

SECTION **CHG**
CHARGING SYSTEM

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PRECAUTIONS

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PRECAUTION

PRECAUTIONS

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

INFOID:000000006887145

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 AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- 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.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

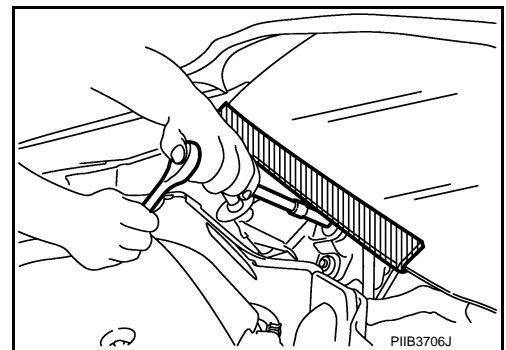
Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

INFOID:000000007802162

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions For Xenon Headlamp Service

INFOID:000000007802163

WARNING:

Comply with the following warnings to prevent any serious accident.

- Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector.

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PRECAUTIONS

< PRECAUTION >

(Turning it ON outside the lamp case may cause fire or visual impairments.)

- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

Precaution for Power Generation Voltage Variable Control System

INFOID:000000006887147

CAUTION:

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

PREPARATION


< PREPARATION >

PREPARATION

PREPARATION


Special Service Tools

INFOID:000000006887148

Tool number (Kent-Moore No.) Tool name	Description
<p>— (J-44373 Model MCR620) Starting/Charging System Tester</p>  <p>SEL403X</p>	<p>Tests starting and charging systems. For operating instructions, refer to Technical Service Bulletin.</p>

Commercial Service Tools

INFOID:000000006887149

Tool name	Description
<p>Power tool</p>  <p>PIIB1407E</p>	<p>Loosening bolts, nuts and screws</p>

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COMPONENT PARTS

< SYSTEM DESCRIPTION >

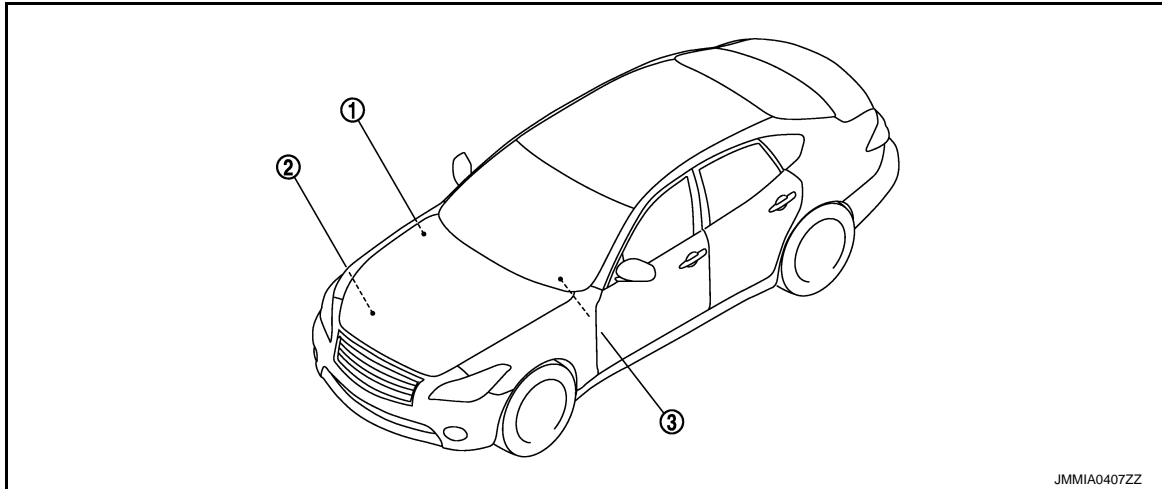
SYSTEM DESCRIPTION

COMPONENT PARTS

CHARGING SYSTEM

CHARGING SYSTEM : Component Parts Location

INFOID:000000006887150



1. IPDM E/R
Refer to [PCS-5, "IPDM E/R : Component Parts Location"](#).
2. Alternator
3. Charge warning lamp

CHARGING SYSTEM : Component Description

INFOID:000000006887151

Component part		Description
Alternator	"B" terminal	Refer to CHG-17, "Description" .
	"S" terminal	Refer to CHG-21, "Description" .
	"L" terminal	Refer to CHG-18, "Description" .
	"C" terminal	Used for the power generation voltage variable control system. Refer to CHG-8, "POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System Description" .
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"> • Excessive voltage is produced. • No voltage is produced.
IPDM E/R		Used for the power generation voltage variable control system. Refer to CHG-8, "POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System Description" .

