

SECTION **CHG**  
CHARGING SYSTEM

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CHG



# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

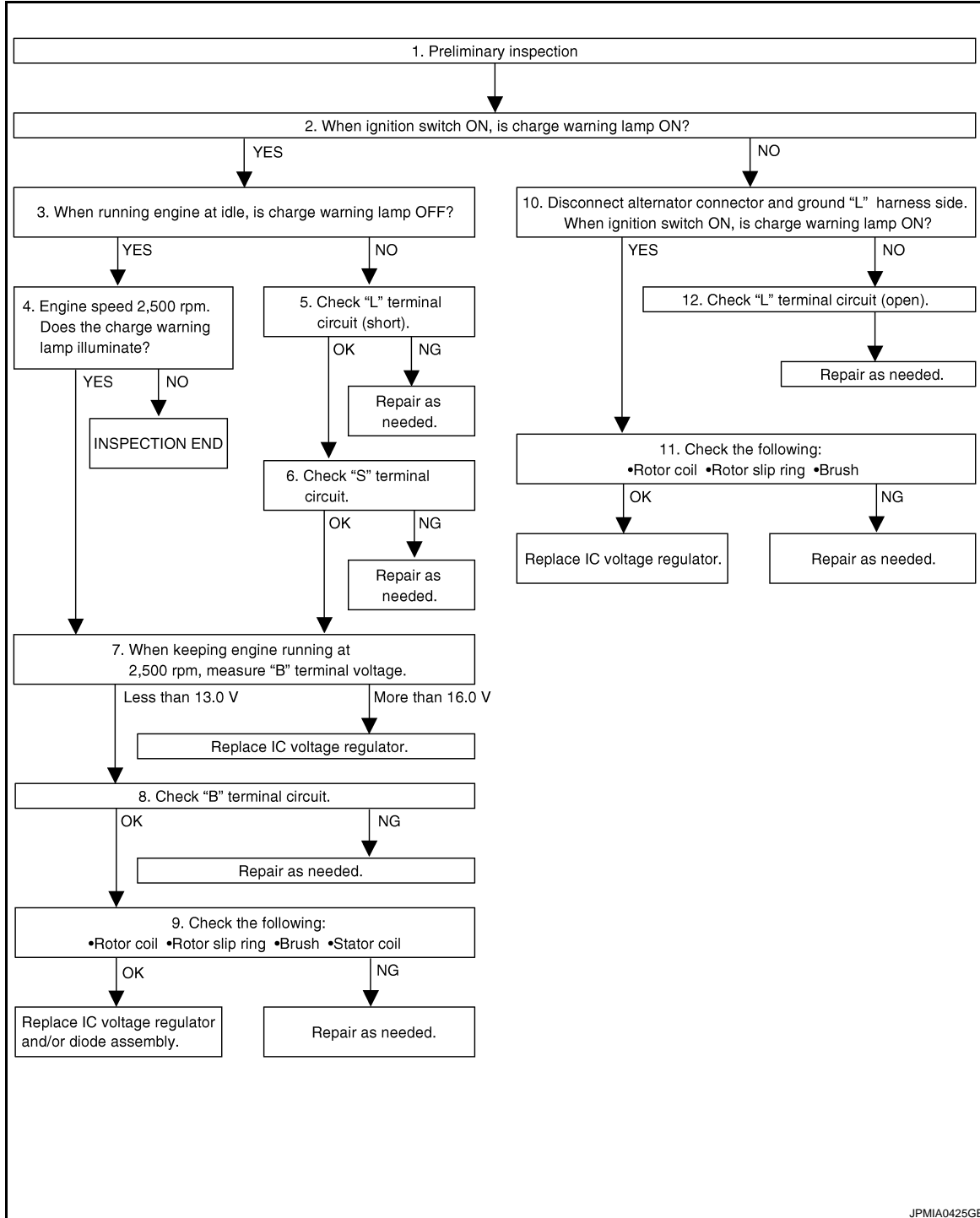
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000001208694

#### OVERALL SEQUENCE



#### DETAILED FLOW

##### 1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-22. "Inspection Procedure"](#) .

# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

---

>> GO TO 2.

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

---

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 3.

NO >> GO TO 10.

### 3.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

---

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 4.

NO >> GO TO 5.

### 4.INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

---

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp illuminate?

YES >> GO TO 7.

NO >> INSPECTION END

### 5.“L” TERMINAL CIRCUIT (SHORT) INSPECTION

---

Check “L” terminal circuit (short). Refer to [CHG-11. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair as needed.

### 6.“S” TERMINAL CIRCUIT INSPECTION

---

Check “S” terminal circuit. Refer to [CHG-12. "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair as needed.

### 7.MEASURE “B” TERMINAL VOLTAGE

---

Start engine. 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 8.

More than 16.0 V>>Replace IC voltage regulator.

### 8.“B” TERMINAL CIRCUIT INSPECTION

---

Check “B” terminal circuit. Refer to [CHG-8. "Diagnosis Procedure"](#) .

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair as needed.

### 9.DISASSEMBLE AND CHECK ALTERNATOR

---

Check the following conditions.

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

Refer to the following.

- [CHG-26. "M9R MODELS : Inspection"](#) (M9R models)
- [CHG-29. "MR20DE MODELS : Inspection"](#) (MR20DE models)
- [CHG-33. "QR25DE MODELS : Inspection"](#) (QR25DE models)

Are these normal?

YES >> Replace IC voltage regulator and/or diode assembly.

NO >> Repair as needed.

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

---

## 10. 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 11.

NO >> GO TO 12.

---

## 11. DISASSEMBLE AND CHECK ALTERNATOR

---

Check the following conditions.

- Rotor coil
- Rotor slip ring
- Brush

Refer to the following.

- [CHG-26. "M9R MODELS : Inspection"](#) (M9R models)
- [CHG-29. "MR20DE MODELS : Inspection"](#) (MR20DE models)
- [CHG-33. "QR25DE MODELS : Inspection"](#) (QR25DE models)

Are these normal?

YES >> Replace IC voltage regulator.

NO >> Repair as needed.

---

## 12. CHECK "L" TERMINAL CIRCUIT (OPEN)

---

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

>> Repair as needed.

