


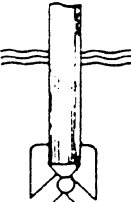
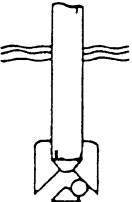
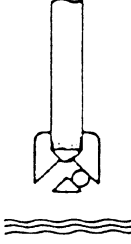


- **Green Dot:**  
 Battery is sufficiently charged for testing.
- **Dark:**  
 Battery must be charged before testing.  
 If there is a cranking complaint, battery should be tested as described in "Battery Inspection".  
 Charging and electrical systems should also be checked at this time.
- **Clear or Light Yellow:**  
 This means that fluid level is below the bottom of hydrometer. Its possible cause is excessive or prolonged charging, a broken case, excessive tipping or normal battery deterioration.  
 When the battery is found in such condition, it is possible that high charging voltage is caused by the faulty charging system and therefore, charging and electrical systems need to be checked. If there is a trouble in cranking and its cause lies in the battery, it should be replaced.

Diagnosis	OK	Charging necessary	Low Level Electrolyte Replace Battery
Indicator	 IYSQ011A0002-01 Green dot	 IYSQ011A0065-01 Dark	 IYSQ011A0066-01 Clear
Gravity Ball	 IYSQ011A0067-01	 IYSQ011A0068-01	 IYSQ011A0069-01

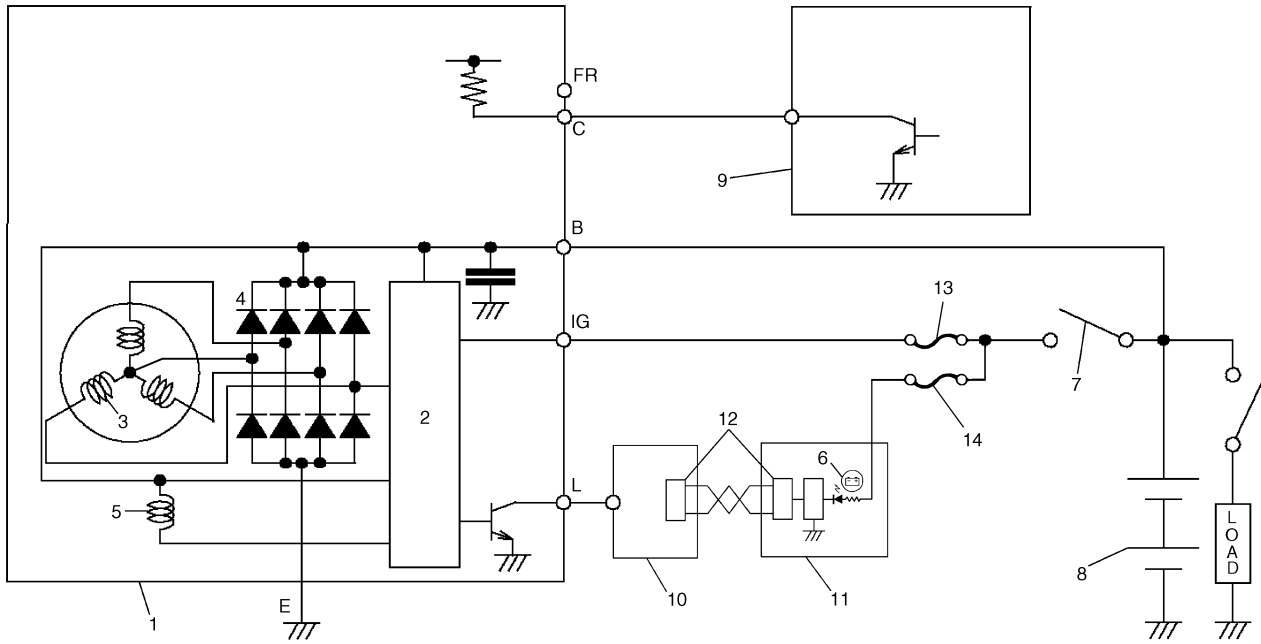
## Generator Description

S6RW0C1A01002

The generator is a small and high performance type with an IC regulator incorporated. The internal components are connected electrically as shown in the following figure.

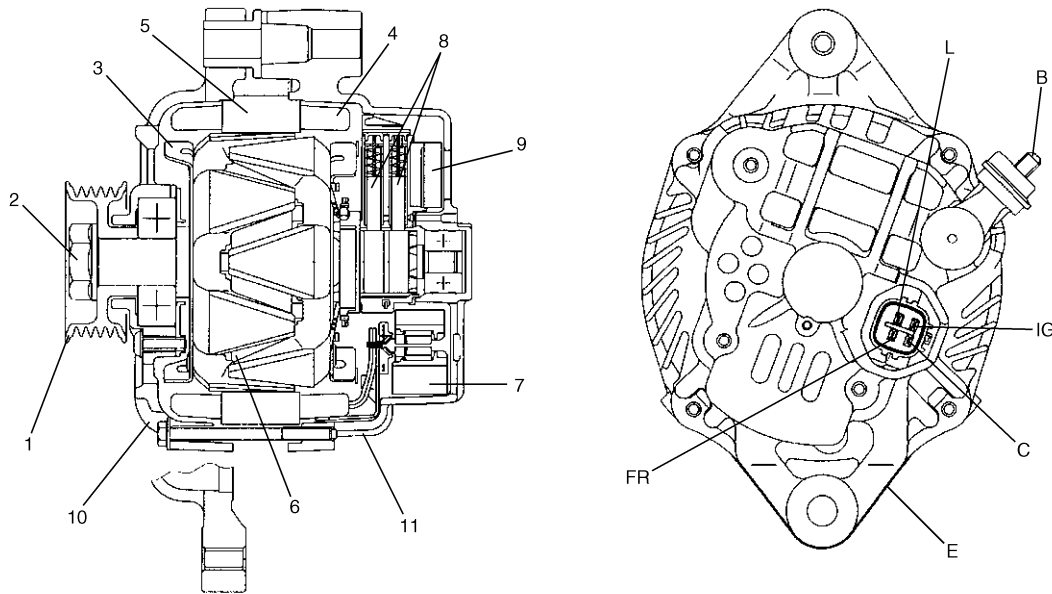
The generator features are as follows:

- Solid state regulator is mounted inside the generator.
- All regulator components are enclosed into a solid mold.
- This unit along with the brush holder assembly is attached to the rear housing.
- The IC regulator uses integrated circuits and controls the voltage produced by the generator, and the voltage setting cannot be adjusted.
- The generator rotor bearings contain enough grease to eliminate the need for periodic lubrication. Two brushes carry current through the two slip rings to the field coil mounted on the rotor, and under normal conditions will provide long period of attention-free service.
- The stator windings are assembled on the inside of a laminated core that forms part of the generator frame.



I7RW011A0006-02

1. Generator with regulator assembly	6. Charge indicator light	11. Combination meter
2. I.C. regulator	7. Main switch	12. CAN driver
3. Stator coil	8. Battery	13. IG fuse
4. Diode	9. ECM	14. METER fuse
5. Field coil (rotor coil)	10. BCM	



I5JB0A1A0004-01

1. Pulley	6. Field coil	11. Rear housing	IG: Ignition terminal
2. Pulley nut	7. Rectifier	B: Generator output (Battery terminal)	L: Light terminal
3. Rotor fan	8. Brush	C: Generator cut	
4. Stator coil	9. Regulator	E: Ground	
5. Stator core	10. Front housing	FR: Field duty monitor	

## Diagnostic Information and Procedures

### Battery Inspection

S6RW0C1A04001

#### Common Causes of Failure

A battery is not designed to last indefinitely; however, with proper care, it will provide many years of service. If the battery performs satisfactorily during test but fails to operate properly for no apparent reason, the following are some factors that may point to the cause of trouble:

- Accessories left on overnight or for an extended period without the generator operating.
- Slow average driving speeds for short periods.
- Electrical load exceeding generator output particularly with addition of aftermarket equipment.
- Defects in charging system such as high resistance, slipping drive belt, loose generator output terminal, faulty generator or voltage regulator. Refer to “Generator Symptom Diagnosis”.
- Battery abuse, including failure to keep battery cable terminals clean and tight or loose battery hold down.
- Mechanical problems in electrical system such as shorted or pinched wires.

#### Visual inspection

Check for obvious damage, such as cracked or broken case or cover, that could permit loss of electrolyte. If obvious damage is noted, replace battery. Determine cause of damage and correct as needed.

### Generator Symptom Diagnosis

S6RW0C1A04002

A charging circuit wiring diagram for generator connection is shown in “Generator Description”. To avoid damage, always follow these precautions:

#### **⚠ CAUTION**

- **Do not mistake polarities of “IG” terminal and “L” terminal.**
- **Do not create a short circuit between “IG” and “L” terminals. Always connect these terminals through a light.**
- **Do not connect any load between “L” and “E” terminals.**
- **When connecting charger or booster battery to vehicle battery, refer to “Jump Starting in Case of Emergency”.**

Trouble in charging system will show up as one or more of the following conditions:

- 1) Faulty charge indicator light operation.
- 2) An undercharged battery as evidenced by slow cranking or indicator clear with dark on light yellow dot.
- 3) An overcharged battery as evidenced by excessive spewing of electrolyte from vents.

Condition	Possible cause	Correction / Reference Item
<b>Noisy generator</b>	Loose drive belt	<i>Adjust or replace drive belt.</i>
	Loose drive belt pulley	<i>Check generator.</i>
	Loose mounting bolts	<i>Check mounting condition.</i>
	Worn or dirty bearings	<i>Check generator.</i>
	Defective diode or stator	<i>Check generator.</i>
<b>Charge indicator light does not light with ignition ON and engine off</b>	Fuse blown	<i>Check fuse.</i>
	Indicator light (LED) faulty	<i>Check BCM, combination meter and/or CAN communication line.</i>
	Wiring connection loose	<i>Tighten loose connection.</i>
	IC regulator faulty	<i>Check generator.</i>
	Poor contact between brush and slip ring	<i>Repair or replace.</i>
<b>Charge indicator light does not go out with engine running Battery requires frequent recharging</b>	Drive belt loose or worn	<i>Adjust or replace drive belt.</i>
	IC regulator or generator faulty	<i>Check charging system.</i>
	Wiring faulty	<i>Repair wiring.</i>

## 1J-5 Charging System:

### Generator Test (Undercharged Battery Check)

S6RW0C1A04003

This condition, as evidenced by slow cranking or indicator clear with dark or light yellow dot can be caused by one or more of the following conditions even though indicator light may be operating normal. The following procedure also applies to cars with voltmeter and ammeter.

