

SECTION

CHG

CHARGING SYSTEM

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

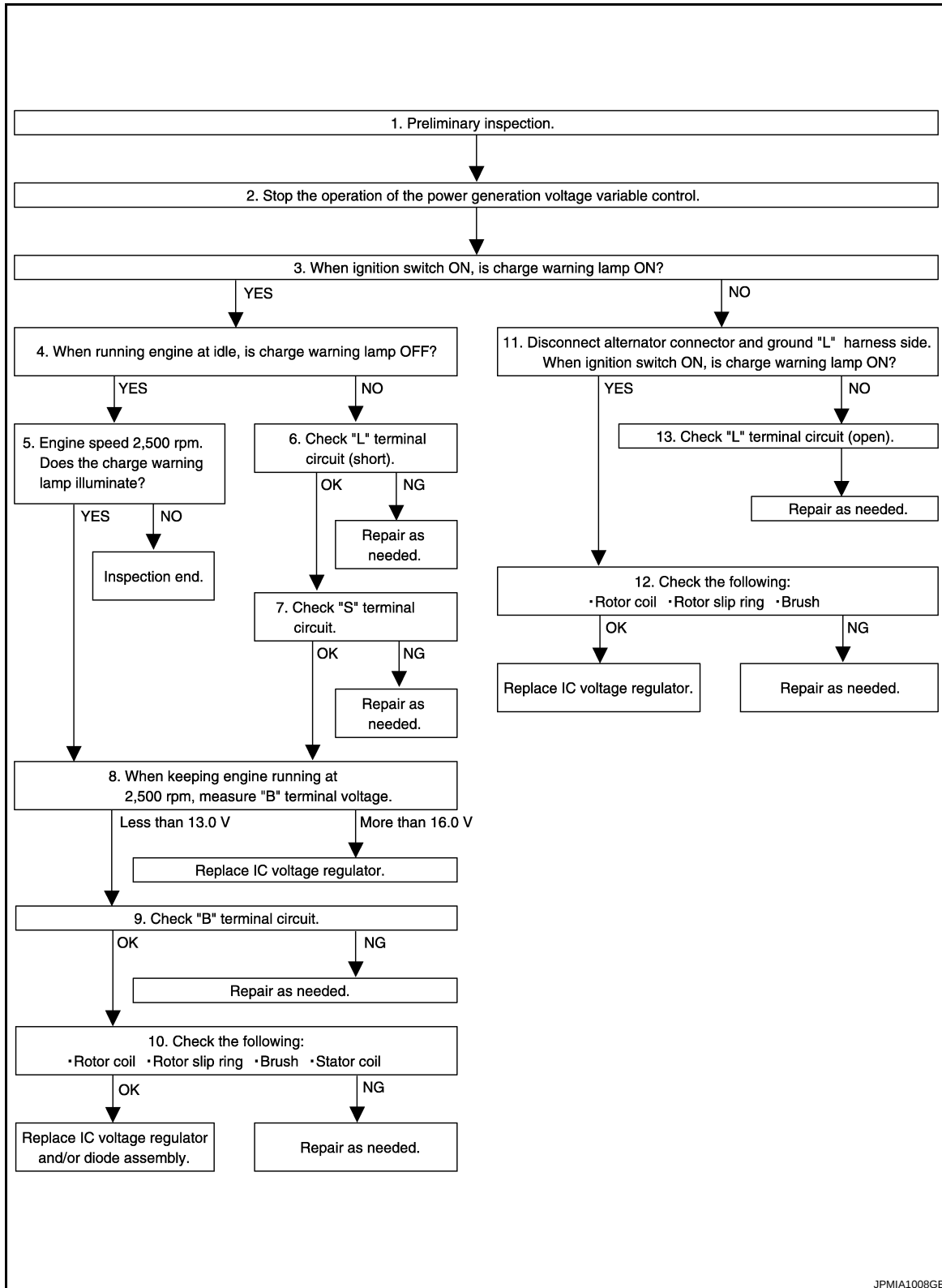
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000003860762

OVERALL SEQUENCE



JPMIA1008GB

DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-20. "Inspection 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" of "SELECT SYSTEM" using CONSULT-III, 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 alternator.)
- 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-III.]

>> GO TO 3.

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

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 4.

NO >> GO TO 11.

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 "L" terminal circuit (short). Refer to [CHG-12. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair as needed.

7. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-13. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. MEASURE "B" TERMINAL VOLTAGE

Engine start. When keeping 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 IC regulator.

9. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-9. "Diagnosis Procedure"](#).

Is the inspection result normal?

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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

10. DISASSEMBLE AND CHECK ALTERNATOR

Check the following conditions. Refer to [CHG-24, "Inspection"](#).

- Rotor coil
- Rotor slip ring
- Brush
- Stator coil

Are these normal?

- YES >> Replace IC regulator and/or diode assembly.
NO >> Repair as needed.