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# CHARGING SYSTEM

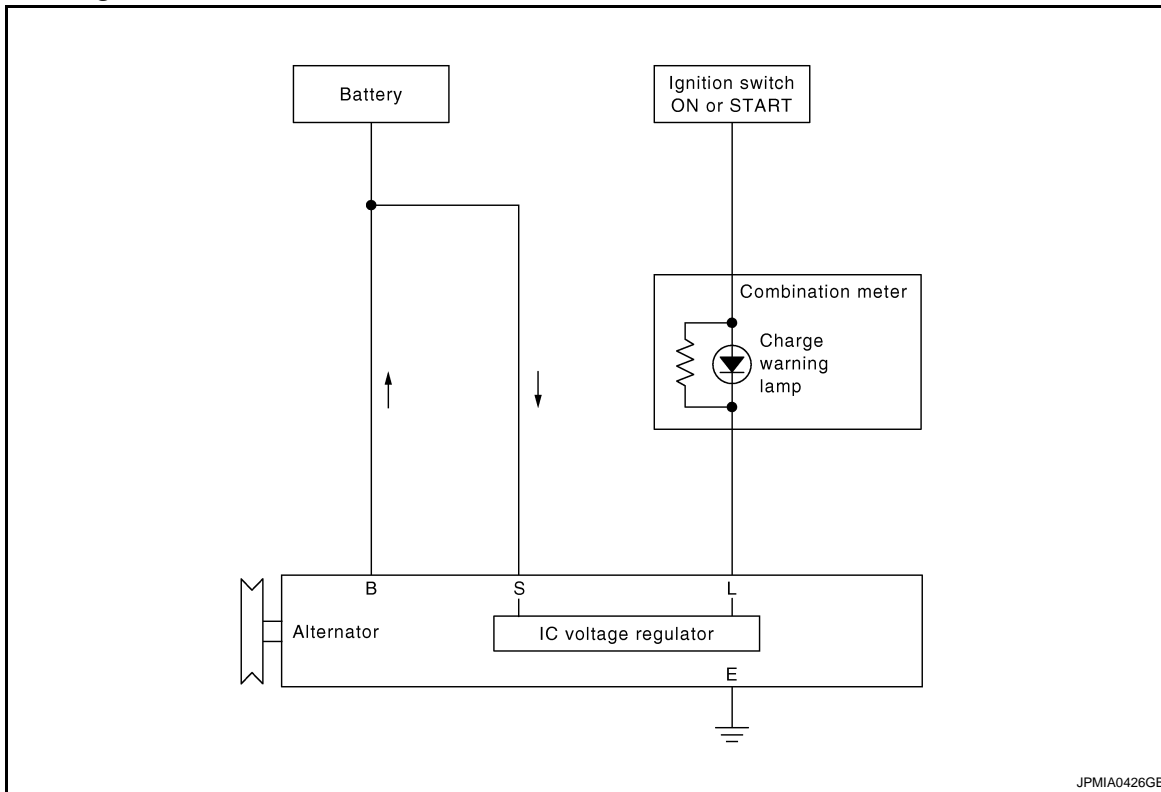
< FUNCTION DIAGNOSIS >

## FUNCTION DIAGNOSIS

### CHARGING SYSTEM

#### System Diagram

INFOID:000000001208695



JPMIA0426GB

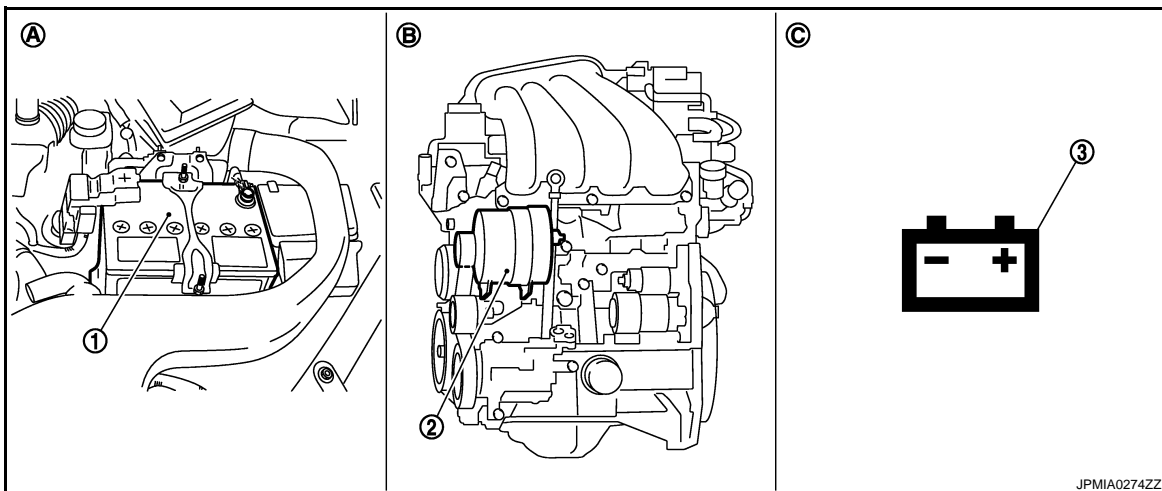
#### System Description

INFOID:000000001208696

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

#### Component Parts Location

INFOID:000000001208697



JPMIA0274ZZ

- |                            |               |                        |
|----------------------------|---------------|------------------------|
| 1. Battery                 | 2. Alternator | 3. Charge warning lamp |
| A. Engine room (left side) | B. Engine     | C. Combination meter   |

# CHARGING SYSTEM

< FUNCTION DIAGNOSIS >

## Component Description

INFOID:000000001208698

Component part		Description
Alternator	"B" terminal	Refer to <a href="#">CHG-8, "Description"</a> .
	"S" terminal	Refer to <a href="#">CHG-12, "Description"</a> .
	"L" terminal	Refer to <a href="#">CHG-9, "Description"</a> .
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: <ul style="list-style-type: none"><li>• Excessive voltage is produced.</li><li>• No voltage is produced.</li></ul>

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# B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

## COMPONENT DIAGNOSIS

### B TERMINAL CIRCUIT

#### Description

INFOID:000000001208699

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

#### Diagnosis Procedure

INFOID:000000001208700

#### 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.

#### 2. CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

Terminals			Voltage (Approx.)
(+)	(-)		
Alternator "B" terminal	Terminal		Battery voltage
F59 (QR25DE) F14 (M9R/MR20DE)	1		

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.)
(+)	(-)		
Battery positive terminal	Alternator "B" terminal	Terminal	Less than 0.2 V
	F59 (QR25DE) F14 (M9R/MR20DE)	1	

Is the inspection result normal?

- YES >> "B" terminal circuit is normal. Refer to [CHG-3, "Work Flow"](#).  
NO >> Check harness between battery and alternator for poor continuity.



# L TERMINAL CIRCUIT (OPEN)

< COMPONENT DIAGNOSIS >

## L TERMINAL CIRCUIT (OPEN)

### Description

INFOID:000000001208701

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:000000001208702

#### 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.

#### 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 (QR25DE) F15 (M9R/MR20DE)	3		ON	Illuminate

Does it illuminate?

- YES >> "L" terminal circuit is normal. Refer to [CHG-3. "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 (QR25DE) F15 (M9R/MR20DE)	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 M34 terminal 2 and 10A fuse [No.3, located in the fuse block(J/B)].

Does continuity exist?

- YES >> GO TO 5.  
NO >> Repair the harness.

#### 5. CHECK POWER SUPPLY CIRCUIT

1. Connect the battery cable to the negative terminal.
2. Check voltage between combination meter harness connector and ground.

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## L TERMINAL CIRCUIT (OPEN)

< COMPONENT DIAGNOSIS >

Terminals		(-)	Condition	Voltage (Approx.)
(+)	Terminal			
Combination meter harness connector				
M34	2	Ground	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 [PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -](#)

["](#)

# L TERMINAL CIRCUIT (SHORT)

< COMPONENT DIAGNOSIS >

## L TERMINAL CIRCUIT (SHORT)

### Description

INFOID:000000001208703

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:000000001208704

#### 1. CHECK "L" TERMINAL CIRCUIT (SHORT)

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

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-3. "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.

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# S TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

## S TERMINAL CIRCUIT

### Description

INFOID:000000001208705

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:000000001208706

#### 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.

#### 2. CHECK "S" TERMINAL CIRCUIT

Check voltage between alternator harness connector and ground.

Terminals		Voltage (Approx.)
(+)	(-)	
Alternator harness connector	Terminal	
F60 (QR25DE) F15 (M9R/MR20DE)	4	Battery voltage

Is the inspection result normal?

- YES >> Refer to [CHG-3, "Work Flow"](#) .  
NO >> Check harness for open between alternator and fuse.

# CHARGING SYSTEM

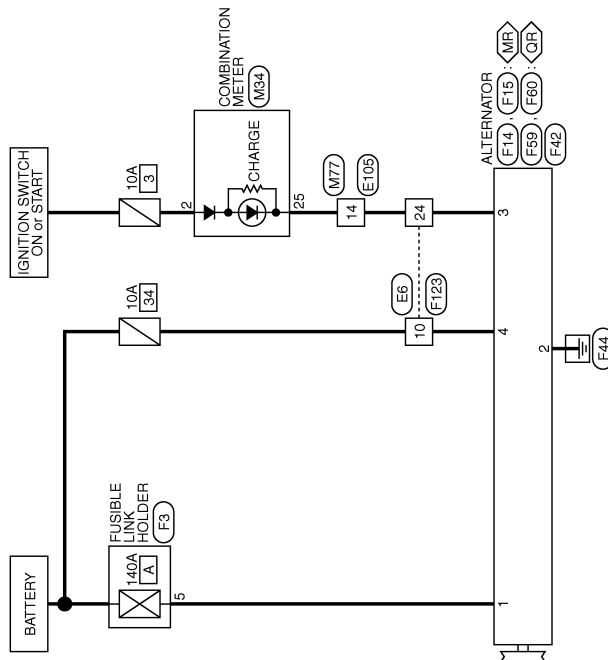
< COMPONENT DIAGNOSIS >

## CHARGING SYSTEM

Wiring Diagram - CHARGING SYSTEM (GASOLINE ENGINE MODELS) - INFOID:000000001208707

### CHARGING SYSTEM (GASOLINE ENGINE)

MR: With MF engine  
QR: With QF engine



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# CHARGING SYSTEM

## < COMPONENT DIAGNOSIS >


### CHARGING SYSTEM (GASOLINE ENGINE)

Connector No.	EB
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V




Terminal No.	Color of Wire	Signal Name [Specification]
10	LG	-
24	O	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS1E-TM4




