

SECTION **CHG**  
CHARGING SYSTEM

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L

CONTENTS

<b>PRECAUTION</b> .....	2	<b>POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION</b> .....	14
<b>PRECAUTIONS</b> .....	2	Diagnosis Procedure .....	14
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	2	<b>B TERMINAL CIRCUIT</b> .....	16
Precaution for Power Generation Variable Voltage Control System .....	2	Description .....	16
Precaution for Work .....	2	Diagnosis Procedure .....	16
<b>PREPARATION</b> .....	4	<b>L TERMINAL CIRCUIT (OPEN)</b> .....	17
<b>PREPARATION</b> .....	4	Description .....	17
Special Service Tool .....	4	Diagnosis Procedure .....	17
Commercial Service Tool .....	4	<b>L TERMINAL CIRCUIT (SHORT)</b> .....	19
<b>BASIC INSPECTION</b> .....	5	Description .....	19
<b>DIAGNOSIS AND REPAIR WORKFLOW</b> .....	5	Diagnosis Procedure .....	19
Work Flow (With EXP-800 NI or GR8-1200 NI) .....	5	<b>S TERMINAL CIRCUIT</b> .....	20
Work Flow (Without EXP-800 NI or GR8-1200 NI).....	8	Description .....	20
<b>SYSTEM DESCRIPTION</b> .....	11	Diagnosis Procedure .....	20
<b>CHARGING SYSTEM</b> .....	11	<b>WIRING DIAGRAM</b> .....	21
System Diagram .....	11	<b>CHARGING SYSTEM</b> .....	21
System Description .....	11	Wiring Diagram .....	21
Component Description .....	11	<b>SYMPTOM DIAGNOSIS</b> .....	27
<b>POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM</b> .....	12	<b>CHARGING SYSTEM</b> .....	27
System Diagram .....	12	Symptom Table .....	27
System Description .....	12	<b>REMOVAL AND INSTALLATION</b> .....	28
Component Description .....	12	<b>GENERATOR</b> .....	28
<b>DTC/CIRCUIT DIAGNOSIS</b> .....	13	Removal and Installation - QR25DE Models .....	28
<b>CHARGING SYSTEM PRELIMINARY INSPECTION</b> .....	13	Removal and Installation - VQ40DE Models .....	29
Diagnosis Procedure .....	13	<b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> .....	30
		<b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> .....	30
		Generator .....	30

CHG

N  
O  
P

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000007328087

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 SR and SB section of this Service Manual.

#### **WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### **WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 Power Generation Variable Voltage Control System

INFOID:000000007328088

#### **CAUTION:**

For this model, the battery current sensor that is installed to the negative battery cable measures the charging/discharging current of the battery and performs various engine controls. If an electrical component is connected directly to the negative battery terminal, the current flowing through that component will not be measured by the battery current sensor. This condition may cause a malfunction of the engine control system and battery discharge may occur. Do not connect an electrical component or ground wire directly to the battery terminal.

#### Precaution for Work

INFOID:000000007328089

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:
  - Water soluble dirt:
    - Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
    - Then rub with a soft, dry cloth.
  - Oily dirt:

## PRECAUTIONS

### < PRECAUTION >

---

- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.
- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

A

B

C

D

E

F

G

H

I

J

K

L

**CHG**

N

O

P

# PREPARATION

< PREPARATION >

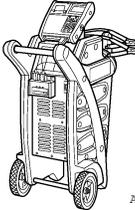
## PREPARATION

### PREPARATION

#### Special Service Tool

INFOID:000000007328090

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
<p>— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station</p>  <p style="text-align: right; font-size: small;">AWI1A12392Z</p>	<p>Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.</p>
<p>— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer</p>  <p style="text-align: right; font-size: small;">JSMIA08062Z</p>	<p>Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.</p>

#### Commercial Service Tool

INFOID:000000007328091

Tool name	Description
<p>Power tool</p>  <p style="text-align: right; font-size: small;">PIIB1407E</p>	<p>Loosening nuts, screws and bolts</p>

