SECTION CHG
CHARGING SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011134530

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 dual stage front air bag modules. The SRS system may only deploy one front air bag, depending on the severity of a collision and whether the front passenger seat is occupied. 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 three minutes before performing any service.**

Precaution for Power Generation Voltage Variable Control System

INFOID:0000000011134531

CAUTION:

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

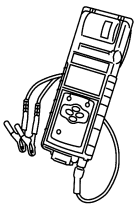
PREPARATION

PREPARATION

Special Service Tool

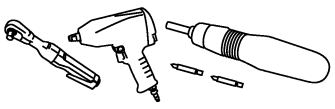
INFOID:0000000011134532

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

Tool number (TechMate No.) Tool name	Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.
— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer  JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tool

INFOID:0000000011134533

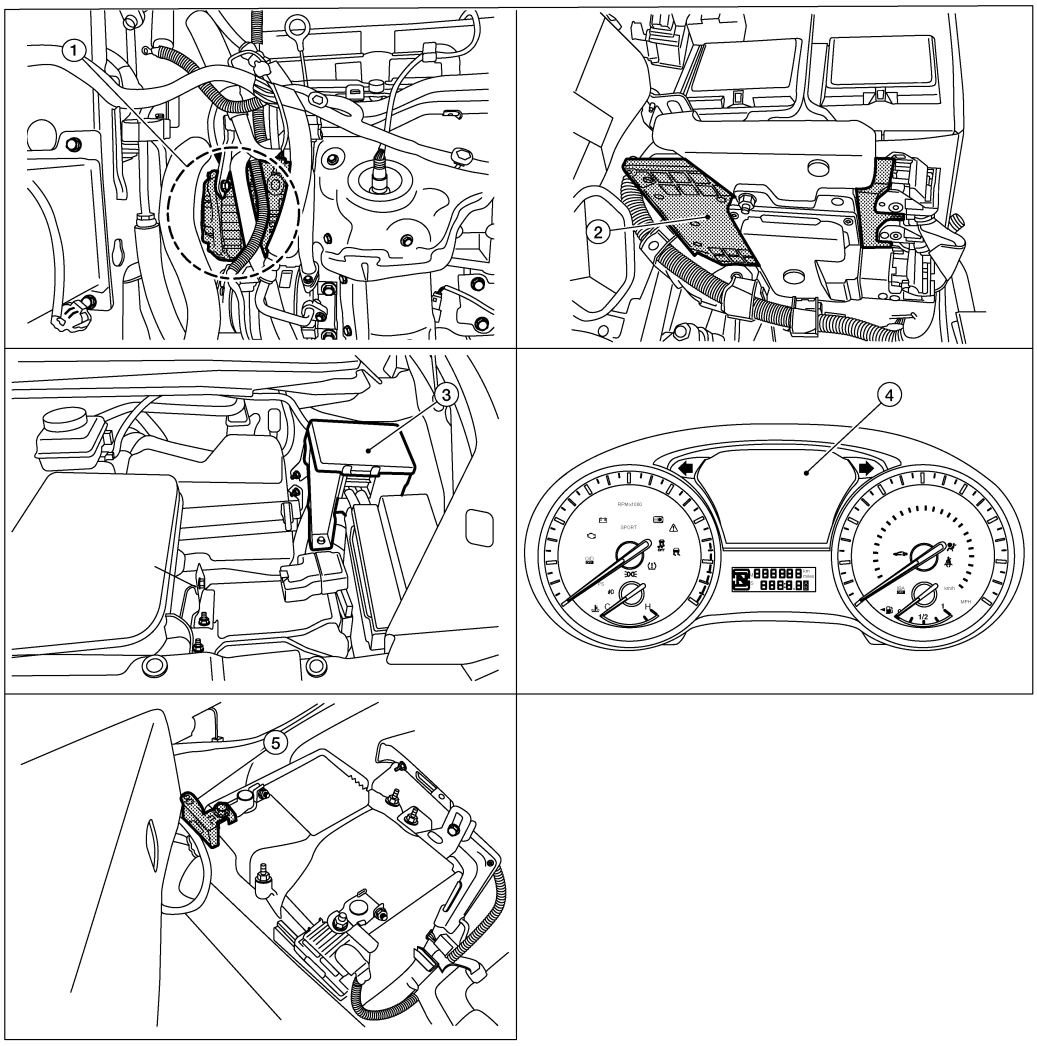
Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011134534



