ISSUE EMD-GS0572

Robin

Generator

Model

RGD3700
RGD5000

Technical Data & Overhaul Instructions

SERVICE MANUAL

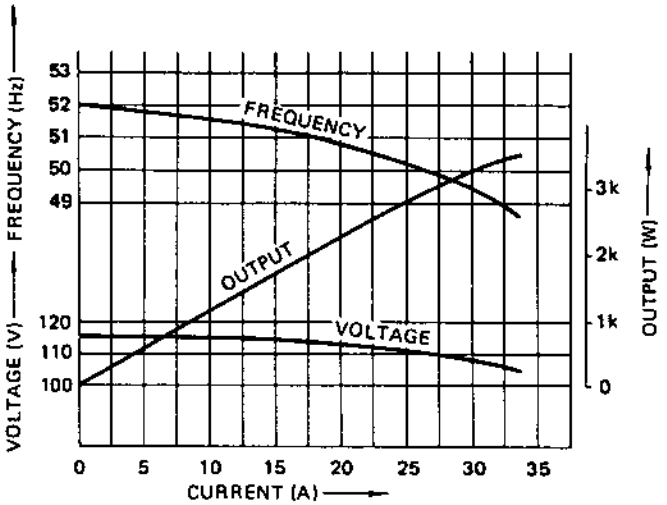
INDEX

CONTENTS

Model				RGD3700				RGD5000			
ALTERNATOR	Type			Brushless, Revolving Field, Self-exciting, 2-pole, Single Phase							
	AC	Frequency		50Hz		60Hz		50Hz		60Hz	
		Maximum Output		3500W		3700W		4800W		5000W	
		Rated Output		3000W		3300W		4300W		4500W	
		Voltage	Rated Current	110V	27.3A	110V	30.0A	110V	39.1A	110V	40.9A
				220V	13.6A	120V	27.5A	220V	19.5A	120V	37.5A
				240V	12.5A	220V	15.0A	240V	17.9A	220V	20.5A
				110V/220V	27.3A/13.6A	110V/220V	30.0A/15.0A	110V/220V	39.1A/19.5A	110V/220V	40.9A/20.5A
				—	—	120V/240V	27.5A/13.8A	—	—	120V/240V	37.5A/18.8A
		Power Factor		1.0							
	DC Output			12V-8.3A (100W)							
	Voltage Regulator			Condenser Type							
	Voltage Regulation			Within 10%							
ENGINE	Type			Air-Cooled 4-Cycle Diesel Engine							
	Model			Robin DY30D				Robin DY41D			
	Displacement			299 cc (18.25 cu. in.)				412 cc (25.14 cu. in.)			
	Maximum Output			6.0 PS/3000 rpm		6.5 PS/3600 rpm		8.0 PS/3000 rpm		8.5 PS/3600 rpm	
	Fuel			Automotive type, Diesel Fuel							
	Fuel Tank Capacity			14 liters (3.6 U.S. gal.)				16 liters (4.2 U.S. gal.)			
	Fuel Consumption Ratio			50Hz: 1.2 liters/hour 60Hz: 1.5 liters/hour				50Hz: 1.7 liters/hour 60Hz: 2.0 liters/hour			
	Oil Capacity			1.0 liter (2.1 U.S. pints)				1.1 liters (2.3 U.S. pints)			
	Starting System			Recoil starter and Electric starter							
Dimensions L x W x H				673 x 500 x 514 mm (26.5 x 19.7 x 20.2 in.)				673 x 500 x 542 mm (26.5 x 19.7 x 21.3 in.)			
Dry Weight				85 kg (186 lbs.)				99 kg (218 lbs.)			

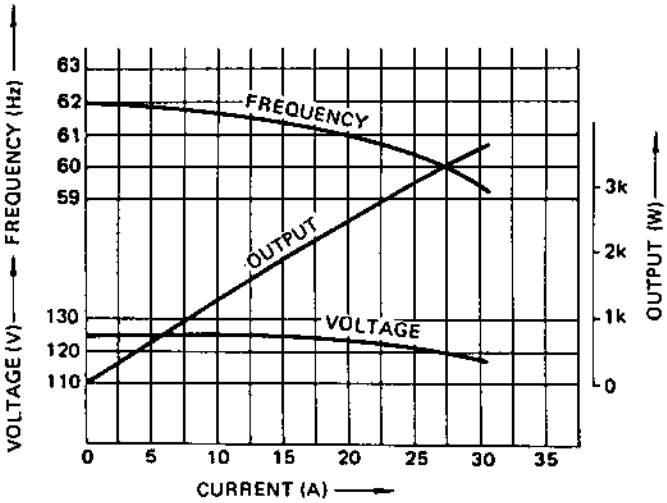
2. PERFORMANCE CURVES

2-1 MODEL RGD3700



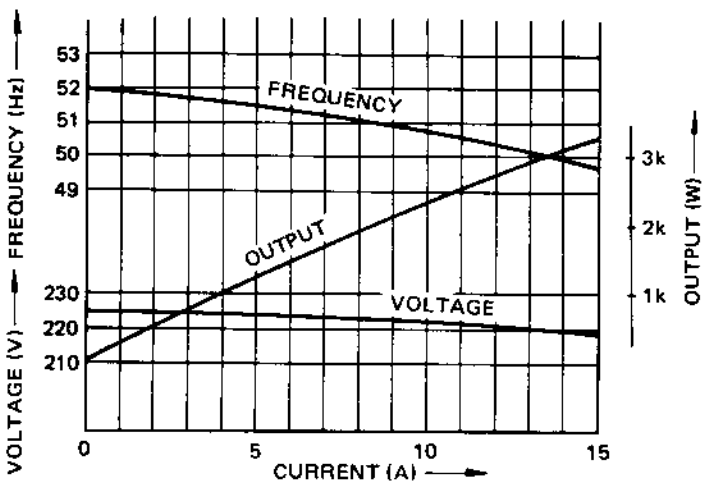
RGD3700

Output Max.	3500W
Rated	3000W
Frequency	50Hz
Voltage	110V



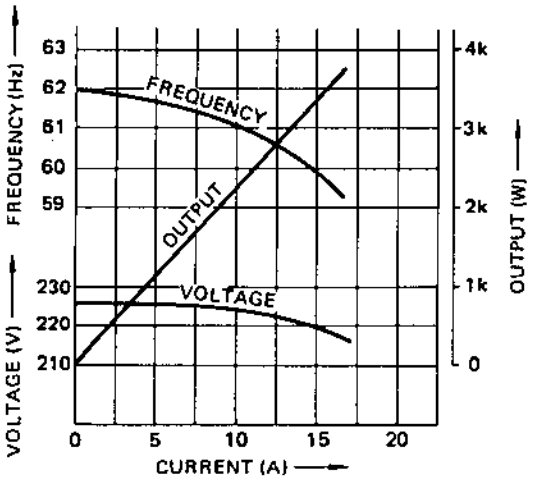
RGD3700

Output Max.	3700W
Rated	3300W
Frequency	60Hz
Voltage	120V



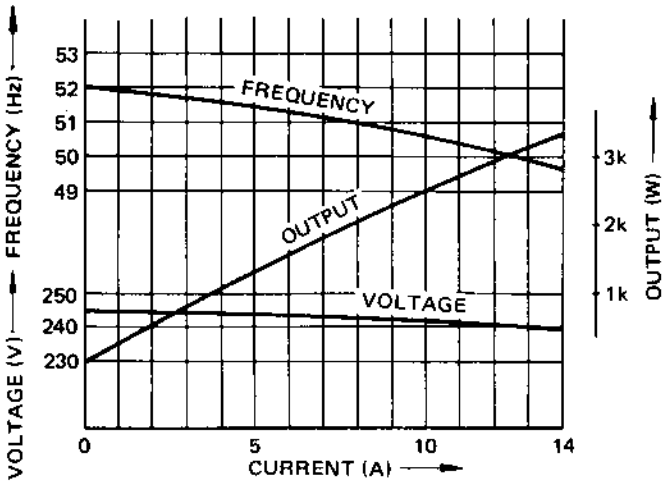
RGD3700

Output Max.	3500W
Rated	3000W
Frequency	50Hz
Voltage	220V



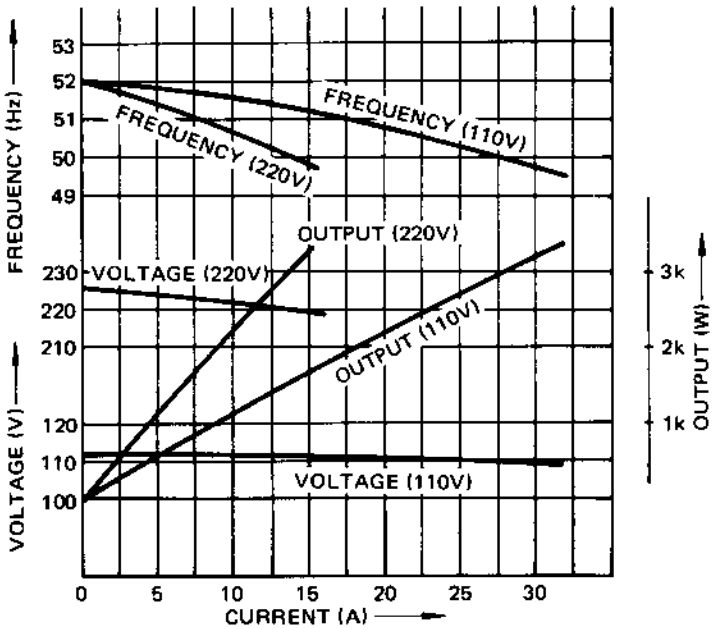
RGD3700

Output Max.	3700W
Rated	3300W
Frequency	60Hz
Voltage	220V



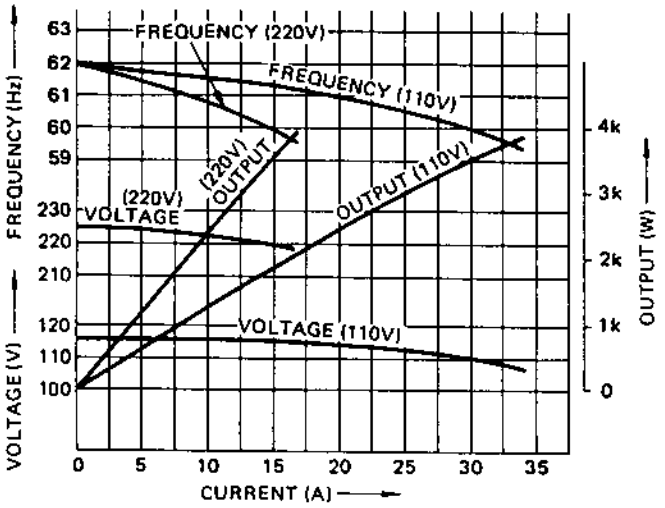
RGD3700

Output Max.	3500W
Rated	3000W
Frequency	50Hz
Voltage	240V



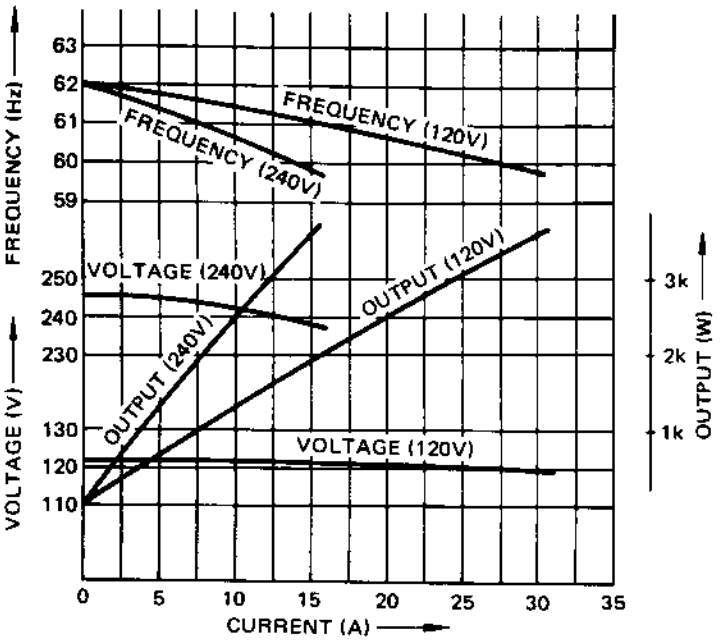
RGD3700

Output Max.	3500W
Rated	3000W
Frequency	50Hz
Voltage	110V/220V



RGD3700

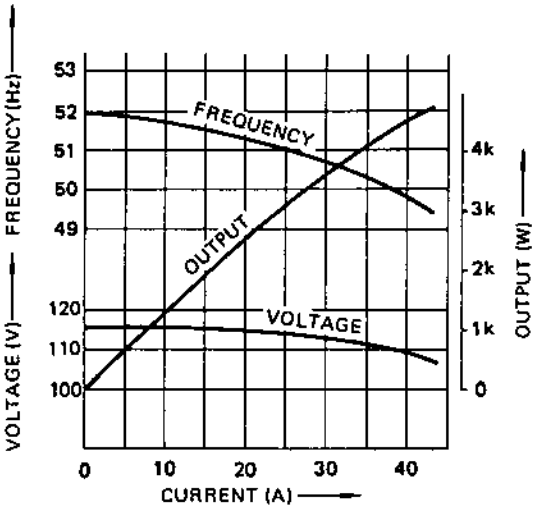
Output Max.	3700W
Rated	3300W
Frequency	60Hz
Voltage	110V/220V



RGD3700

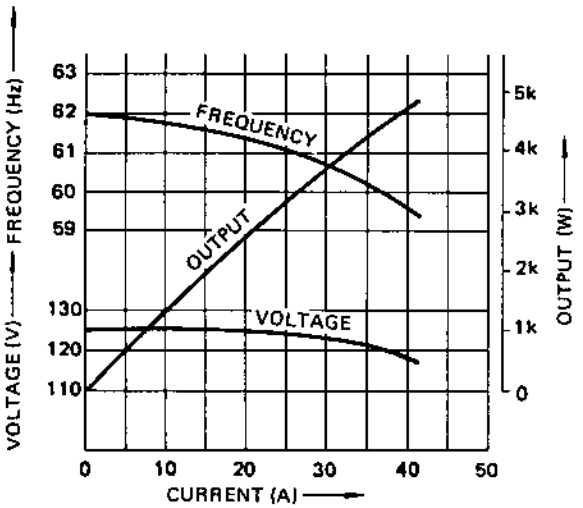
Output Max.	3700W
Rated	3300W
Frequency	60Hz
Voltage	120V/240V

2-2 MODEL RGD5000



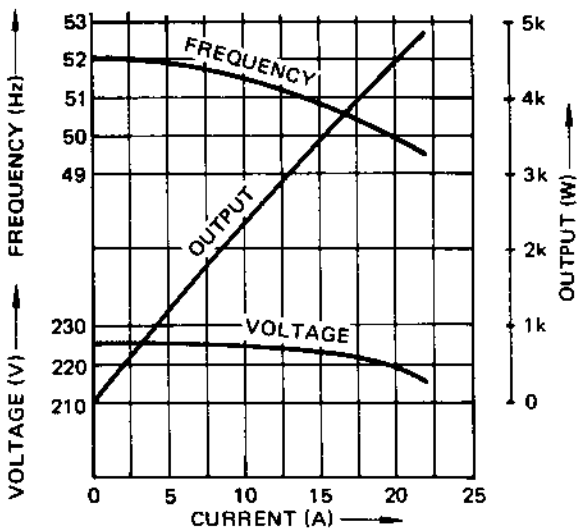
RGD5000

Output Max.	4800W
Rated	4300W
Frequency	50Hz
Voltage	110V



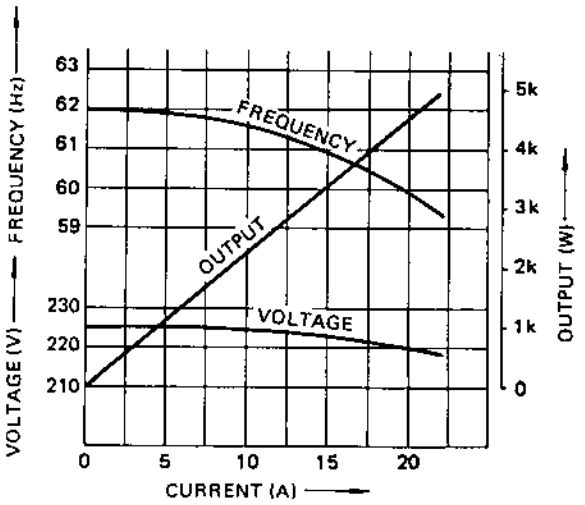
RGD5000

Output Max.	5000W
Rated	4500W
Frequency	60Hz
Voltage	120V



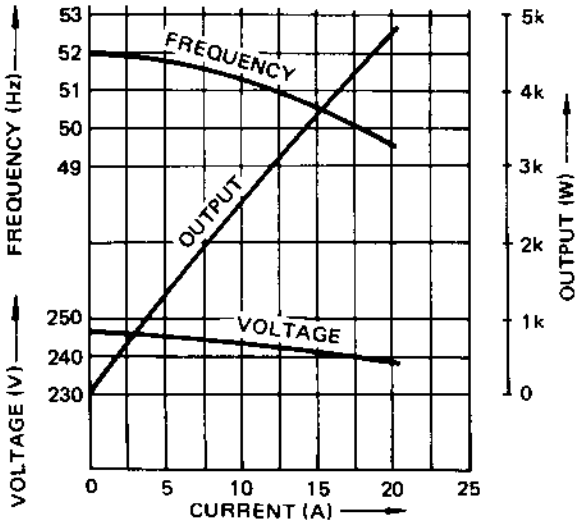
RGD5000

Output Max.	4800W
Rated	4300W
Frequency	50Hz
Voltage	220V



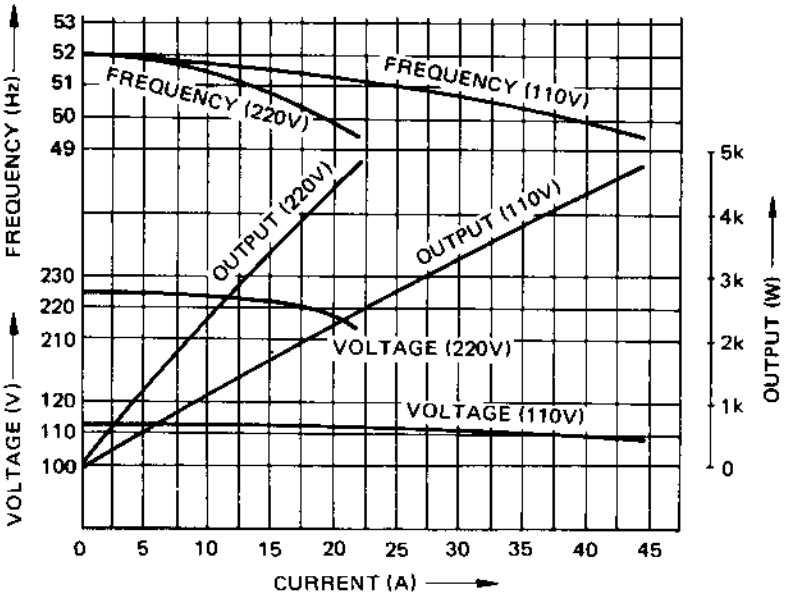
RGD5000

Output Max.	5000W
Rated	4500W
Frequency	60Hz
Voltage	220V



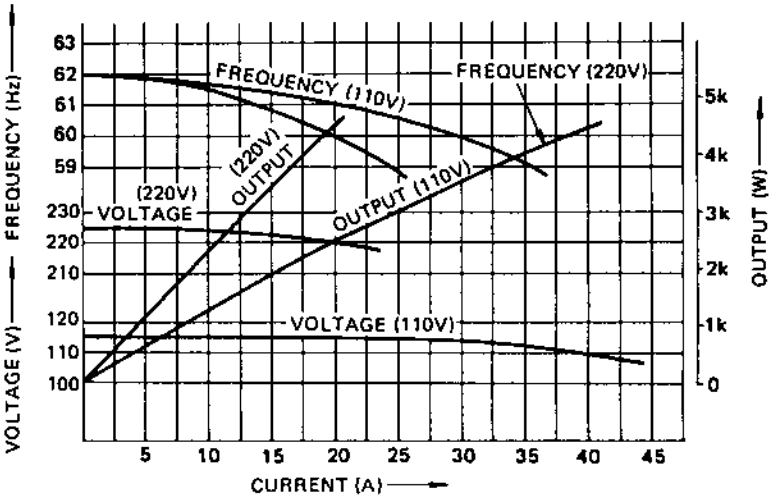
RGD5000

Output Max.	4800W
Rated	4300W
Frequency	50Hz
Voltage	240V



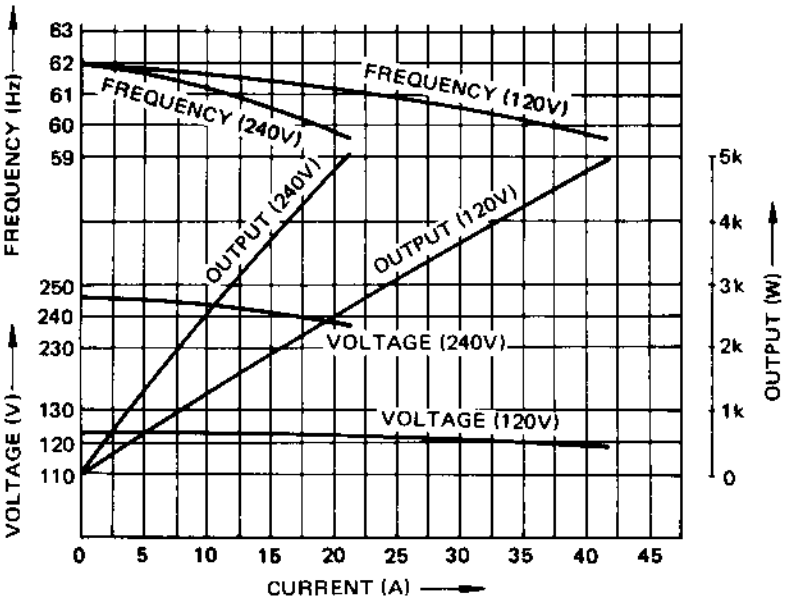
RDG5000

Output Max.	4800W
Rated	4300W
Frequency	50Hz
Voltage	110V/220V



RGD5000

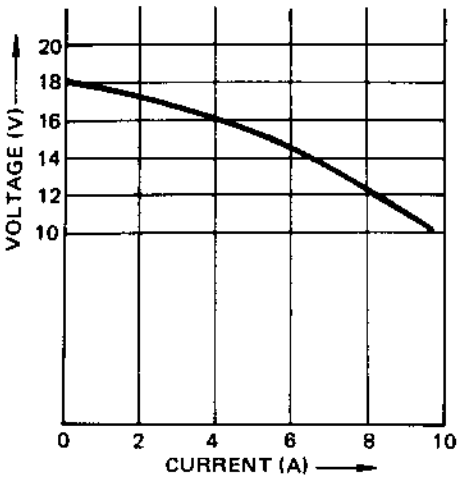
Output Max.	5000W
Rated	4500W
Frequency	60Hz
Voltage	110V/120V



RGD5000

Output Max.	5000W
Rated	4500W
Frequency	60Hz
Voltage	120V/240V

2-3 DC OUTPUT (RGD3700, RGD5000)



DC Voltage	12V
DC Ampere	8.3A
DC Output	100W

The voltage curve shown in the left indicates the characteristic of DC output when charging a battery. The voltage may be decreased by 20% when the resistance load is applied.

NOTE: It is possible to use both DC and AC outputs simultaneously up to the rated output in total.

3. FEATURES

3-1 BRUSHLESS ALTERNATOR

Newly developed brushless alternator eliminates troublesome brush maintenance.

3-2 EASY STARTING

Light pull recoil starter accompanied with automatic decompression system makes the new RGD series generators even easier in starting than gasoline engine generators.

3-3 QUIET OPERATION

The new RGD series generator provides quiet operation by means of:

- The superb design of intake-exhaust system.
- Direct injection combustion system.
- A large super silent muffler.
- An efficient low noise air cleaner.

3-4 ECONOMICAL PERFORMANCE

On top of well known diesel economy, the air-cooled Robin diesel engine features direct fuel injection and special design refinements for extra fuel efficiency.

3-5 OIL SENSOR

The OIL SENSOR automatically shuts the engine off whenever the oil level falls down below a safe level preventing engine seizure.

3-6 COMPACT, LIGHT WEIGHT

The combination of newly developed brushless alternator and air-cooled single cylinder Robin diesel engine enables the new RGD series generators to be very compact in size and light in weight.

3-7 RELIABLE PERFORMANCE WITH MINIMAL MAINTENANCE

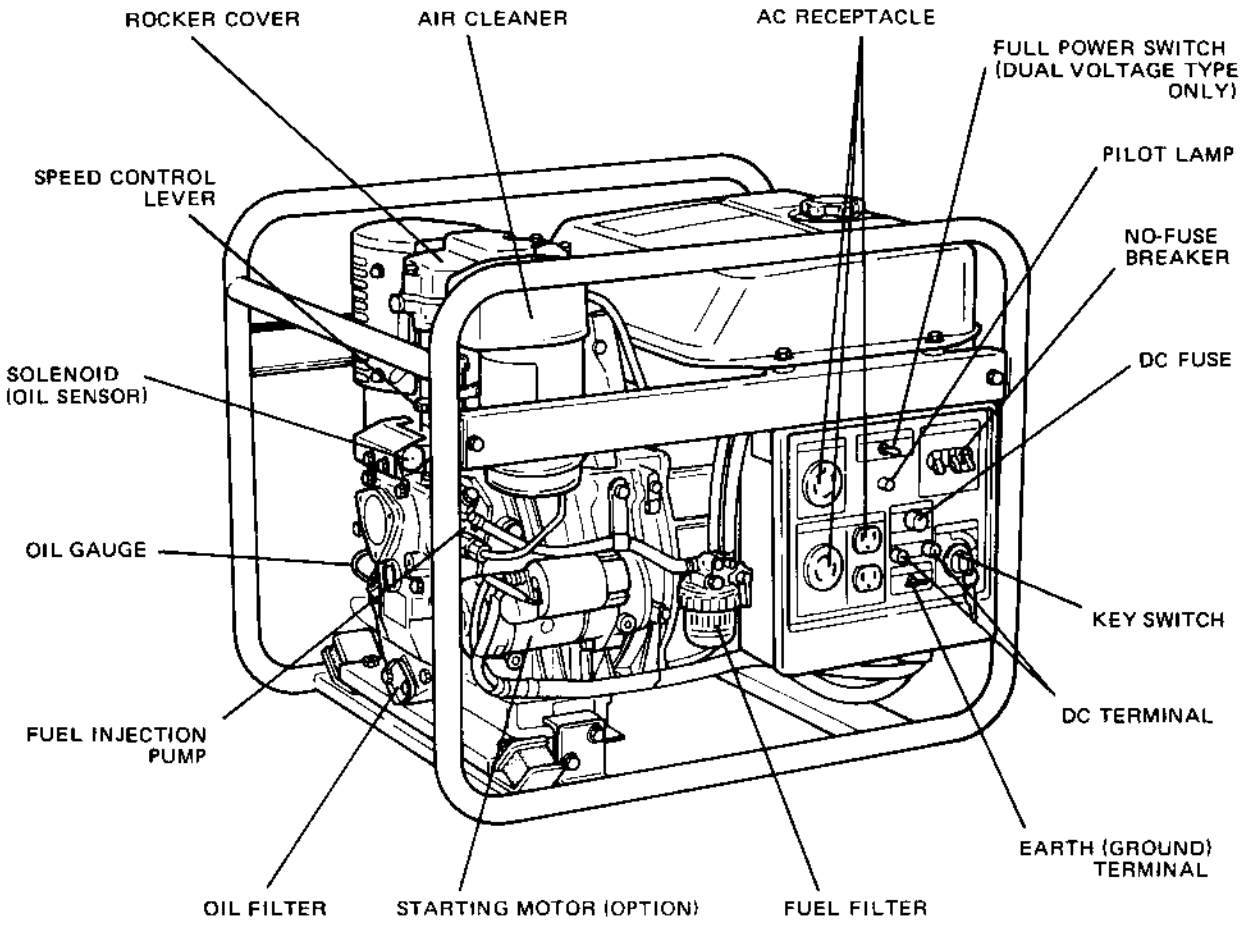
- A brushless alternator eliminates troublesome brush maintenance.
- A drip-proof alternator design.
- A trouble free condenser voltage regulator.
- A fuseless circuit breaker.
- A dust-proof oil-bath air cleaner.
- The OIL SENSOR automatically shuts the engine off whenever the oil level falls down below a safe level preventing engine seizure.

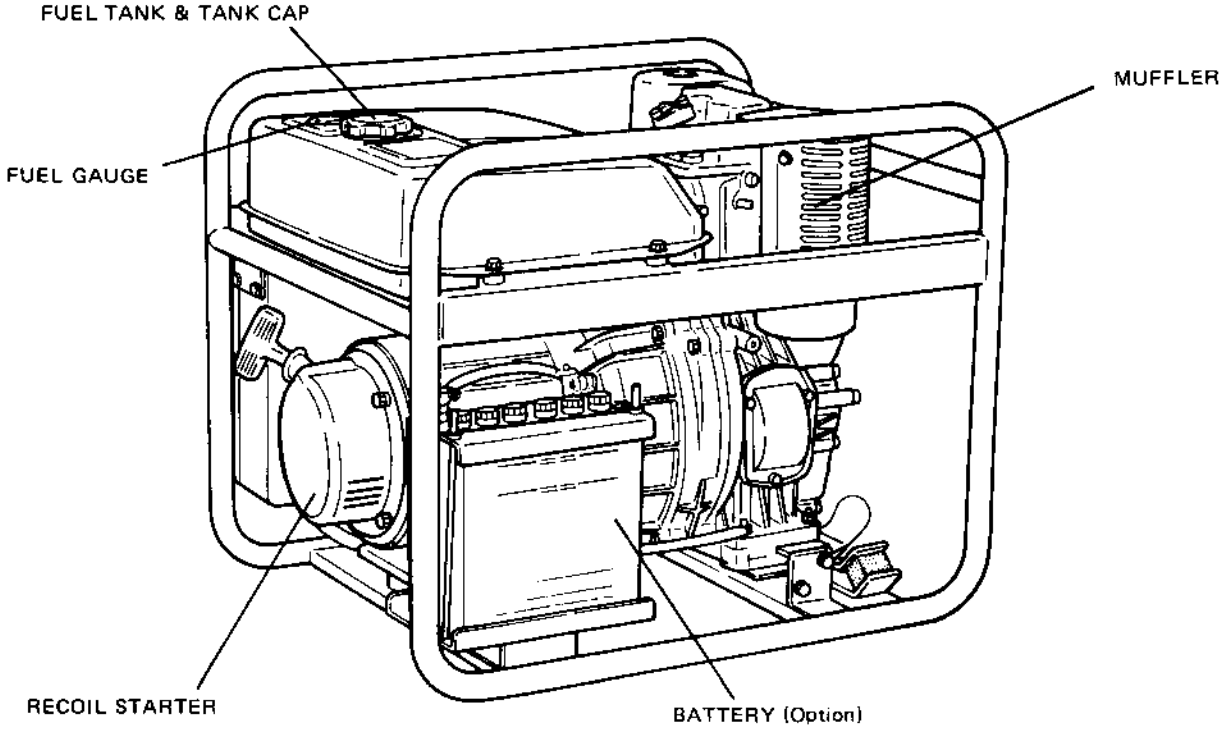
3-8 LONG-LIFE DURABILITY

- Compact and smooth running air-cooled Robin diesel engine lasts much longer than the gasoline engine of the same size.
- Trouble-free brushless alternator with condenser type voltage regulator works all the year round without any maintenace work.