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

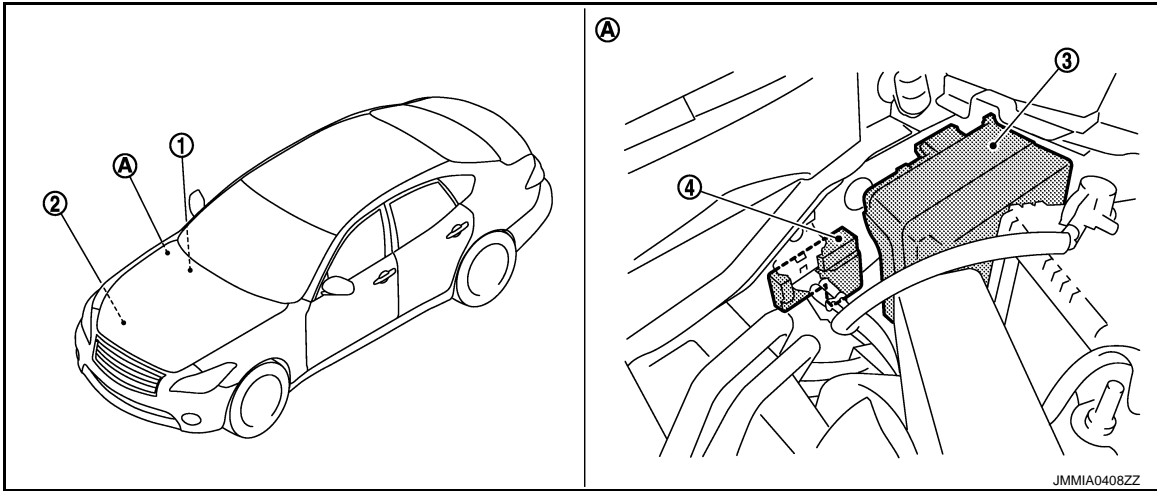
POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Component

COMPONENT PARTS

< SYSTEM DESCRIPTION >

Parts Location

INFOID:000000006887152



- 1. ECM
Refer to [EC-38. "ENGINE CONTROL SYSTEM : Component Parts Location"](#) (VQ37VHR) or [EC-990. "ENGINE CONTROL SYSTEM : Component Parts Location"](#) (VK56VD).
- 2. Alternator
- 3. IPDM E/R
Refer to [PCS-5. "IPDM E/R : Component Parts Location"](#).
- 4. Battery current sensor (with battery temperature sensor)
- A. Engine room dash panel (RH)

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Component Description

INFOID:000000006887153

Component part	Description
Battery current sensor (with battery temperature sensor)	EC-45. "Battery Current Sensor (With Battery Temperature Sensor)" (VQ37VHR) EC-997. "Battery Current Sensor (With Battery Temperature Sensor)" (VK56VD)
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.

SYSTEM

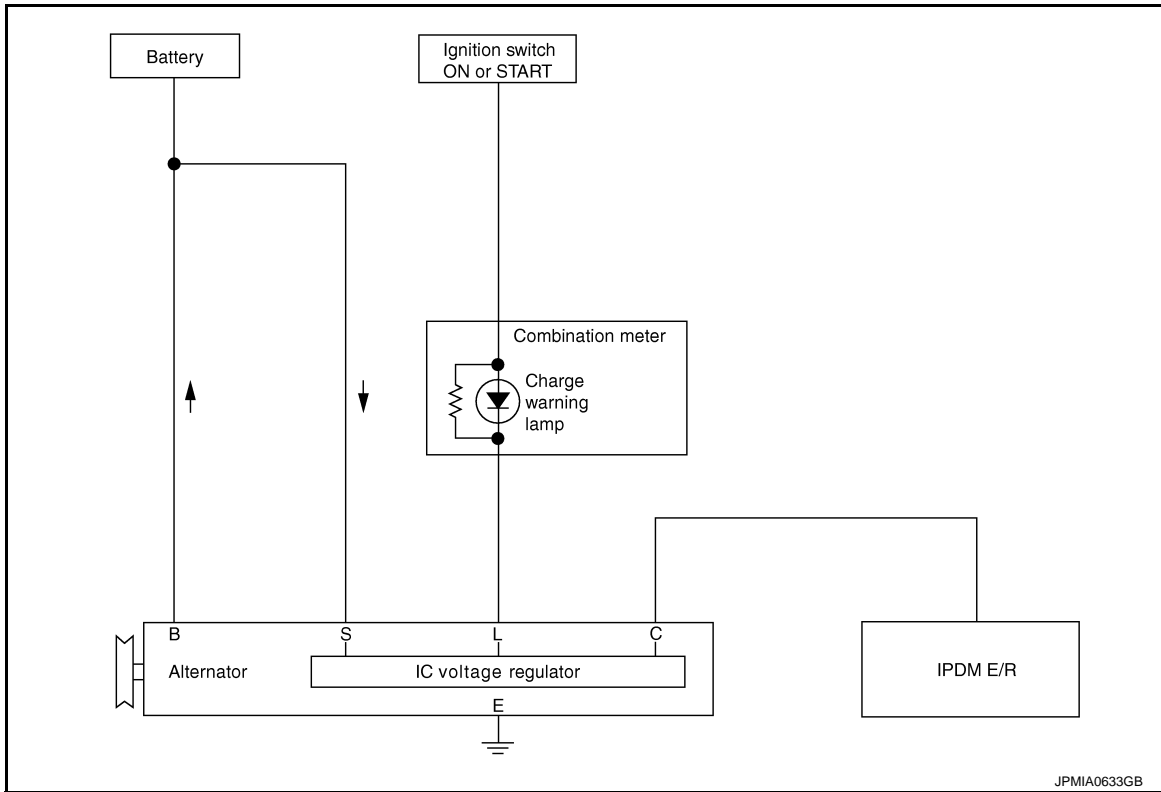
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CHARGING SYSTEM

CHARGING SYSTEM : System Diagram

INFOID:000000006887154



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CHARGING SYSTEM : System Description