AWMIA1268ZZ

1. Generator
2. ECM
3. IPDM E/R
4. Combination Meter
5. Battery current sensor

Component Description

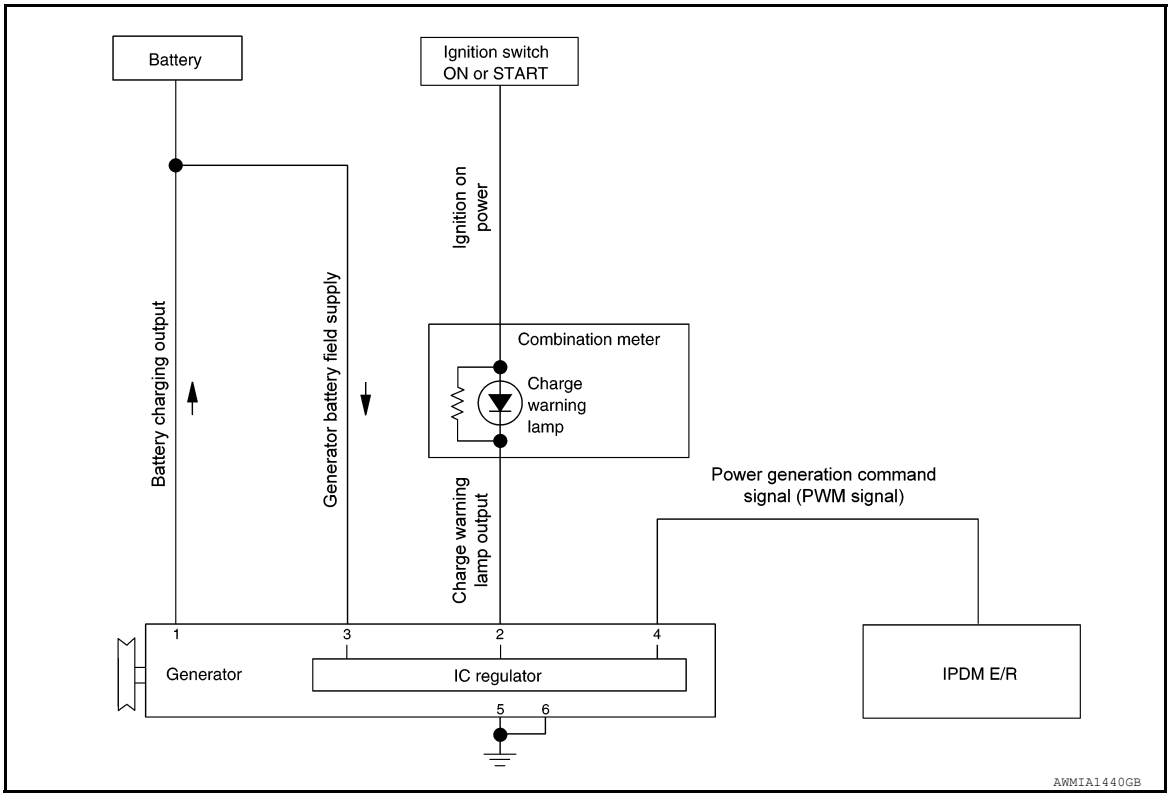
INFOID:0000000011134535

Component part	Description
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.
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.
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.
Battery current sensor	The battery current sensor is located on the negative battery cable 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.