4. GENERAL DESCRIPTION OF THE GENERATOR

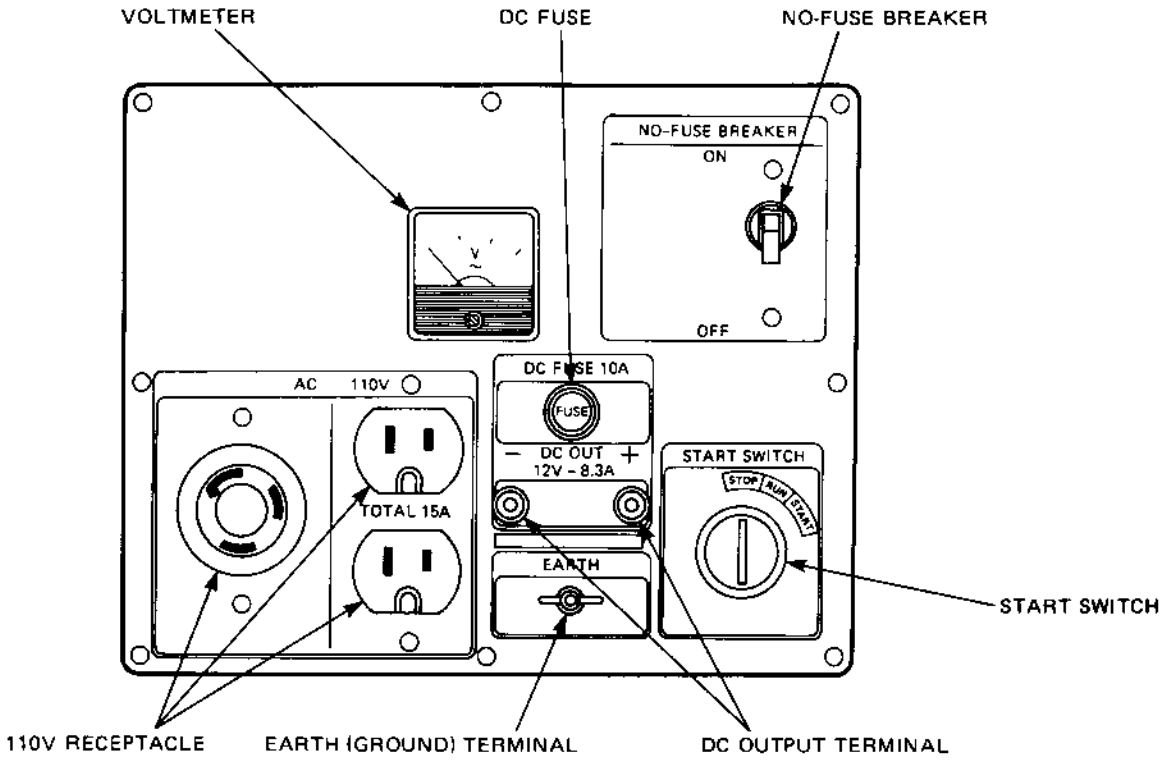
4-1 EXTERNAL VIEW of GENERATOR



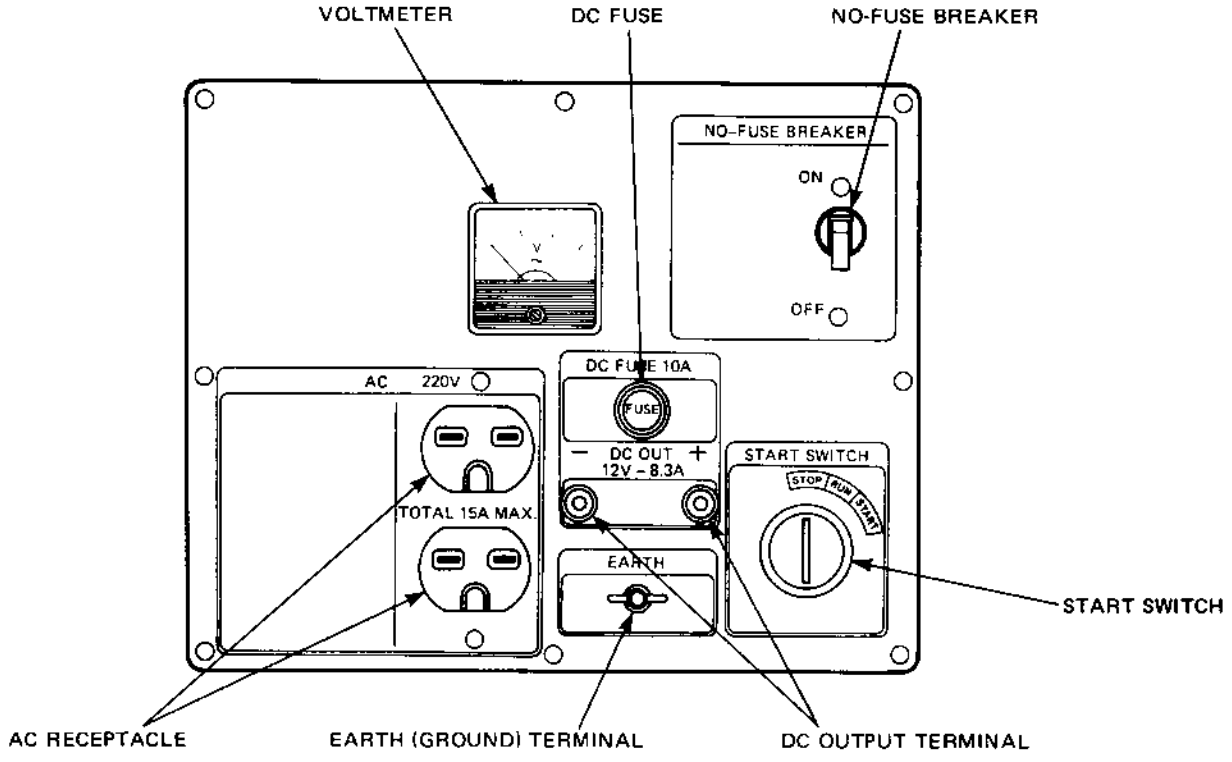


4-2 CONTROL PANEL

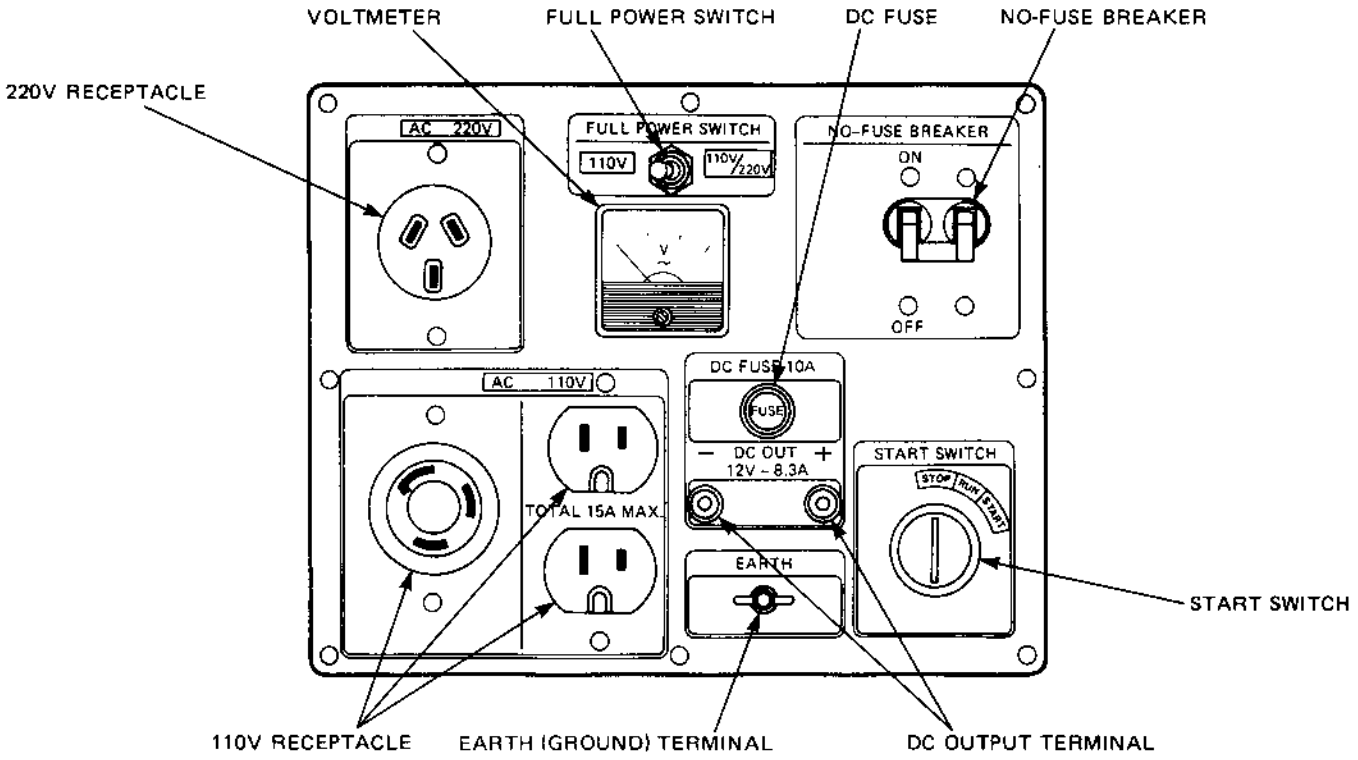
- **RGD3700: 50Hz-110V, 60Hz-110V, 120V TYPE**



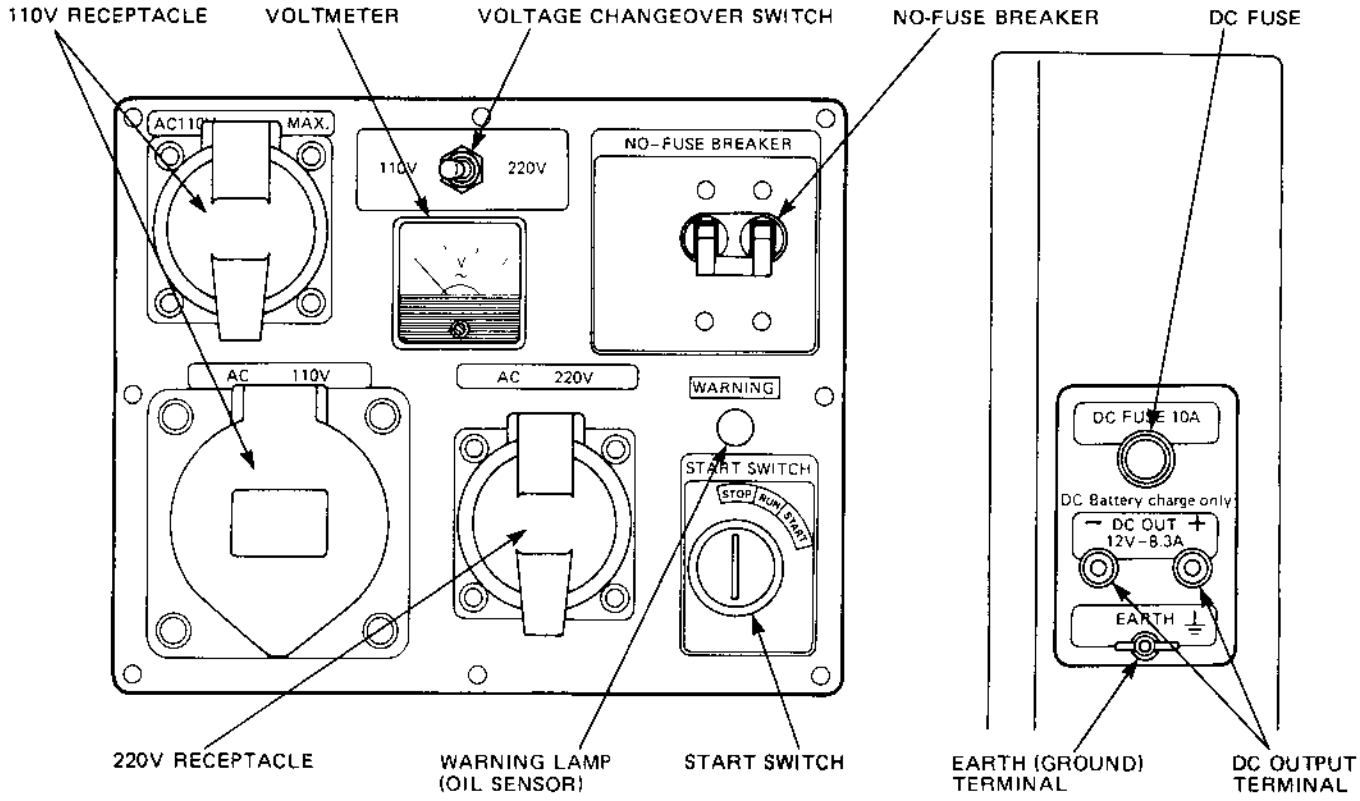
- **RGD3700: 50Hz-220V, 240V, 60Hz-220V TYPE**



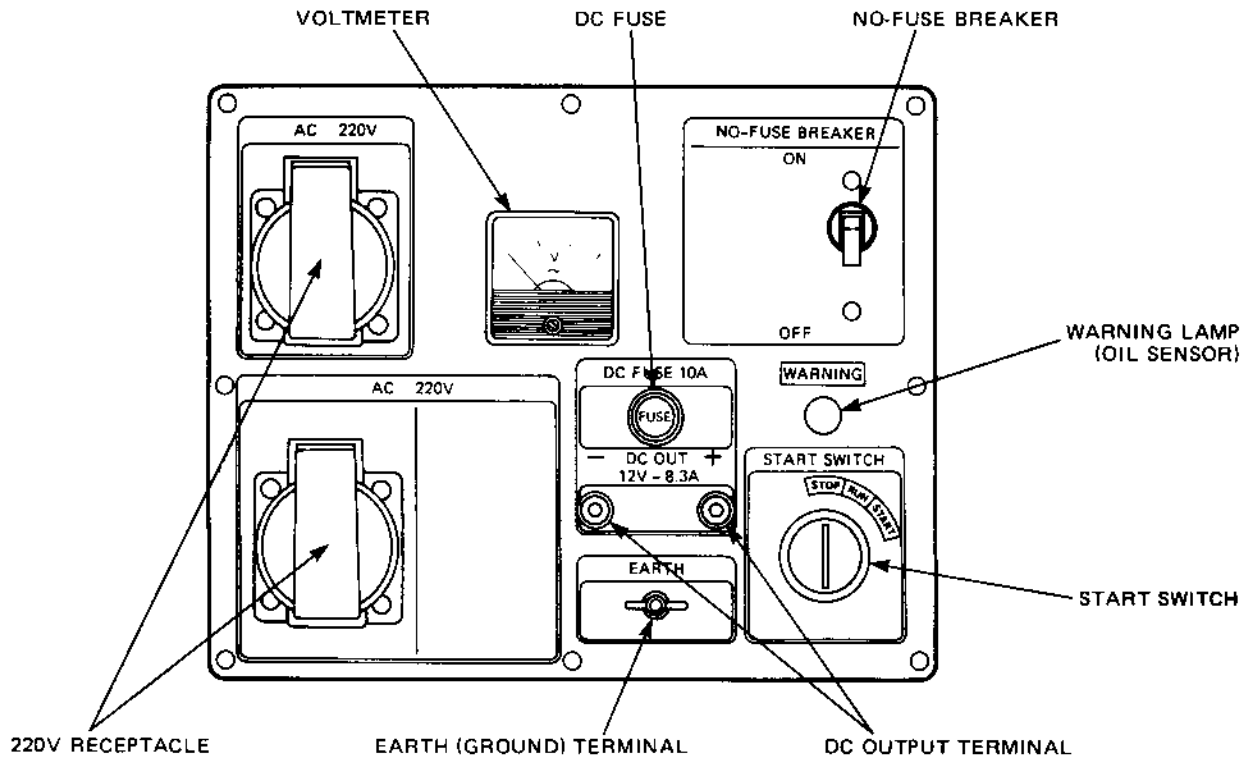
• RGD3700: 50Hz-110V/220V, 60Hz-110V/220V TYPE



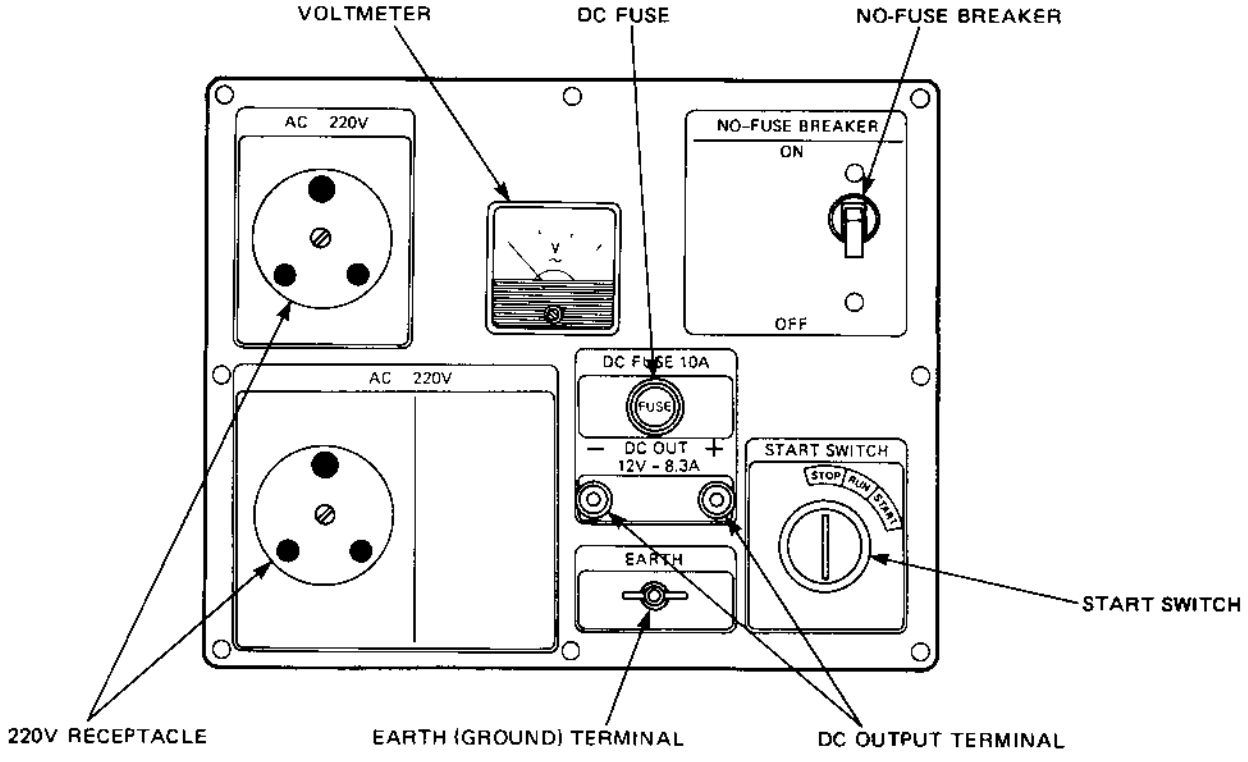
• RGD3700: U.K., 50Hz-110V/220V [BS RECEPTACLE]



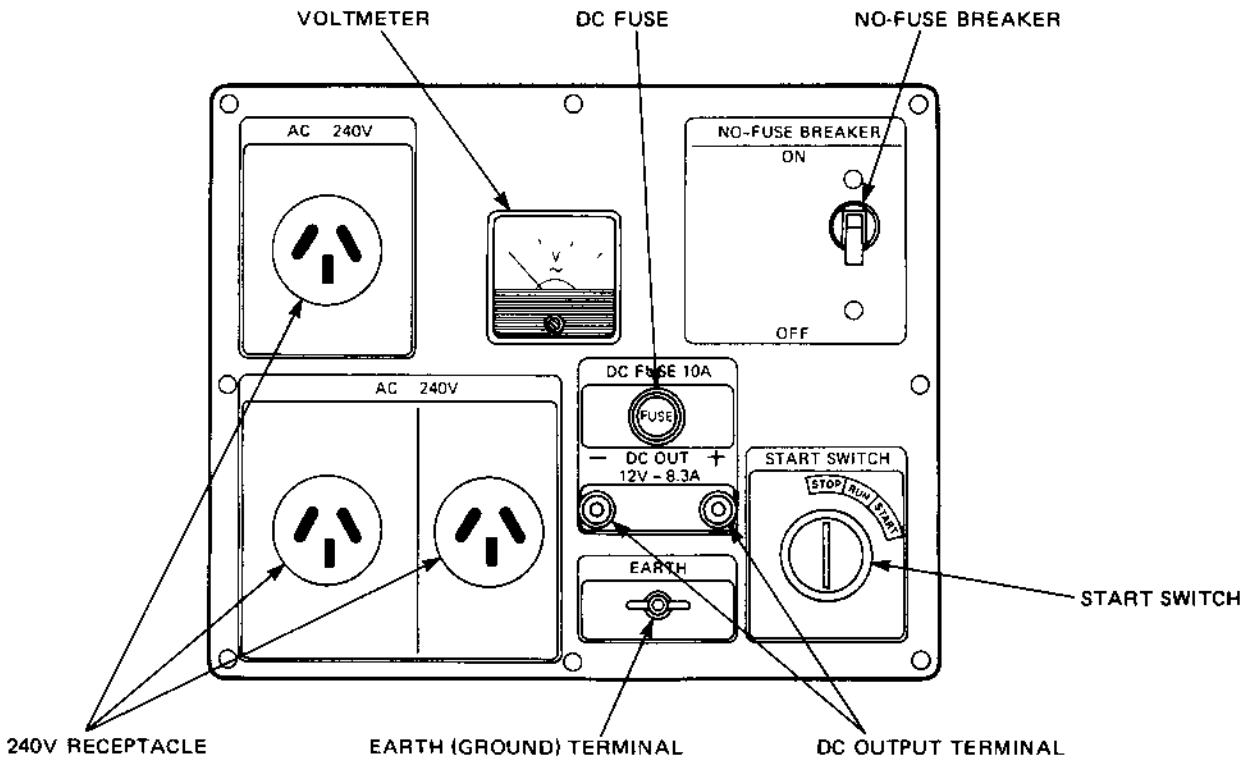
- **RGD3700: GERMANY, 50Hz-220V**



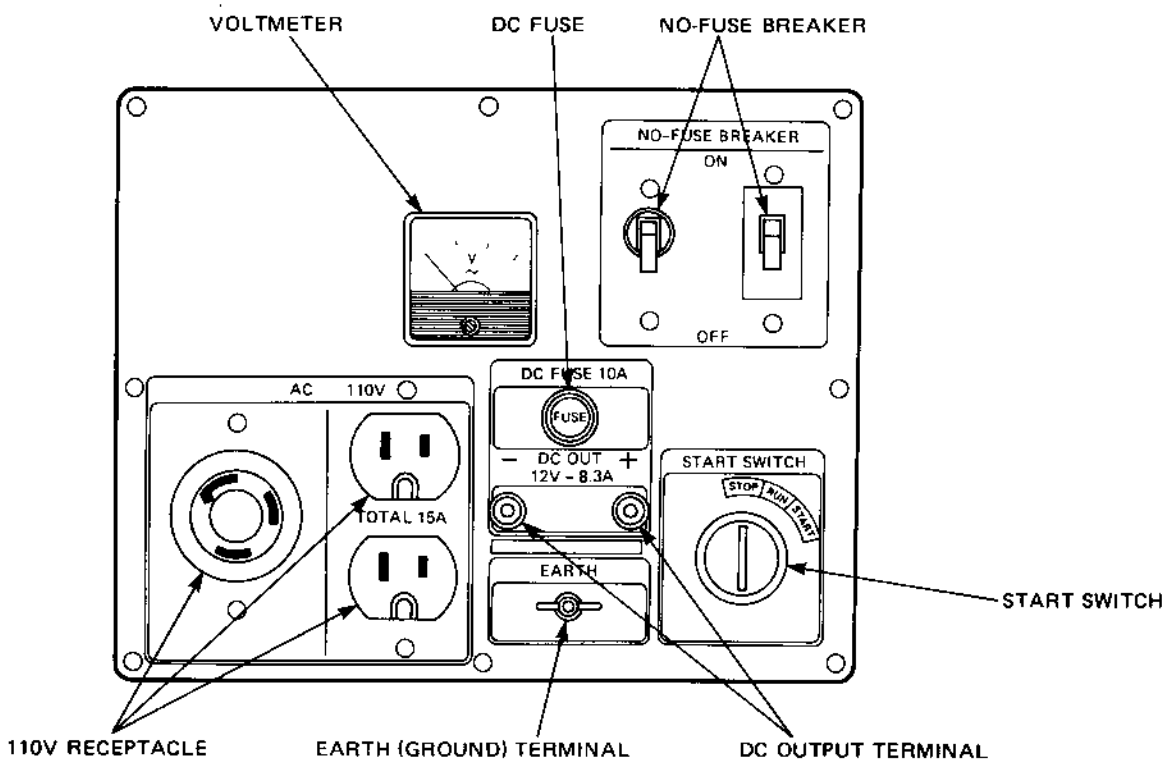
- **RGD3700: 50Hz-220V [WITH SPECIAL RECEPTACLE]**



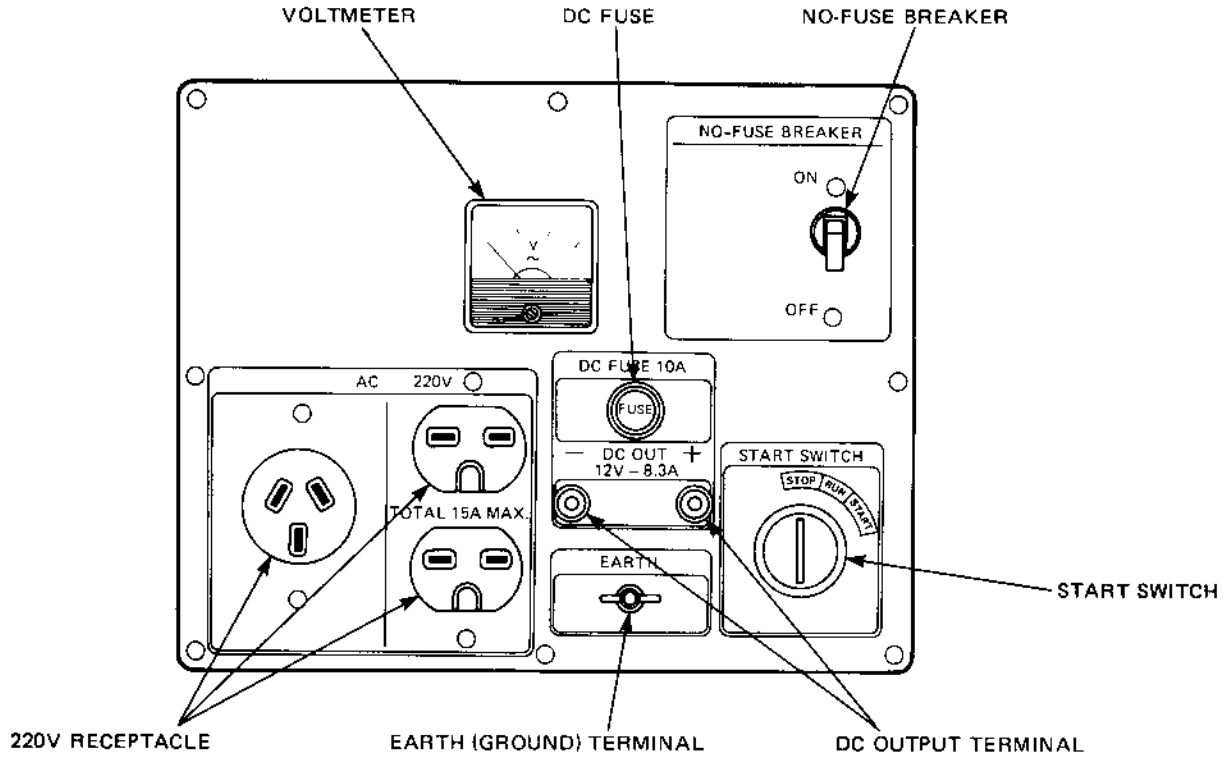
- **RGD3700: OCEANIA, 50Hz-240V**



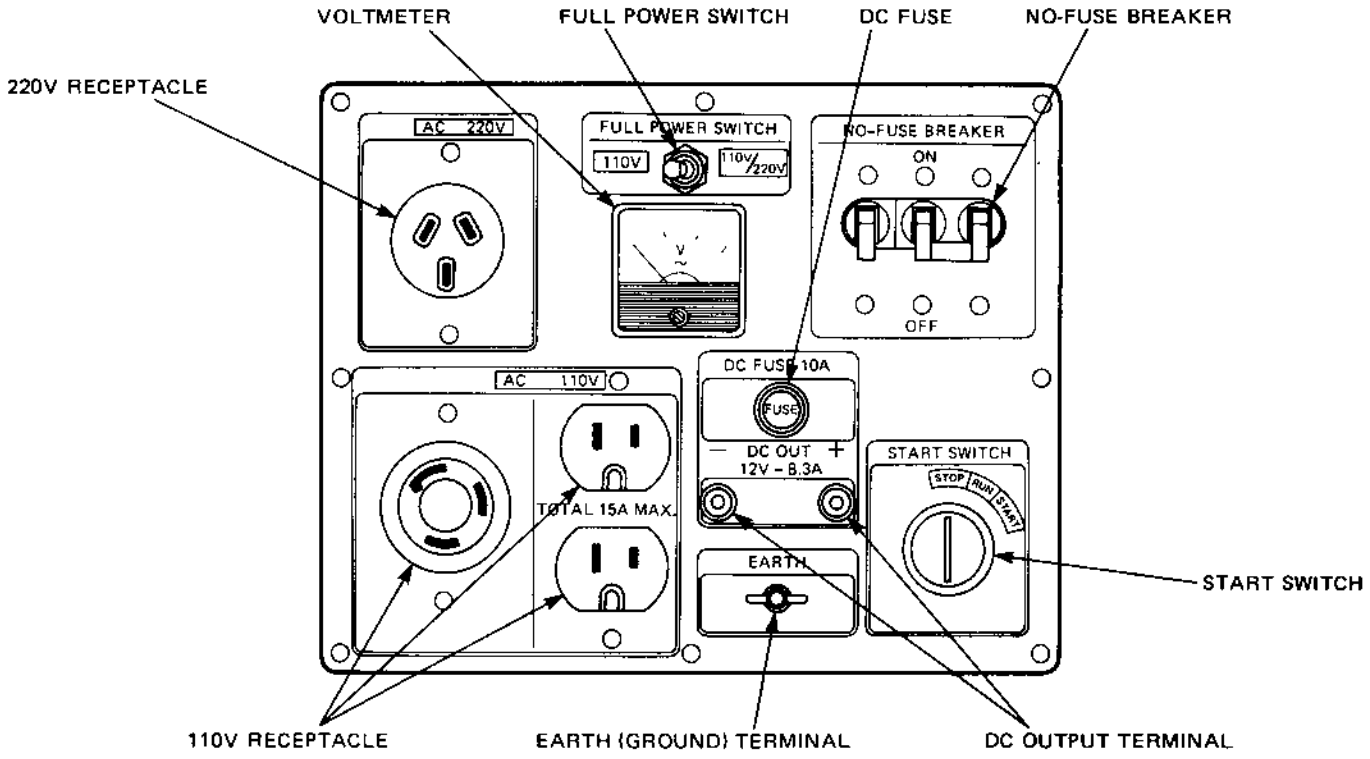
- **RGD5000: 50Hz-110V, 60Hz-110V, 120V TYPE**



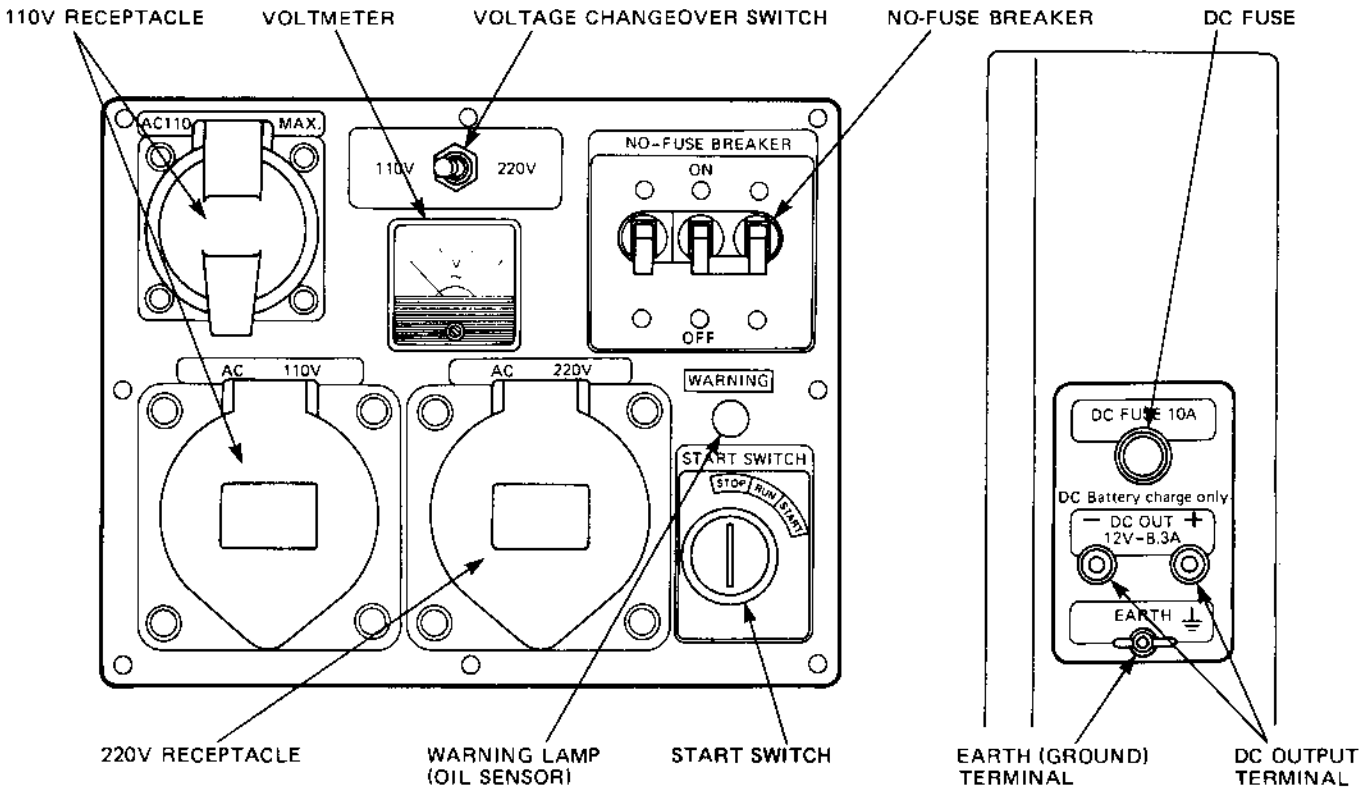
- **RGD5000: 50Hz-220V, 240V, 60Hz-220V TYPE**



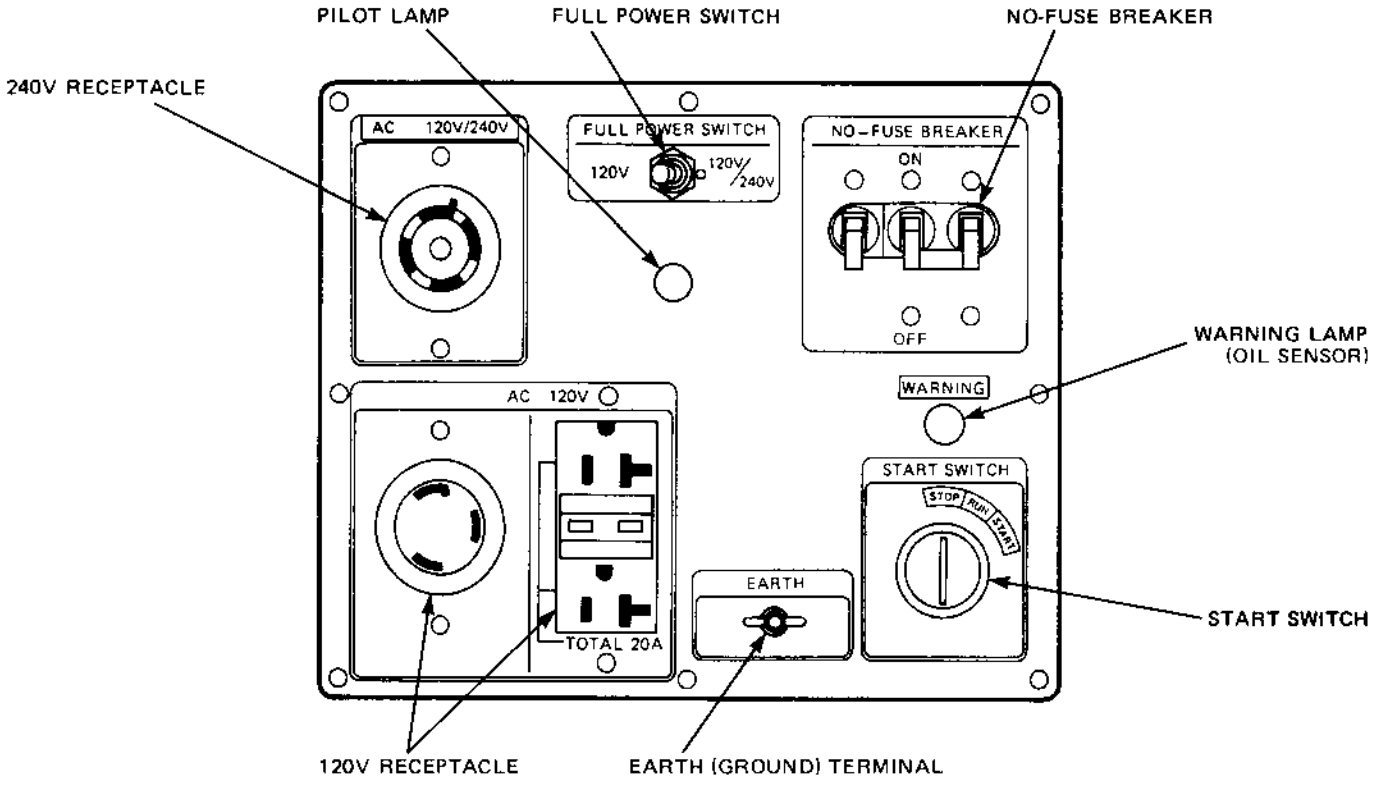
- **RGD5000: 50Hz-110V/220V, 60Hz-110V/220V TYPE**