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

Connector No.	F3
Connector Name	FUSIBLE LINK HOLDER
Connector Type	-




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

Connector No.	F14
Connector Name	ALTERNATOR
Connector Type	-




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

Connector No.	F15
Connector Name	ALTERNATOR
Connector Type	HS03FB




Terminal No.	Color of Wire	Signal Name [Specification]
3	L	L
4	P	S

Connector No.	F42
Connector Name	ALTERNATOR
Connector Type	-




Terminal No.	Color of Wire	Signal Name [Specification]
2	-	GND

Connector No.	F59
Connector Name	ALTERNATOR
Connector Type	-



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

Connector No.	F80
Connector Name	ALTERNATOR
Connector Type	X102FW



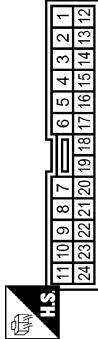
Terminal No.	Color of Wire	Signal Name [Specification]
3	L	L
4	P	S

# CHARGING SYSTEM

## < COMPONENT DIAGNOSIS >

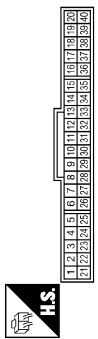
### CHARGING SYSTEM (GASOLINE ENGINE)

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-1V



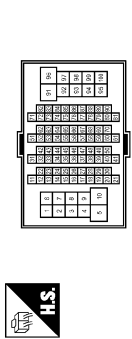
Terminal No.	Color of Wire	Signal Name [Specification]
10	P	-
24	L	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	P	IGN
25	BR	ALTERNATOR

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	-

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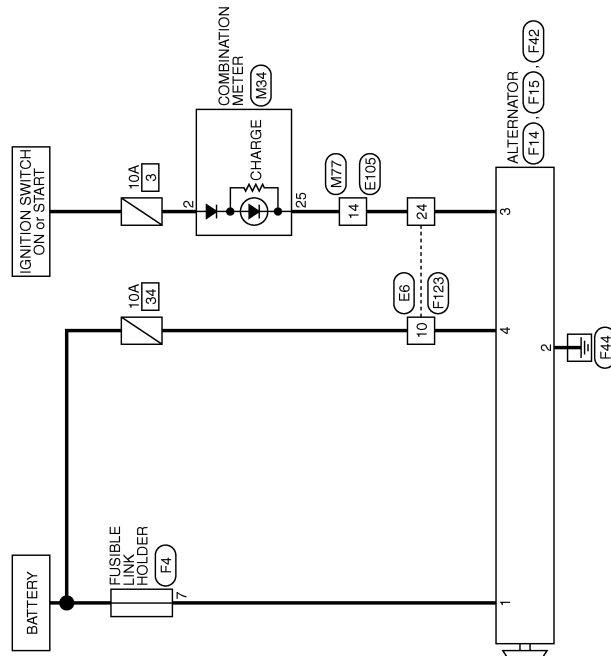
# CHARGING SYSTEM

< COMPONENT DIAGNOSIS >

## Wiring Diagram - CHARGING SYSTEM (DIESEL ENGINE MODELS) -

INFOID:000000001208708

### CHARGING SYSTEM (DIESEL ENGINE)



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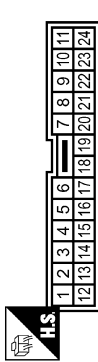


# CHARGING SYSTEM

## < COMPONENT DIAGNOSIS >

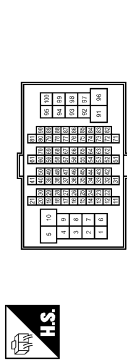
### CHARGING SYSTEM (DIESEL ENGINE)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V



Terminal No.	Color of Wire	Signal Name [Specification]
10	LG	-
24	O	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TK80FW-CS1E-TM4



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

Connector No.	F4
Connector Name	FUSIBLE LINK HOLDER
Connector Type	-



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

Connector No.	F14
Connector Name	ALTERNATOR
Connector Type	-



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

Connector No.	F15
Connector Name	ALTERNATOR
Connector Type	HSB3FB



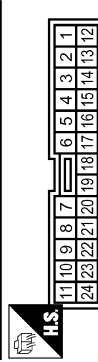
Terminal No.	Color of Wire	Signal Name [Specification]
3	L	L
4	P	S

Connector No.	F42
Connector Name	ALTERNATOR
Connector Type	-



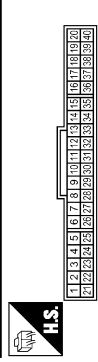
Terminal No.	Color of Wire	Signal Name [Specification]
2	-	GND

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24W-1V



Terminal No.	Color of Wire	Signal Name [Specification]
10	P	-
24	L	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
2	P	IGN
25	BR	ALTERNATOR

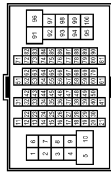
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# CHARGING SYSTEM

## < COMPONENT DIAGNOSIS >

### CHARGING SYSTEM (DIESEL ENGINE)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
14	BR	-

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# CHARGING SYSTEM

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### CHARGING SYSTEM

#### Symptom Table

INFOID:000000001208709

Symptom	Reference
Discharged battery	Refer to <a href="#">CHG-3, "Work Flow"</a> .
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 >

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## PRECAUTION

### PRECAUTIONS

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

INFOID:000000001308692

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".
- 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.

# PREPARATION

< PREPARATION >

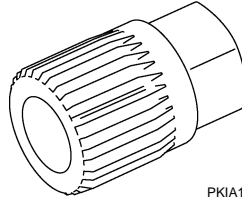
## PREPARATION

### PREPARATION

#### Special Service Tools

INFOID:000000001208711

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



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# CHARGING SYSTEM PRELIMINARY INSPECTION

< ON-VEHICLE MAINTENANCE >

## ON-VEHICLE MAINTENANCE

### CHARGING SYSTEM PRELIMINARY INSPECTION

#### Inspection Procedure

INFOID:000000001208712

#### 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)	34
Combination meter	Ignition switch ON ("L" terminal)	3

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-257. "Checking"](#) (M9R)
- [EM-15. "Checking"](#) (MR20DE)
- [EM-138. "Checking"](#) (QR25DE)

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

# ALTERNATOR

< ON-VEHICLE REPAIR >

## ON-VEHICLE REPAIR

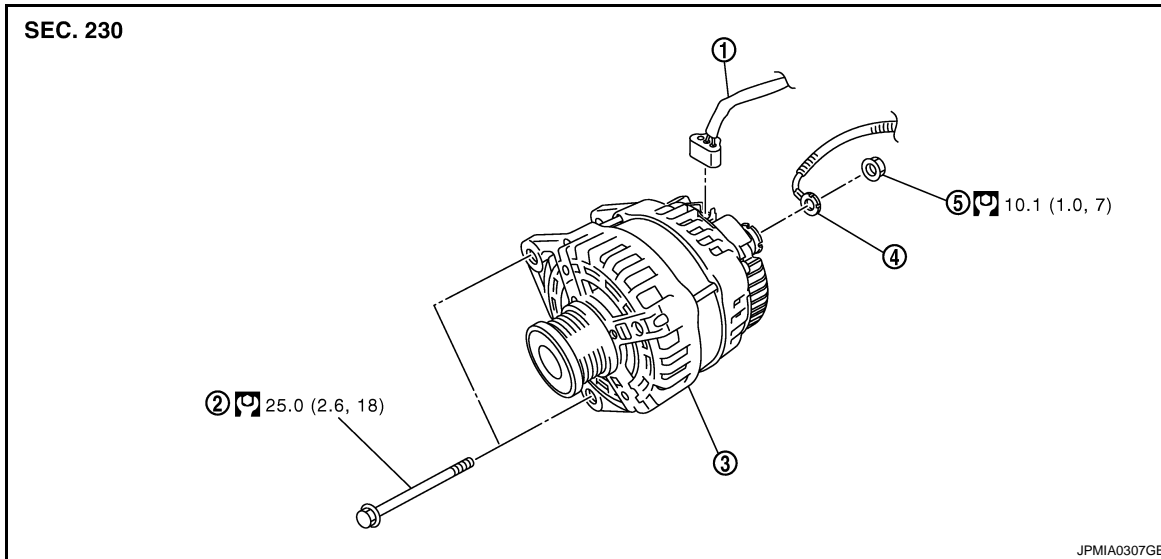
### ALTERNATOR

#### M9R MODELS

#### M9R MODELS : Exploded View

INFOID:000000001208713

#### REMOVAL



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

Refer to [GI-4. "Components"](#) for symbols in the figure.

