SECTION CHG
CHARGING SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000012875184

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, 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 Air Bag Diagnosis Sensor Unit or other Air Bag 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 or batteries, and wait at least three minutes before performing any service.**

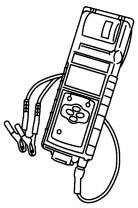
PREPARATION

PREPARATION

Special Service Tool

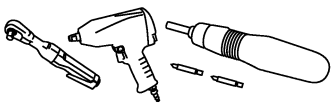
INFOID:0000000012875185

The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
— (165-GR8-1200KIT-NI) Nissan battery and electronics tester  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.
— (165-EXP-800-NI) Midtronic hand-held battery tester  JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tool

INFOID:0000000012875186

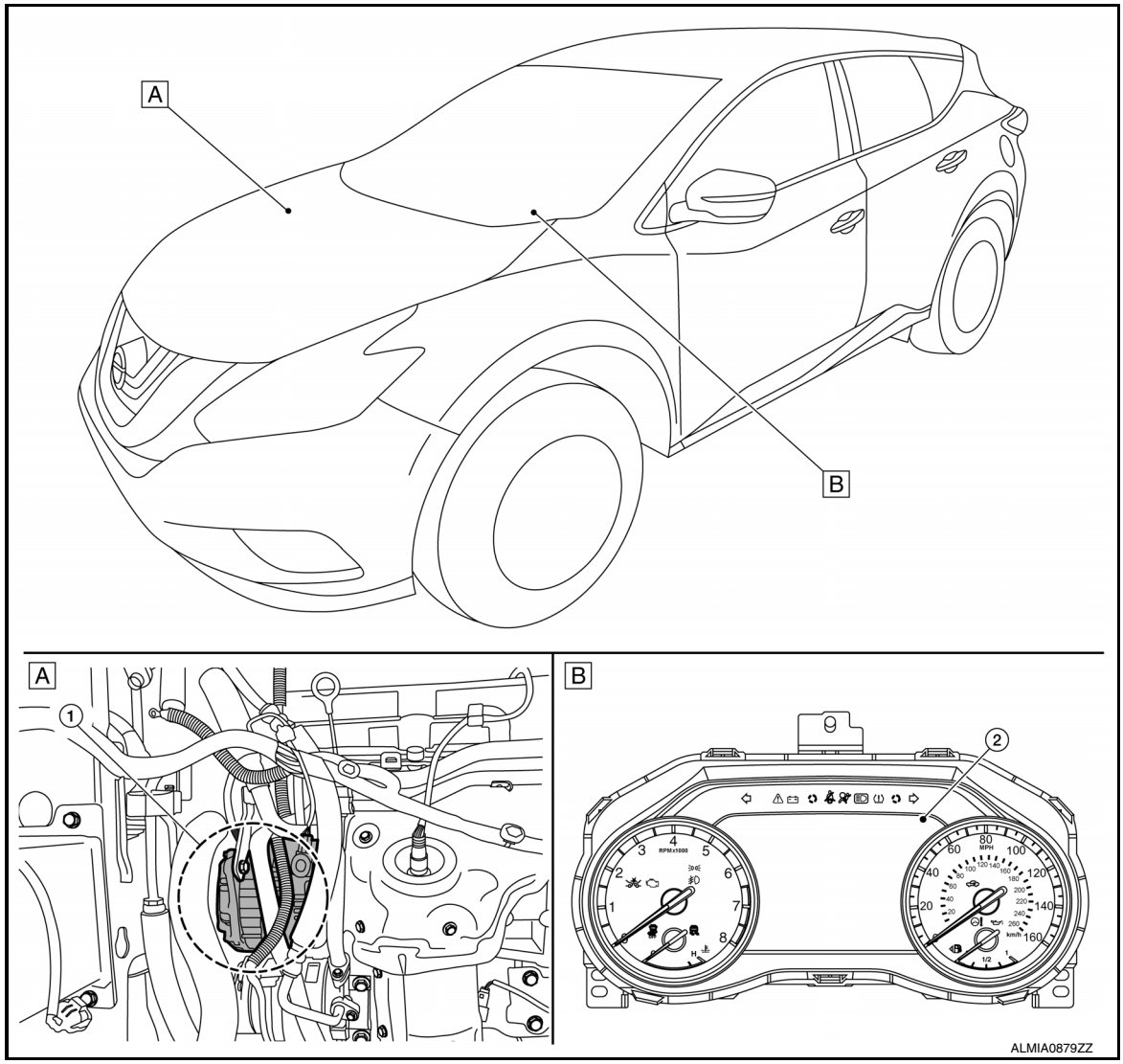
Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000012875187



