

RODEO

ENGINE

STARTING AND CHARGING SYSTEM (Y22SE 2.2L)

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Service Precaution

WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT AND WIRING LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS SERVICE INFORMATION. FAILURE TO FOLLOW WARNINGS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.

CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

Starting System

General Description

Cranking Circuit

The cranking system consists of a battery, starter, starter switch, starter relay, etc. These main components are connected.

Starter

The cranking system employs a magnetic type reduction starter in which the motor shaft is also used as a pinion shaft. When the starter switch is turned on, the contacts of magnetic switch are closed, and the armature rotates. At the same time, the plunger is attracted, and the pinion is pushed forward by the shift lever to mesh with the ring gear.

Then, the ring gear runs to start the engine. When the engine starts and the starter switch is turned off, the plunger returns, the pinion is disengaged from the ring gear, and the armature stops rotation. When the engine speed is higher than the pinion, the pinion idles, so that the armature is not driven.

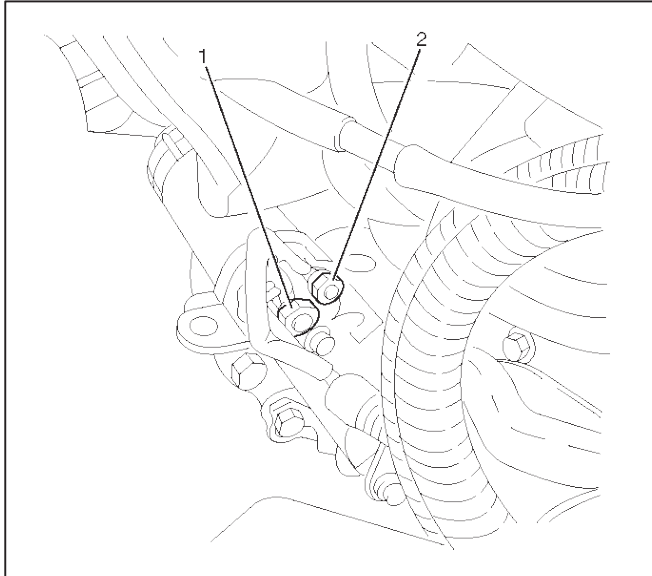
Diagnosis

Condition	Possible cause	Correction
Starter does not run	Charging failure	Repair charging system
	Battery Failure	Replace Battery
	Terminal connection failure	Repair or replace terminal connector and/or wiring harness
	Starter switch failure	Repair or replace starter switch
	Starter relay failure	Replace starter relay
	Starter failure	Repair or replace starter

Starter

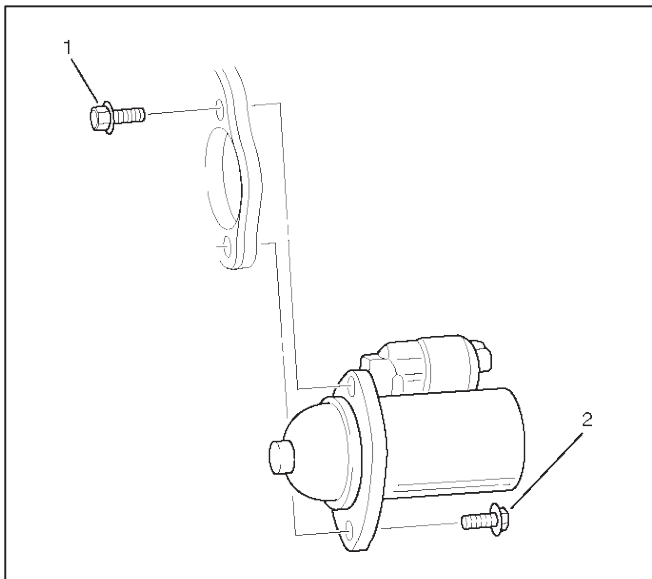
Removal

1. Battery ground cable.
2. Remove harness connectors (1) and (2).



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3. Remove bolts from starter (1), (2).



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Installation

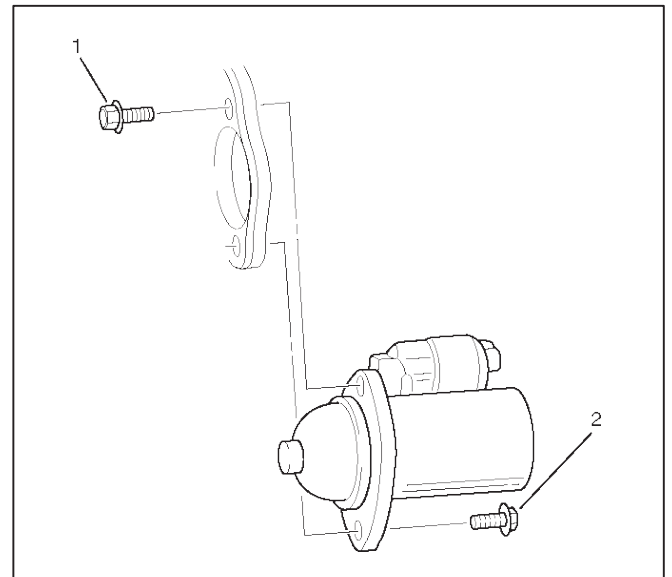
1. Install starter assembly(6).
2. Install mounting bolts and tighten bolts to specified torque (1), (2).

Starter to transmission

Torque: 60 N·m (44 lb ft)

