VQ engine]

22	B	- [With VK engine]
22	G	- [With VQ engine]
23	LG	- [With VK engine]
23	Y	- [With VQ engine]
24	LG	- [With VK engine]
24	Y	- [With VQ engine]
25	V	-
26	O	-
27	GR	- [With VQ engine]
27	SB	- [With VK engine]
28	BR	- [With VQ engine]
28	LG	- [With VK engine]
29	L	- [With VQ engine]
29	P	- [With VK engine]
30	GR	- [With VQ engine]
30	R	- [With VK engine]
31	BR	- [With VQ engine]
31	P	- [With VK engine]
32	G	- [With VQ engine]
32	W	- [With VK engine]
33	L	- [With VQ engine]
33	SB	- [With VK engine]
34	O	-
35	P	-
36	SHIELD	-
37	SHIELD	- [With VQ engine]
37	Y	- [With VK engine]
38	SHIELD	- [With VQ engine]
38	W	- [With VK engine]
39	W	- [With VQ engine]
39	Y	- [With VK engine]
40	G	- [With VQ engine]
40	SHIELD	- [With VK engine]
41	B	- [With VQ engine]
41	Y	- [With VK engine]
42	GR	- [With VQ engine]
42	SHIELD	- [With VK engine]
43	R	- [With VQ engine]
43	W	- [With VK engine]
44	LG	-
45	L	-
46	G	- [With VQ engine]
46	SHIELD	- [With VK engine]
47	B	- [With VQ engine]
47	W	- [With VK engine]
48	LG	- [With VQ engine]
48	R	- [With VK engine]
49	G	- [With VQ engine]
49	L	- [With VK engine]
50	B	- [With VQ engine]

50	G	- [With VK engine]
51	B	- [With VK engine]
51	W	- [With VQ engine]
52	R	-

Connector No.	F36
Connector Name	ALTERNATOR
Connector Type	HS03FB



Terminal No.	Color Of Wire	Signal Name [Specification]
2	G	L
3	O	S [With VK engine]
3	V	S [With VQ engine]
4	P	C [With VK engine]
4	W	C [With VQ engine]

Connector No.	F103
Connector Name	WIRE TO WIRE
Connector Type	TK36FW-NS10



Terminal No.	Color Of Wire	Signal Name [Specification]
2	G	-
3	W	-
4	GR	- [With VK engine]
4	R	- [With VQ engine]
5	B	- [With VQ engine]
5	R	- [With VK engine]
7	B	- [With VK engine]
9	W	- [With VK engine]
9	Y	- [With VQ engine]

A
B
C
D
E
F
G
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J
K
L
N
O
P

CHG

CHARGING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

CHARGING SYSTEM

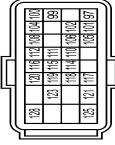
Connector No.	M53
Connector Name	COMBINATION METER
Connector Type	TH01FM-NH
10	GR - [With VQ engine]
19	L - [With VK engine]
20	O -
27	L -
28	B -
29	LG -
31	R -
34	LG -
35	BR -
36	W -
37	Y -
38	Y -
43	P -
44	L -
45	Y -
46	V -



Connector No.	M116
Connector Name	WIRE TO WIRE
Connector Type	TK36MW-NS10



Connector No.	M160
Connector Name	ECM
Connector Type	RP24FGY-R25-R-LH-Z

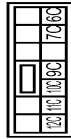


Terminal No.	Color	Wire	Signal Name [Specification]
1	BG	W	BATTERY POWER SUPPLY
2	LG	B	COMMUNICATION SIGNAL (METER->AMP.)
3	GR	B	COMMUNICATION SIGNAL (AMP->METER)
5	B	B	GROUND
6	W	W	ALTERNATOR SIGNAL
7	P	P	AIR BAG SIGNAL
10	G	G	SECURITY INDICATOR SIGNAL
15	B	B	GROUND
16	B	B	METER CONTROL SWITCH GROUND
21	R	R	IGNITION SIGNAL
24	BR	BR	COMMUNICATION SIGNAL (LCD->AMP.)
25	Y	Y	COMMUNICATION SIGNAL (AMP->LCD)
26	R	R	VEHICLE SPEED SIGNAL (8-PULSE)
27	V	V	PARKING BRAKE SWITCH SIGNAL
28	W	W	BRAKE FLUID LEVEL SWITCH SIGNAL
29	SB	SB	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
30	G	G	PASSENGER SEAT BELT WARNING SIGNAL
31	L	L	WASHER LEVEL SWITCH SIGNAL
34	B	B	ILLUMINATION CONTROL SIGNAL
36	LG	LG	SELECT SWITCH SIGNAL
37	SB	SB	ENTER SWITCH SIGNAL
38	L	L	TRIP AIR RESET SWITCH SIGNAL
39	P	P	ILLUMINATION CONTROL SWITCH SIGNAL (-)
40	BG	BG	ILLUMINATION CONTROL SWITCH SIGNAL (+)