A. Engine room left side B. Combination meter

Component Description

INFOID:0000000012875188

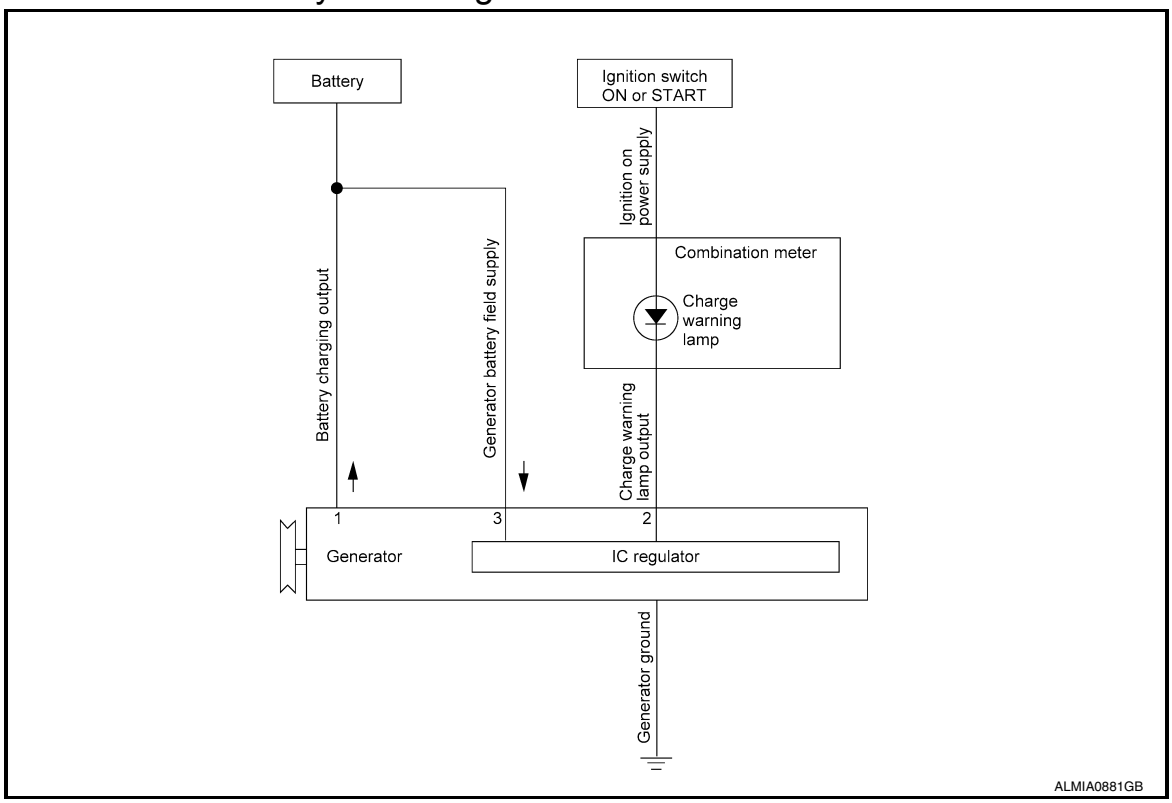
No.	Component part	Description
1.	Generator (IC regulator)	The IC regulator controls the power generation voltage by the target power generation voltage based on the received power generation command signal. When there is no power generation command signal, the generator performs the normal power generation according to the characteristic of the IC voltage regulator.
2.	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: ·Excessive voltage is produced. ·No voltage is produced.