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

1. Disconnect alternator connector and ground "L" harness side.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

- YES >> GO TO 12.
NO >> GO TO 13.

12. DISASSEMBLE AND CHECK ALTERNATOR

Check the following conditions. Refer to [CHG-24, "Inspection"](#).

- Rotor coil
- Rotor slip ring
- Brush

Are these normal?

- YES >> Replace IC regulator.
NO >> Repair as needed.

13. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (open). Refer to [CHG-10, "Diagnosis Procedure"](#).

>> Repair as needed.

CHARGING SYSTEM

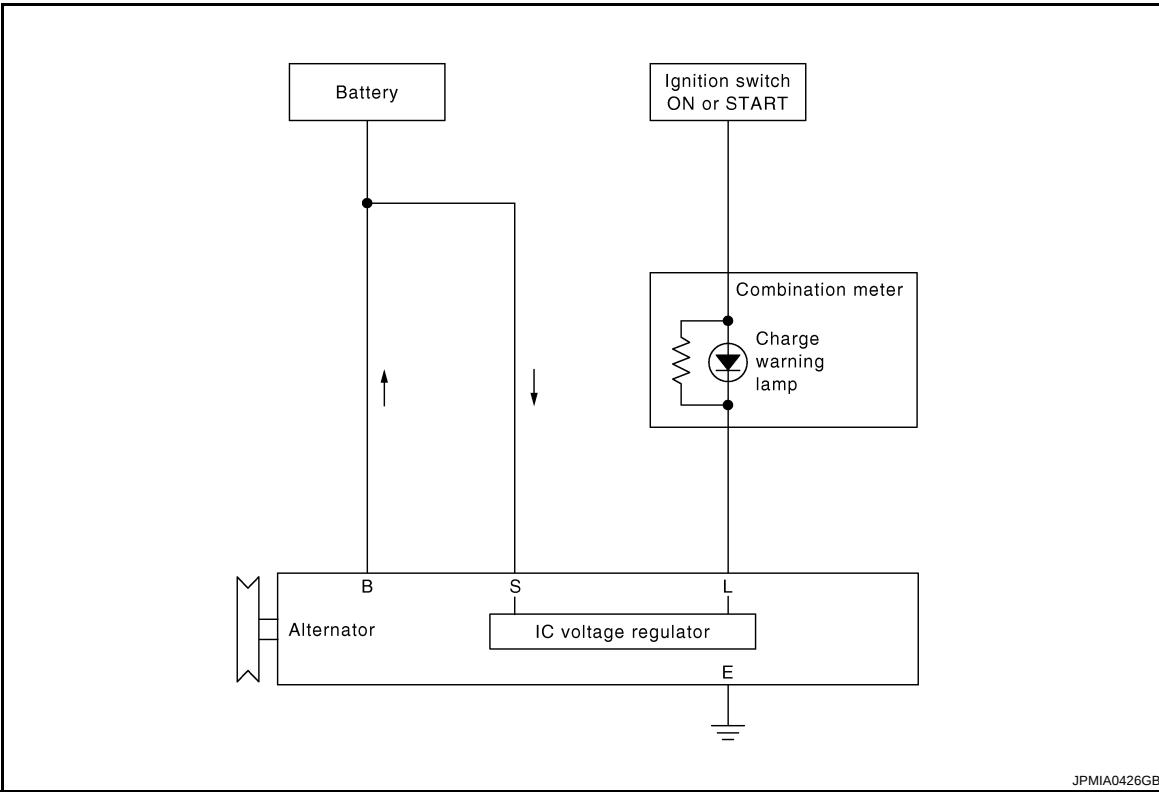
< FUNCTION DIAGNOSIS >

FUNCTION DIAGNOSIS

CHARGING SYSTEM

System Diagram

INFOID:000000003860509



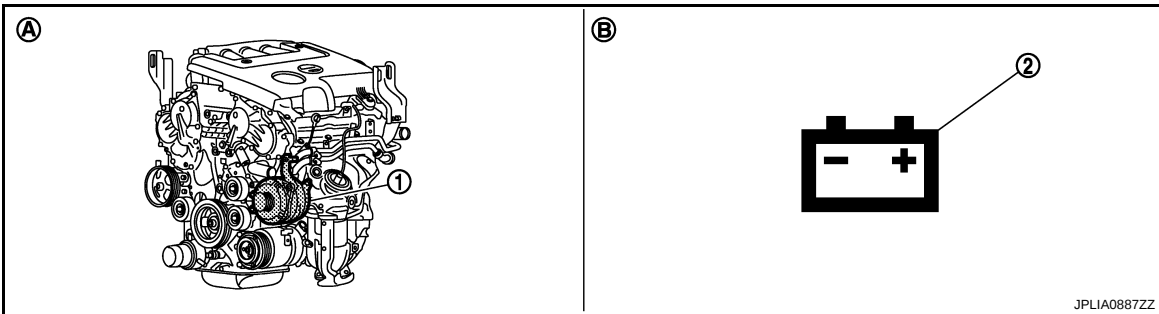
System Description

INFOID:000000003860510

The voltage output is controlled by the IC voltage regulator.