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

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

INFOID:000000009001105

#### 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.

A

B

C

D

E

F

G

H

I

J

K

L

CHG

N

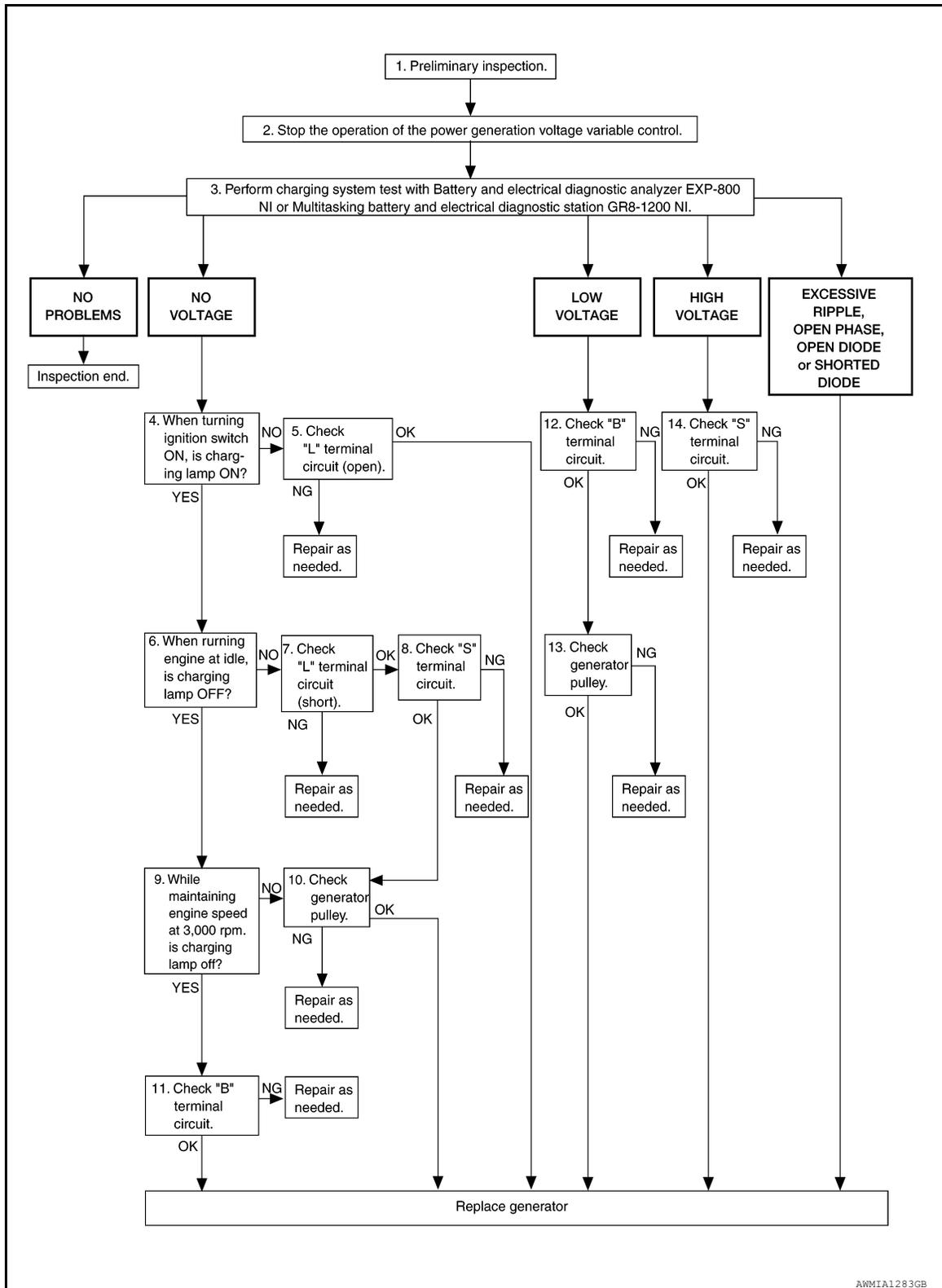
O

P

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

## OVERALL SEQUENCE



### DETAILED FLOW

#### NOTE:

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

#### 1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-13, "Diagnosis Procedure"](#).

# DIAGNOSIS AND REPAIR WORKFLOW

## < 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” 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 regulator of the generator.)
- 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 generator. Refer to [CHG-28. "Removal and Installation - QR25DE Models"](#) or [CHG-29. "Removal and Installation - VQ40DE Models"](#). 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-17. "Diagnosis Procedure"](#).

#### Is the “L” terminal circuit normal?

YES >> Replace generator. Refer to [CHG-28. "Removal and Installation - QR25DE Models"](#) or [CHG-29. "Removal and Installation - VQ40DE Models"](#).

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-19. "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-20. "Diagnosis Procedure"](#).

#### Is the “S” terminal circuit normal?

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L

CHG

N  
O  
P

# DIAGNOSIS AND REPAIR WORKFLOW

## < 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 GENERATOR PULLEY

---

Check generator pulley. Refer to [EM-14, "Checking Drive Belts"](#) (QR25DE) or [EM-128, "Checking Drive Belts"](#) (VQ40DE).

Is generator pulley normal?

- YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).  
NO >> Repair as needed.

## 11. "B" TERMINAL CIRCUIT INSPECTION

---

Check "B" terminal circuit. Refer to [CHG-16, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

- YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).  
NO >> Repair as needed.

## 12. "B" TERMINAL CIRCUIT INSPECTION

---

Check "B" terminal circuit. Refer to [CHG-16, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

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

## 13. INSPECTION OF GENERATOR PULLEY

---

Check generator pulley. Refer to [EM-14, "Checking Drive Belts"](#) (QR25DE) or [EM-128, "Checking Drive Belts"](#) (VQ40DE).

Is generator pulley normal?

- YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).  
NO >> Repair as needed.

## 14. "S" TERMINAL CIRCUIT INSPECTION

---

Check "S" terminal circuit. Refer to [CHG-20, "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

- YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-20, "Diagnosis Procedure"](#).  
NO >> Repair as needed.

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

INFOID:000000009001106

## OVERALL SEQUENCE

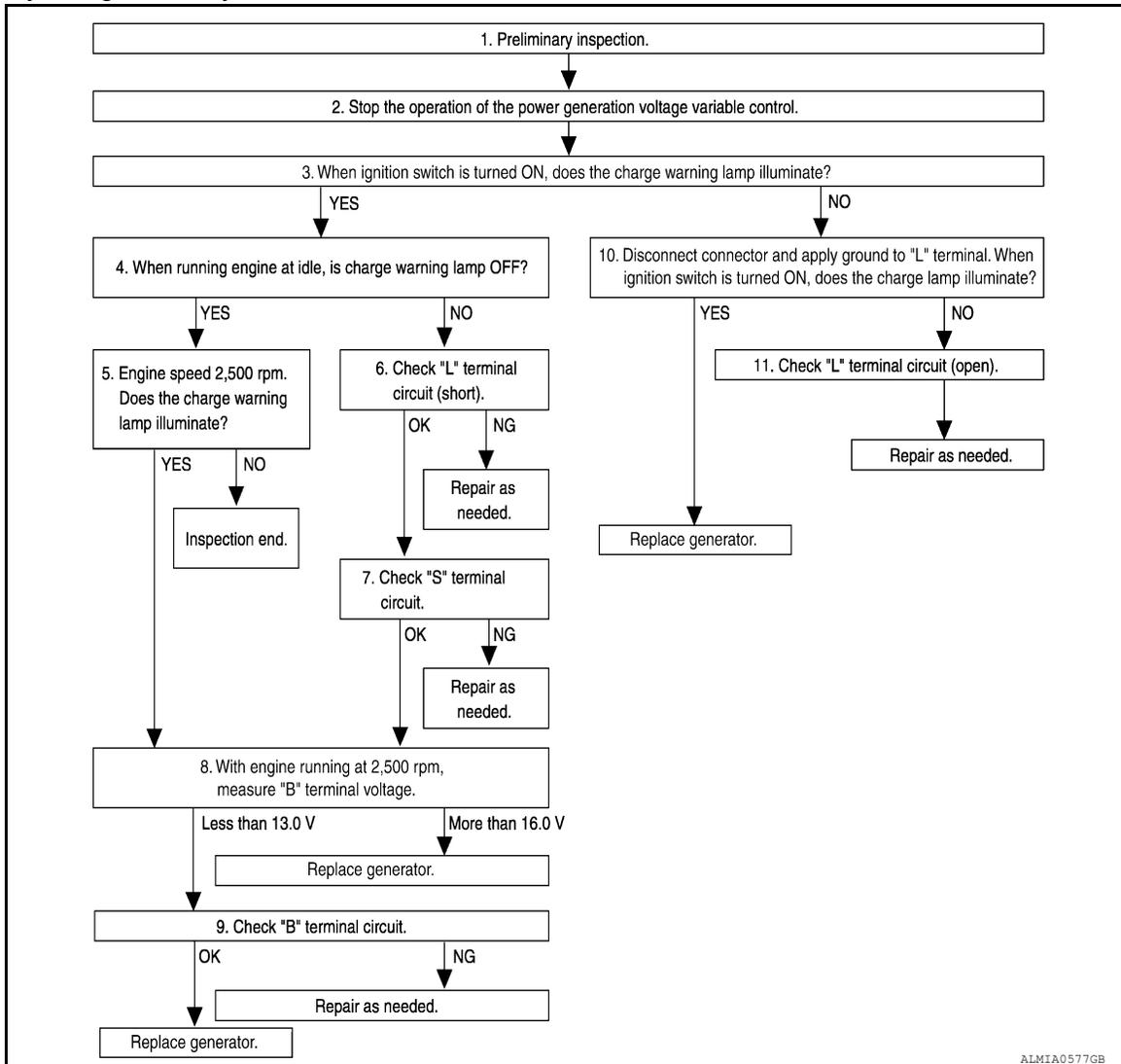
Before performing a generator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test.

