

SECTION

CHG

CHARGING SYSTEM

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PRECAUTION

PRECAUTIONS

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

INFOID:000000001731367

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIRBAG" and "SEAT BELT" 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 "SRS AIRBAG".
- 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.

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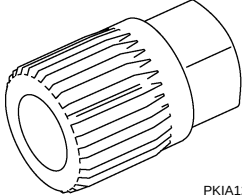
CHG

PREPARATION

PREPARATION

Special Service Tools

INFOID:000000001691349

Tool number Tool name	Description
KV10118200 (included in the adapter kit: Mot. 1732) Alternator pulley adapter  PKIA1241E	Removing and installing alternator pulley

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[HR16DE]

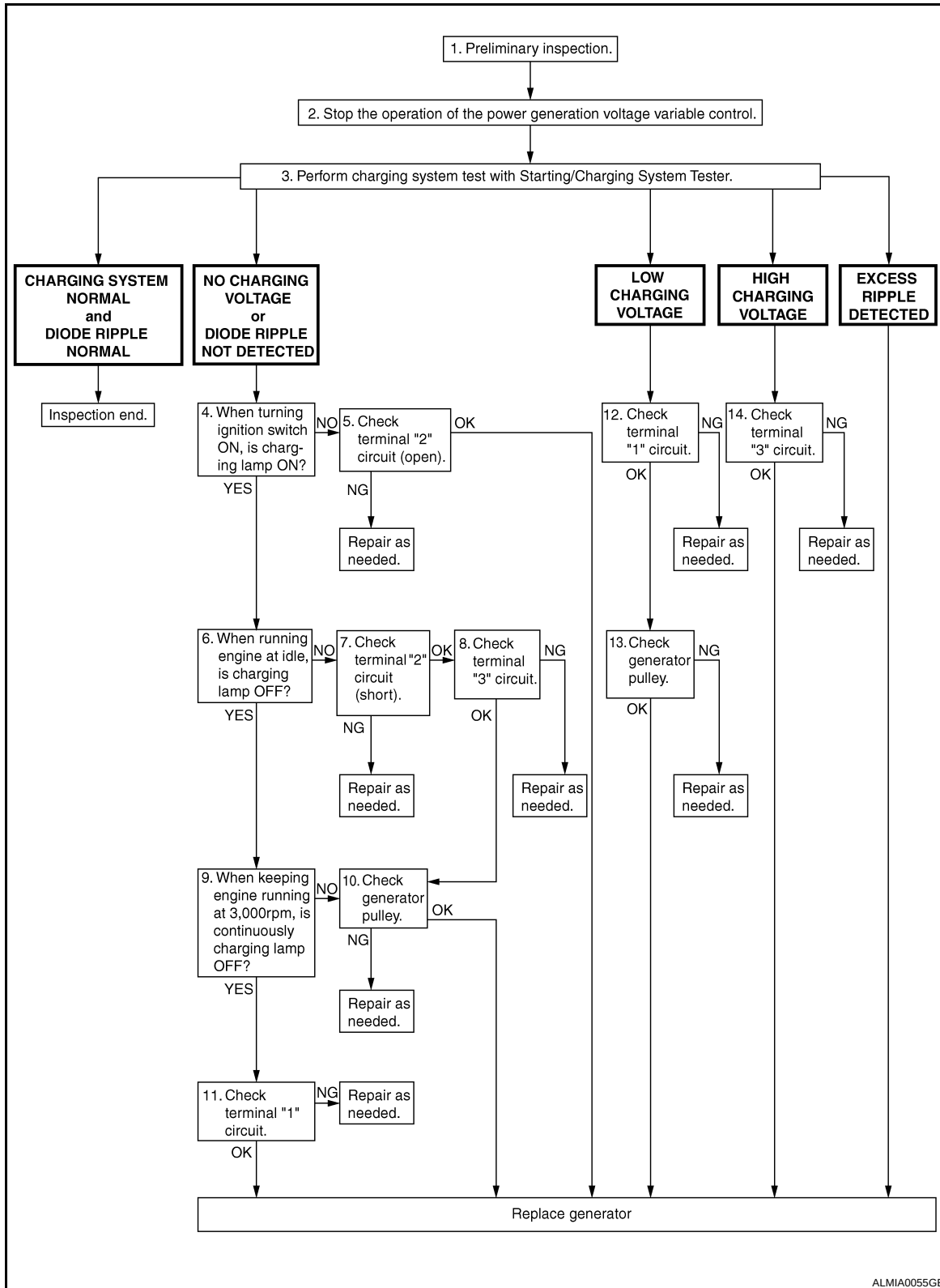
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001724466

OVERALL SEQUENCE



DETAILED FLOW

CHG-5

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DIAGNOSIS AND REPAIR WORKFLOW

[HR16DE]

< BASIC INSPECTION >

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-37, "Inspection Procedure"](#).

>> GO TO 2

2. DISABLE THE POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Disable the power generation voltage variable control with either of the following procedures.

- After selecting "ENGINE" on the "SELECT SYSTEM" screen of CONSULT-III, set the "ALTERNATOR DUTY" value 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, disconnect the battery current sensor connector and leave it disconnected during the course of the test.

NOTE:

Running the engine with the battery current sensor disconnected will cause DTC's (P1550-P1554) to set. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnostic results history of the engine using CONSULT-III.

>> GO TO 3

3. DIAGNOSIS WITH STARTING/CHARGING SYSTEM TESTER

Perform the charging system test using Starting/Charging System Tester (J-44373). For details and operating instructions, refer to Technical Service Bulletin.

Test result

CHARGING SYSTEM NORMAL>>Charging system is normal and will also show "DIODE RIPPLE" test result.
NO CHARGING VOLTAGE>>GO TO 4
LOW CHARGING VOLTAGE>>GO TO 12
HIGH CHARGING VOLTAGE>>GO TO 14
DIODE RIPPLE NORMAL>>Diode ripple is OK and will also show "CHARGING VOLTAGE" test result.
EXCESS RIPPLE DETECTED>>Replace the generator. Perform "DIODE RIPPLE" test again using Starting/Charging System Tester (J-44373) to confirm repair.
DIODE RIPPLE NOT DETECTED>>GO TO 4

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. TERMINAL "2" (OPEN) CIRCUIT INSPECTION

Check terminal "2" circuit for open circuits. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

YES >> Replace generator.
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. TERMINAL "2"(SHORT) CIRCUIT INSPECTION

Check terminal "2" circuit for short to ground. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

DIAGNOSIS AND REPAIR WORKFLOW

[HR16DE]

< BASIC INSPECTION >

YES >> GO TO 8
NO >> Repair as needed.

8.TERMINAL“3” CIRCUIT INSPECTION

Check terminal “3” circuit. Refer to [CHG-40. "Diagnosis Procedure"](#).

Is the terminal “3” 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.

Is generator pulley normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

11.TERMINAL “1” CIRCUIT INSPECTION

Check terminal “1” circuit. Refer to [CHG-38. "Diagnosis Procedure"](#).

Is terminal “1” circuit normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

12.TERMINAL “1” CIRCUIT INSPECTION

Check terminal “1” circuit. Refer to [CHG-38. "Diagnosis Procedure"](#).

Is terminal “1” circuit normal?

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

13.INSPECTION OF GENERATOR PULLEY

Check generator pulley.

Is generator pulley normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

14.TERMINAL “3” CIRCUIT INSPECTION

Check terminal“3” circuit. Refer to [CHG-40. "Diagnosis Procedure"](#).

Is the terminal “3” circuit normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

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FUNCTION DIAGNOSIS

CHARGING SYSTEM

System Diagram

INFOID:0000000001724467



ALMIA0321GB

System Description

INFOID:0000000001724468

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:0000000001724469

Component part		Description
Generator	Terminal "1"	Refer to CHG-10, "Description" .
	Terminal "2"	Refer to CHG-11, "Description" .
	Terminal "3"	Refer to CHG-12, "Description" .
	Terminal "5"	Generator ground.
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.