SYSTEM

CHARGING SYSTEM

CHARGING SYSTEM : System Diagram

INFOID:0000000012875189



CHARGING SYSTEM : System Description

INFOID:0000000012875190

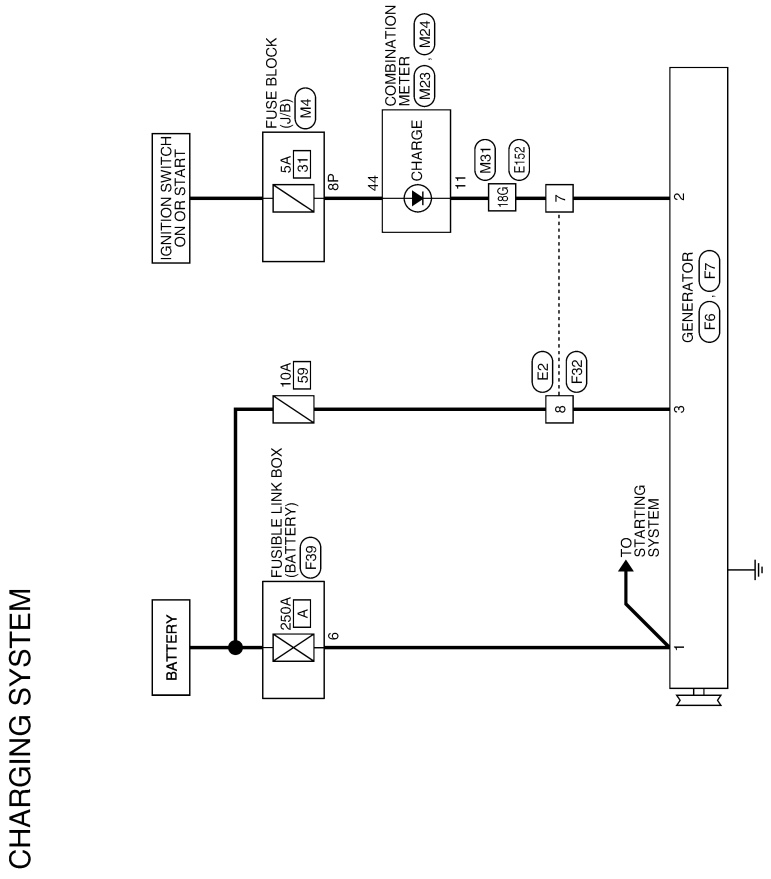
The generator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.

WIRING DIAGRAM

CHARGING SYSTEM

Wiring Diagram

INFOID:0000000012875191



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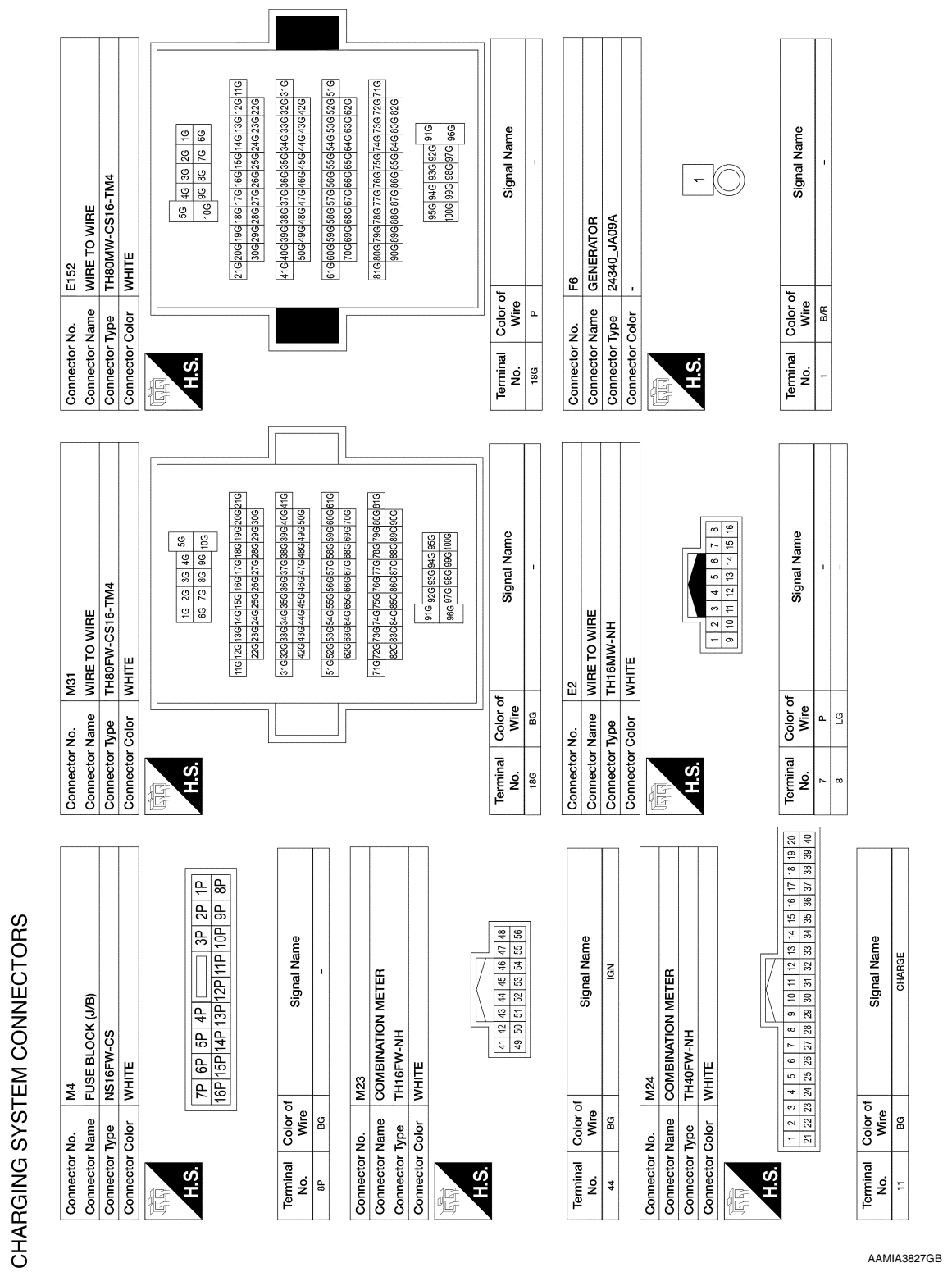
CHARGING SYSTEM CONNECTORS