Terminal No.	Color	Wire	Signal Name [Specification]
2	W	-	-
3	L	-	-
4	B	-	- [With VK engine]
4	R	-	- [With VQ engine]
5	B	-	- [With VQ engine]
5	R	-	- [With VK engine]
7	B	-	-
9	L	-	- [With VK engine]
9	R	-	- [With VQ engine]
10	R	-	-
19	BG	-	-
20	Y	-	-
27	L	-	-
28	B	-	-
29	LG	-	-
31	W	-	-
34	LG	-	-
35	BR	-	-
36	W	-	-
37	Y	-	-
38	BG	-	-
43	P	-	-
44	L	-	-
45	G	-	-
46	Y	-	-

Terminal No.	Color	Wire	Signal Name [Specification]
97	R	R	ENGINE SPEED SIGNAL OUTPUT
99	G	G	SENSOR POWER SUPPLY
100	L	L	SENSOR POWER SUPPLY
101	P	P	CAN COMMUNICATION LINE
102	SB	SB	ASCD/CC STEERING SWITCH
104	R	R	ACCELERATOR PEDAL POSITION SENSOR 1
105	L	L	CAN COMMUNICATION LINE
106	L	L	IGNITION SWITCH
108	P	P	ACCELERATOR PEDAL MODULE (FCM) CHECK
110	P	P	STOP LAMP SWITCH
111	V	V	SENSOR GROUND
112	LG	LG	FUEL PUMP CONTROL MODULE (FCM) CHECK
114	GR	GR	DATA LINK CONNECTOR
115	GR	GR	SENSOR GROUND
116	G	G	TRANSMISSION RANGE SWITCH
117	BR	BR	ASCD/CC BRAKE SWITCH
118	R	R	POWER SUPPLY FOR ECM (BACK-UP)
119	W	W	SENSOR GROUND
120	W	W	FUEL TANK TEMPERATURE SENSOR
121	GR	GR	POWER SUPPLY FOR ECM
123	B	B	ECM GROUND
125	R	R	FUEL PUMP CONTROL MODULE (FCM)
128	B	B	ECM GROUND

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS2FW-CS



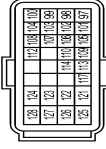
Terminal No.	Color	Wire	Signal Name [Specification]
10C	L	-	-
11C	LG	-	-
12C	R	-	-
6C	P	-	-
7C	B	-	-
9C	BG	-	-

JRMWF4539GB

CHARGING SYSTEM

Connector No.	M164
Connector Name	ECM
Connector Type	RH24FGY-RZ8-R-LH-Z





Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	ACCELERATOR PEDAL POSITION SENSOR 1
98	P	ACCELERATOR PEDAL POSITION SENSOR 2 (With NAVI)
99	Y	ACCELERATOR PEDAL POSITION SENSOR 2 (Without NAVI)
99	G	SENSOR POWER SUPPLY [With NAVI]
99	L	SENSOR POWER SUPPLY [Without NAVI]
100	W	SENSOR GROUND
101	SB	ASDICC STEERING SWITCH
102	LG	EVAP CONTROL SYSTEM PRESSURE SENSOR
103	G	SENSOR POWER SUPPLY [Without NAVI]
103	L	SENSOR POWER SUPPLY [With NAVI]
104	BR	SENSOR GROUND [Without NAVI]
104	GR	SENSOR GROUND [With NAVI]
105	L	REFRIGERANT PRESSURE SENSOR
106	W	FUEL TANK TEMPERATURE SENSOR
107	BG	SENSOR POWER SUPPLY
108	V	SENSOR GROUND
109	G	PNP SIGNAL
110	R	ENGINE SPEED OUTPUT SIGNAL
112	V	IMMEDIATELY OPEN LAMP CONTROL, SYSTEM PRESSURE SENSOR
112	W	SENSOR GROUND [Without NAVI]
113	P	CAN COMMUNICATION LINE
114	L	CAN COMMUNICATION LINE
117	GR	DATA LINK CONNECTOR
121	LG	EVAP CANISTER VENT CONTROL VALVE
122	P	STOP LAMP SWITCH
123	B	ECM GROUND
124	B	ECM GROUND
125	GR	POWER SUPPLY FOR ECM
126	BR	ASDICC BRAKE SWITCH
127	B	ECM GROUND
128	B	ECM GROUND