Starter to flywheel housing

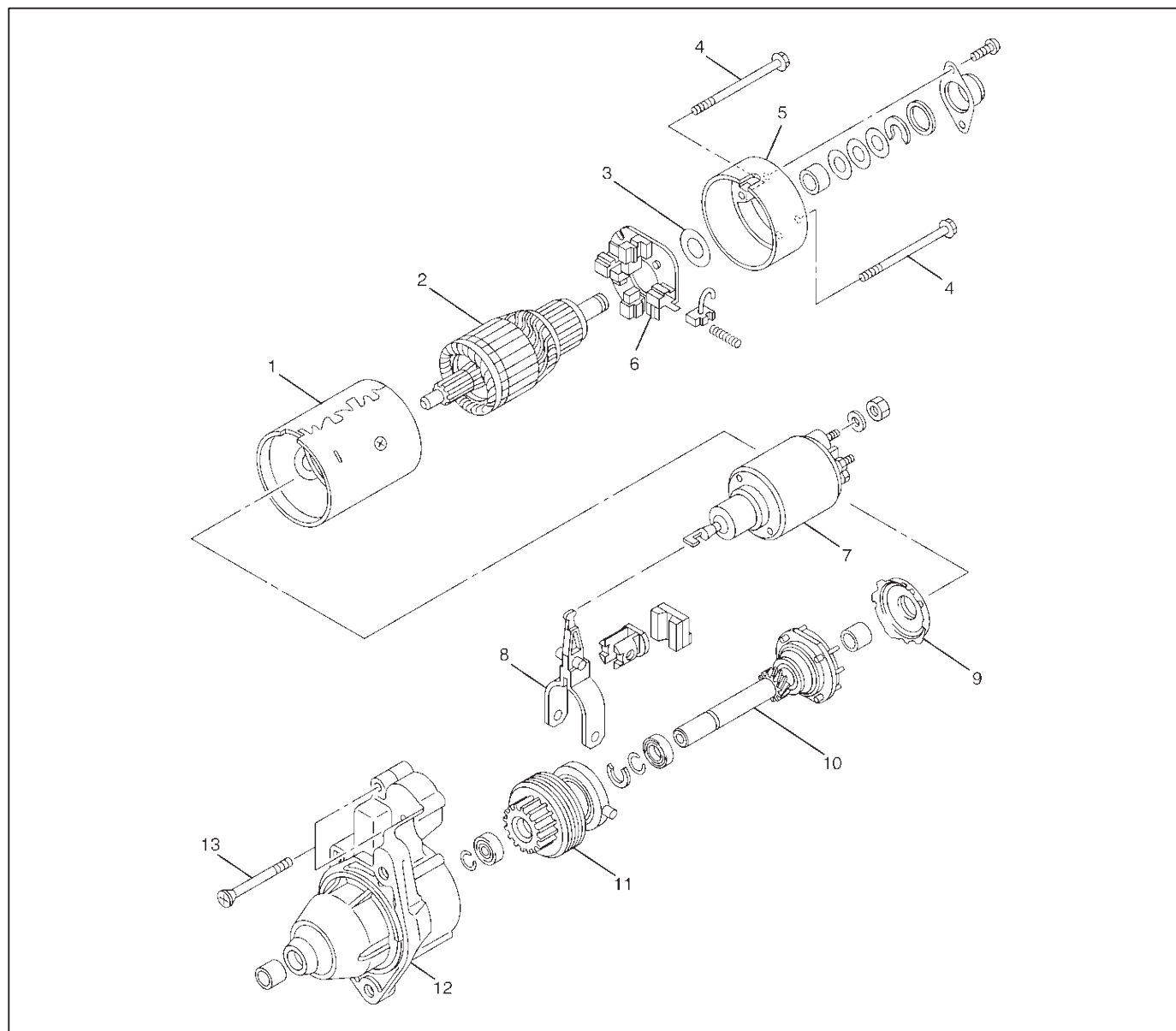
Torque: 35 N·m (26 lb ft)



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3. Connect harness.
4. Reconnect the battery ground cable.

Disassembled View



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Legend

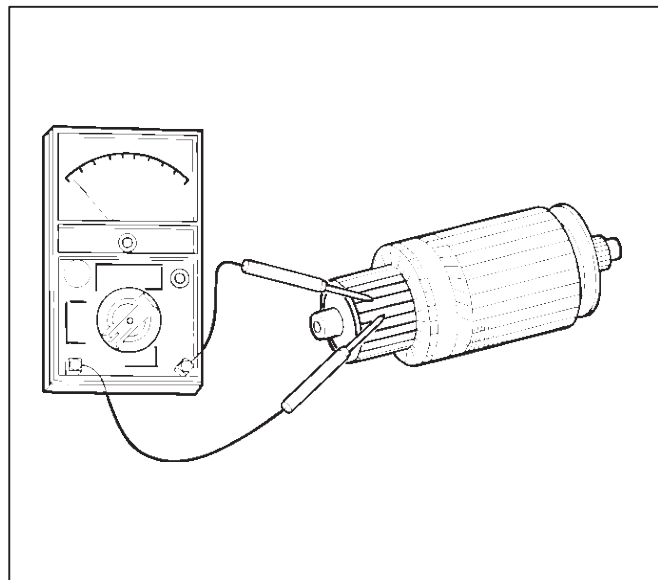
- | | |
|----------------------------|---------------------|
| (1) Yoke Assembly | (7) Magnetic Switch |
| (2) Armature | (8) Engage Lever |
| (3) Washer | (9) Center Bracket |
| (4) Through Bolt | (10) Shaft |
| (5) Rear Cover | (11) Engage Gear |
| (6) Brush and Brush Holder | (12) Gear Case |
| | (13) Bolt |

Inspection and Repair

Repair or replace necessary parts if extreme wear or damage is found during inspection.

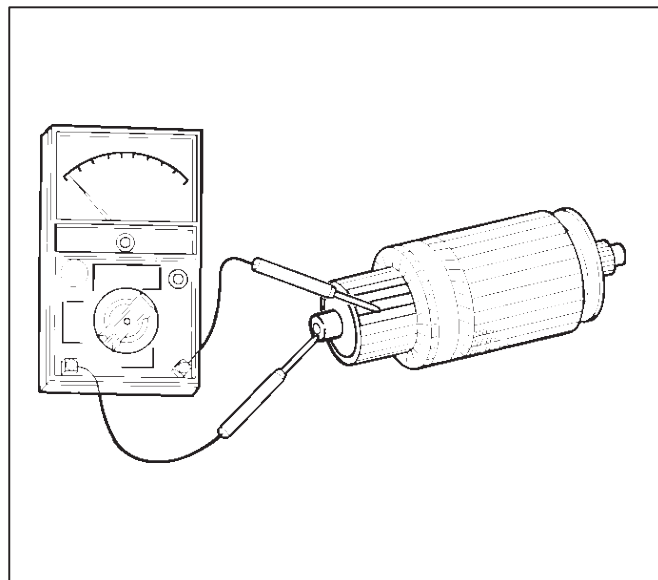
Armature

Check for continuity between commutator and segment. Replace commutator if there is no continuity (i.e., disconnected).



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Check for continuity between commutator and shaft. Also, check for continuity between commutator and armature core, armature core and shaft. Replace commutator if there is continuity (i.e., internally grounded).



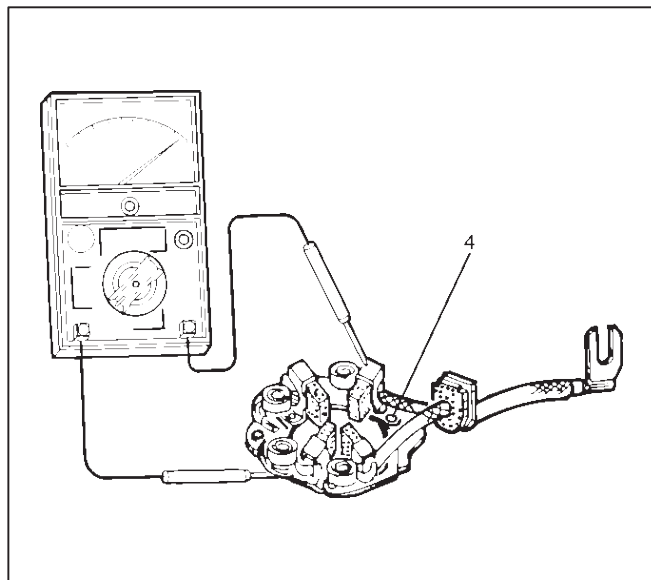
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Brush

Measure the length of brush. Replace with a new one, if it is below the limit.