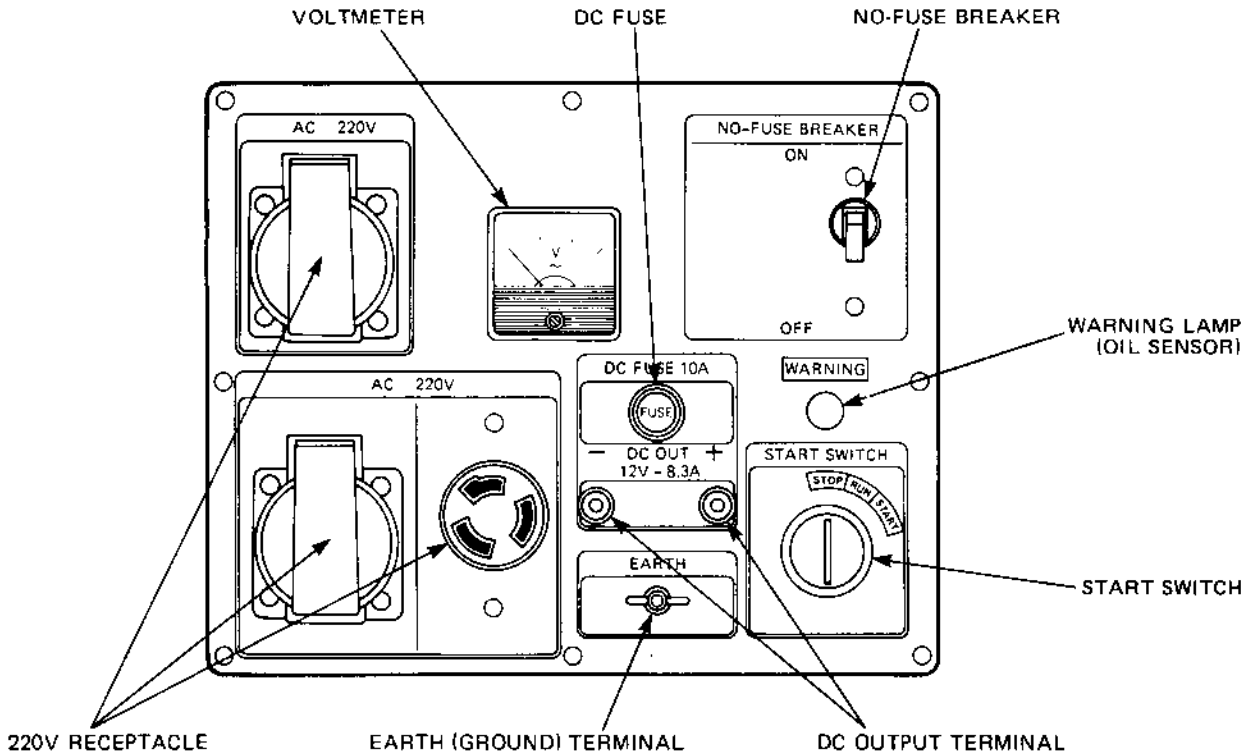
- **RGD5000: U.K., 50Hz-110V/220V [BS RECEPTACLE]**



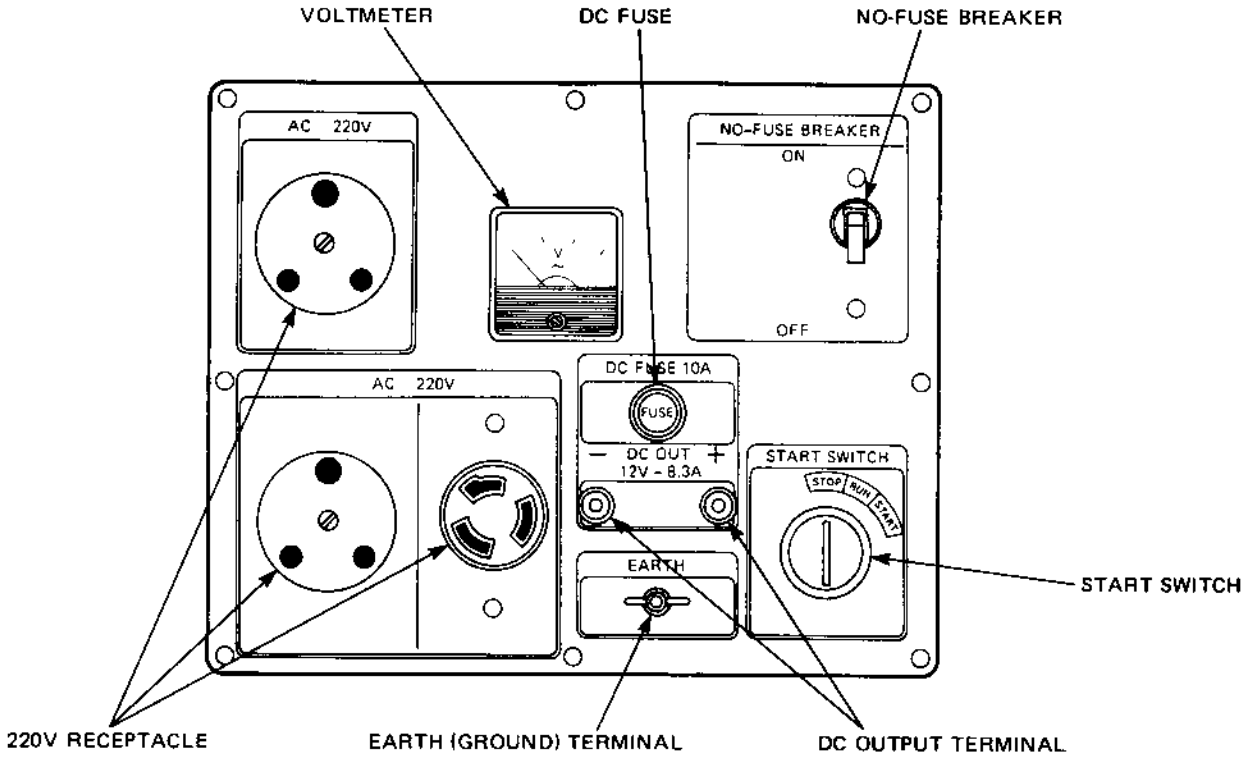
- **RGD5000: U.S.A., 60Hz-120V/240V [NEMA RECEPTACLE]**



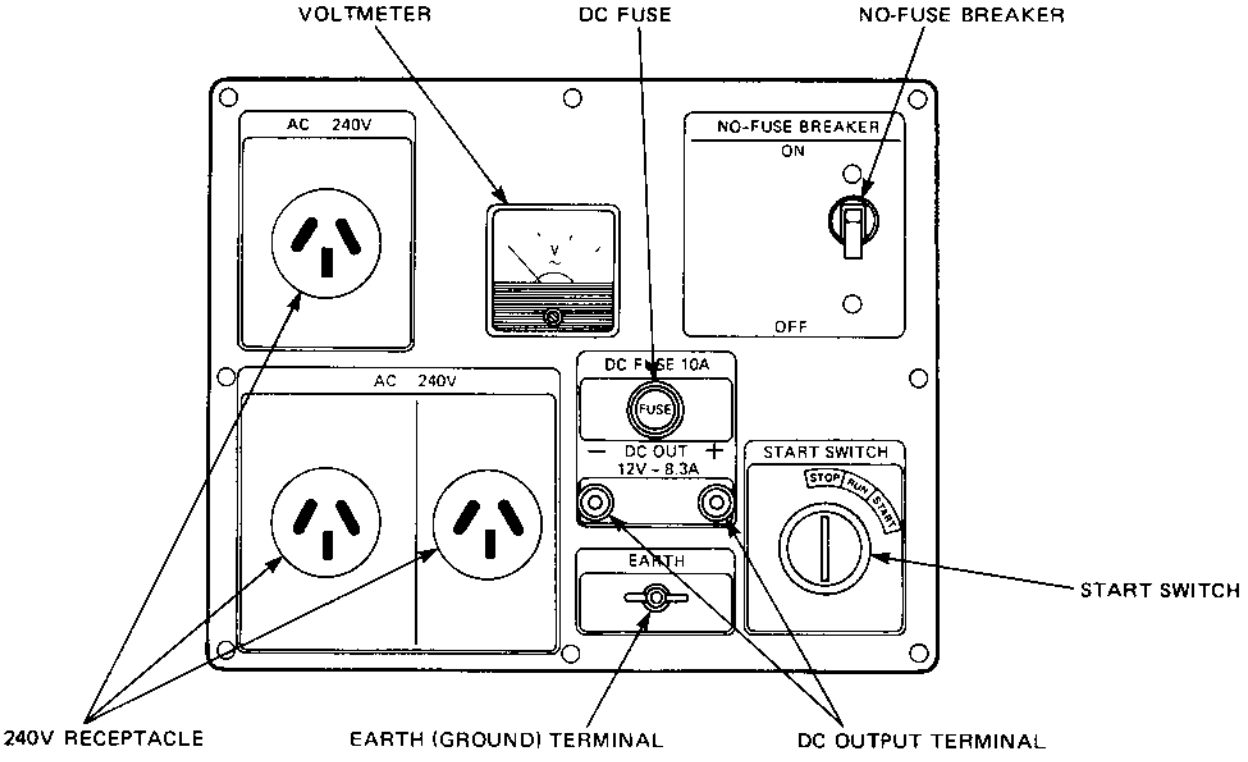
- **RGD5000: GERMANY, 50Hz-220V**



- **RGD5000: 50Hz-220V [WITH SPECIAL RECEPTACLE]**



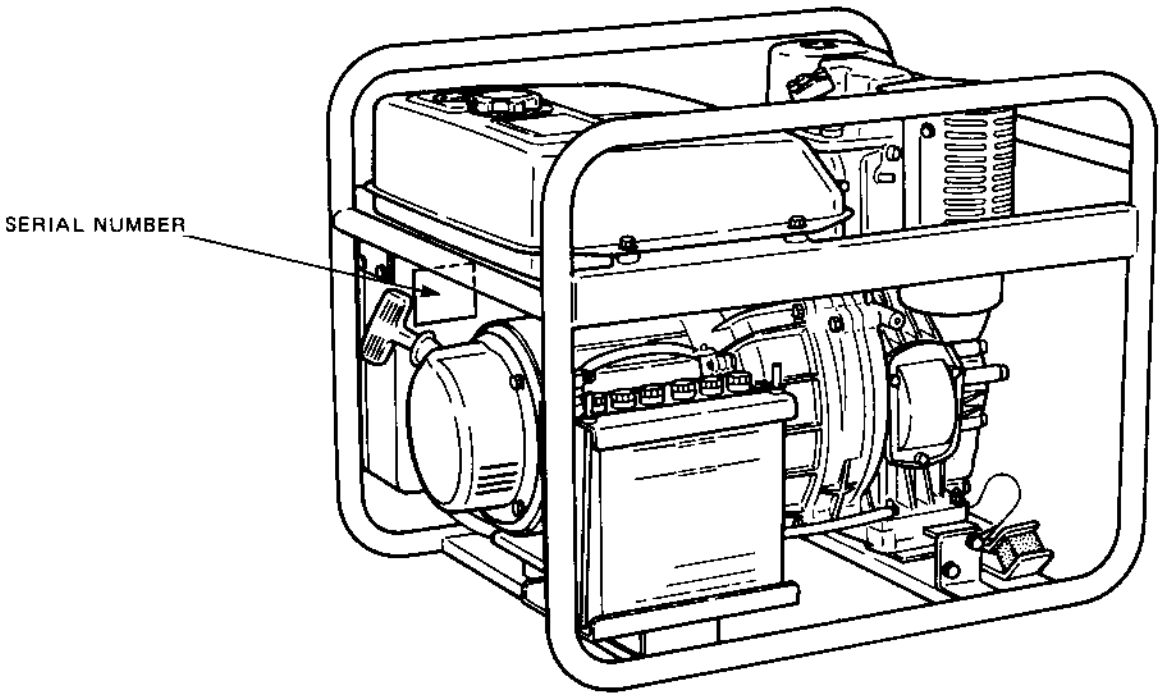
- **RGD5000: OCEANIA, 50Hz-240V**



4-3 LOCATION of SERIAL NUMBER and SPECIFICATION NUMBER

Serial number is stamped on the LABEL (MODEL NAME) stuck on the rear cover.
Specification number is stamped on the stator cover.

NOTE: Always specify these numbers when inquiring about the generator or ordering spare parts in order to get correct parts and accurate service.



5. CONSTRUCTION AND FUNCTION

5-1 CONSTRUCTION

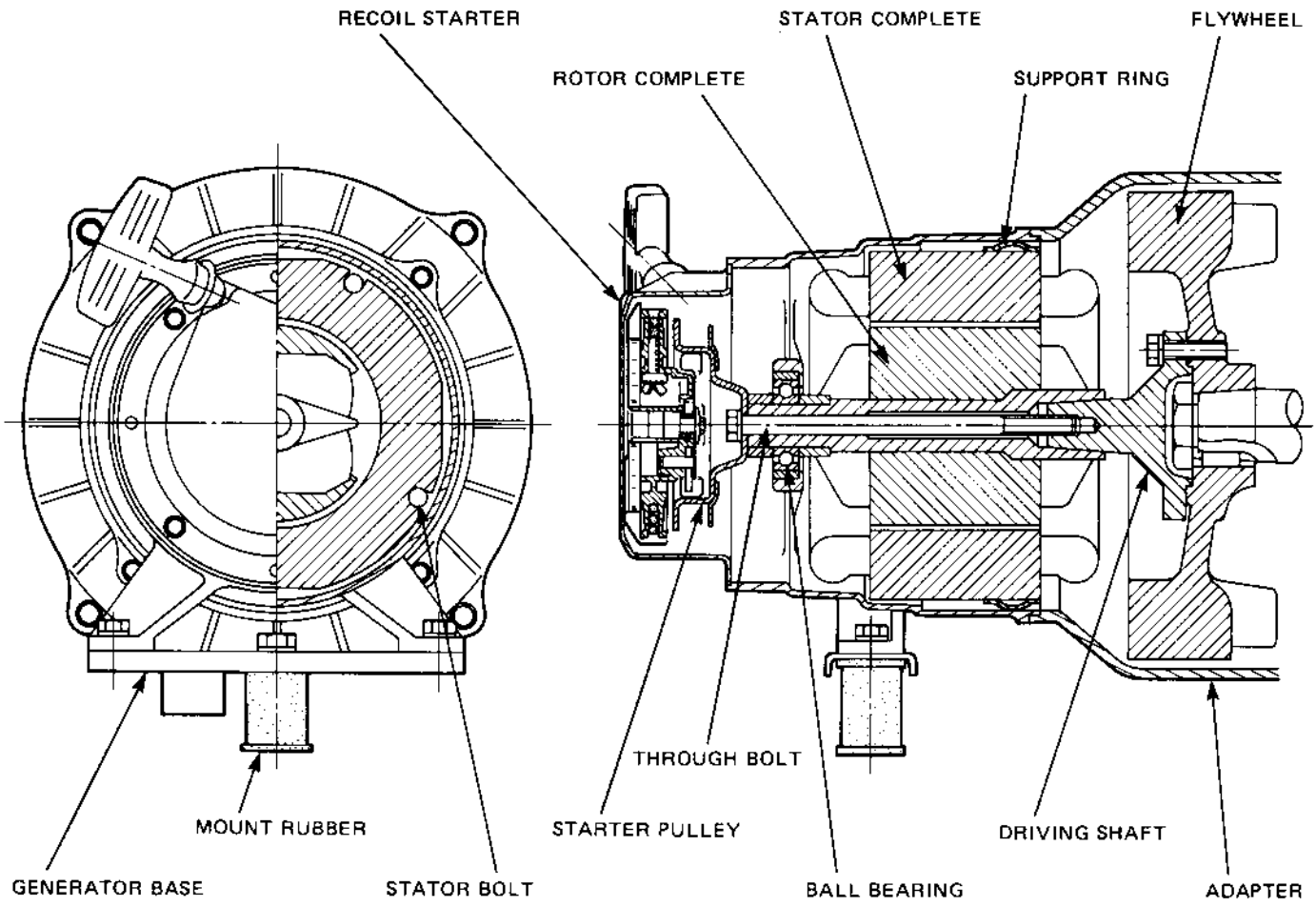


Fig. 5-1

5-2 FUNCTION

5-2-1 STATOR

The stator consists of a laminated silicon steel sheet core, a main coil and a condenser coil which are wound in the core slots.
The condenser coil excites the rotor field coil which generates AC voltage in the main coil.

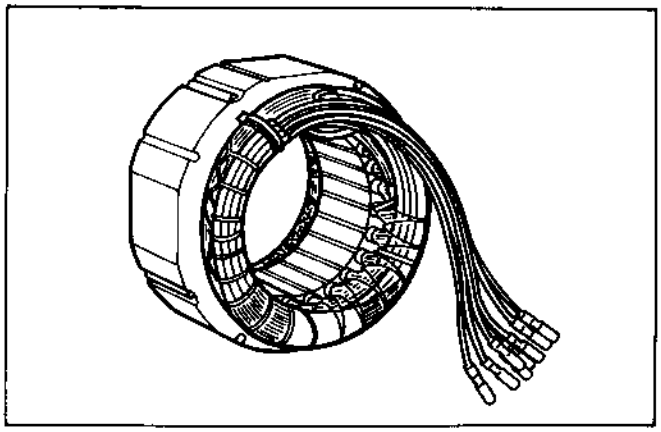


Fig. 5-2

5-2-2 CONDENSER

Two condensers are installed in the control box and are connected to the condenser coil of the stator. These condensers and condenser coil regulate the output voltage.

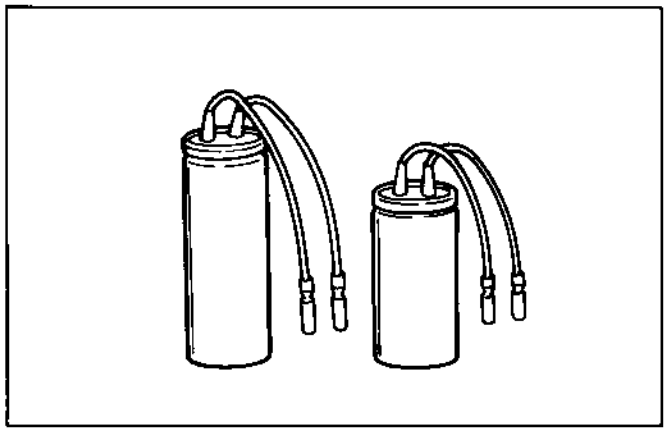


Fig. 5-3

5-2-3 ROTOR

The rotor consists of a laminated silicon steel sheet core and a field coil which is wound over the core. DC current in the field coil magnetizes the steel sheet core. Two permanent magnets are provided for the primary exciting action.

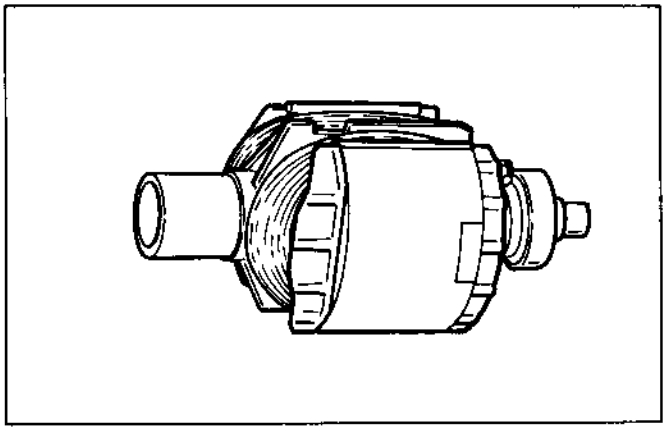


Fig. 5-4

A diode rectifier and surge absorber is mounted inside of the insulator.

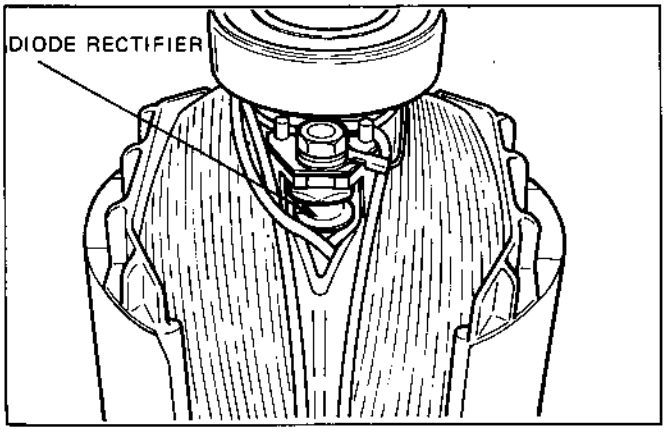


Fig. 5-5A

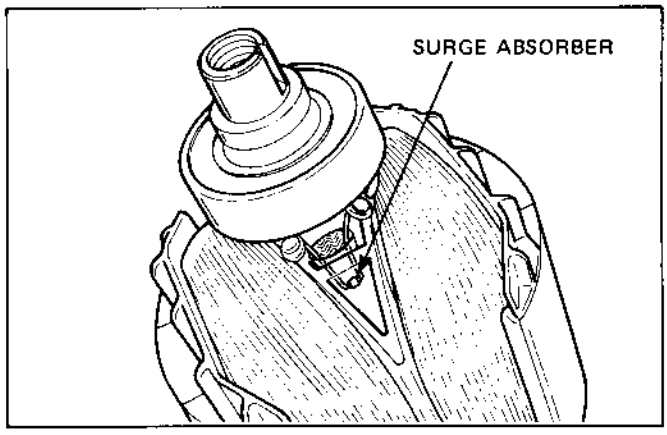


Fig. 5-5B

5-2-4 FUSE

(1) The 10 ampere DC fuse mounted on the control panel protects whole DC circuit from getting damage by overload or short circuit.

(2) The 15 ampere DC fuse in the control box protects the diode rectifier from getting damage by reverse connection to the battery.

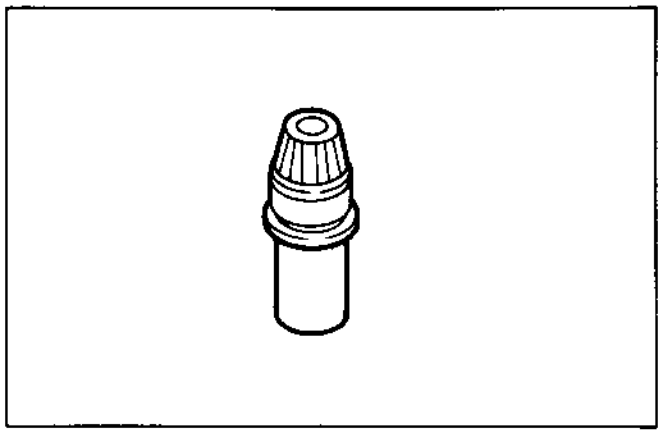


Fig. 5-6

5-2-5 NO-FUSE BREAKER

The no-fuse breaker protects the generator from getting damage by overloading or short circuit in the appliance. Table 5-1 shows the capacity of no-fuse breaker by each spec. and their object of protection.

MODEL	SPECIFICATION	NO-FUSE BREAKER	OBJECT of PROTECTION
RGD3700	110V, 120V	27A	Total output amperage
	220V	14A	Total output amperage
	240V	12A	Total output amperage
	110/220V, 120/240V	14A x 2	Total output amperage
RGD5000	110V	40A	Total output amperage
		30A	Output from 30A receptacle
	120V	37.5A	Total output amperage
		30A	Output from 30A receptacle
	220V	20A	Total output amperage
	240V	18A	Total output amperage
	110/220V, 120/240V	20A x 2	Total output amperage
		30A	Output from 30A receptacle

Table 5-1

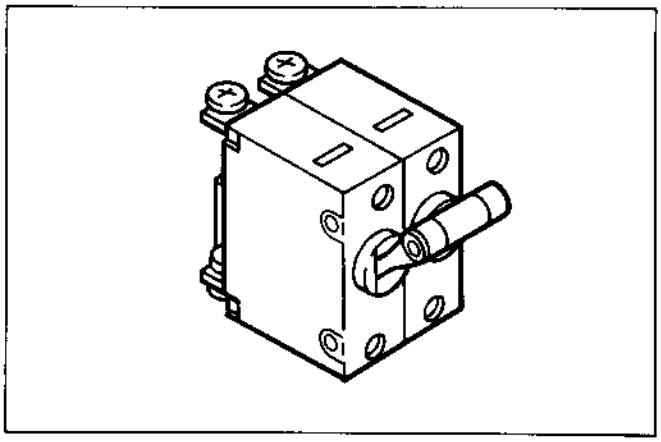


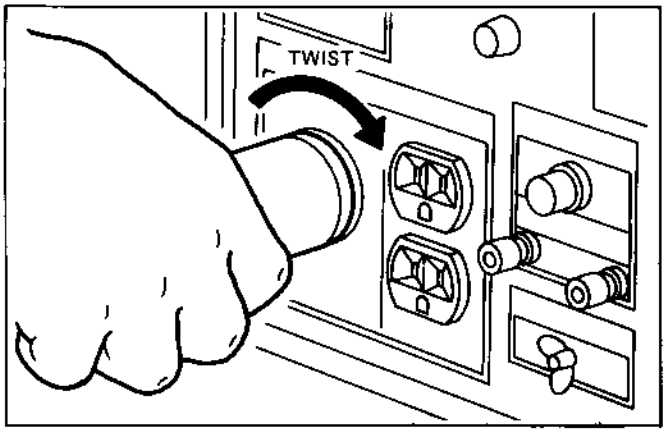
Fig. 5-7

5-2-6 RECEPTACLE and AC PLUG (STD. SPEC.)

These are used for taking AC output power from the generator. A total of five kinds of receptacles, each varying in rated voltage and current from another, are used. Each model has at least one receptacle to deliver the rated generator output. As many AC plugs as the receptacles, each matching the corresponding receptacle, are provided. Table 5-2 shows the rated current for each receptacle. Be careful not to use the receptacles and AC plugs beyond the specified limits to prevent burning.

	up to total 15 amperes from two receptacles
	up to 15 amperes
	up to 20 amperes
	up to 30 amperes (See Caution.)

Table 5-2



Caution: To connect the appliance to locking receptacle, insert the plug into the receptacle and turn it clockwise to lock.

Fig. 5-8

NOTE: If your generator has receptacles peculiar to your country, Table 5-2 does not apply.

NOTE: The generator for U.S.A. market is equipped with NEMA standard receptacles shown in table 5-3. Use the proper plug for connecting appliance to the generator.

Style	Ampere	Receptacle	AC plug	Description
	125V 20A	NEMA 5-20R	NEMA 5-20P	GFCI (Ground Fault Circuit Interrupter) Receptacle, duplex
	125V/250V 20A	NEMA L14-20R	NEMA L14-20P	Locking Receptacle
	125V 30A	NEMA L5-30	NEMA L5-30P	Locking Receptacle

Table 5-3

5-3 DESCRIPTION of GENERATOR OPERATION

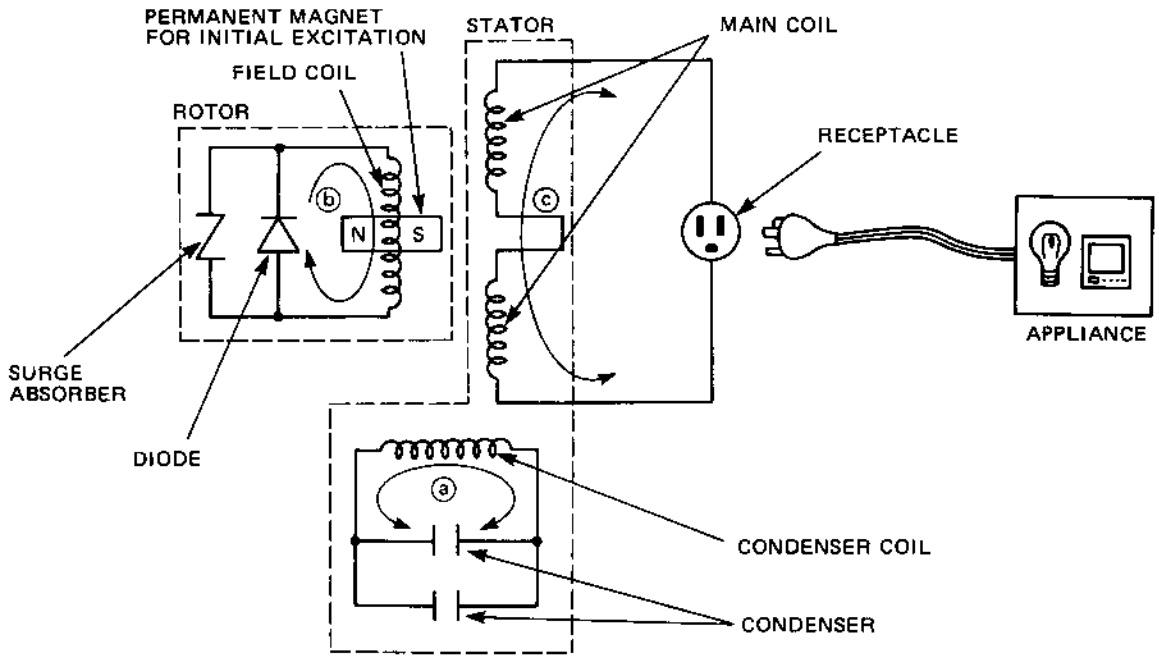


Fig. 5-9

5-3-1 GENERATION of NO-LOAD VOLTAGE

(1) When the generator starts running, the permanent magnet built-in to the rotor generates 3 to 6V of AC voltage in the main coil and condenser coil wound on the stator.

(2) As two condensers are connected to the condenser coil, the small voltage at the condenser coil generates a minute current ⓐ which flows through the condenser coil. At this time, a small flux is produced with which the magnetic force at the rotor's magnetic pole is intensified. When this magnetic force is intensified, the respective voltages in the main coil and condenser coil rise up. As the current ⓐ increases, the magnetic flux at the rotor's magnetic pole increases further. Thus the voltages at the main coil and condenser coil keep rising by repeating this process.

(3) As AC current flows through the condenser coil, the density of magnetic flux in the rotor changes. This change of magnetic flux induces AC voltage in the field coil, and the diode rectifier in the field coil circuit rectifies this AC voltage into DC. Thus a DC current flows through the field coil and magnetizes the rotor core to generate an output voltage in the main coil.

(4) When generator speed reaches 2700 to 2800 rpm (50Hz type) or 3000 to 3300 rpm (60Hz type), the current in the condenser coil and field coil increases rapidly.
This acts to stabilize the output voltage of each coils. If generator speed further increases to the rated value, the generator output voltage will reach to the rated value.

5-3-2 VOLTAGE FLUCTUATIONS UNDER LOAD

When the output current ⓒ flows through the main coil to the appliance, a magnetic flux is produced and serves to increase current ⓐ in the condenser coil. When current ⓐ increases, the density of magnetic flux across the rotor core rises. As a result, the current flowing in the field coil increases and the generator output voltage is prevented from decreasing.

5-3-3 FULL POWER SWITCH (Dual Voltage Type)

The full power switch is provided for the dual voltage type to take out the full rated power from one receptacle in each voltage.

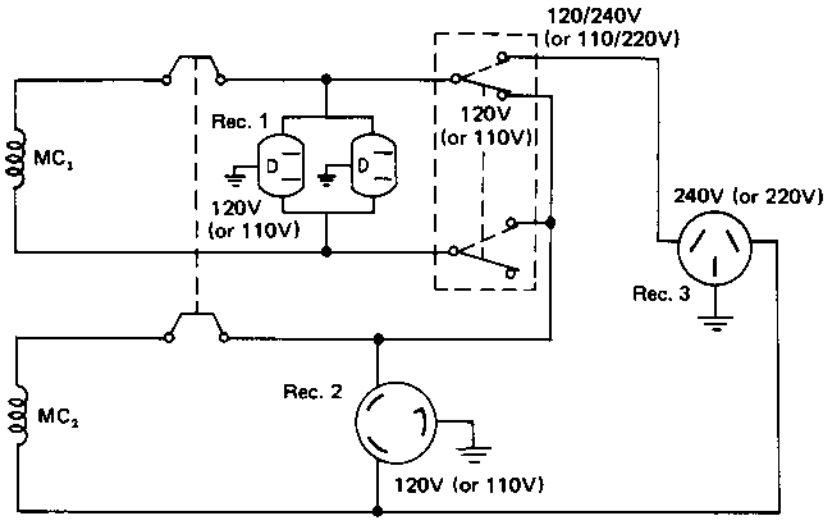


Fig. 5-10

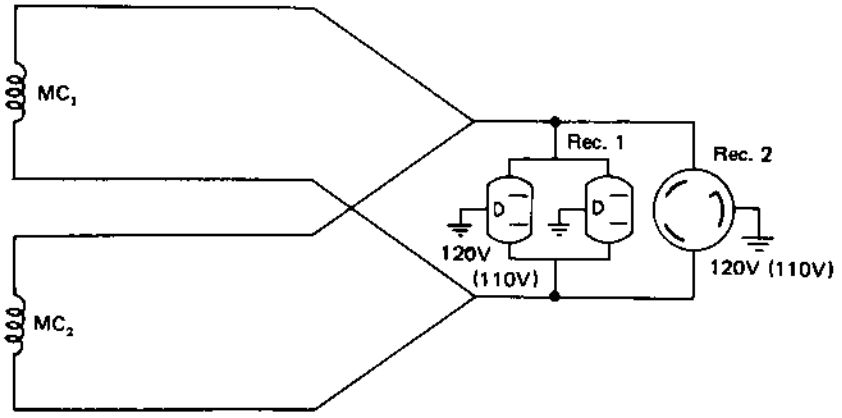


Fig. 5-11

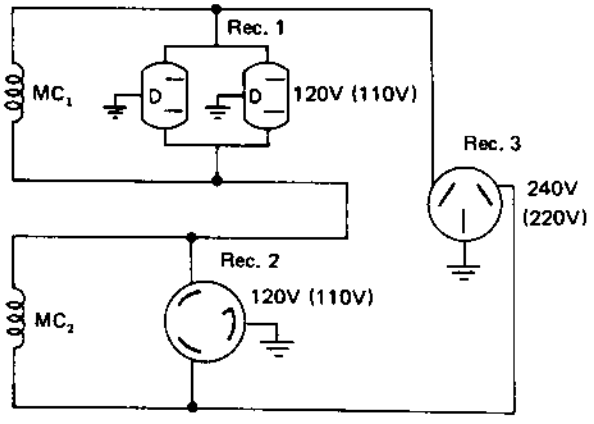


Fig. 5-12

Switch Position	LOWER VOLTAGE RECEPTACLE	HIGHER VOLTAGE RECEPTACLE
110V or 120V	Rated output	No output can be taken.
110/220V or 120/240V	Half of rated output	Rated output

Table 5-4

Inside the generator are two sets of main coils. Each main coil outputs half the rated power at the lower voltage (110V or 120V). These main coils are wound to be in the same phase. The full power switch reconnects these main coils in parallel or in series.