CHARGING SYSTEM

System Diagram

INFOID:0000000011134536



System Description

INFOID:0000000011134537

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

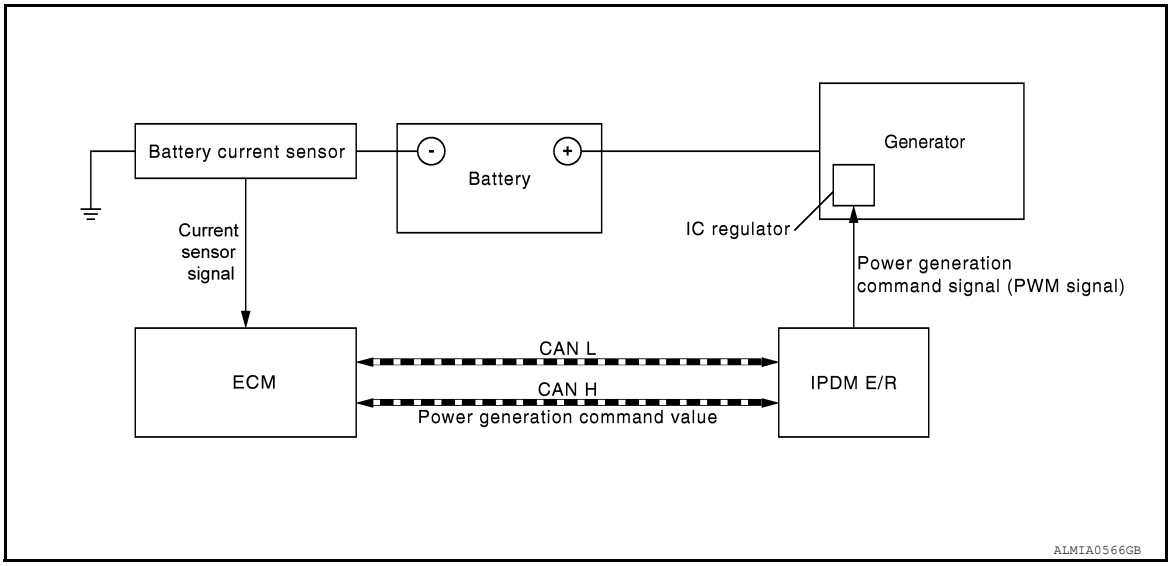
INFOID:0000000011134538

Component part		Description
Generator	Terminal “1”	Refer to CHG-23, "Description".
	Terminal “2”	Refer to CHG-24, "Description".
	Terminal “3”	Refer to CHG-27, "Description".
	Terminal “4”	Used for the power generation voltage variable control system. Refer to CHG-8, "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: • Excessive voltage is produced. • No voltage is produced.
IPDM E/R		Used for the power generation voltage variable control system. Refer to CHG-8, "System Description".

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

System Diagram

INFOID:0000000011134539



System Description

INFOID:0000000011134540

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:

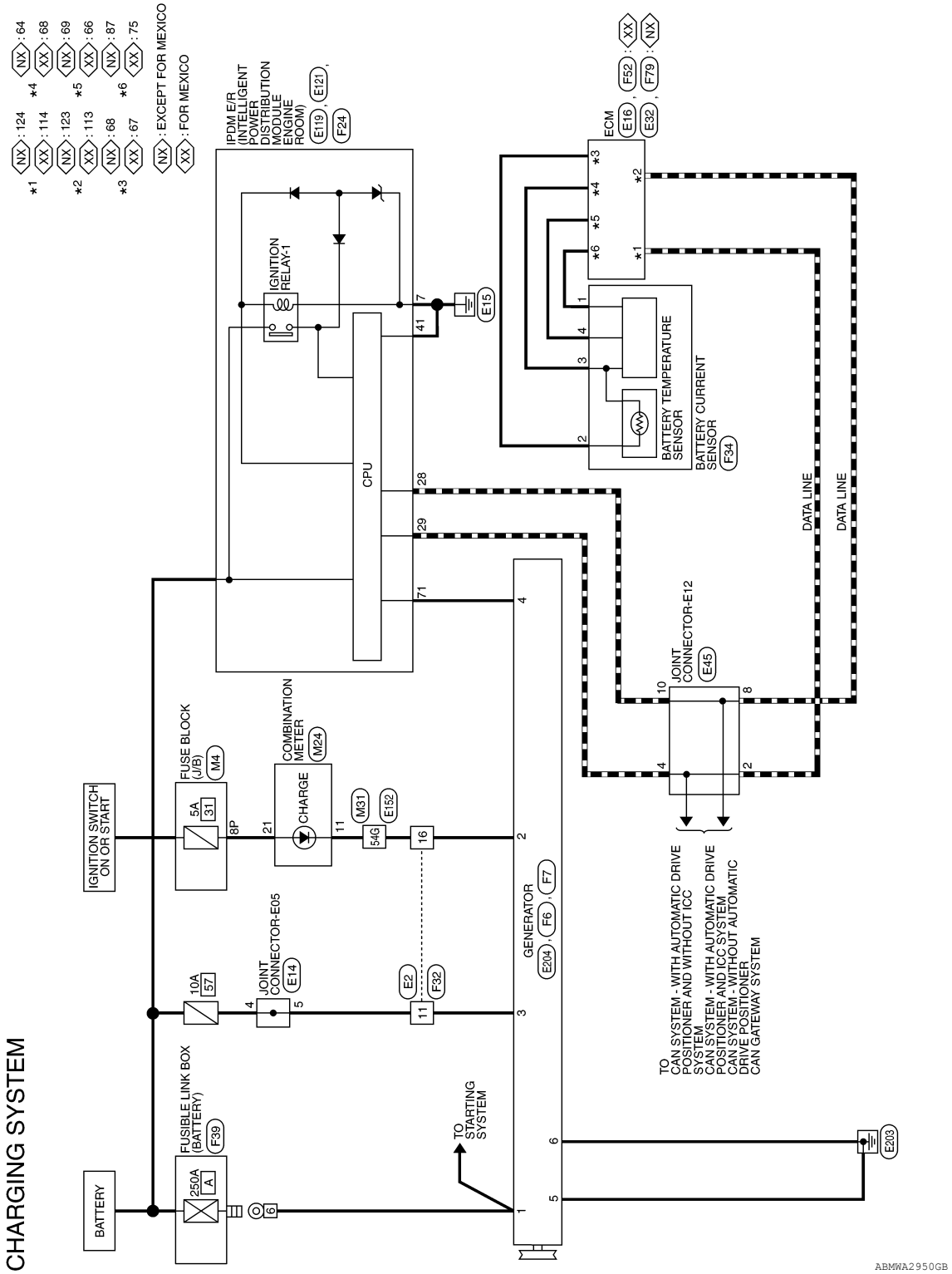
When any malfunction is detected in the power generation variable voltage control system, power generation is performed according to the characteristic of the IC regulator in the generator.