CHG

CHARGING SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000010576838

Symptom	Reference
Discharged battery	Refer to CHG-3, "Work Flow(With EXP-800 NI or GR8-1200 NI)" or CHG-7, "Work Flow(Without EXP-800 NI or GR8-1200 NI)" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000010576839

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:

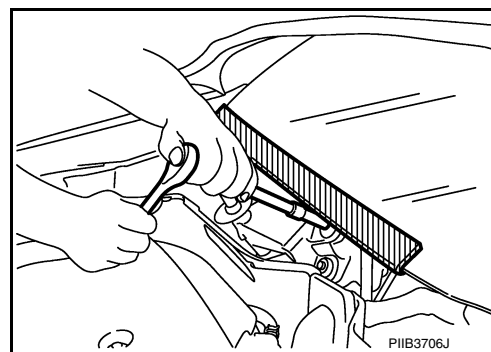
Always observe the following items for preventing accidental activation.

- 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:0000000010576840

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:0000000010576841

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

< 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.).

Precaution for Power Generation Voltage Variable Control System

INFOID:0000000010576842

CAUTION:

For this model, the battery current sensor that is installed to the battery cable at the negative terminal measures the charging/discharging current of the battery, and performs various controls. If the electrical component or the ground wire is connected directly to the battery terminal, the current other than that being measured with the battery current sensor is charging to or discharging from the battery. This condition causes the malfunction of the control, and then the battery discharge may occur. Do not connect the electrical component or the ground wire directly to the battery terminal.

Precautions for Removing Battery Terminal

INFOID:0000000010741358

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

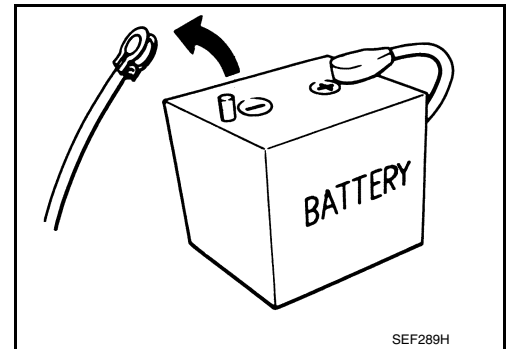
NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:

The removal of 12V battery may cause a DTC detection error.



SEF289H

PREPARATION

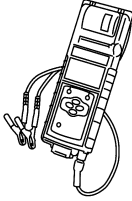
< PREPARATION >

PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000010576843

Tool number (Kent-Moore No.) Tool name	Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station  AWI1A1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.
— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer  JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tools

INFOID:0000000010576844

Tool name	Description
Power tool  PIIB1407E	Loosening bolts, nuts and screws

CHG

CHARGING SYSTEM PRELIMINARY INSPECTION

< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:0000000010576845

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair battery terminals connection.

2.CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse No.
Alternator	Battery ("S" terminal)	31
Combination meter	Ignition switch ON ("L" terminal)	4

Is the inspection result normal?

YES >> GO TO 3.

NO >> Be sure to eliminate the cause of malfunction before installing new fuse.

3.CHECK "E" TERMINAL CONNECTION

Check if "E" terminal (alternator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair "E" terminal connection.

4.CHECK DRIVE BELT TENSION

Check drive belt tension.

- VQ37VHR [EM-15, "Checking"](#).
- VK50VE [EM-173, "Checking"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< PERIODIC MAINTENANCE >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Inspection Procedure

INFOID:0000000010576846

CAUTION:

When performing this inspection, always use a charged battery that has completed the battery inspection. (When the charging rate of the battery is low, the response speed of the voltage change will become slow. This can cause an incorrect inspection.)

1. CHECK ECM (CONSULT)

Perform ECM self-diagnosis with CONSULT. Refer to the following.

- VQ37VHR models: [EC-157, "CONSULT Function"](#) (For USA and Canada) or [EC-750, "CONSULT Function"](#) (For Mexico).
- VK50VE models: [EC-1264, "CONSULT Function"](#).

Self-diagnostic results content

No malfunction detected>> GO TO 2.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

2. CHECK OPERATION OF POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

1. Connect CONSULT and start the engine.
2. The selector lever is in "P" or "N" position and all of the electric loads and A/C, etc. are turned OFF.
3. Select "ALTERNATOR DUTY" at "Active Test" of "ENGINE", and then check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 40.0 %.

"BATTERY VOLT"

2 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 40.0 % : 12 - 13.6 V

4. Check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 80.0%.

"BATTERY VOLT"

20 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 80.0 % : +0.5 V or more against the value of "BATTERY VOLT" monitor when DUTY value is 40.0 %

Is the measurement value within the specification?