CHARGING SYSTEM PRELIMINARY INSPECTION

< COMPONENT DIAGNOSIS >

[HR16DE]

COMPONENT DIAGNOSIS

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000001724473

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair battery terminals connection.

2.CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 29
	Battery (terminal 1)	Fusible Link A
Combination meter	Ignition switch ON (terminal 2)	Fuse 3

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 F4 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 XX-XX, "*****".

Is the inspection result normal?

YES >> Inspection end.

NO >> Repair as needed.

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B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[HR16DE]

B TERMINAL CIRCUIT

Description

INFOID:000000001724475

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

Diagnosis Procedure

INFOID:000000001724476

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 Starting/Charging system test. Refer to Technical Service Bulletin.

2.CHECK TERMINAL "1" CIRCUIT

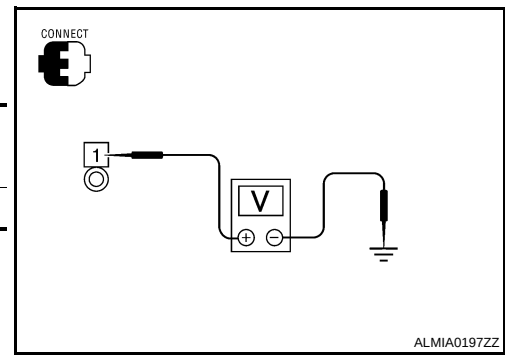
Check voltage between generator connector F2 terminal 1 and ground.

(+) Terminal		(-)	Voltage
Connector	Terminal		
F2	1	Ground	Battery voltage

Is voltage reading as specified?

YES >> GO TO 3.

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



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

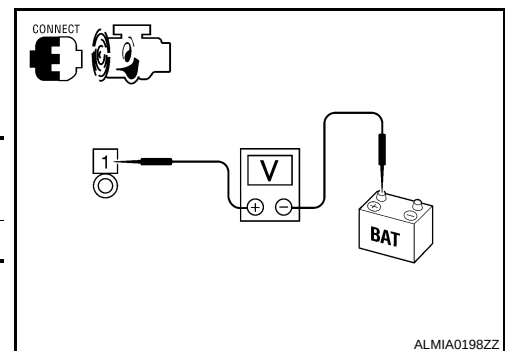
1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector F2 terminal 1.

(+) Terminal		(-)	Voltage
Connector	Terminal		
F2	1	Battery positive terminal	Less than 0.2V

Is the voltage reading as specified?

YES >> Terminal "1" circuit is normal. Refer to [CHG-33, "Work Flow"](#).

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



L TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[HR16DE]

L TERMINAL CIRCUIT

Description

INFOID:000000001724477

The terminal "2" (L) circuit controls the charge warning lamp. The charge warning lamp illuminates 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 will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:000000001724478

1.CHECK CHARGE WARNING LAMP CIRCUIT CONNECTION

Verify generator connector F2 terminal 2 is clean and tight.

Is the connection secure?

YES >> GO TO 2

NO >> Repair the connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK CHARGE WARNING LAMP CIRCUIT

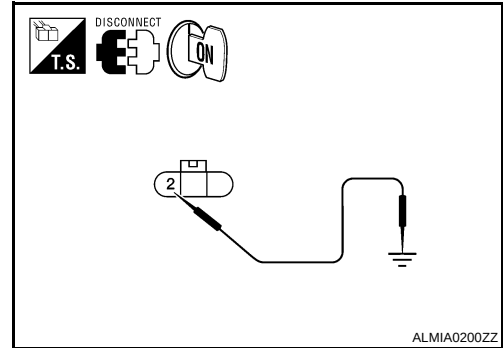
1. Disconnect generator connector F2.
2. Apply ground to generator harness connector F2 terminal 2 with the ignition switch in the ON position.

Charge lamp should illuminate

Does the charge lamp illuminate?

YES >> Check generator function. Refer to [CHG-33. "Work Flow"](#).

NO >> GO TO 3



3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect the generator connector F2 and combination meter connector M24.
3. Check continuity between generator harness connector F2 (A) terminal 2 and combination meter harness connector M24 (B) terminal 38.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
F2	2	M24	38	Yes

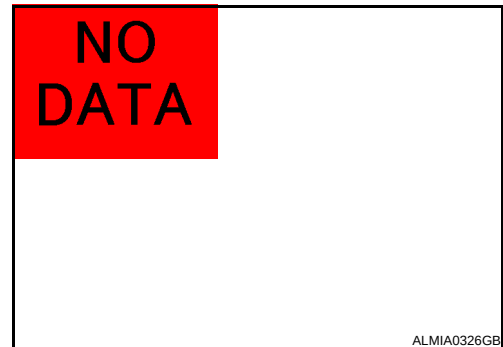
4. Check continuity between generator harness connector F2 terminal 2 and ground.

A		—	Continuity
Connector	Terminal		
F2	2	Ground	No

Are the continuity results as specified?

YES >> Replace the combination meter. Refer to [XX-XX. "*****"](#).

NO >> Repair the harness or connector.



S TERMINAL CIRCUIT

Description

INFOID:000000001724479

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:000000001724480

1.CHECK VOLTAGE REGULATOR CIRCUIT CONNECTION

Check to see if connector F2 terminal 3 is clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair terminal connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK VOLTAGE REGULATOR CIRCUIT

Check voltage between generator harness connector F2 terminal 3 and ground.

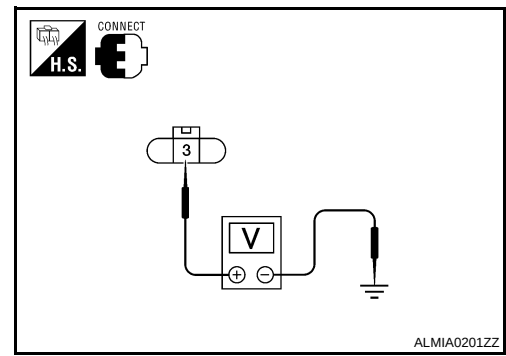
3 - ground

Battery voltage

Does battery voltage exist?

YES >> Refer to [CHG-33. "Work Flow"](#).

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



CHARGING SYSTEM

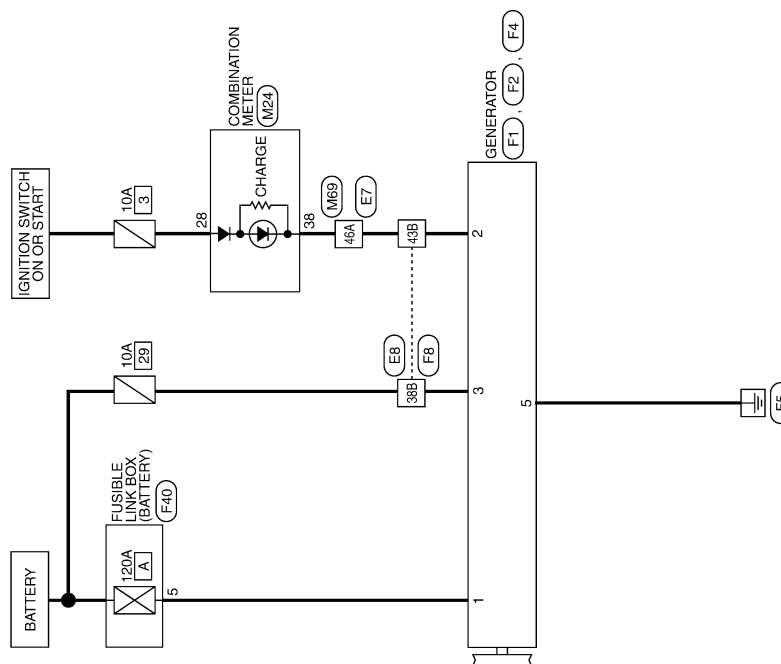
< COMPONENT DIAGNOSIS >

[HR16DE]