#### DISASSEMBLY

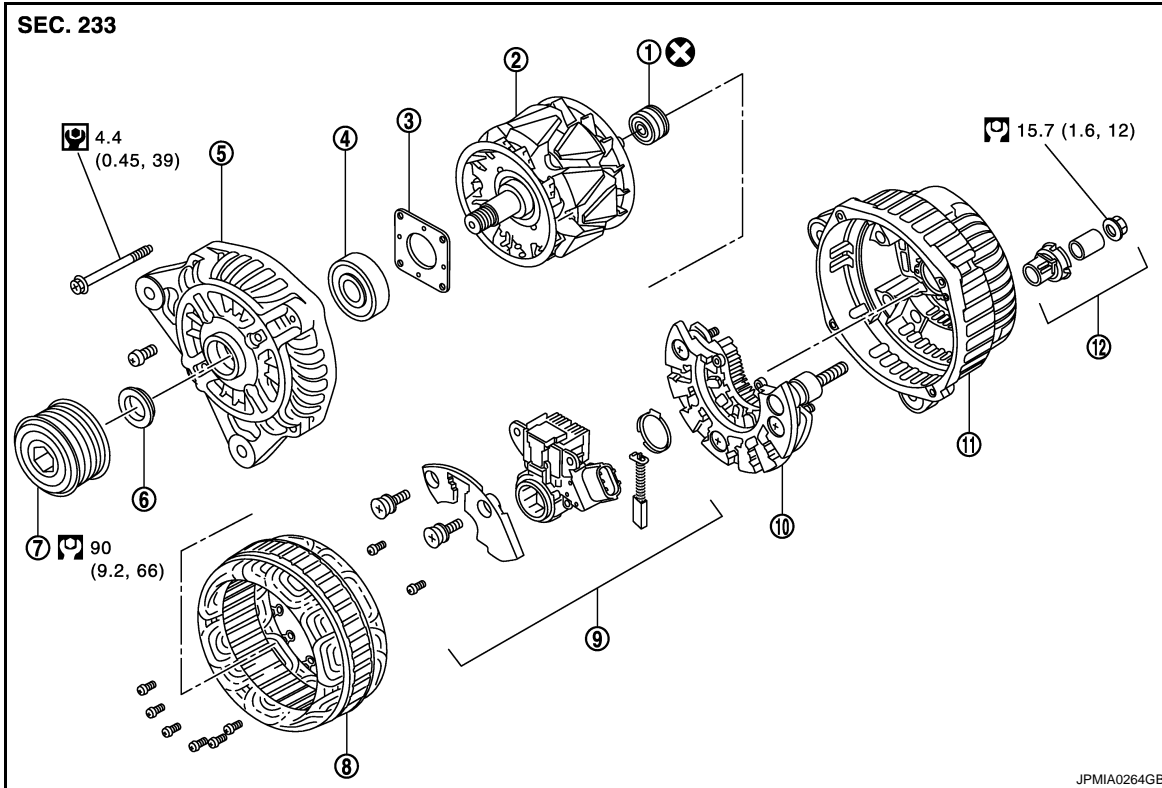
Type: A3TJ2481

A  
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F  
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J  
K  
L

CHG

# ALTERNATOR

< ON-VEHICLE REPAIR >



- |                    |                           |                                  |
|--------------------|---------------------------|----------------------------------|
| 1. Rear bearing    | 2. Rotor assembly         | 3. Retainer                      |
| 4. Front bearing   | 5. Front bracket assembly | 6. Washer                        |
| 7. Pulley          | 8. Stator assembly        | 9. IC voltage regulator assembly |
| 10. Diode assembly | 11. Rear bracket assembly | 12. Terminal set                 |

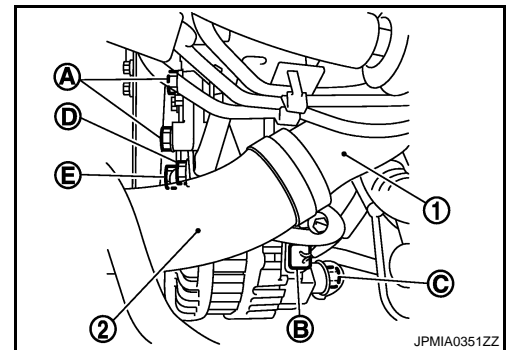
Refer to [GI-4, "Components"](#) for symbols in the figure.

## M9R MODELS : Removal and Installation

INFOID:000000001208714

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove engine cover. Refer to [EM-265, "Exploded View"](#).
3. Remove RH fender protector partially.
4. Remove drive belt. Refer to [EM-257, "Exploded View"](#).
5. Remove air inlet tube (1). Refer to [EM-266, "Exploded View"](#).
6. Get air inlet hose (2) out of alternator removal area.
7. Remove reservoir tank hose bracket mounting bolts (A) and reservoir tank hose bracket.
8. Disconnect alternator connector (B).
9. Remove "B" terminal nut (C) and "B" terminal harness.
10. Remove upper alternator mounting bolt (D).
11. Completely loosen lower alternator mounting bolt (E), and pull it out until the bolt head is in contact with the side member. And then, remove the alternator by pulling it forward.



#### NOTE:

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

12. Remove alternator upward from the vehicle.

### INSTALLATION

Install in the reverse order of removal.



# ALTERNATOR

## < ON-VEHICLE REPAIR >

### CAUTION:

Be sure to tighten "B" terminal nut carefully.

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

### CAUTION:

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

- Install alternator, and check tension of belt. Refer to [EM-257, "Checking"](#).

## M9R MODELS : Disassembly and Assembly

INFOID:000000001208922

### DISASSEMBLY

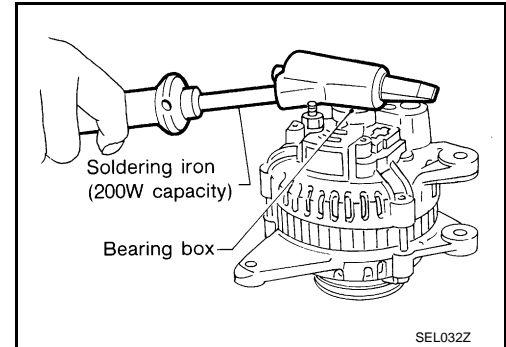
#### Rear Cover

### NOTE:

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, 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.



### ASSEMBLY

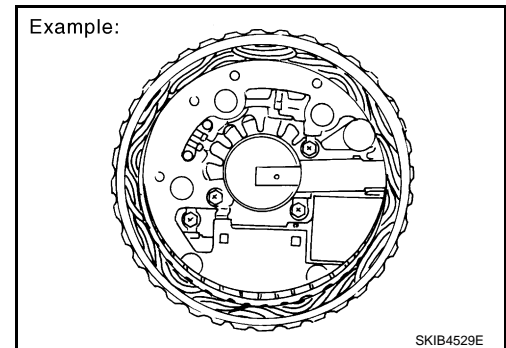
#### Rear Bearing

### CAUTION:

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

#### Rear Cover Installation

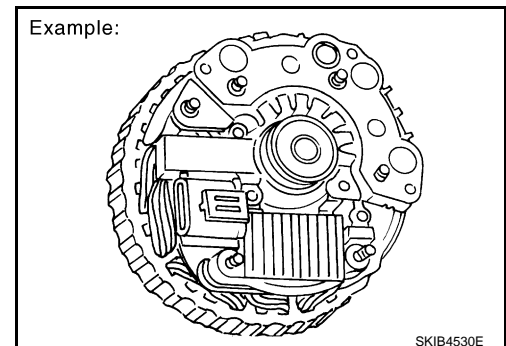
- Fit brush assembly, diode assembly, regulator assembly and stator assembly.



- Push brushed up with fingers and install them to rotor.

### NOTE:

Take care not damage slip ring sliding surface.



A  
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# ALTERNATOR

< ON-VEHICLE REPAIR >

## M9R MODELS : Inspection

INFOID:000000001208923

### INSPECTION AFTER DISASSEMBLY

#### Rotor Check

##### 1. Resistance test

###### Resistance

Refer to SDS [CHG-35, "Alternator"](#).

- Replace the rotor if the measurement value is outside of the specified range.

##### 2. Insulator test

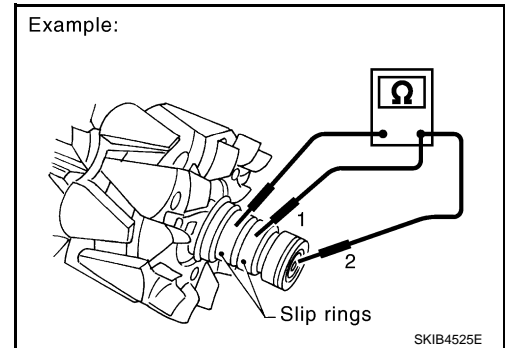
- Replace the rotor if continuity exists.

