

# OPERATOR'S MANUAL FOR YOUR

# **BALDOR**<sup>®</sup> **GENERATORS**

## MODEL PC13R



SERIAL NUMBER \_\_\_\_\_

### BALDOR GENERATORS

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## FORWARD

This manual contains the information you need to safely and efficiently operate your generator set. During the preparation of this manual every effort was made to ensure the accuracy of its contents.

**DO NOT OPERATE THIS GENERATOR SET UNTIL YOU CAREFULLY READ THIS MANUAL AND UNDERSTAND THE SAFETY WARNINGS AND INSTRUCTIONS CONTAINED IN IT.** While safety is built into every Baldor Pow'R Gard generator set, careless or improper operation could possibly result in mechanical failure, property damage, severe injury or even death.

Note that this manual covers only very basic information in regards to the engine. A separate owner's manual for the engine is supplied with this unit for your use. Please refer to this manual for information relative to engine operation, maintenance, recommendations and additional safety warnings.

As soon as you receive your generator set, inspect it closely for shipping damage. If you find some damage, notify the transportation company immediately and file a freight damage claim.

Think of this manual as a tool to help you get the most out of your generator set. **WE STRONGLY SUGGEST THAT YOU KEEP THIS MANUAL WITH YOUR GENERATOR SET AND MAKE IT AVAILABLE TO ANYONE USING THE GENERATOR SET.** You should refer to the manual when questions arise in regards to the operation of the generator set and carefully observe all safety warnings and instructions contained in it.

Baldor Generators, formerly Pow'R Gard Generator Corporation has been in business since 1965. The generator sets we manufacture have earned the reputation of being of high quality and a dependable product. We take pride in this fact and continue to keep our quality standards high on our list of priorities. We are also constantly researching new technological ideas to determine if they could be used to make our generator sets even better.

Thank you for purchasing your Baldor Pow'R Gard Generator Set.

## SAFETY WARNINGS



**Improper Maintenance or Repair Can Result in Property Damage, Mechanical Failure, Severe Injury or Death!**

- ◆ Place protective covers and guards over the rotating parts, if rotating parts such as the drive shaft, pulley, belt, etc. are left exposed, they are potentially hazardous.
- ◆ When cleaning, repairing or inspecting, make sure all moving parts have stopped.
- ◆ Prior to working on the generator set, disconnect the spark plug and battery to prevent accidental starting.
- ◆ Use only original equipment or authorized replacement parts. Use of correct parts will assure the operator of the safety integrity that was designed into the unit.
- ◆ Unauthorized modifications to the generator set may impair the function and/or safety of the unit.
- ◆ Do not operate the generator set without a muffler. Inspect periodically and replace if necessary.
- ◆ Do not touch the hot exhaust components or the high voltage spark plug and coil terminals. While Spark Plug Voltages are not normally lethal, an involuntary jerk of the hand caused by a hot surface or by an electrical shock can result in injury.
- ◆ Repair of electrical generating equipment requires specialized skills. Repair personnel must have a thorough understanding of generator and small engine repair procedures.



**Exhaust Fumes/Gases Are Extremely Dangerous And Can Cause Illness Or Death.**

- ◆ Never inhale exhaust gases. They contain carbon monoxide; a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning can include: dizziness, nausea, headaches, sleepiness, vomiting or incoherency. If you or anyone else experiences any of these symptoms, get out into the fresh air immediately. Shut the unit down and do not operate it until it has been inspected and, if necessary, repaired.
- ◆ Never Operate the generator set indoors or in a poorly ventilated area such as a tunnel or cave.
- ◆ CALIFORNIA PROPOSITION 65 WARNING: engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.



**Improper Operation Can Result In Property Damage, Mechanical Failure, Severe Injury Or Death.**

- ◆ Know how to stop the engine quickly and understand the operation of all controls.

## SAFETY WARNINGS

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- ◆ Never permit anyone to operate the generator set without proper instructions.
- ◆ Never allow children to operate the generator set.
- ◆ Children and pets must be kept away from the area of operation due to the possibility of burns from hot engine components or injury from any equipment the generator set is powering.
- ◆ Always wear eye protection and Hearing protection when working near the generator set.
- ◆ Operate the generator set only with the guards, shields and other safety items in place and working properly.
- ◆ Do not put hands, feet, tools or other objects near rotating parts.
- ◆ Use reasonable care when moving or lifting the unit. The generator set may move around inside the wrap frame creating "Pinch Points".
- ◆ Do not run the generator set while it is being moved.
- ◆ Do not support the generator set from the top of the wrap frame.
- ◆ Do not operate the generator set while under the influence of alcohol, drugs or medication.
- ◆ When transporting or using a generator set with the wheel option, secure the unit to prevent it from moving around.
- ◆ Do not tamper with or change the engine speed as it has been preset at the factory for proper operation.
- ◆ Keep hands and face away from the carburetor when the air cleaner is being moved. A sudden backfire can cause serious burns.
- ◆ Be careful of hot parts. The muffler and other generator parts become very hot while the engine is running.
- ◆ Do not "jump start" the generator set.
- ◆ Sulfuric acid can cause severe injury and can give off gases, which are corrosive and potentially explosive. Avoid contact with skin, eyes, and clothing. In case of contact, flush area immediately with water.
- ◆ When transporting a generator set, secure it to prevent it from moving or shifting.