Brush Holder

Check for continuity between brush holder (+) (4) and base (-). Replace, if there is continuity (i.e., insulation is broken).

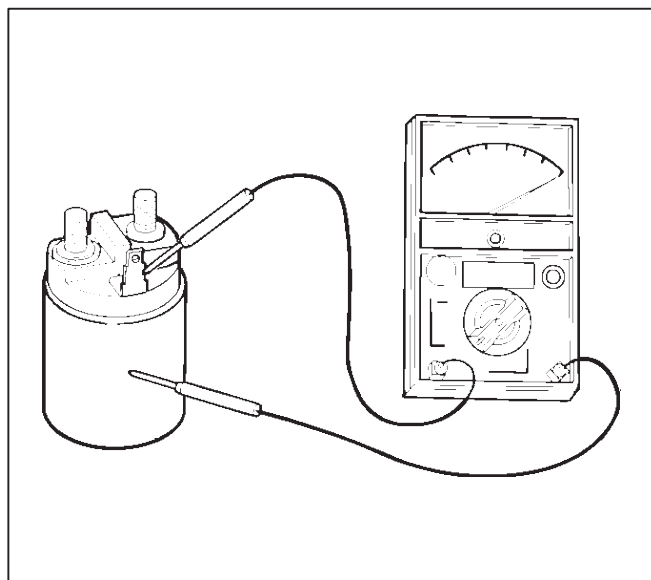


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Magnetic Switch

Check for continuity of shunt coil between terminals S and M.

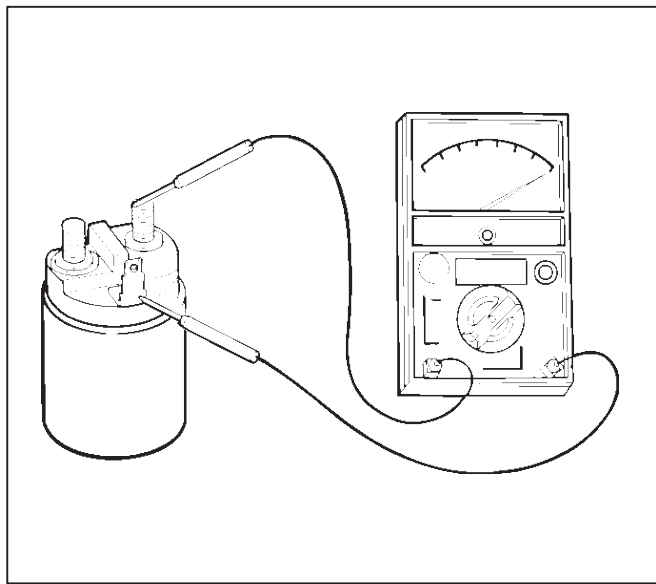
Replace, if there is no continuity (i.e., coil is disconnected).



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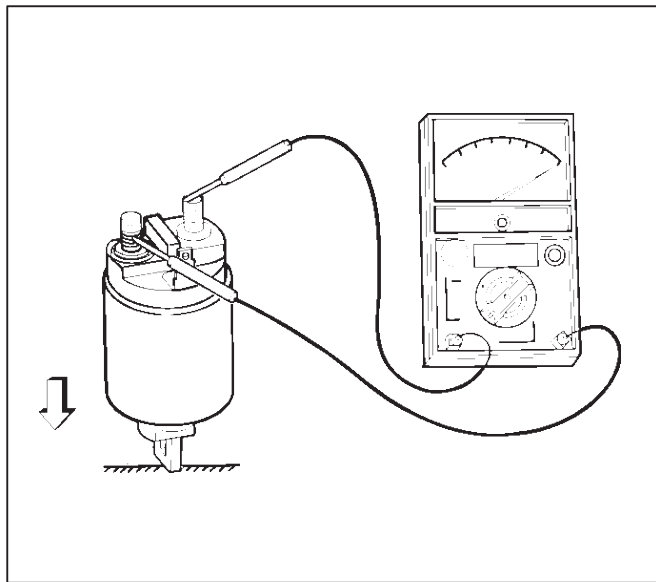
Continuity of Series Coil

Check for continuity between terminals S and M. Replace, if there is no continuity (i.e., coil is disconnected).



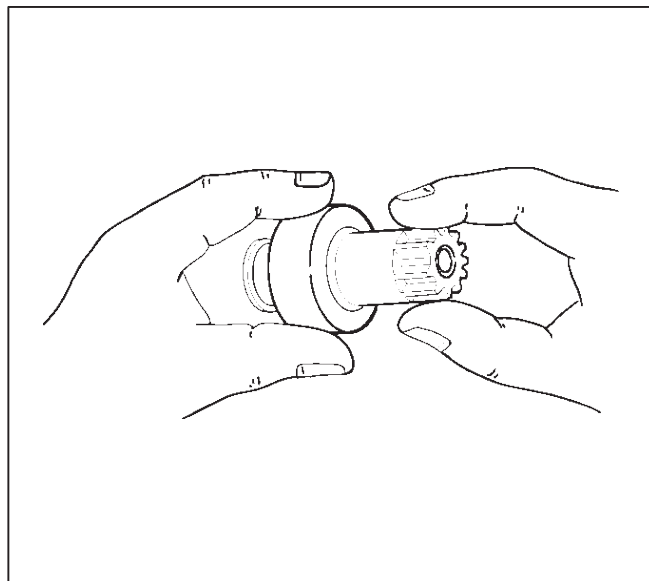
Continuity of Contacts

With the plunger faced downward, push down the magnetic switch. In this state, check for continuity between terminals B and M. Replace, if there is no continuity (i.e., contacts are faulty).



Pinion

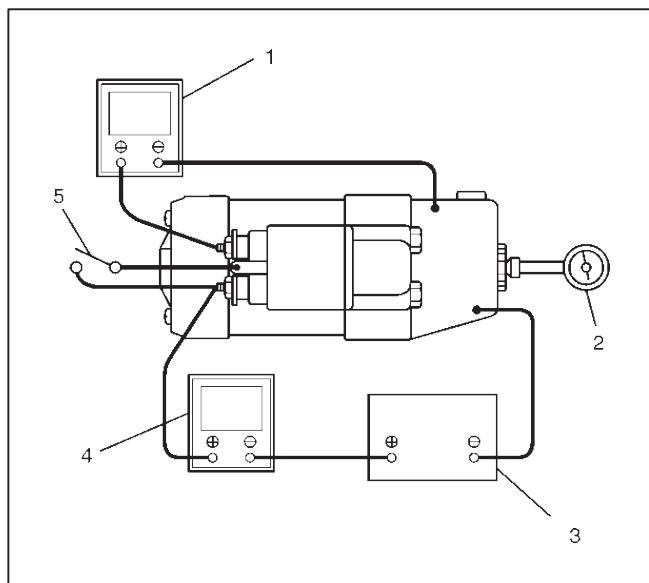
Check if the pinion rotates smoothly in drive direction by hand, or if it is locked when it is rotated in reverse. If not, replace the pinion.