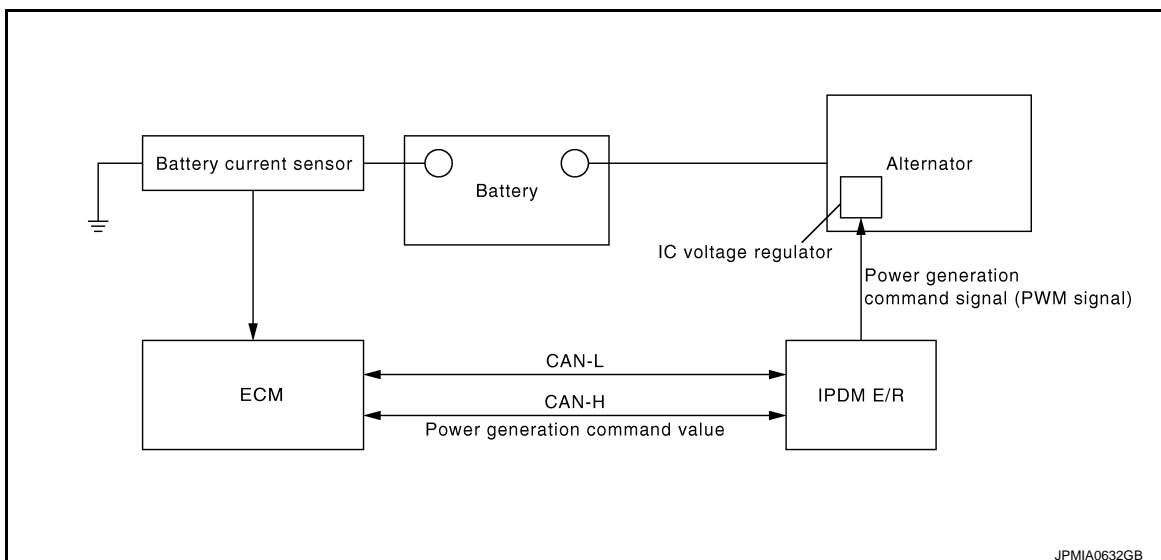
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The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC voltage regulator.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System Diagram

INFOID:000000006887156



JPMIA0632GB

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System De-

SYSTEM

< SYSTEM DESCRIPTION >

scription

INFOID:000000006887157

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.

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DIAGNOSIS AND REPAIR WORK FLOW

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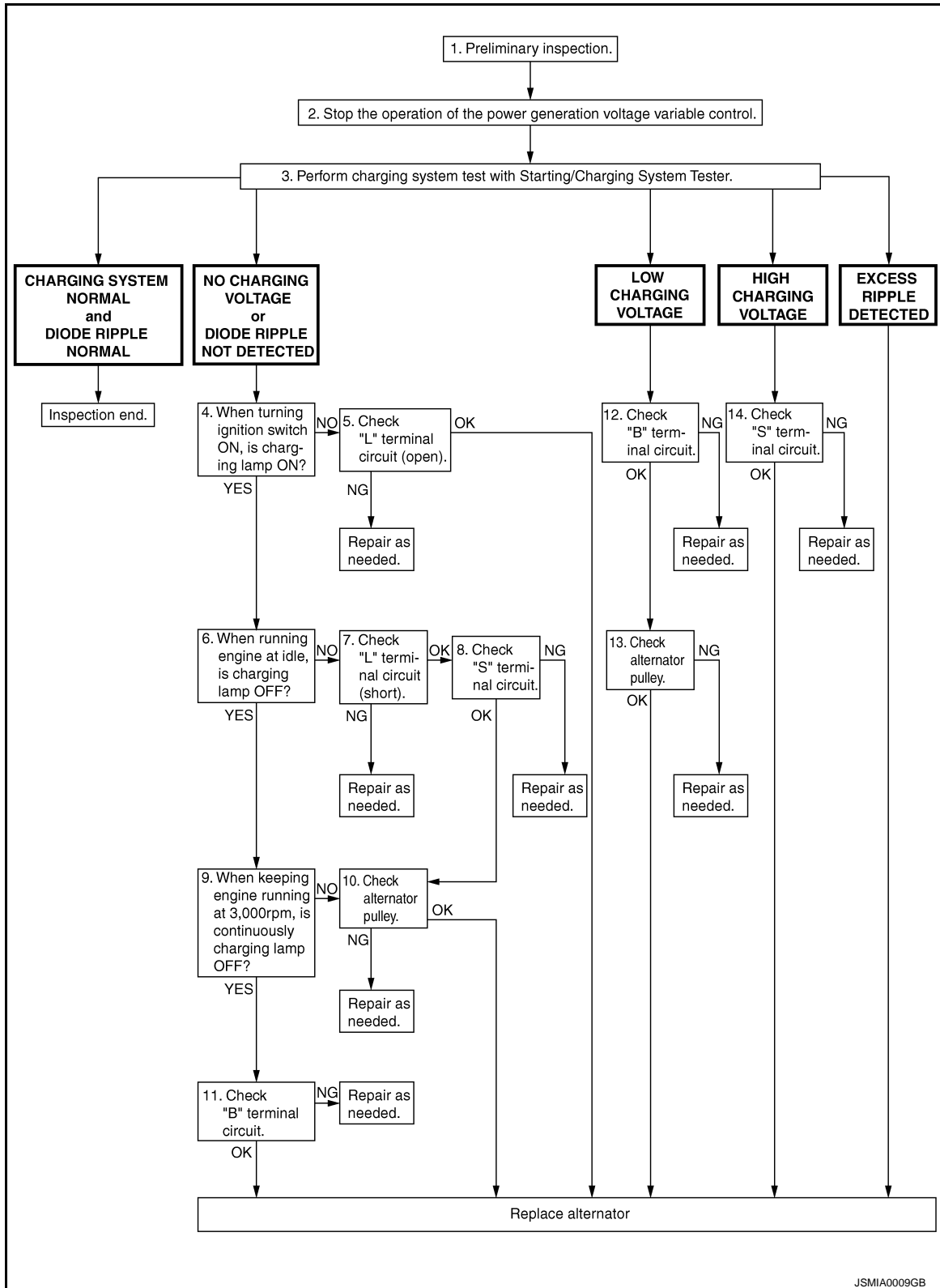
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000006887159

OVERALL SEQUENCE



DETAILED FLOW

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-14, "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, 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 voltage 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-diagnosis results history of the engine using CONSULT.]