- Before starting, inspect the fusible link.

# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

- Use fully charged battery.



### DETAILED FLOW

#### 1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-13, "Diagnosis Procedure"](#).

>> 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" using CONSULT, set the DUTY value of "ALTERNATOR DUTY" to 0 % by selecting "ALTERNATOR DUTY" with "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 regulator of the generator.)
- 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-diagnostic 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?

# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

---

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 terminal “L” circuit for (short). Refer to [CHG-19, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 7.  
NO >> Repair as needed.

### 7.“S” TERMINAL CIRCUIT INSPECTION

---

Check terminal “S” circuit. Refer to [CHG-20, "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 generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).

### 9.“B” TERMINAL CIRCUIT INSPECTION

---

Check “B” terminal circuit. Refer to [CHG-16, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).  
NO >> Repair as needed.

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

---

1. Disconnect generator connector and apply ground to “L” terminal.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> Replace generator. Refer to [CHG-28, "Removal and Installation - QR25DE Models"](#) or [CHG-29, "Removal and Installation - VQ40DE Models"](#).  
NO >> GO TO 11.

### 11.CHECK “L” TERMINAL CIRCUIT (OPEN)

---

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

>> Repair as needed.

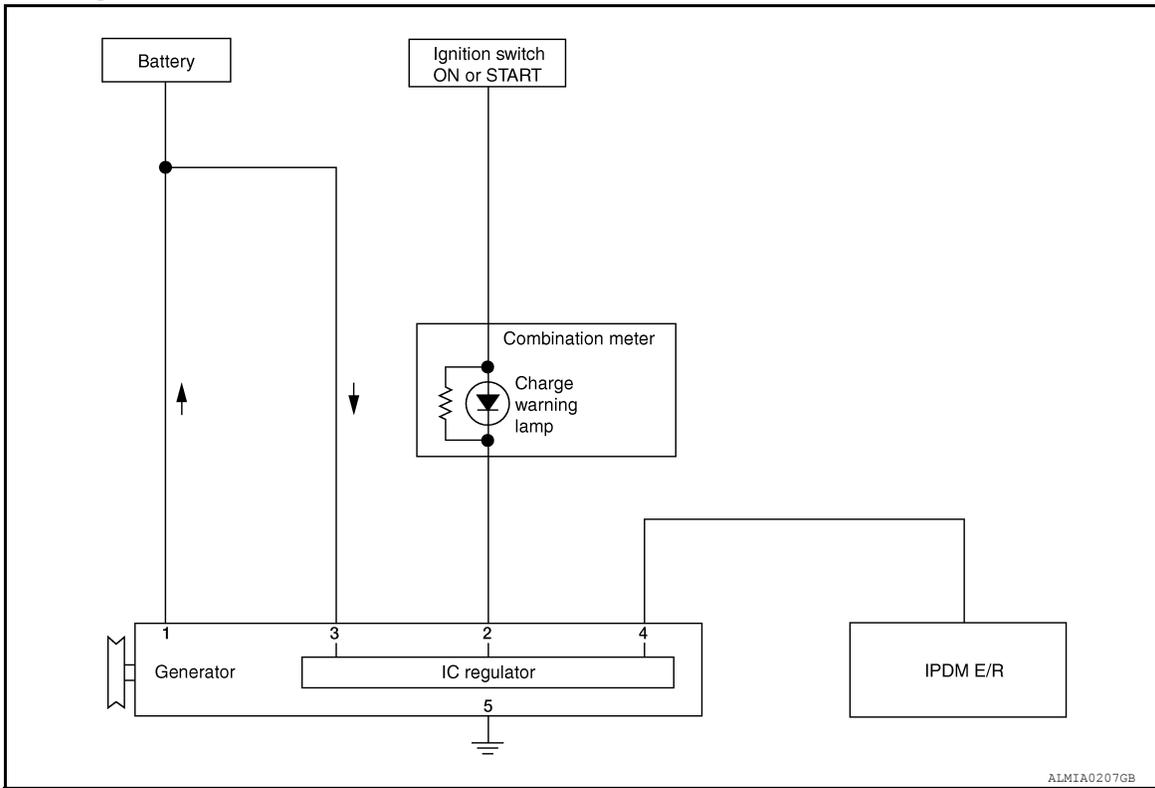
# CHARGING SYSTEM

< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### CHARGING SYSTEM

#### System Diagram



#### System Description

INFOID:000000007328094

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

#### Component Description

INFOID:000000007328095

Component part		Description
Generator	Terminal "1"	Refer to <a href="#">CHG-16, "Description"</a> .
	Terminal "2"	Refer to <a href="#">CHG-17, "Description"</a> .
	Terminal "3"	Refer to <a href="#">CHG-20, "Description"</a> .
	Terminal "4"	Used for the power generation voltage variable control system. Refer to <a href="#">CHG-12, "System Description"</a> .
Combination meter (Charge warning lamp)		The IC regulator warning function activates to illuminate the charge warning lamp if any of the following symptoms occur while generator is operating: <ul style="list-style-type: none"> <li>Excessive voltage is produced.</li> <li>No voltage is produced.</li> </ul>
IPDM E/R		Used for the power generation voltage variable control system. Refer to <a href="#">CHG-12, "System Description"</a> .