CHARGING SYSTEM

Wiring Diagram

INFOID:0000000001724481



CHARGING SYSTEM - WITHOUT DIESEL

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AWMWA0022G

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000001724482

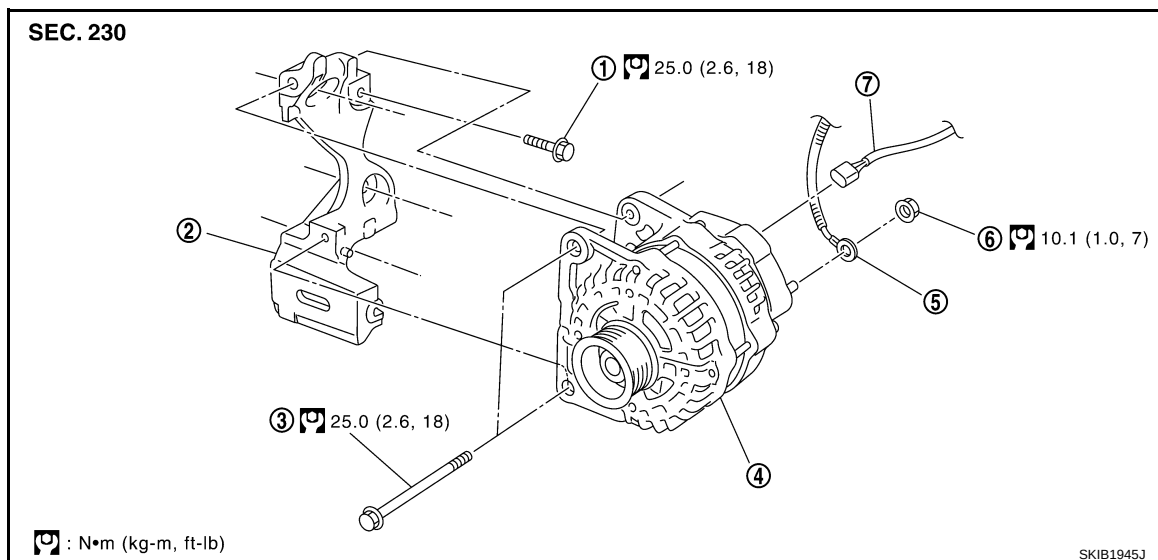
Symptom	Reference
Battery discharged	Refer to CHG-5, "Work Flow" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

ON-VEHICLE REPAIR

GENERATOR

Removal and Installation

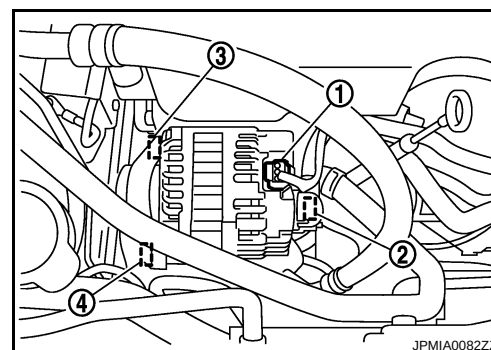
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- | | | |
|---------------------------|-------------------------|---------------------|
| 1. Generator bracket bolt | 2. Generator bracket | 3. Generator bolt |
| 4. Generator | 5. "B" terminal harness | 6. "B" terminal nut |
| 7. Generator connector | | |

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove drive belt. Refer to [EM-16, "Removal and Installation"](#).
3. Disconnect generator connector (1).
4. Remove "B" terminal nut (2) and "B" terminal harness.
5. Remove upper generator bolt (3) and generator lower bolt (4).
6. Remove generator upward from the vehicle.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

- Temporarily tighten the generator bolts in order from the lower to the upper, and then tighten them in order from the upper to the lower.

CAUTION:

For the generator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the generator mating part, and then tighten the bolts.

- Install generator, and check tension of belt. Refer to [EM-15, "Checking"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[HR16DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Generator

INFOID:000000001689489

Applied model		HR16DE
Type		A2TJ0291ZE
		MITSUBISHI
Nominal rating	[V - A]	12 - 120
Ground polarity		Negative
Minimum revolution under no-load (When 13.5 V is applied)	[rpm]	Less than 1,300
Hot output current (When 13.5 V is applied)	[A/rpm]	More than 27/1,300 More than 95/2,500 More than 116/5,000
Regulated output voltage	[V]	14.1 - 14.7
Minimum length of brush	[mm (in)]	More than 5.00 (0.197)
Brush spring pressure	[N (g, oz)]	4.1 - 5.3 (418 - 541, 14.7 - 19.1)
Slip ring minimum outer diameter	[mm (in)]	More than 22.1 (0.870)
Rotor (Field coil) resistance	[Ω]	1.7 - 2.2

PRECAUTION

PRECAUTIONS

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

INFOID:000000001731368

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIRBAG" and "SEAT BELT" 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 "SRS AIRBAG".
- 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.

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PREPARATION

PREPARATION

Special Service Tools

INFOID:000000001691351

Tool number Tool name	Description
KV10118200 (included in the adapter kit: Mot. 1732) Alternator pulley adapter PKIA1241E	Removing and installing alternator pulley

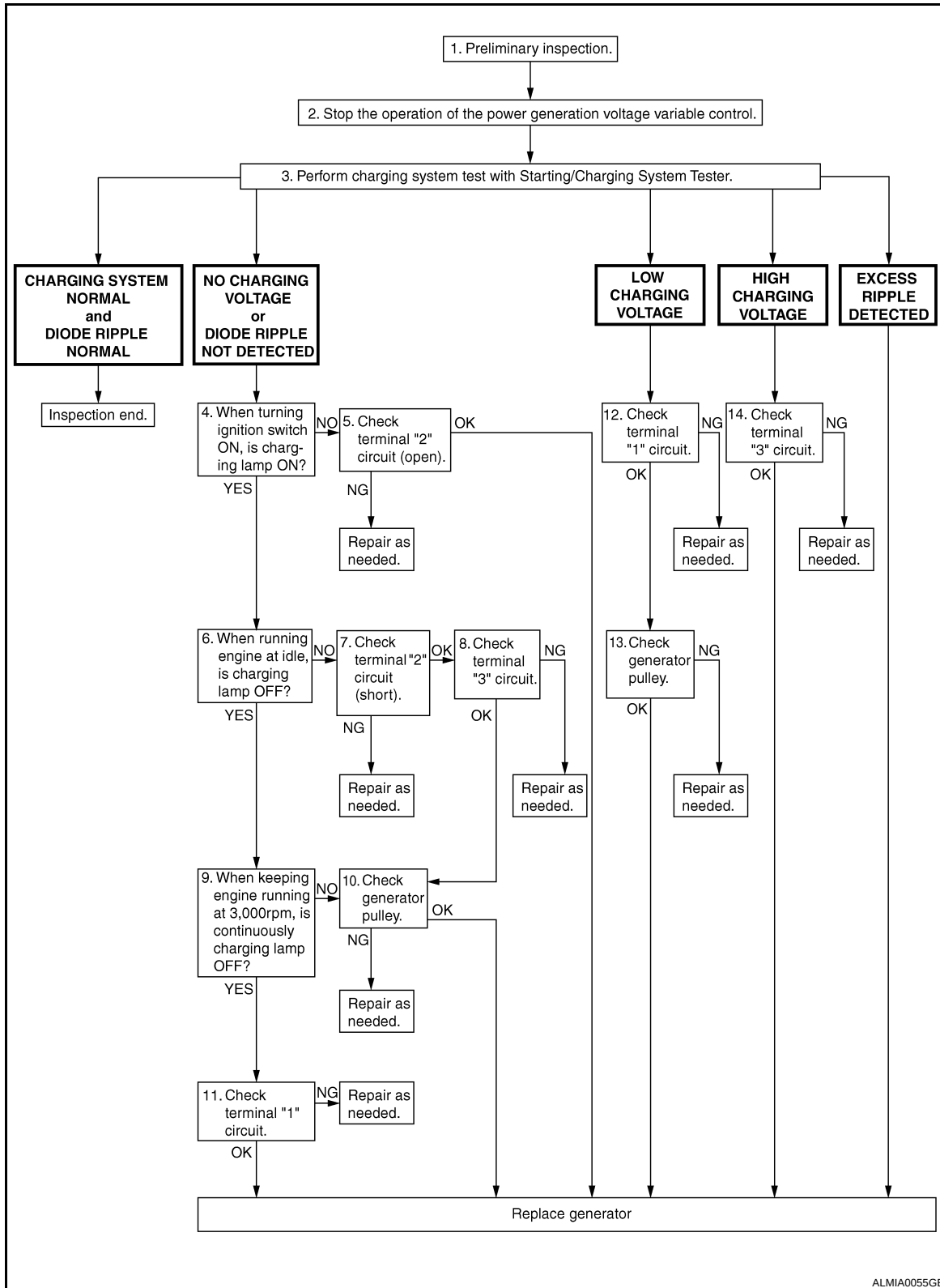
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001724517

OVERALL SEQUENCE



DETAILED FLOW

< BASIC INSPECTION >

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-37, "Inspection Procedure"](#).