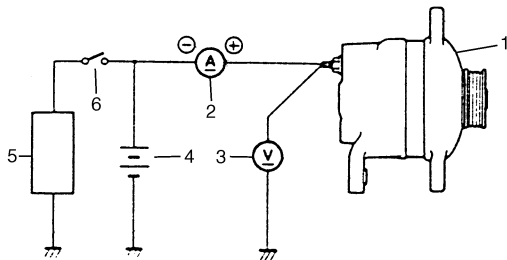
- 1) Make sure that undercharged condition has not been caused by accessories left on for extended period of time.
- 2) Check drive belt for proper tension.
- 3) If battery defect is suspected, refer to "Battery Description".
- 4) Inspect wiring for defects. Check all connections for tightness and cleanliness, battery cable connections at battery, starting motor, ignition ground cable and no "C" terminal circuit at ground.
- 5) Connect switch (6), load (5), battery (4), voltmeter (3) and ammeter (2) to generator (1) as shown in figure.

**Voltmeter: Set between generator "B" terminal and ground.**

**Ammeter: Set between generator "B" terminal and battery (+) terminal.**

#### NOTE

**Use fully charged battery.**



IYSQ011A0007-01

- 6) Measure current and voltage.

#### No-Load Check

- 1) Run engine from idling up to 2000 rpm and read meters.

#### NOTE

**Turn off switches of all accessories (wiper, heater etc.).**

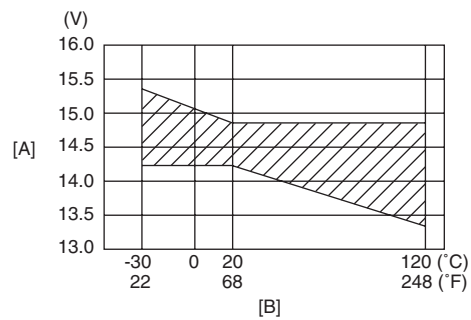
#### Specification for undercharged battery (No-load check)

**Current: 10 A**

**Voltage: 14.2 – 14.8 V (at 20 °C, 68 °F)**

#### NOTE

**Consideration should be taken that voltage will differ somewhat with regulator case temperature as shown in figure.**

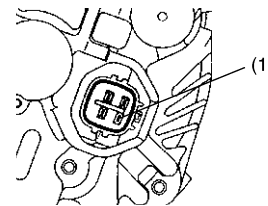


I6RS0B1A1002-01

[A]: Regulated voltage (V)

[B]: Heat sink temperature (°C)

- 2) Using service wire, ground "C" terminal (1) of generator.



I5JB0A1A0011-01

- 3) Measure voltage between "B" terminal of generator and body ground.

**Voltage: 12.5 – 13.1 V (at 20 °C, 68 °F)**

- **If voltage is higher than standard value**  
If voltage is higher than standard value, check ground of brushes.  
If brushes are not grounded, replace IC regulator.
- **If voltage is lower than standard value**, proceed to the following check.

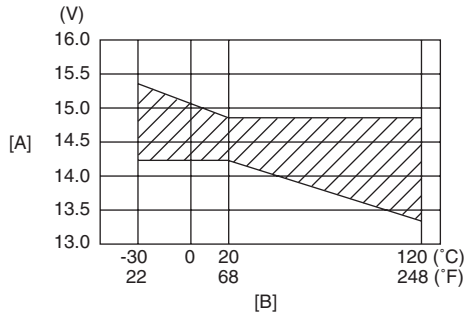
#### Load Check

- 1) Run engine at 2000 rpm and turn on head light and heater motor.
- 2) Measure current and if it is less than 30 A repair or replace generator.

## Generator Test (Overcharged Battery Check)

S6RW0C1A04004

- 1) To determine battery condition, refer to "Battery Description".
- 2) If obvious overcharge condition exists as evidenced by excessive spewing of electrolyte, measure generator "B" terminal voltage at engine 2000 rpm.



I6RS0B1A1002-01

[A]: Regulated voltage (V)
[B]: Heat sink temperature (°C)

- 3) If measured voltage is higher than upper limit value, proceed to disassemble generator.
- 4) Check ground of brushes. If brushes are not grounded, replace IC regulator. Then check field coil for grounds and shorts, referring to "Generator Inspection".

## Repair Instructions

### Jump Starting in Case of Emergency

S6RW0C1A06001

#### With Auxiliary (Booster) Battery

#### ⚠ CAUTION

If vehicle is manual transmission model and has a catalytic converter, do not push or tow it to start. Damage to its emission system and/or to other parts may result.

Both booster and discharged battery should be treated carefully when using jumper cables. Follow the procedure outlined as follows, being careful not to cause sparks.

#### ⚠ WARNING

- Departure from these conditions or procedure described as follows could result in:
  - a. Serious personal injury (particularly to eyes) or property damage from such causes as battery explosion, battery acid, or electrical burns.
  - b. Damage to electronic components of either vehicle.
- Never expose battery to open flame or electric spark. Batteries generate gas which is flammable and explosive.
- Remove rings, watches, and other jewelry. Wear approved eye protection.