##### 3. Check slip ring for wear.

###### Slip ring minimum outer diameter

: Refer to SDS [CHG-35, "Alternator"](#).

- Replace the rotor if the measurement value is outside of the specified range.



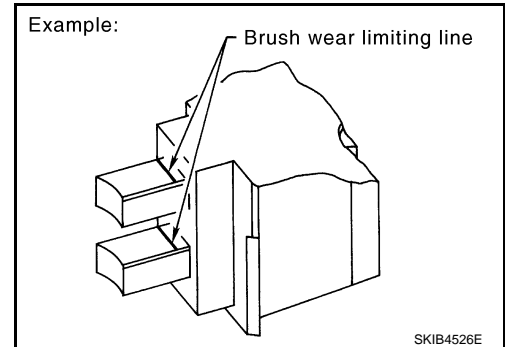
#### Brush Check

##### 1. Check smooth movement of brush.

- Check brush holder and clean if it is not smooth.

##### 2. Check brush for wear.

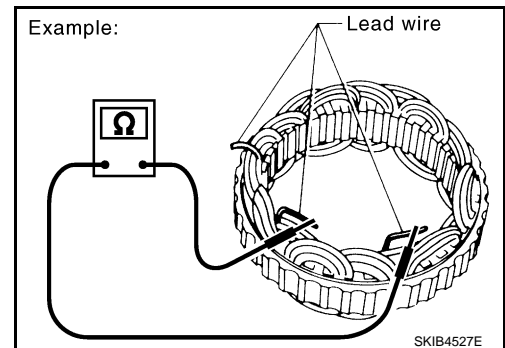
- Replace brush if it is worn down to the limit line.



#### Stator Check

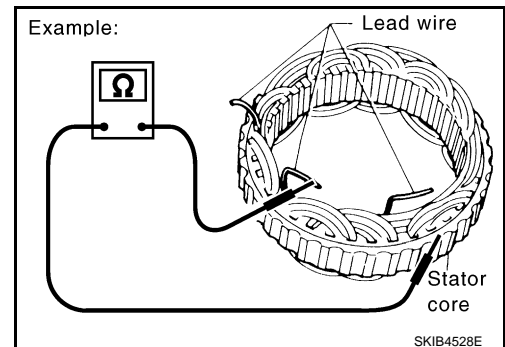
##### 1. Continuity test

- Replace the stator if continuity does not exist.



##### 2. Ground test

- Replace the stator if continuity exists.



MR20DE MODELS

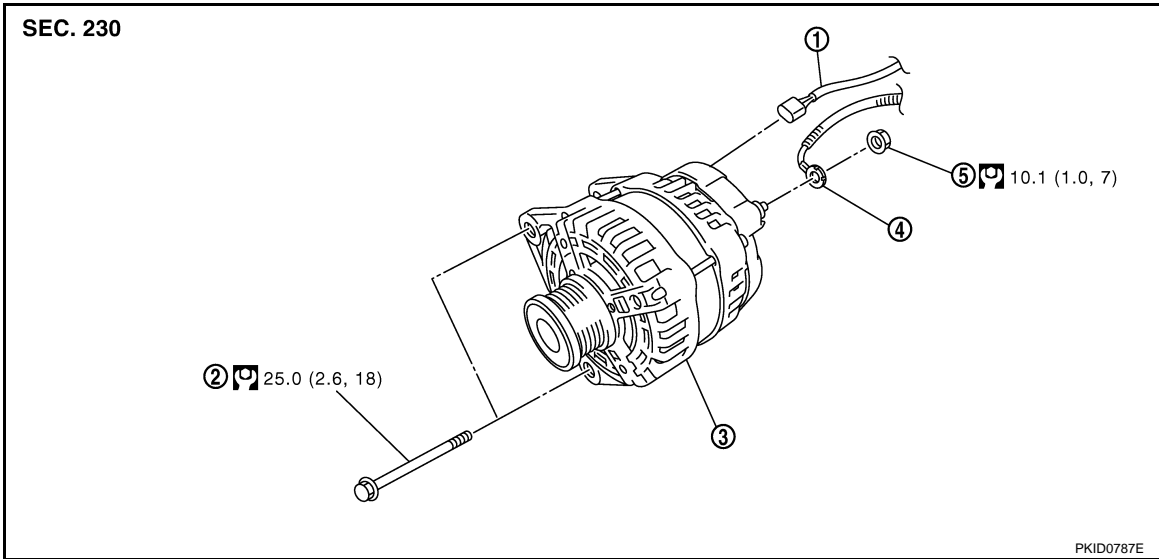
# ALTERNATOR

< ON-VEHICLE REPAIR >

MR20DE MODELS : Exploded View

INFOID:000000001208715

## REMOVAL

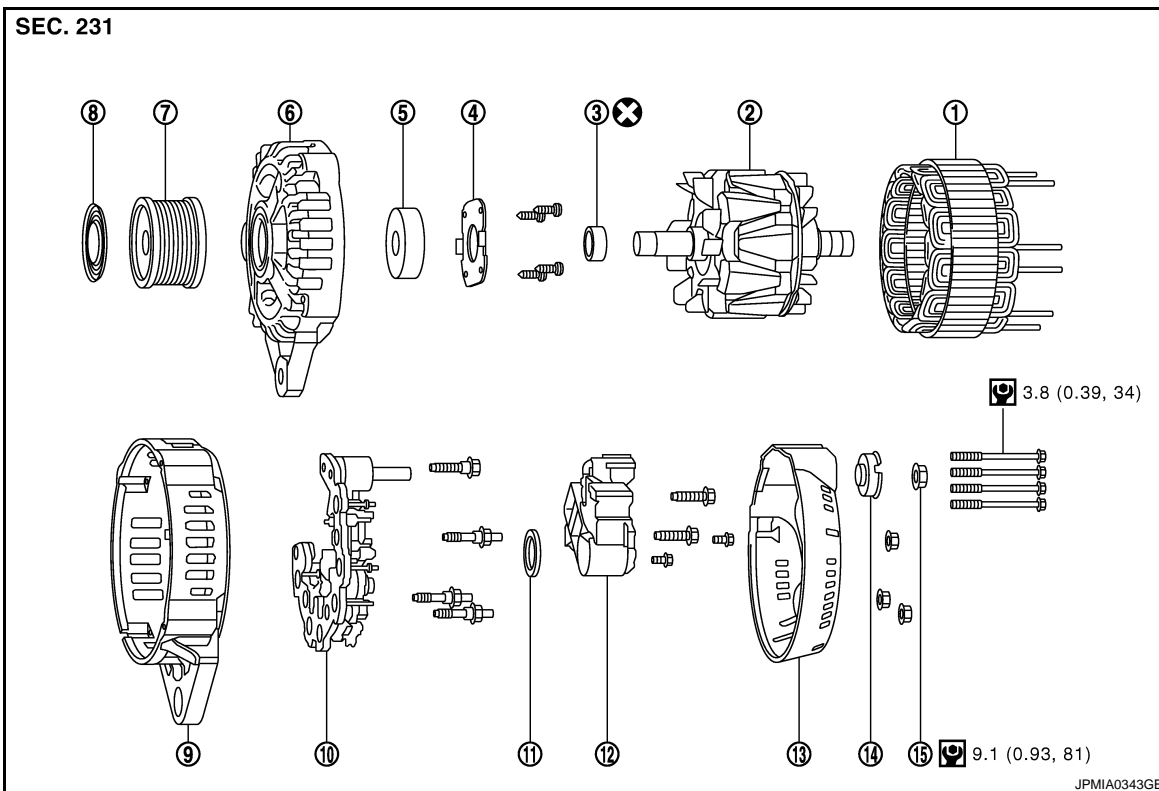


- |                         |                             |               |
|-------------------------|-----------------------------|---------------|
| 1. Alternator connector | 2. Alternator mounting bolt | 3. Alternator |
| 4. "B" terminal harness | 5. "B" terminal nut         |               |

Refer to [GI-4, "Components"](#) for symbols in the figure.

## DISASSEMBLY

Type: LR1140-802C



- |                    |                   |                           |
|--------------------|-------------------|---------------------------|
| 1. Stator assembly | 2. Rotor assembly | 3. Rotor spacer           |
| 4. Retainer        | 5. Front bearing  | 6. Front bracket assembly |

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CHG

# ALTERNATOR

## < ON-VEHICLE REPAIR >

- |                    |                           |                                   |
|--------------------|---------------------------|-----------------------------------|
| 7. Pulley          | 8. Pulley cap             | 9. Rear bracket assembly          |
| 10. Diode assembly | 11. Double labyrinth seal | 12. IC voltage regulator assembly |
| 13. Rear cover     | 14. Bush                  | 15. "B" terminal nut              |

Refer to [GI-4. "Components"](#) for symbols in the figure.

