

SECTION **CHG**
CHARGING SYSTEM

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PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000007355038

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 Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000007355039

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

PRECAUTIONS

< PRECAUTION >

5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Power Generation Variable Voltage Control System

INFOID:000000007355040

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:000000007355041

- 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 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, and wring the water out of the cloth to wipe the dirty area.
Then rub with a soft and dry cloth.
 - Oily dirt: 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, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.
- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

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PREPARATION

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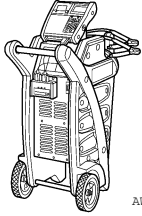
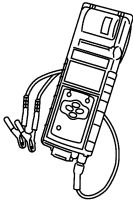
PREPARATION

PREPARATION

Special Service Tool


INFOID:000000007355042

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;">AWIIA12392Z</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:000000007355043

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:000000008802085

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.

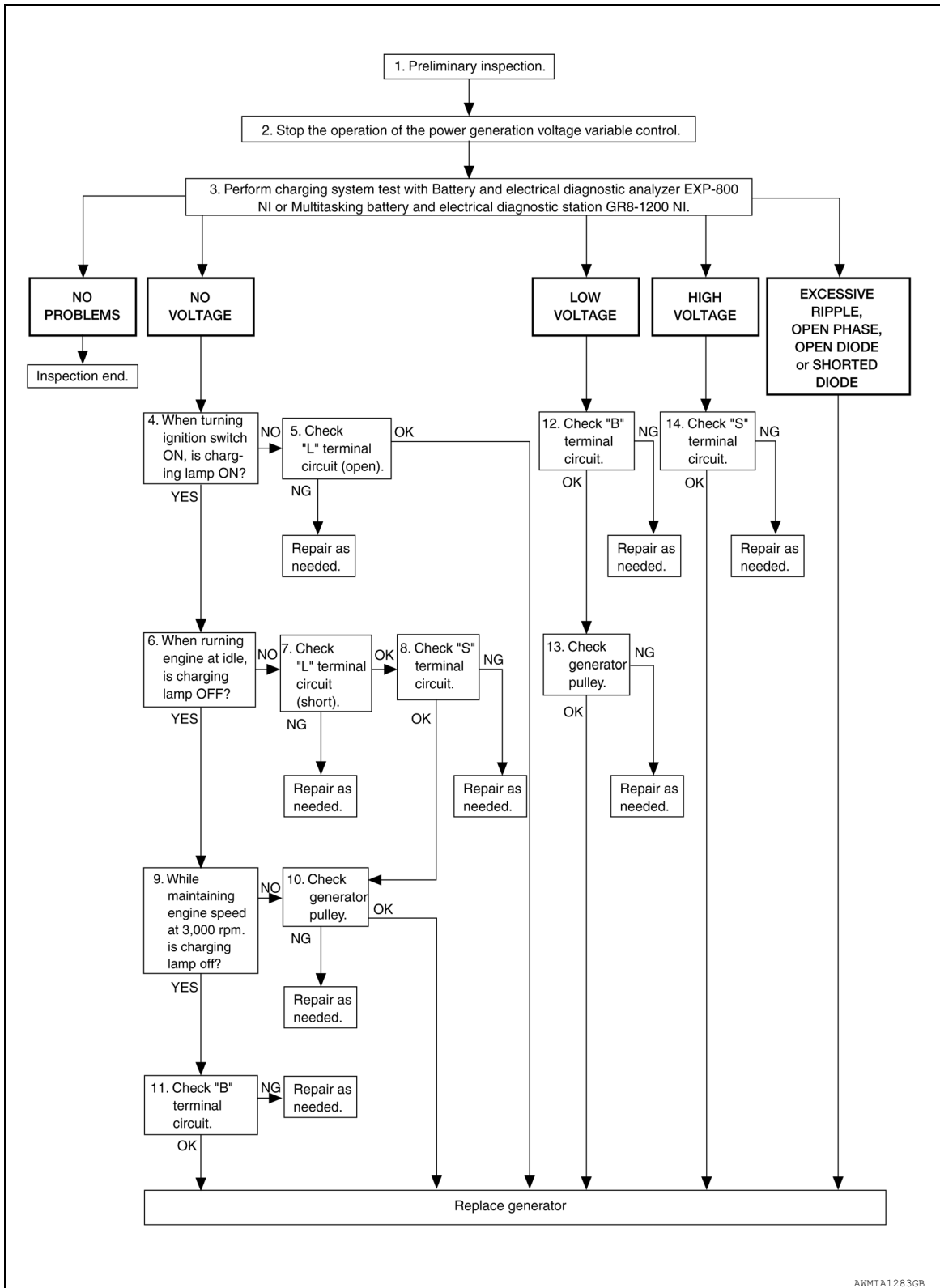
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DIAGNOSIS AND REPAIR WORKFLOW

< 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"](#). 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"](#).

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?