- Do not allow battery fluid to contact eyes, skin, fabrics, or painted surface as fluid is a corrosive acid. Flush any contacted area with water immediately and thoroughly.
- Be careful so that metal tools or jumper cables do not contact positive battery terminal (or metal in contact with it) and any other metal on vehicle, because a short circuit could occur.
- Batteries should always be kept out of reach of children.

- 1) Set parking brake and place automatic transmission in PARK (NEUTRAL on manual transmission).
- 2) Turn OFF ignition switch, turn OFF lights and all other electrical loads.
- 3) Check built-in indicator (if equipped). If it is clear or light yellow, replace the battery.
- 4) Attach end of one jumper cable to positive terminal of booster battery and the other end of the same cable to positive terminal of discharged battery. (Use 12-volt battery only to jump start engine).
- 5) Attach one end of the remaining negative cable to negative terminal of booster battery, and the other end to a solid engine ground (such as exhaust manifold) at least 45 cm (18 in.) away from battery of vehicle being started.

#### ⚠ WARNING

Do not connect negative cable directly to negative terminal of dead battery.

## 1J-7 Charging System:

- 6) Start engine of vehicle with booster battery and turn off electrical accessories. Then start engine of the vehicle with discharged battery.
- 7) Disconnect jumper cable in the exact reverse order.

### With Charging Equipment

#### **⚠ CAUTION**

**When jump starting engine with charging equipment, be sure equipment used is 12-volt and negative ground. Do not use 24-volt charging equipment. Using such equipment can cause serious damage to electrical system or electronic parts.**

### Battery Dismounting and Remounting

S6RW0C1A06002

#### **⚠ WARNING**

**When handling battery, following safety precautions should be followed:**

- **Hydrogen gas is produced by battery. A flame or spark near battery may cause the gas to ignite.**
- **Battery fluid is highly acidic. Avoid spilling on clothing or other fabric. Any spilled electrolyte should be flushed with large quantity of water and cleaned immediately.**

### Dismounting

- 1) Disconnect negative cable.
- 2) Disconnect positive cable.
- 3) Remove retainer.
- 4) Remove battery.

### Handling

When handling battery, the following safety precautions should be followed:

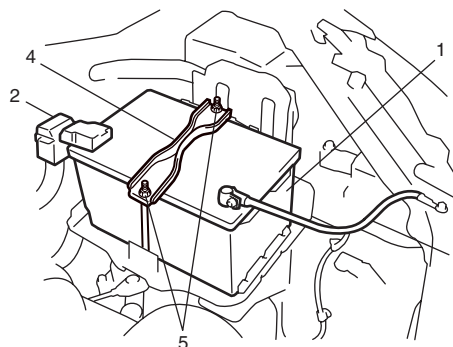
- Hydrogen gas is produced by battery. A flame or spark near battery may cause the gas to ignite.
- Battery fluid is highly acidic. Avoid spilling on clothing or other fabric. Any spilled electrolyte should be flushed with large quantity of water and cleaned immediately.

### Remounting

- 1) Reverse removal procedure.
- 2) Tighten battery cables securely.

### NOTE

**Check to be sure that ground cable has enough clearance to hood panel by terminal.**



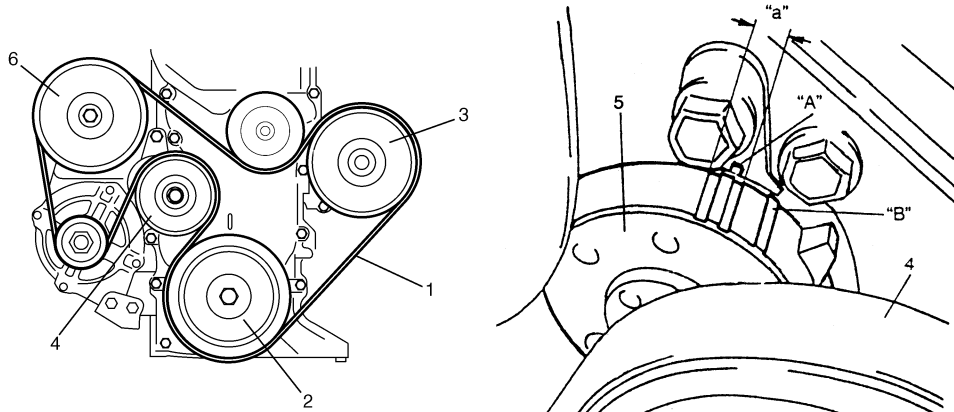
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1. Battery	4. Retainer
2. Positive cable	5. Nut
3. Negative cable	

## Water Pump and Generator Drive Belt On-Vehicle Inspection

S6RW0C1A06003

- Inspect belt for cracks, cuts, deformation, wear and cleanliness. If any of these conditions are found, replace belt, referring to "Water Pump and Generator Drive Belt Removal and Installation".
- Check to make sure that tension indicators are as follows in the figure by using mirror.
  - a. If the tension indicator "B" is found to the left of the indicator "A", replace the generator belt.
  - b. If new generator belt has been installed, indicator "A" should be within "a" of the figure. If it isn't, it means that belt is not installed properly. Reinstall it properly.