>> GO TO 2

2. DISABLE THE POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Disable the power generation voltage variable control with either of the following procedures.

- After selecting "ENGINE" on the "SELECT SYSTEM" screen of CONSULT-III, set the "ALTERNATOR DUTY" value 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, disconnect the battery current sensor connector and leave it disconnected during the course of the test.

NOTE:

Running the engine with the battery current sensor disconnected will cause DTC's (P1550-P1554) to set. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnostic results history of the engine using CONSULT-III.

>> GO TO 3

3. DIAGNOSIS WITH STARTING/CHARGING SYSTEM TESTER

Perform the charging system test using Starting/Charging System Tester (J-44373). For details and operating instructions, refer to Technical Service Bulletin.

Test result

CHARGING SYSTEM NORMAL>>Charging system is normal and will also show "DIODE RIPPLE" test result.

NO CHARGING VOLTAGE>>GO TO 4

LOW CHARGING VOLTAGE>>GO TO 12

HIGH CHARGING VOLTAGE>>GO TO 14

DIODE RIPPLE NORMAL>>Diode ripple is OK and will also show "CHARGING VOLTAGE" test result.

EXCESS RIPPLE DETECTED>>Replace the generator. Perform "DIODE RIPPLE" test again using Starting/Charging System Tester (J-44373) to confirm repair.

DIODE RIPPLE NOT DETECTED>>GO TO 4

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. TERMINAL "2" (OPEN) CIRCUIT INSPECTION

Check terminal "2" circuit for open circuits. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

YES >> Replace generator.

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. TERMINAL "2"(SHORT) CIRCUIT INSPECTION

Check terminal "2" circuit for short to ground. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

DIAGNOSIS AND REPAIR WORKFLOW

[MR18DE]

< BASIC INSPECTION >

YES >> GO TO 8
NO >> Repair as needed.

8.TERMINAL“3” CIRCUIT INSPECTION

Check terminal “3” circuit. Refer to [CHG-40. "Diagnosis Procedure"](#).

Is the terminal “3” 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.

Is generator pulley normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

11.TERMINAL “1” CIRCUIT INSPECTION

Check terminal “1” circuit. Refer to [CHG-38. "Diagnosis Procedure"](#).

Is terminal “1” circuit normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

12.TERMINAL “1” CIRCUIT INSPECTION

Check terminal “1” circuit. Refer to [CHG-38. "Diagnosis Procedure"](#).

Is terminal “1” circuit normal?

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

13.INSPECTION OF GENERATOR PULLEY

Check generator pulley.

Is generator pulley normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

14.TERMINAL “3” CIRCUIT INSPECTION

Check terminal“3” circuit. Refer to [CHG-40. "Diagnosis Procedure"](#).

Is the terminal “3” circuit normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

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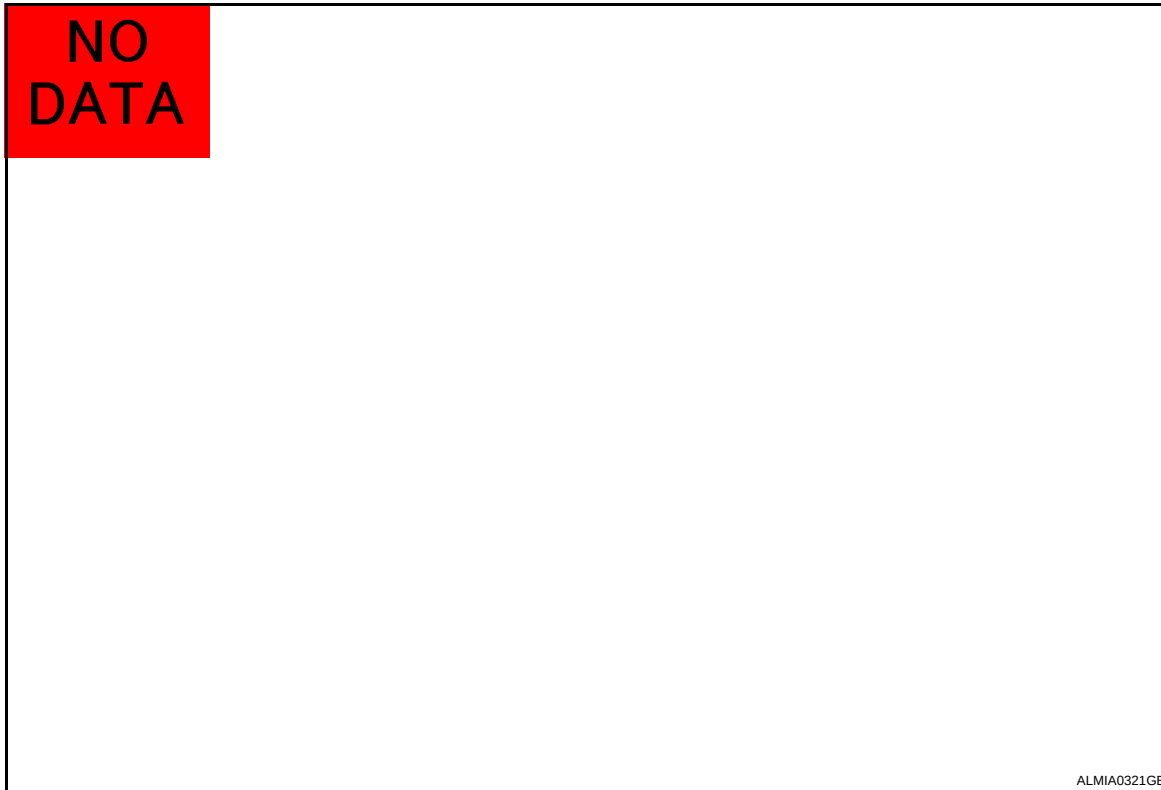
CHG

FUNCTION DIAGNOSIS

CHARGING SYSTEM

System Diagram

INFOID:0000000001724518



ALMIA0321GB

System Description

INFOID:0000000001724519

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:0000000001724520

Component part		Description
Generator	Terminal "1"	Refer to CHG-24, "Description" .
	Terminal "2"	Refer to CHG-25, "Description" .
	Terminal "3"	Refer to CHG-26, "Description" .
	Terminal "5"	Generator ground.
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.

CHARGING SYSTEM PRELIMINARY INSPECTION

< COMPONENT DIAGNOSIS >

[MR18DE]

COMPONENT DIAGNOSIS

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000001724524

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair battery terminals connection.

2.CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 29
	Battery (terminal 1)	Fusible Link A
Combination meter	Ignition switch ON (terminal 2)	Fuse 3

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 F4 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 XX-XX, "*****".

Is the inspection result normal?

YES >> Inspection end.

NO >> Repair as needed.

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CHG

B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[MR18DE]

B TERMINAL CIRCUIT

Description

INFOID:000000001724526

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

Diagnosis Procedure

INFOID:000000001724527

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 Starting/Charging system test. Refer to Technical Service Bulletin.