YES >> INSPECTION END

NO >> GO TO 3.

3. CHECK IPDM E/R (CONSULT)

Perform IPDM E/R self-diagnosis with CONSULT. Refer to the following.

- VQ37VHR models: [PCS-12, "CONSULT Function \(IPDM E/R\)"](#).
- VK50VE models: [PCS-12, "CONSULT Function \(IPDM E/R\)"](#).

Self-diagnostic results content

No malfunction detected>> GO TO 4.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

4. CHECK HARNESS BETWEEN ALTERNATOR AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect alternator connector and IPDM E/R connector.
3. Check continuity between alternator harness connector and IPDM E/R harness connector.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< PERIODIC MAINTENANCE >

Alternator harness connector		IPDM E/R harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F36	4	E7	76	Existed

4. Check continuity between alternator harness connector and ground.

Alternator harness connector		Ground	Continuity
Connector	Terminal		
F36	4		Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair harness or connector between IPDM E/R and alternator.

ALTERNATOR

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

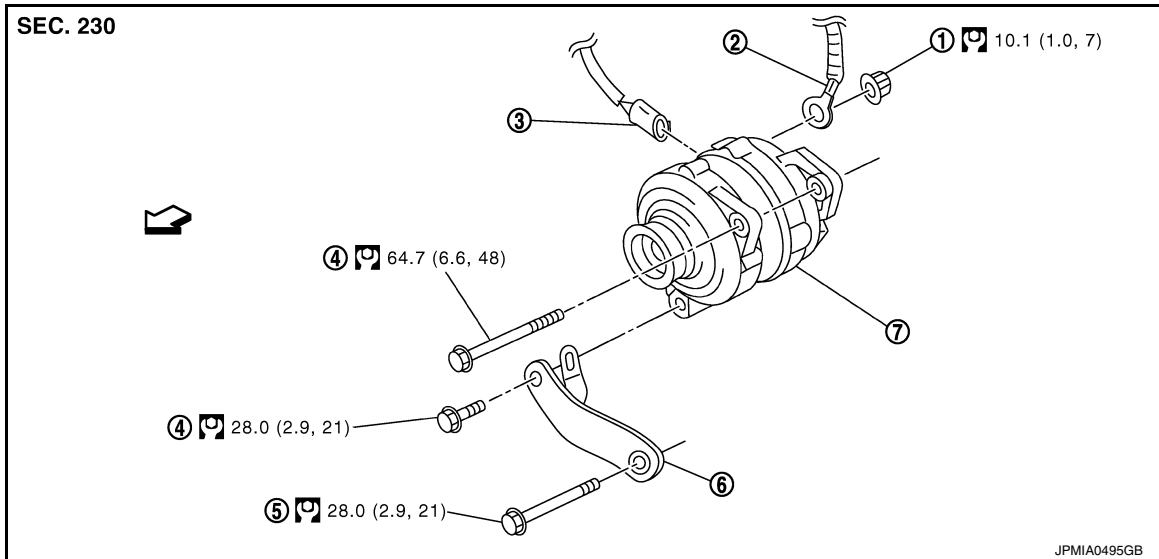
ALTERNATOR

VQ37VHR

VQ37VHR : Exploded View

INFOID:0000000010576847

REMOVAL



1. "B" terminal nut
4. Alternator mounting bolt
7. Alternator

2. "B" terminal harness
5. Alternator stay mounting bolt

3. Alternator connector
6. Alternator stay

⇨ : Engine front

⌘ : N·m (kg-m, ft-lb)