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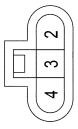
Connector No.	F7
Connector Name	GENERATOR
Connector Type	HS03FB
Connector Color	BLACK

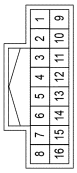
H.S.



Terminal No.	Color of Wire	Signal Name
2	GR	-
3	BR	-

Connector No.	F32
Connector Name	WIRE TO WIRE
Connector Type	TH16FW-NH
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
7	GR	-
8	BR	-

Connector No.	F39
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Type	24340_JA04D
Connector Color	-

H.S.

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

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

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

INFOID:0000000012875192

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

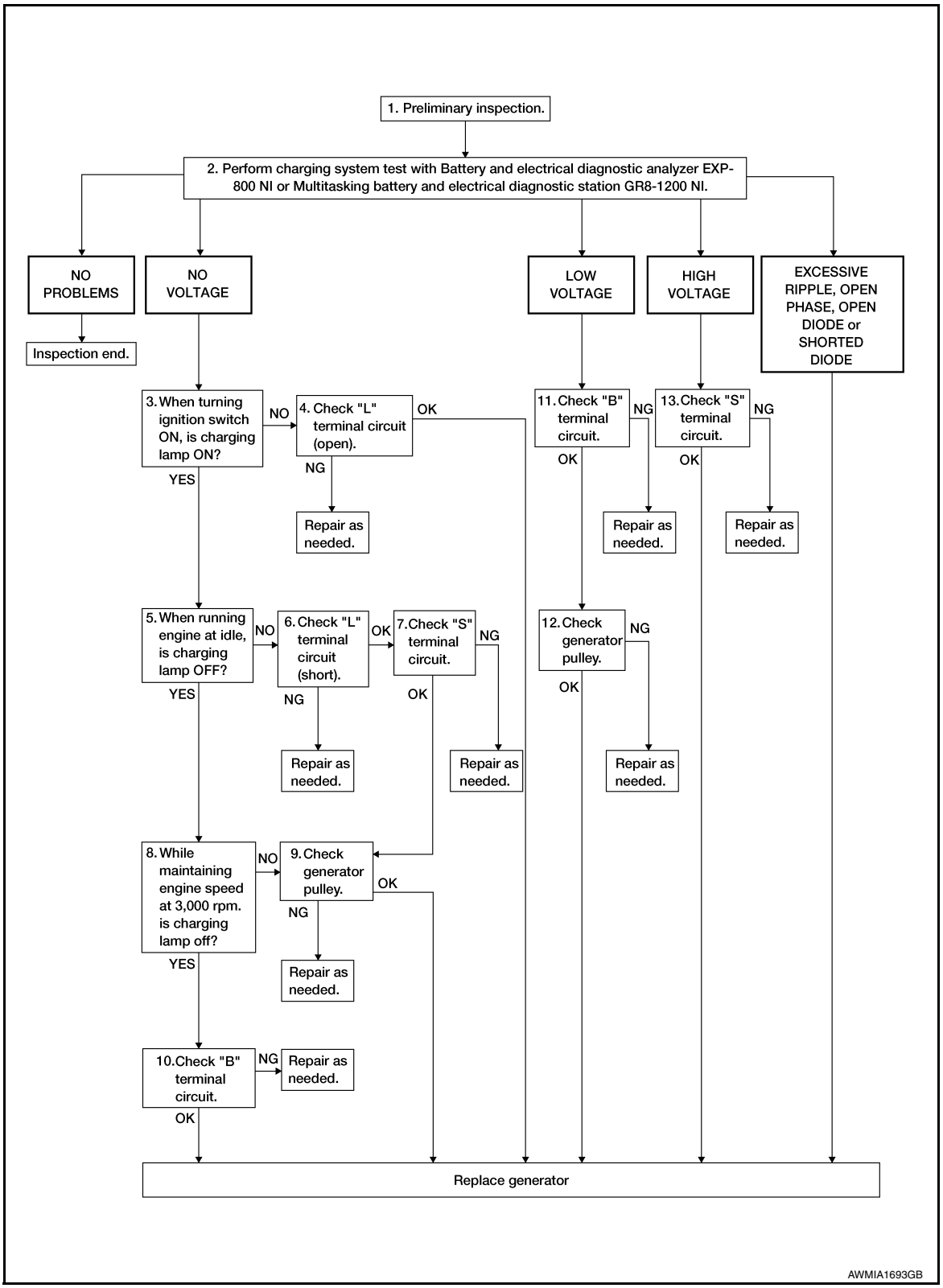
To test the charging system, use the following special service tools:

- 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.

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

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

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-15, "Diagnosis Procedure".

>> GO TO 2.

2.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 3.
LOW VOLTAGE>> GO TO 11.
HIGH VOLTAGE>> GO TO 13.
EXCESSIVE RIPPLE, OPEN PHASE, OPEN DIODE or SHORTED DIODE>> Replace the generator. Refer to CHG-22, "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.

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

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

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

4.“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-22, "Removal and Installation".
NO >> Repair as needed.

5.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 8.
NO >> GO TO 6.

6.“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 7.
NO >> Repair as needed.

7.“S” TERMINAL CIRCUIT INSPECTION

Check “S” terminal circuit. Refer to CHG-20, "Diagnosis Procedure".

Is the “S” terminal circuit normal?

YES >> GO TO 9.
NO >> Repair as needed.

8.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 10.
NO >> GO TO 9.

9.INSPECTION OF GENERATOR PULLEY

Check generator pulley. Refer to CHG-22, "Inspection".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-22, "Removal and Installation".

NO >> Repair as needed.

10. "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-22, "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 >> GO TO 12.
NO >> Repair as needed.

12. INSPECTION OF GENERATOR PULLEY

Check generator pulley. Refer to CHG-22, "Inspection".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-22, "Removal and Installation".
NO >> Repair as needed.

13. "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-22, "Removal and Installation".
NO >> Repair as needed.