Fig. 5-10 shows a circuit diagram. When the full power switch is set for single lower voltage indication (110V or 120V), the switch position is as indicated by the lower solid line in the diagram. Fig. 5-11 is a simplified representation of this circuit, showing the two main coils connected in parallel. In this case, the higher voltage (220V or 240V) at Rec. 3 cannot be taken out. Rec. 2 for the lower voltage can output up to the rated power (up to 30A if the rated current is over 30A), and Rec. 1 can output up to a total of 15A.

When the full power switch is set for double voltage indication (110V/220V or 120V/240V), the switch position is as indicated by the upper dotted line in Fig. 5-10. Fig. 5-12 is a simplified representation of this circuit, showing the two main coils connected in series. In this case, power can be taken simultaneously from the receptacles for the both voltages. Rec. 3 for the higher voltage can output up to the rated power, but Rec. 1 and Rec. 2 for the lower voltage can output only up to half the rated power each.

Table 5-4 is a summary of the above explanation. Select the proper output voltage by full power switch in accordance with the appliance to be used.

5-3-4 VOLTAGE CHANGEOVER SWITCH

The generator of 50Hz 110V/220V dual voltage type for U.K. is provided with voltage changeover switch instead of full power switch.

The output voltage is selected from 110V and 220V by turning this switch and both voltages cannot be taken out simultaneously.

The middle point of the main coil shall be grounded when the changeover switch is turned to 110V side.

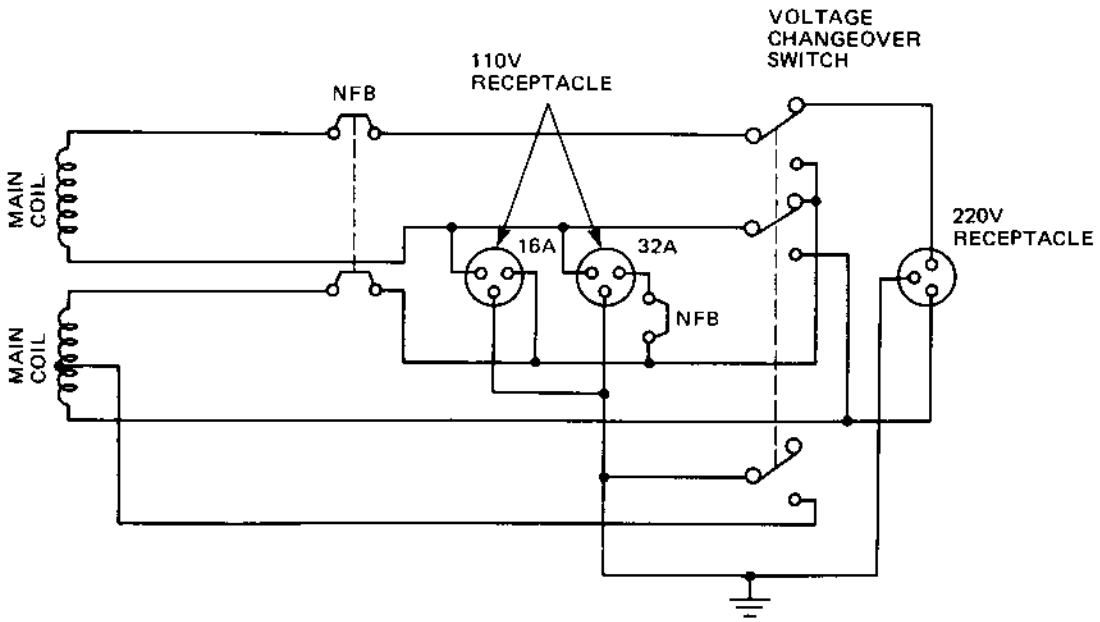


Fig. 5-13

6. SAFETY PRECAUTIONS

1. **Use extreme caution near fuel. A constant danger of explosion or fire exists.**
   Do not fill the fuel tank while the engine is running. Do not smoke or use open flame near the fuel tank. Be careful not to spill fuel when refueling. If spilt, wipe it and let dry before starting the engine.

2. **Do not place inflammable materials near the generator.**
   Be careful not to put fuel, matches, gunpowder, oily cloth, straw, and any other inflammables near the generator.

3. **Do not operate the generator in a room, cave or tunnel. Always operate in a well-ventilated area.**
   Otherwise the engine may overheat and also, the poisonous carbon monoxide contained in the exhaust gases will endanger human lives. Keep the generator at least 1 m (4 feet) away from structures or facilities during use.

4. **Operate the generator on a level surface.**
   If the generator is tilted or moved during use, there is a danger of fuel spillage and a chance that the generator may tip over.

5. **Do not operate with wet hands or in the rain.**
   Severe electric shock may occur. If the generator is wet by rain or snow, wipe it and thoroughly dry it before starting.
   Don't pour water over the generator directly nor wash it with water.
   If the generator is wet with water, the insulations will be adversely affected and may cause current leakage and electric shock.

6. **Do not connect the generator to the commercial power lines.**
   This may cause a short-circuit or damage to the generator. Use a transfer switch for connecting with indoor wiring.
   NOTE: The parts numbers of the transfer switches and of the plastic box to store them are as shown in Table 6-1.

Part No.	Part Name	Q'ty	Phase	Allowable Current
365-45604-08	Transfer Switch	1	1	15A
367-45605-08	Transfer Switch	1	1	30A
340-45606-08	Transfer Switch	1	1	60A
367-43008-08	Plastic Box	1	1	30A
348-43009-08	Plastic Box	1	1	60A

Table 6-1

7. **Use a fuse of the correct capacity. (DC output)**
   If the generator rpm is increased excessively in the overload condition by using an over rated fuse, the generator may be burnt.

   CAUTION: If the fuse is burnt out or the circuit breaker tripped off as a result of using an electrical appliance, the cause can be an overload or a short-circuit. In such a case, stop operation immediately and carefully check the electrical appliance and AC plugs for faulty wiring.

7. RANGE OF APPLICATIONS

Generally, the power rating of an electrical appliance indicates the amount of work that can be done by it. The electric power required for operating an electrical appliance is not always equal to the output wattage of the appliance. The electrical appliances generally have a label showing their rated voltage, frequency, and power consumption (input wattage). The power consumption of an electrical appliance is the power necessary for using it. When using a generator for operating an electrical appliance, the power factor and starting wattage must be taken into consideration.

In order to determine the right size generator, it is necessary to add the total wattage of all appliances to be connected to the unit.

Refer to the followings to calcurate the power consumption of each appliance or equipment by its type.

(1) Incandescent lamp, heater, etc. with a power factor of 1.0

Total power consumption must be equal to or less than the rated output of the generator.

Example: A rated 3000W generator can turn thirty 100W incandescent lamps on.

(2) Fluorescent lamps, mercury lamps, etc. with a smaller power factor

Select a generator with a rated output equivalent to 1.2 to 2 times of the power consumption of the load.

Example: A 400W mercury lamp requires 600W to 700W power source to be turned on.
A rated 3000W generator can power four or five 400W mercury lamps.

NOTE 1: If a power factor correction capacitor is not applied to the mercury lamp or fluorescent lamp, the more power shall be required to drive those lamps.
A rated 3000W generator can drive one or two 400W mercury lamps without power factor correction capacitors.

NOTE 2: Nominal wattage of the fluorescent lamp generally indicates the output wattage of the lamp. Therefore, if the fluorescent lamp has no special indication as to the power consumption, efficiency should be taken into account as explained in Item (5) on the following page.

(3) Motor driven tools and light electrical appliances

Generally the starting wattage of motor driven tools and light electrical appliances are 1.2 to 3 times larger than their running wattage.

Example: A rated 250W electric drill requires a 400W generator to start it.

(4) Initially loaded motor driven appliances such as water pumps, compressors, etc.

These appliances require the large starting wattage which is 3 to 5 times of running wattage.

Example: A rated 900W compressor requires a 4500W generator to drive it.

NOTE 1: Motor-driven appliances require the aforementioned generator output only at the starting. Once their motors are started, the appliances consume about 1.2 to 2 times their rated power consumption so that the excess power generated by the generator can be used for other electrical appliances.

NOTE 2: Motor-driven appliances mentioned in Items (3) and (4) vary in their required motor starting power depending on the kind of motor and start-up load. If it is difficult to determine the optimum generator capacity, select a generator with a larger capacity.

(5) Appliances without any indication as to power consumption

Some appliances have no indication as to power consumption; but instead the work load (output) is indicated. In such a case, power consumption is to be worked out according to the numerical formula mentioned below.

$$\frac{\text{(Output of electrical appliance)}}{\text{(Efficiency)}} = \text{(Power consumption)}$$

Efficiencies of some electrical appliances are as follows:

Single-phase motor ..... 0.6 ~ 0.75
Three-phase motor ..... 0.65 ~ 0.9
} The smaller the motor, the lower the efficiency.

Fluorescent lamp ..... 0.7 ~ 0.8

Example 1: A 40W fluorescent lamp means that its luminous output is 40W. Its efficiency is 0.7 and accordingly, power consumption will be 40 ÷ 0.7 = 57W. As explained in **Item (2)**, multiply this power consumption value of 57W by 1.2 ~ 2 and you will get the figure of the necessary capacity of a generator. In other words, a generator with a rated output of 1000W capacity can light nine to fourteen 40W fluorescent lamps.

Example 2: Generally speaking, a 400W motor means that its work load is 400W. Efficiency of this motor is 0.7 and power consumption will be 400 ÷ 0.7 = 570W. When this motor is used for a motor-driven tool, the capacity of the generator should be multipled by 1.2 to 3 and 570W as explained in the **Item (3)**.

MODEL	RGD3700		RGD5000	
Frequency	50 Hz	60 Hz	50 Hz	60 Hz
Incandesent lamp, heater, etc.	3,000W	3,300W	4,300W	4,500W
Fluorescent lamp, mercury lamp, etc.	approx. 2,000W	approx. 2,200W	approx. 2,800W	approx. 3,000W
Motor-driven tool, general-purpose motor, etc.	approx. 1,800W	approx. 1,900W	approx. 2,600W	approx. 2,700W
Water pump, compressor, etc.	approx. 900W	approx. 950W	approx. 1,250W	approx. 1,300W

Table 7-1

NOTES: Wiring between generator and electrical appliances

1. *Allowable current of cable*
   Use a cable with an allowable current that is larger than the rated input current of the load (electrical appliance). If the input current is larger than the allowable current of the cable used, the cable will become excessively heated and deteriorate the insulation, possibly burning it out.
   Table 7-2 shows cables and their allowable currents for your reference.
2. *Voltage drop in long electric extension cords*
   When a long wire is used to connect an appliance with the generator, a certain amount of voltage drop occurs in the wire which lessens effective voltage available to the appliance.
   The table below has been prepared to illustrate the approximate voltage loss when an extension cord of 300 feet (approx. 100 meters) is used to connect an appliance or tool to the generator.

Nominal cross section	A.W.G. Gauge No.	Allowable current	No. of strands/strand dia.	Resistance	Current Amp.							
mm^2	No.	A	No./mm	Ω/100 m	1A	3A	5A	8A	10A	12A	15A	Voltage drop
0.75	18	7	30/0.18	2.477	2.5	8V	12.5V	–	–	–	–	
1.27	16	12	50/0.18	1.486	1.5V	5V	7.5V	12V	15V	18V	–	
2.0	14	17	37/0.26	0.952	1V	3V	5V	8V	10V	12V	15V	
3.5	12 ~ 10	23	45/0.32	0.517	–	1.5V	2.5V	4V	5V	6.5V	7.5V	
5.5	10 ~ 8	35	70/0.32	0.332	–	1V	2V	2.5V	3.5V	4V	5V	

Table 7-2

Voltage drop indicates as $V = \frac{1}{100} \times R \times I \times \ell$

R means resistance (Ω/100 m) on the above table.
I means electric current through the wire (A).
ℓ means the length of the wire (m).

The length of the wire indicates round length, it means twice the length from generator to electrical tools.

8. MEASURING PROCEDURES

8-1 MEASURING INSTRUMENTS

8-1-1 VOLTMETER

AC voltmeter is necessary. The approximate AC voltage ranges of the voltmeters to be used for various types of generators are as follows:

0 to 150V: Type with an output voltage of 110 or 120V

0 to 300V: Type with an output voltage of 220, 230, or 240V

0 to 150V, 0 to 300V: Dual voltage type

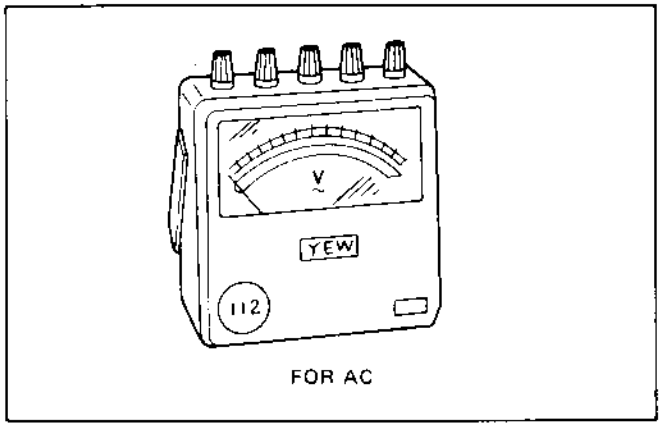


Fig. 8-1

8-1-2 AMMETER

AC ammeter is necessary. An AC ammeter with a range that can be changed according to the current rating of a given generator is most desirable. (About 10A, 20A, 100A)

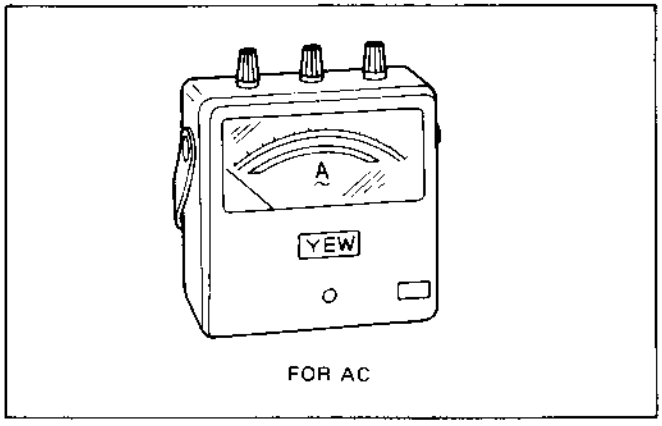


Fig. 8-2

8-1-3 FREQUENCY METER

Frequency range: About 45 to 65Hz

NOTE: Be careful of the frequency meter's input voltage range.

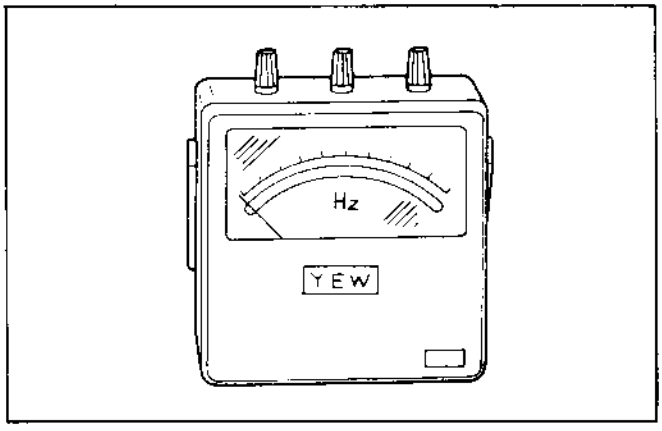


Fig. 8-3

8-1-4 TESTER

Used for measuring resistance, etc.

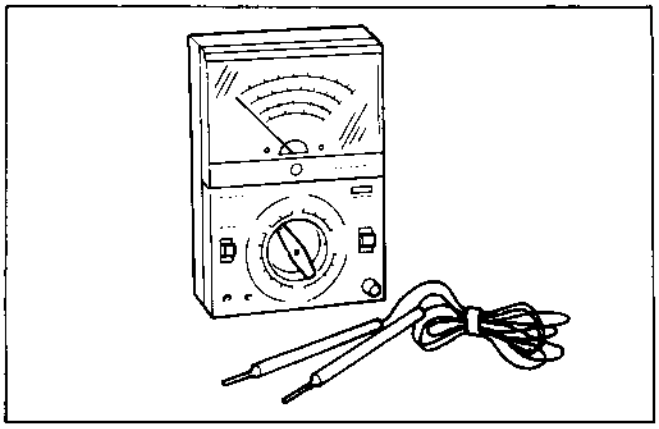


Fig. 8-4

8-1-5 MEGGER TESTER

Used for measuring generator insulation resistance. Select one with testing voltage range of 500V.

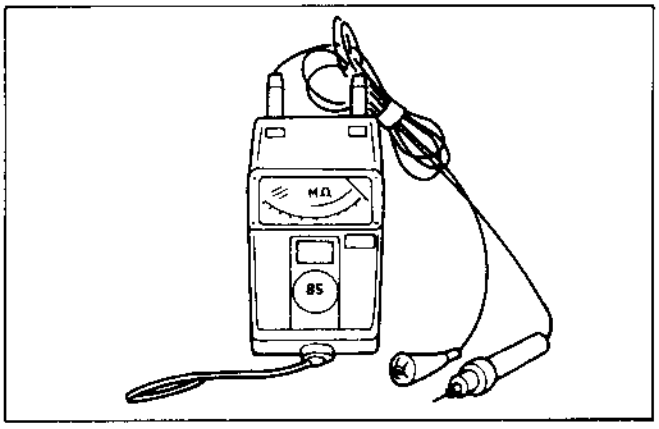


Fig. 8-5

8-1-6 TACHOMETER

There are various types of tachometers, such as contactless type, contact type, and strobe type. The contact type can be used only when the generator and engine have been disassembled. The contactless type is recommended.

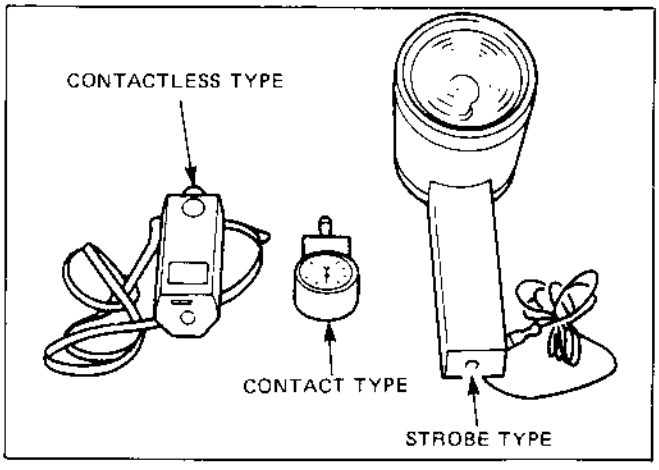


Fig. 8-6

8-2 AC OUTPUT MEASURING

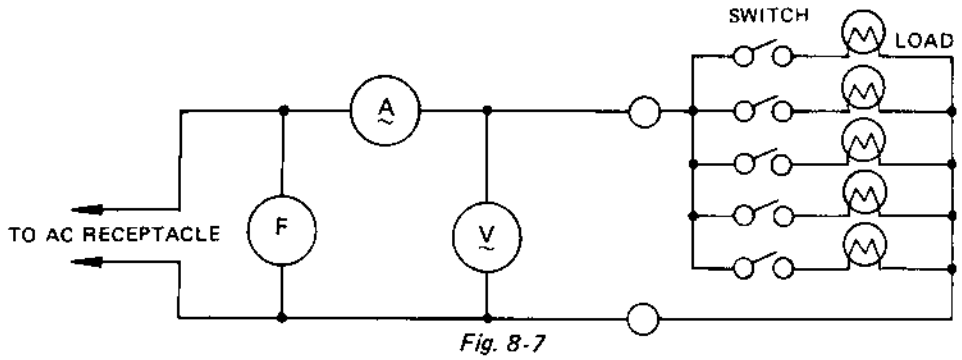


Fig. 8-7

Use a circuit like the one shown in Fig. 8-7 for measuring AC output. A hot plate or lamp with a power factor of 1.0 may be used as a load. Adjust the load and rpm, and check that the voltage range is as specified in Table 8-1 at the rated amperage and rated rpm.

Rated voltage	110V	120V	220V	240V
Voltage range	107 ~ 119V	117 ~ 130V	215 ~ 238	235 ~ 260

Table 8-1

8-3 MEASURING INSULATION RESISTANCE

Connect a megger tester to one of receptacle output terminals and the ground terminal, then measure the insulation resistance. An insulation resistance of 1 megohm or more is normal. (The original insulation resistance at the time of shipment from the factory is 10 megohms or more.)
If it is less than 1 megohm, disassemble the generator and measure the insulation resistance of the stator, rotor and control panel individually.

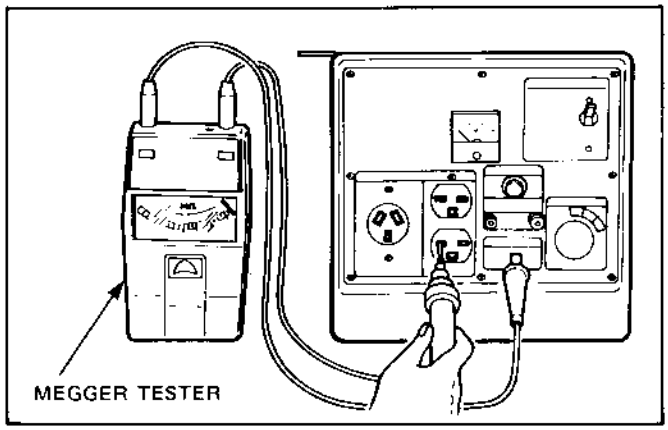


Fig. 8-8

• STATOR

(1) Measure the insulation resistance between BLUE lead and the core.
(2) Measure the insulation resistance between WHITE lead and the core.
(3) Measure the insulation resistance between YELLOW lead and the core.
(4) Measure the insulation resistance between BROWN lead and the core.

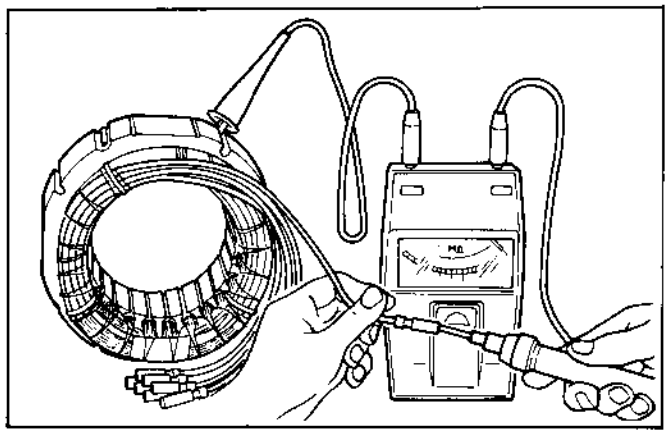


Fig. 8-9

• ROTOR

Measure the insulation across one of the soldered terminals of the rotor and the core.

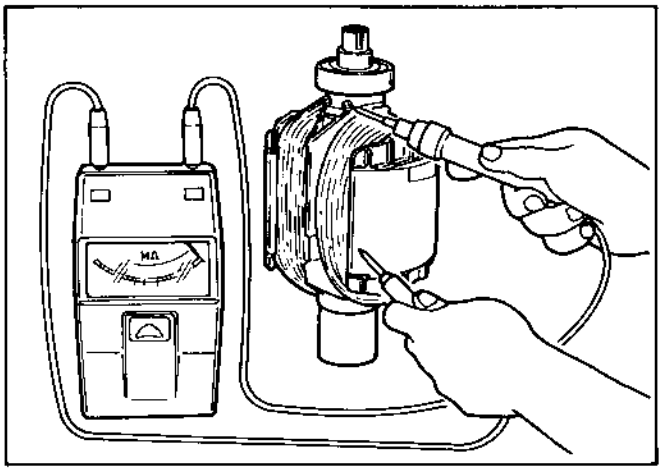


Fig. 8-10

• CONTROL PANEL

Measure the insulation resistances between the live parts and the grounded parts.

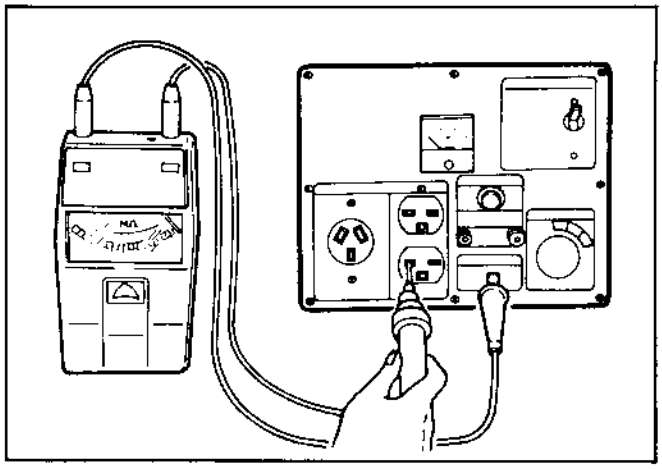


Fig. 8-11

Any part where the insulation resistance is less than 1 MΩ has faulty insulation, and may cause electric leakage and electric shock.
Replace the faulty part.

9. CHECKING FUNCTIONAL MEMBERS

9-1 PILOT LAMP

Check the pilot lamp if it is turned on by applying specified voltage.

Pilot lamp cannot be checked with circuit tester because its resistance is too large. (See Fig. 9-1.)

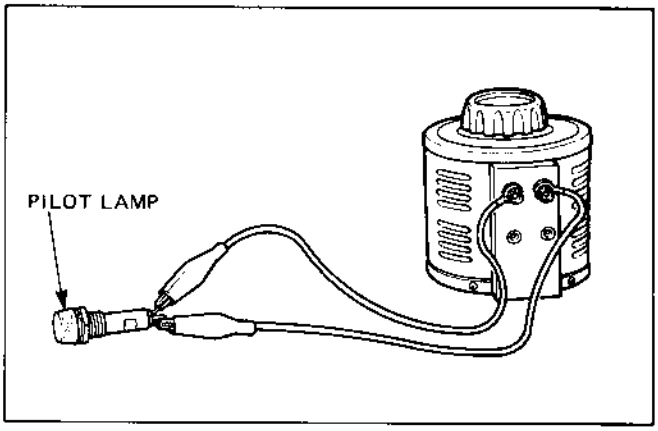


Fig. 9-1

● **RGD3700, RGD5000** . . . . . Pilot lamp should be turned on at 70 to 120V.

9-2 AC RECEPTACLES

Using a circuit tester, check continuity between the two terminals at the rear of the AC receptacles while the receptacle is mounted on the control panel. When continuity is found between the output terminals of the receptacle with a wire connected across these terminals, the AC receptacle is normal. When the wire is removed and no continuity is found between these terminals, the receptacles are also normal.

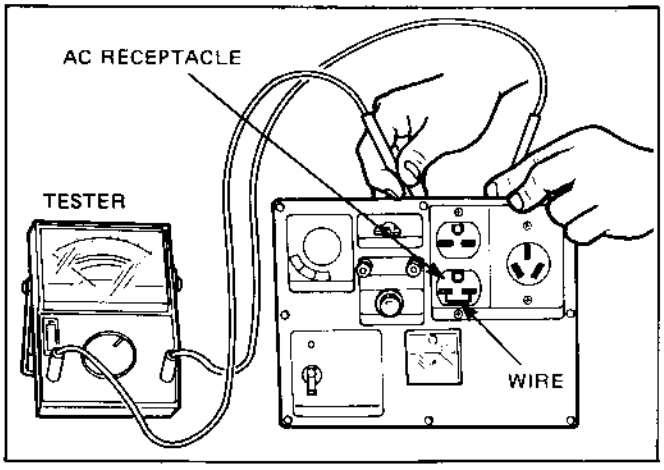


Fig. 9-2A (Front)

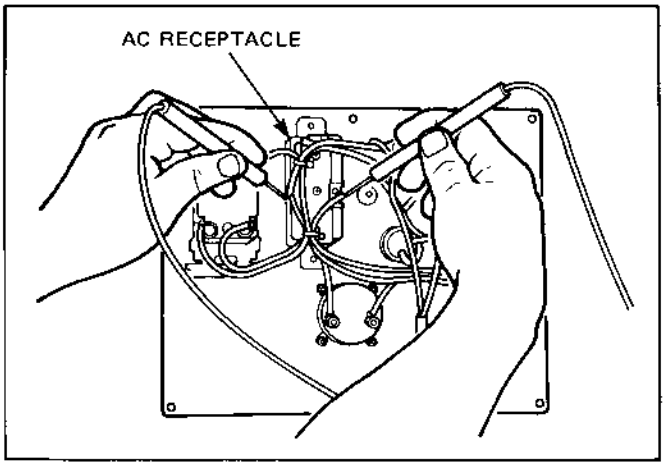


Fig. 9-2B (Rear)

9-3 CIRCUIT BREAKER

Check continuity between each of two terminals at the rear of the circuit breaker while it is mounted on the control panel. Normally, there is continuity between each of the two when the circuit breaker is on while there is no continuity when the circuit breaker is off.

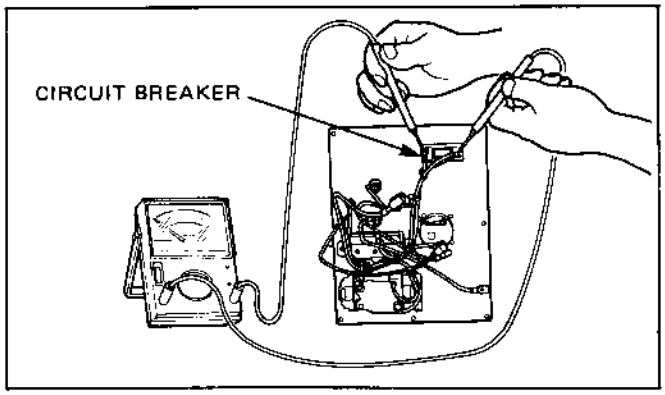


Fig. 9-3

9-4 STATOR

Disengage connectors on the wires from stator and check the resistance between wires with a circuit tester referring to the following table.

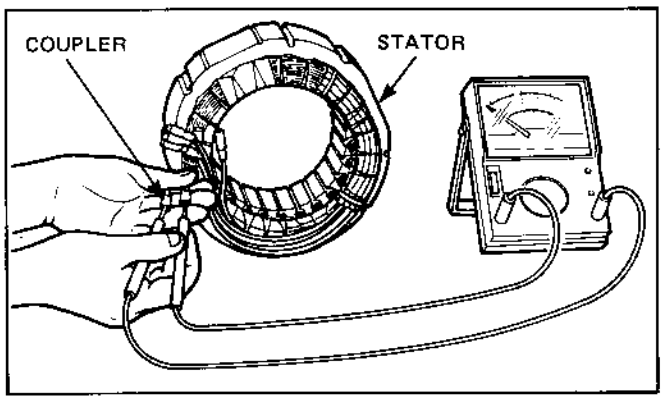


Fig. 9-4

(R x 1Ω ±10%)

MODEL	SPECIFICATION		AC Winding		Condenser Winding
	Hz	Voltage	White-Red	Black-Blue	Yellow-Yellow
RGD3700	50	110V 220V 110V/220V	0.68	0.68	1.35
		240V	0.84	0.84	1.35
	60	220V 110V/220V	0.56	0.56	0.98
		120V 120V/240V	0.56	0.56	0.98
RGD5000	50	110V 220V 110V/220V	0.34	0.34	0.80
		240V	0.41	0.41	0.80
	60	220V 110V/220V	0.26	0.26	0.57
		240V 120V/240V	0.26	0.26	0.57

Table 9-1

NOTE: If the circuit tester is not sufficientlly accurate, it may not show the values given and may give erroneous readings.
Erroneous readings will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from 20°C (68°F).

9-5 ROTOR ASSEMBLY

1) Using the circuit tester, measure the resistance of the field coil.

(R x 1Ω ±10%)

MODEL	RGD3700	RGD5000
Resistance	2.1Ω	1.6Ω

Table 9-2

NOTE 1: Measure the resistance of each coil winding while the diode and each resistor are disconnected with their solder removed.

NOTE 2: If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings.
Erroneous reading will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from 20°C (68°F).

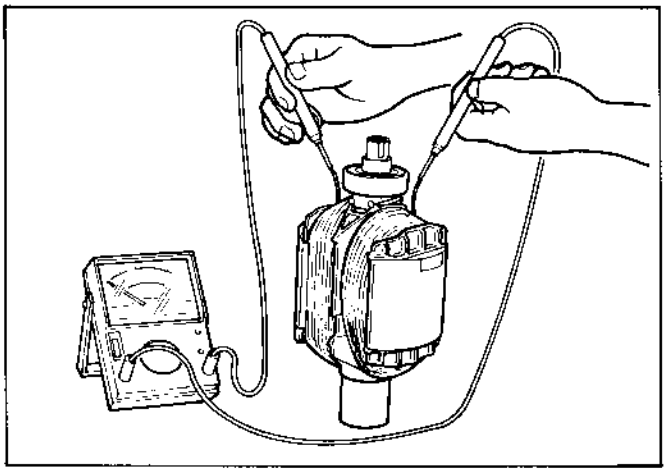


Fig. 9-5

2) Check if the surge absorber is burnt.
Check the resistance of surge absorber.
Normal resistance is ∞Ω.