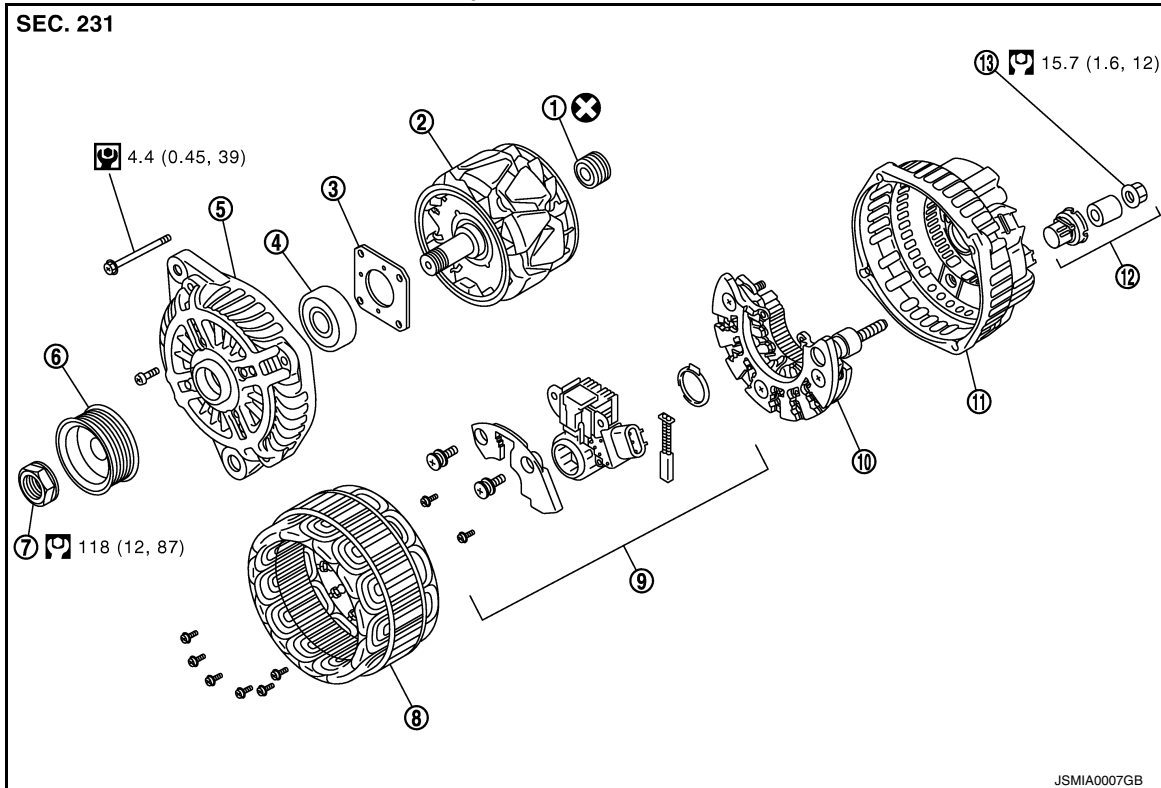
DISASSEMBLY

CHG

ALTERNATOR

< REMOVAL AND INSTALLATION >

Type: A003TJ1991B



- | | | |
|----------------------|---------------------------|----------------------------------|
| 1. Rear bearing | 2. Rotor assembly | 3. Retainer |
| 4. Front bearing | 5. Front bracket assembly | 6. Pulley |
| 7. Pulley nut | 8. Stator assembly | 9. IC voltage regulator assembly |
| 10. Diode assembly | 11. Rear bracket assembly | 12. Terminal set |
| 13. "B" terminal nut | | |

⊗ : Always replace after every disassembly.

⌚ : N·m (kg-m, ft-lb)

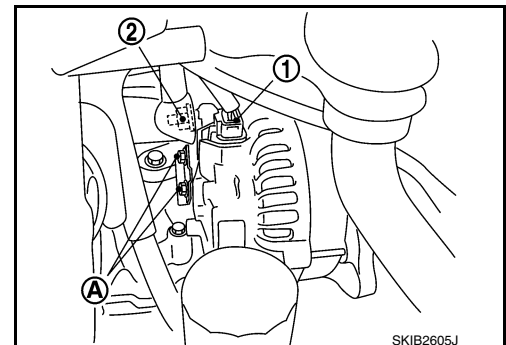
⌚ : N·m (kg-m, in-lb)

VQ37VHR : Removal and Installation (2WD)

INFOID:0000000010576848

REMOVAL

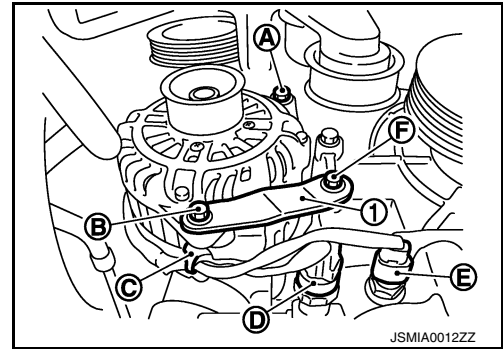
1. Disconnect the battery cable from the negative terminal. Refer to [PG-126. "Removal and Installation"](#).
2. Remove engine front undercover, using power tools.
3. Remove drive belt. Refer to [EM-28. "Removal and Installation"](#).
4. Remove the Splash guard RH.
5. Disconnect alternator connector (1).
6. Remove "B" terminal nut (2).
7. Remove the harness bracket bolts (A).



ALTERNATOR

< REMOVAL AND INSTALLATION >

8. Remove oil pressure switch harness clip (C) from alternator stay (1).
9. Disconnect oil pressure switch connector (D) and oil temperature sensor connector (E).
10. Remove alternator mounting bolt (B) and alternator stay mounting bolt (F) using power tools, then remove alternator stay.
11. Remove alternator mounting bolt (A), using power tools.