>> GO TO 3.

3. DIAGNOSIS WITH STARTING/CHARGING SYSTEM TESTER

Perform the charging system test using Starting/Charging System Tester (SST: 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 alternator. Perform "DIODE RIPPLE" test again using Starting/Charging System Tester (SST: 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. "L" TERMINAL CIRCUIT (OPEN) INSPECTION

Check "L" terminal circuit (open). Refer to [CHG-18, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> Replace alternator.

NO >> Repair as needed.

6. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 9.

NO >> GO TO 7.

7. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to [CHG-20, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> GO TO 8.

NO >> Repair as needed.

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

8. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-21. "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

YES >> GO TO 10.

NO >> Repair as needed.

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

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

Does the charge warning lamp remain off?

YES >> GO TO 11.

NO >> GO TO 10.

10. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-26. "VQ37VHR : Inspection"](#) (VQ37VHR) or [CHG-28. "VK56VD : Inspection"](#) (VK56VD).

Is alternator pulley normal?

YES >> Replace alternator.

NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-17. "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> Replace alternator.

NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-17. "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> GO TO 13.

NO >> Repair as needed.

13. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-26. "VQ37VHR : Inspection"](#) (VQ37VHR) or [CHG-28. "VK56VD : Inspection"](#) (VK56VD).

Is alternator pulley normal?

YES >> Replace alternator.

NO >> Repair as needed.

14. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-21. "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

YES >> Replace alternator.

NO >> Repair as needed.

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CHARGING SYSTEM PRELIMINARY INSPECTION

< BASIC INSPECTION >

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000006887160

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 No.
Alternator	Battery ("S" terminal)	31
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.

- VQ37VHR: [EM-22. "Checking"](#)
- VK56VD: [EM-175. "Checking"](#)

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< BASIC INSPECTION >

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Inspection Procedure

INFOID:000000006887161

CAUTION:

When performing this inspection, always use a charged battery that has completed the battery inspection. (When the charging rate of the battery is low, the response speed of the voltage change will become slow. This can cause an incorrect inspection.)

1. CHECK ECM (CONSULT)

Perform ECM self-diagnosis with CONSULT. Refer to the following.

- VQ37VHR: [EC-88, "CONSULT Function"](#)
- VK56VD: [EC-1044, "CONSULT Function"](#)

Self-diagnostic results content

No malfunction detected>> GO TO 2.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

2. CHECK OPERATION OF POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

1. Connect CONSULT and start the engine.
2. The selector lever is in "P" or "N" position and all of the electric loads and A/C, etc. are turned OFF.
3. Select "ALTERNATOR DUTY" at "Active Test" of "ENGINE", and then check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 40.0 %.

"BATTERY VOLT"

2 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 40.0 % : 12 - 13.6 V

4. Check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 80.0%.

"BATTERY VOLT"

20 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 80.0 % : +0.5 V or more against the value of "BATTERY VOLT" monitor when DUTY value is 40.0 %

Is the measurement value within the specification?

YES >> INSPECTION END

NO >> GO TO 3.

3. CHECK IPDM E/R (CONSULT)

Perform IPDM E/R self-diagnosis with CONSULT. Refer to [PCS-14, "CONSULT Function \(IPDM E/R\)"](#).

Self-diagnostic results content

No malfunction detected>> GO TO 4.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

4. CHECK HARNESS BETWEEN ALTERNATOR AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect alternator connector and IPDM E/R connector.
3. Check continuity between alternator harness connector and IPDM E/R harness connector.

Alternator		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F36	4	E5	22	Existed

4. Check continuity between alternator harness connector and ground.

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POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< BASIC INSPECTION >

Alternator		Ground	Continuity
Connector	Terminal		
F36	4		Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Repair harness or connector between IPDM E/R and alternator.

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:000000006887162

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

Diagnosis Procedure

INFOID:000000006887163

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.

VQ engine

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal		
E203	1	Ground	Battery voltage

VK engine

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal		
E206	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.

VQ engine

(+)	(-)		Voltage (Approx.)
	Alternator		
	Connector	Terminal	
Battery positive terminal	E203	1	Less than 0.2 V

VK engine

(+)	(-)		Voltage (Approx.)
	Alternator		
	Connector	Terminal	
Battery positive terminal	E206	1	Less than 0.2 V

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to [CHG-11, "Work Flow"](#).

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

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L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:000000006887164

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp turns OFF. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:000000006887165

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		Ground	Condition	
Connector	Terminal		Ignition switch position	Charge warning lamp
F36	2		ON	illuminate

Does it illuminate?

YES >> "L" terminal circuit is normal. Refer to [CHG-11, "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		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F36	2	M53	25	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the harness.

4. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check continuity between combination meter harness connector and fuse block (J/B).

Combination meter		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M53	2	M3	12C	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace 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.

L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

(+)		(-)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M53	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-28, "Wiring Diagram - IGNITION POWER SUPPLY -](#)

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L TERMINAL CIRCUIT (SHORT)

< DTC/CIRCUIT DIAGNOSIS >

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:000000006887166

The "L" terminal circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp turns OFF. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:000000006887167

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-11. "Work Flow"](#).