## MR20DE MODELS : Removal and Installation

INFOID:000000001208716

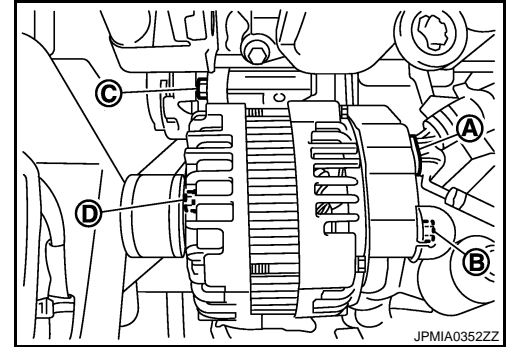
### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove engine cover. Refer to [EM-27. "Exploded View"](#).
3. Remove drive belt. Refer to [EM-15. "Exploded View"](#).
4. Disconnect alternator connector (A).
5. Remove "B" terminal nut (B) and "B" terminal harness.
6. Remove upper alternator mounting bolt (C).
7. Completely loosen lower alternator mounting bolt (D), and pull it out until the bolt head is in contact with the side member. And then, remove the alternator by pulling it forward.

#### NOTE:

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

8. Remove alternator upward from the vehicle.



JPMIA0352ZZ

### INSTALLATION

Install in the reverse order of removal.

#### CAUTION:

**Be sure to tighten "B" terminal nut carefully.**

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

#### CAUTION:

**For the alternator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the alternator mounting part, and then tighten the bolts.**

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

## MR20DE MODELS : Disassembly and Assembly

INFOID:000000001208717

### DISASSEMBLY

#### Rear Bracket Assembly

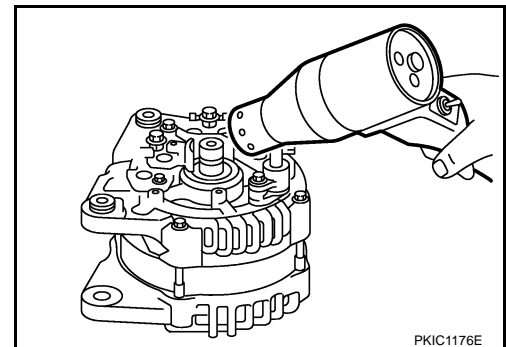
1. Remove rear cover.
2. Remove IC voltage regulator assembly.
3. Separate front bracket assembly, stator assembly and rear bracket assembly.

#### NOTE:

- Raise the temperature of the center of the rear bracket assembly approximately between 30°C (86°F) and 50°C (122°F).
- Insert the tip of the suitable tool into the clearance between front cover and stator core, and then separate front side (front bracket assembly, rotor assembly) and rear side (rear bracket assembly, stator assembly, diode assembly).

#### CAUTION:

**Be careful not to damage stator assembly.**



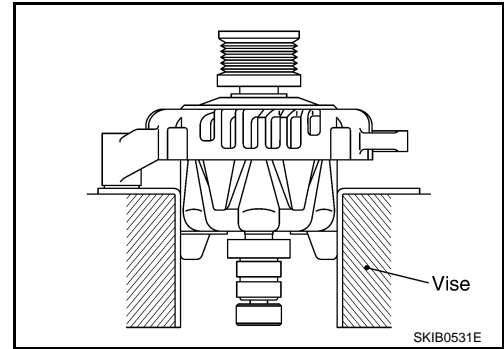
PKIC1176E

#### Front Cover

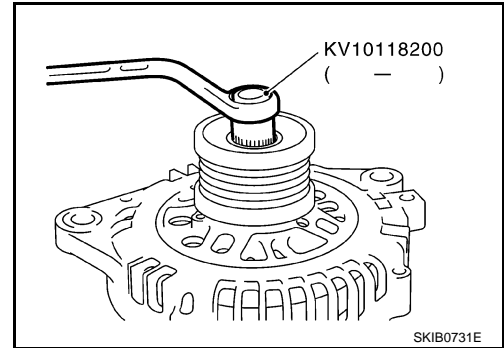
# ALTERNATOR

## < ON-VEHICLE REPAIR >

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.



3. Remove alternator pulley, using alternator pulley adaptor [SST].



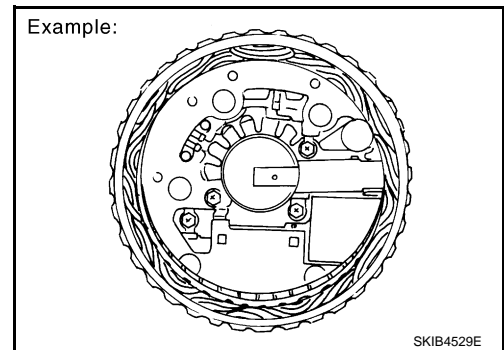
## ASSEMBLY

### Rear Bearing

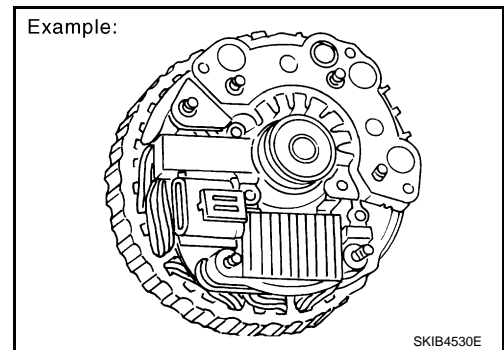
- CAUTION:**
- Never reuse rear bearing. Replace with a new one.
  - Never lubricate rear bearing outer race.

### Rear Cover Installation

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



2. Push brushes up with fingers and install them to rotor.  
**NOTE:**  
Take care not damage slip ring sliding surface.



## MR20DE MODELS : Inspection

## INSPECTION AFTER DISASSEMBLY

INFOID:000000001208718

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# ALTERNATOR

## < ON-VEHICLE REPAIR >

### Rotor Check

#### 1. Resistance test

##### Resistance

Refer to SDS [CHG-35, "Alternator"](#).

- Replace the rotor if the measurement value is outside of the specified range.

#### 2. Insulator test

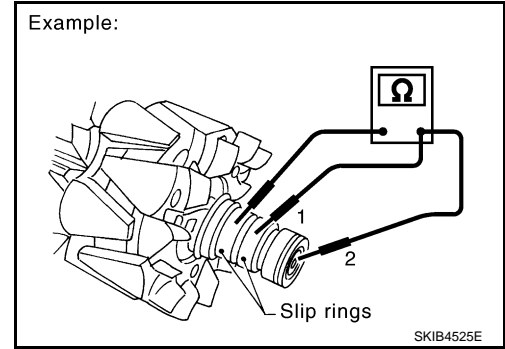
- Replace the rotor if continuity exists.

#### 3. Check slip ring for wear.

##### Slip ring minimum outer diameter

: Refer to SDS [CHG-35, "Alternator"](#).

- Replace the rotor if the measurement value is outside of the specified range.



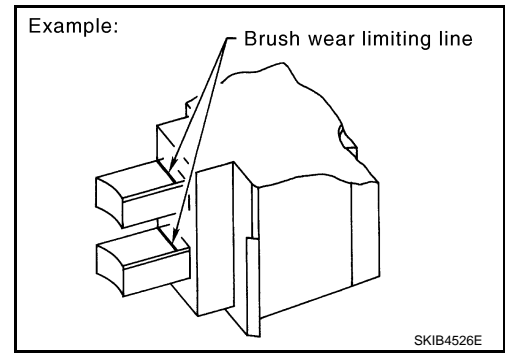
### Brush Check

#### 1. Check smooth movement of brush.

- Check brush holder and clean if it is not smooth.

#### 2. Check brush for wear.

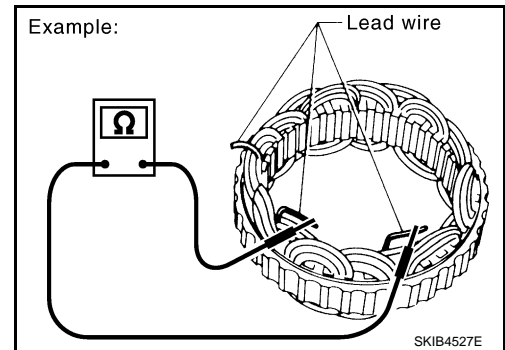
- Replace brush if it is worn down to the limit line.