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

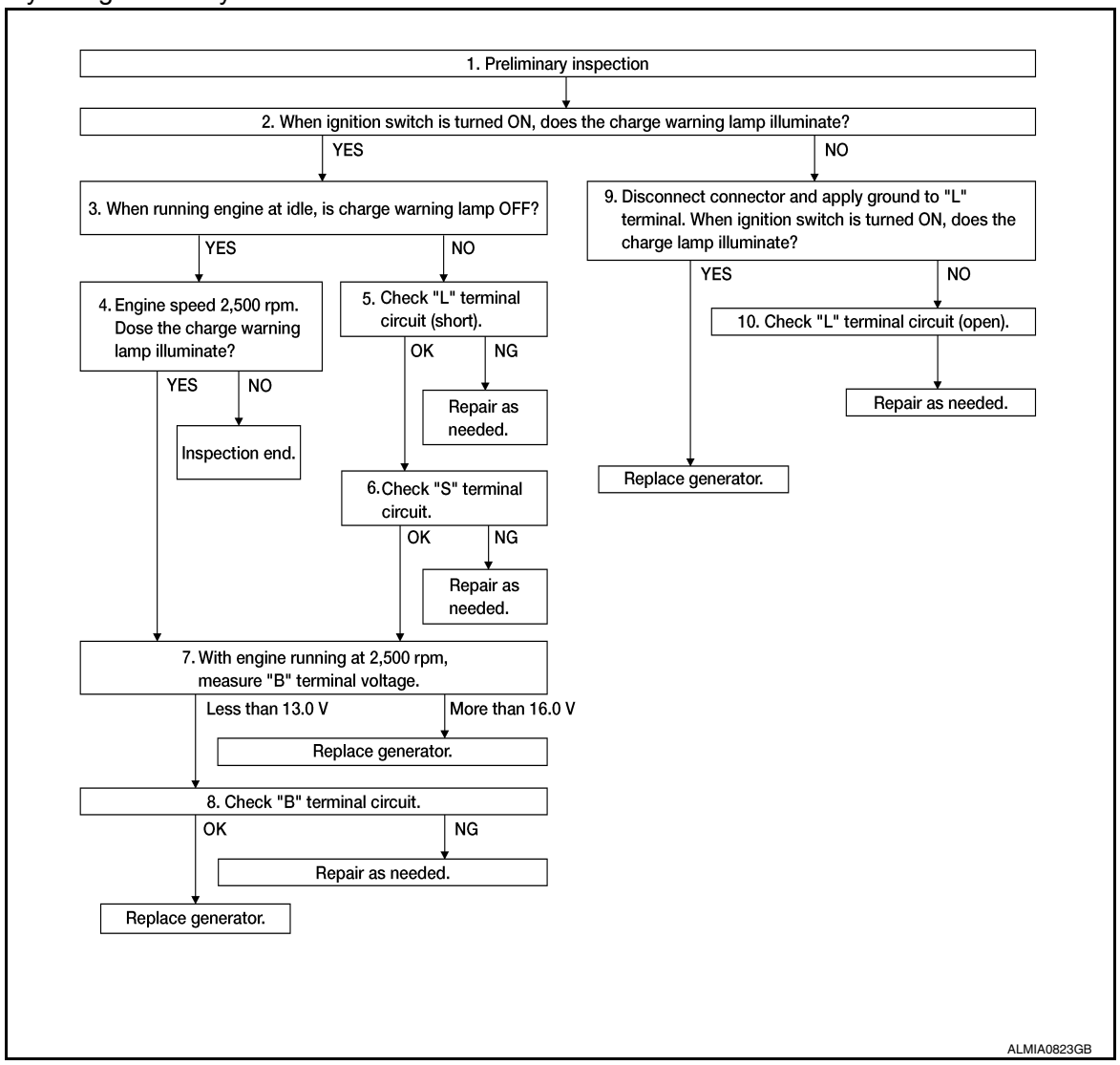
INFOID:0000000012875193

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.

• Use fully charged battery.



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-15, "Diagnosis Procedure".

>> GO TO 2.

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

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 3.
NO >> GO TO 9.

3.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

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

4.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 7.
NO >> Inspection End.

5. "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 6.
NO >> Repair as needed.

6. "S" TERMINAL CIRCUIT INSPECTION

Check terminal "S" circuit. Refer to CHG-20, "Diagnosis Procedure".

Is the inspection result normal?

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

7. 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 8.
More than 16.0 V>> Replace generator. Refer to CHG-22, "Removal and Installation".

8. "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-22, "Removal and Installation".
NO >> Repair as needed.

9. 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-22, "Removal and Installation".
NO >> GO TO 10.

10. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit open. Refer to CHG-17, "Diagnosis Procedure".

>> Repair as needed.

DTC/CIRCUIT DIAGNOSIS

CHARGING SYSTEM PRELIMINARY INSPECTION

Diagnosis Procedure

INFOID:0000000012875194

1.CHECK BATTERY TERMINAL CONNECTIONS

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 the applicable instruction manual for proper testing procedures.

2.CHECK FUSE AND FUSIBLE LINK

Check for blown fuse and fusible link.

Unit	Power source (power supply terminal)	Fuse or fusible link
Generator	Battery (terminal 3)	Fuse 59
	Battery (terminal 1)	Fusible Link **A**
Combination meter	Ignition switch ON (terminal 2)	Fuse 31

Is the fuse or fusible link blown?