WIRING DIAGRAM

CHARGING SYSTEM

Wiring Diagram

INFOID:0000000011134541



CHARGING SYSTEM CONNECTORS

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

H.S.

7P	6P	5P	4P		3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
8P	BG	–

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
11	BG	ALTERNATOR (CHARGE)
21	BG	IGN

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

H.S.

1G	2G	3G	4G	5G
6G	7G	8G	9G	10G

11G	12G	13G	14G	15G	16G	17G	18G	19G	20G	21G
22G	23G	24G	25G	26G	27G	28G	29G	30G		

31G	32G	33G	34G	35G	36G	37G	38G	39G	40G	41G
42G	43G	44G	45G	46G	47G	48G	49G	50G		

51G	52G	53G	54G	55G	56G	57G	58G	59G	60G	61G
62G	63G	64G	65G	66G	67G	68G	69G	70G		

71G	72G	73G	74G	75G	76G	77G	78G	79G	80G	81G
82G	83G	84G	85G	86G	87G	88G	89G	90G		

91G	92G	93G	94G	95G
96G	97G	98G	99G	100G

Terminal No.	Color of Wire	Signal Name
54G	BG	–

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

H.S.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
11	LG	–
16	P	–

ABMIA3644GB

Connector No.	E14
Connector Name	JOINT CONNECTOR-E05
Connector Color	BLACK

H.S.

12	11	10	9	8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
4	LG	–
5	LG	–

Connector No.	E16
Connector Name	ECM (FOR MEXICO)
Connector Color	GRAY

H.S.

128	124	120	116	112	108	104	100
127	123	119	115	111	107	103	99
126	122	118	114	110	106	102	98
125	121	117	113	109	105	101	97

Terminal No.	Color of Wire	Signal Name
113	P	CAN-L
114	L	CAN-H

Connector No.	E32
Connector Name	ECM (EXCEPT FOR MEXICO)
Connector Color	BLACK

H.S.

121	125	129	133	137	141	145	149
122	126	130	134	138	142	146	150
123	127	131	135	139	143	147	151
124	128	132	136	140	144	148	152

Terminal No.	Color of Wire	Signal Name
123	P	CAN-L
124	L	CAN-H

Connector No.	E45
Connector Name	JOINT CONNECTOR-E12
Connector Color	BLUE

H.S.

12	11	10	9	8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
2	L	–
4	L	–
8	P	–
10	P	–

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

Terminal No.	Color of Wire	Signal Name
28	P	CAN-L
29	L	CAN-H
41	B	GND (SIGNAL)

Connector No.	E121
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

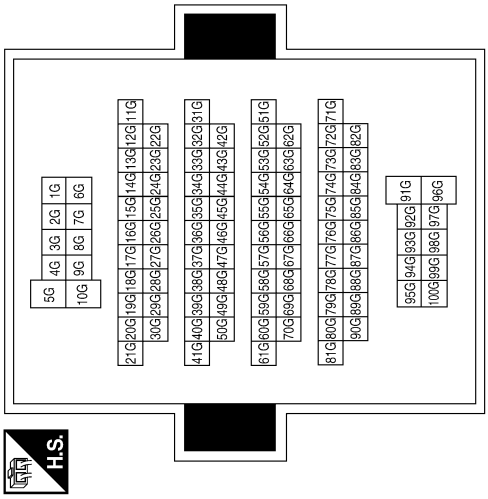
7	8		9	10	11
12	13	14	15	16	17	18

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

ABMIA6840GB

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

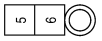
H.S.



Terminal No.	Color of Wire	Signal Name
54G	P	–

Connector No.	E204
Connector Name	GENERATOR
Connector Color	–

H.S.