Component Parts Location

INFOID:000000003860511



- | | |
|------------------------------|------------------------|
| 1. Alternator | 2. Charge warning lamp |
| A. Cylinder block bank2 side | B. Combination meter |

Component Description

INFOID:000000003860512

CHARGING SYSTEM

< FUNCTION DIAGNOSIS >

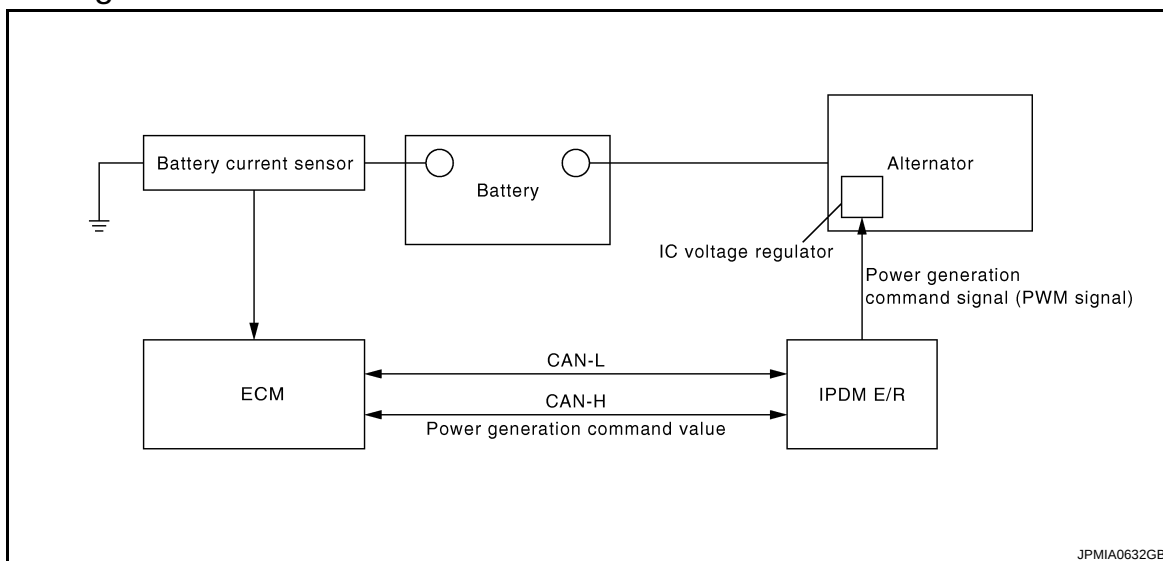
Component part	Description
Alternator	The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged.
Combination meter (Charge warning lamp)	The IC voltage regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while alternator is operating: • Excessive voltage is produced. • No voltage is produced.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

System Diagram



System Description

INFOID:000000003860518

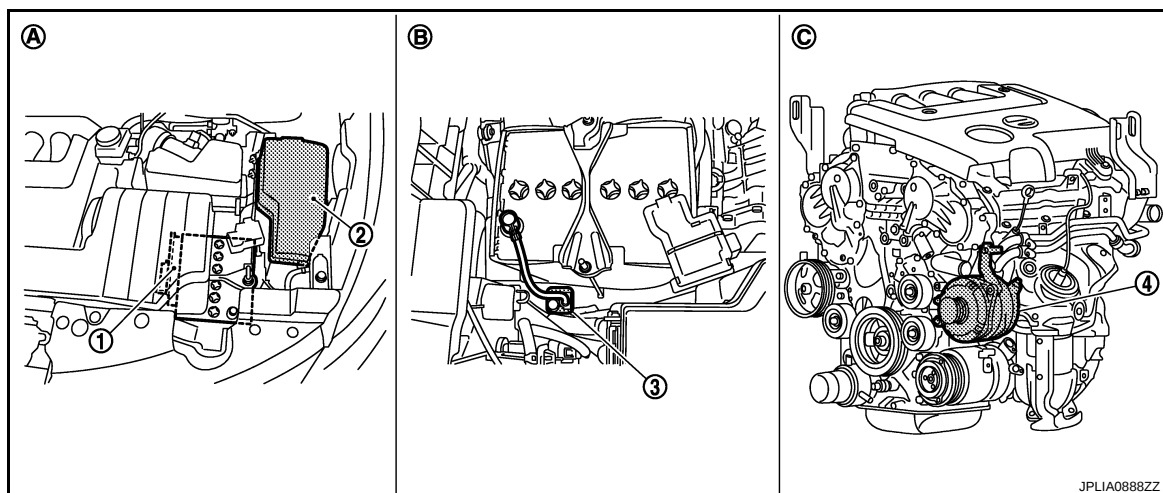
By performing the power generation voltage variable control, the engine load due to the power generation of the alternator is reduced and fuel consumption is decreased.