YES >> Replace the blown fuse or fusible link after repairing the affected circuit.
NO >> GO TO 3.

3.CHECK GENERATOR GROUND

Check if generator case ground is clean.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair connection.

4.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to CHG-22, "Inspection".

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair as needed.

B TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:0000000012875195

Regarding Wiring Diagram information, refer to CHG-6, "Wiring Diagram".

1.CHECK TERMINAL "B" CONNECTION

1. Turn ignition switch OFF.
2. Verify terminal “B” is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair terminal “B” connection. Confirm repair by performing complete charging system test. using the EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable instruction manual for proper testing procedures.

2.CHECK TERMINAL "B" CIRCUIT

Check voltage between generator connector F6 terminal 1 and ground.

(+)		(-)	Voltage (Approx.)
Connector	Terminal		
F6	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness for open between generator and fusible link.

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

1. Start engine, engine should be running at idle and warm.
2. Check voltage between battery positive terminal and generator connector F6 terminal 1.

(+)		(-)	Voltage (Approx.)
Connector	Terminal		
F6	1	Battery positive terminal	Less than 0.2 V

Is the inspection result normal?

YES >> Terminal “B” circuit is normal. Refer to CHG-9, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-12, "Work Flow (Without EXP-800 NI or GR8-1200 NI)".
NO >> Check harness between battery and generator for high resistance.

L TERMINAL CIRCUIT (OPEN)

Diagnosis Procedure

INFOID:0000000012875196

Regarding Wiring Diagram information. Refer to CHG-6, "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 generator connector F7.
2. Apply ground generator harness connector F7 terminal 2.
3. Check condition of the charge warning lamp with the ignition switch in the ON position.

Generator		(−)	Condition	
Connector	Terminal		Ignition switch position	Charge warning lamp
F7	2	Ground	ON	Illuminate

Does it illuminate?

YES >> “L” terminal circuit is normal. Refer to CHG-9, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-12, "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 combination meter connector M24 and generator connector F7.
3. Check continuity between generator harness connector F7 terminal 2 and combination meter harness connector M24 terminal 11.

Generator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F7	2	M24	11	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 M23 terminal 44 and fuse block (J/B) M4 terminal 8P.

Combination meter		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M23	44	M4	8P	Yes

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 M23 terminal 44 and ground.

(+)		(-)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M23	44	Ground	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-72, "Removal and Installation".
NO >> Repair or replace the harness or connectors.

L TERMINAL CIRCUIT (SHORT)

Diagnosis Procedure

INFOID:0000000012875197

Regarding Wiring Diagram information, refer to CHG-6, "Wiring Diagram".

1.CHECK “L” TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect generator connector F7.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 2.
NO >> Refer to CHG-9, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-12, "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 M23.
4. Check continuity between the combination meter harness connector M23 terminal 44 and ground.

Combination meter		(–)	Continuity
Connector	Terminal		
M23	44	Ground	No

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-72, "Removal and Installation".
NO >> Repair or replace the harness or connectors.

S TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:0000000012875198

Regarding Wiring Diagram information. Refer to CHG-6, "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 the applicable Instruction Manual for proper testing procedures.

2.CHECK “S” TERMINAL CIRCUIT

Check voltage between generator harness connector F7 terminal 3 and ground.

(+)		(–)	Voltage (Approx.)
Generator			
Connector	Terminal		
F7	3	Ground	Battery voltage

Is the inspection result normal?

YES >> Refer to CHG-9, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-12, "Work Flow (Without EXP-800 NI or GR8-1200 NI)".
NO >> Check harness for open between generator and fuse.