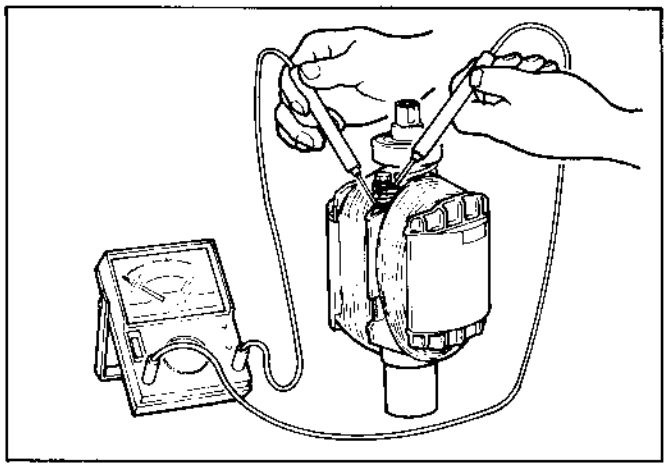


Fig. 9-6

3) Measure the resistance of the diode.

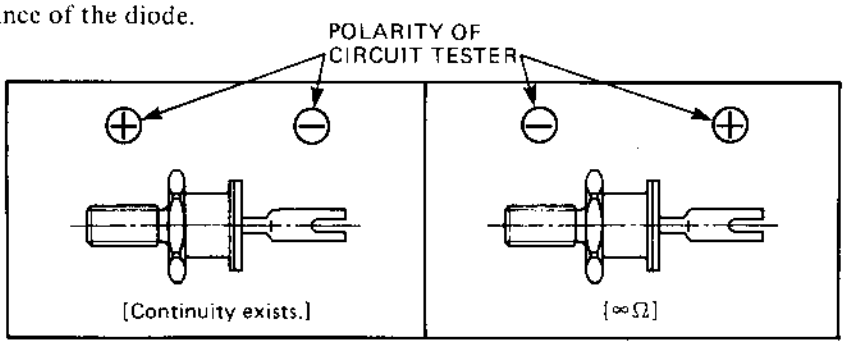


Fig. 9-7

9-6 CONDENSER

■ If an instrument (QC-meter or C-meter) for measuring capacity of condender is available, check the capacity of condenser. (See Fig.9-8.)

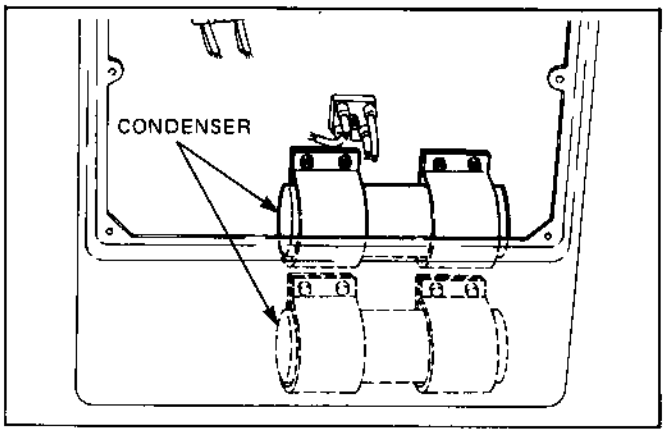


Fig. 9-8

■ **NORMAL CAPACITY OF CONDENSER**

NODEL		RGD3700		RGD5000	
		50 Hz	60 Hz	50 Hz	60 Hz
CAPACITY	①	20μF	20μF	30μF	30μF
	②	20μF	20μF	30μF	30μF

Table 9-3

■ If such an instrument is unavailable, the condenser can be checked by replacing with a new one. If the generator performs good with new condenser, the cause of trouble is defect in original condenser.

9-7 DIODE RECTIFIER

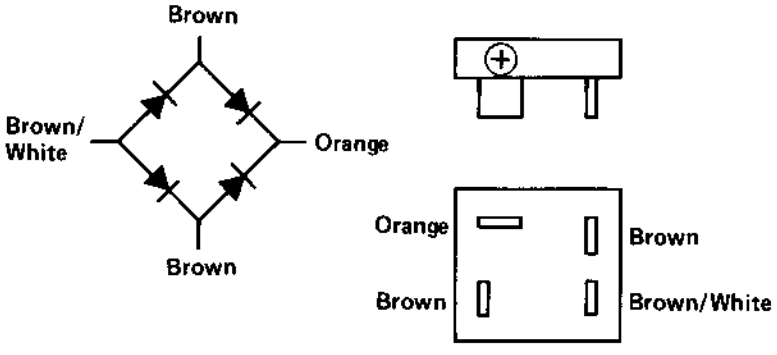


Fig. 9-9

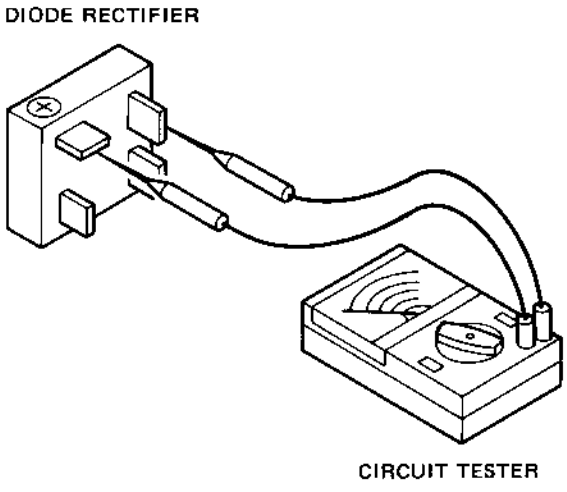


Fig. 9-10

Circuit inside of the diode rectifiers is as shown in Fig.9-9. Check continuity between each terminal by using a circuit tester as shown in Fig. 9-10. The rectifier is normal when continuity is as follows:

		Apply black ⊖ needle of the circuit tester			
		Brown	Brown	Orange	Brown/White
Apply red ⊕ needle of the circuit tester	Brown		No continuity	No continuity	Continuity
	Brown	No continuity		No continuity	Continuity
	Orange	Continuity	Continuity		Continuity
	Brown/ White	No continuity	No continuity	No continuity	

Table 9-4

NOTE 1: In checking the diode, direction of connection is contrary to the ordinary case because of characteristics of the diode and battery incorporated in the tester.

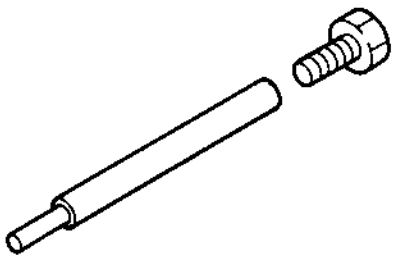
NOTE 2: "Continuity" means forward direction characteristics of the diode, and different from short circuit condition (in which a pointer of the tester goes out of its normal scale), shows resistance to some extent. When results of the checking indicates failure even in one section, replace with a new one.

10. DISASSEMBLY AND ASSEMBLY

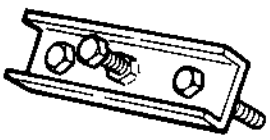
10-1 PREPARATION and PRECAUTIONS

1) Be sure to memorize the location of individual parts when disassembling the generator so that the generator can be reassembed correctly. Tie tags noted with the necessary information to facilitate easier and smoother reassembly.
2) For more convenience, divide the parts into several groups and store them in boxes.
3) To prevent bolts and nuts from being misplaced or installed incorrectly, place them temporarily back at their original position.
4) Handle disassembled parts with care; clean them before reassembly using a neutral cleaning fluid.
5) Use all disassembly/assembly tools properly, and use the proper tool for each specific job.

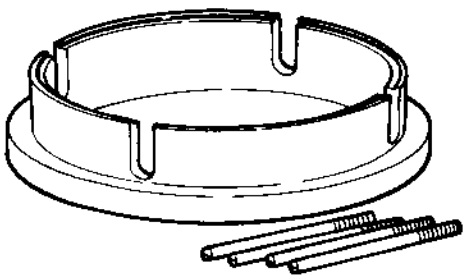
10-2 SPECIAL TOOLS for DISASSEMBLY and ASSEMBLY



ROTOR PULLER



REAR COVER PULLER



JIG

10-3 DISASSEMBLY PROCEDURES

Step	Part to remove	Description	Remarks	Necessary tool
1	Fuel Tank	(1) Discharge fuel from the tank. 1. Turn the fuel cock to close (S). 2. Disconnect the rubber pipe from the injection pump. (See Fig. 10-1.) 3. Turn the fuel cock to OPEN (O) to discharge the fuel.	Do not lose the gasket. Wipe off spilt fuel.	17 mm spanner
		(2) Disconnect the fuel pipe and return pipe from the tank bottom. (See Fig. 10-2.) 1. Remove the hose clamp and pull the fuel pipe off from the tank. 2. Remove the banjo bolt that fastens the return pipe.	Do not lose the gasket	Pliers 12 mm spanner
		(3) Remove the fuel tank. After removing the nut and washer, remove the fuel tank. (See Fig. 10-3.) 8ϕ Flange Nut . . . . . 4 pcs. 8ϕ Washer . . . . . 4 pcs.		12 mm spanner or box spanner
		(4) Remove the fuel filter. 1. Remove the hose clamp, and pull out the air return pipe. (See Fig. 10-4.) 2. Remove the fuel filter bolts and the fuel filter.		Pliers 12 mm spanner or box spanner

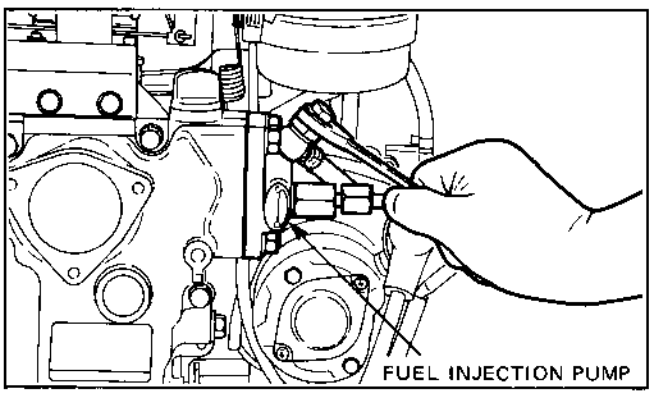


Fig. 10-1

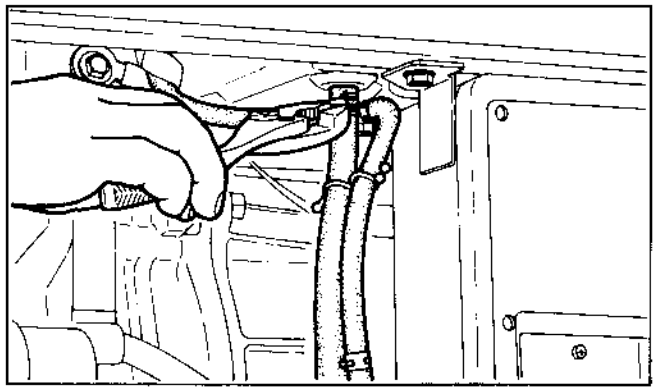


Fig. 10-2

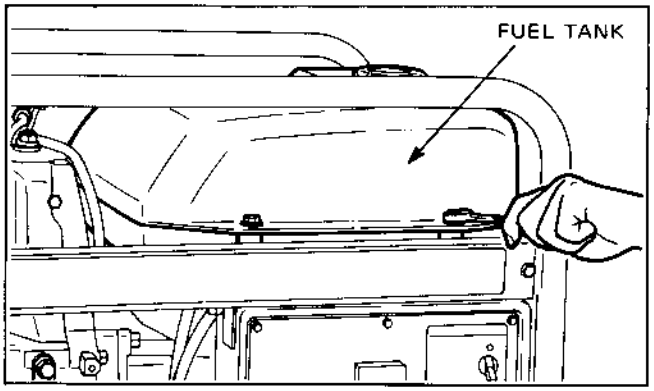


Fig. 10-3

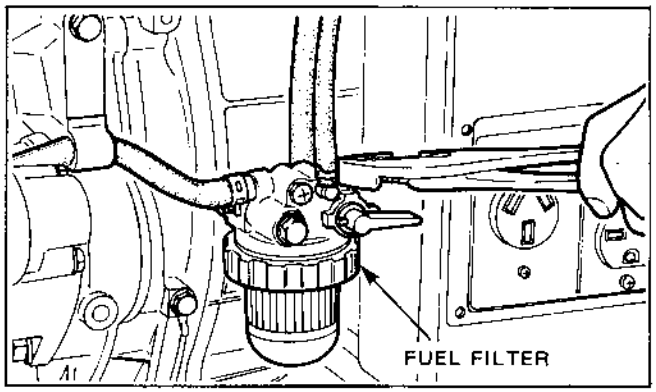


Fig. 10-4

Step	Part to remove	Description	Remarks	Necessary tool
2	Battery (Only electric starter type)	(1) Remove battery cable from battery. Remove the negative side cable first, and then the positive side.	Be careful not to short.	
		(2) Remove battery from battery base. Remove the two nuts that fasten the battery, and take off the battery holder, battery bolts, and battery. 6φ nut . . . . . 2 pcs.		10 mm spanner or box spanner
		(3) Remove battery base from the pipe frame. 6φ bolt . . . . . 2 pcs.		10 mm spanner or box spanner

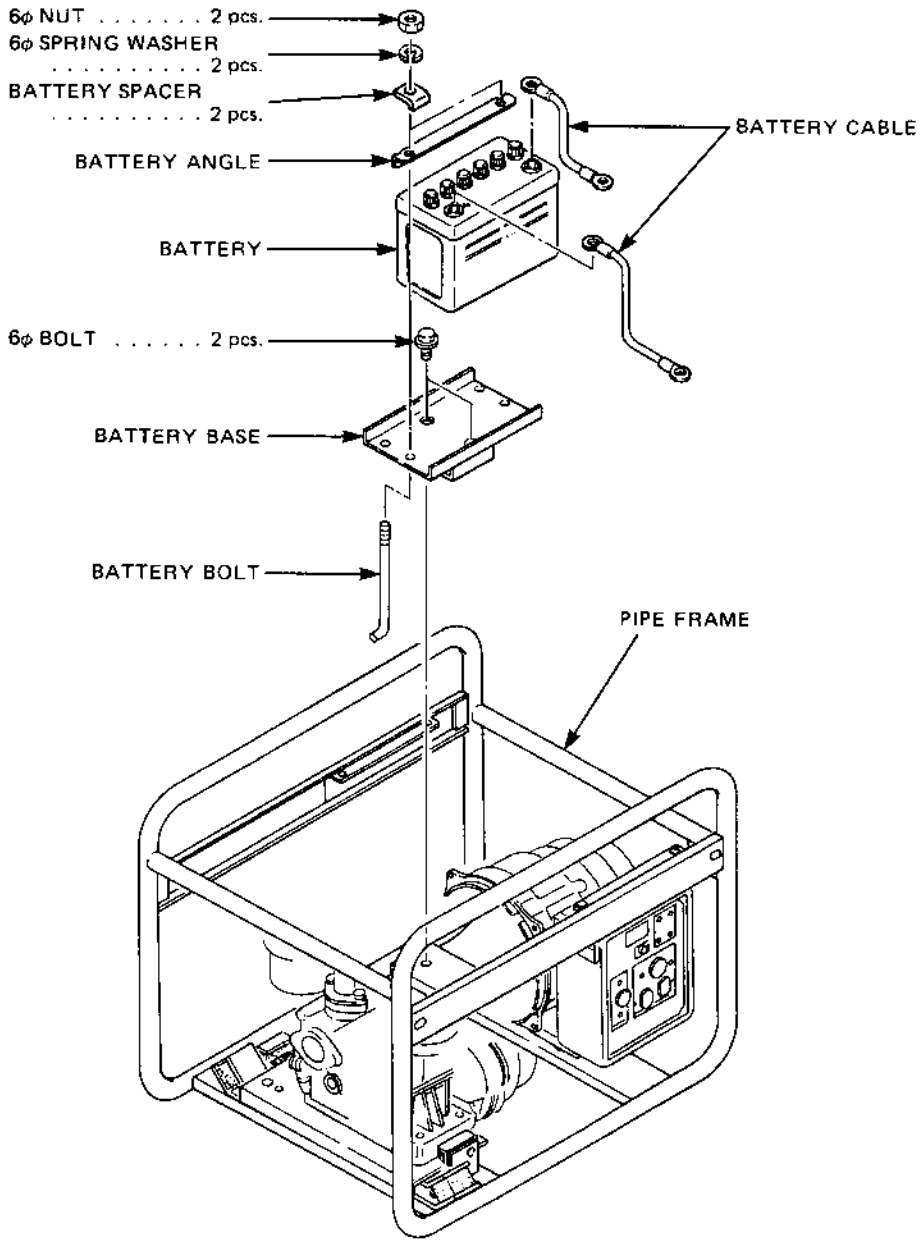
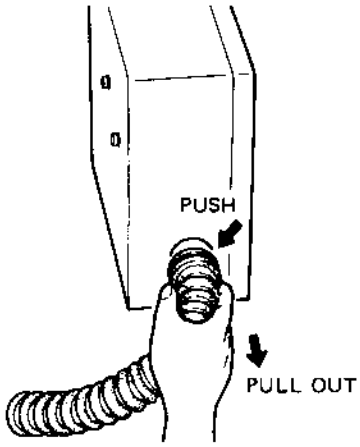
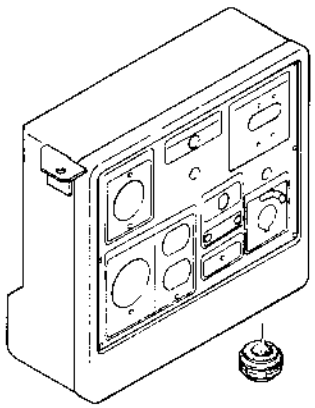
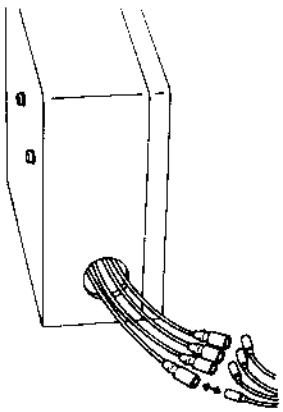
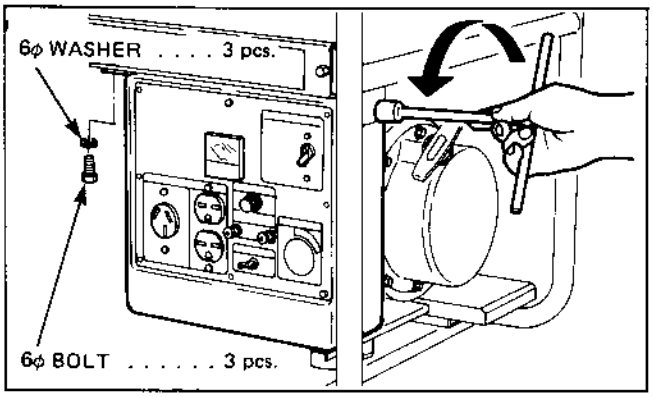
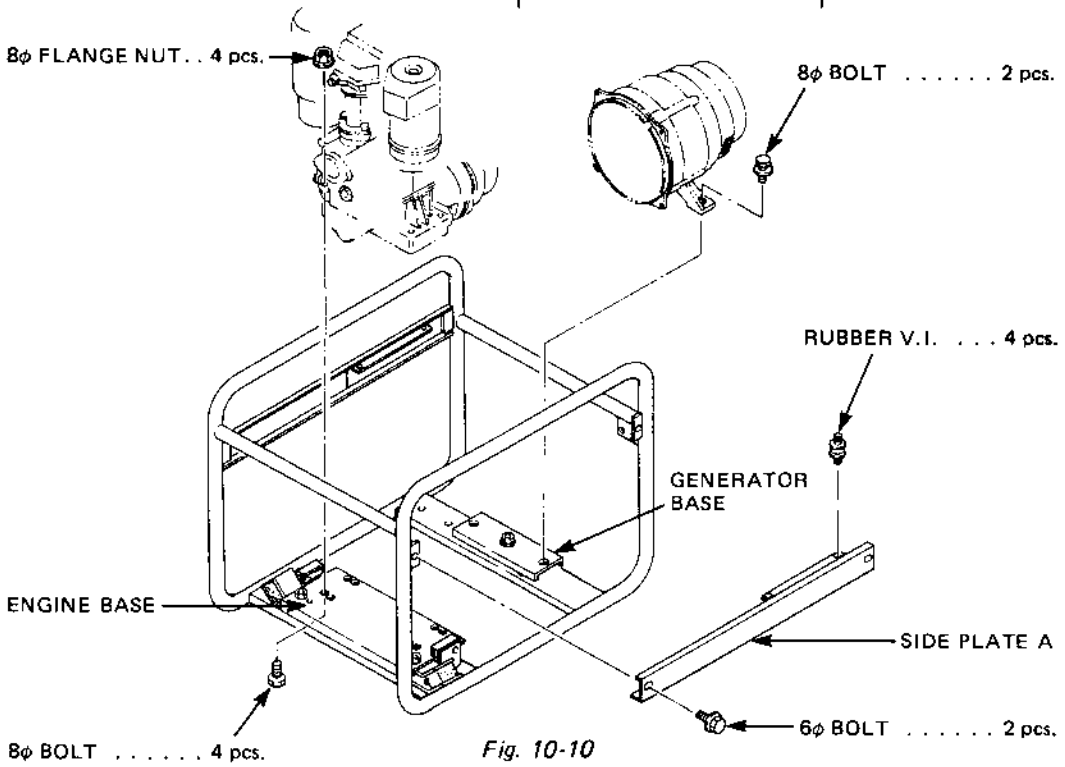


Fig. 10-5

Step	Part to remove	Description	Remarks	Necessary tool
3	Control Box	(1) Take off the bushing from the bottom of the control box.  *Fig. 10-6*	Press the upper end and pull out the bushing.	
		(2) Take out the grommet from the bottom face of the control box.  *Fig. 10-7*		
		(3) Pull out the wires for the oil sensor and electric starter, and remove them from the connectors.  *Fig. 10-8*		

Step	Part to remove	Description	Remarks	Necessary tool
3	Control Box	(4) Remove the control box from the frame. 6φ Washer . . . . . 3 pcs. 6φ bolt . . . . . 3 pcs.		10 mm spanner or box spanner
		 *Fig. 10-9*		
4	Pipe Frame	(1) Remove side plate A. 6φ bolt . . . . . 2 pcs. Remove the mount rubbers from side plate.		
		(2) Remove the nuts and bolts that fasten the generator and frame together. 1. Remove the two bolts which fix the alternator to the generator base. 2. Remove the four bolts and flange nuts which fix the engine to the engine base. 8φ bolt . . . . . 4 pcs. 8φ flange nut . . . . . 4 pcs.	Nuts are welded to the generator base.	12 mm spanner or box spanner
		 *Fig. 10-10*		

Step	Part to remove	Description	Remarks	Necessary tool
4	Pipe Frame	(3) Lift the generator with a chain block and dismount from the frame. (See Fig. 10-11.)	Be careful to keep the belt in place.	

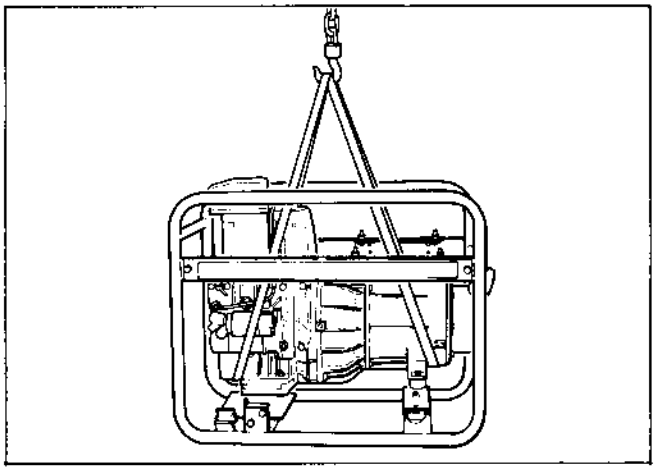


Fig. 10-11

(4) Remove engine base, generator base, and mount rubbers from frame.

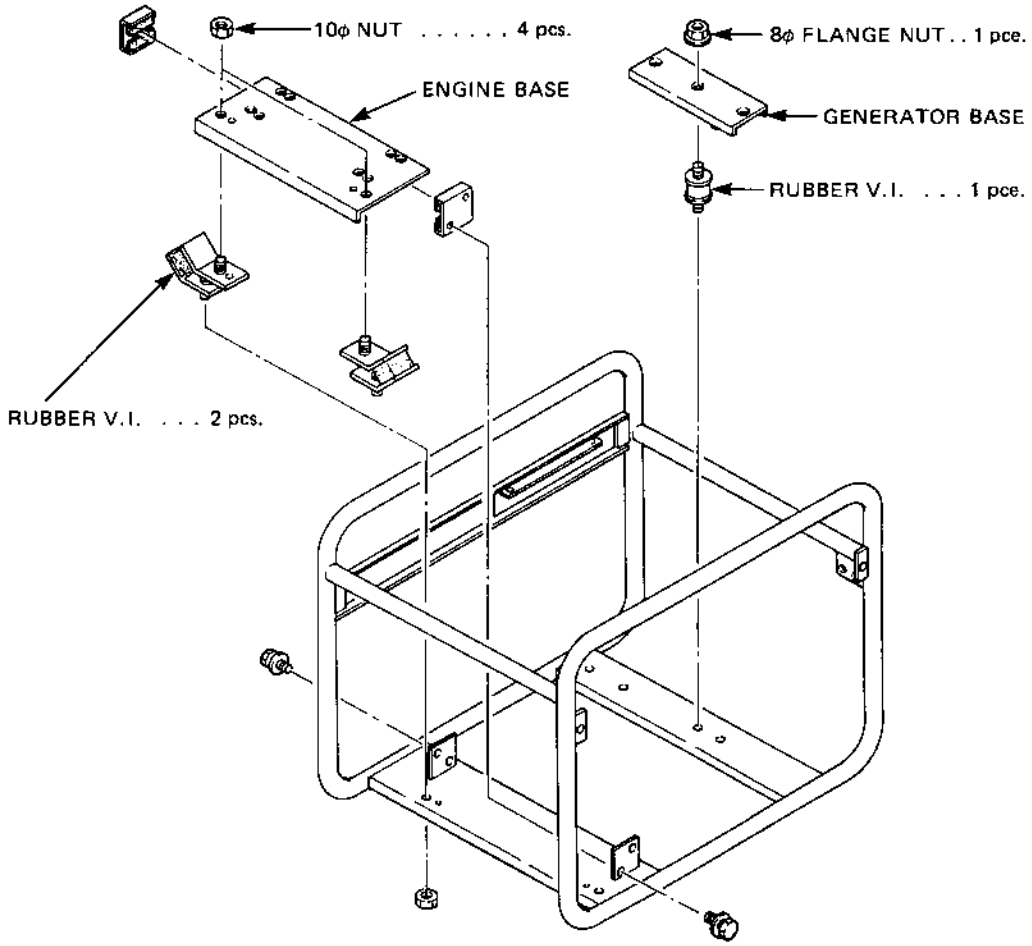


Fig. 10-12

Step	Part to remove	Description	Remarks	Necessary tool
5	Recoil Starter	(1) Remove recoil starter from rear cover. 6φ bolt . . . . . 4 pcs.		10 mm spanner or box spanner
6	Rear Cover	(1) Take off the through bolt and remove the starting pulley and spacer from rotor shaft. Apply a box wrench on the head of through bolt and hit the wrench handle with a hammer counterclockwise to loosen.	Be careful not to lose the key at removing starting pulley.	Box spanner or socket wrench Hammer

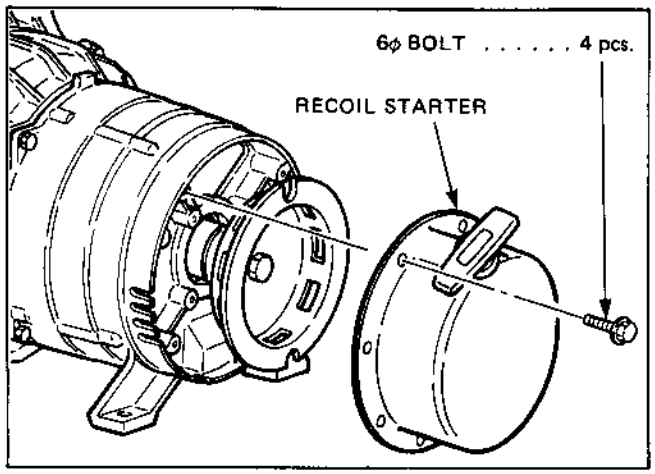


Fig. 10-13

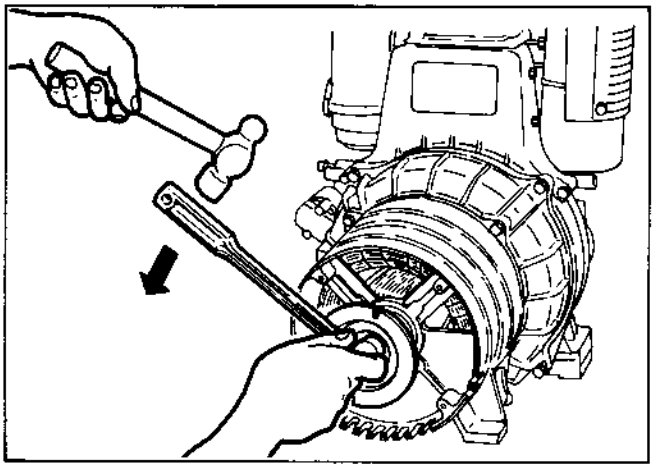


Fig. 10-14

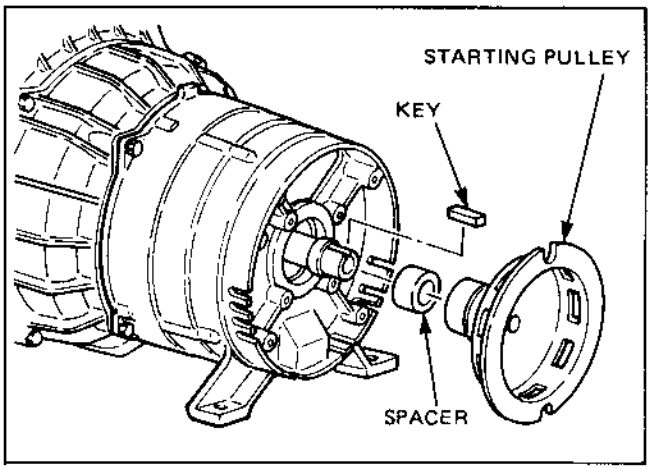


Fig. 10-15

Step	Part to remove	Description	Remarks	Necessary tool
6	Rear Cover	(2) Take off the rear cover. 1. Remove the four bolts which fasten the rear cover to the adapter of the engine. 6φ bolt . . . . . 4 pcs.		10 mm spanner or box spanner
		2. Use a special tool "REAR COVER PULLER" to remove the rear cover. a) Insert the two bolts of the special tool into the thread hole of the rear cover. b) Apply the center bolt of the special tool to the center hole of the rotor shaft. c) Tighten the center bolt to pull out the rear cover.	Insert the two bolts sufficently and evenly or the thread hole may be damaged at removing.	Special tool 17 mm spanner Driver

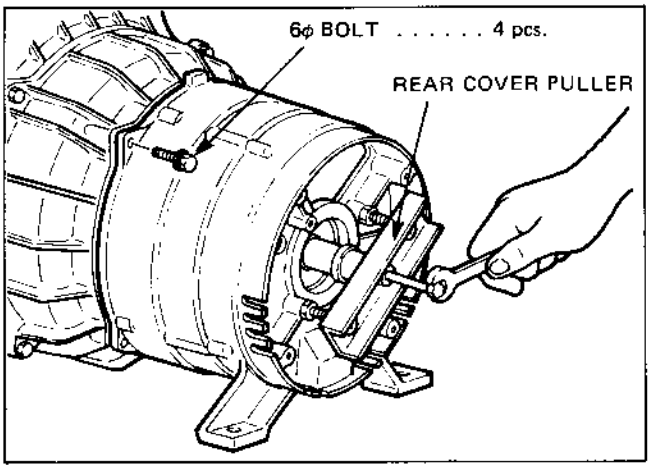


Fig. 10-16

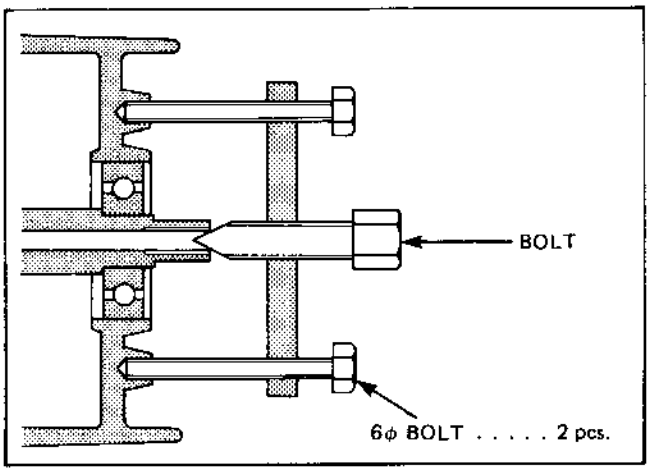


Fig. 10-17

		In case that "REAR COVER PULLER" is unavailable, remove the rear cover by the following instructions. 1. Insert the through bolt into the rotor shaft and tighten lightly. Hit on the boss and legs of rear cover with a plastic hammer.	Do not give a strong hit on the rear cover boss or legs.	Box spanner or socket wrench Plastic hammer

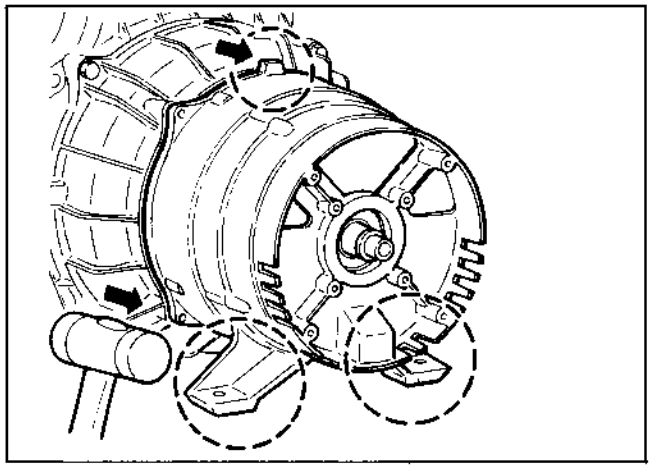


Fig. 10-18

Step	Part to remove	Description	Remarks	Necessary tool
7	Stator	(1) Remove support ring. 1. Remove the four bolts which fasten the stator to the rear cover. 2. Insert a small hook into the hole inside of the support ring and pull it out.		10 mm socket

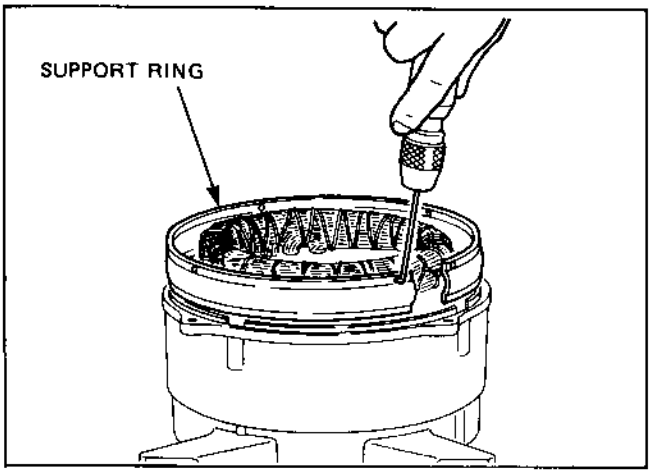


Fig. 10-19

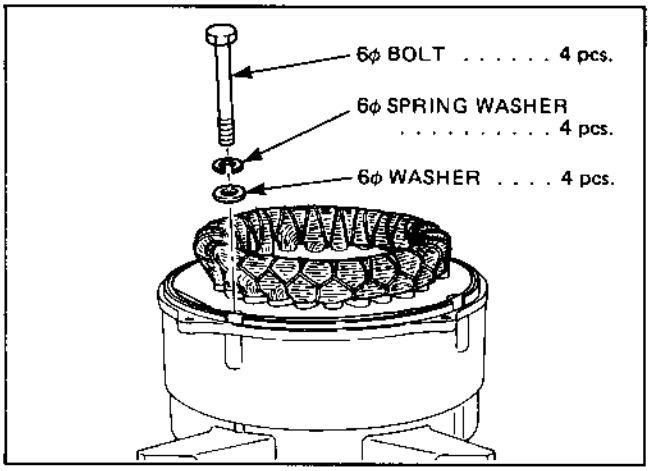


Fig. 10-20

(2) Take apart the stator from the rear cover.
NOTE: Use utmost care not to give damage to the stator insulation and stator leads.