Characteristic Test

For easily confirming the characteristics, conduct the no-load test as follows:

Rating as short as 30 seconds requires rapid testing. Fix the starter on the test bench, and wire as shown in illustration. When the switch is closed, the current flows and the starter runs under no load. At this time, measure current, voltage and speed to check if they satisfy the standard.



Legend

- (1) Volt Meter
- (2) Revolution Indicator
- (3) Battery
- (4) Ammeter
- (5) Switch

Charging System

General Description

The charging system is an IC integral regulator charging system and its main components are connected as shown in illustration.

The regulator is a solid state type and it is mounted along with the brush holder assembly inside the generator installed on the rear end cover.

The generator does not require particular maintenance such as voltage adjustment. The rectifier connected to the stator coil has eight diodes to transform AC voltage into DC voltage.

This DC voltage is connected to the output terminal of generator.

General On-Vehicle Inspection

The operating condition of charging system is indicated by the charge warning lamp. The warning lamp comes on when the starter switch is turned to "ON" position. The charging system operates normally if the lamp goes off when the engine starts.

If the warning lamp shows abnormality or if undercharged or overcharged battery condition is suspected, perform diagnosis by checking the charging system as follows:

1. Check visually the belt and wiring connector.

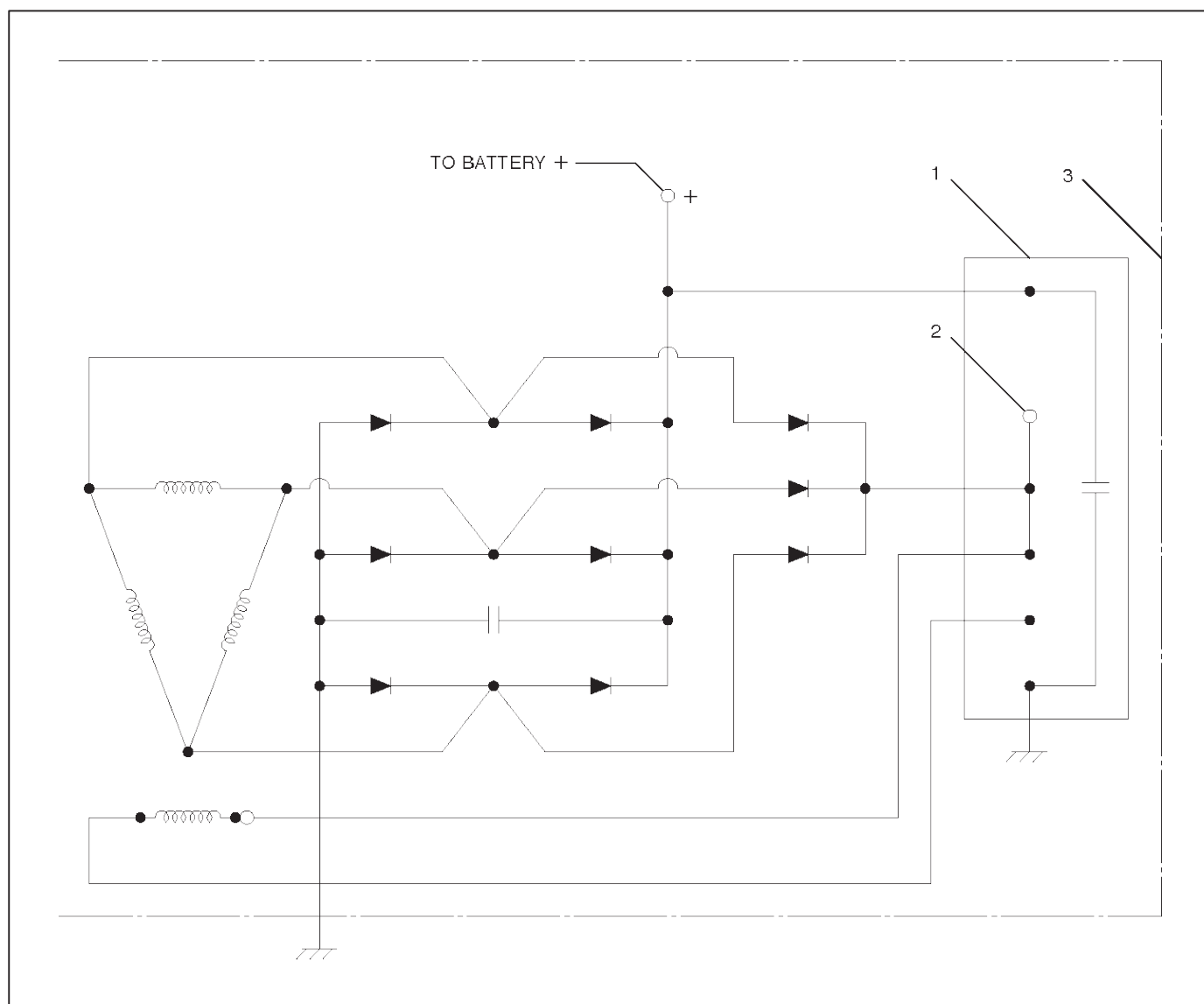
2. With the engine stopped, turn the stator switch to "ON" position and observe the warning lamp.

If lamp does not come on:

Disconnect wiring connector from generator, and ground the terminal "L" on connector side.

If lamp comes on:

Repair or replace the generator.