2.CHECK TERMINAL "1" CIRCUIT

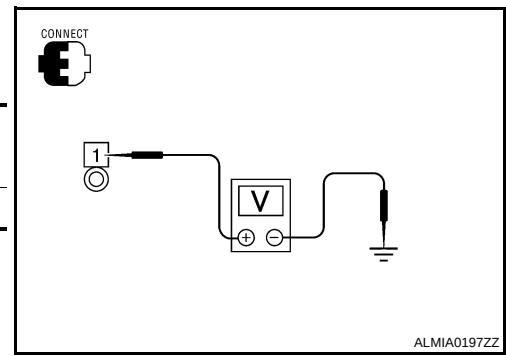
Check voltage between generator connector F2 terminal 1 and ground.

(+)		(-)	Voltage
Connector	Terminal		
F2	1	Ground	Battery voltage

Is voltage reading as specified?

YES >> GO TO 3.

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



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

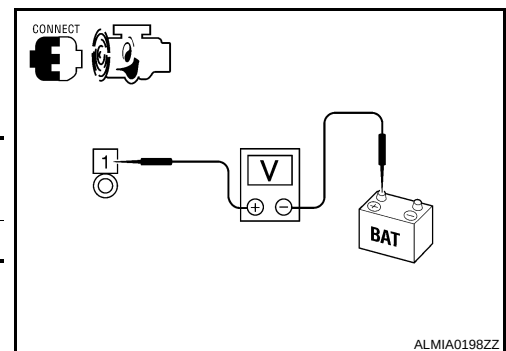
1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector F2 terminal 1.

(+)		(-)	Voltage
Connector	Terminal		
F2	1	Battery positive terminal	Less than 0.2V

Is the voltage reading as specified?

YES >> Terminal "1" circuit is normal. Refer to [CHG-33, "Work Flow"](#).

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



L TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[MR18DE]

L TERMINAL CIRCUIT

Description

INFOID:000000001724528

The terminal "2" (L) circuit controls the charge warning lamp. The charge warning lamp illuminates 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 will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:000000001724529

1.CHECK CHARGE WARNING LAMP CIRCUIT CONNECTION

Verify generator connector F2 terminal 2 is clean and tight.

Is the connection secure?

YES >> GO TO 2

NO >> Repair the connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK CHARGE WARNING LAMP CIRCUIT

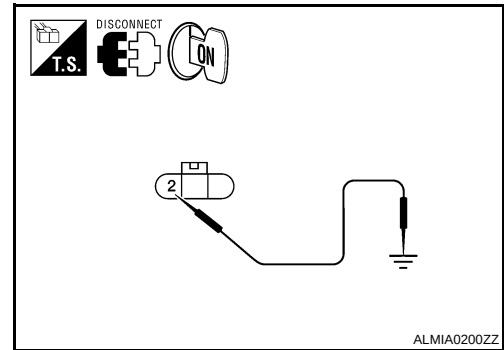
1. Disconnect generator connector F2.
2. Apply ground to generator harness connector F2 terminal 2 with the ignition switch in the ON position.

Charge lamp should illuminate

Does the charge lamp illuminate?

YES >> Check generator function. Refer to [CHG-33. "Work Flow"](#).

NO >> GO TO 3



3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect the generator connector F2 and combination meter connector M24.
3. Check continuity between generator harness connector F2 (A) terminal 2 and combination meter harness connector M24 (B) terminal 38.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
F2	2	M24	38	Yes

4. Check continuity between generator harness connector F2 terminal 2 and ground.

A		—	Continuity
Connector	Terminal		
F2	2	Ground	No

Are the continuity results as specified?

YES >> Replace the combination meter. Refer to [XX-XX. "*****"](#).

NO >> Repair the harness or connector.



S TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[MR18DE]

S TERMINAL CIRCUIT

Description

INFOID:000000001724530

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:000000001724531

1.CHECK VOLTAGE REGULATOR CIRCUIT CONNECTION

Check to see if connector F2 terminal 3 is clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair terminal connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK VOLTAGE REGULATOR CIRCUIT

Check voltage between generator harness connector F2 terminal 3 and ground.

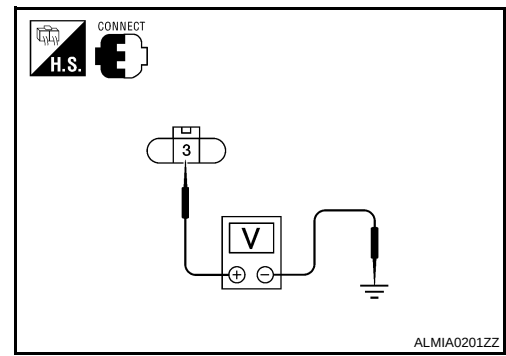
3 - ground

Battery voltage

Does battery voltage exist?

YES >> Refer to [CHG-33, "Work Flow"](#).