YES >> GO TO 10.

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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 [CHG-28, "Removal and Installation"](#).

Is generator pulley normal?

YES >> Replace generator. Refer to [CHG-28, "Removal and Installation"](#).

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"](#).

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 [CHG-28, "Removal and Installation"](#).

Is generator pulley normal?

YES >> Replace generator. Refer to [CHG-28, "Removal and Installation"](#).

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"](#).

NO >> Repair as needed.

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

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OVERALL SEQUENCE

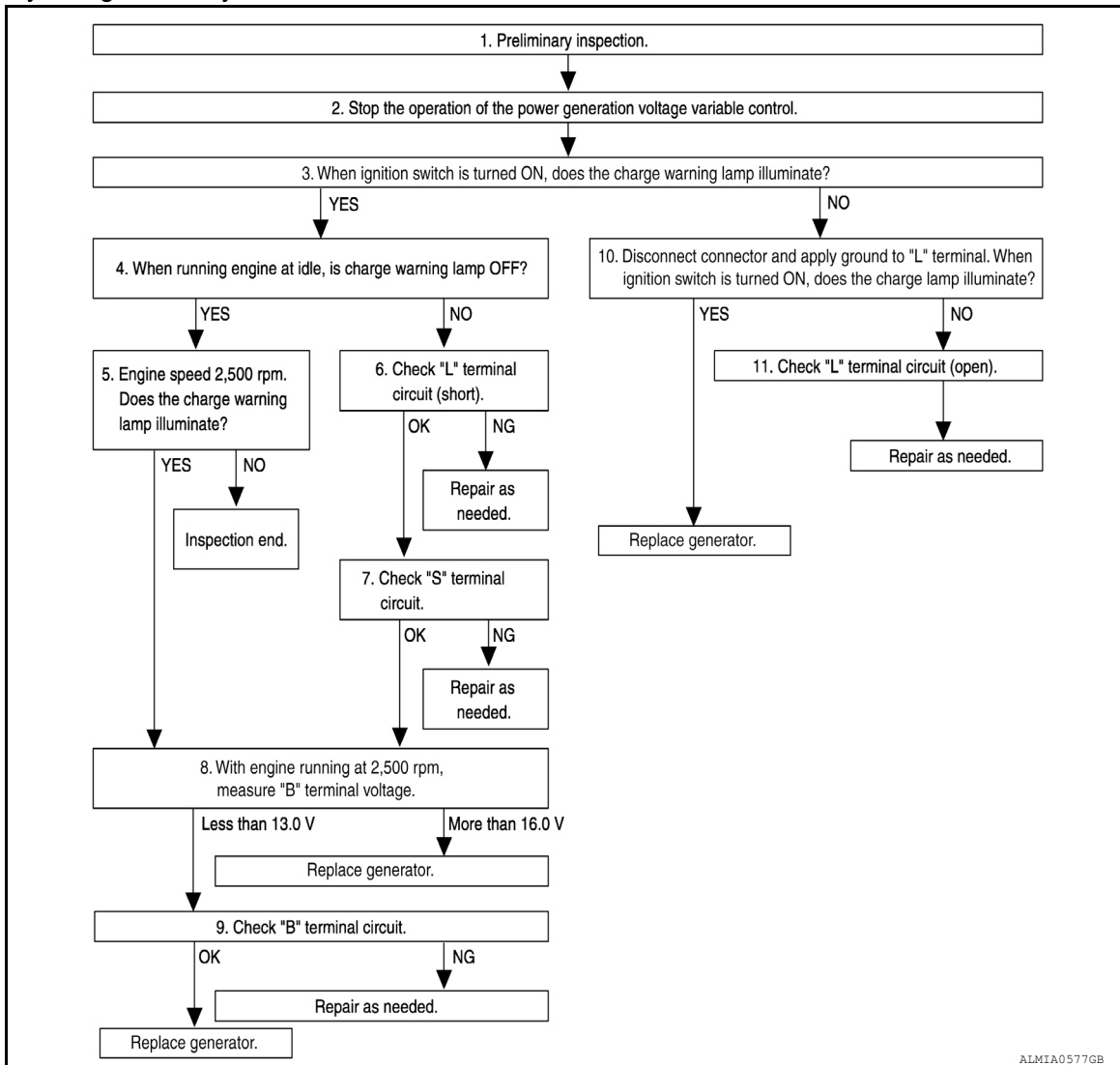
Before performing a generator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test.

- 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"](#).

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"](#).
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"](#).
NO >> GO TO 11.

11.CHECK “L” TERMINAL CIRCUIT (OPEN)

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

>> Repair as needed.