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

CHG

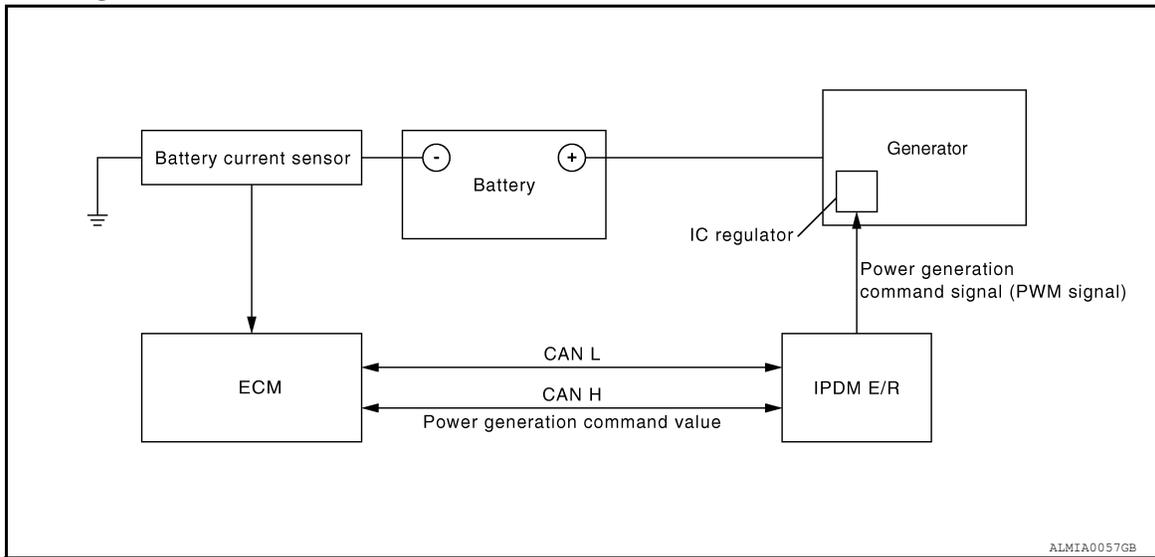
# POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

## POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

### System Diagram

INFOID:000000007328096



### System Description

INFOID:000000007328097

Power generation variable voltage control system has been adopted. By varying the voltage to the generator, engine load due to power generation of the generator is reduced and fuel consumption is decreased.

#### NOTE:

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

### Component Description

INFOID:000000007328098

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

# CHARGING SYSTEM PRELIMINARY INSPECTION

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### CHARGING SYSTEM PRELIMINARY INSPECTION

#### Diagnosis Procedure

INFOID:000000007328099

#### 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. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to applicable Instruction Manual for proper testing procedures.

#### 2. CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 30
	Battery (terminal 1)	Fusible Link <b>A</b>
Combination meter	Ignition switch ON (terminal 16)	Fuse 14

Is the inspection result normal?

YES >> GO TO 3

NO >> Be sure to eliminate cause of malfunction before installing new fuse or fusible link.

#### 3. CHECK GENERATOR GROUND TERMINAL CONNECTION

Verify connector E209 terminal 5 (generator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair connection.

#### 4. CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to [EM-14, "Checking Drive Belts"](#) (QR25DE) or [EM-128, "Checking Drive Belts"](#) (VQ40DE).

Is the inspection result normal?

YES >> Inspection End.

NO >> Repair as needed.

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

CHG

# POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< DTC/CIRCUIT DIAGNOSIS >

## POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

### Diagnosis Procedure

INFOID:000000007328100

Regarding Wiring Diagram information, refer to [CHG-21, "Wiring Diagram"](#).

#### **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 [EC-52, "CONSULT Function"](#) (QR25DE) or [EC-498, "CONSULT Function"](#) (VQ40DE).

#### 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" in "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 specification?

YES >> Inspection End.

NO >> GO TO 3

### 3. CHECK IPDM E/R (CONSULT)

Perform IPDM E/R self-diagnosis with CONSULT. Refer to [PCS-11, "CONSULT Function \(IPDM E/R\)"](#).

#### Self-diagnostic results content

No malfunction detected>> GO TO 4

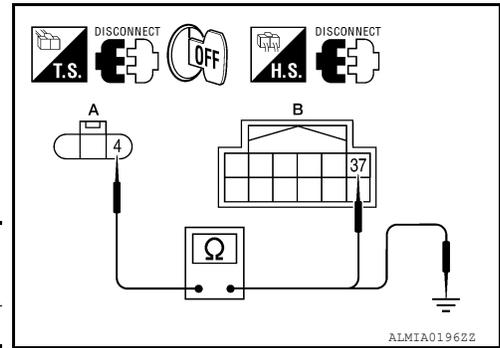
Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

### 4. CHECK HARNESS BETWEEN GENERATOR AND IPDM E/R

# POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect generator connector E205 and IPDM E/R connector E122.
3. Check continuity between generator harness connector E205 (A) terminal 4 and IPDM E/R harness connector E122 (B) terminal 37.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
E205	4	E122	37	Yes

4. Check continuity between generator harness connector E205 (A) terminal 4 and ground.

A		—	Continuity
Connector	Terminal		
E205	4	Ground	No

Are the continuity test results as specified?

- YES >> Replace IPDM E/R. Refer to [PCS-28. "Removal and Installation of IPDM E/R"](#).  
 NO >> Repair harness or connector between IPDM E/R and generator.

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L

CHG

## B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

### B TERMINAL CIRCUIT

#### Description

INFOID:000000007328101

The terminal "1" (B) circuit supplies power to charge the battery and operate the vehicles electrical system.

#### Diagnosis Procedure

INFOID:000000007328102

Regarding Wiring Diagram information, refer to [CHG-21, "Wiring Diagram"](#).

### 1. CHECK TERMINAL "1" CONNECTION

1. Turn ignition switch OFF.
2. Verify terminal "1" is clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair terminal "1" connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to applicable Instruction Manual for proper testing procedures.