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

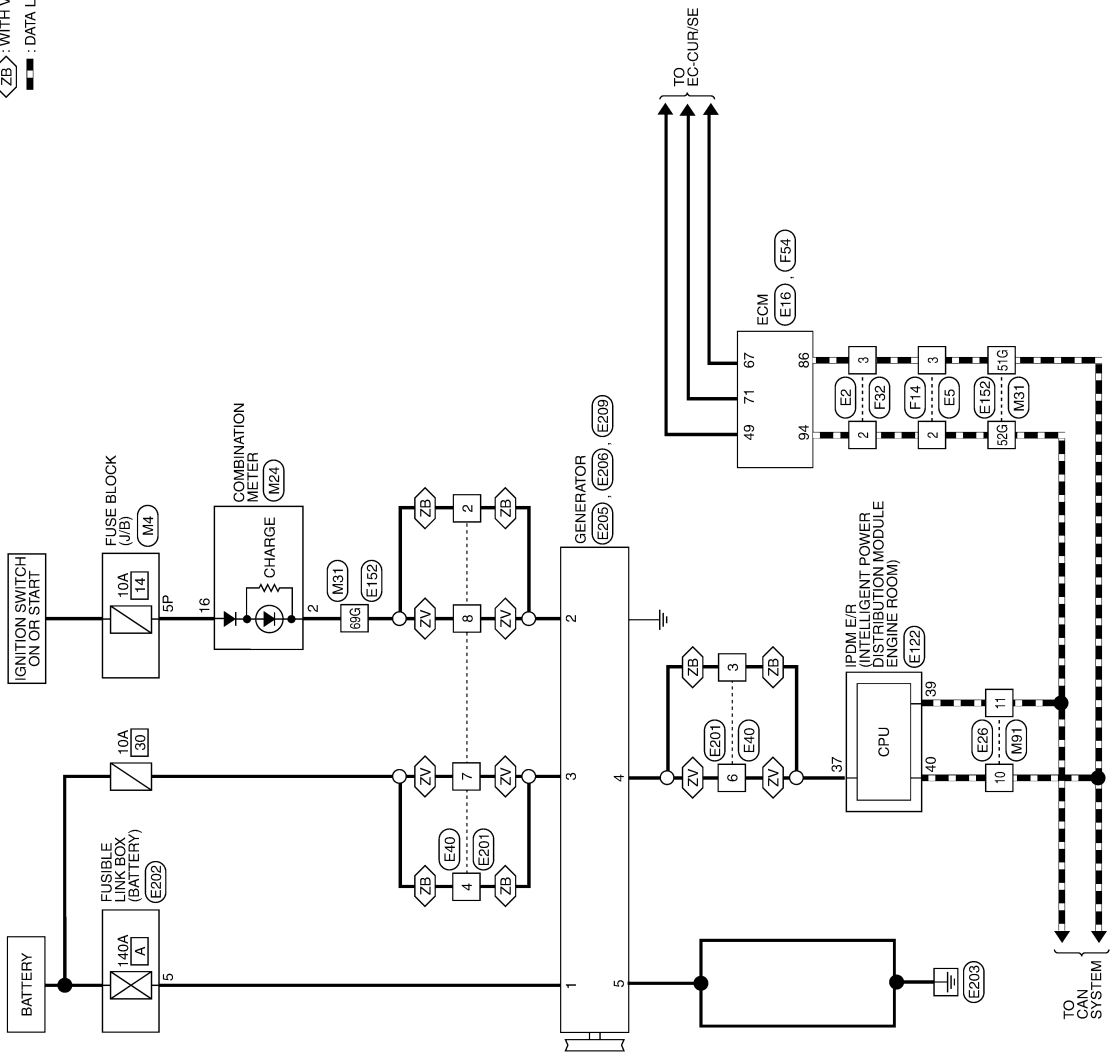


CHARGING SYSTEM

Wiring Diagram

INFOID:000000001724532

ZV> : WITH VQ40DE
ZB> : WITH VK56DE
— : DATA LINE



CHARGING SYSTEM

CHG

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000001724533

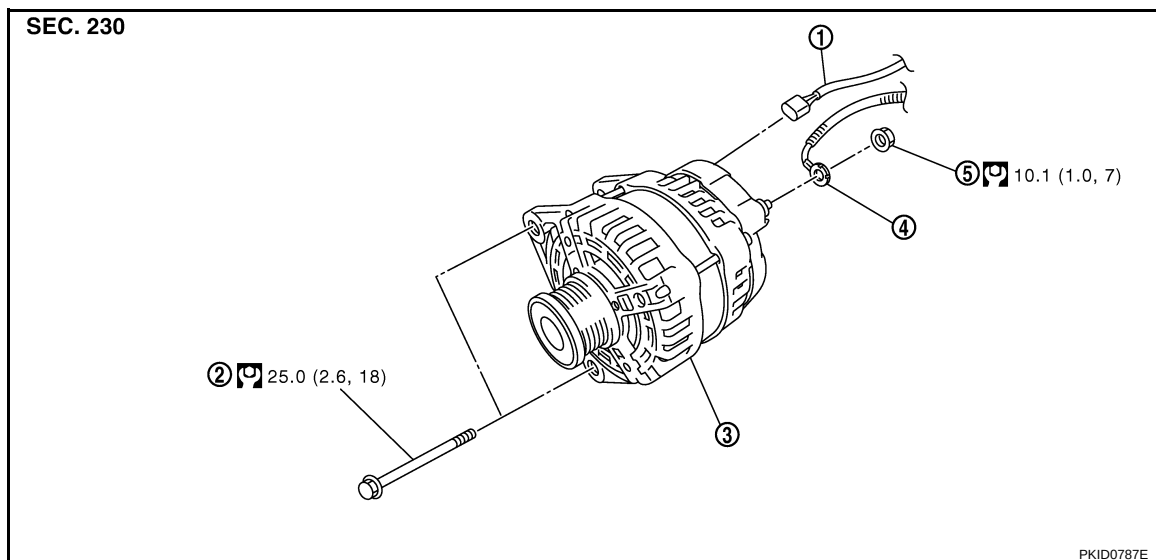
Symptom	Reference
Battery discharged	Refer to CHG-19, "Work Flow" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

ON-VEHICLE REPAIR

GENERATOR

Removal and Installation

INFOID:000000001689498



- | | | |
|-------------------------|---------------------|--------------|
| 1. Generator connector | 2. Generator bolt | 3. Generator |
| 4. "B" terminal harness | 5. "B" terminal nut | |

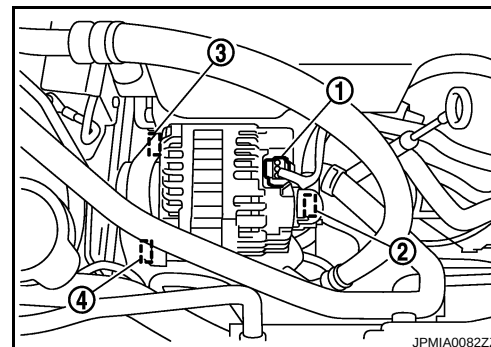
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove drive belt. Refer to [EM-142, "Removal and Installation"](#).
3. Disconnect generator connector (1).
4. Remove "B" terminal nut (2) and "B" terminal harness.
5. Remove upper generator bolt (3).
6. Completely loosen lower generator bolt (4), and pull it out until the bolt head is in contact with the side member. And then, remove the generator by pulling it forward.

NOTE:

The generator can be removed together with the bolts by pulling it forward and using the generator bracket bolt hole cutout.

7. Remove generator upward from the vehicle.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

- Temporarily tighten the generator bolts in order from the lower to the upper, and then tighten them in order from the upper to the lower.

CAUTION:

For the generator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the generator mating part, and then tighten the bolts.

- Install generator, and check tension of belt. Refer to [EM-142, "Checking Drive Belts"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR18DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Generator

INFOID:0000000001690788

Type	H90-128SC
	MITSUBISHI make
Nominal rating	12 V - 90 A
Ground polarity	Negative
Minimum revolution under no-load (when 13.5 V is applied)	Less than 1,200 rpm
Hot output current (when 13.5 V is applied)	More than 27 A/1,300 rpm More than 76 A/2,500 rpm More than 85 A/5,000 rpm
Regulated output voltage	14.1 - 14.7 V
Minimum length of brush	More than 6.00 mm (0.236 in)
Brush spring pressure	1.1 - 3.7 N (112 - 378 g, 4.00 - 13.3 oz)
Slip ring minimum outer diameter	More than 14.7 mm (0.579 in)
Rotor (field coil) resistance	1.61 - 1.91 Ω

PRECAUTION

PRECAUTIONS

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

INFOID:000000001731369

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIRBAG" and "SEAT BELT" 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 "SRS AIRBAG".
- 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.

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PREPARATION

< PREPARATION >

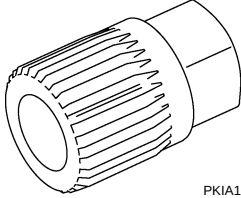
[K9K]

PREPARATION

PREPARATION

Special Service Tools

INFOID:000000001691353

Tool number Tool name	Description
KV10118200 (included in the adapter kit: Mot. 1732) Alternator pulley adapter	Removing and installing alternator pulley
 PKIA1241E	

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[K9K]