**This Generator Set Produces Electricity And With That There Is The Potential Danger For Electrocution.**

- ◆ Know how to stop the engine quickly and understand the operation of all controls.
- ◆ Do not operate electrical equipment while standing in water, on wet ground or with wet hands or shoes.
- ◆ Use extreme caution when working on electrical components. Potentially dangerous voltage is present when the engine is running.

## SAFETY WARNINGS

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- ◆ Always treat the electrical circuits as if they were energized.
- ◆ Disconnect all leads plugged into the unit Prior to working on it.
- ◆ Have the electrical circuits serviced only by qualified technicians.
- ◆ Inspect wiring frequently and replace frayed, broken or poor leads.
- ◆ Do not connect this unit to any building's electrical system unless you utilize an approved transfer switch or the main service entrance switch has been disconnected and locked open.
- ◆ Circuit overload protection must be provided in accordance with national electrical codes and local regulations.
- ◆ Check GFCI Receptacles monthly by using the "Test" and "Reset" buttons designed into them.
- ◆ Depending on your application it may be mandatory to ground or not ground this unit to earth ground. Comply with local electrical codes.

○ ○ ○ ○ **FOR GASOLINE OR DIESEL POWERED GENERATOR SETS** ○ ○ ○ ○



**Gasoline And Diesel Fuel Are Flammable And Can Cause Explosions, Fire, Injury Or Death!**

- ◆ Operate the generator set on a level surface. If the generator set is tilted, fuel spillage may result.
- ◆ Handle fuel with care. It is highly flammable. Use only clean, properly marked and approved safety containers for refueling and storing fuel.
- ◆ Stop the engine and allow it to cool before refueling.
- ◆ Do not overfill the fuel tank. Only fill the tank to within 1/2" of the top of the tank to allow space for fuel expansion.
- ◆ If fuel is spilled, wipe it up carefully and wait until the fuel has dried before starting the engine.
- ◆ Make sure the fuel cap is properly closed after refueling.
- ◆ Never operate the generator set while smoking.
- ◆ Never operate the generator set near an open flame.
- ◆ Never store the generator set with fuel in the tank indoors or in an enclosed, poorly ventilated enclosure where fuel fumes may reach an open flame, electrical spark or pilot light as on a furnace, water heater, clothes dryer, etc.
- ◆ When transporting over long distances or rough roads, drain the fuel tank to prevent leakage and spillage.

## SAFETY WARNINGS

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**Gaseous Fuels are Highly Combustible and can Cause Explosions, Fire, Injury or Death!**

○ ○ ○ ○ **FOR GASOLINE OR DIESEL POWERED GENERATOR SETS** ○ ○ ○ ○

- ◆ Check all fuel supply piping and their connections on a monthly basis for fuel leaks.
- ◆ Use only approved piping and componentry in your fuel supply system.
- ◆ A professional, experienced technician should only install the fuel supply system.
- ◆ Do not run the fuel line up against any sharp objects.
- ◆ Comply with NFPA regulations and your local codes in regard to shut-off valves, regulators, etc. and any other recommendations or requirements they may have.



**This Generator Set Creates A Significant Amount Of Heat And If Not Handled Properly, Can Become A Substantial Fire Hazard.**

- ◆ Keep the generator set at least three feet away from buildings or other structures.
- ◆ Keep the generator set away from flammable and other hazardous materials (trash, rags, lubricants, explosives, paints, etc.)
- ◆ Keep the generator set free of grass, leaves and excessive grease and oils.
- ◆ Allow the generator set to cool before transporting it or storing it indoors.
- ◆ Have fire extinguisher accessible and nearby while operating the generator set.
- ◆ This generator set must not be used on or near any forest covered brush covered or grass covered land unless the engine's exhaust system is equipped with a spark arrester and it must be maintained in effective working order by the operator.
- ◆ Operation inside an enclosed compartment or building is a potential fire hazard and should not be done unless approval is obtained from Baldor Generators. Engine/Generator overheating can cause severe damage due to restricted, obstructed or improper airflow that is necessary for the proper cooling of the unit.
- ◆ Hot exhaust gases being discharged by the engine must never be directed toward anything that could catch fire or explode.