### Stator Check

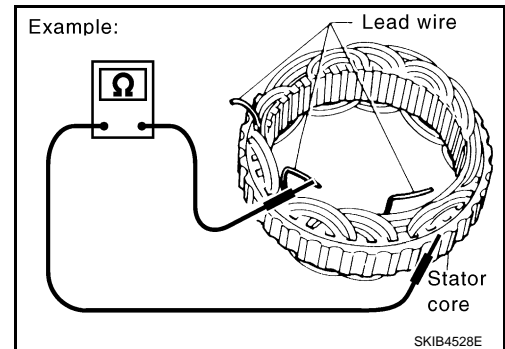
#### 1. Continuity test

- Replace the stator if continuity does not exist.



#### 2. Ground test

- Replace the stator if continuity exists.



## QR25DE MODELS

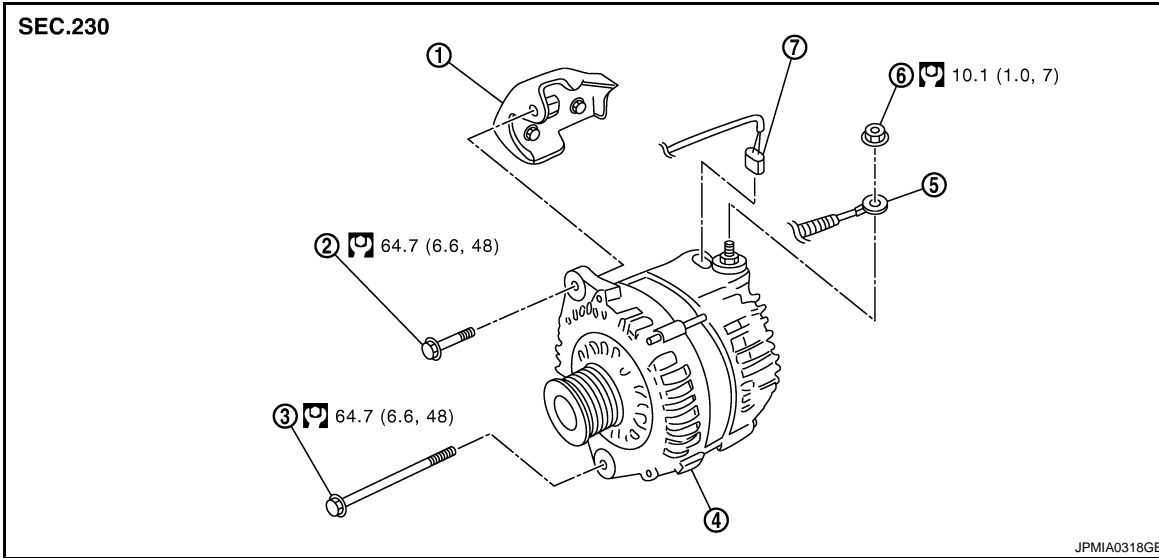
## QR25DE MODELS : Exploded View

## REMOVAL

INFOID:000000001208719

# ALTERNATOR

< ON-VEHICLE REPAIR >

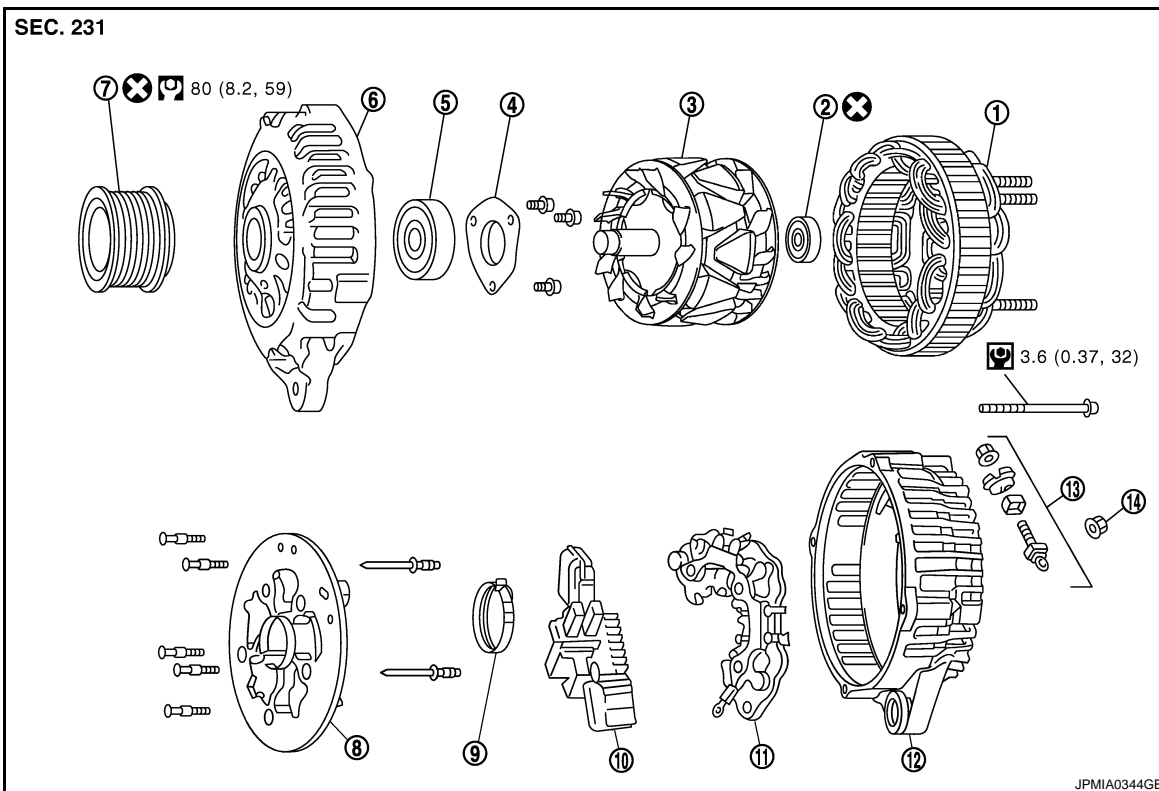


- |                         |                                   |                                   |
|-------------------------|-----------------------------------|-----------------------------------|
| 1. Alternator bracket   | 2. Upper alternator mounting bolt | 3. Lower alternator mounting bolt |
| 4. Alternator           | 5. "B" terminal harness           | 6. "B" terminal nut               |
| 7. Alternator connector |                                   |                                   |

Refer to [GI-4, "Components"](#) for symbols in the figure.

## DISASSEMBLY

Type: LR1110-713C



- |                                   |                    |                   |
|-----------------------------------|--------------------|-------------------|
| 1. Stator                         | 2. Rear bearing    | 3. Rotor          |
| 4. Retainer                       | 5. Front bearing   | 6. Front cover    |
| 7. Pulley                         | 8. Fan guide       | 9. Labyrinth seal |
| 10. IC voltage regulator assembly | 11. Diode assembly | 12. Rear cover    |

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CHG

# ALTERNATOR

## < ON-VEHICLE REPAIR >

13. Terminal assembly

14. "B" terminal nut

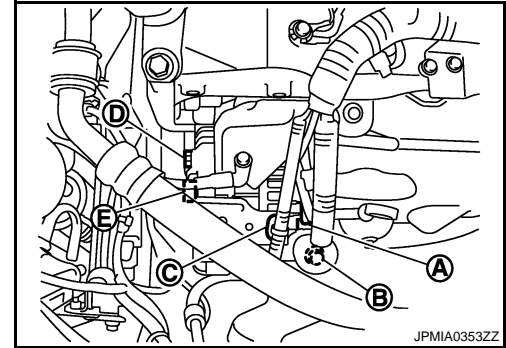
Refer to [GI-4, "Components"](#) for symbols in the figure.

## QR25DE MODELS : Removal and Installation

INFOID:000000001208720

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove drive belt. Refer to [EM-138, "Exploded View"](#).
3. Disconnect alternator connector (A).
4. Remove "B" terminal nut (B) and "B" terminal harness.
5. Remove harness clip (C) from the harness bracket.
6. Remove upper alternator mounting bolt (D).
7. Remove lower alternator mounting bolt (E).



8. Remove alternator upward from the vehicle.

### INSTALLATION

Note the following, and installation is the reverse order of removal.

- Install alternator, and check tension of belt. Refer to [EM-138, "Checking"](#).