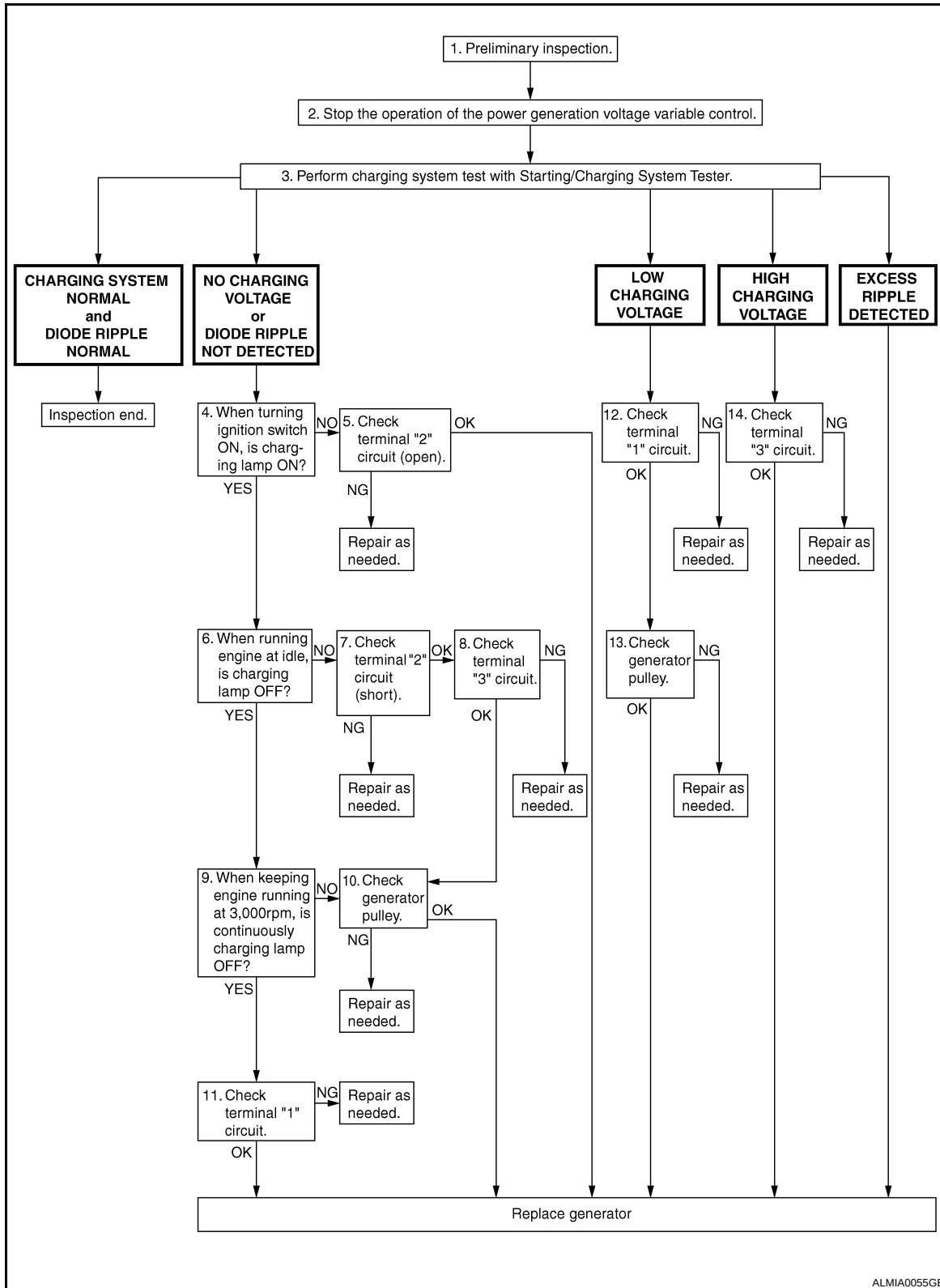
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001724500

OVERALL SEQUENCE



DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

[K9K]

< BASIC INSPECTION >

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-37, "Inspection Procedure"](#).

>> GO TO 2

2. DISABLE THE POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Disable the power generation voltage variable control with either of the following procedures.

- After selecting "ENGINE" on the "SELECT SYSTEM" screen of CONSULT-III, set the "ALTERNATOR DUTY" value 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, disconnect the battery current sensor connector and leave it disconnected during the course of the test.

NOTE:

Running the engine with the battery current sensor disconnected will cause DTC's (P1550-P1554) to set. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnostic results history of the engine using CONSULT-III.

>> GO TO 3

3. DIAGNOSIS WITH STARTING/CHARGING SYSTEM TESTER

Perform the charging system test using Starting/Charging System Tester (J-44373). For details and operating instructions, refer to Technical Service Bulletin.

Test result

CHARGING SYSTEM NORMAL>>Charging system is normal and will also show "DIODE RIPPLE" test result.

NO CHARGING VOLTAGE>>GO TO 4

LOW CHARGING VOLTAGE>>GO TO 12

HIGH CHARGING VOLTAGE>>GO TO 14

DIODE RIPPLE NORMAL>>Diode ripple is OK and will also show "CHARGING VOLTAGE" test result.

EXCESS RIPPLE DETECTED>>Replace the generator. Perform "DIODE RIPPLE" test again using Starting/Charging System Tester (J-44373) to confirm repair.

DIODE RIPPLE NOT DETECTED>>GO TO 4

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. TERMINAL "2" (OPEN) CIRCUIT INSPECTION

Check terminal "2" circuit for open circuits. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

YES >> Replace generator.

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. TERMINAL "2"(SHORT) CIRCUIT INSPECTION

Check terminal "2" circuit for short to ground. Refer to [CHG-39, "Diagnosis Procedure"](#).

Is the terminal "2" circuit normal?

DIAGNOSIS AND REPAIR WORKFLOW

[K9K]

< BASIC INSPECTION >

YES >> GO TO 8
NO >> Repair as needed.

A

8. TERMINAL "3" CIRCUIT INSPECTION

Check terminal "3" circuit. Refer to [CHG-40, "Diagnosis Procedure"](#).

B

Is the terminal "3" circuit normal?

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

C

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

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

D

Does the charge warning lamp remain off?

YES >> GO TO 11
NO >> GO TO 10

E

10. INSPECTION OF GENERATOR PULLEY

Check generator pulley.

Is generator pulley normal?

F

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

11. TERMINAL "1" CIRCUIT INSPECTION

G

Check terminal "1" circuit. Refer to [CHG-38, "Diagnosis Procedure"](#).

Is terminal "1" circuit normal?

H

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

12. TERMINAL "1" CIRCUIT INSPECTION

I

Check terminal "1" circuit. Refer to [CHG-38, "Diagnosis Procedure"](#).

Is terminal "1" circuit normal?

J

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

13. INSPECTION OF GENERATOR PULLEY

K

Check generator pulley.

Is generator pulley normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

L

14. TERMINAL "3" CIRCUIT INSPECTION

Check terminal "3" circuit. Refer to [CHG-40, "Diagnosis Procedure"](#).

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Is the terminal "3" circuit normal?

YES >> Replace generator. Refer to [XX-XX, "*****"](#).
NO >> Repair as needed.

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FUNCTION DIAGNOSIS

CHARGING SYSTEM

System Diagram

INFOID:0000000001724501



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System Description

INFOID:0000000001724502

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:0000000001724503

Component part		Description
Generator	Terminal "1"	Refer to CHG-38, "Description" .
	Terminal "2"	Refer to CHG-40, "Description" .
	Terminal "3"	Monitors charge voltage.
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		Supplies charge voltage to terminal "3" of generator.

CHARGING SYSTEM PRELIMINARY INSPECTION

< COMPONENT DIAGNOSIS >

[K9K]

COMPONENT DIAGNOSIS

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000001724507

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair battery terminals connection.

2.CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power supply terminals	Power source
Generator	Battery (terminal 3)	IPDM E/R
	Battery (terminal 1)	Fusible Link A
Combination meter	Ignition switch ON (terminal 2)	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 CASE GROUND

Verify generator case ground 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 XX-XX, "*****".

Is the inspection result normal?

YES >> Inspection end.

NO >> Repair as needed.

CHG

B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[K9K]

B TERMINAL CIRCUIT

Description

INFOID:000000001724509

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

Diagnosis Procedure

INFOID:000000001724510

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 Starting/Charging system test. Refer to Technical Service Bulletin.

2.CHECK TERMINAL "1" CIRCUIT

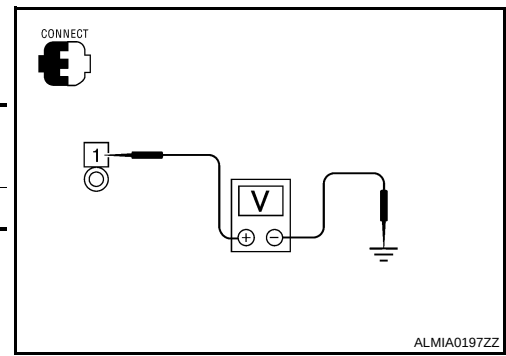
Check voltage between generator connector F2 terminal 1 and ground.

(+) Terminal		(-)	Voltage
Connector	Terminal		
F2	1	Ground	Battery voltage

Is voltage reading as specified?

YES >> GO TO 3.

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



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

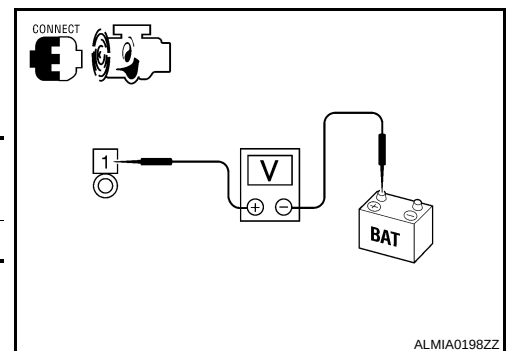
1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector F2 terminal 1.