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Legend

(1) Regulator

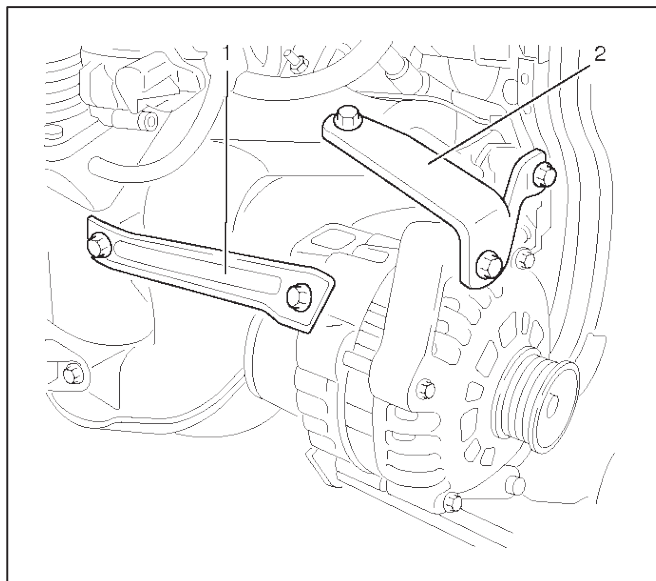
(2) Indicator Lamp

(3) Generator Assembly

Generator

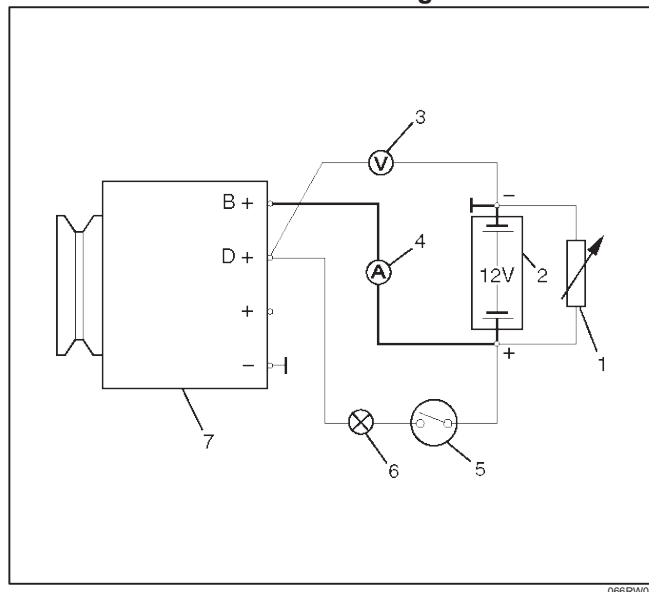
Removal

1. Disconnect battery ground cable.
2. Move drive belt tensioner to loose side using wrench then remove drive belt.
3. Disconnect terminal "B" wiring connector and connector.
4. Remove generator bracket (1), (2) and remove generator assembly.



Inspection

Generator Power and Circuit Diagram



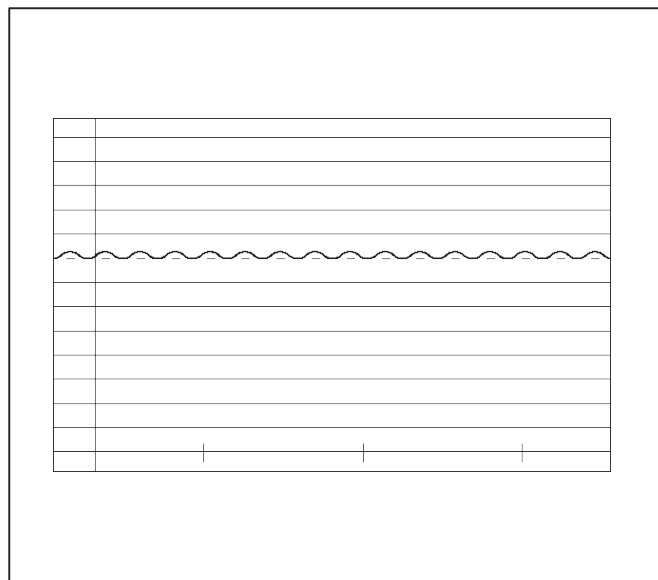
Legend

- (1) Load resistor, set parallel to battery
- (2) Battery
- (3) Voltmeter
- (4) Ammeter
- (5) Ignition Lock
- (6) Charge Telltale
- (7) Generator

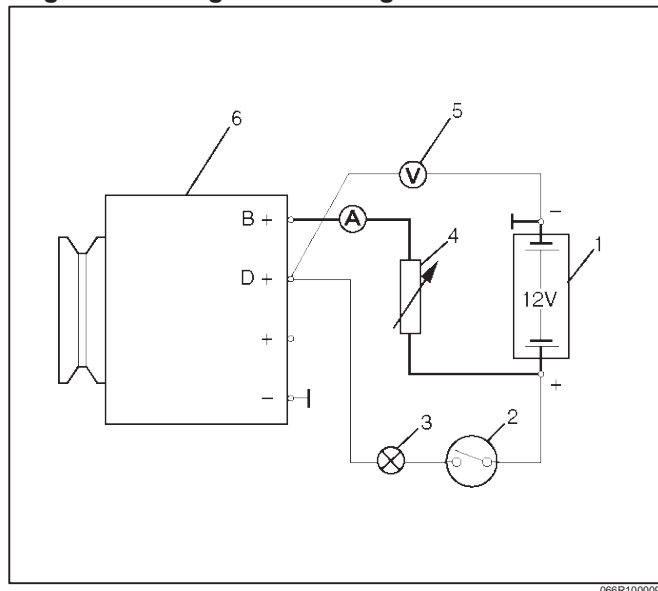
1. Disconnect battery.
2. Close off connecting cable from alternator terminal "B+".
3. Set ammeter (measuring range 100A) in disconnected line.
4. Connect controllable load resistor to battery terminal.
5. Set resistor in front of connection to "0"; connect first to battery, then to resistor.
6. Connect tachometer.
7. Connect oscilloscope according to manufacturer's instructions.
8. Connect battery.
9. Start engine and read off resulting current at various engine speeds.

Generator Power

1. Adjust load resistor, if the required load currents are not attained.
2. The shape of the voltage curves on oscilloscope curve should be regular.
3. Test value: 5 to 7A.
4. If the required minimum current intensity is not attained, or if the oscilloscope picture shows variations, the alternator should be overhauled.



Regulated Voltage Circuit Diagram



Legend

- (1) Battery
- (2) Ignition Lock
- (3) Charge Telltale
- (4) Resistor, for attainment of load current with the battery set in series
- (5) Voltmeter
- (6) Generator

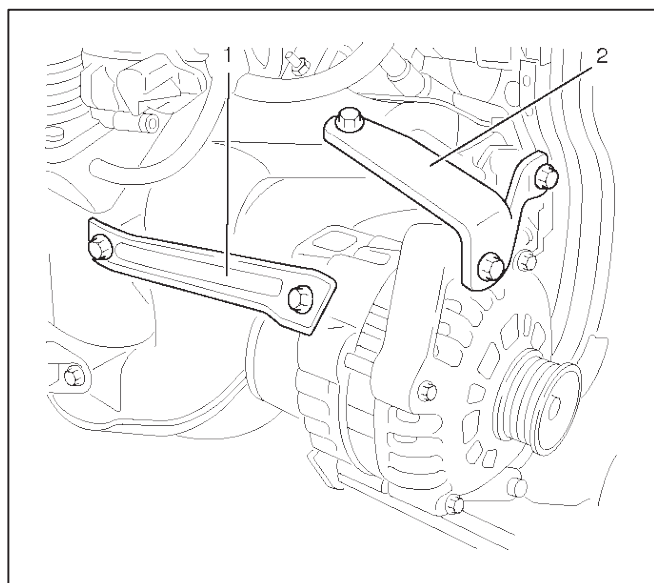
Installation

1. Install generator assembly and bring generator assembly to the position to be installed.
2. Install generator bracket (1), (2) and tighten to the specified torque.