I5JB0A1A0010-01

1. Water pump and generator drive belt	3. Water pump pulley	5. Tensioner
2. Crankshaft pulley	4. Tension pulley	6. Power steering pump pulley

## Water Pump and Generator Drive Belt Removal and Installation

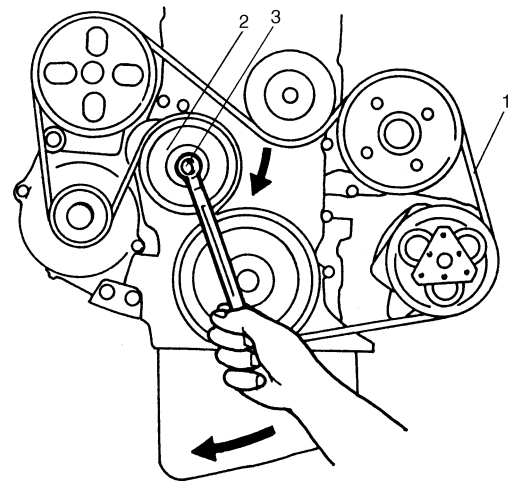
S6RW0C1A06004

### Removal

#### **⚠ WARNING**

**Disconnect negative (-) cable at battery before removing and installing generator belt.**

- 1) Hoist vehicle.
- 2) Remove right side engine under cover.
- 3) Loosen tensioner by turning the tensioner pulley (2) clockwise.
- 4) While holding the tensioner and belt loose, remove generator belt (1).



I3TR011A4001-01

3. Tensioner pulley bolt

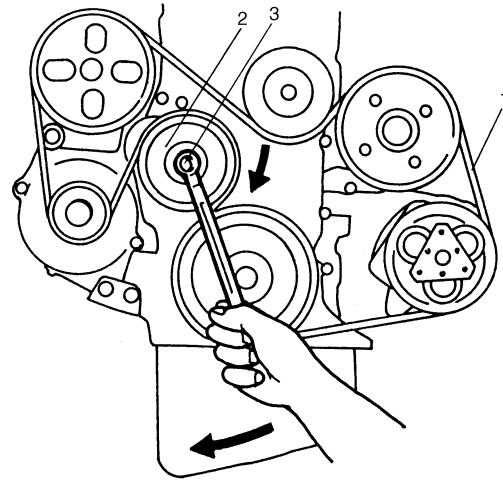
## 1J-9 Charging System:

### Installation

- 1) Loosen tensioner by turning the tensioner pulley (2) clockwise.
- 2) While holding the tensioner, install generator belt (1).
- 3) Install right side engine under cover.

### NOTE

- Make sure that the belt fits each pulley's groove properly.
- After installing generator belt, make sure that tension indicator is within standard range referring to "Water Pump and Generator Drive Belt On-Vehicle Inspection".