NOTE:

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

Component Parts Location

INFOID:000000003860519



1. ECM

2. IPDM E/R

3. Battery current sensor

4. Alternator

A. Engine room dash panel (LH)

B. Battery

C. Cylinder block bank2 side

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

Component Description

INFOID:000000003860520

Component part	Description
Battery current sensor	Battery current sensor is installed to the battery cable at the negative terminal, and it detects the charging/discharging current of the battery and sends the voltage signal to ECM according to the current value.
ECM	Battery current sensor detects the charging/discharging current of the battery. ECM judges the battery condition based on this signal. ECM judges whether to perform the power generation voltage variable control according to the battery condition. When performing the power generation voltage variable control, ECM calculates the target power generation voltage according to the battery condition and sends the calculated value as the power generation command value to IPDM E/R.
IPDM E/R	IPDM E/R converts the received power generation command value into the power generation command signal (PWM signal) and sends it to the IC voltage regulator.
Alternator (IC voltage regulator)	IC voltage 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 alternator performs the normal power generation according to the characteristic of the IC voltage regulator.

B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

COMPONENT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000003860521

"B" terminal circuit supplies power to charge the battery and to operate the vehicle's electrical system.

Diagnosis Procedure

INFOID:0000000003860522

1.CHECK "B" TERMINAL CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

Terminals			Voltage (Approx.)
(+)		(-)	
Alternator "B" terminal	Terminal		
F59	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

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

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

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and alternator "B" terminal.

Terminals			Voltage (Approx.)
(+)	(-)		
	Alternator "B" terminal	Terminal	
Battery positive terminal	F59	1	Less than 0.2 V

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to [CHG-2, "Work Flow"](#).

NO >> Check harness between battery and alternator for poor continuity.

L TERMINAL CIRCUIT (OPEN)

< COMPONENT DIAGNOSIS >

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:000000003860523

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator 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:000000003860524

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

2.CHECK "L" TERMINAL CIRCUIT (OPEN)

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

Alternator harness connector	Terminal	Ground	Condition	
			Ignition switch position	Charge warning lamp
F60	3		ON	illuminate

Does it illuminate?

YES >> "L" terminal circuit is normal. Refer to [CHG-2. "Work Flow"](#).

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 alternator harness connector and combination meter harness connector.

Alternator harness connector		Combination meter harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F60	3	M34	25	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the harness or connector.

4.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check continuity between combination meter harness connector and fuse block.

Combination meter harness connector		Fuse block		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M34	2	M3	12C	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the harness.

5.CHECK POWER SUPPLY CIRCUIT

1. Connect the battery cable to the negative terminal.

L TERMINAL CIRCUIT (OPEN)

< COMPONENT DIAGNOSIS >

2. Check voltage between combination meter harness connector and ground.

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Combination meter harness connector	Terminal		
M34	2	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

- YES >> Replace combination meter.
- NO >> Inspect the power supply circuit. Refer to [CHG-14, "Wiring Diagram - CHARGING SYSTEM -"](#).

L TERMINAL CIRCUIT (SHORT)

< COMPONENT DIAGNOSIS >

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:000000003860525

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator 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:000000003860526

1. CHECK "L" TERMINAL CIRCUIT (SHORT)

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

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-2, "Work Flow"](#).

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

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

Combination meter harness connector		Ground	Continuity
Connector No.	Terminal No.		
M34	25		Not existed

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair the harness.

S TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

S TERMINAL CIRCUIT

Description

INFOID:000000003860527

The output voltage of the alternator is controlled by the IC voltage regulator at the "S" terminal detecting the input voltage.

The "S" terminal circuit detects the battery voltage to adjust the alternator output voltage with the IC voltage regulator.

Diagnosis Procedure

INFOID:000000003860528

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

2.CHECK "S" TERMINAL CIRCUIT

Check voltage between alternator harness connector and ground.

Terminals			Voltage (Approx.)
(+) Alternator harness connector		(–) Terminal	
F60	4		Ground

Is the inspection result normal?

YES >> Refer to [CHG-2. "Work Flow"](#).