12. Move a power steering oil pump hose upward.
13. Remove alternator assembly downward from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

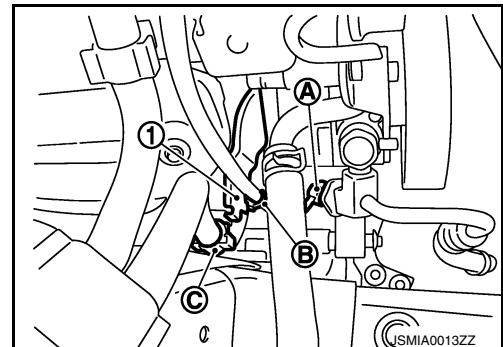
- Install alternator, and check tension of belt. Refer to [EM-15, "Checking"](#).
- For this model, the power generation voltage variable control system that controls the power generation voltage of the alternator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the alternator, and then make sure that the system operates normally. Refer to [CHG-29, "Inspection Procedure"](#).

VQ37VHR : Removal and Installation (AWD)

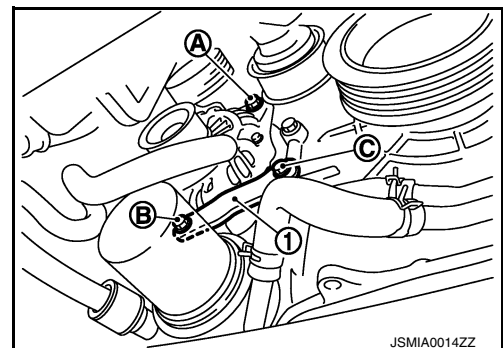
INFOID:0000000010576849

REMOVAL

1. Disconnect the battery cable from the negative terminal. Refer to [PG-126, "Removal and Installation"](#).
2. Remove air cleaner case. Refer to [EM-29, "Exploded View"](#).
3. Disconnect power steering oil pressure sensor connector (A).
4. Remove the clip (B) from the harness bracket (1) and "B" terminal harness from the clip (C).



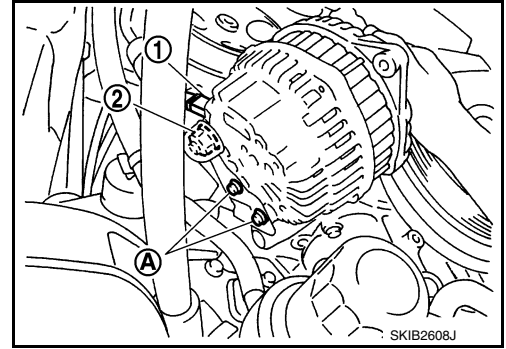
5. Remove engine undercover, using power tools.
6. Remove drive belt. Refer to [EM-28, "Removal and Installation"](#).
7. Remove alternator mounting bolt (B) and alternator stay mounting bolt (C) using power tools, then remove alternator stay (1).
8. Remove alternator mounting bolt (A), using power tools.



ALTERNATOR

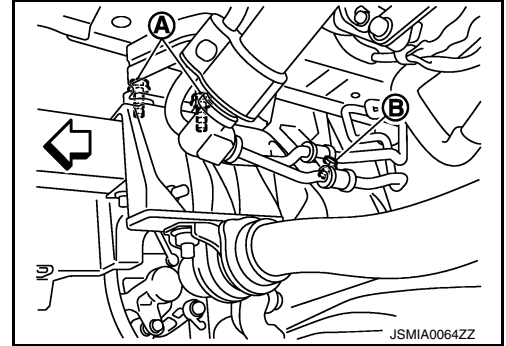
< REMOVAL AND INSTALLATION >

9. Pull and turn alternator, and then remove the harness bracket bolts (A).
10. Disconnect alternator connector (1).
11. Remove "B" terminal nut (2).



12. Remove power steering oil pump hose bracket bolts (A) and clamp bolts (B).
13. Move a power steering oil pump hose upward.

⇐ : Vehicle front



14. Remove alternator assembly downward from the vehicle.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

- Install alternator, and check tension of belt. Refer to [EM-15. "Checking"](#).
- For this model, the power generation voltage variable control system that controls the power generation voltage of the alternator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the alternator, and then make sure that the system operates normally. Refer to [CHG-29. "Inspection Procedure"](#).

VQ37VHR : Inspection

INFOID:0000000010576850

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight. Refer to [CHG-31. "VQ37VHR : Exploded View"](#).