Terminal No.	Color of Wire	Signal Name
5	B	–
6	B	–

Connector No.	F6
Connector Name	GENERATOR
Connector Color	–

H.S.

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

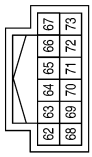
Connector No.	F7
Connector Name	GENERATOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
2	GR	–
3	Y	–
4	LG	–

Connector No.	F24
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
71	LG	ALT C

ABMIA4489GB

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

H.S.

8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9

Terminal No.	Color of Wire	Signal Name
11	Y	–
16	GR	–

Connector No.	F34
Connector Name	BATTERY CURRENT SENSOR
Connector Color	GRAY

H.S.

1	2
3	4

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	Y	–
3	G	–
4	W	–

Connector No.	F39
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	–

H.S.

6

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

Connector No.	F52
Connector Name	ECM (FOR MEXICO)
Connector Color	BROWN

H.S.

96	92	88	84	80	76	72	68	64	60	56	52
95	91	87	83	79	75	71	67	63	59	55	51
94	90	86	82	78	74	70	66	62	58	54	50
93	89	85	81	77	73	69	65	61	57	53	49

Terminal No.	Color of Wire	Signal Name
66	W	BATTERY CURRENT SENSOR
67	Y	BATTERY TEMPERATURE SENSOR
68	G	SENSOR GROUND (BATTERY CURRENT SENSOR)
75	LG	SENSOR POWER SUPPLY (BATTERY CURRENT SENSOR)

Connector No.	F79
Connector Name	ECM (EXCEPT FOR MEXICO)
Connector Color	BLACK

H.S.

56	61	66	71	76	81	86	91	96	101	106	111	116
57	62	67	72	77	82	87	92	97	102	107	112	117
58	63	68	73	78	83	88	93	98	103	108	113	118
59	64	69	74	79	84	89	94	99	104	109	114	119
60	65	70	75	80	85	90	95	100	105	110	115	120

Terminal No.	Color of Wire	Signal Name
64	G	SENSOR GROUND (BATTERY CURRENT SENSOR)
68	Y	BATTERY TEMPERATURE SENSOR

Terminal No.	Color of Wire	Signal Name
69	W	BATTERY UUCURRENT SENSOR
87	LG	SENSOR POWER SUPPLY (BATTERY CURRENT SENSOR)

ABMIA6841GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

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

INFOID:0000000011134542

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

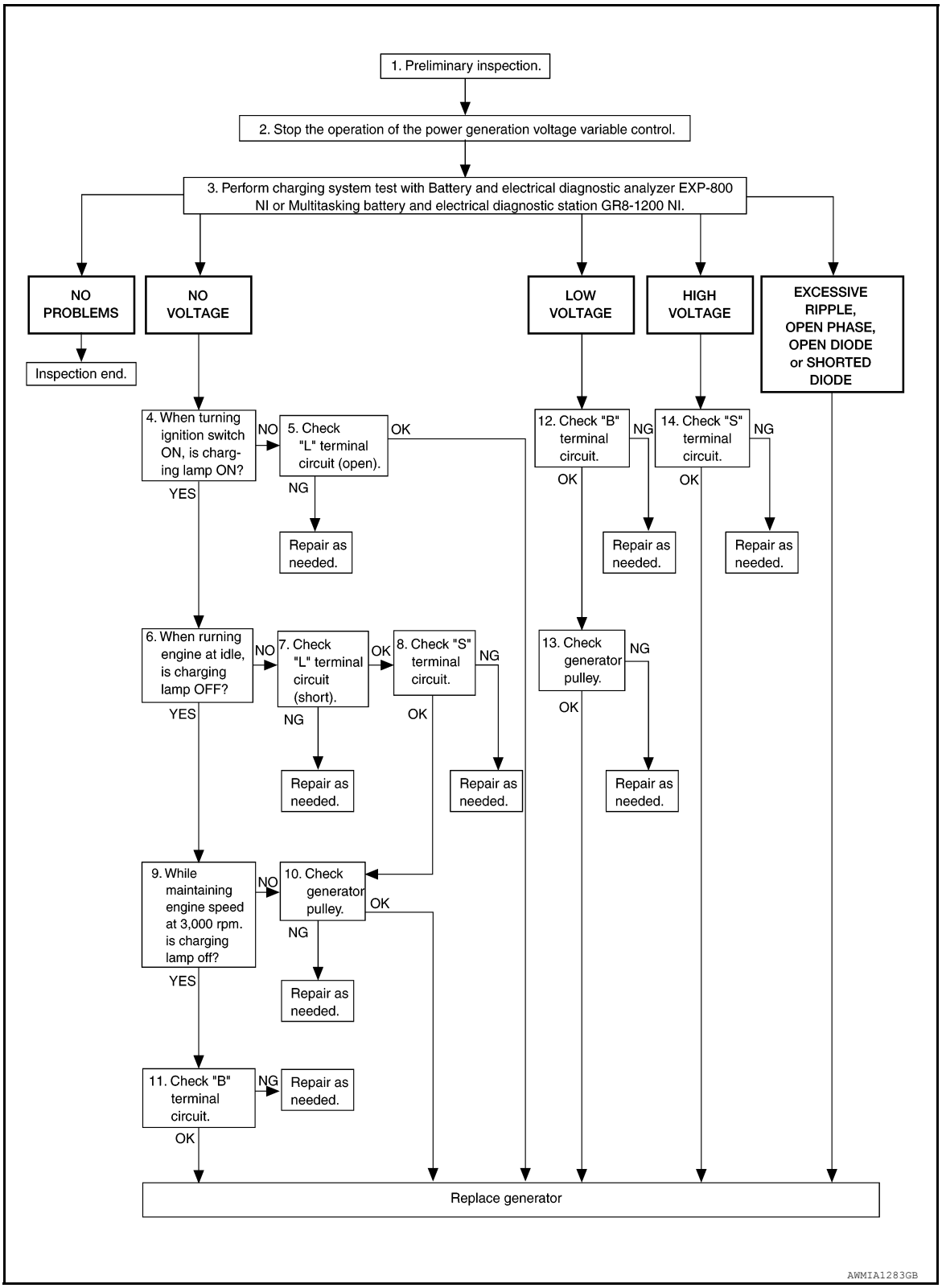
To test the charging system, use the following special service tools:

- 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-20, "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” 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-29, "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-24, "Diagnosis Procedure".

Is the “L” terminal circuit normal?

YES >> Replace generator. Refer to CHG-29, "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-26, "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-27, "Diagnosis Procedure".

Is the “S” terminal circuit normal?

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 CHG-30, "Inspection".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-29, "Removal and Installation".
NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-23, "Diagnosis Procedure".

Is "B" terminal circuit normal?

YES >> Replace generator. Refer to CHG-29, "Removal and Installation".
NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-23, "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-30, "Inspection".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-29, "Removal and Installation".
NO >> Repair as needed.

14. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to CHG-27, "Diagnosis Procedure".

Is the "S" terminal circuit normal?

YES >> Replace generator. Refer to CHG-29, "Removal and Installation".
NO >> Repair as needed.

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

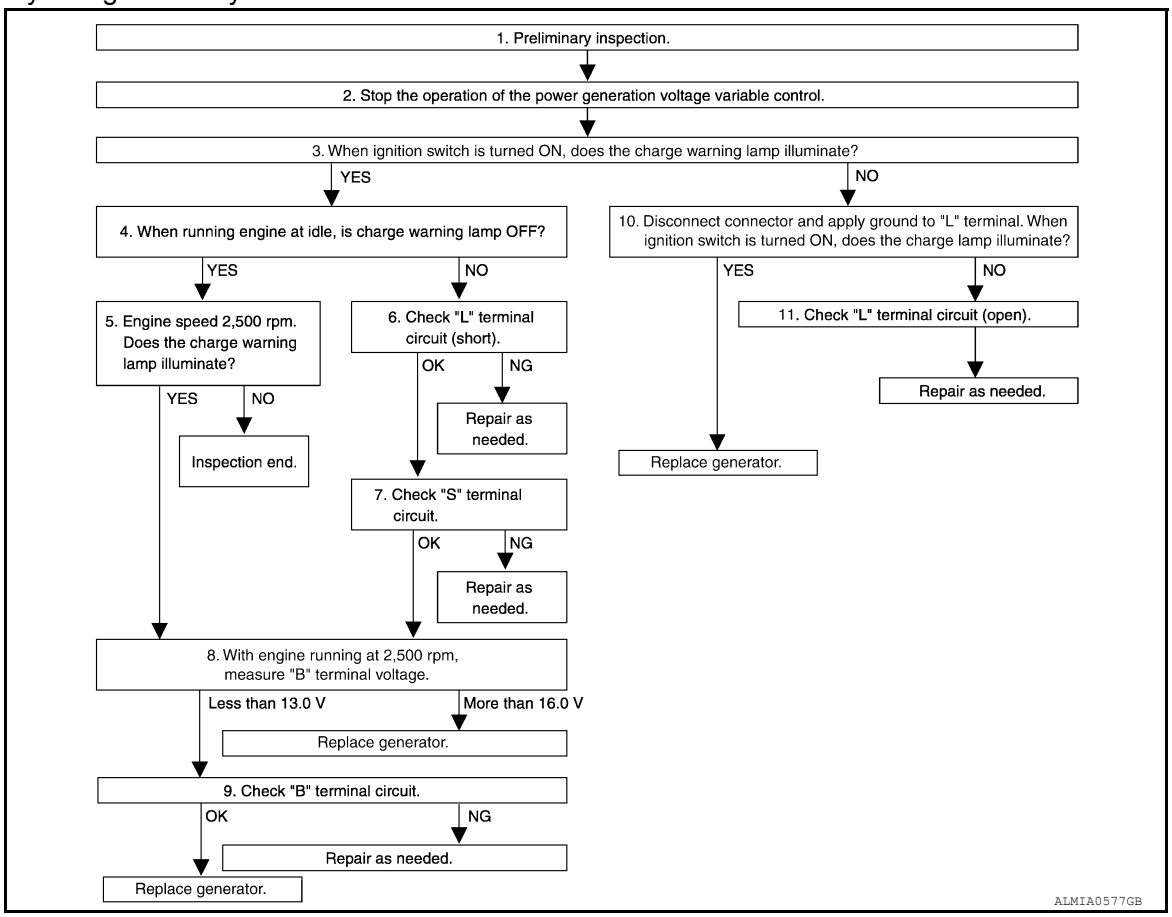
INFOID:0000000011134543

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-20, "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?

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-26, "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-27, "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-29, "Removal and Installation".

9. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-23, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace generator. Refer to CHG-29, "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-29, "Removal and Installation".
NO >> GO TO 11.

11. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (OPEN). Refer to CHG-24, "Diagnosis Procedure".

>> Repair as needed.

DTC/CIRCUIT DIAGNOSIS

CHARGING SYSTEM PRELIMINARY INSPECTION

Diagnosis Procedure

INFOID:0000000011134544

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 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 terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 57
	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 TERMINAL CONNECTION

Check if connector E204 terminal 5 and 6 (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 CHG-30, "Inspection".

Is the inspection result normal?

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

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Diagnosis Procedure

INFOID:0000000011134545

Regarding Wiring Diagram information, refer to CHG-9, "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-79, "CONSULT Function" (except for Mexico) or EC-606, "CONSULT Function" (for Mexico).

Is the inspection result normal?

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 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-9, "CONSULT Function (IPDM E/R)".

Is the inspection result normal?

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

1. Turn ignition switch OFF.