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

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CHARGING SYSTEM

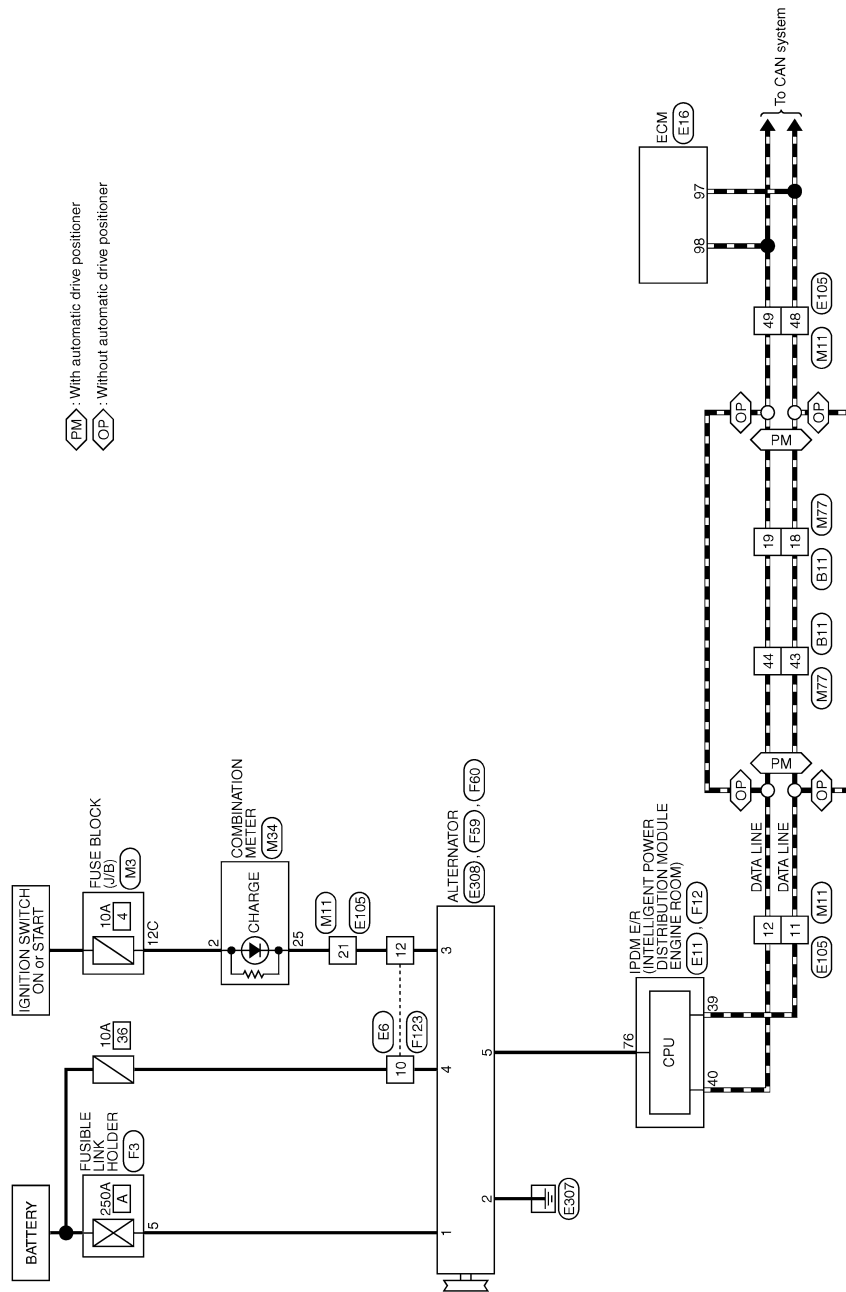
< COMPONENT DIAGNOSIS >

CHARGING SYSTEM

Wiring Diagram - CHARGING SYSTEM -

INFOID:000000003860529

CHARGING SYSTEM



CHARGING SYSTEM

< COMPONENT DIAGNOSIS >

CHARGING SYSTEM

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS19



Terminal No.	Color of Wire	Signal Name [Specification]
18	P	-
19	L	-
43	P	-
44	L	-

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK18MGY-1V



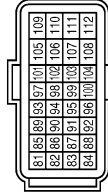
Terminal No.	Color of Wire	Signal Name [Specification]
10	W	-
12	BR	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH68FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
39	P	-
40	L	-

Connector No.	E16
Connector Name	ECM
Connector Type	FR24FB-R28-L-LH



Terminal No.	Color of Wire	Signal Name [Specification]
97	P	VEHCAN-L
98	L	VEHCAN-H

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH70MW-CS10-M3



Terminal No.	Color of Wire	Signal Name [Specification]
11	P	-
12	L	-
21	BR	-
48	P	-
49	L	-

Connector No.	E308
Connector Name	ALTERNATOR
Connector Type	E-LA6



Connector No.	E3
Connector Name	FUSIBLE LINK HOLDER
Connector Type	24340 JAO4D



Connector No.	F12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH20FW-CS12-M4



Terminal No.	Color of Wire	Signal Name [Specification]
76	SS	-

JCMW1692GI

CHARGING SYSTEM

< COMPONENT DIAGNOSIS >

CHARGING SYSTEM

Connector No.	F59
Connector Name	ALTERNATOR
Connector Type	24340-JA09A



Terminal No.	Color of Wire	Signal Name [Specification]
1	B/R	-

Connector No.	F60
Connector Name	ALTERNATOR
Connector Type	HS07FB



Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-
4	Y/B	-
5	SB	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK16GY-1V



Terminal No.	Color of Wire	Signal Name [Specification]
10	Y/B	-
12	BR	-

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
12C	O	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH10FW-CS10-M3



Terminal No.	Color of Wire	Signal Name [Specification]
11	P	-
12	L	-
21	BR	-
48	P	-
49	L	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
2	O	IGN
25	BR	CHG

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS19



Terminal No.	Color of Wire	Signal Name [Specification]
18	P	-
19	L	-
43	P	-
44	L	-

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000003860530

Symptom	Reference
Discharged battery	Refer to CHG-2, "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 charge warning lamp turns ON when increasing the engine speed.	