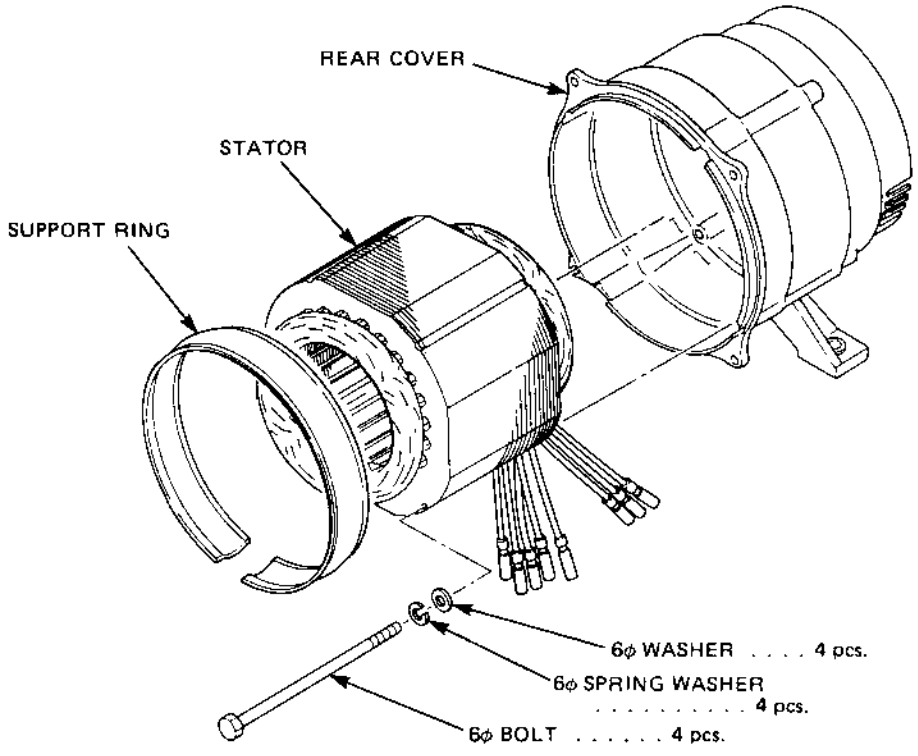


Fig. 10-21

Step	Part to remove	Description	Remarks	Necessary tool
8	ROTOR	(1) Insert the rotor-puller shaft into the rotor, and tighten the rotor-puller bolt until the rotor comes loose. If the special tool is unavailable, take the following instructions to remove the rotor. Lightly strike the rotor core with plastic hammer, and pull out the rotor from the tapered shaft of the engine. If the rotor cannot be taken off, strike it at different angles. (See Fig. 10-23.)	Never strike on the coil.	17 mm spanner Platic hammer

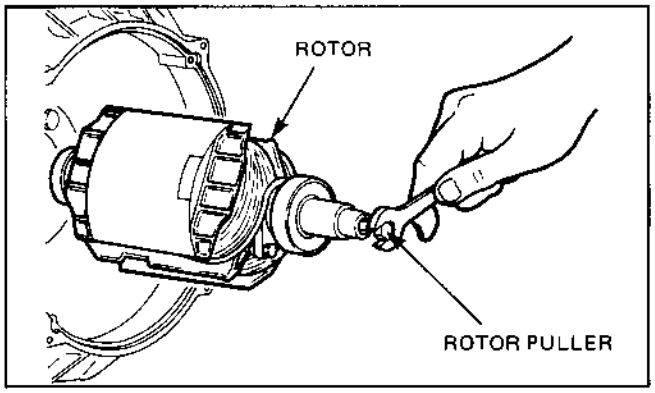


Fig. 10-22

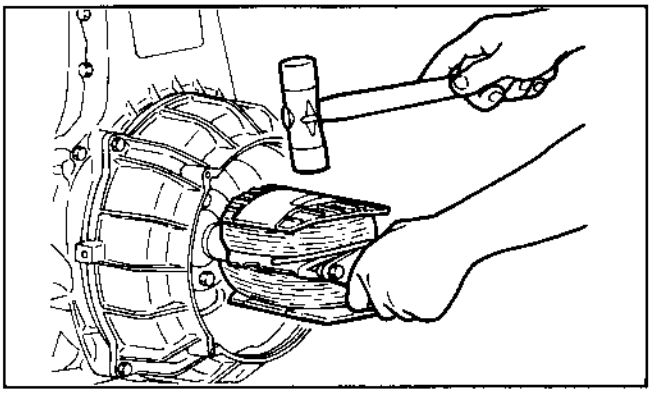


Fig. 10-23

9	Adaptor and Driving Shaft	(1) Remove the four adaptor mounting bolts, and the adaptor. 8ϕ bolt . . . . . 4 pcs.		12 mm spanner
		(2) Remove the four driving shaft mounting bolts, and the driving shaft. 10ϕ bolt . . . . . 4 pcs.		14 mm spanner

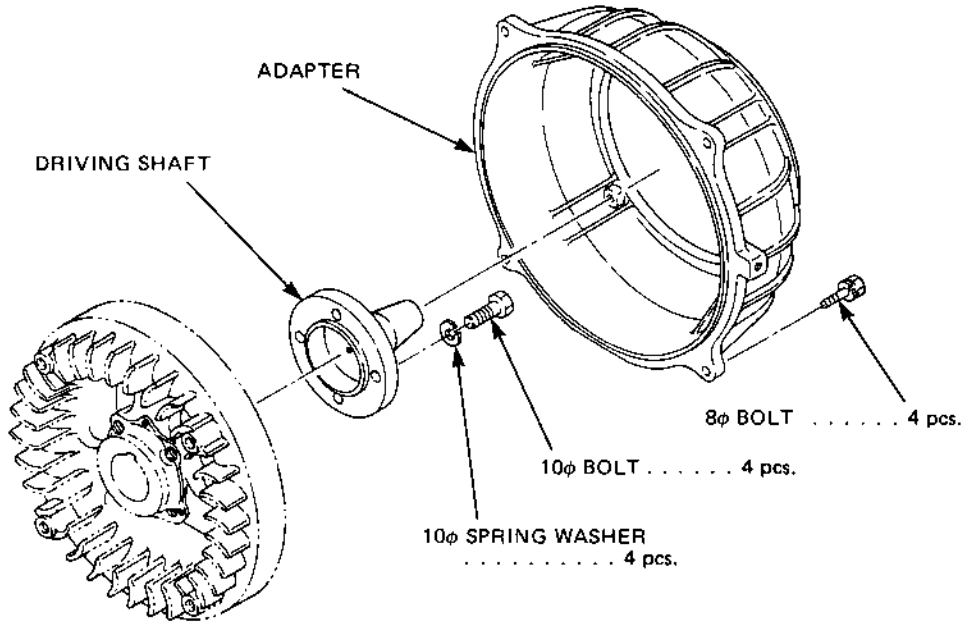


Fig. 10-24

10-4 ASSEMBLY PROCEDURES

10-4-1 DRIVING SHAFT and ADAPTOR

(1) Align the driving shaft with the faucet joint of the flywheel and install it.

10ϕ x 30 mm bolt	4 pcs.
10ϕ spring washer	4 pcs.
Tightening torque	550 ~ 700 kg-cm

(2) Install the adaptor in the blower housing, making sure that its flat side is down and its fuel filter mounting boss on the air cleaner side.

8ϕ x 25 mm bolt	4 pcs.
8ϕ spring washer	4 pcs.
Tightening torque	200 ~ 230 kg-cm

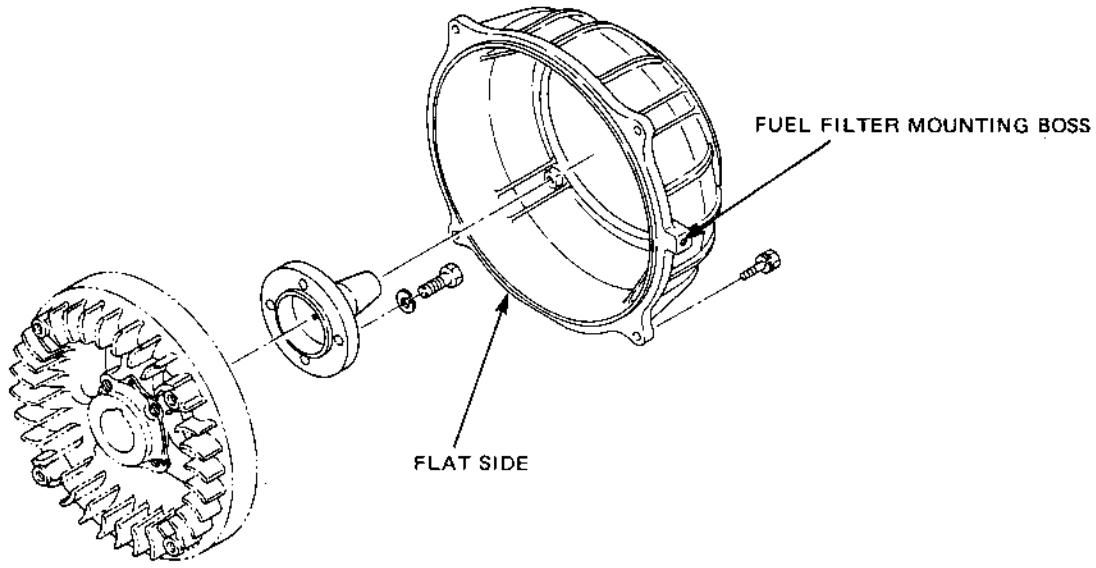


Fig. 10-25

10-4-2 ROTOR

(1) Clean the tapered part of the driving shaft and the matching tapered part of the rotor shaft of oil and dirt with a waste cloth.

(2) Attach the rotor to the engine shaft. Tighten the through bolt tentatively. (See Fig. 10-26.) Apply a wrench on the head of through bolt and hit it clockwise with a hammer to tighten.

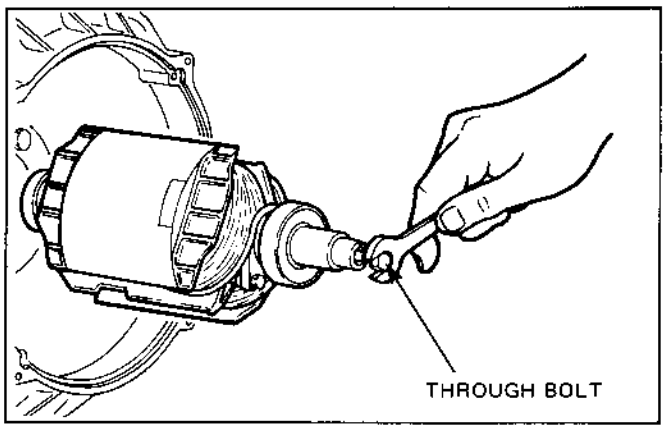


Fig. 10-26

10-4-3 STATOR

(1) Set the stator on the jig so that the grooves on the stator side match with the grooves of the jig. At the same time, be sure to set the stator on the jig so that the lead wires direct to the window of rear cover.
Attach the support ring around the stator.
Check that the hooking holes are placed at the flat sides of the stator. (See Fig. 10-27.)

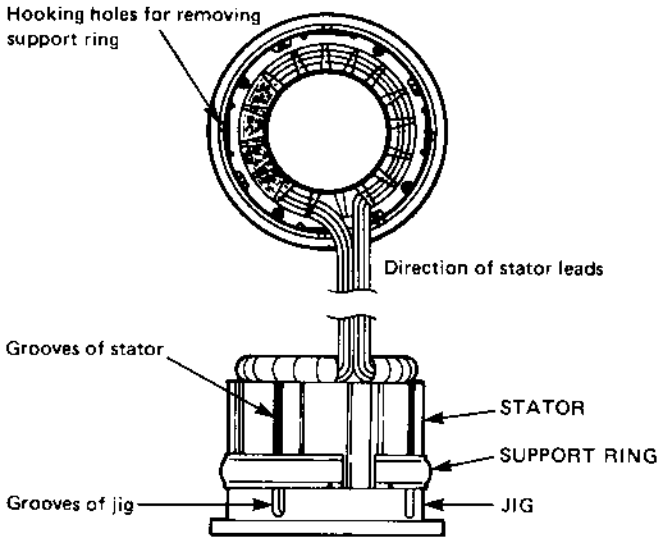


Fig. 10-27

(2) Insert 4 guide bolts in the rear cover and let them match with the grooves in the stator and set the rear cover over the stator.

(3) Take the stator leads out from the window of the rear cover.

(4) Tap lightly and evenly the upper surface of the rear cover with plastic hammer and press the rear cover over the stator. (See Fig. 10-28.)

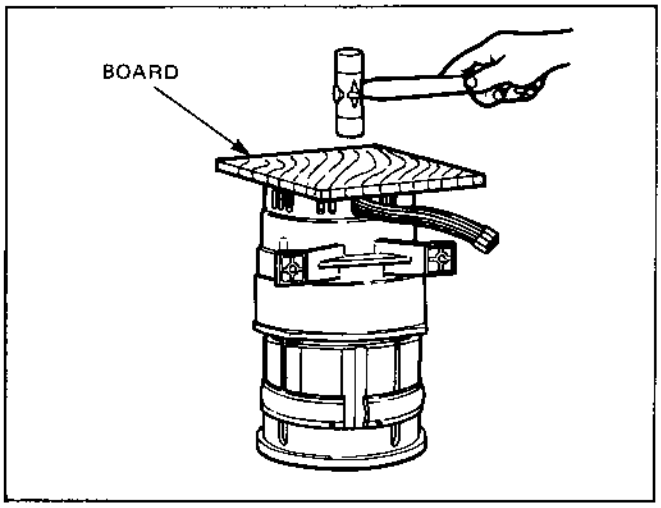


Fig. 10 28

(5) Fix the stator to the rear cover with four bolts, washers and spring washers. (See Fig. 10-29.)

6ϕ bolt	4 pcs.
6ϕ washer	4 pcs.
6ϕ spring washer	4 pcs.
Tightening torque	50 ~ 60 kg-cm

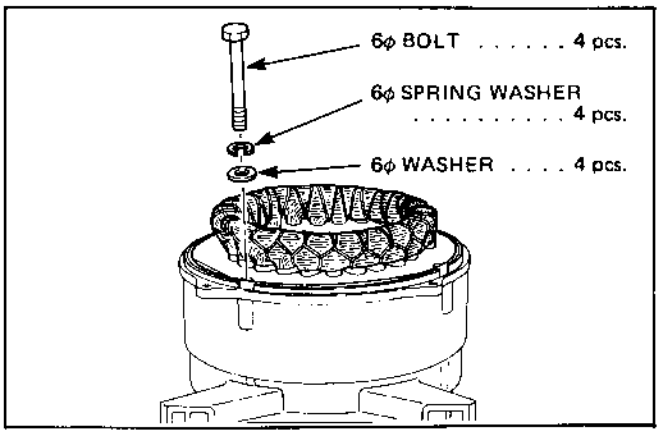
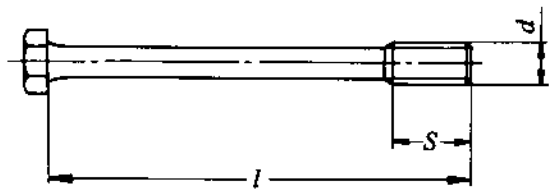


Fig. 10-29

- The dimensions of the stator bolts are shown in Table 10-2.



Model		*l*	*s*	*d*
RGD3700	(mm)	85	40	6
	(inch)	3.35	1.57	0.24
RGD5000	(mm)	115	40	6
	(inch)	4.53	1.57	0.24

Table 10-2

10-4-4 REAR COVER

(1) Attach the bush over the lead wires drawn out from the rear cover. Press the bush end into the window of the rear cover. (See Fig. 10-30.)

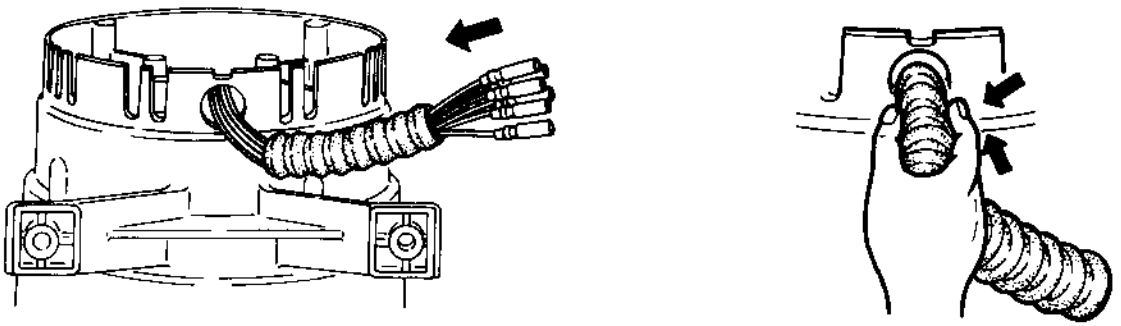


Fig. 10-30

(2) Put the rear cover with stator over the rotor. Tap on the rear cover evenly with a plastic hammer to press the rotor bearing into the rear cover. (See Fig. 10-31.)

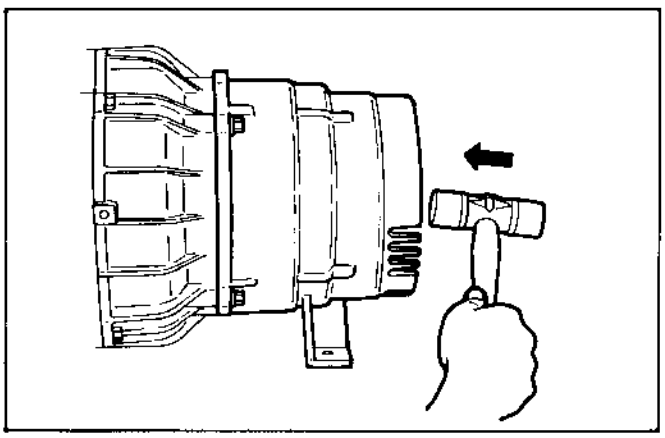


Fig. 10-31

(3) Fix the rear cover to the adaptor with four bolts, spring washers, and washers.
(See Fig. 10-32.)

6ϕ x 25 mm bolt ..... 4 pcs.
6ϕ spring washer ..... 4 pcs.
6ϕ washer ..... 4 pcs.
Tightening torque ..... 50 ~ 60 kg-cm

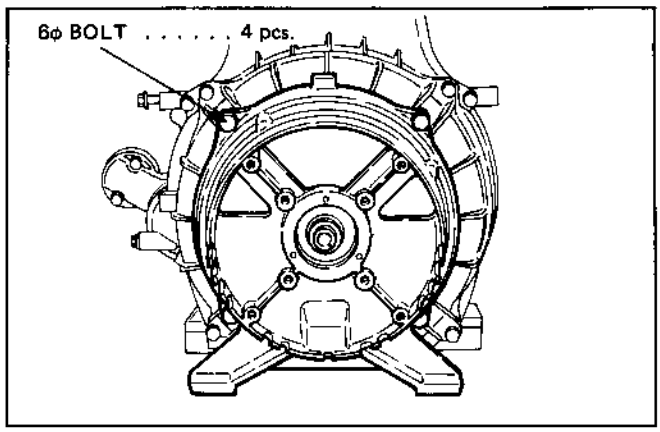


Fig. 10-32

10-4-5 RECOIL STARTER

(1) Remove the through bolt which has been tentatively attached to the rotor.

(2) Insert the key into the keyway of the rotor shaft. (See Fig. 10-33.)
Then, insert the spacer.
Tapping the starter pulley with a plastic hammer, attach the starter pulley to the rotor shaft.

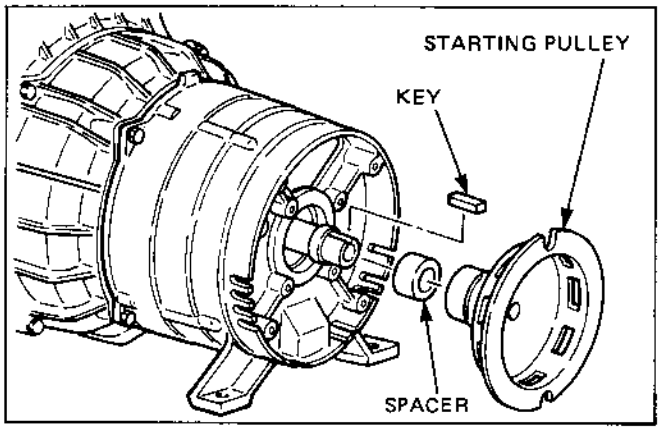
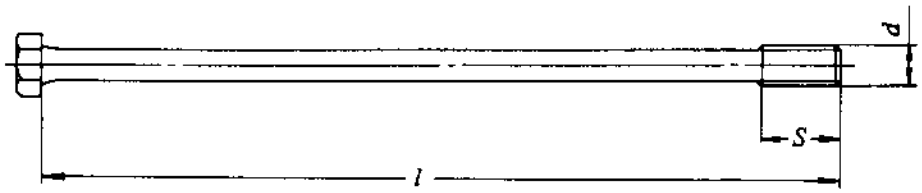


Fig. 10-33

(3) Apply a washer and a spring washer to the through bolt and insert it into the rotor shaft.

Through bolt ..... 1 pce.
10ϕ spring washer ..... 1 pce.
10ϕ washer ..... 1 pce.

- The dimension of the through bolt is shown in Table 10-3.



l	*s*	*d*
220 mm	50 mm	10 mm
8.66 inch	1.97 inch	0.39 inch

Table 10-3

(4) Tighten the through bolt with a box wrench or a spanner.
If an impact wrench is available, use it.
Tightening torque . . . . . 240 ~ 300 kg-cm

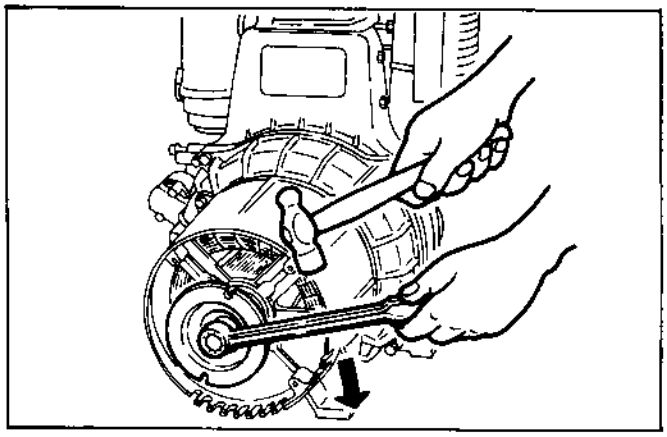


Fig. 10-34

(5) Attach the RECOIL STARTER to REAR COVER.
6ϕ 8 mm flange bolt . . . . 4 pcs.
Tightening torque . . . . . 40 ~ 60 kg-cm

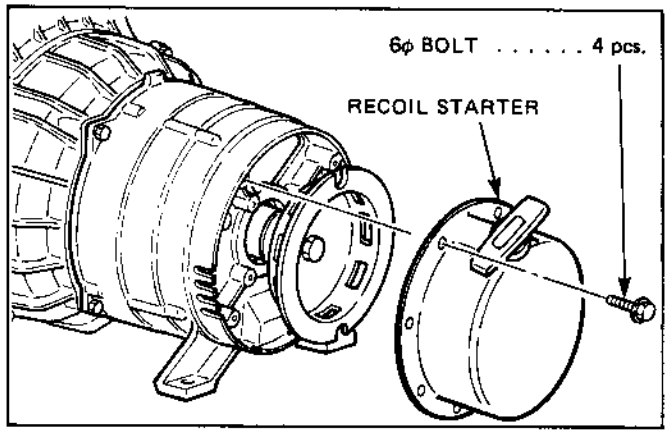


Fig. 10-35

10-4-6 FRAME

(1) Attach two engine mount rubbers and one alternator mount rubber to the frame. (See Fig. 10-36.)
10 mm nut . . . . . 2 pcs.
Tightening torque . . . . . 240 ~ 300 kg-cm

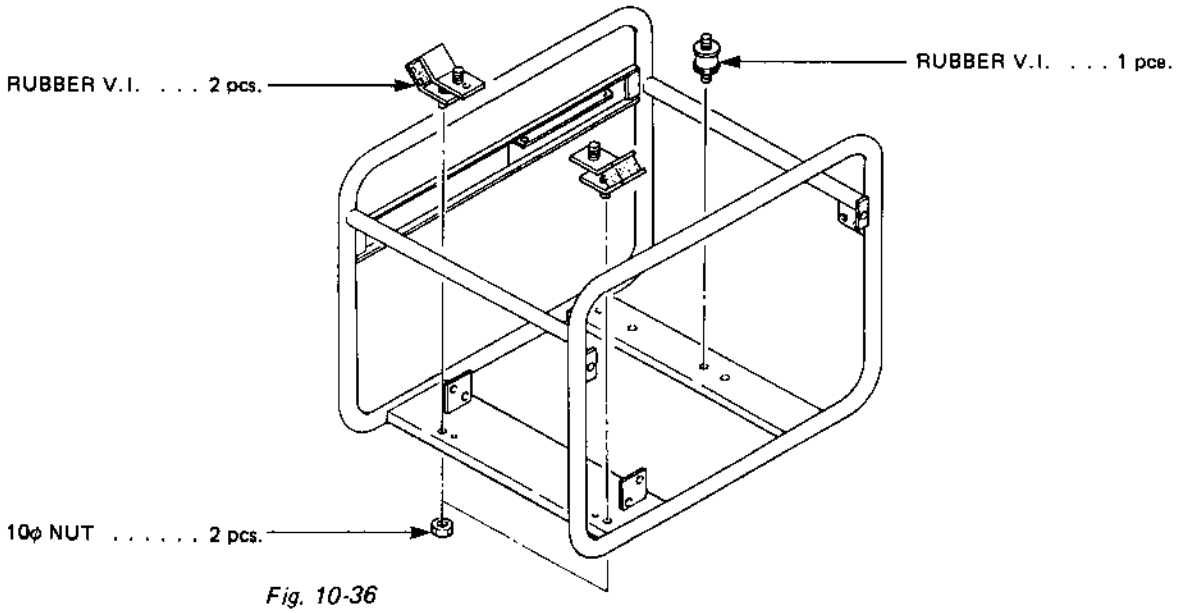


Fig. 10-36

(2) Attach the engine base to the bottom of the engine. (See Fig. 10-37.)
8ϕ x 50 mm bolt ..... 4 pcs.
8ϕ nut ..... 4 pcs.
Tightening torque .....120 ~ 140 kg-cm
NOTE: Insert the bolts from the bottom side of the engine base.

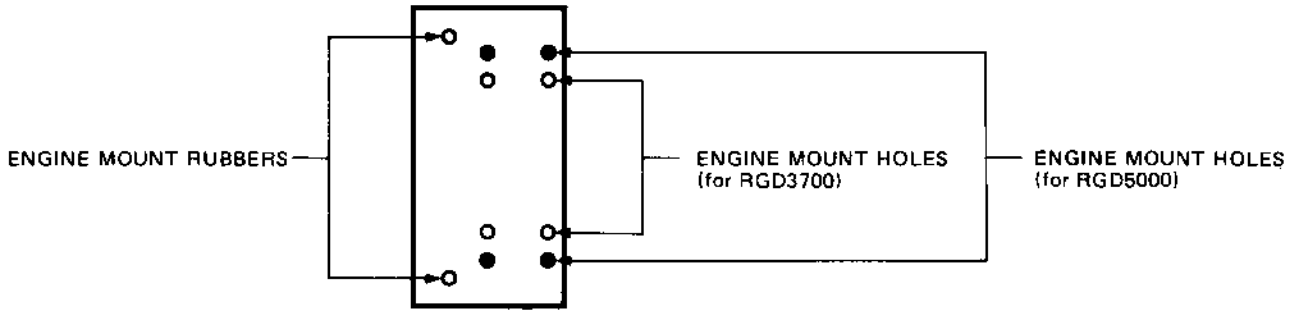


Fig. 10-37

(3) Mount the generator base on the alternator mount rubber and fix with the nut.
8ϕ nut ..... 1 pce.
Tightening torque ..... 120 ~ 140 kg-cm
NOTE: Set the generator base so that the column of the frame is placed in the center of the pipe on the bottom of the generator base.

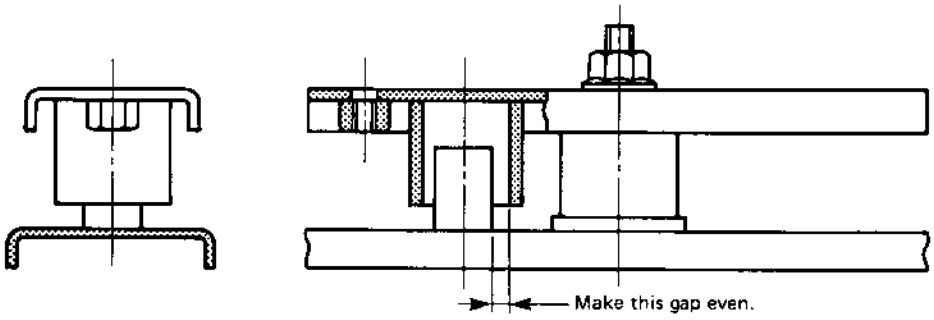


Fig. 10-38

(4) Install the engine and alternator assembly into the frame.
a) Lift the engine and alternator assembly with a chain block, and down it into the frame, making sure that the bolts of the mount rubbers are correctly inserted into the engine base.
b) Fix the engine and a alternator assembly to the mount rubbers.
Tighten the two nuts at engine base and two bolts at generator base.
10ϕ nut ..... 2 pcs.
Tightening torque ..... 240 ~ 300 kg-cm
8ϕ x 25 mm bolt ..... 2 pcs.
Tightening torque ..... 120 ~ 140 kg-cm

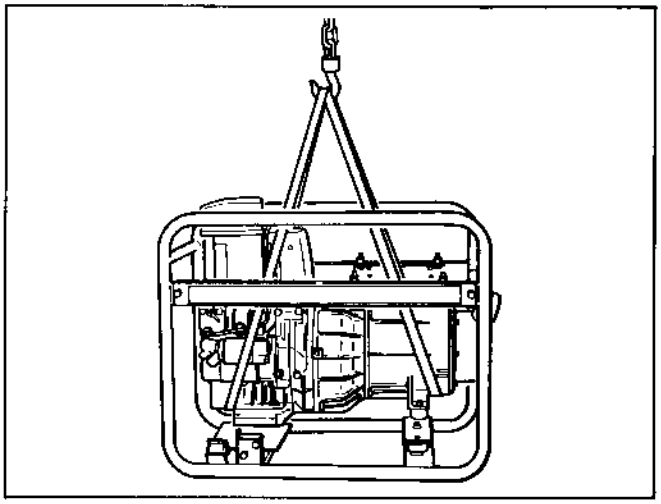


Fig. 10-39

NOTE: When tightening the nuts and bolts, slightly lift the engine and alternator assembly so that the weight is not applied to the mount rubbers.

(5) Attach the stoppers to the frame.

NOTE 1: Set the stoppers so that the engine base is placed in the center of the upper and the lower rubbers. (See Fig. 10-40.)

NOTE 2: If the engine mount rubbers are replaced with new ones, set the stoppers so that the upper rubber touches the engine base. The new mount rubber shall be distorted by approx. 3 mm in one month.