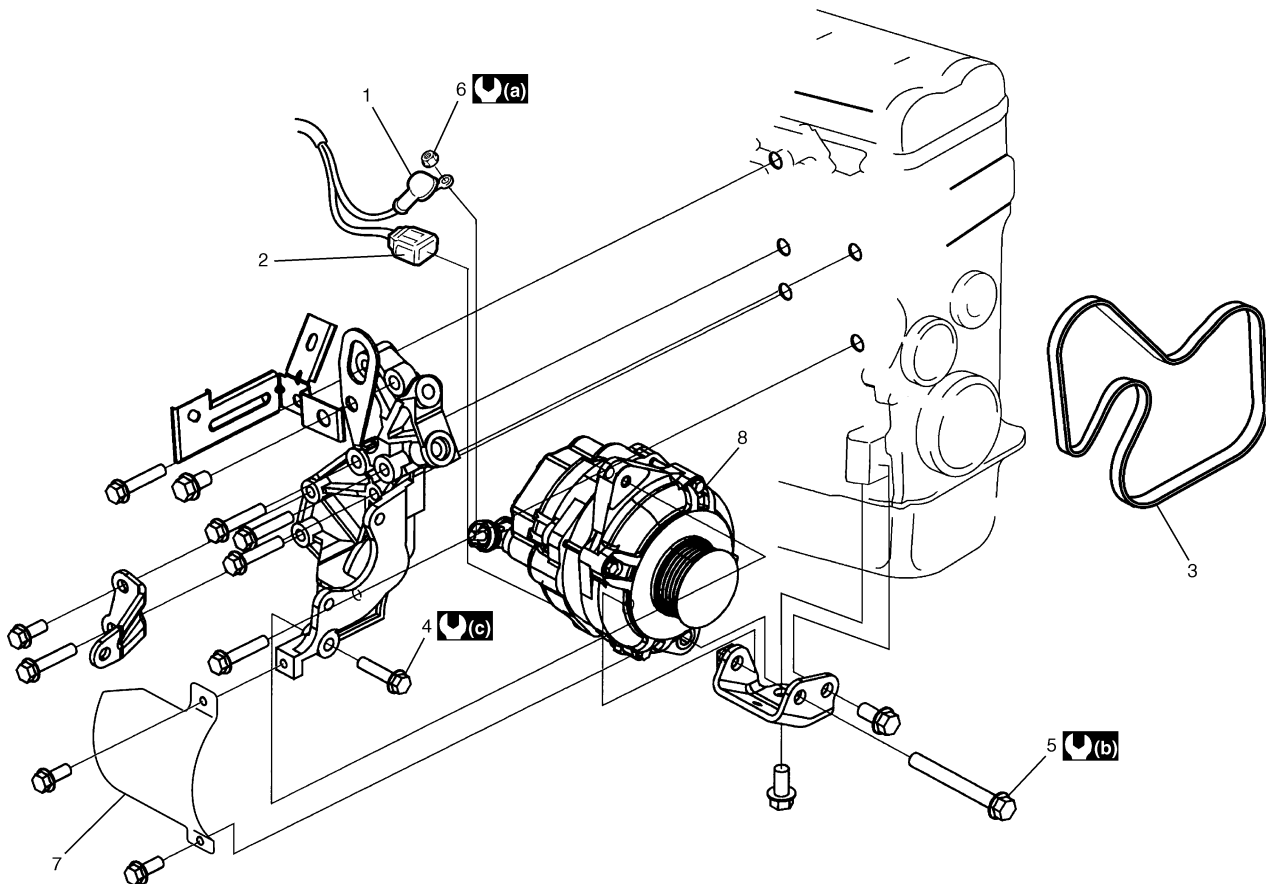


I3TR011A4001-01

3. Tensioner pulley bolt

### Generator Unit Components

S6RW0C1A06005



I7RW011A0002-01

1. "B" terminal wire	5. Generator pivot bolt	Ⓐ : 5.0 N·m (0.5 kgf-m, 4.0 lb-ft)
2. coupler	6. "B" terminal nut	Ⓑ : 52.5 N·m (5.25 kgf-m, 38.0 lb-ft)
3. Water pump and generator drive belt	7. Generator cover	Ⓒ : 25 N·m (2.5 kgf-m, 18.5 lb-ft)
4. Generator mounting bolt	8. Generator	

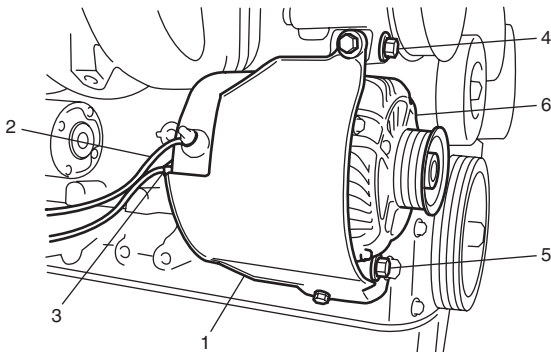


## Generator Dismounting and Remounting

S6RW0C1A06006

### Dismounting

- 1) Disconnect negative (-) cable at battery.
- 2) Remove water pump and generator drive belt referring to "Water Pump and Generator Drive Belt Removal and Installation".
- 3) Remove air cleaner case referring to "Air Cleaner Assembly Removal and Installation in Section 1D".
- 4) Remove intake manifold referring to "Intake Manifold Removal and Installation in Section 1D".
- 5) Remove generator cover (1).
- 6) Disconnect "B" terminal wire (2) and coupler (3) from generator.
- 7) Remove generator mounting bolt (4) and generator pivot bolt (5) from generator.
- 8) Remove generator (6) from engine.



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### Remounting

Reverse dismounting procedure, noting the following.

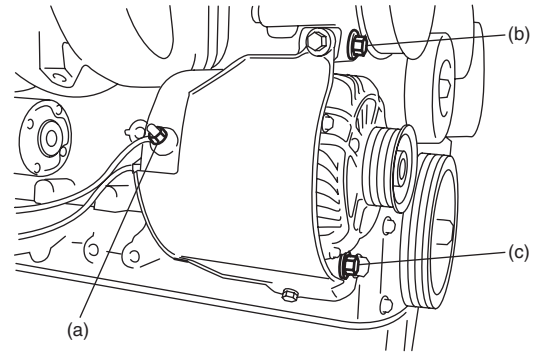
- Tighten each bolts and nuts to specified torque.

### Tightening torque

"B" terminal nut (a): 5 N·m (0.5 kgf-m, 4.0 lb-ft)

Generator mounting bolt (b): 25 N·m (2.5 kgf-m, 18.5 lb-ft)