### 2. CHECK TERMINAL "1" CIRCUIT

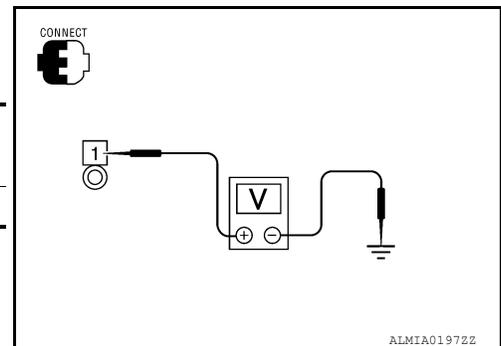
Check voltage between generator connector E206 terminal 1 and ground.

(+)		(-)	Voltage
Connector	Terminal		
E206	1	Ground	Battery voltage

Is voltage reading as specified?

YES >> GO TO 3.

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



ALMIA01972Z

### 3. CHECK TERMINAL "1" CONNECTION (VOLTAGE DROP TEST)

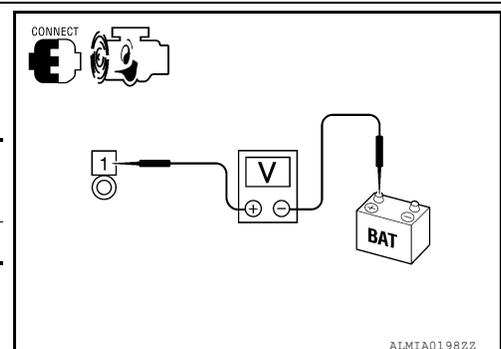
1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector E206 terminal 1.

(+)		(-)	Voltage
Connector	Terminal		
E206	1	Battery positive terminal	Less than 0.2V

Is the voltage reading as specified?

YES >> Terminal "1" circuit is normal. Refer to [CHG-5, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-8, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> Check harness between battery and generator for high resistance.



ALMIA01982Z

# L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

## L TERMINAL CIRCUIT (OPEN)

### Description

INFOID:000000009001109

The "2" (L) terminal circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the generator is providing sufficient voltage with the engine running, the charge warning lamp turns OFF. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

### Diagnosis Procedure

INFOID:000000009001110

Regarding Wiring Diagram information. Refer to [CHG-21, "Wiring Diagram"](#).

#### 1. CHECK "L" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "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 applicable Instruction Manual for proper testing procedures.

#### 2. CHECK "L" TERMINAL CIRCUIT (OPEN)

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

Generator		Ground	Condition	
Connector	Terminal		Ignition switch position	Charge warning lamp
E205	2		ON	Illuminate

Does it illuminate?

YES >> "L" terminal circuit is normal. Refer to [CHG-5, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-8, "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 generator harness connector and combination meter harness connector.

Generator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E205	2	M24	2	Yes

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the harness or connectors.

#### 4. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Combination meter		Fuse box (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M24	16	M4	5P	Yes

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L

CHG

N  
O  
P

## L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace the harness or connectors.

### 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 (Approx.)
Combination meter				
Connector	Terminal			
M24	16	Ground	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

YES >> Replace the combination meter. Refer to [MWI-89. "Removal and Installation"](#).

NO >> Repair or replace the harness or connectors.

# L TERMINAL CIRCUIT (SHORT)

< DTC/CIRCUIT DIAGNOSIS >

## L TERMINAL CIRCUIT (SHORT)

### Description

INFOID:000000009001111

The terminal "2" (L) circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the generator is providing sufficient voltage with the engine running, the charge warning lamp turns off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

### Diagnosis Procedure

INFOID:000000009001112

Regarding Wiring Diagram information, refer to [CHG-21, "Wiring Diagram"](#).

### 1. CHECK "L" TERMINAL CIRCUIT (SHORT)

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

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-5, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-8, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

### 2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

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

Combination meter		Ground	Continuity
Connector	Terminal		
M24	2		No

Is the inspection result normal?

YES >> Replace the combination meter. Refer to [MWI-89, "Removal and Installation"](#).

NO >> Repair or replace the harness or connectors.

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L

CHG

# S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## S TERMINAL CIRCUIT

### Description

INFOID:000000009001113

The output voltage of the generator is controlled by the IC regulator at terminal "3" (S) detecting the input voltage. Terminal "3" circuit detects the battery voltage to adjust the generator output voltage with the IC regulator.

### Diagnosis Procedure

INFOID:000000009001114

Regarding Wiring Diagram information, refer to [CHG-21, "Wiring Diagram"](#).

### 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 applicable Instruction Manual for proper testing procedures.

### 2. CHECK VOLTAGE REGULATOR CIRCUIT

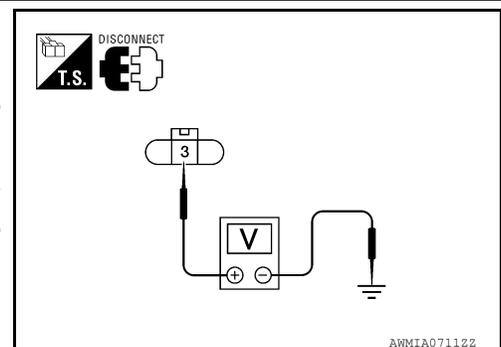
Check voltage between generator harness connector E205 terminal 3 and ground.

(+)		(-)	Voltage (approx.)
Connector	Terminal		
E205	3	Ground	Battery voltage

#### Does battery voltage exist?

YES >> Refer to [CHG-5, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-8, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