2. Disconnect generator connector and IPDM E/R connector.
3. Check continuity between generator harness connector F7 terminal 4 and IPDM E/R harness connector F24 terminal 71.

Generator		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	4	F24	71	Yes

4. Check continuity between generator harness connector F7 terminal 4 and ground.

Generator		—	Continuity
Connector	Terminal		
F7	4	Ground	No

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-32, "Removal and Installation".
NO >> Repair harness or connector between IPDM E/R and generator.

B TERMINAL CIRCUIT

Description

INFOID:0000000011134546

The terminal “1” circuit supplies power to charge the battery and operate the vehicle’s electrical system.

Diagnosis Procedure

INFOID:0000000011134547

Regarding Wiring Diagram information, refer to CHG-9, "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 the EXP-800 or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2.CHECK TERMINAL “1” 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 “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 F6 terminal 1.

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

Is the inspection result normal?

YES >> Terminal “1” circuit is normal. Refer to CHG-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-17, "Work Flow (Without EXP-800 NI or GR8-1200 NI)".
NO >> Check harness between battery and generator for high resistance.

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:0000000011134548

The “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:0000000011134549

Regarding Wiring Diagram information. Refer to CHG-9, "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
F7	2		ON	Illuminate

Does it illuminate?

YES >> “L” terminal circuit is normal. Refer to CHG-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-17, "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	
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 and fuse block (J/B).

Combination meter		Fuse box (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M24	21	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 and ground.

(+)		(-)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M24	21	Ground	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-96, "Removal and Installation".
NO >> Repair or replace the harness or connectors.

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:0000000011134550

The terminal “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:0000000011134551

Regarding Wiring Diagram information, refer to CHG-9, "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-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-17, "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	21		No

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-96, "Removal and Installation".
NO >> Repair or replace the harness or connectors.

S TERMINAL CIRCUIT

Description

INFOID:0000000011134552

The output voltage of the generator is controlled by the IC regulator at terminal “S” detecting the input voltage from battery.
The “S” terminal circuit detects the battery voltage to adjust the generator output voltage with the IC voltage regulator.

Diagnosis Procedure

INFOID:0000000011134553

Regarding Wiring Diagram information. Refer to CHG-9, "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 and ground.