Torque:

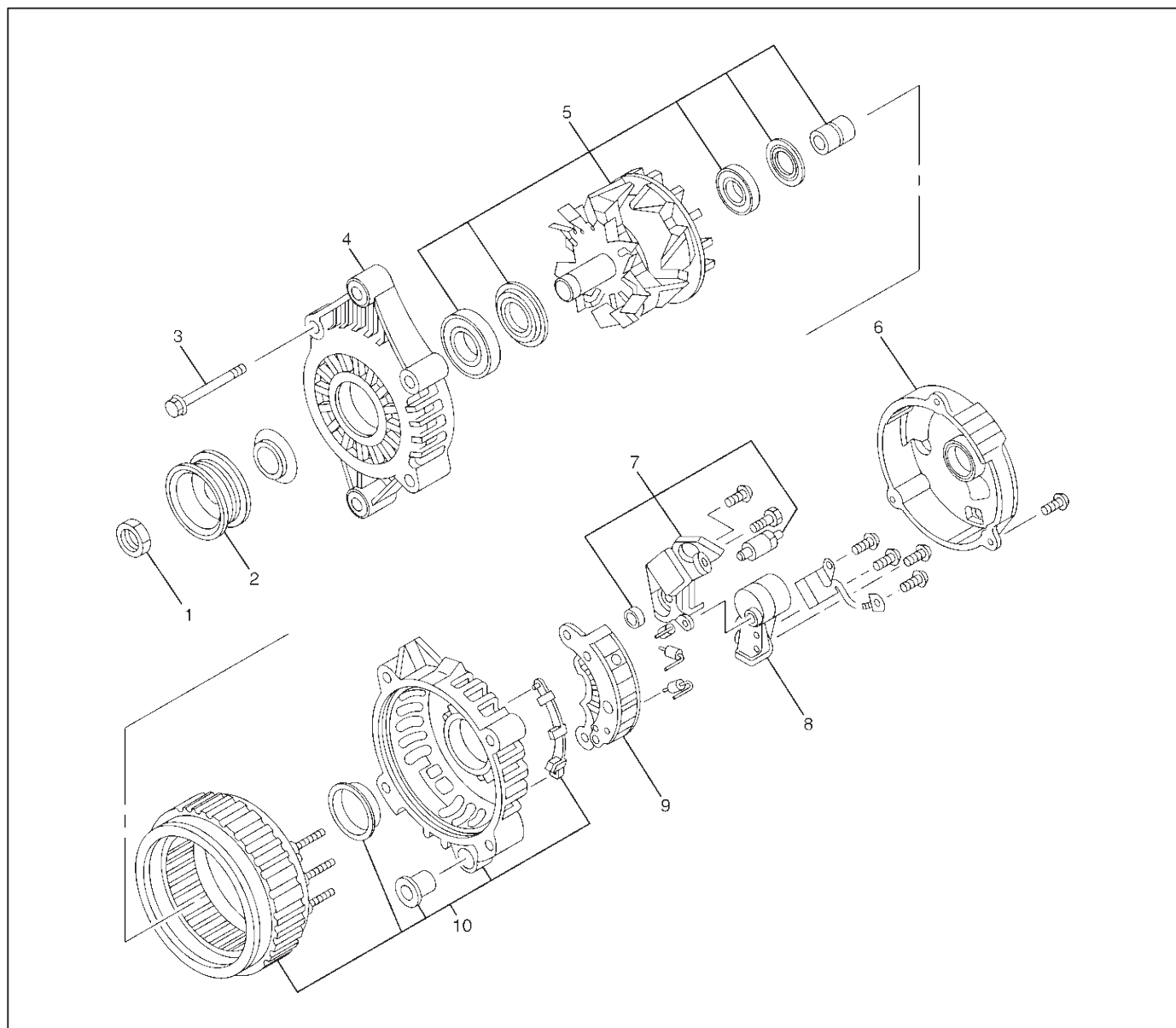
Long bolt: 35 N·m (26 lb ft)

Short bolt: 20 N·m (15 lb ft)



3. Connect wiring harness connector.
4. Move drive belt tensioner to loose side using wrench, then install drive belt to normal position.
5. Reconnect battery ground cable.

Disassembled View

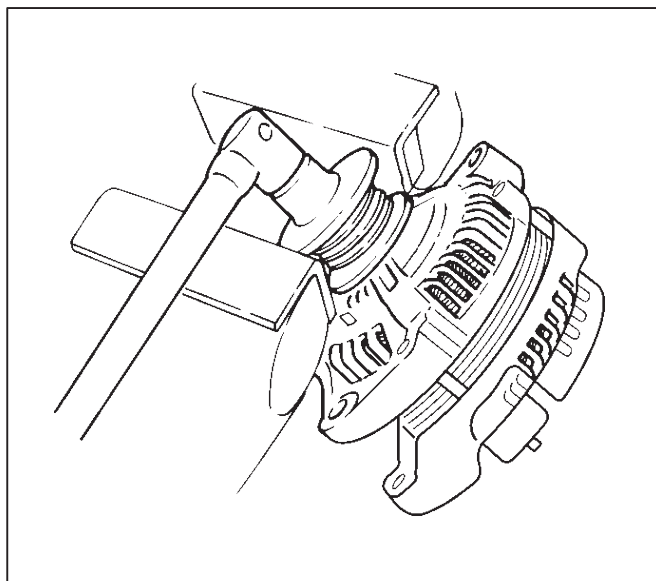


Legend

- | | |
|--------------------------|---------------------------|
| (1) Pulley Nut | (6) Cover |
| (2) Pulley | (7) Regulator Assembly |
| (3) Through Bolt | (8) Brush Holder Assembly |
| (4) Front Cover Assembly | (9) Rectifier |
| (5) Rotor Assembly | (10) Rear Cover Assembly |

Disassembly

1. Belt pulley nut.



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2. Remove the four through bolts (1).

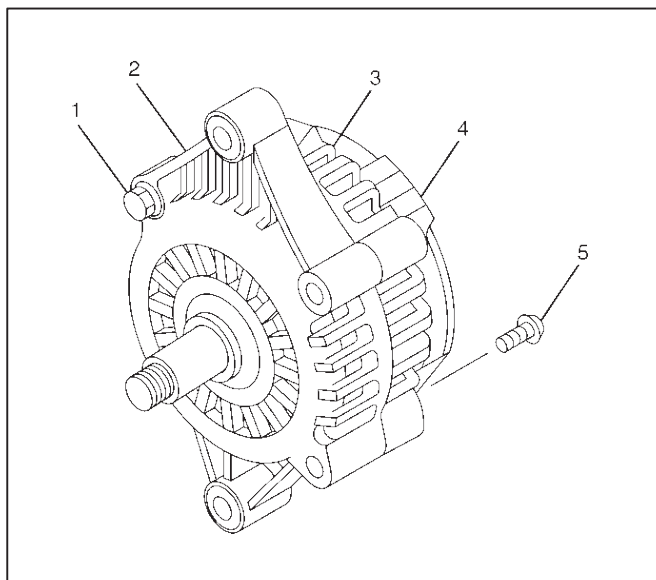
3. Remove the front cover (2).