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



# CHARGING SYSTEM

< WIRING DIAGRAM >

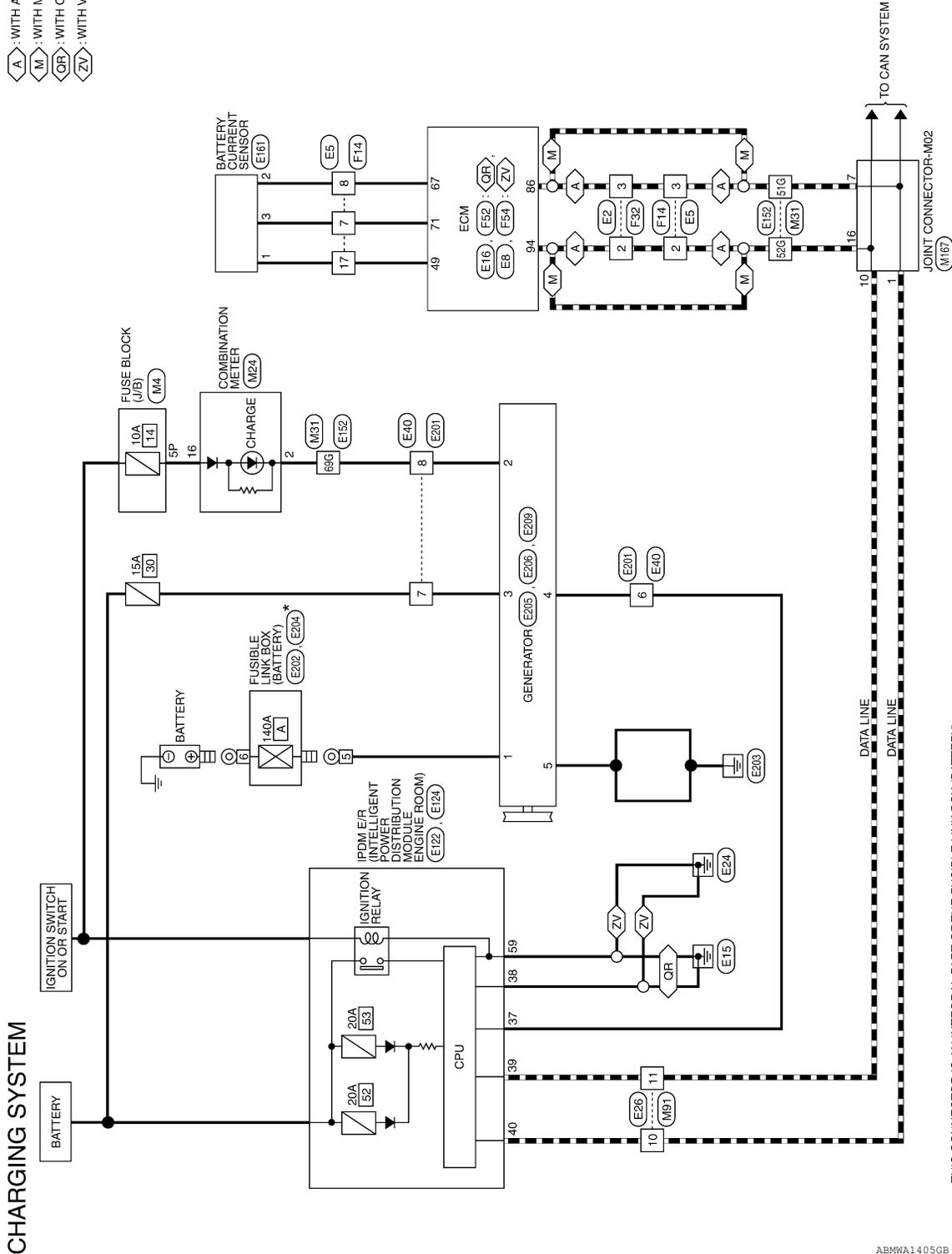
## WIRING DIAGRAM

### CHARGING SYSTEM

#### Wiring Diagram

INFOID:000000007328107

- A : WITH A/T
- M : WITH M/T
- OR : WITH QR25DE
- ZV : WITH VQ40DE



# CHARGING SYSTEM

< WIRING DIAGRAM >

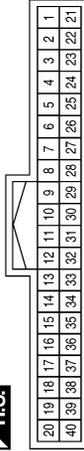
## CHARGING SYSTEM CONNECTORS

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



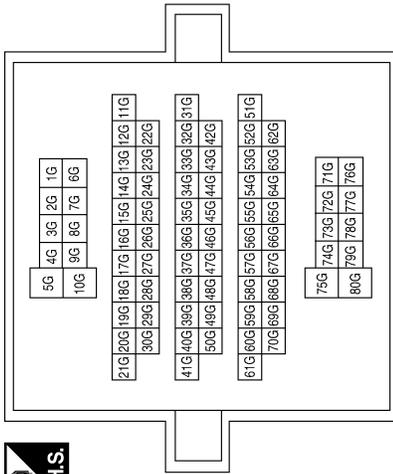
Terminal No.	Color of Wire	Signal Name
5P	W/G	-

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE



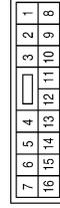
Terminal No.	Color of Wire	Signal Name
2	P	CHARGE (ALT) INPUT
16	W/G	RUN START

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
51G	P	-
52G	L	-
69G	P	-

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE



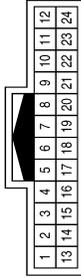
Terminal No.	Color of Wire	Signal Name
10	P	-
11	L	-

ABMIA0298GB

# CHARGING SYSTEM

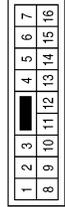
< WIRING DIAGRAM >

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Color	WHITE



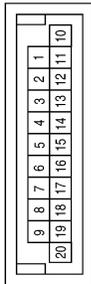
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-
7	R	-
8	B	-
17	P	-

Connector No.	E2
Connector Name	WIRE TO WIRE
Connector Color	WHITE



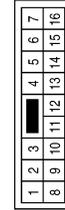
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-

Connector No.	M167
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE



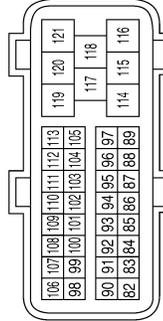
Terminal No.	Color of Wire	Signal Name
1	P	-
7	P	-
10	L	-
16	L	-

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE



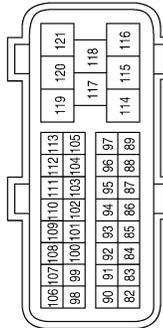
Terminal No.	Color of Wire	Signal Name
10	P	-
11	L	-

Connector No.	E16
Connector Name	ECM (WITH QR25DE)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
86	P	CAN-L
94	L	CAN-H

Connector No.	E8
Connector Name	ECM (WITH VQ40DE)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
86	P	CAN-L
94	L	CAN-H

ABMIA3424GB

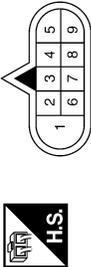
A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
N  
O  
P

CHG

# CHARGING SYSTEM

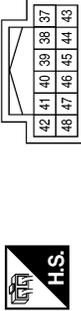
< WIRING DIAGRAM >

Connector No.	E40
Connector Name	WIRE TO WIRE
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
6	Y	-
7	SB	-
8	P	-

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



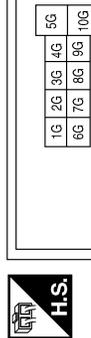
Terminal No.	Color of Wire	Signal Name
37	Y	ALT-C CONT
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