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PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000003860531

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 "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".
- Never 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.

PREPARATION

< PREPARATION >

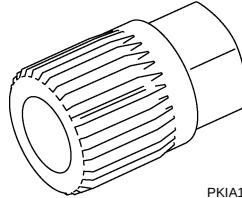
PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000003860532

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



PKIA1241E

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CHARGING SYSTEM PRELIMINARY INSPECTION

< ON-VEHICLE MAINTENANCE >

ON-VEHICLE MAINTENANCE

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000003860533

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.

Unit	Power source (Power supply terminals)	Fuse No.
Alternator	Battery ("S" terminal)	36
Combination meter	Ignition switch ON ("L" terminal)	4

Is the inspection result normal?

YES >> GO TO 3.

NO >> Be sure to eliminate the cause of malfunction before installing new fuse.

3.CHECK "E" TERMINAL CONNECTION

Check if "E" terminal (alternator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair "E" terminal connection.

4.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to the following [EM-12. "Checking"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

ALTERNATOR

< ON-VEHICLE REPAIR >

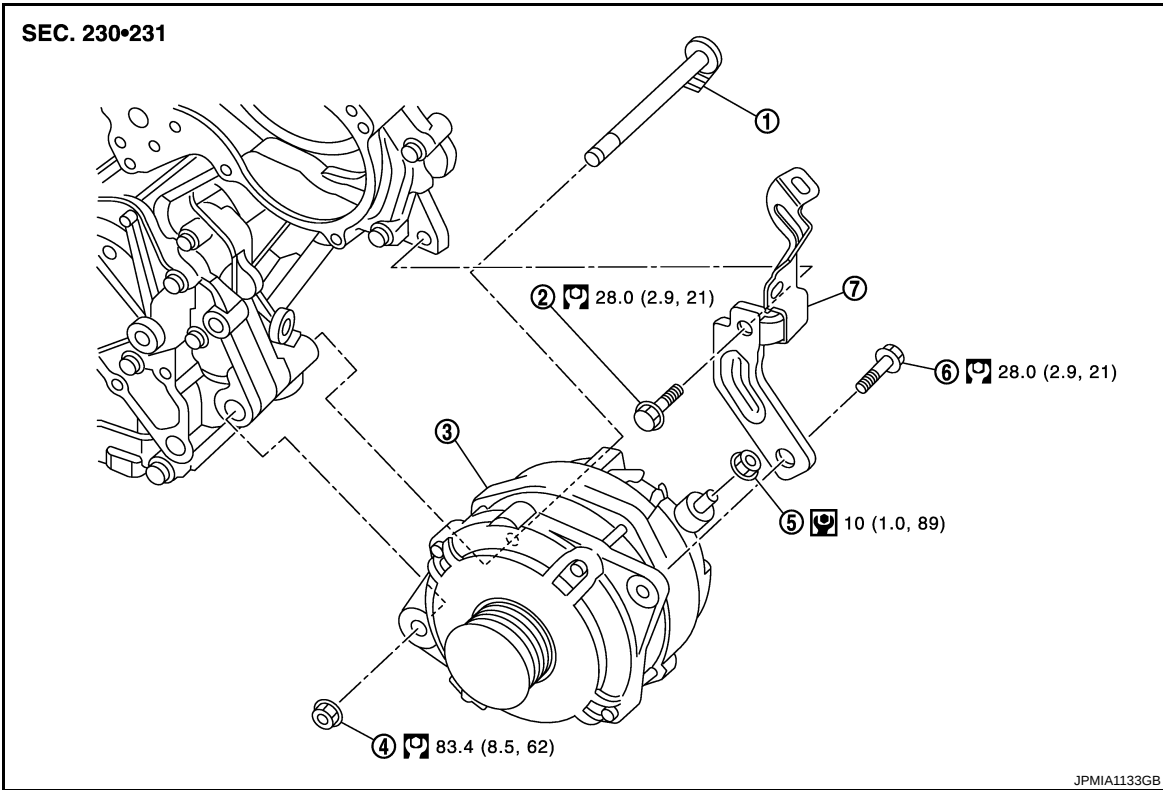
ON-VEHICLE REPAIR

ALTERNATOR

Exploded View

REMOVAL

INFOID:000000003860538



DISASSEMBLY

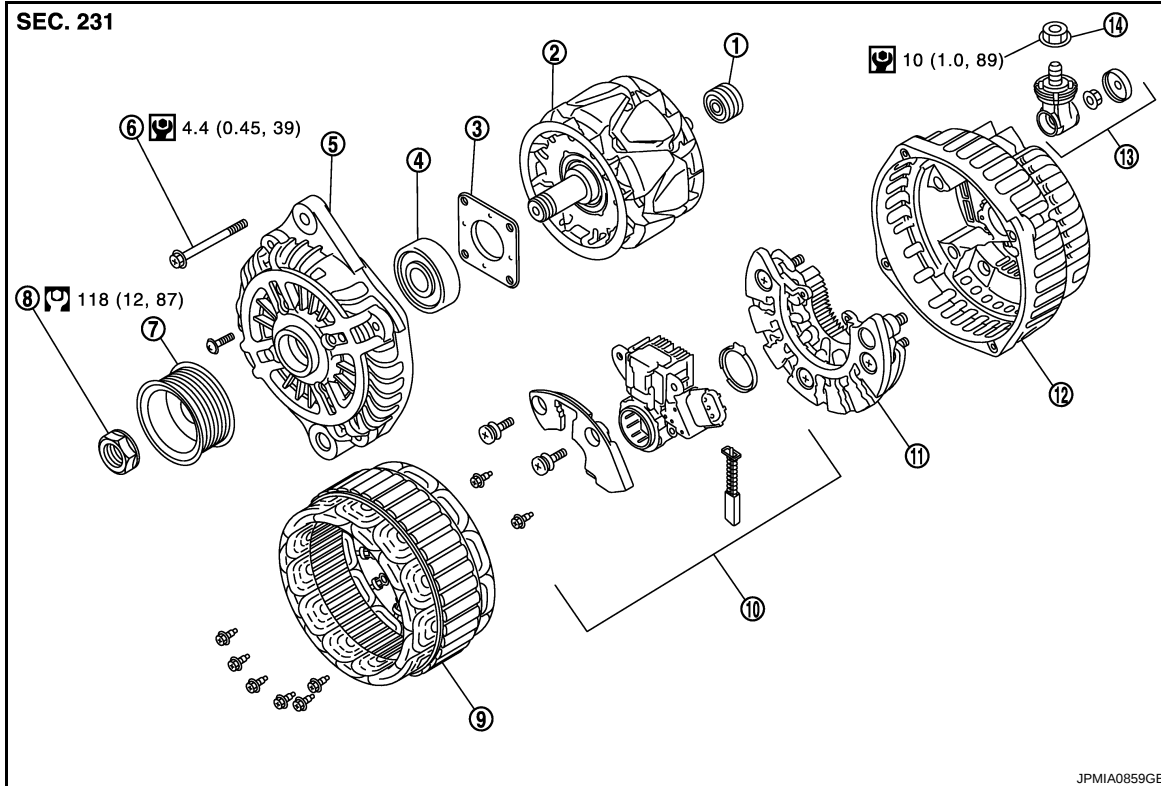
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ALTERNATOR

< ON-VEHICLE REPAIR >

Type: A003TJ1791



Removal and Installation

INFOID:000000003860539

REMOVAL

1. Disconnect the negative battery terminal.
2. Remove engine cover.
3. Remove front wheel and tire (RH).
4. Remove splash guard (RH) Refer to [EXT-22, "FENDER PROTECTOR : Exploded View"](#).
5. Remove air cleaner and air duct assembly. Refer to [EM-26, "Removal and Installation"](#).
6. Remove drive belt. Refer to [EM-25, "Removal and Installation"](#).
7. Remove A/C compressor. Refer to [HA-36, "Removal and Installation"](#).
8. Remove idler pulley.
9. Disconnect the oil pressure switch.
10. Disconnect the alternator harness connectors.
11. Remove the alternator bolt and nuts.
12. Slide the alternator out and remove.

INSTALLATION

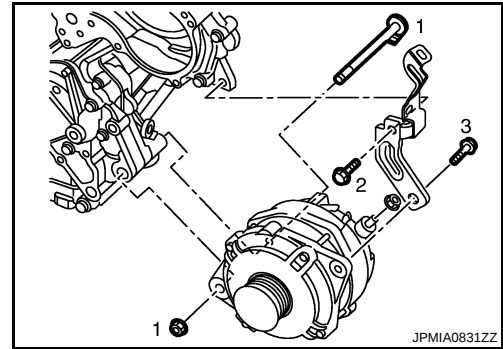
Installation is in the reverse order of removal.

CAUTION:

ALTERNATOR

< ON-VEHICLE REPAIR >

- Temporarily tighten all of alternator bolt and nuts. And then tighten them in numerical order shown in the figure.