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000012875199

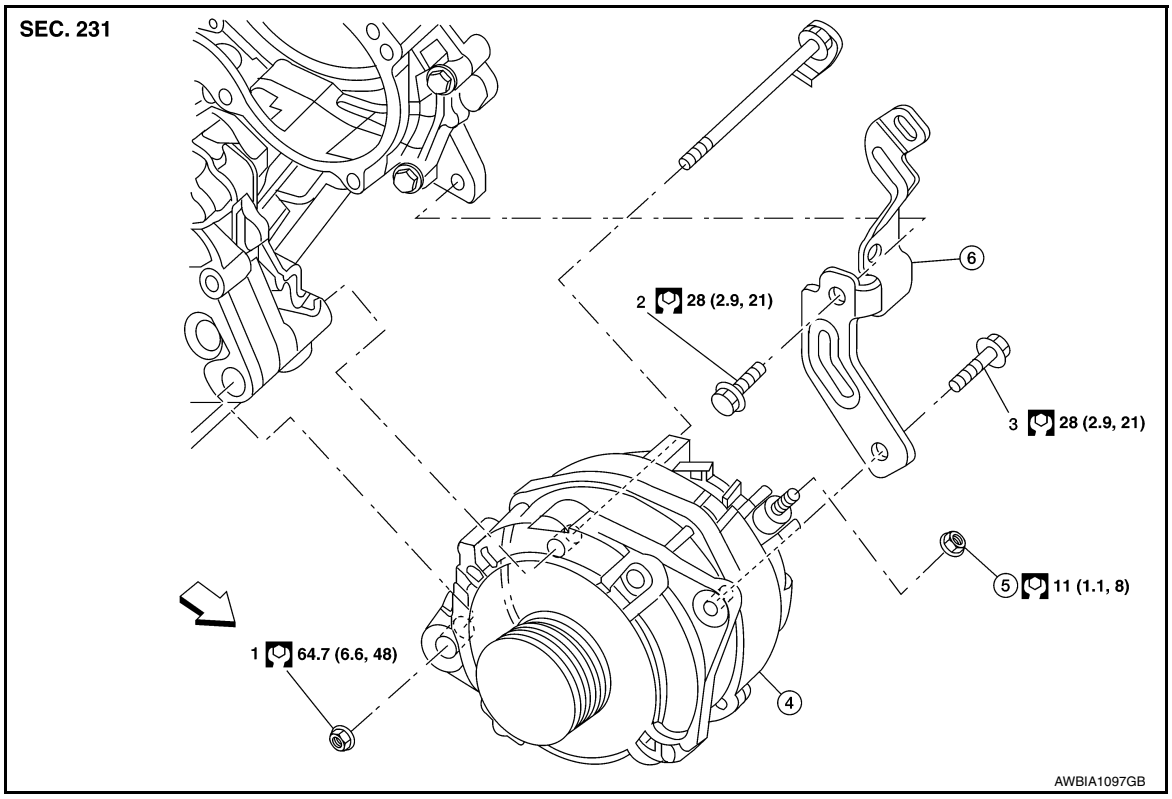
Symptom	Reference
Battery discharged	Refer to CHG-9, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-12, "Work Flow (Without EXP-800 NI or GR8-1200 NI)".
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charge warning lamp turns ON when increasing the engine speed.	

REMOVAL AND INSTALLATION

GENERATOR

Exploded View

INFOID:0000000012875200



1 - 3 Tightening order
4. Generator
5. "B" terminal nut
6. Generator bracket
⇦ Front

Removal and Installation

INFOID:0000000012875201

REMOVAL

1. Remove radiator assembly. Refer to CO-12, "Removal and Installation".
2. Remove cooling fan assembly. Refer to CO-14, "Removal and Installation".
3. Remove drive belt auto-tensioner assembly. Refer to EM-16, "Removal and Installation of Drive Belt Auto-tensioner".
4. Disconnect the harness connectors from the generator.
5. Remove generator bracket.
6. Remove generator bolts and nut using power tools.
7. Slide the generator out and remove.

INSTALLATION

Installation is in the reverse order of removal. Refer to CHG-22, "Exploded View".

- Temporarily tighten bolts and nut then tighten nut and bolts in the specified numerical order.

CAUTION:

Be sure to tighten “B” terminal nut carefully.

- Install generator and check tension of belt. Refer to EM-14, "Checking Drive Belt".

Inspection

INFOID:0000000012875202

GENERATOR PULLEY INSPECTION

Perform the following.
- Make sure that generator pulley does not rattle.
- Make sure that generator pulley nut is tight.

NOTE:
Replace the generator as an assembly if necessary.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Generator

INFOID:0000000012875203

Application	VQ35DE
Type*	A003TJ3991ZC
	Mitsubishi
Nominal rating	12V-150A
Ground polarity	Negative
Minimum revolution under no-load	1,000 rpm
Hot output current (when 13.5 volts are applied)	More than 122A/2,500 rpm More than 144A/5,000 rpm
Regulated output voltage	14.1 - 14.7V @ 20°C (68°F)

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