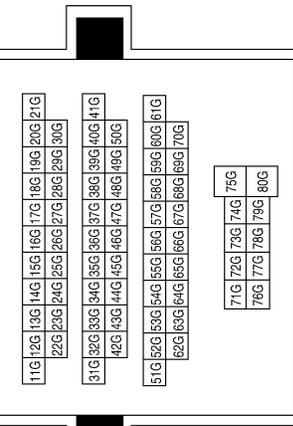
Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
51G	P	-
52G	L	-
69G	P	-

Connector No.	E161
Connector Name	BATTERY CURRENT SENSOR
Connector Color	BLACK

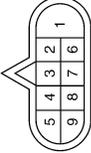


ABMIA3425GB

# CHARGING SYSTEM

< WIRING DIAGRAM >

Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
6	Y	-
7	SB	-
8	P	-

Connector No.	E202
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-




Terminal No.	Color of Wire	Signal Name
5	B/R	-

Connector No.	E204
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-




Terminal No.	Color of Wire	Signal Name
6	B/R	-

Connector No.	E205
Connector Name	GENERATOR
Connector Color	BLACK




Terminal No.	Color of Wire	Signal Name
2	P	L
3	SB	S
4	Y	C

Connector No.	E206
Connector Name	GENERATOR
Connector Color	-




Terminal No.	Color of Wire	Signal Name
1	B/R	B

Connector No.	E209
Connector Name	GENERATOR
Connector Color	-




Terminal No.	Color of Wire	Signal Name
5	B	E

ABMIA3426GB

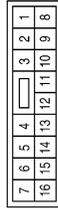
A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
N  
O  
P

CHG

# CHARGING SYSTEM

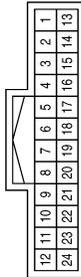
< WIRING DIAGRAM >

Connector No.	F32
Connector Name	WIRE TO WIRE
Connector Color	WHITE



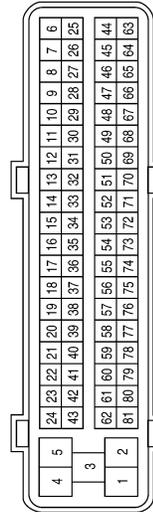
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE



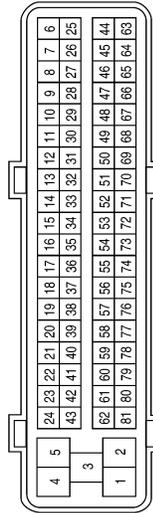
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-
7	R	-
8	B	-
17	P	-

Connector No.	F54
Connector Name	ECM (WITH VQ40DE)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
49	P	AVCC (PDPRES)
67	B	GND-A
71	R	CURSEN

Connector No.	F52
Connector Name	ECM (WITH QR25DE)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
49	P	AVCC (PDPRES)
67	B	GND-A
71	R	CURSEN

ABMIA3427GB

# CHARGING SYSTEM

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### CHARGING SYSTEM

#### Symptom Table

INFOID:000000007328108

Symptom	Reference
Battery discharged	Refer to <a href="#">CHG-5, "Work Flow (With EXP-800 NI or GR8-1200 NI)"</a> or <a href="#">CHG-8, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"</a> .
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.	

A

B

C

D

E

F

G

H

I

J

K

L

CHG

N

O

P

# GENERATOR

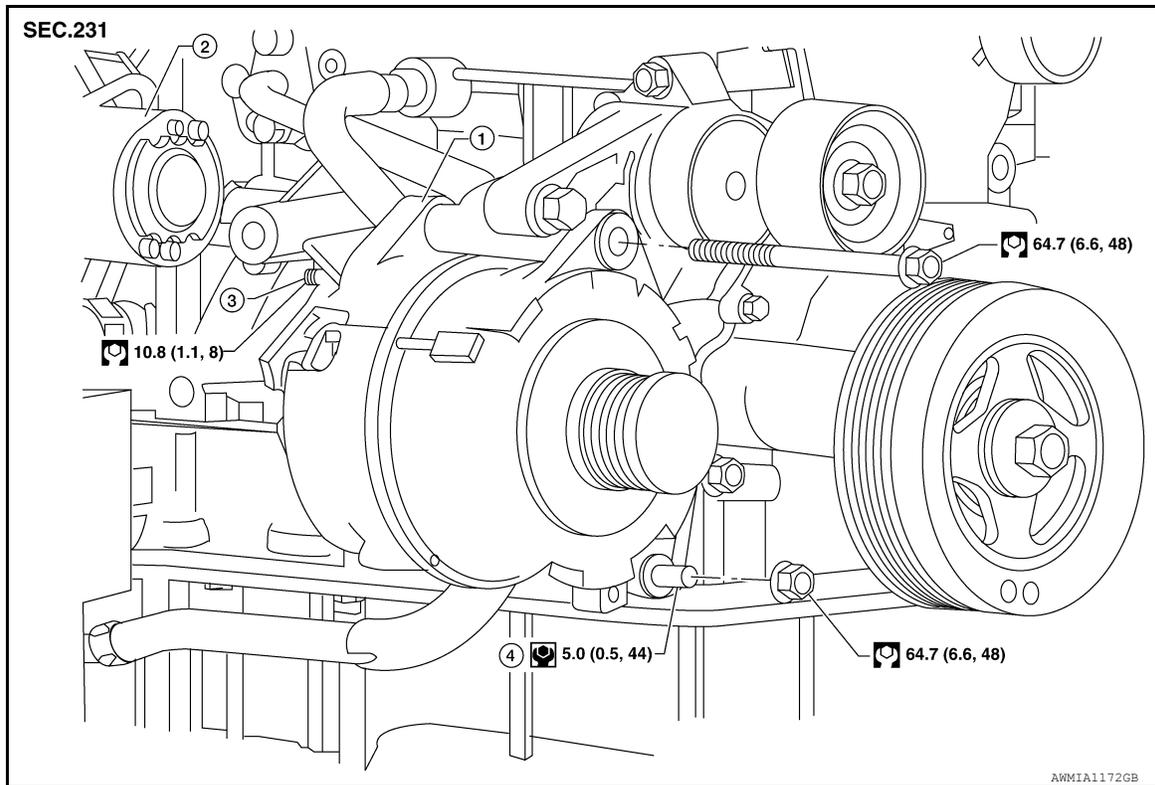
< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

### GENERATOR

Removal and Installation - QR25DE Models

INFOID:000000007328109



1. Generator
2. Starter motor assembly
3. Terminal "1"
4. Generator lower stud

#### REMOVAL

1. Disconnect the negative battery terminal. Refer to [PG-80. "Removal and Installation"](#).
2. Remove engine under cover. Refer to [EXT-15. "Removal and Installation"](#).
3. Remove front RH fender protector. Refer to [EXT-27. "Removal and Installation of Front Fender Protector"](#).
4. Remove the drive belt. Refer to [EM-14. "Removal and Installation"](#).
5. Disconnect the generator harness connectors.
6. Remove generator nut, using power tools.
7. Remove the generator upper bolt, using power tools.
8. Remove the generator.