4. Remove the three cover fixing bolts (5), regulator terminal nut and battery terminal nut.

5. Remove the cover (4).

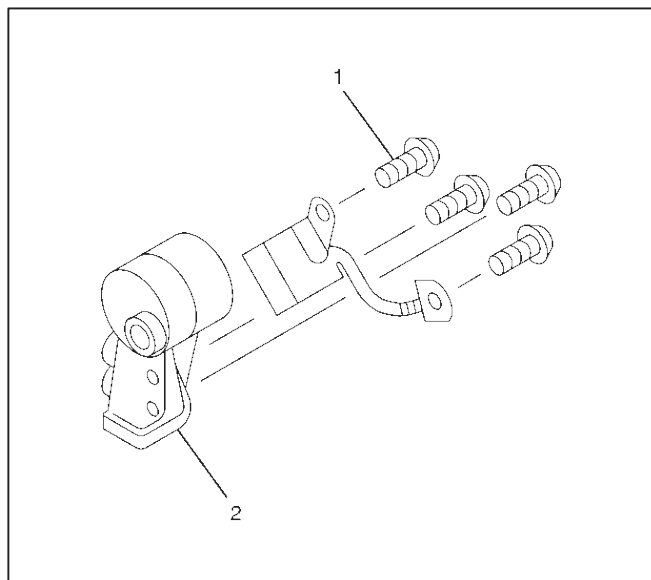
6. Remove the rotor assembly.

7. Remove the rear cover assembly (3).



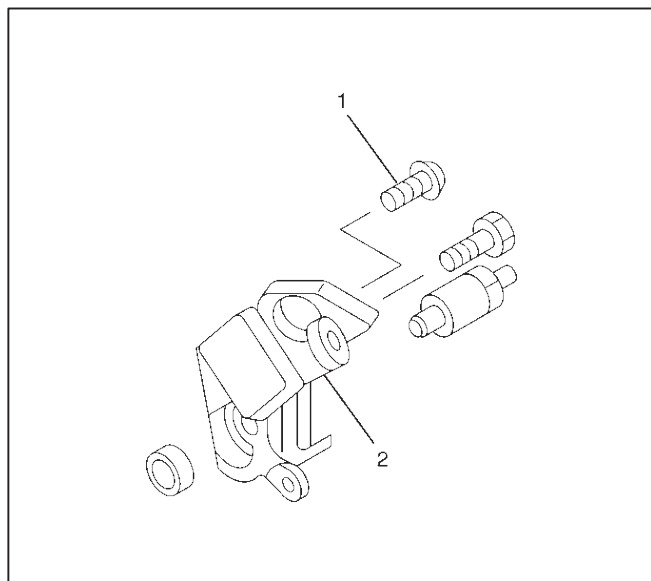
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8. Remove the four brush holder fixing bolts and brush holder assembly.



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9. Remove the two regulator fixing bolts and regulator assembly.



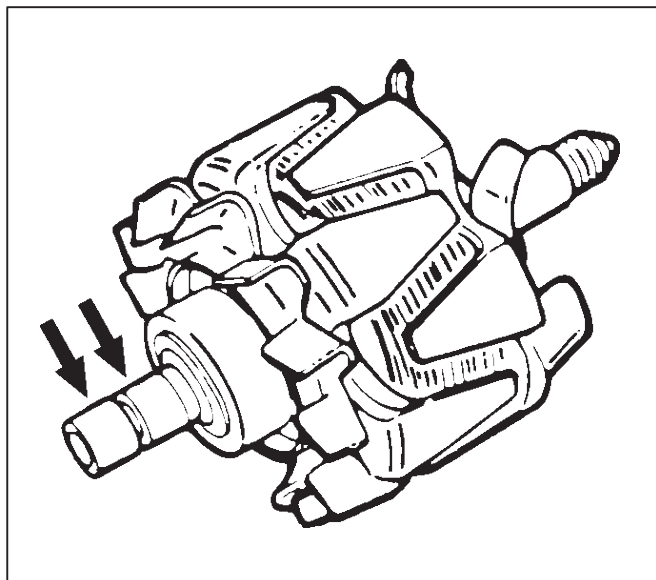
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Inspection and Repair

Repair or replace necessary parts if extreme wear or damage is found during inspection.

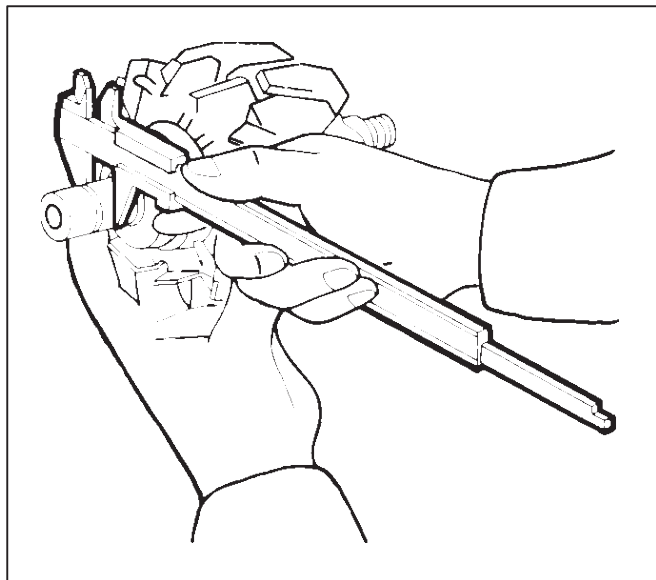
Rotor Assembly

1. Check the rotor slip ring surfaces for contamination and roughness. If rough, polish with #500–600 sandpaper.



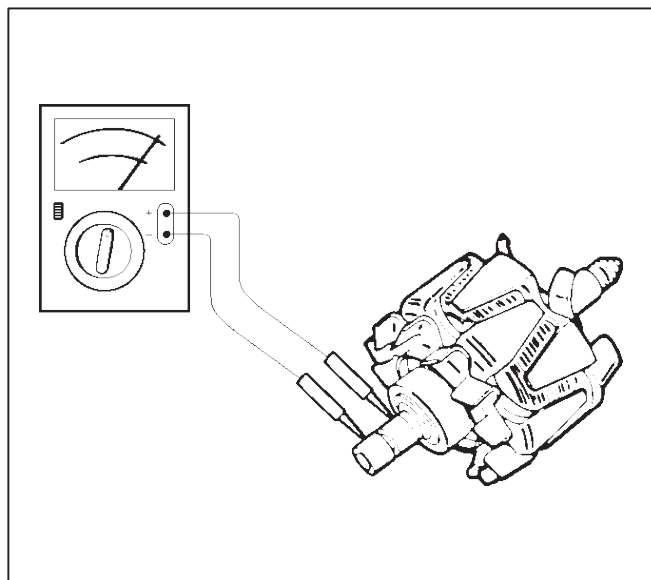
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2. Measure the slip ring diameter, and replace if it exceeds the limit.