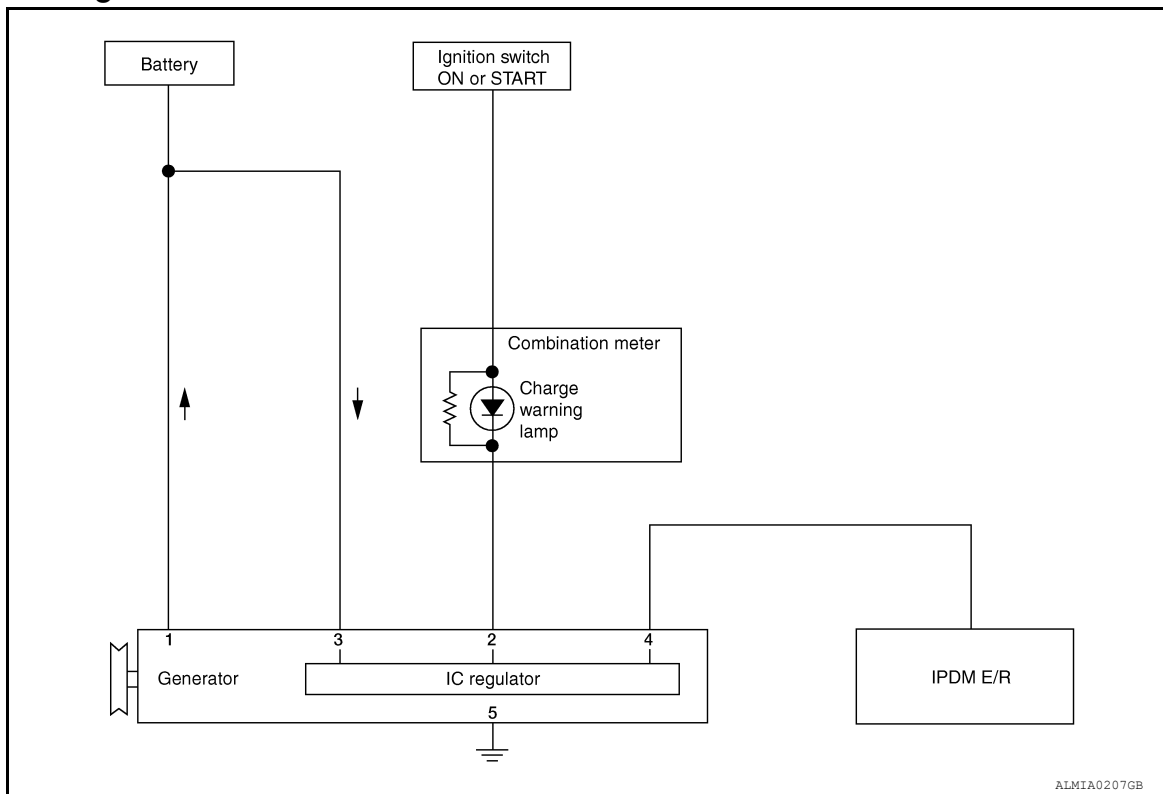
CHARGING SYSTEM

< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

CHARGING SYSTEM

System Diagram



System Description

INFOID:000000007355046

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:000000007355047

Component part		Description
Generator	Terminal "1"	Refer to CHG-16, "Description" .
	Terminal "2"	Refer to CHG-17, "Description" .
	Terminal "3"	Refer to CHG-20, "Description" .
	Terminal "4"	Used for the power generation voltage variable control system. Refer to CHG-12, "System Description" .
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"> Excessive voltage is produced. No voltage is produced.
IPDM E/R		Used for the power generation voltage variable control system. Refer to CHG-12, "System Description" .

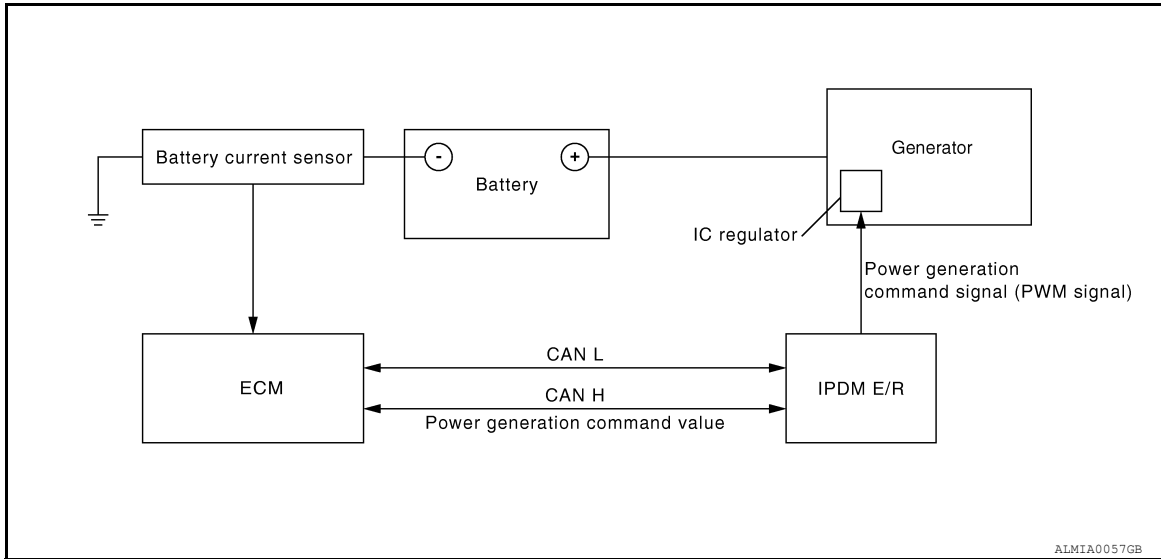
POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< SYSTEM DESCRIPTION >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