#### INSTALLATION

Installation is in the reverse order of removal.

- Be sure the generator spacer is in place on the lower stud.
- Install the generator and check tension of drive belt. Refer to [EM-14. "Checking Drive Belts"](#).

**Terminal "1" nut : 10.8 N·m (1.1 kg·m, 8 ft·lb)**

#### CAUTION:

**Be sure to tighten terminal "1" nut carefully.**

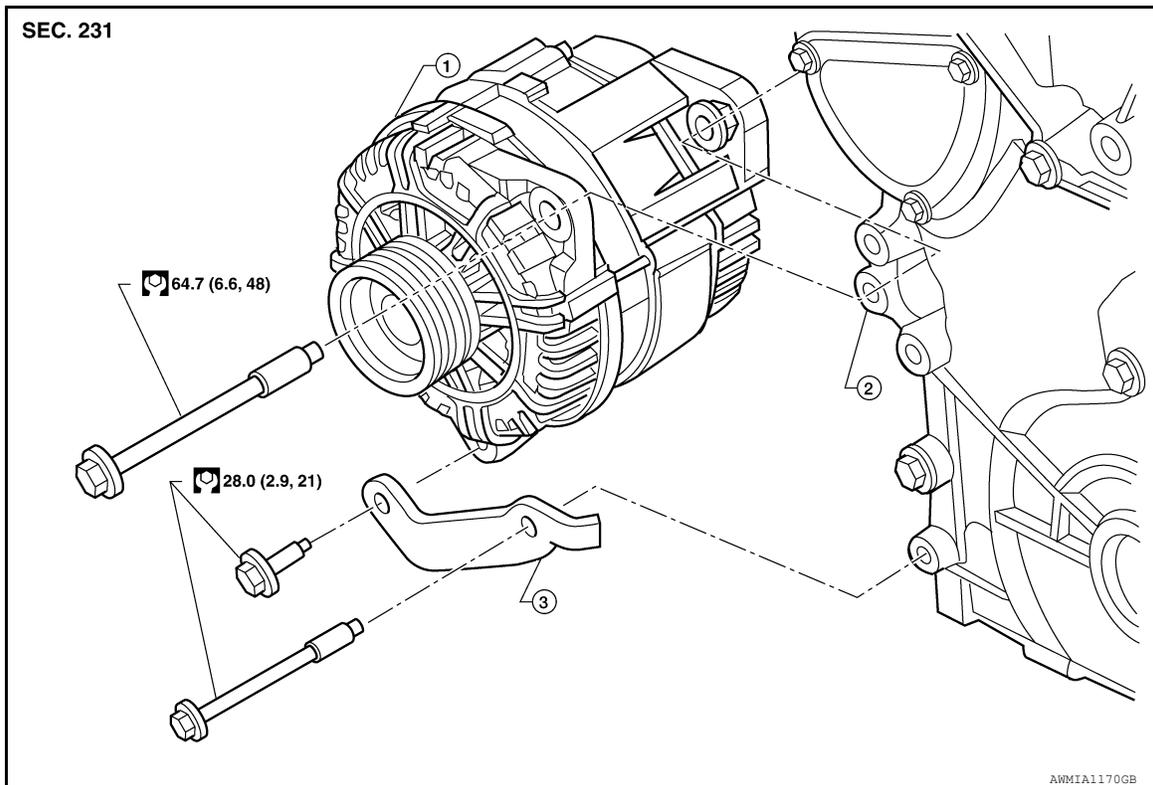
- For this model, the power generation voltage variable control system that controls the power generation voltage of the generator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the generator, and then make sure that the system operates normally. Refer to [CHG-14. "Diagnosis Procedure"](#).

# GENERATOR

< REMOVAL AND INSTALLATION >

## Removal and Installation - VQ40DE Models

INFOID:000000007328110



1. Generator

2. Engine block

3. Generator stay

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

1. Disconnect the negative battery terminal. Refer to [PG-80, "Removal and Installation"](#).
2. Remove engine cooling fan (Motor driven type). Refer to [CO-48, "Removal and Installation \(Motor driven type\)"](#).
3. Remove the drive belt. Refer to [EM-128, "Removal and Installation"](#).
4. Remove generator stay, using power tools.
5. Remove the generator upper bolt, using power tools.
6. Disconnect the generator harness connectors.
7. Remove the generator.

### INSTALLATION

Installation is in the reverse order of removal.

- Install the generator and check tension of drive belt. Refer to [EM-128, "Adjustment"](#).

**Terminal "1" nut : 10.8 N·m (1.1 kg-m, 8 ft-lb)**

### CAUTION:

**Be sure to tighten terminal "1" nut carefully.**

- For this model, the power generation voltage variable control system that controls the power generation voltage of the generator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the generator, and then make sure that the system operates normally. Refer to [CHG-14, "Diagnosis Procedure"](#).

## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Generator

INFOID:000000007328111

Engine	QR25DE	VQ40DE
Type*	LR1110-724C	TG15S179
	Hitachi	Valeo
Nominal rating	12V-110A	14V-130A
Ground polarity	Negative	
Minimum revolution under no-load	1,100 rpm	1,200 rpm
Hot output current (When 13.5 volts is applied)	More than 35A/1,300 rpm More than 70A/1,800 rpm More than 91A/2,500 rpm More than 110A/5,000 rpm	More than 52A/1,500 rpm More than 82A/1,800 rpm More than 115A/2,500 rpm More than 130A/5,000 rpm
Regulated output voltage	13.5 - 14.0V @ 20°C (68°F)	13.5 - 14.0 @ 20°C (68°F)
Adjustment range of power generation variable voltage control	11.7 - 15.3V	11.4 - 15.6V

\*: Always check with the Parts Department for the latest parts information.