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

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

Combination meter		Ground	Continuity
Connector	Terminal		
M53	25		Not existed

Is the inspection result normal?

- YES >> Replace combination meter.
NO >> Repair or replace the harness.

S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

S TERMINAL CIRCUIT

Description

INFOID:000000006887168

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:000000006887169

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.

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal		
F36	3	Ground	Battery voltage

Is the inspection result normal?

YES >> Refer to [CHG-11, "Work Flow"](#).

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

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CHARGING SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000006887170

Symptom	Reference
Discharged battery	Refer to CHG-11, "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.	

ALTERNATOR

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

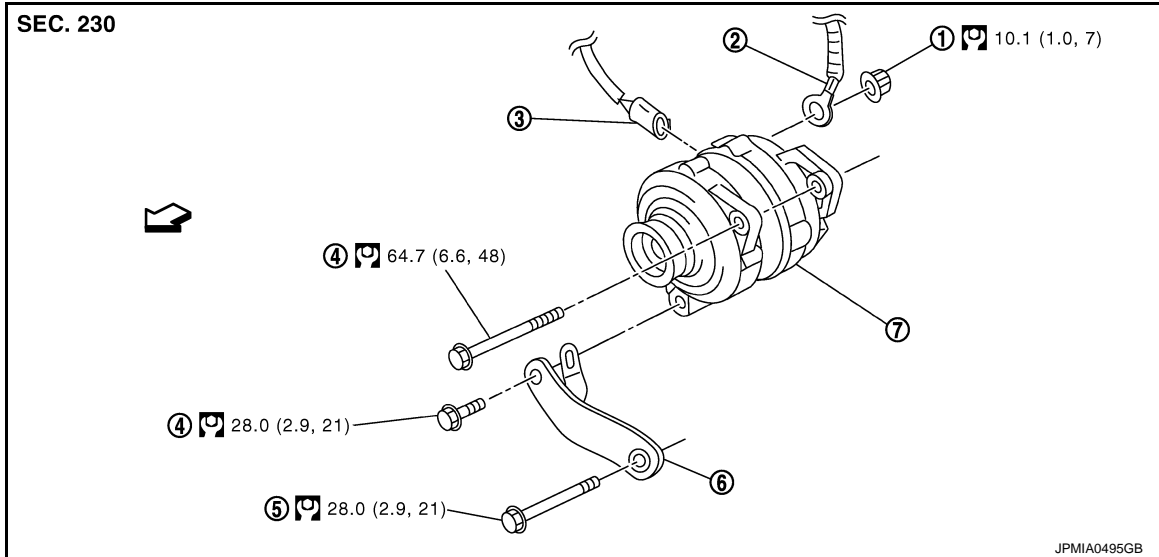
ALTERNATOR

VQ37VHR

VQ37VHR : Exploded View

INFOID:000000006887171

REMOVAL



- | | | |
|-----------------------------|----------------------------------|-------------------------|
| 1. Terminal B nut | 2. Terminal B harness | 3. Alternator connector |
| 4. Alternator mounting bolt | 5. Alternator stay mounting bolt | 6. Alternator stay |
| 7. Alternator | | |

↔ : Engine front

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

DISASSEMBLY

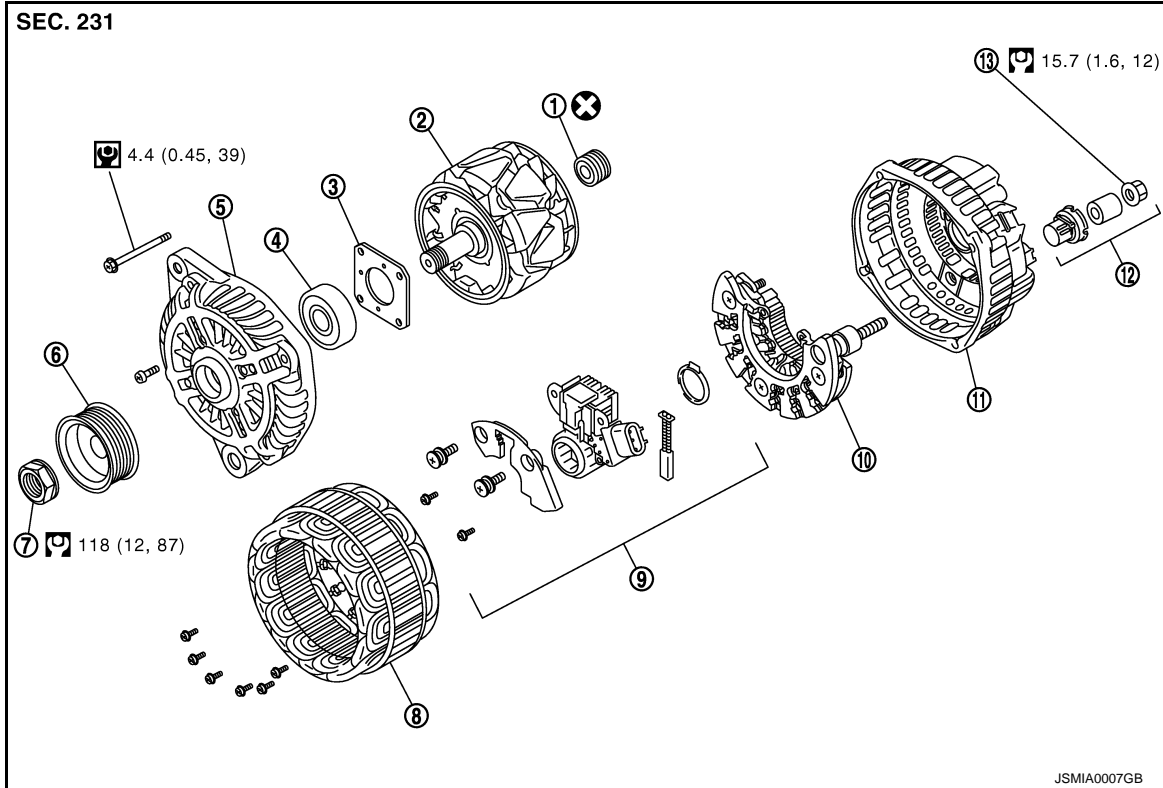
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ALTERNATOR