System Diagram

INFOID:000000007355048



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System Description

INFOID:000000007355049

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:000000007355050

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:000000007355051

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 A
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"](#) (VQ40DE) or [EM-152, "Checking Drive Belts"](#) (VK56DE).

Is the inspection result normal?

YES >> Inspection End.

NO >> Repair as needed.

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POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< DTC/CIRCUIT DIAGNOSIS >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Diagnosis Procedure

INFOID:000000007355052

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-77, "CONSULT Function"](#) (VQ40DE) or [EC-533, "CONSULT Function"](#) (VK56DE).

Is the inspection result normal?

YES >> GO TO 2

NO >> Check applicable parts, and repair or replace corresponding parts.

2. CHECK OPERATION OF POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

1. Connect 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 inspection result normal?

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 \(IPDM E/R\)"](#).

Is the inspection result normal?

YES >> GO TO 4

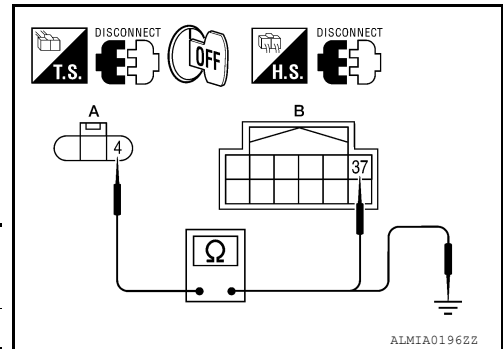
NO >> Check applicable parts, and repair or replace corresponding parts.

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

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-29. "Removal and Installation of IPDM E/R"](#).
 NO >> Repair harness or connector between IPDM E/R and generator.

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B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

B TERMINAL CIRCUIT

Description

INFOID:000000007355053

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

Diagnosis Procedure

INFOID:000000007355054

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

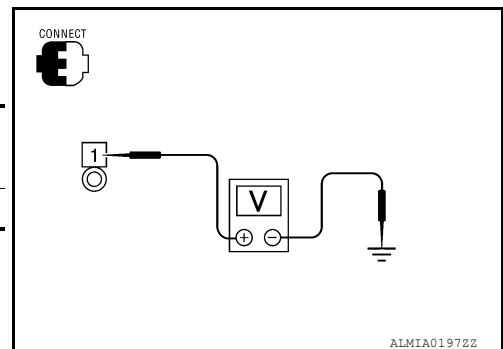
Check voltage between generator connector E206 terminal 1 and ground.

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

Is the inspection result normal?

YES >> GO TO 3.

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



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

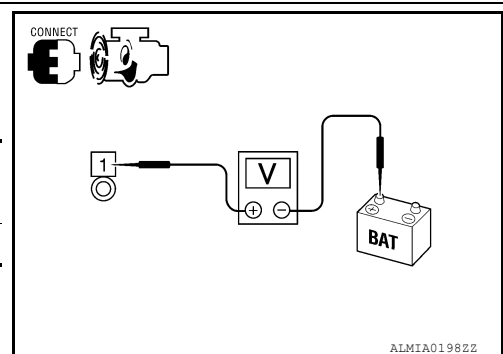
1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector E206 terminal 1.

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

Is the inspection result normal?

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:000000008802447

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:000000008802448

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

1. CHECK "2" TERMINAL CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "2" 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 "2" 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 >> "2" 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

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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	2	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:000000008802449

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:000000008802450

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

1. CHECK "2" 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.

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S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

S TERMINAL CIRCUIT

Description

INFOID:000000007355057

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:000000007355058

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

1. CHECK TERMINAL "3" CONNECTION

Check to see if connector E205 terminal 3 is clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair terminal "3" 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.

3 - ground

Battery voltage

Is the inspection result normal?