8ϕ x 12 mm bolt ..... 4 pcs.
Tightening torque .....120 ~ 140 kg-cm

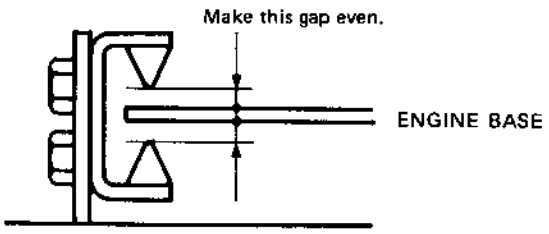


Fig. 10-40

(6) Attach side plate A to frame.
6ϕ x 10 mm bolt ..... 2 pcs.
Attach fuel tank mount rubbers to side plates.
The nuts for mount rubbers are welded to side plates.
Tightening torque ..... 40 ~ 60 kg-cm

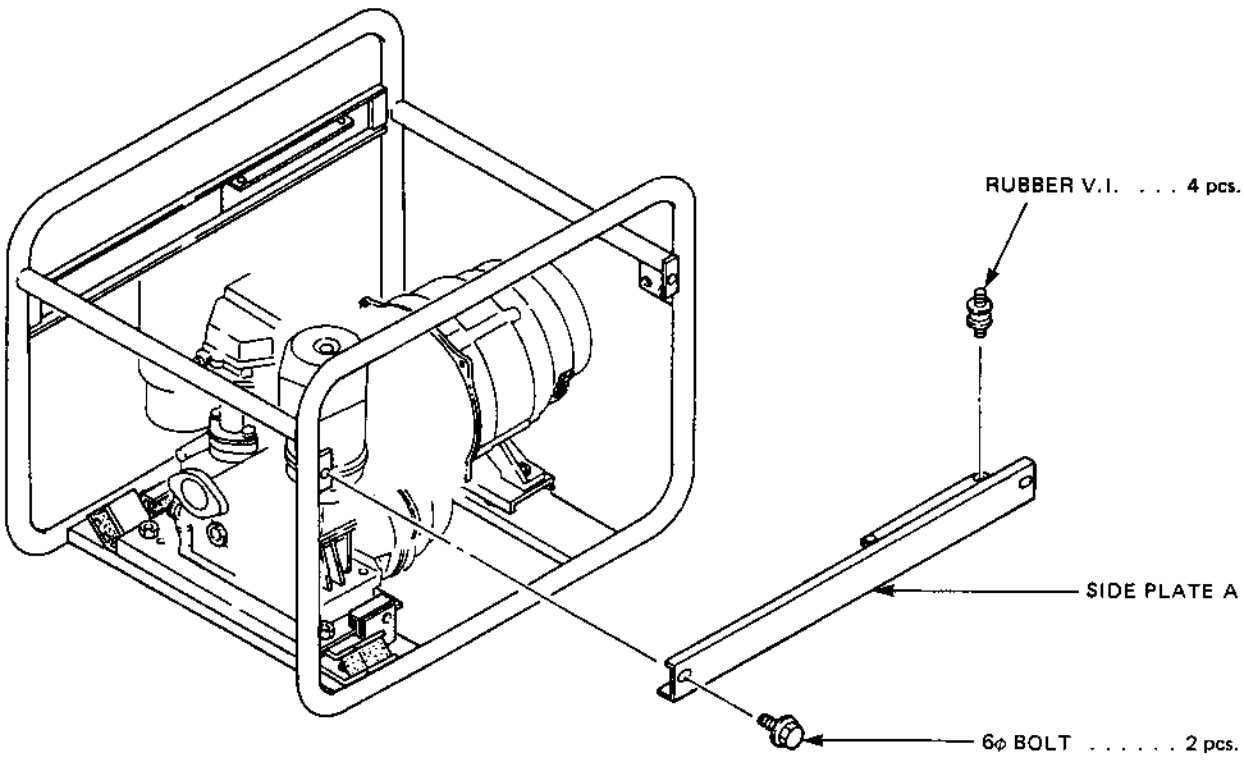


Fig. 10-41

10-4-7 CONTROL BOX

Mount the control box assembly to the frame.
Refer to Section 10-5 for disassembly, checking and reassembly procedures of the control box.

(1) Mount the control box to the frame. (See Fig. 10-42.)
   6ϕ x 10 mm flange bolt .... 3 pcs.
   6ϕ washer ..... 3 pcs.
   Tightening torque ..... 40 ~ 60 kg-cm

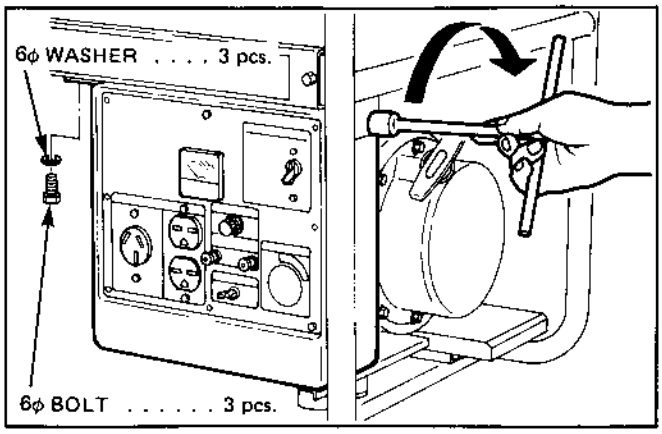


Fig. 10-42

(2) Connect the wires drawn out from the stator to the wires from the control box. Connect the oil sensor wires at the same time.
   NOTE: Connect the wires of the same color.

(3) Press the upper end of the bushing into the bottom window of the control box. (See Fig. 10-43.)
   Attach the grommet for the oil sensor wires to the rear panel of the control box.

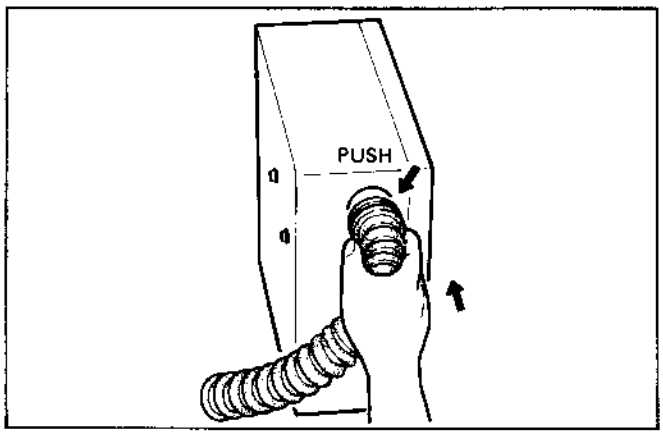
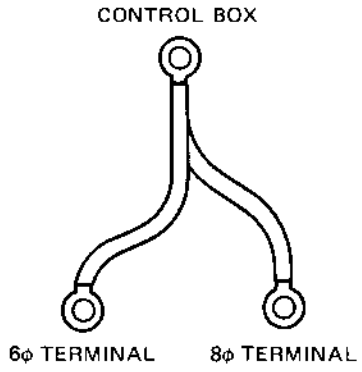


Fig. 10-43

(4) Fasten the one earth cable with 8ϕ terminal drawn out from the control box to the rear cover leg.
   8ϕ x 25 mm bolt ..... 1 pce.
   Tightening torque ..... 120 ~ 240 kg-cm
   Fasten the other earth cable with 6ϕ terminal to the unpainted bolt hole on the frame. (See Fig. 10-44.)



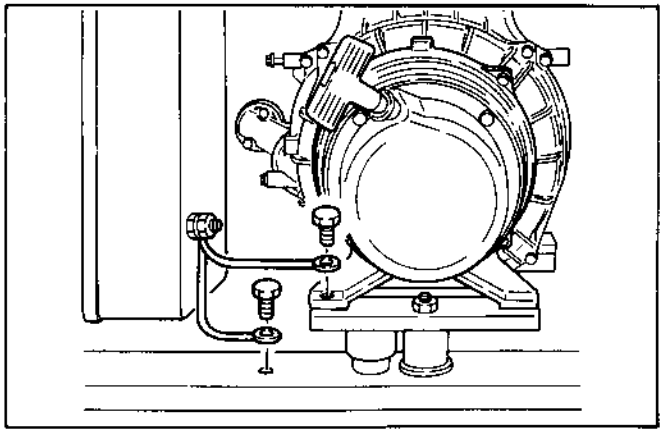


Fig. 10-44

10-4-8 BATTERY

(1) Attach the battery base to the frame.

6ϕ x 10 mm bolt ..... 2 pcs.
Tightening torque ..... 40 ~ 60 kg-cm

(2) Mount the battery on the battery base, and fix it with two battery bolts and a battery angle. (See Fig. 10-45.)

6ϕ nut ..... 2 pcs.
6ϕ spring washer ..... 2 pcs.
Tightening torque ..... 40 ~ 60 kg-cm

(3) Attach battery cords to the battery.
Attach the positive (+) cord first and then the negative (−) cord.
Fasten the other end of the negative (−) cord to the engine base using the engine mount nut.

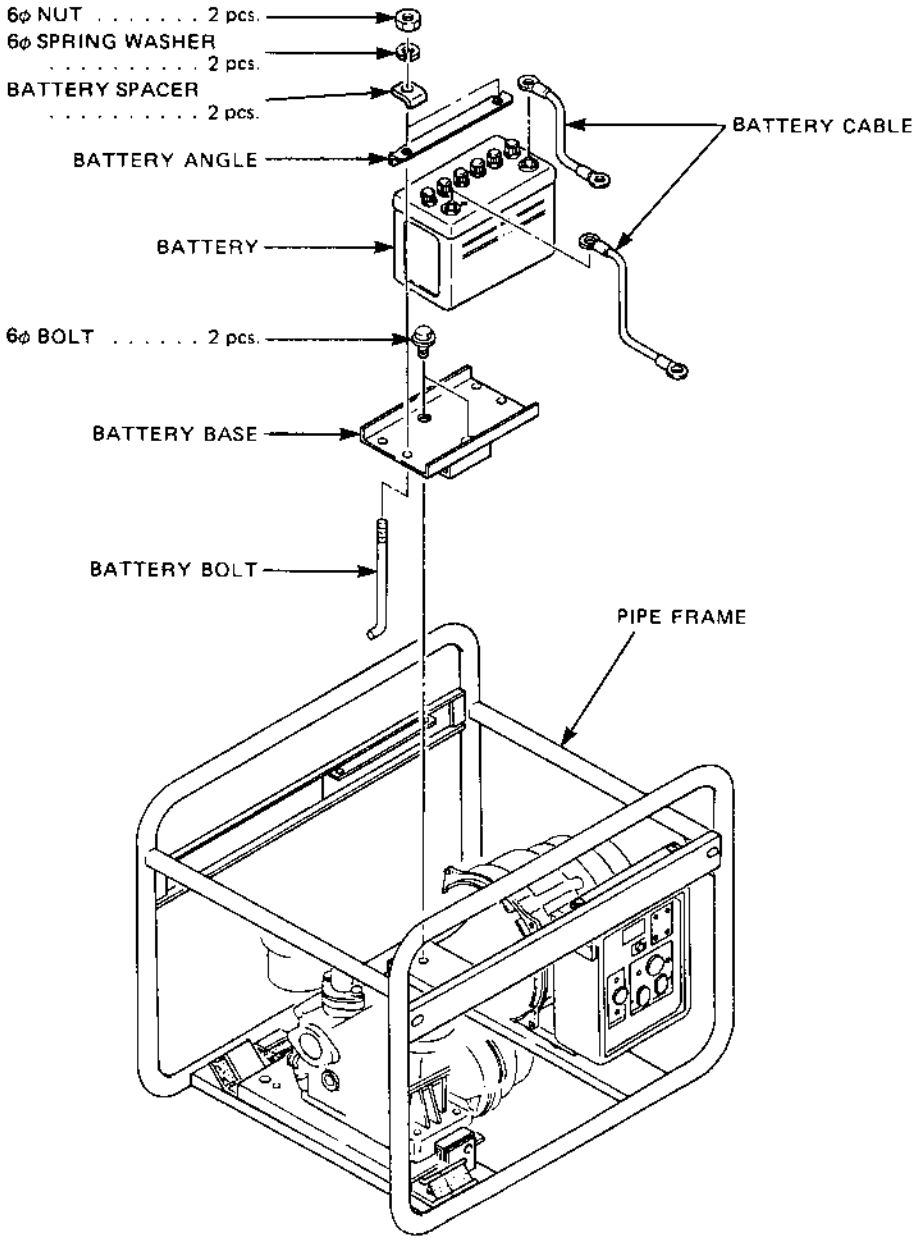


Fig. 10-45

10-4-9 FUEL TANK

(1) Connect fuel pipe 29 complete and rubber pipe (6 mm inside diameter, 12 mm outside diameter, 170 mm long) to the fuel tank.

a) Connect the rubber pipe and fasten it with the hose clamp (10.5 mm inside diameter).

b) Connect fuel pipe 29 complete to both ends of the banjo and tighten it with banjo bolt using two pieces of GASKET (ALUMINUM).

Tightening torque ..... 80 ~ 100 kg-cm

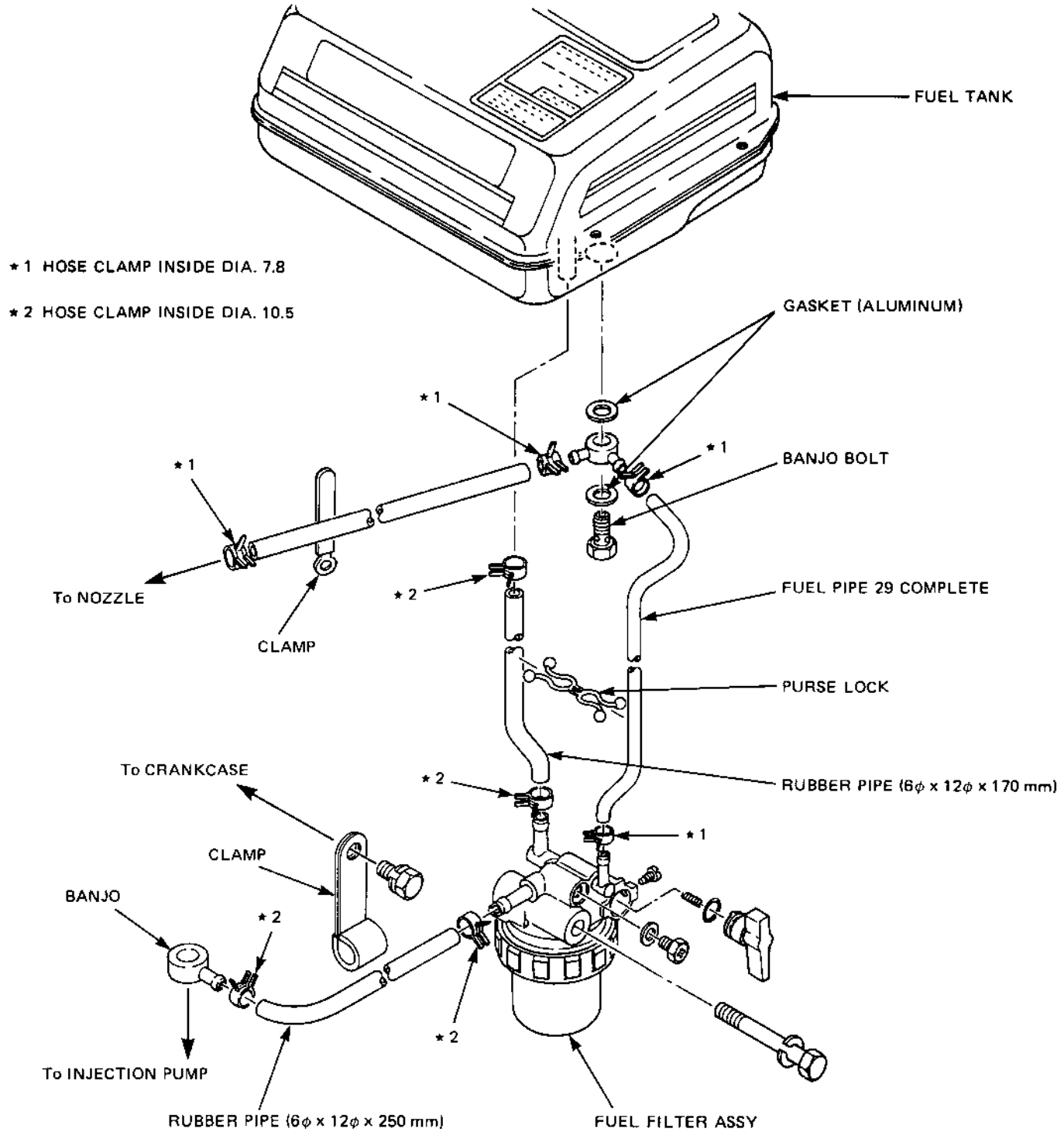


Fig. 10-46

(2) Mount the fuel tank on the mount rubbers attached to the side plates.

8ϕ nut ..... 4 pcs.
8ϕ spring washer ..... 4 pcs.
Tightening torque ..... 120 ~ 140 kg-cm

(3) Connect the fuel pipe.

a) Install the fuel filter assembly on the boss on the side of the adaptor (generator).
8ϕ x 65 mm bolt ..... 1 pce.

b) Connect the other end of the pipe installed in Step (1) to the fuel filter.
Slide the hose clamp over the pipe, connect the pipe to the fuel filter, and clamp the pipe at the correct point.
Then, secure the pipe with the purse lock.
NOTE: Connect the shorter pipe of fuel pipe 29 complete to the fuel filter. The hose clamp for the rubber pipe has an inside diameter of 10.5 mm, and that for fuel pipe 29 complete is 7.8 mm in inside diameter.

c) Connect the longer pipe of fuel pipe 29 complete to the engine nozzle.
The nozzle must be pulled up from the cylinder head before connecting the pipe to it.
After pulling the nozzle up, slide the hose clamp (7.8 mm in inside diameter) over the pipe, connect the pipe to the nozzle, and fasten the pipe with the hose clamp at the correct point.
Then, install the nozzle on the head.
Mount the bracket on the blower housing, and secure the pipe with the clamp.

d) Connect the fuel filter and injection pump with pipe.
Fit the banjo to the rubber pipe (6 mm in inside diameter, 12 mm in outside diameter, 250 mm long) and clamp it. Connect the other end of the pipe to the fuel filter and clamp it. Connect the banjo to the injection pump. A gasket must be placed on each side of the banjo. Use hose clamps 10.5 mm in inside diameter. Finally, clamp the pipe to the crankcase.

10-5 CHECKING, DISASSEMBLY and REASSEMBLY of the CONTROL BOX

10-5-1 CHECKING OF THE CONTROL BOX

Dismount the control box from frame.
Remove the control panel and check each components and wiring.
Refer to Section 9 for the detail of checking the components in the control box.

10-5-2 DISASSEMBLY

(1) Remove the control panel from the control box.
4ϕ screw . . . . . 8 pcs.

(2) Disconnect the connectors on the wires to detach the control panel and box.

(3) Remove the regulator, oil sensor unit, condensers and diode rectifier from the control box. When removing the regulator, push the hook on the coupler and pull out to disengage the couplers. (See Fig. 10-47.)

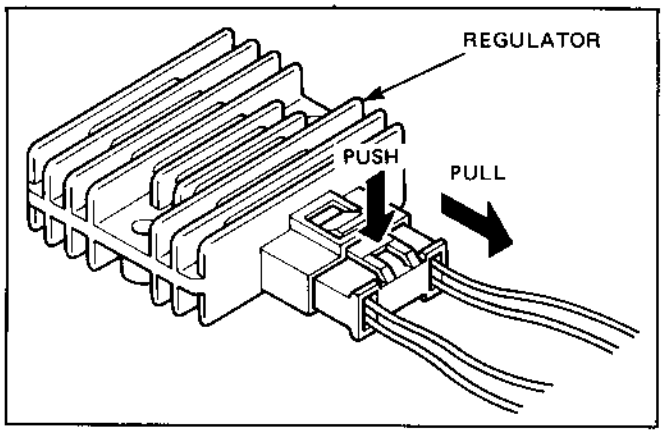


Fig. 10-47

(4) After disconnecting individual wires, remove the control panel components.

NOTE: DC fuse, full power switch, pilot lamp and warning lamp have their wires soldered. Unsolder them to remove those parts if necessary.

10-5-3 REASSEMBLY

(1) Install the receptacles, no-fuse breaker, fuse, terminals, switches, etc. on the control panel and wire them.

NOTE: Circuit diagrams are shown in Section 12. Colored wires are used for easy identification, and are of the correct capacity and size. Use heat-resistant type wires (permissible temperature range 75°C or over) in the specified gauge shown in the circuit diagrams.

(2) Install regulator, oil sensor unit, condensers, and diode rectifier into the control box.

(3) Connect the wires of control panel components and control box.
Fasten the earth wires to the rear of the control box using a 6ϕ nut to the bolt which fixes the condenser bracket to the inside of the control box. (See Fig. 10-48.)

(4) Attach the control panel to the control box.
4ϕ screw . . . . . 8 pcs.
Tightening torque . . . . . 12 ~ 15 kg-cm

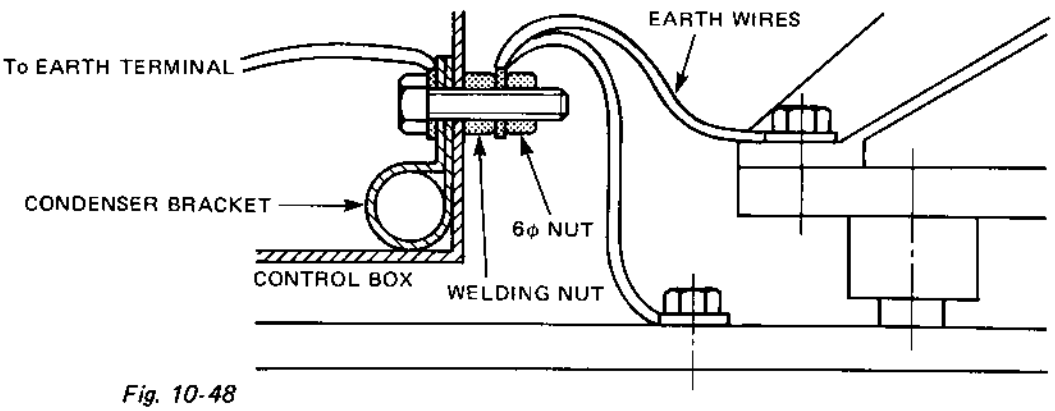


Fig. 10-48

11. TROUBLE SHOOTING

11-1 NO AC OUTPUT

11-1-1 CHECKING STATOR

- Remove control panel and disconnect black, blue, red, and white wires at the connectors.
- Measure the resistance between terminals on stator leads. (See Fig. 11-1.)
  Refer to Table 11-1 for normal resistance. If stator is faulty, replace with a new one.

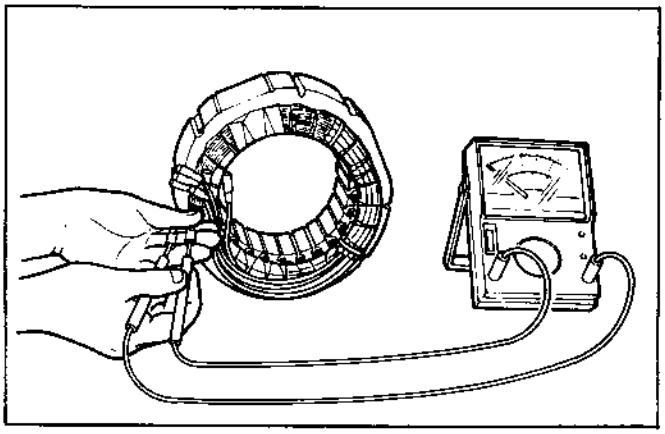


Fig. 11-1

11-1-2 CHECKING CONDENSER

- If an instrument (QC-meter or C-meter) for measuring capacity of condender is available, check the capacity of condenser. (See Fig. 11-2.)

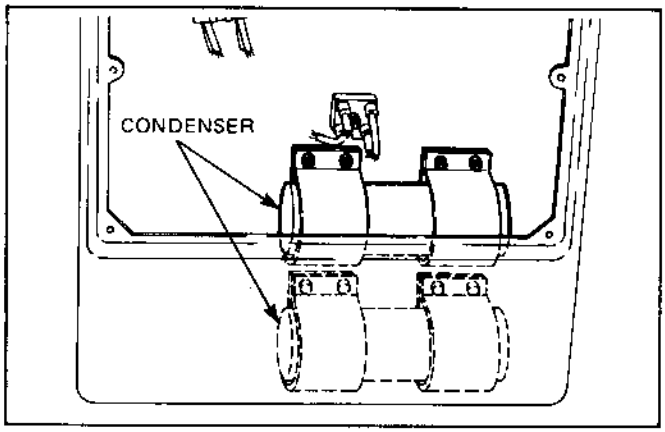


Fig. 11-2

- NORMAL CAPACITY OF CONDENSER

NODEL		RGD3700		RGD5000	
		50 Hz	60 Hz	50 Hz	60 Hz
CAPACITY	①	20μF	20μF	30μF	30μF
	②	20μF	20μF	30μF	30μF

Table 11-1

- If such an instrument is unavailable, the condenser can be checked by replacing with a new one. If the generator performs good with new condenser, the cause of trouble is defect in original condenser.

11-1-3 CHECKING OF ROTOR

(1) CHECKING FIELD COIL

- Remove rear cover and stator.
- Unsolder the coil ends from the terminals on the rotor. (See Fig. 11-3.)

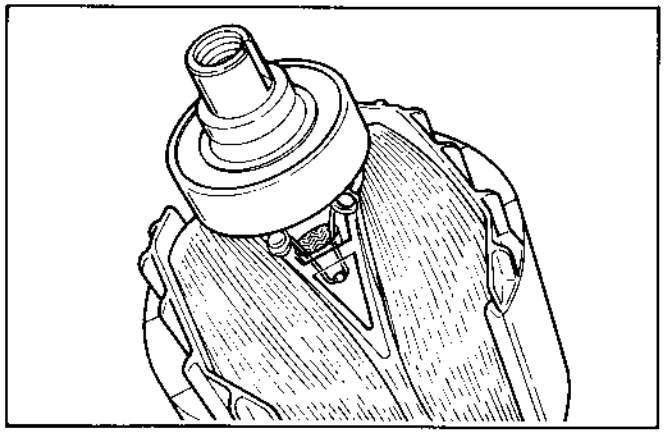


Fig. 11-3

- Measure the resistance of field coil with a circuit tester. (See Fig. 11-4.)

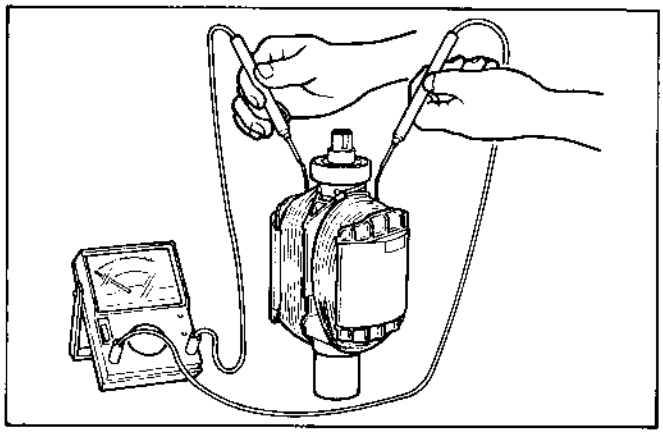


Fig. 11-4

- **NORMAL RESISTANCE**

MODEL	RGD3700	RGD5000
Resistance	2.1Ω	1.6Ω

Table 11-2

[Remedy]
If the resistance is not normal, replace rotor with a new one.

(2) CHECKING OF DIODES AND RESISTORS ON THE ROTOR

- Unsolder and take out the diodes and a resistor from rotor.
- Measure the resistance of diodes.

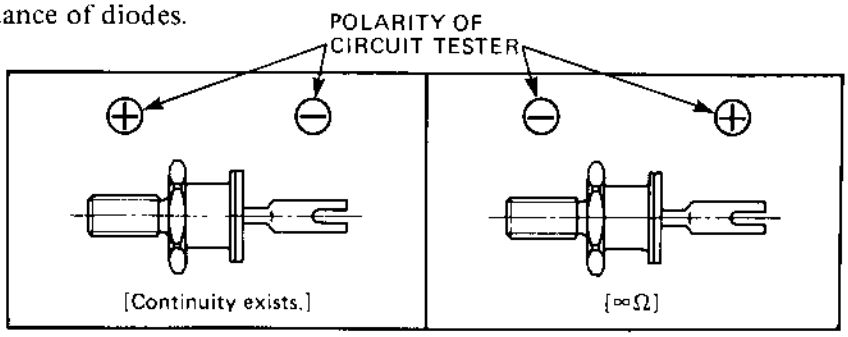


Fig. 11-5

Each rotor has three diodes. Check the resistance of each diode.

■ Measure the resistance of surge absorber connected to the diode holder.

NORMAL RESISTANCE :	∞ Ω

■ Check the magnetic force of permanent magnets molded in the rotor.

[Remedy]

1. If the magnetic force of rotor magnets is weak, or if the surge absorber is not good, replace the rotor with a new one.
2. If the diode is not good, replace it with a new one.

CAUTION: In case the diode troubles are frequent, check the surge absorber because it might be broken even if its resistance is normal (∞ Ω). In such a case, replace the rotor with a new one.

[Reassembling]

1. As shown in Fig. 11-6, place the white mark on the magnet to the left and solder the diodes so that cathode mark is to be placed at the bottom.
2. Solder the coil ends to the terminal.

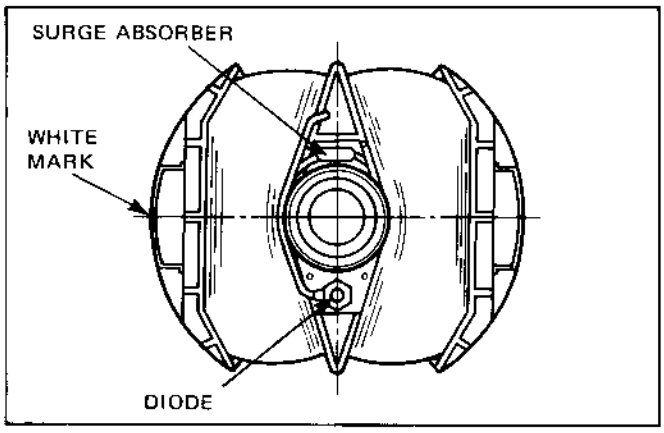


Fig. 11-6

11-2 AC VOLTAGE IS TOO HIGH OR TOO LOW.

11-2-1 CHECKING STATOR

Check stator referring to Step 11-1-1.

11-2-2 CHECKING CONDENSER

Check condenser referring to Step 11-1-2.

11-2-3 CHECKING ROTOR

Check rotor referring to Step 11-1-3.

11-3 AC VOLTAGE IS NORMAL AT NO-LOAD, BUT THE LOAD CANNOT BE APPLIED.

11-3-1 CHECK THE ENGINE SPEED.

If the engine speed is low, adjust it to the rated r.p.m.

* Refer to Step 11-2-1 for engine speed adjustment.

11-3-2 CHECK THE TOTAL WATTAGE OF APPLIANCES CONNECTED TO THE GENERATOR.

Refer to Section 7 "RANGE OF APPLICATIONS" for the wattage of the appliances.
If the generator is over-loaded, reduce the load to the rated output of the generator.

11-3-3 CHECK THE APPLIANCE FOR TROUBLE.

If the appliance is faulty, repair it.

11-3-4 CHECK IF THE ENGINE IS OVER-HEATED.

If the cooling air inlet and/or cooling air outlet is clogged with dirt, grass, chaff or other debris, remove it.

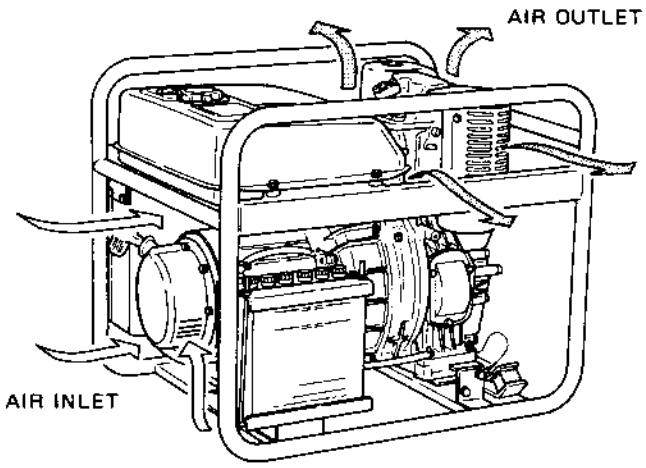


Fig. 11-7

11-3-5 CHECK THE INSULATION OF THE GENERATOR.

Stop the engine. Measure the insulation resistance between the live terminal of the receptacle and the ground terminal.
If the insulation resistance is less than 1 MΩ, disassemble the generator and check the insulation resistance of the stator, rotor and the live parts in the control box. (Refer to Section 8-3.)
Any part where the insulation resistance is less than 1 MΩ, the insulation is faulty and may cause electric leakage.
Replace the faulty part.

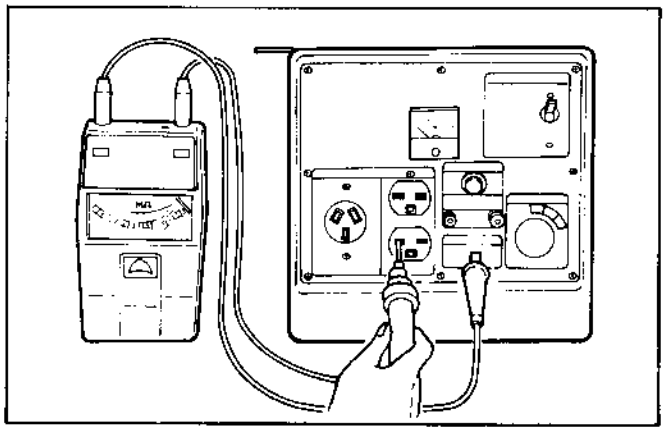


Fig. 11-8

11-4 NO DC OUTPUT

11-4-1 CHECK THE AC OUTPUT.

Check the generator by following Step 11-1-1 through Step 11-1-3.

11-4-2 CHECK THE DC FUSE.

Check the fuse in the fuse holder.
If the fuse is blown, check for the cause of fuse blowing, and then replace with a new one.

FUSE : 10A

NOTE: If the DC output is used to charge a large capacity battery or an over-discharged battery, an excessive current may flow causing fuse blow.

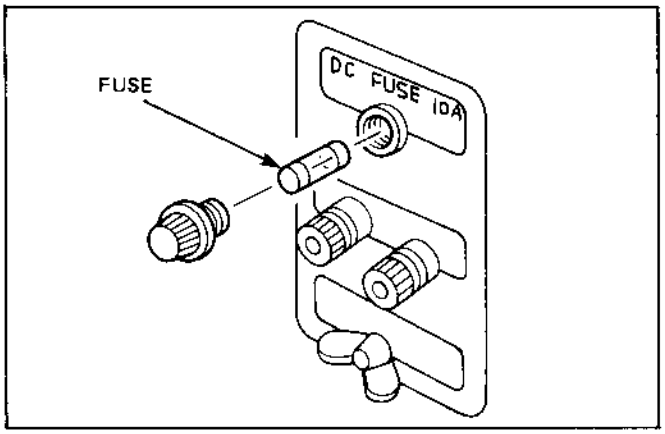


Fig. 11-9

11-4-3 CHECK THE WIRING.

Check all the wires to be connected correctly.

11-4-4 CHECK THE DIODE RECTIFIER.

Remove the control panel and check the diode rectifier with a circuit tester.
Refer to Section 9-7 "DIODE RECTIFIER" for the checking procedure.

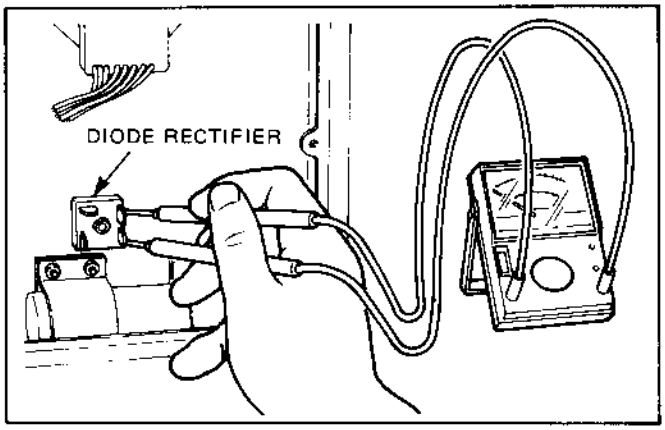


Fig. 11-10

11-4-5 CHECK THE DC COIL

Check the resistance between two brown leads from stator with a circuit tester.