< REMOVAL AND INSTALLATION >

Type: A003TJ1991



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|----------------------|---------------------------|----------------------------------|
| 1. Rear bearing | 2. Rotor assembly | 3. Retainer |
| 4. Front bearing | 5. Front bracket assembly | 6. Pulley |
| 7. Pulley nut | 8. Stator assembly | 9. IC voltage regulator assembly |
| 10. Diode assembly | 11. Rear bracket assembly | 12. Terminal set |
| 13. "B" terminal nut | | |

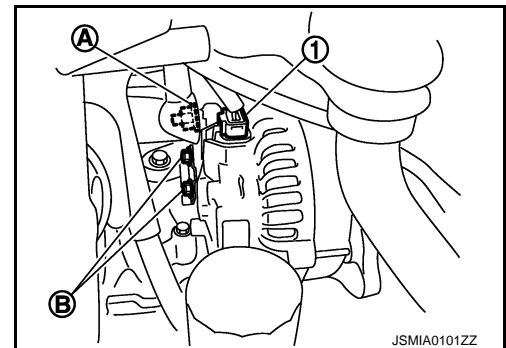
Refer to [GI-4, "Components"](#) for symbols in the figure.

VQ37VHR : Removal and Installation (2WD)

INFOID:000000006887172

REMOVAL

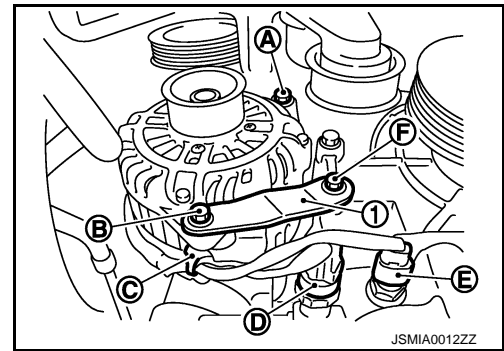
1. Disconnect the battery cable from the negative terminal. Refer to [PG-142, "Removal and Installation"](#).
2. Remove engine engine under cover. Refer to [EXT-28, "ENGINE UNDER COVER : Removal and Installation"](#)
3. Remove drive belt. Refer to [EM-22, "Removal and Installation"](#)
4. Disconnect alternator connector (1).
5. Remove terminal B nut (A), and then remove terminal B harness.
6. Remove the harness bracket bolts (B).



ALTERNATOR

< REMOVAL AND INSTALLATION >

7. Remove oil pressure switch harness clip (C) from alternator stay (1).
8. Disconnect oil pressure switch connector (D) and oil temperature sensor connector (E).
9. Remove alternator mounting bolt (B) and alternator stay mounting bolt (F), and then remove alternator stay.
10. Remove alternator mounting bolt (A).



11. Remove alternator assembly downward from the vehicle.

INSTALLATION

Note the following items, and then install in the reverse order of removal.

CAUTION:

- Be sure to tighten terminal B nut carefully.
- Install alternator, and check tension of belt. Refer to [EM-22, "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-15, "Inspection Procedure"](#).

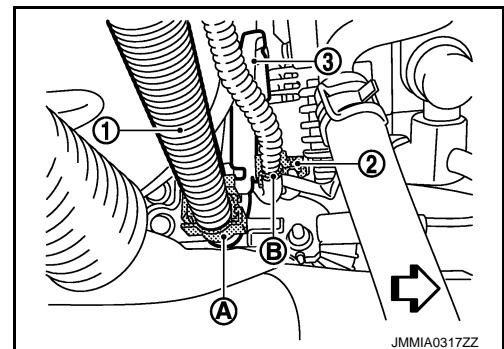
VQ37VHR : Removal and Installation (AWD)

INFOID:000000006887173

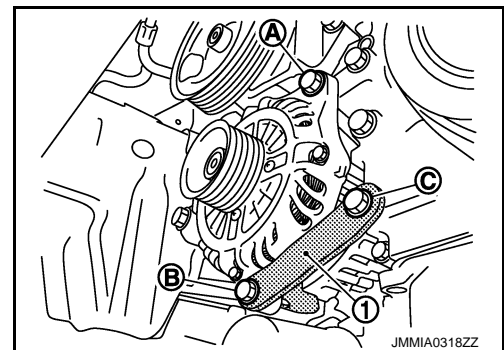
REMOVAL

1. Disconnect the battery cable from the negative terminal. Refer to [PG-142, "Removal and Installation"](#)
2. Remove air duct (inlet). Refer to [EM-29, "Removal and Installation"](#)
3. Remove air cleaner case RH. Refer to [EM-29, "Removal and Installation"](#).
4. Remove terminal B harness (1) from harness clamp (A).
5. Remove harness clip (B) from harness bracket (3).
6. Disconnect alternator connector (2).