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

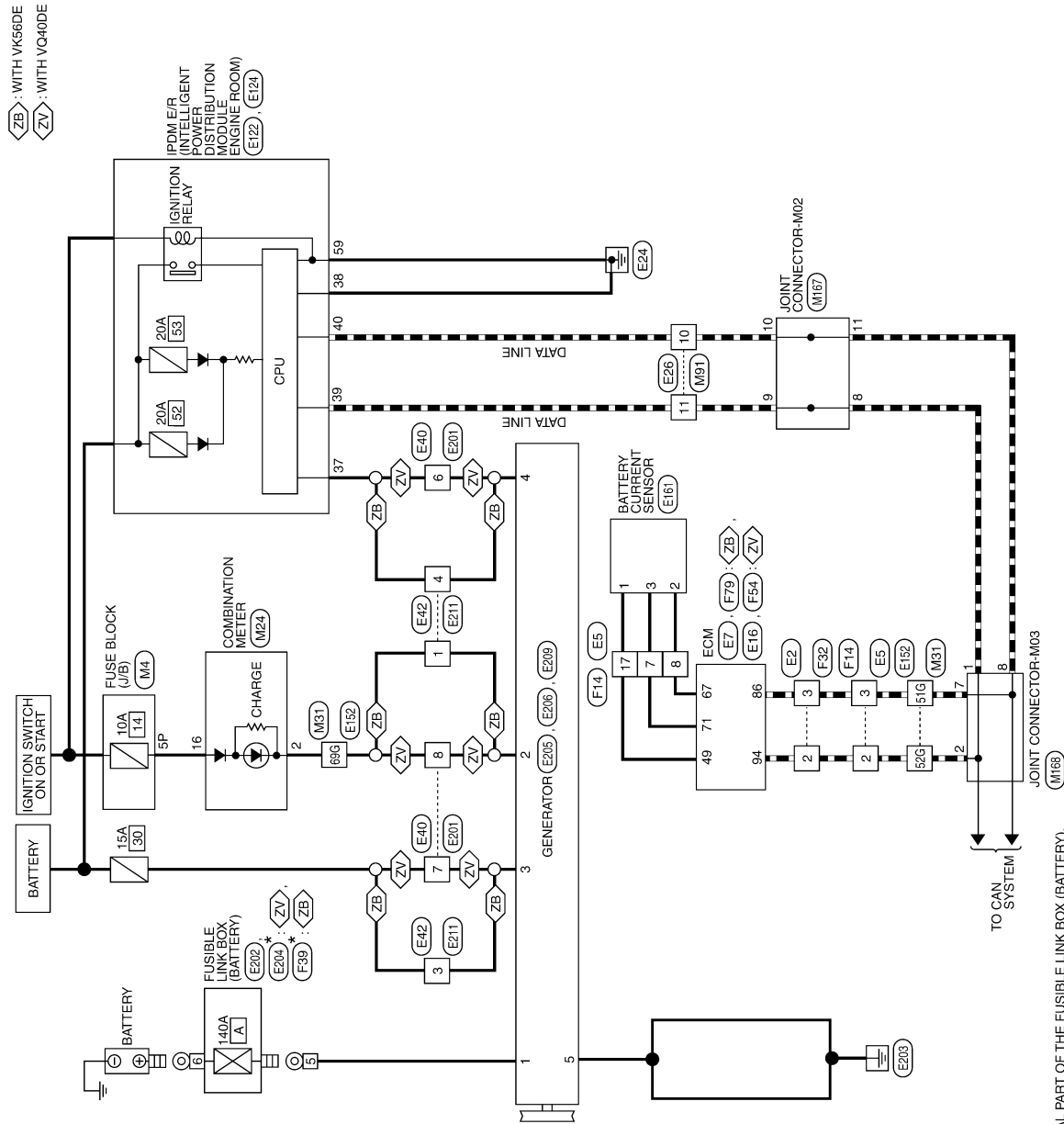
< WIRING DIAGRAM >

WIRING DIAGRAM

CHARGING SYSTEM

Wiring Diagram

INFOID:000000007355059



* : THIS CONNECTOR IS AN INTEGRAL PART OF THE FUSIBLE LINK BOX (BATTERY).

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CHARGING SYSTEM

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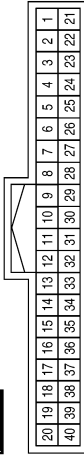
CHARGING SYSTEM CONNECTORS

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



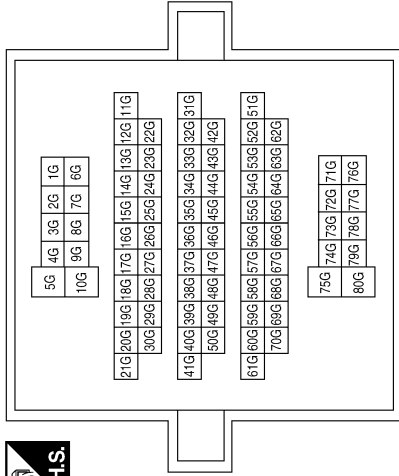
Terminal No.	Color of Wire	Signal Name
5P	W/G	-

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE



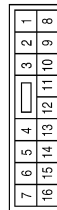
Terminal No.	Color of Wire	Signal Name
2	P	CHARGE (ALT) INPUT
16	W/G	RUN START