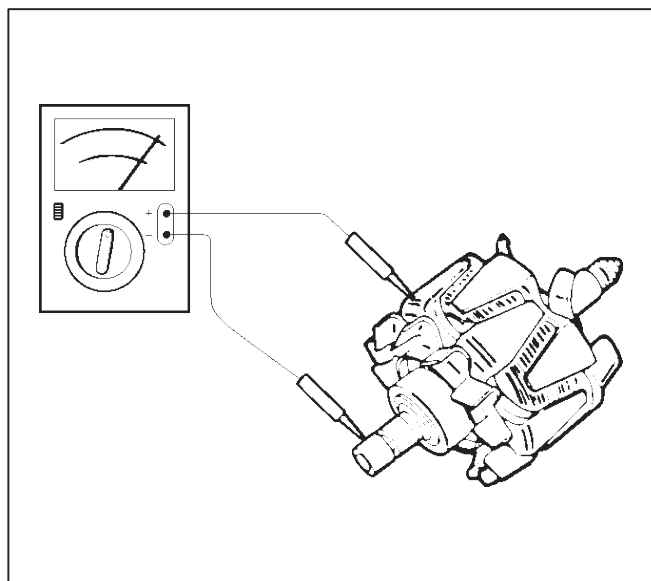
066RS015

3. Check continuity between slip rings, and replace if there is no continuity.



066RS016

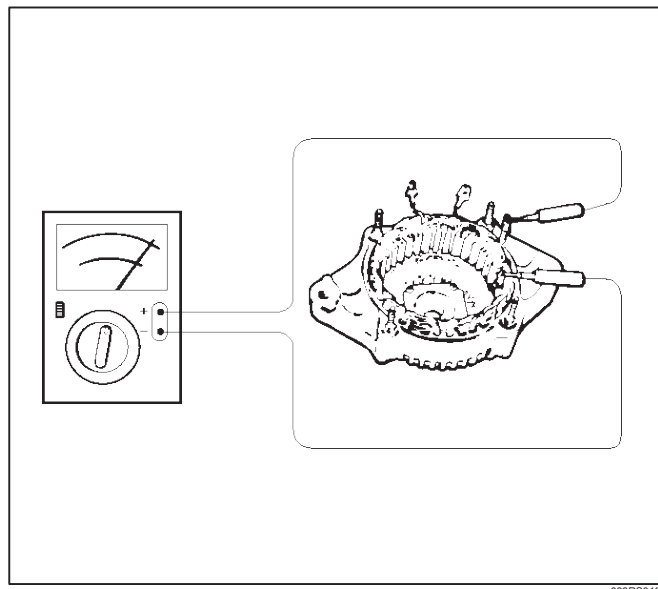
4. Check for continuity between slip ring and rotor core. In case of continuity, replace the generator assembly.



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Stator Coil

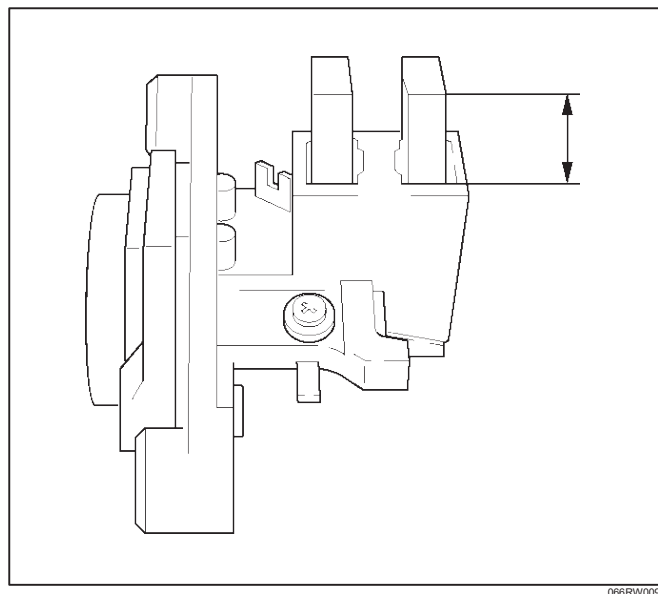
1. Measure resistance between respective phases.
 2. Measure insulation resistance between stator coil and core with a mega-ohmmeter.
- If less than standard, replace the generator assembly.



Brush

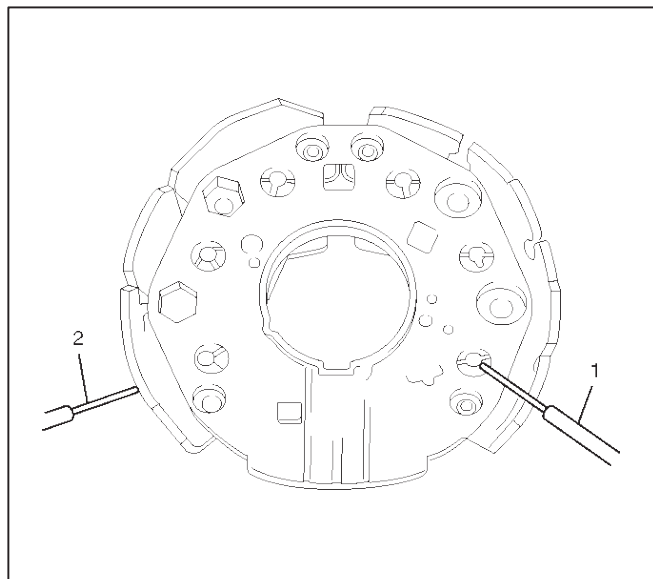
Measure the brush length.
If more than limit, replace the brush.

Standard: 5 mm (0.20 in)



Rectifier Assembly

Check for continuity across "1" and "2" in the × 100W range of multimeter.



Change polarity, and make sure that there is continuity in one direction, and not in the reverse direction. In case of continuity in both directions, replace the rectifier assembly.

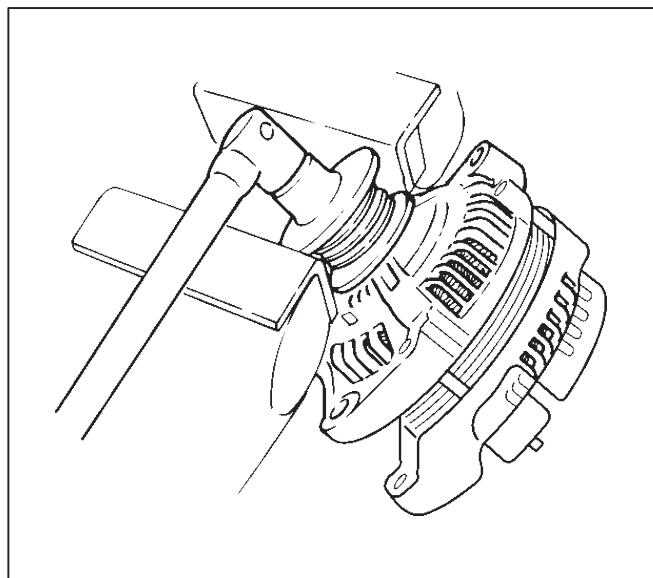
Reassembly

To reassemble, follow the disassembly steps in the reverse order, noting the following points:

1. Install pulley on the rotor shaft.

Clamp pulley to the vise, and tighten nut to the specified torque.

Torque: 40 N·m (30 lb ft)



Main Data and Specifications

General Specifications

Battery voltage	V	12
Rated output	A	100
Direction of rotation (as viewed from pulley side)		Clockwise
Maximum speed	rpm	8000