(+) Terminal		(-)	Voltage
Connector	Terminal		
F2	1	Battery positive terminal	Less than 0.2V

Is the voltage reading as specified?

YES >> Terminal "1" circuit is normal. Refer to [CHG-33, "Work Flow"](#).

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



L TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[K9K]

L TERMINAL CIRCUIT

Description

INFOID:000000001724511

The terminal "2" (L) circuit controls the charge warning lamp. The charge warning lamp illuminates 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 will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:000000001724512

1.CHECK CHARGE WARNING LAMP CIRCUIT CONNECTION

Verify generator connector F1 terminal 2 is clean and tight.

Is the connection secure?

YES >> GO TO 2

NO >> Repair the connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK CHARGE WARNING LAMP CIRCUIT

1. Disconnect generator connector F1.
2. Apply ground to generator harness connector F1 terminal 2 with the ignition switch in the ON position.

Charge lamp should illuminate

Does the charge lamp illuminate?

YES >> Check generator function. Refer to [CHG-33, "Work Flow"](#).

NO >> GO TO 3

**NO
DATA**

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3.CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect the generator connector F1 and combination meter connector M24.
3. Check continuity between generator harness connector F1 terminal 2 and combination meter harness connector M24 terminal 38.

Terminal		Terminal		Continuity
Connector	Terminal	Connector	Terminal	
F1	2	M24	38	Yes

4. Check continuity between generator harness connector F1 terminal 2 and ground.

Terminal		—	Continuity
Connector	Terminal		
F1	2	Ground	No

Are the continuity results as specified?

YES >> Replace the combination meter. Refer to [XX-XX, "*****"](#).

NO >> Repair the harness or connector.

**NO
DATA**

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S TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

[K9K]

S TERMINAL CIRCUIT

Description

INFOID:000000001724513

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:000000001724514

1.CHECK VOLTAGE REGULATOR CIRCUIT CONNECTION

Check to see if connector F1 terminal 3 is clean and tight.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair terminal connection. Confirm repair by performing complete Starting/Charging system test.
Refer to Technical Service Bulletin.

2.CHECK VOLTAGE REGULATOR CIRCUIT

1. Disconnect generator harness connector F1.
2. Turn ignition switch ON.
3. Check voltage between generator harness connector F1 terminal 3 and ground.

3 - ground

Battery voltage

Does battery voltage exist?

YES >> Refer to [CHG-33, "Work Flow"](#).

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

**NO
DATA**

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CHARGING SYSTEM

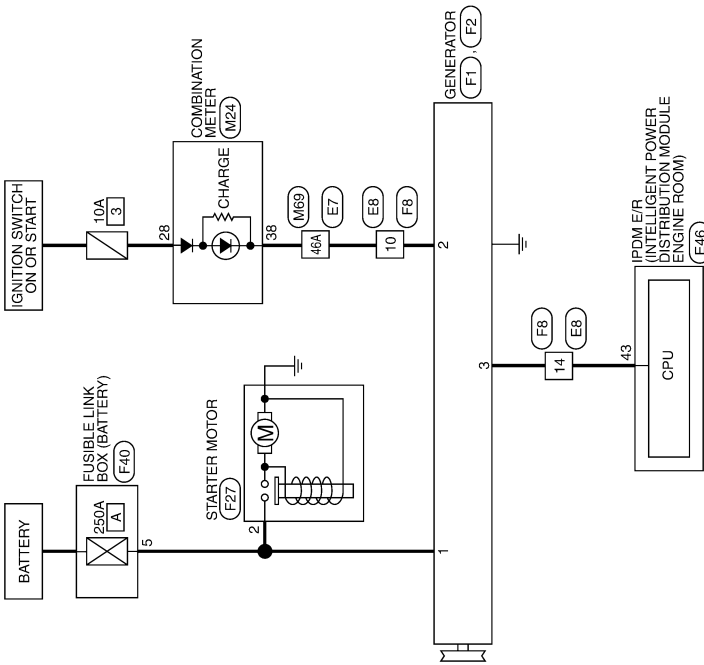
< COMPONENT DIAGNOSIS >

[K9K]

CHARGING SYSTEM

Wiring Diagram

INFOID:000000001724515



CHARGING SYSTEM - WITH DIESEL

CHG

AWMWA0023G

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000001724516

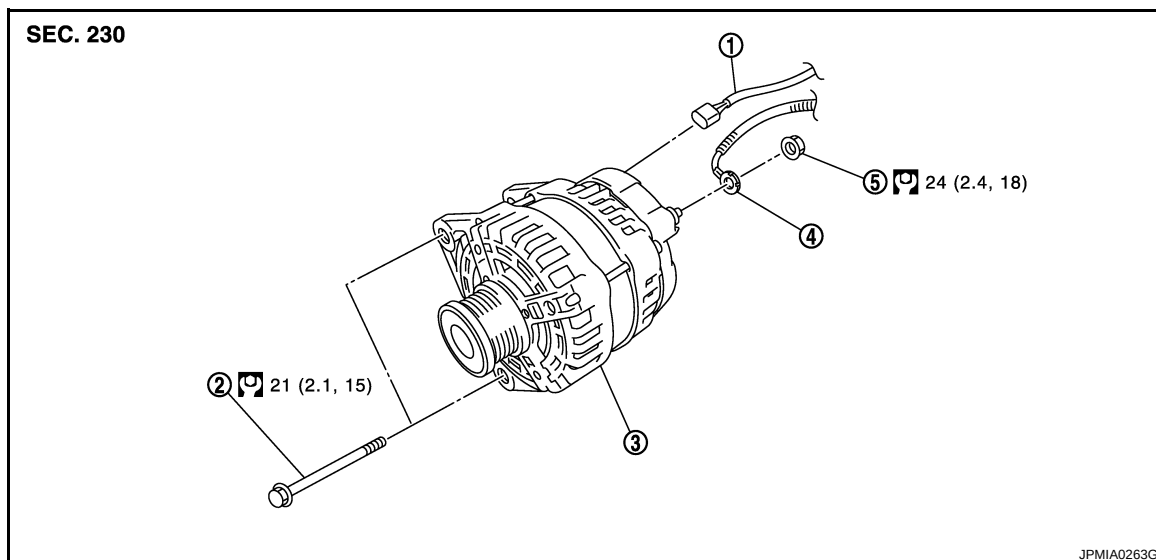
Symptom	Reference
Battery discharged	Refer to CHG-33, "Work Flow" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

ON-VEHICLE REPAIR

GENERATOR

Removal and Installation

INFOID:000000001689502



- | | | |
|-------------------------|---------------------|--------------|
| 1. Generator connector | 2. Generator bolt | 3. Generator |
| 4. "B" terminal harness | 5. "B" terminal nut | |

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove RH fender protector partially.
3. Remove fuel injection pipe protector.
4. Remove drive belt. Refer to [EM-263. "Removal and Installation"](#).
5. Disconnect generator connector.
6. Remove "B" terminal nut and "B" terminal harness.
7. Remove upper generator bolt.
8. Release lower generator bolt, then push it aside.
9. Remove generator with lower bolt.

NOTE:

Pull generator to the front side from upside. Turn, then pull lower side of generator with lower bolt.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

- Install generator, and check tension of belt. Refer to [EM-263. "Inspection and Adjustment"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

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[K9K]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Generator

INFOID:0000000001691231

Applied model		K9K
Type		0 124 525 082
		BOSCH make
Nominal rating	[V - A]	—
Ground polarity		—
Minimum revolution under no-load (When 13.5 V is applied)	[rpm]	—
Hot output current (When 13.5 V is applied)	[A/rpm]	—
Regulated output voltage	[V]	—
Minimum length of brush	[mm (in)]	—
Brush spring pressure	[N (g, oz)]	—
Slip ring minimum outer diameter	[mm (in)]	—
Rotor (Field coil) resistance	[Ω]	—