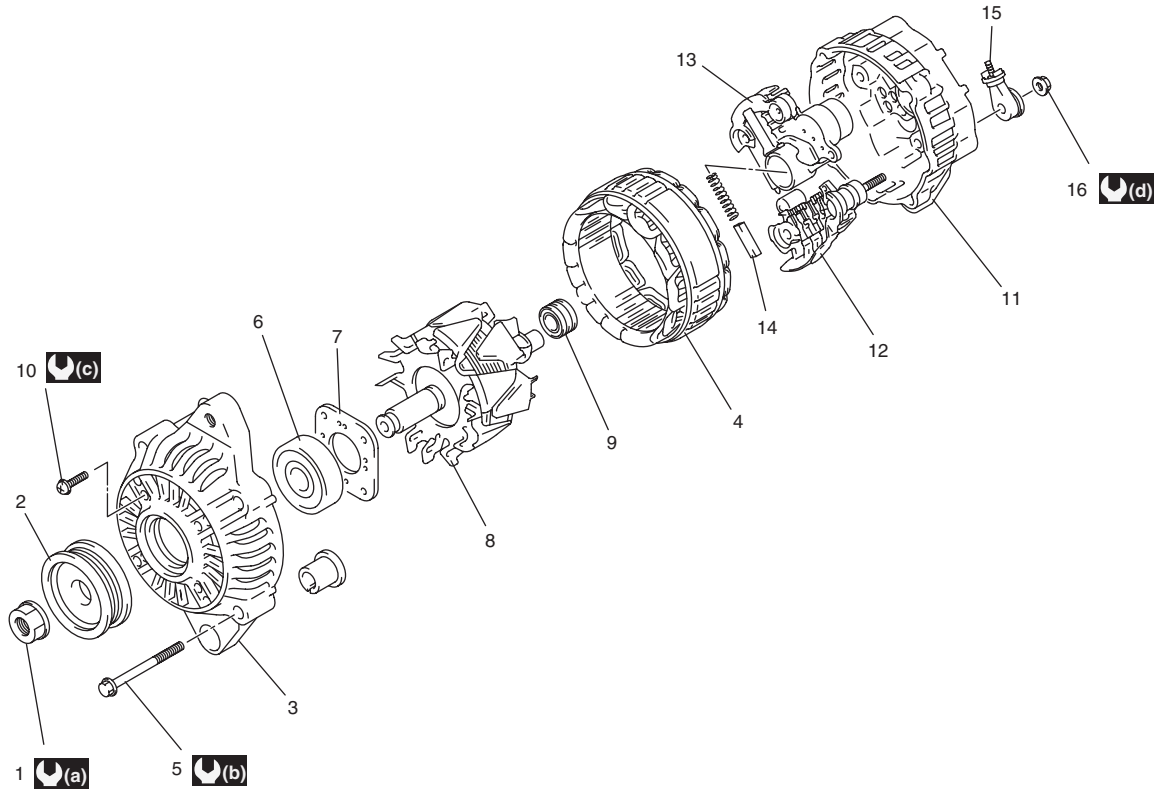
Generator pivot bolt (c): 52.5 N·m (5.25 kgf-m, 38.0 lb-ft)



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Generator Components

S6RW0C1A06007



I4RS0B1A0007-01

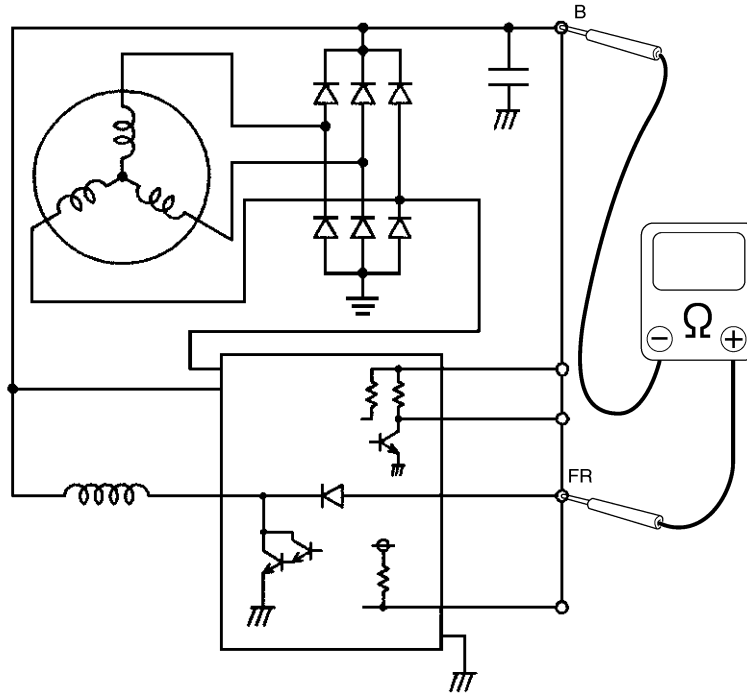
1. Pulley nut	6. Drive end bearing	11. Rear housing	16. "B" terminal nut
2. Pulley	7. Bearing retainer	12. Rectifier	(a) : 118 N·m (11.8 kgf-m, 85.5 lb-ft)
3. Front housing	8. Rotor	13. Regulator	(b) : 4.5 N·m (0.45 kgf-m, 3.5 lb-ft)
4. Stator	9. Rear end bearing	14. Brush	(c) : 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)
5. Frame bolt	10. Retainer screw	15. "B" terminal	(d) : 5.0 N·m (0.5 kgf-m, 4.0 lb-ft)

## Generator Inspection

S6RW0C1A06008

### Rotor

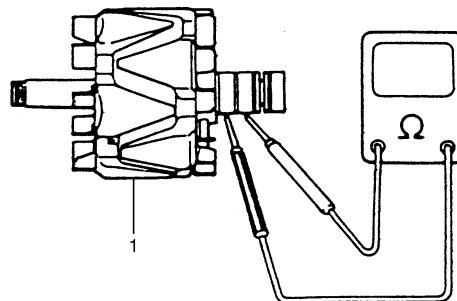
- Using ohmmeter, connect positive terminal to "FR" terminal and connect negative terminal to "B" terminal of generator, check that continuity between "B" terminal and "FR" terminal. If there is no continuity, replace rotor or regulator.



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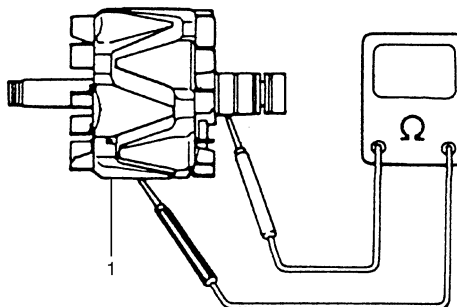
- Using ohmmeter, check for continuity between slip rings of rotor. If there is no continuity, replace rotor (1).