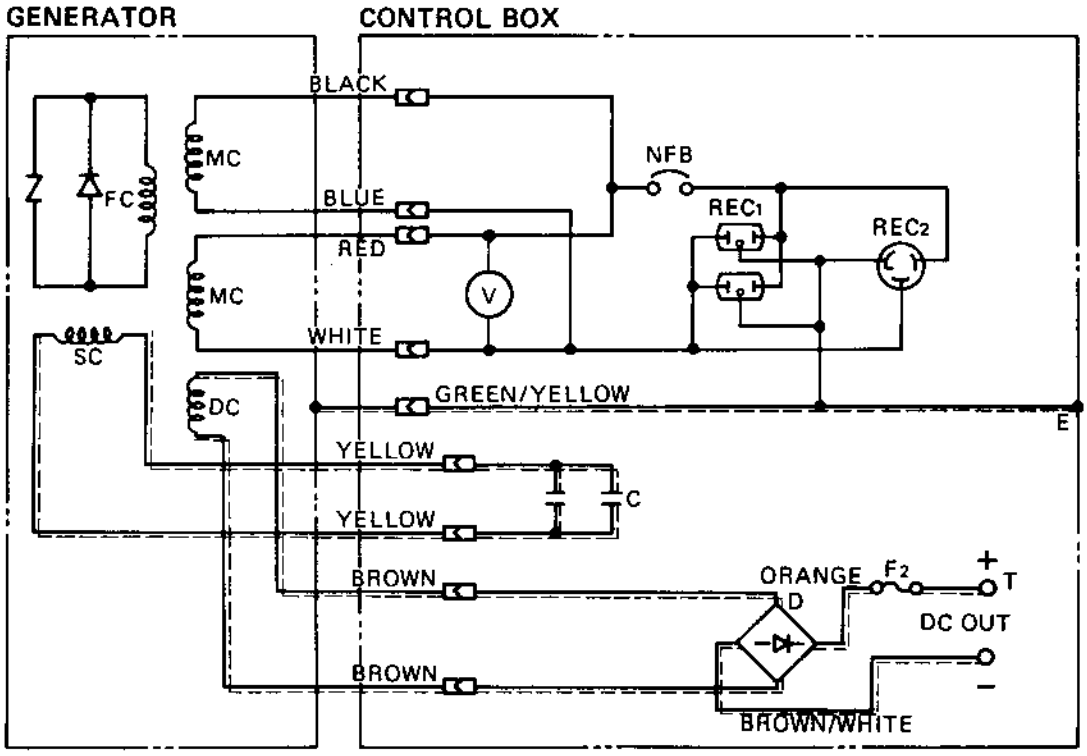
MODEL	SPECIFICATION		RESISTANCE
RGD3700	50Hz	110V, 220V, 240V 110V/220V	0.24
	60Hz	120V 110V/220V, 120V/240V	0.18
RGD5000	50Hz	110V, 220V, 240V 110V/220V	0.16
	60Hz	120V 110V/220V, 120V/240V	0.13

Table 11-3

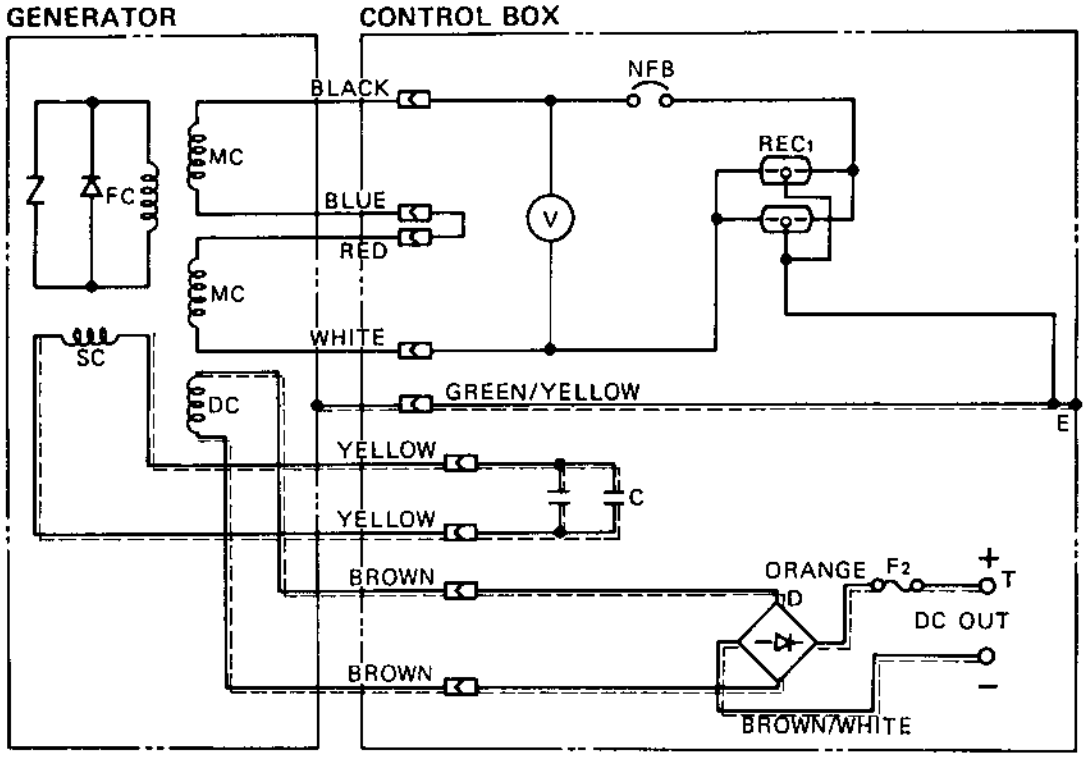
If the resistance reading is much larger or smaller than the specified value, the DC coil of the stator is faulty. Replace stator with a new one.

12. WIRING DIAGRAM

- RGD3700: 50Hz-110V, 60Hz-110V, 120V TYPE



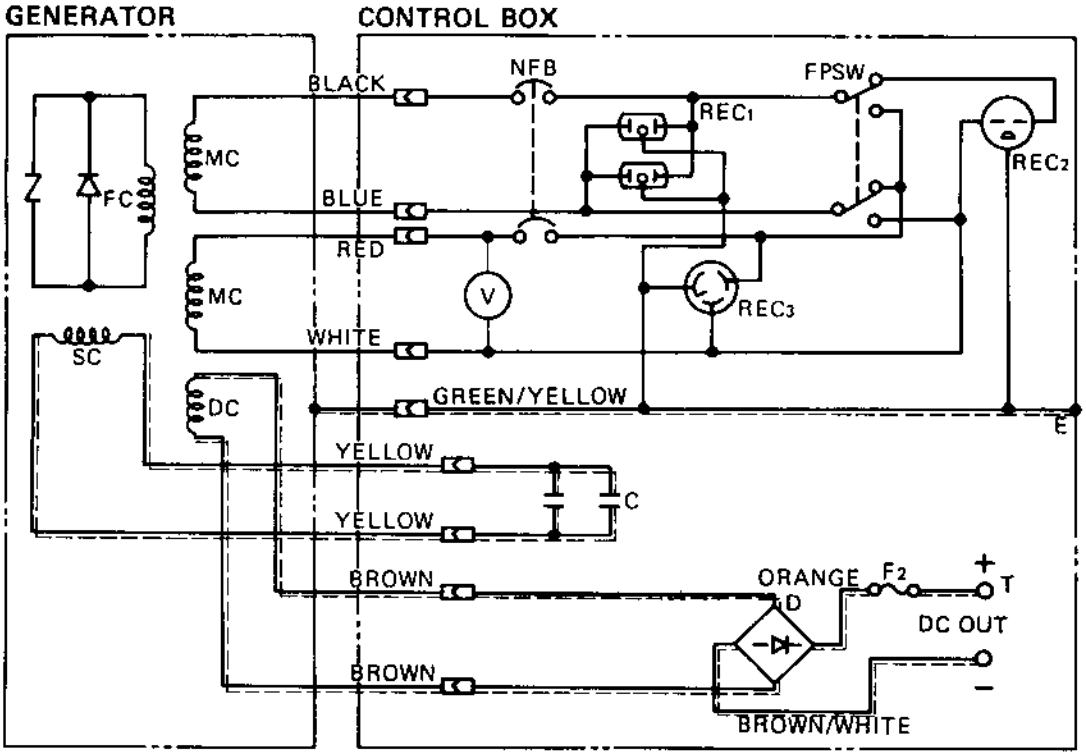
- RGD3700: 50Hz-220V, 240V, 60Hz-220V TYPE



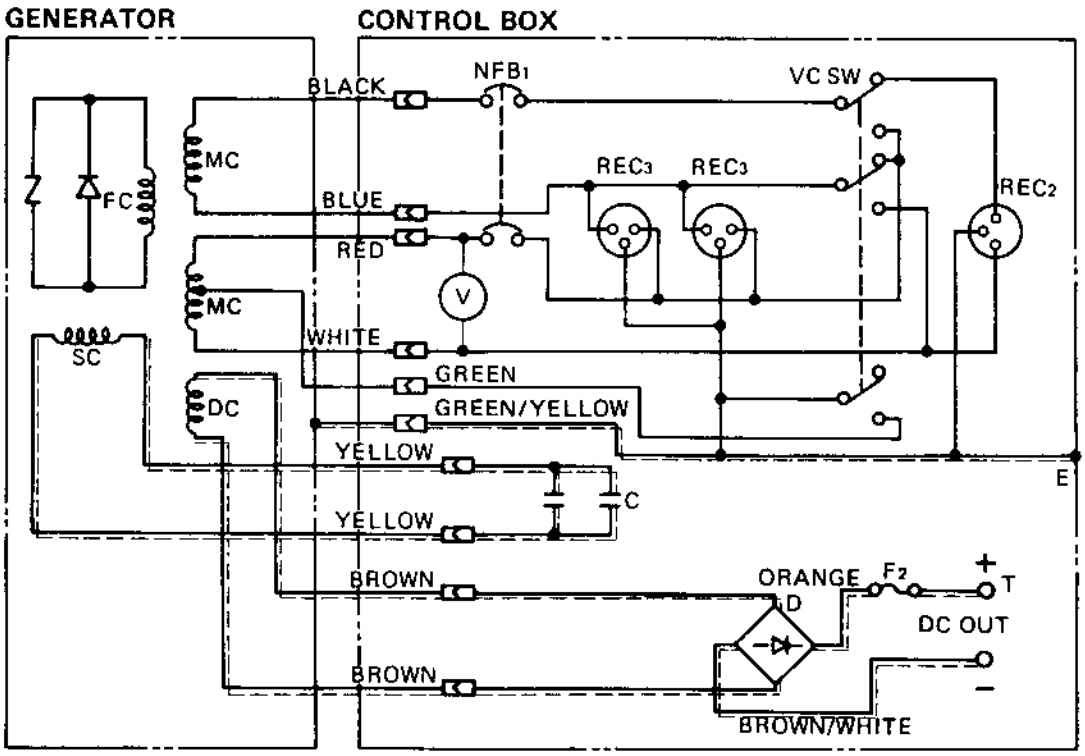
0.75 mm² 2.0 mm²

1.25 mm² 3.5 mm²

- **RGD3700: 50Hz-110V/220V, 60Hz-110V/220V TYPE**



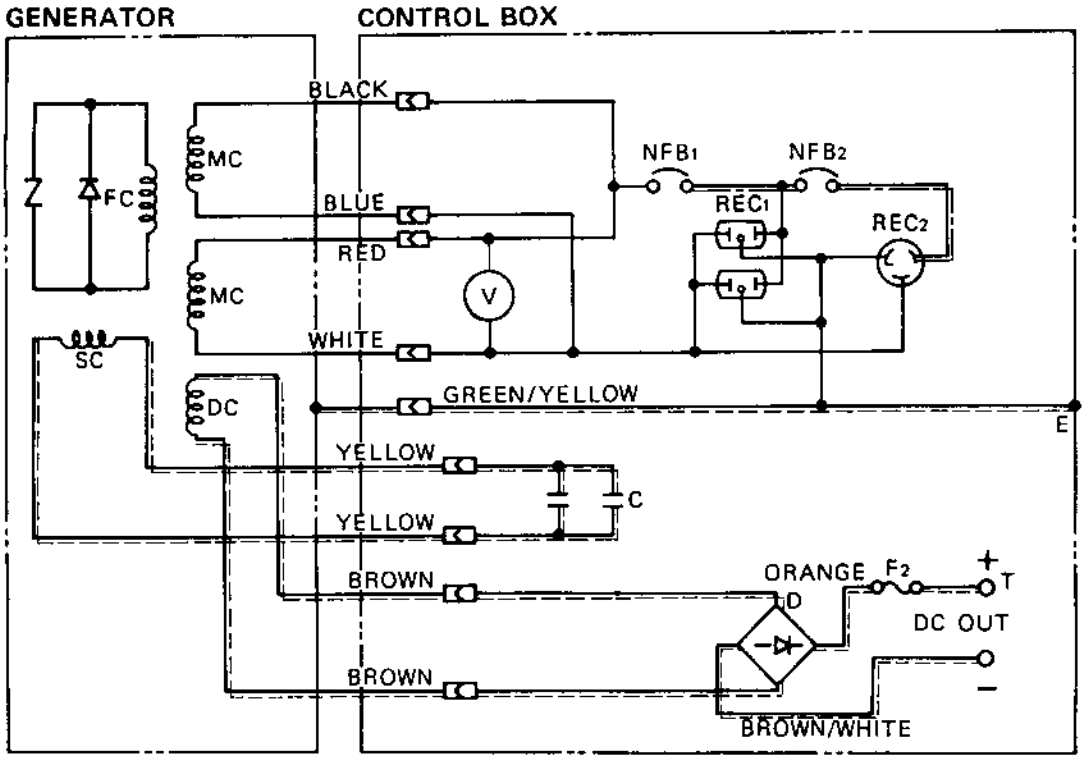
- **RGD3700: U.K., 50Hz-110V/220V [BS RECEPTACLE]**



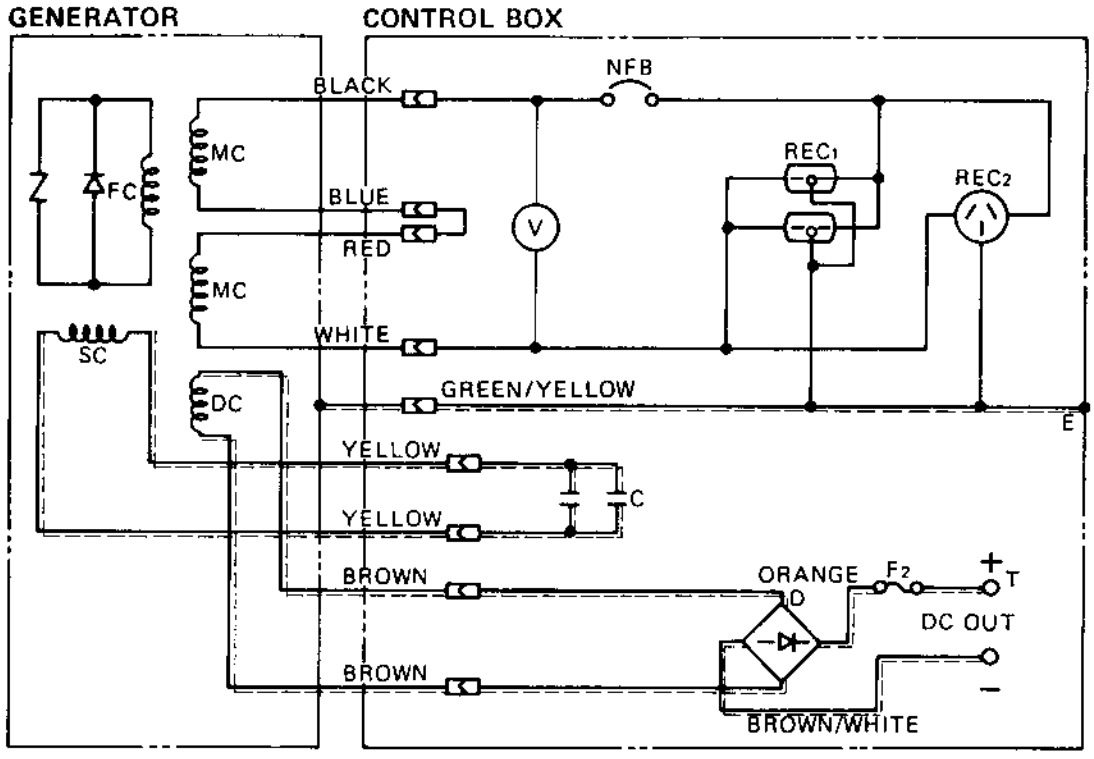
0.75 mm² 2.0 mm²

1.25 mm² 3.5 mm²

- RGD5000: 50Hz-110V, 60Hz-110V, 120V TYPE



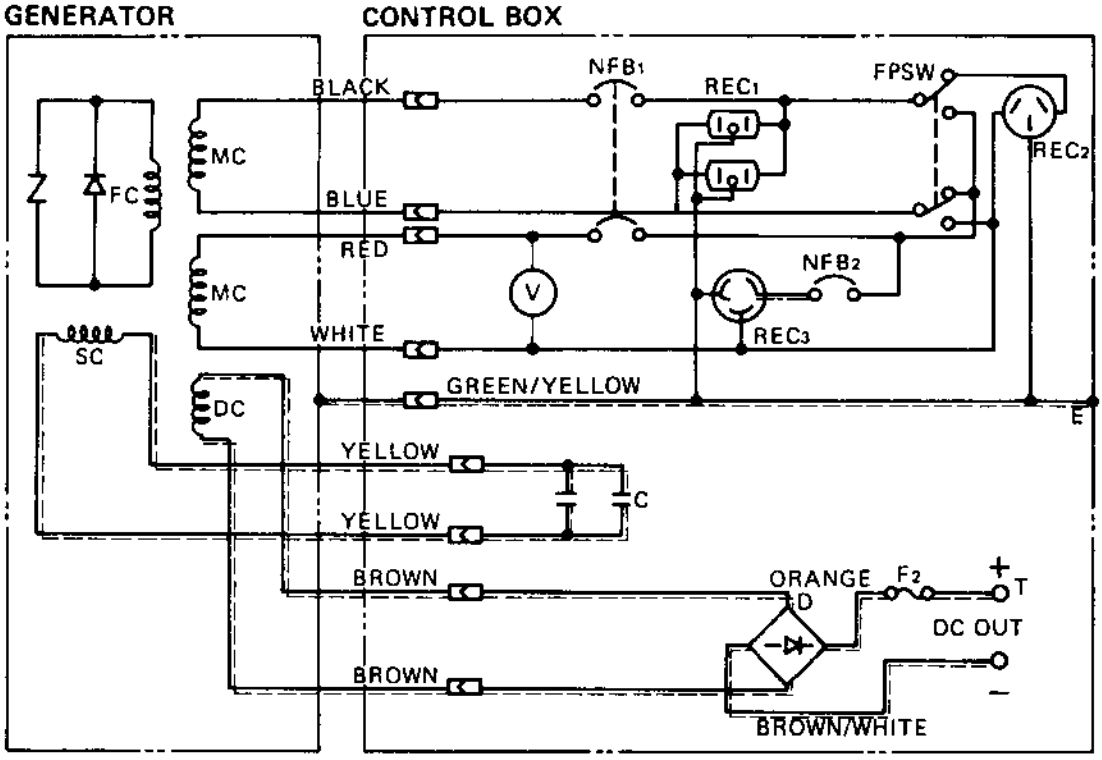
- RGD5000: 50Hz-220V, 240V, 60Hz-220V TYPE



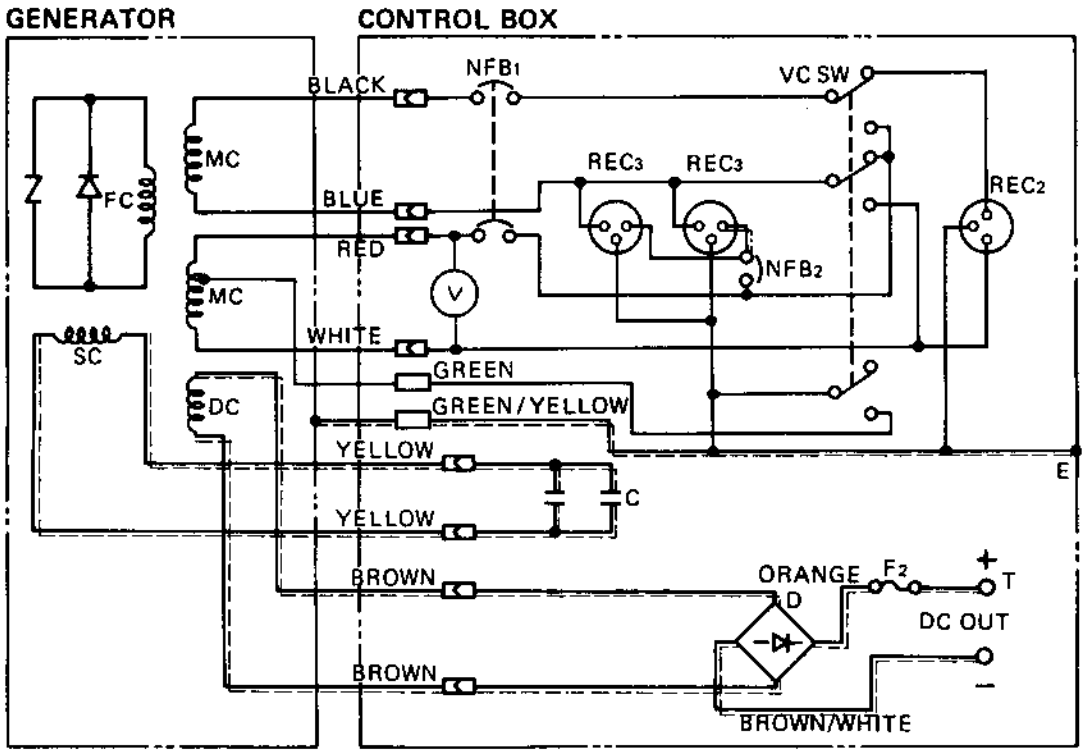
0.75 mm² 2.0 mm²

1.25 mm² 3.5 mm²

- **RGD5000: 50Hz-110V/220V, 60Hz-110V/220V TYPE**



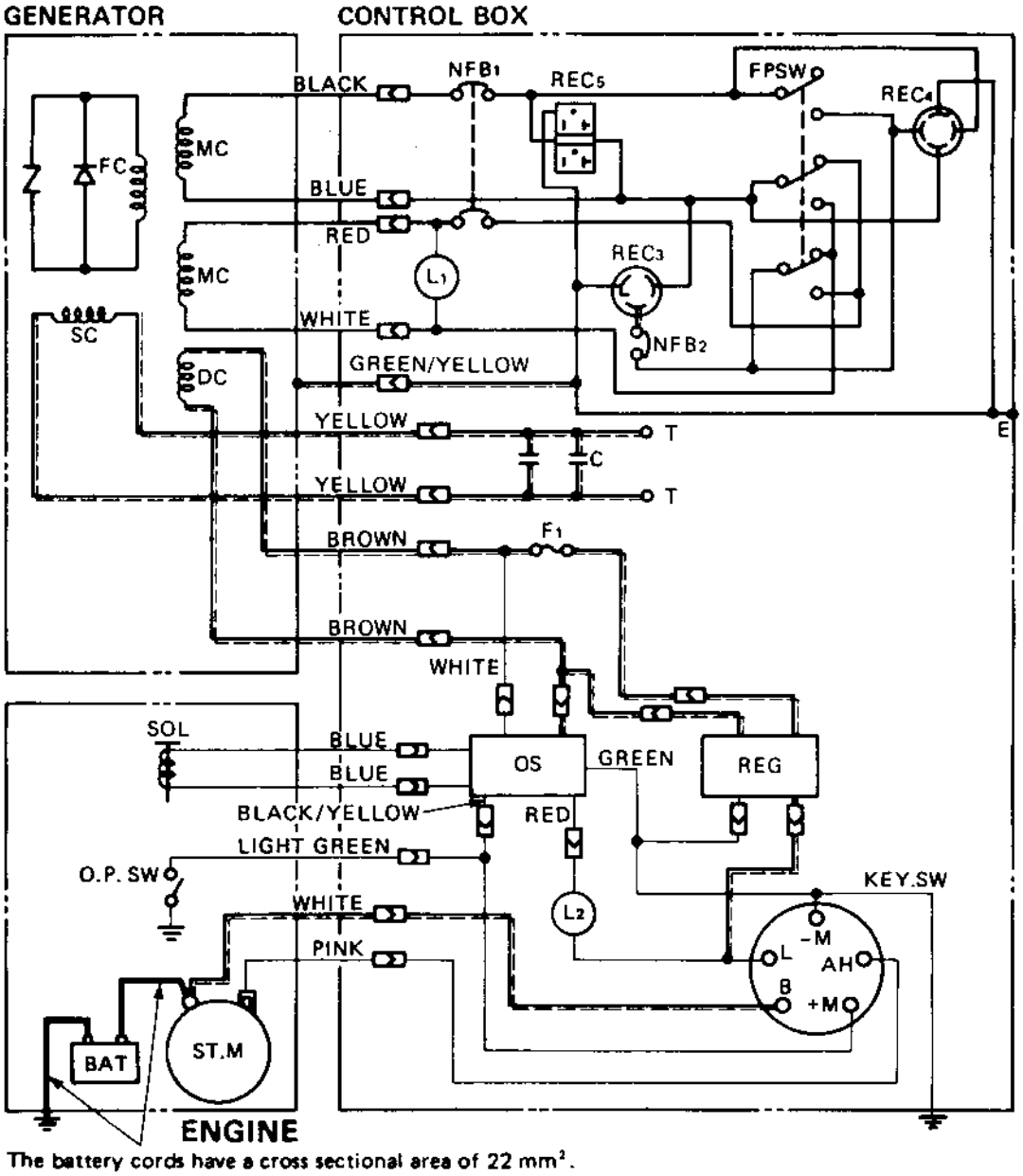
- **RGD5000: U.K., 50Hz-110V/220V [BS RECEPTACLE]**



——— 0.75 mm² ——— 2.0 mm²

═══ 1.25 mm² ═══ 3.5 mm²

- RGD5000: U.S.A., 60Hz-120V/240V [NEMA RECEPTACLE]

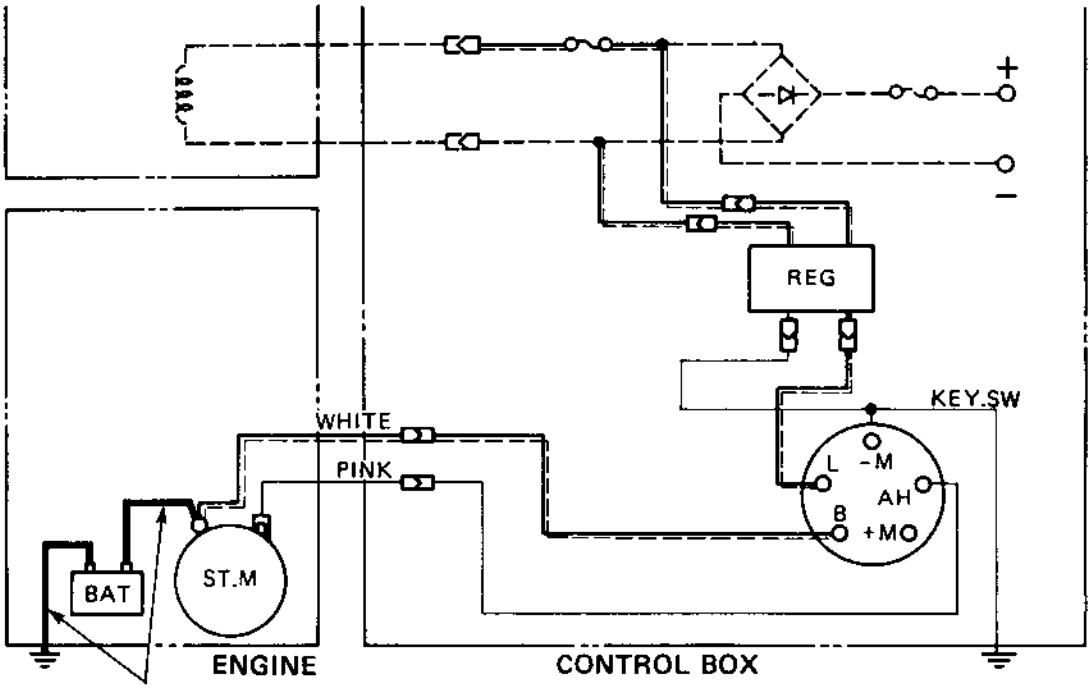


The battery cords have a cross sectional area of 22 mm^2.

——— 0.75 mm^2 ——— 2.0 mm^2

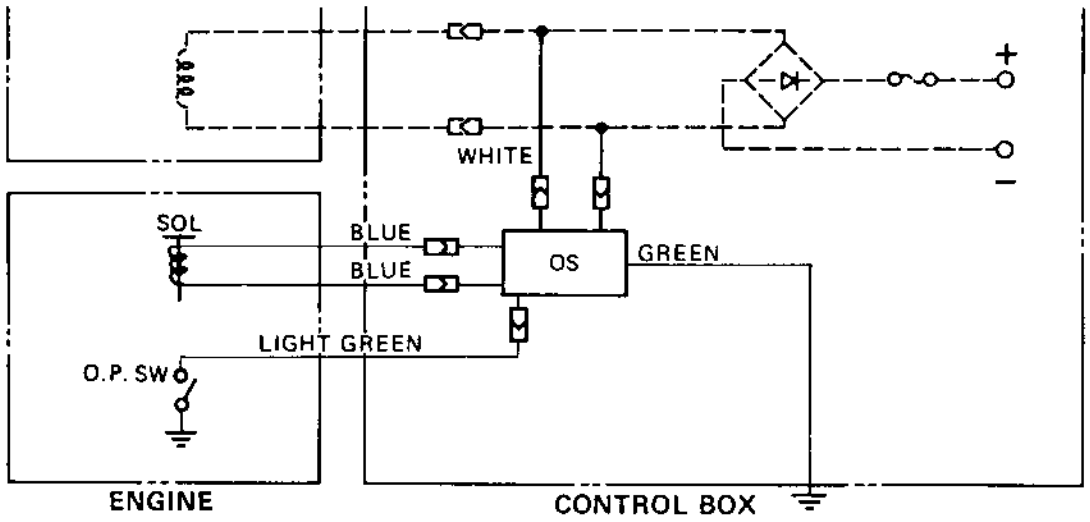
═══ 1.25 mm^2 ═══ 3.5 mm^2

- **ELECTRIC STARTER TYPE (Optional Equipment)**



The battery cords have a cross sectional area of 22 mm².

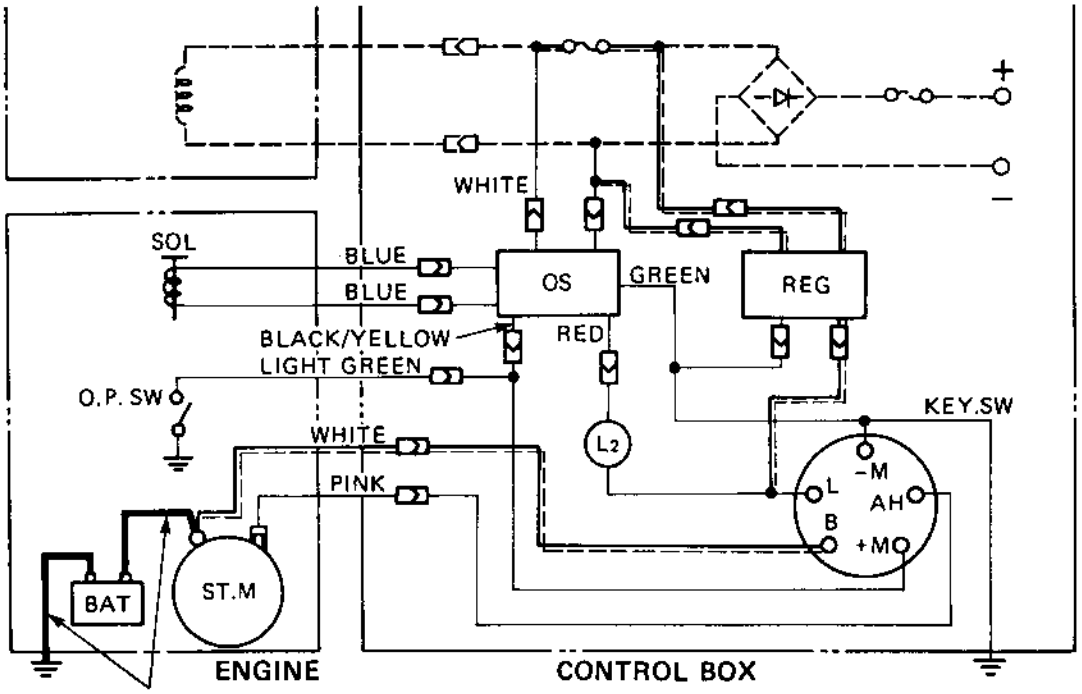
- **TYPE WITH OIL SENSOR (Optional Equipment)**



——— 0.75 mm² ——— 2.0 mm²

═══ 1.25 mm² ═══ 3.5 mm²

• ELECTRIC STARTER TYPE WITH OIL SENSOR (Optional Equipment)



The battery cords have a cross sectional area of 22 mm².

———	0.75 mm²	———	2.0 mm²
═══	1.25 mm²	═══	3.5 mm²

Symbols	Parts Name
MC	AC Winding
SC	Auxiliary Winding
DC	DC Winding
FC	Field Winding
C	Condenser
D	Diode Stack Assy
L_1	Pilot Lamp
L_2	Warning Lamp (Oil Sensor)
T	DC Output Terminal
F_1	Fuse 1
F_2	Fuse 2
NFB_1	No-Fuse Breaker
NFB_2	No-Fuse Breaker
FPSw	Full Power Switch
REG	Regulator
OS	Oil Sensor
ST.M	Starting Motor
SOL	Solenoid
KEY.SW	KEY. Switch
O.P. SW	Oil Pressure Switch
BAT	Battery
E	Earth Terminal (Ground Terminal)
VC SW	Voltage Changeover Switch
REC_1	AC Output Receptacle (Total 15A MAX.)
REC_2	AC Output Receptacle (220V/240V)
REC_3	AC Output Receptacle (110V/120V)
REC_4	AC Output Receptacle (120V/240V)
REC_5	AC Output Receptacle (Total 20A MAX)
V	Voltmeter