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



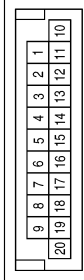
Terminal No.	Color of Wire	Signal Name
51G	P	-
52G	L	-
69G	P	-

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



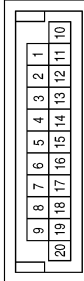
Terminal No.	Color of Wire	Signal Name
10	P	-
11	L	-

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



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

Connector No.	M168
Connector Name	JOINT CONNECTOR-M03
Connector Color	GREEN

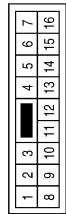


Terminal No.	Color of Wire	Signal Name
1	L	-
2	L	-
7	P	-
8	P	-

CHARGING SYSTEM

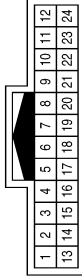
< WIRING DIAGRAM >

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



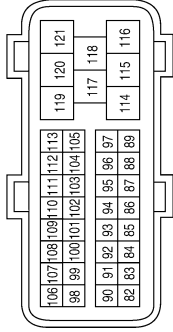
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-

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



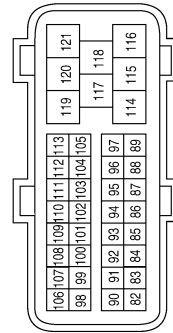
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-
7	R	-
8	B	-
17	P	-

Connector No.	E7
Connector Name	ECM (WITH VK56DE)
Connector Color	BLACK



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

Connector No.	E16
Connector Name	ECM (WITH VQ40DE)
Connector Color	BLACK



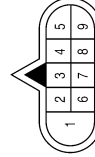
Terminal No.	Color of Wire	Signal Name
86	P	CAN-L
94	L	CAN-H

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



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

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



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

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CHARGING SYSTEM

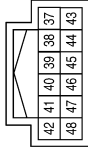
< WIRING DIAGRAM >

Connector No.	E42
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	P	-
3	SB	-
4	Y	-

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



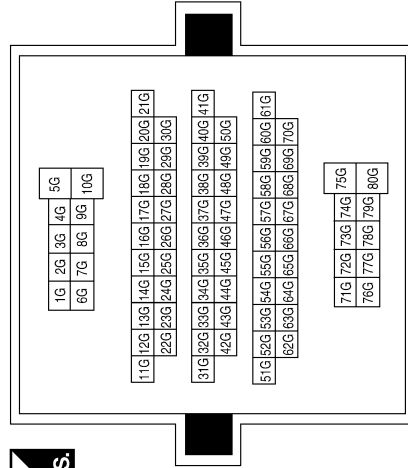
Terminal No.	Color of Wire	Signal Name
37	Y	ALT-C CONT
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L

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



Terminal No.	Color of Wire	Signal Name
1	P	POWER SUPPLY
2	B	GND
3	R	SIGNAL

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CHARGING SYSTEM

< WIRING DIAGRAM >

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



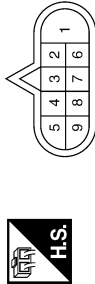
Terminal No.	Color of Wire	Signal Name
6	B/R	-

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



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

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.	E209
Connector Name	GENERATOR
Connector Color	-



Terminal No.	Color of Wire	Signal Name
5	B	E

Connector No.	E206
Connector Name	GENERATOR
Connector Color	-



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

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

ABMIA3476GB

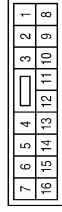
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CHARGING SYSTEM

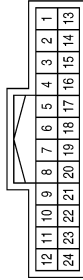
< WIRING DIAGRAM >

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



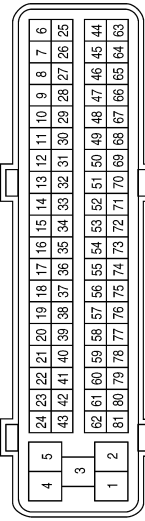
Terminal No.	Color of Wire	Signal Name
2	L	-
3	P	-
7	R	-
8	B	-
17	P	-

Connector No.	E211
Connector Name	WIRE TO WIRE
Connector Color	BLACK



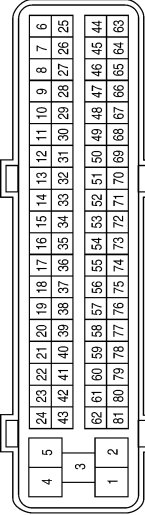
Terminal No.	Color of Wire	Signal Name
1	P	-
3	SB	-
4	Y	-

Connector No.	F79
Connector Name	ECM (WITH VK56DE)
Connector Color	BLACK



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

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.	F39
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-



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

ABMIA3477GB

CHARGING SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000007355060

Symptom	Reference
Battery discharged	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)" .
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.	