**Resistance between slip rings of rotor**  
**1.7 – 2.0  $\Omega$**



IYSQ011A0035-01

- Using ohmmeter, check that there is no continuity between slip ring and rotor core. If there is continuity, replace rotor (1).

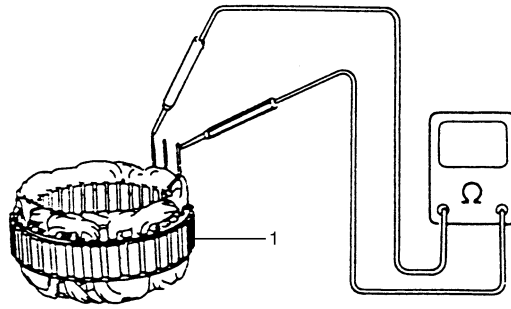


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- Check slip rings for roughness or scoring. If rough or scored, replace rotor.

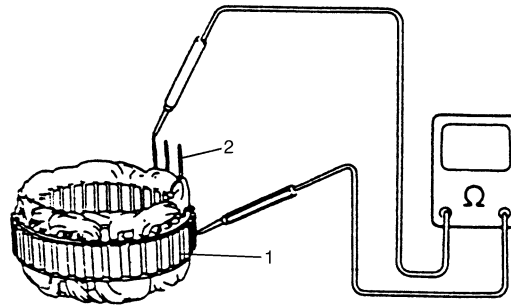
**Stator**

- Using ohmmeter, check all leads for continuity. If there is no continuity, replace stator (1).



IYSQ011A0037-01

- Using ohmmeter, check that there is no continuity between coil leads (2) and stator core (1). If there is continuity, replace stator.



IYSQ011A0038-01

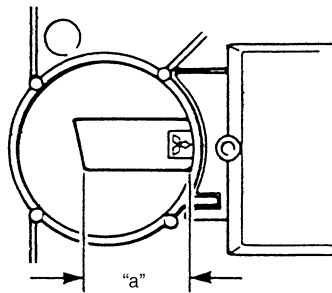
**Brush and brush holder**

Check each brush for wear by measuring its length. If brush is found worn down to service limit, replace brush.

**Brush length "a"**

**Standard: 16 mm (0.63 in.)**

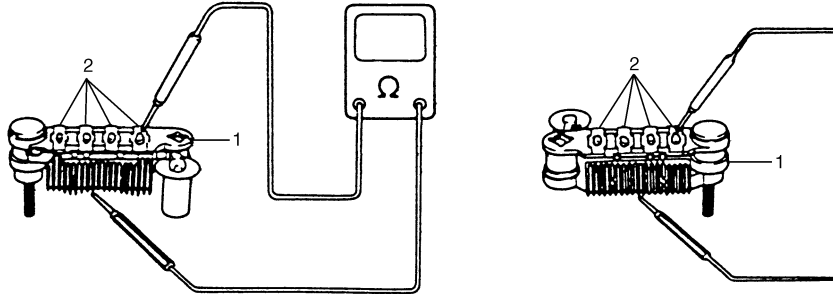
**Limit: 5 mm (0.20 in.)**



IYSQ011A0039-01

## Rectifier

- 1) Using ohmmeter, check continuity between each of upper and lower rectifier bodies and each diode lead (2). Check both directions by reversing probes of ohmmeter and there should be only one-way continuity in each case. If check result is not satisfactory, replace rectifier (1).
- 2) In the same manner as described in above Step 1), check that there is only one-way continuity between both leads of diode trio.



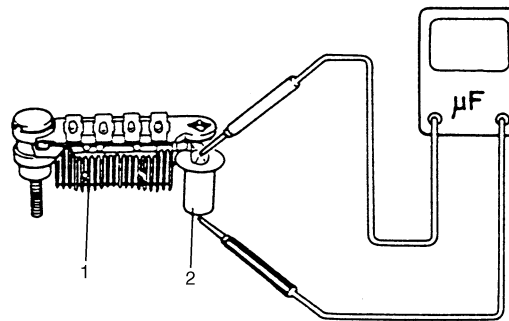
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## Condenser

Check condenser capacity.

### Condenser capacity

0.5  $\mu\text{F}$



IYSQ011A0041-01

1. Rectifier
2. Condenser

## Specifications

### Charging System Specifications

S6RW0C1A07001

#### Battery

##### Battery

: **55B24R (42.5AH/5HR) 12V**

Battery type	55B24R
Rated Capacity AH/5HR, 12 Volts	42.5
Electrolyte L (US/Imp. pt)	2.8 (5.92/4.93)
Electrolyte S.G.	1.28 when fully charged at 20 °C (68 °F)

#### Generator

Type	80 A type
Rated voltage	12 V
Nominal output	80 A
Permissible max. speed	18000 r/min (rpm)
No-load speed	1200 r/min (rpm)
Setting voltage	14.2 to 14.8 V
Permissible ambient temperature	-30 to 100 °C (-22 to 212 °F)
Polarity	Negative ground
Rotation	Clockwise viewed from pulley side

### Tightening Torque Specifications

S6RW0C1A07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
"B" terminal nut	5	0.5	4.0	☞
Generator mounting bolt	25	2.5	18.5	☞
Generator pivot bolt	52.5	5.25	38.0	☞

#### NOTE

The specified tightening torque is also described in the following.

“Generator Unit Components”

“Generator Components”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A”.