- Be sure to tighten "B" terminal nut carefully.
- Install alternator and check tension of belt. Refer to [EM-12, "Checking"](#).
- For this model, the power generation voltage variable control system that controls the power generation voltage of the alternator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the alternator, and then make sure that the system operates normally. Refer to [CHG-20, "Inspection Procedure"](#).

Disassembly and Assembly

INFOID:000000003860540

DISASSEMBLY

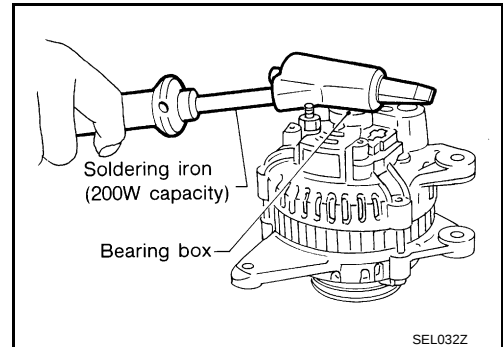
Rear bracket assembly

NOTE:

Rear bracket assembly may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear bracket assembly, heat only the bearing box section until the temperature increases to approximately 30°C (86°F) with a soldering iron (200W capacity).

CAUTION:

Never use a heat gun, as it can damage diode assembly.

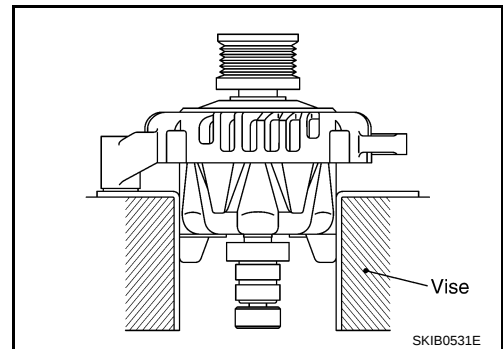


Front Cover

1. Set rotor to the vise.

CAUTION:

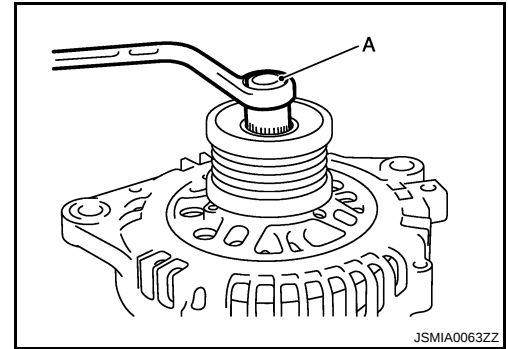
- Be careful not to damage the rotor.
 - Use copper plate or thick cloth for rotor in the vise.
2. Remove pulley cap, using suitable tool.



ALTERNATOR

< ON-VEHICLE REPAIR >

3. Remove alternator pulley, using alternator pulley adaptor (A) [SST:KV10118200].



ASSEMBLY

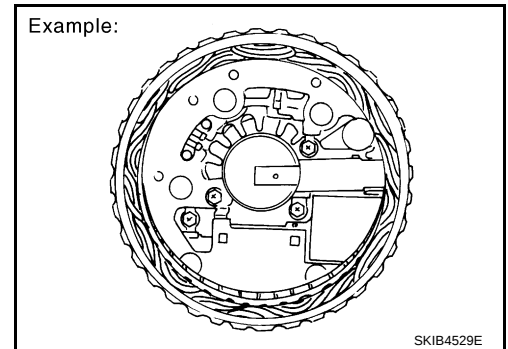
Rear Bearing

CAUTION:

- **Never reuse rear bearing. Replace with a new one.**
- **Never lubricate rear bearing outer race.**

Rear bracket assembly Installation

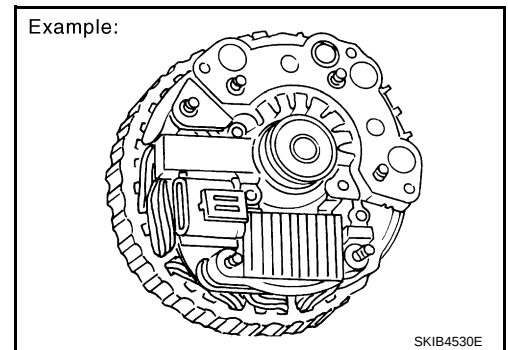
1. Fit brush assembly, diode assembly, regulator assembly and stator.



2. Push brushes up with fingers and install them to rotor.

NOTE:

Take care not damage slip ring sliding surface.



Inspection

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight.

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SERVICE DATA AND SPECIFICATIONS (SDS)

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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:000000003860542

Applied model		VQ25DE, VQ35DE
Type		A003TJ1791
		MITSUBISHI make
Nominal rating	[V - A]	12 - 130
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 61/1,500 More than 109/2,500 More than 129/5,000
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]	1.8 - 2.2

A

B

C

D

E

F

G

H

I

J

K

L

CHG

N

O

P