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

Is the inspection result normal?

YES >> Refer to CHG-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-17, "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:0000000011134554

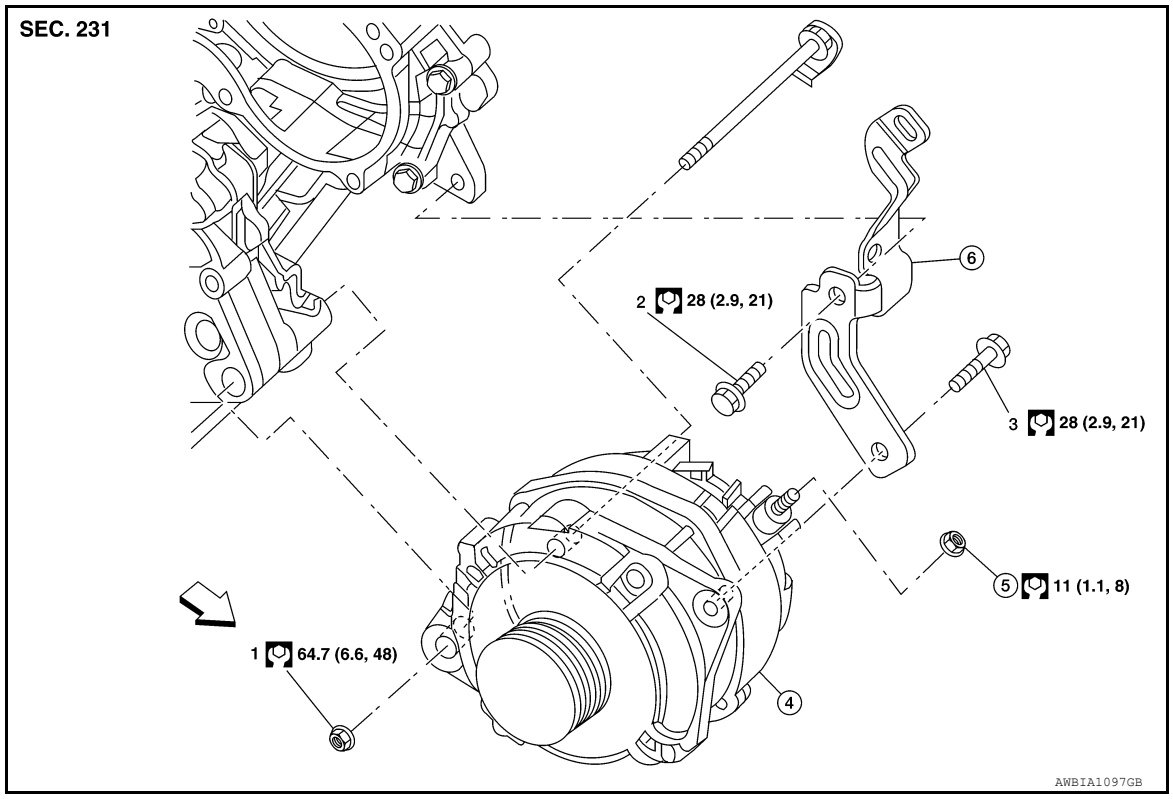
Symptom	Reference
Battery discharged	Refer to CHG-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-17, "Work Flow (Without EXP-800 NI or GR8-1200 NI)".
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

REMOVAL AND INSTALLATION

GENERATOR

Exploded View

INFOID:0000000011134555



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

Removal and Installation

INFOID:0000000011134556

REMOVAL

1. Remove front wheel and tire (RH) using power tool. Refer to WT-53, "Adjustment".
2. Remove radiator assembly. Refer to CO-15, "Removal and Installation".
3. Remove cooling fan assembly. Refer to CO-17, "Removal and Installation"
4. Remove drive belt auto-tensioner assembly. Refer to EM-14, "Removal and Installation of Drive Belt Auto-tensioner".
5. Disconnect generator wiring harness.
6. Disconnect harness retainers.
7. Remove bolts and generator bracket.
8. Remove generator.

INSTALLATION

Installation is in the reverse order of removal.

- Temporarily tighten bolts and nut then tighten nut and bolts in the specified numerical order. Refer to CHG-29, "Exploded View".

CAUTION:

Be sure to tighten “B” terminal nut carefully.

- Install generator and check tension of belt. Refer to EM-12, "Checking Drive Belt".
- 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-7, "System Description".WT-53, "Adjustment"

Inspection

INFOID:0000000011134557

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:0000000011134558

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)
Adjustment range of power generation voltage variable control	11.4 - 15.6 V

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