← : Vehicle front



7. Remove engine under cover. Refer to [EXT-28, "ENGINE UNDER COVER : Removal and Installation"](#).
8. Remove drive belt. Refer to [EM-22, "Removal and Installation"](#).
9. Remove alternator mounting bolt (B) and alternator stay mounting bolt (C), and then remove alternator stay (1).
10. Remove alternator mounting bolt (A).



ALTERNATOR

< REMOVAL AND INSTALLATION >

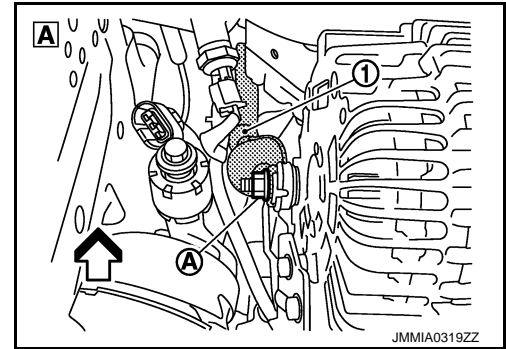
- Remove alternator from engine and laterally rotate to a position so that terminal B nut (A) is visible.

CAUTION:

Be careful not to damage engine oil filter.

- Remove terminal B nut, and then remove terminal B harness (1).

↶ : Vehicle front



- Remove alternator assembly downward from the vehicle.

INSTALLATION

Note the following item, and then install in the reverse order of removal.

CAUTION:

- Be sure to tighten terminal B nut carefully.
- Install alternator, and check tension of belt. Refer to [EM-22, "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-15, "Inspection Procedure"](#).

VQ37VHR : Inspection

INFOID:000000006887174

ALTERNATOR PULLEY INSPECTION

Perform the following.

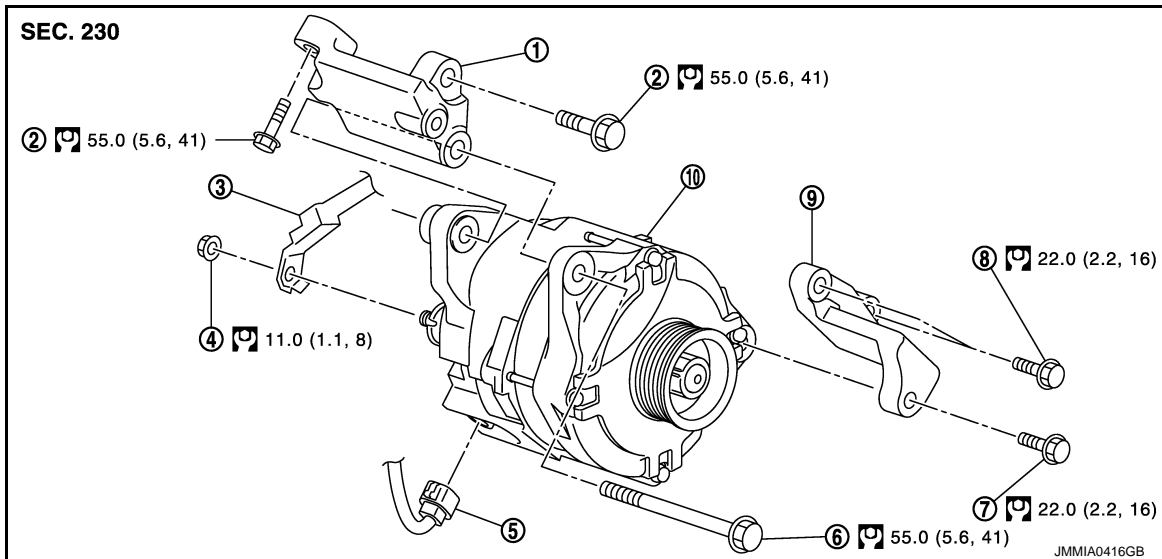
- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight. Refer to [CHG-23, "VQ37VHR : Exploded View"](#).