VK50VE

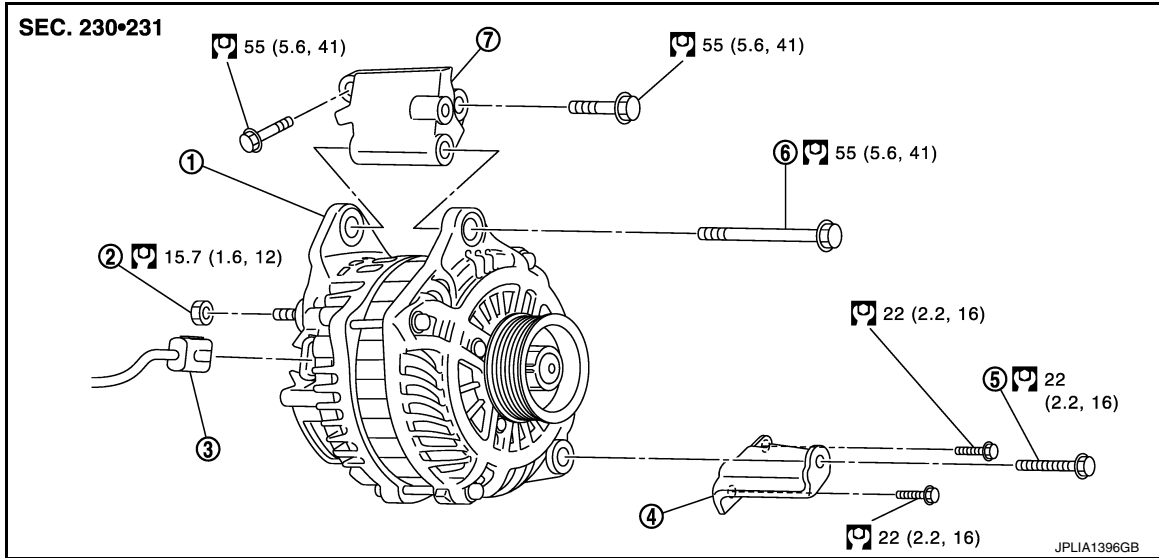
VK50VE : Exploded View

INFOID:0000000010576851

REMOVAL

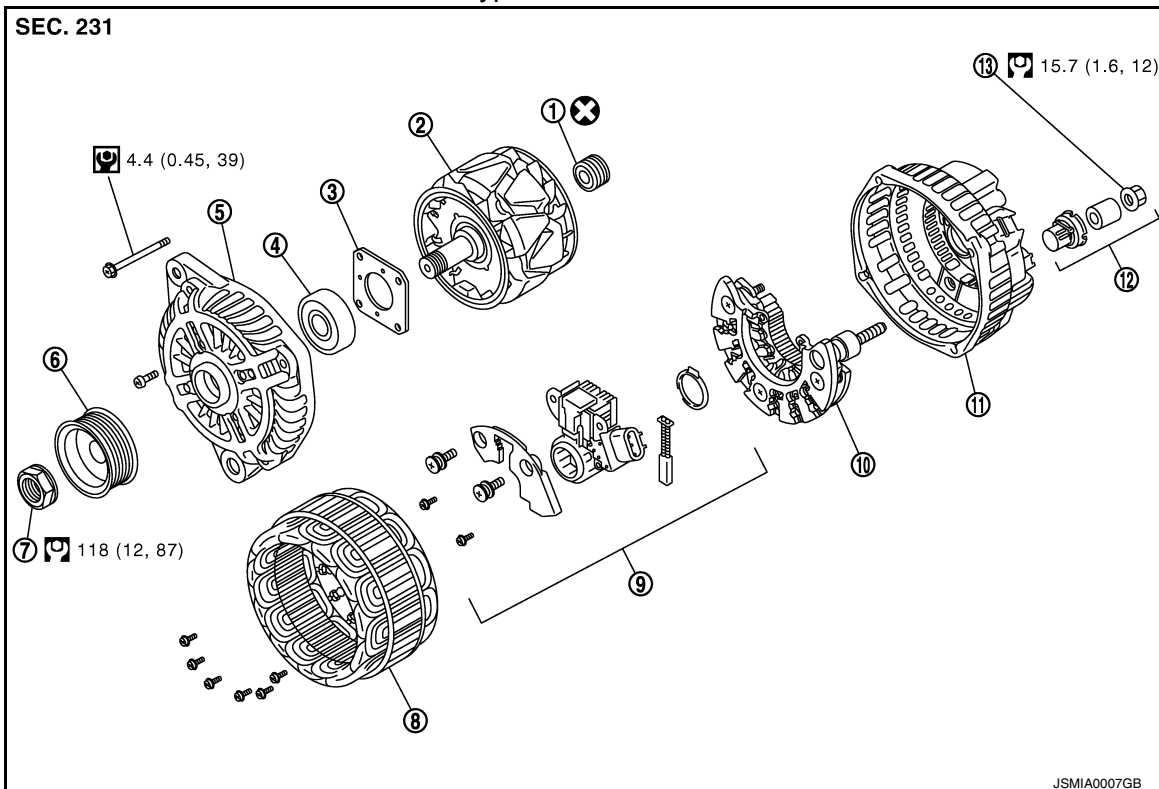
ALTERNATOR

< REMOVAL AND INSTALLATION >



DISASSEMBLY

Type: A003TJ3091



ALTERNATOR

< REMOVAL AND INSTALLATION >

⊗ : Always replace after every disassembly.

⌚ : N·m (kg-m, ft-lb)

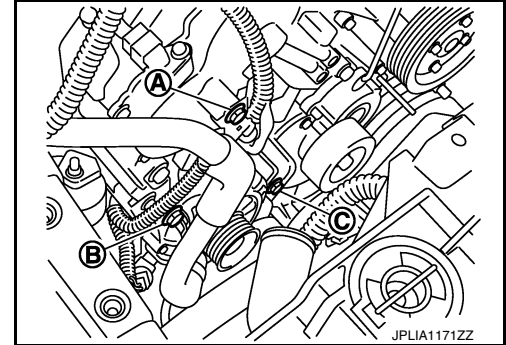
⌚ : N·m (kg-m, in-lb)

VK50VE : Removal and Installation

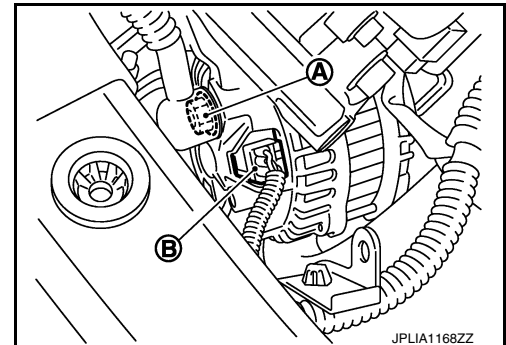
INFOID:0000000010576852

REMOVAL

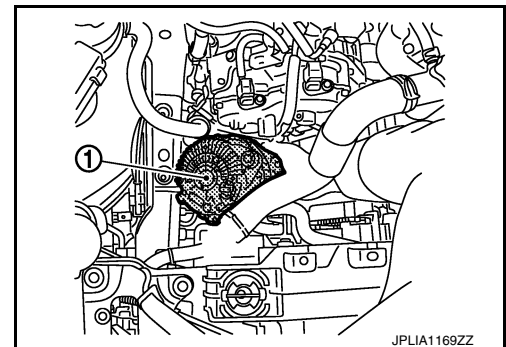
1. Disconnect the battery cable from the negative terminal. Refer to [PG-126, "Removal and Installation"](#).
2. Remove drive belt. Refer to [EM-186, "Exploded View"](#).
3. Remove the air ducts and air cleaner assembly RH.
4. Remove the alternator connector harness bracket (A).
5. Move a steering hose and harness not to interfere the removal of the alternator.
6. Remove the alternator mounting bolt (B) and alternator mounting bolt (C).



7. Pull and turn alternator, and then remove the "B" terminal nut (A) and alternator connector (B).



8. Remove alternator assembly (1) upward from the vehicle.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

- Install alternator, and check tension of belt. Refer to [EM-173, "Checking"](#).
- For this model, the power generation voltage variable control system that controls the power generation voltage of the alternator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the alternator, and then make sure that the system operates normally. Refer to [CHG-29, "Inspection Procedure"](#).

ALTERNATOR

< REMOVAL AND INSTALLATION >

VK50VE : Inspection

INFOID:0000000010576853

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight. Refer to [CHG-34, "VK50VE : Exploded View"](#).

A

B

C

D

E

F

G

H

I

J

K

L

CHG

N

O

P

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:0000000010576854

	VQ37VHR	VK50VE
Type	A003TJ1991B	A003TJ3091
	MITSUBISHI make	
Nominal rating [V - A]	12 -130	12 -150
Ground polarity	Negative	
Minimum revolution under no-load (When 13.5 V is applied) [rpm]	Less than 1,300	
Hot output current (When 13.5 V is applied) [A/ rpm]	More than 108/2,500 More than 124/5,000	More than 122/2,500 More than 144/5,000
Regulated output voltage [V]	14.1 – 14.7*	

*: Adjustment range of power generation voltage variable control is 11.4 - 15.6 V.