#### **CAUTION:**

**Be sure to tighten "B" terminal nut carefully.**

## QR25DE MODELS : Disassembly and Assembly

INFOID:000000001208721

### DISASSEMBLY

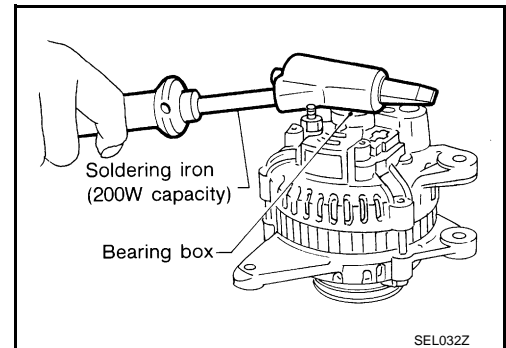
#### Rear Cover

#### **NOTE:**

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, 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.**



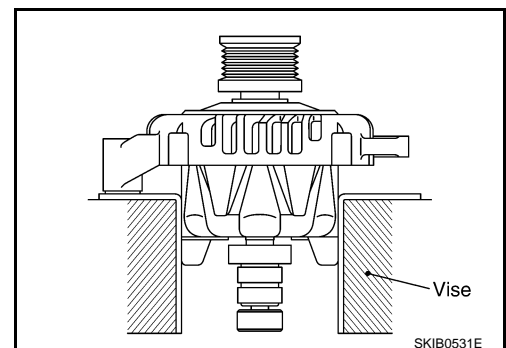
#### Front Cover

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.

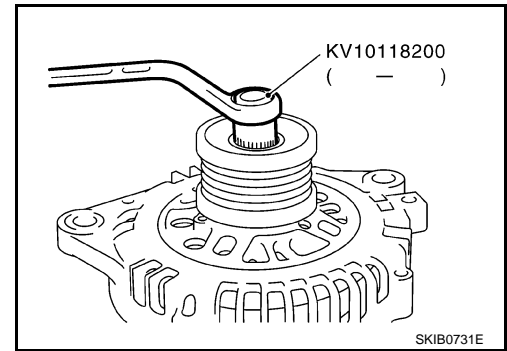




# ALTERNATOR

## < ON-VEHICLE REPAIR >

3. Remove alternator pulley, using alternator pulley adaptor [SST].



## ASSEMBLY

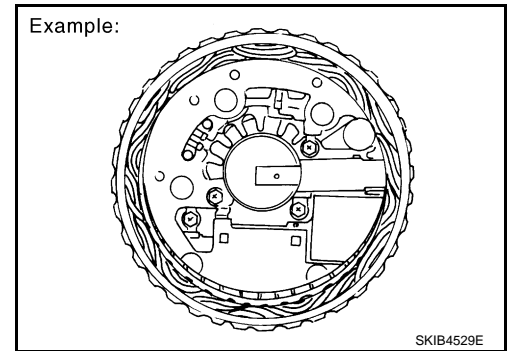
### Rear Bearing

#### **CAUTION:**

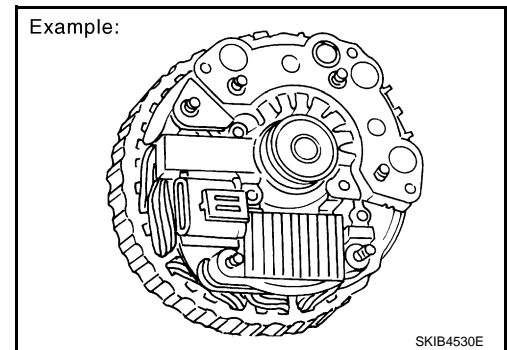
- Never reuse rear bearing. Replace with a new one.
- Never lubricate rear bearing outer race.

### Rear Cover 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.



## QR25DE MODELS : Inspection

INFOID:000000001208722

### INSPECTION AFTER DISASSEMBLY

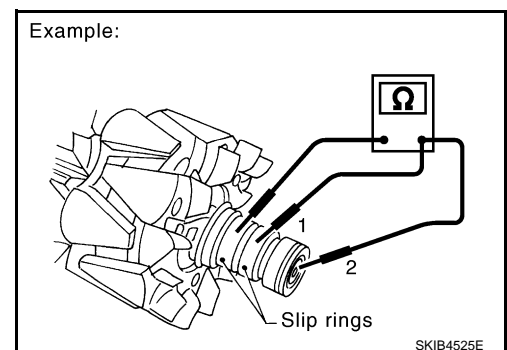
#### Rotor Check

1. Resistance test

#### **Resistance**

Refer to SDS [CHG-35. "Alternator"](#).

- Replace the rotor if the measurement value is outside of the specified range.
2. Insulator test
    - Replace the rotor if continuity exists.
  3. Check slip ring for wear.



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# ALTERNATOR

## < ON-VEHICLE REPAIR >

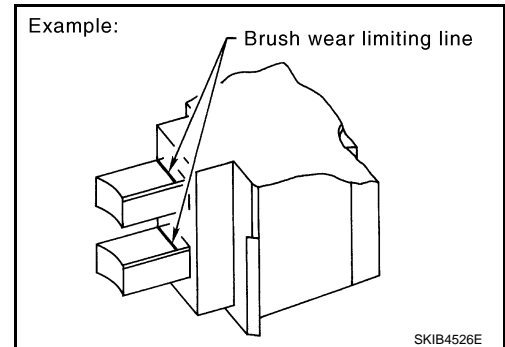
**Slip ring minimum outer diameter**

**: Refer to SDS [CHG-35](#), "[Alternator](#)".**

- Replace the rotor if the measurement value is outside of the specified range.

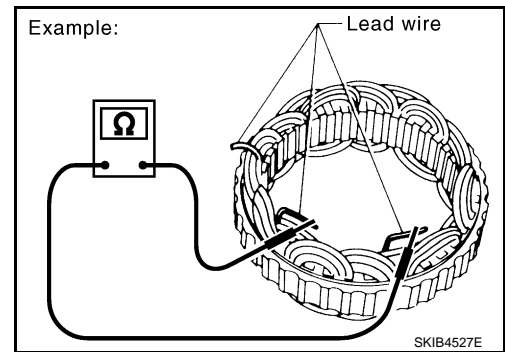
### Brush Check

1. Check smooth movement of brush.
  - Check brush holder and clean if it is not smooth.
2. Check brush for wear.
  - Replace brush if it is worn down to the limit line.

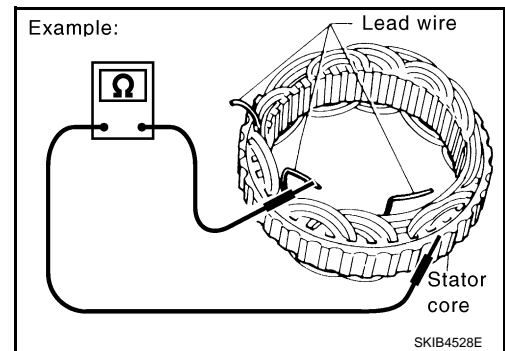


### Stator Check

1. Continuity test
  - Replace the stator if continuity does not exist.



2. Ground test
  - Replace the stator if continuity exists.



## SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### Alternator

INFOID:000000001208723

Applied model	M9R	MR20DE	QR25DE
Type	A3TJ2481	LR1140-802C	LR1110-713C
	MITSUBISHI make	HITACHI make	
Nominal rating [V - A]	12 - 150	12 - 140	12 - 110
Ground polarity	Negative		
Minimum revolution under no-load (When 13.5 V is applied) [rpm]	Less than 1,300	Less than 1,200	Less than 1,100
Hot output current (When 13.5 V is applied) [A/rpm]	More than 31/1,300 More than 122/2,500 More than 144/5,000	More than 56/1,500 More than 114/2,500 More than 139/5,000	More than 70/1,800 More than 91/2,500 More than 110/5,000
Regulated output voltage [V]	14.1 - 14.7		
Minimum length of brush [mm (in)]	More than 5.00 (0.197)	More than 6.00 (0.236)	
Brush spring pressure [N (g, oz)]	4.1 - 5.3 (418 - 541, 14.7 - 19.1)	1.1 - 3.7 (112 - 377, 4.00 - 13.3)	1.00 - 3.43 (102 - 350, 3.60 - 12.34)
Slip ring minimum outer diameter [mm (in)]	More than 22.1 (0.870)	More than 14.7 (0.579)	More than 26.0 (1.024)
Rotor (Field coil) resistance [ $\Omega$ ]	1.7 - 2.0	1.61 - 1.91	2.16 - 2.46

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CHG