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GENERATOR

< REMOVAL AND INSTALLATION >

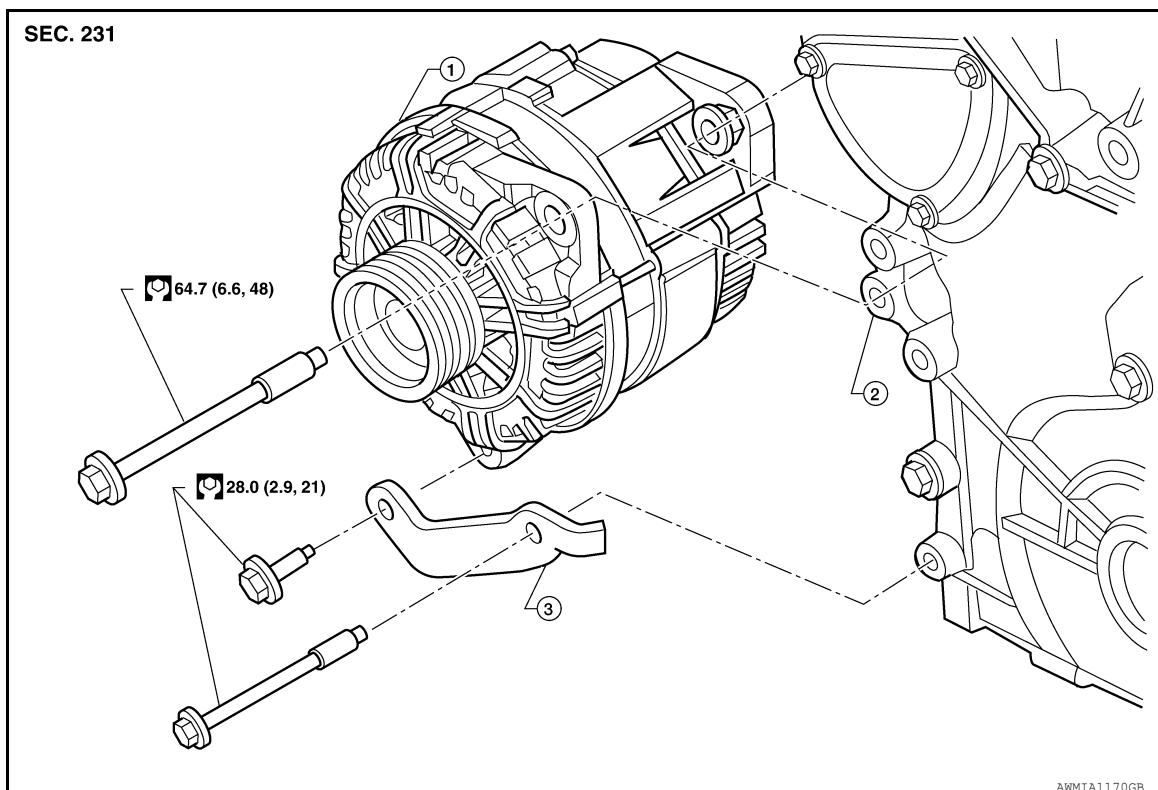
REMOVAL AND INSTALLATION

GENERATOR

Removal and Installation

INFOID:000000007355061

VQ40DE MODELS



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-76. "Removal and Installation"](#).
2. Partially drain the engine coolant. Refer to [CO-12. "Changing Engine Coolant"](#).
3. Remove engine room cover.
4. Remove air duct and resonator assembly. Refer to [EM-26. "Exploded View"](#).
5. Remove upper radiator hose.
6. Disconnect coolant reservoir hose from radiator.
7. Remove the crankcase ventilation hose.
8. Remove the fan shroud. Refer to [CO-17. "Exploded View"](#).
9. Remove engine cooling fan (Motor Driven Type). Refer to [CO-21. "Removal and Installation \(Motor driven type\)"](#).
10. Remove the drive belt. Refer to [EM-14. "Removal and Installation"](#).
11. Remove the generator stay, using power tools.
12. Remove the generator upper bolt, using power tools.
13. Disconnect the generator harness connectors.
14. Remove the generator.

GENERATOR

< REMOVAL AND INSTALLATION >

Installation

Installation is in the reverse order of removal.

- Install the generator and check the tension of the drive belt. Refer to [EM-14, "Checking Drive Belts"](#).