VK56VD

VK56VD : Exploded View

INFOID:000000006887175

REMOVAL



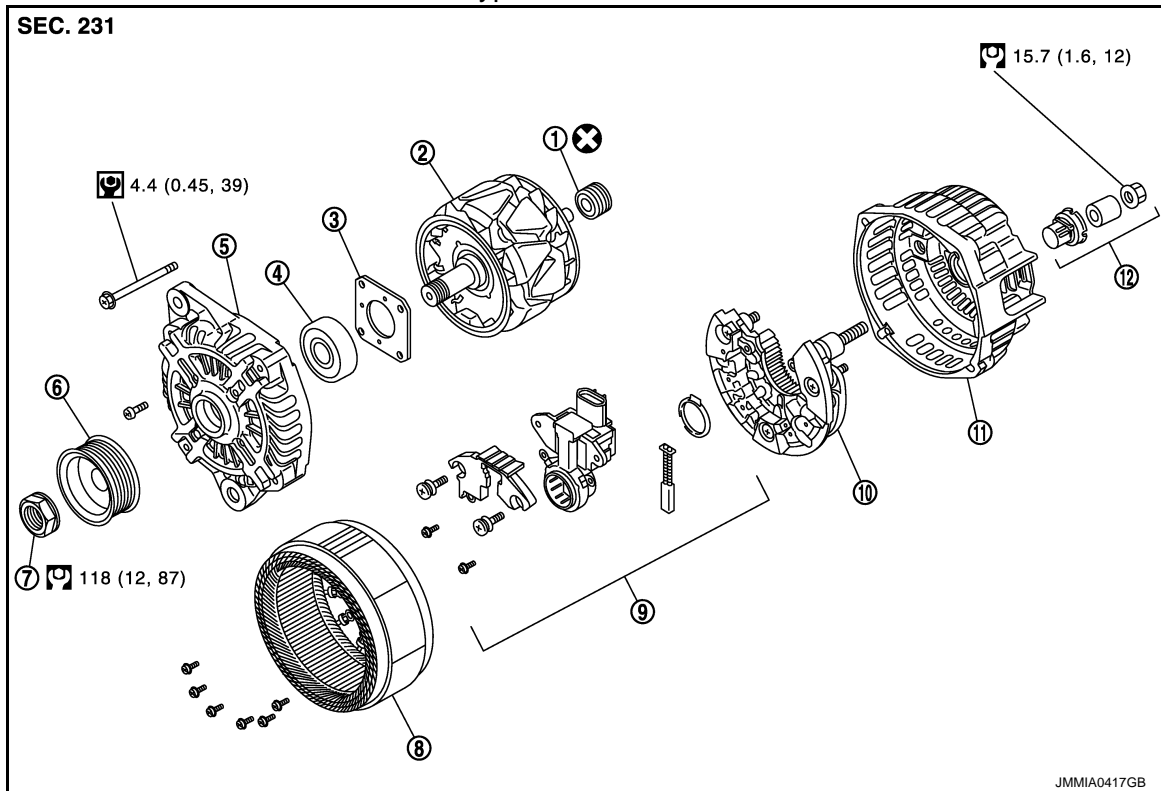
- | | | |
|-----------------------------------|-------------------------------------|-----------------------------------|
| 1. Alternator bracket | 2. Alternator bracket mounting bolt | 3. Terminal B harness |
| 4. Terminal B nut | 5. Alternator connector | 6. Alternator mounting bolt upper |
| 7. Alternator mounting bolt lower | 8. Alternator stay mounting bolt | 9. Alternator stay |
| 10. Alternator | | |

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

ALTERNATOR

< REMOVAL AND INSTALLATION > DISASSEMBLY

Type: A002TX1591



- | | | |
|--------------------|---------------------------|----------------------------------|
| 1. Rear bearing | 2. Rotor assembly | 3. Retainer |
| 4. Front bearing | 5. Front bracket assembly | 6. Pulley |
| 7. Pulley nut | 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.

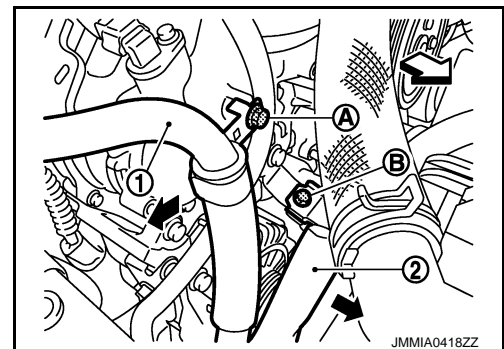
VK56VD : Removal and Installation

INFOID:0000000006887176

REMOVAL

1. Disconnect the battery cable from the negative terminal. Refer to [PG-142, "Removal and Installation"](#).
2. Remove air duct (inlet) and air cleaner case (bank 2). Refer to [EM-184, "Removal and Installation"](#).
3. Remove drive belt. Refer to [EM-176, "Removal and Installation"](#).
4. Remove mounting bolt (A) and (B). Move power steering suction hose (1) and power steering high pressure piping (2) and secure work space.

← : Vehicle front



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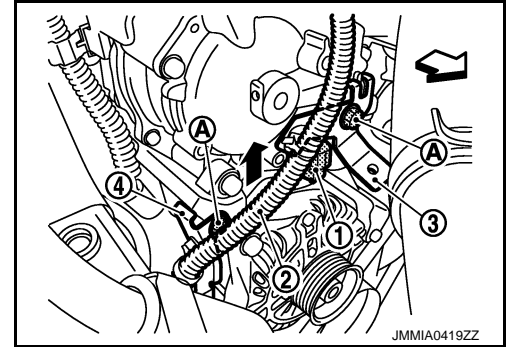
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ALTERNATOR

< REMOVAL AND INSTALLATION >

5. Remove harness bracket mounting bolt (A).
6. Disconnect VDC harness connector (1)
7. Move harness (2) together with harness brackets (3) and (4), and secure work space.

← : Vehicle front



8. Remove engine under cover. Refer to [EXT-28, "ENGINE UNDER COVER : Removal and Installation"](#).
9. Disconnect alternator connector.
10. Remove terminal B nut, and then remove terminal B harness.
11. Remove alternator mounting bolt lower.
12. Remove alternator mounting bolt upper.
13. Remove alternator assembly upward from the vehicle.

INSTALLATION

Note the following items, and install in the reverse order of removal.

CAUTION:

- Be sure to tighten terminal B nut carefully.
- Install alternator, and check tension of belt. Refer to [EM-175, "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-15, "Inspection Procedure"](#).

VK56VD : Inspection

INFOID:000000006887177

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight. Refer to [CHG-26, "VK56VD : Exploded View"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:000000006887178

Applied model		VQ37VHR	VK56VD
Type		A003TJ1991	A002TX1591
		MITSUBISHI make	
Nominal rating	[V - A]	12 -130	12 -150
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 31/1,300	More than 57/1,500
		More than 122/2,500	More than 126/2,500
		More than 144/5,000	More than 152/5,000
Regulated output voltage	[V]	14.1 - 14.7*	

*: Adjustment range of power generation voltage variable control is 11.4 - 15.6 V.

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