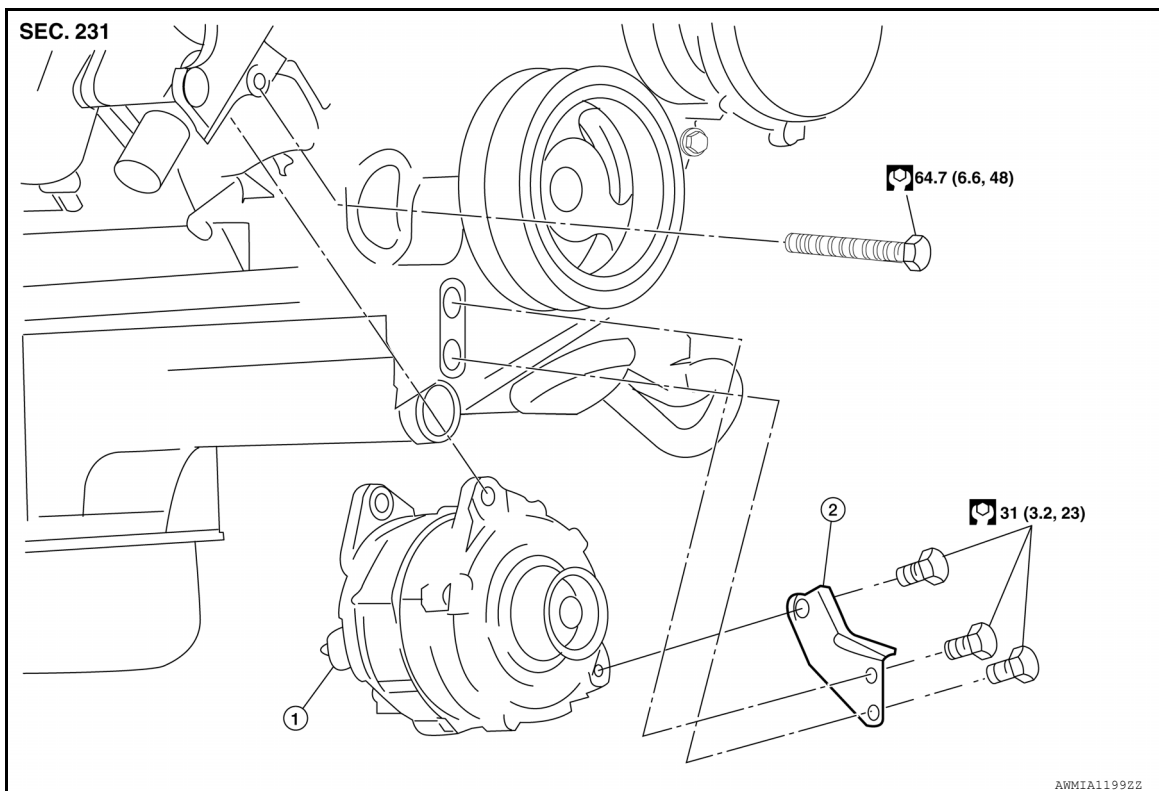
CAUTION:

Tighten terminal nut carefully.

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

- For this model, the power generation variable voltage control system that controls the power generation voltage of the generator has been adopted. Therefore, the power generation variable voltage 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"](#).

VK56DE MODELS



1. Generator

2. Lower bracket

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-76, "Removal and Installation"](#).
2. Remove engine room cover. Refer to [EM-163, "Removal and Installation"](#).
3. Partially drain the engine coolant. Refer to [CO-42, "Changing Engine Coolant"](#).
4. Remove air duct and resonator assembly and air cleaner case (upper). Refer to [EM-164, "Exploded View"](#).
5. Remove upper radiator hose. Refer to [CO-46, "Exploded View"](#).
6. Remove the lower fan shroud. Refer to [CO-46, "Exploded View"](#).
7. Disconnect the coolant reservoir hose from the radiator. Refer to [CO-46, "Exploded View"](#).
8. Remove the upper fan shroud. Refer to [CO-46, "Exploded View"](#).
9. Remove the drive belt. Refer to [EM-152, "Removal and Installation"](#).
10. Remove the lower bracket, using power tools.

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GENERATOR

< REMOVAL AND INSTALLATION >

11. Remove the generator upper bolt, using power tools.
12. Disconnect the generator harness connectors.
13. Remove the generator.

Installation

Installation is in the reverse order of removal.

- Install the generator and check the tension of the drive belt. Refer to [EM-152, "Checking Drive Belts"](#).

CAUTION:

Tighten terminal nut carefully.

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

- For this model, the power generation variable voltage control system that controls the power generation voltage of the generator has been adopted. Therefore, the power generation variable voltage control system operation inspection should be performed after replacing the generator, and then make sure that the system operates normally.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Generator

INFOID:000000007355062

Application	VQ40DE	VK56DE
Type*	TG15S179	TG15S179
	Valeo	Valeo
Nominal rating	14V-130A	14V-130A
Ground polarity	Negative	Negative
Minimum revolution under no-load	1,200 rpm	1,200 rpm
Hot output current (When 13.5 volts is applied)	More than 52A/1,500 rpm More than 82A/1,800 rpm More than 115A/2,500 rpm More than 130A/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 @ 5,000 rpm @ 20°C (68°F)	13.5 @ 5,000 rpm @ 20°C (68°F)
Adjustment range of power generation variable voltage control	11.4 - 15.6V	11.4 - 15.6V

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

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