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# 1. SPECIFICATIONS

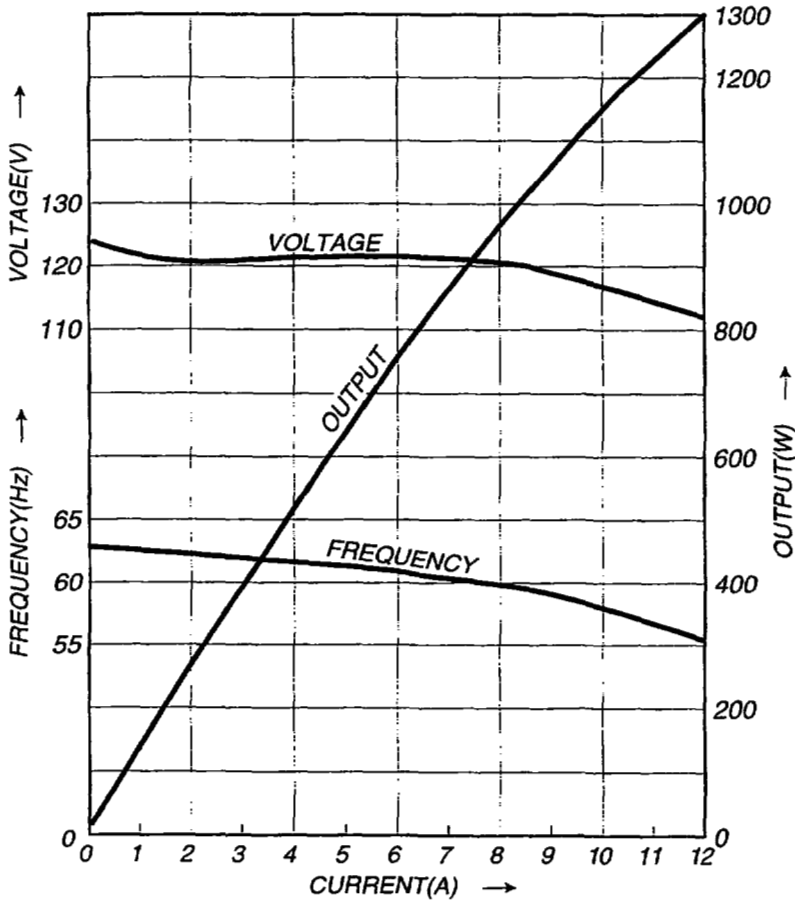
Generator	Type	Brushless, self-exciting, 2-pole, single phase, revolving field	
	Frequency	60 Hz	
	AC Voltage (Rated current)	120V (8.3 A)	
	AC Output	Max.	1300 W
		Rated	1000 W
	DC Output	12V – 8.3A (100 W)	
Voltage regulation system	Condenser system		
Engine	Type	Forced Air-cooled, 4-Stroke, Side Valve, Gasoline Engine	
	Displacement	8.73 cu. in (143 cm <sup>3</sup> )	
	Bore × Stroke	2.48 × 1.81 in (63 × 46 mm)	
	Fuel	Automotive Gasoline (unleaded)	
	Fuel tank capacity	0.9 U.S. gal (3.5 liters)	
	Oil pan capacity	1.3 U.S. pints (600 cc)	
	Continuous operating hours per tank	Approx. 3.6 hours	
	Ignition system	Solid state ignition	
	Starting system	Recoil starter	
Dimensions (L × W × H)		19.3 × 11.3 × 16.1in (490 × 288 × 410mm)	
Dry weight		60.6 lbs. (27.5 kg)	

Specifications are subject to change without notice.



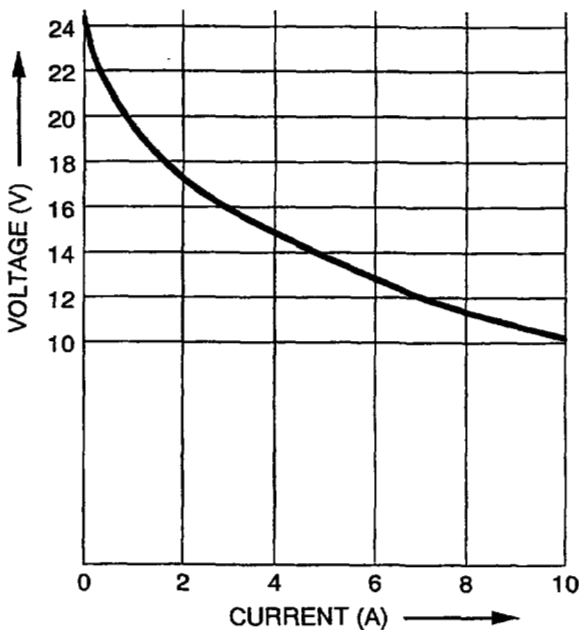
## 2. PERFORMANCE CURVES

### 2-1 AC OUTPUT



Output Max. .... 1300W  
 Rated ..... 1000W  
 Frequency ..... 60Hz  
 Voltage ..... 120V  
 60Hz • 120V • 8.3A

### 2-2 DC OUTPUT



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.

### 3. FEATURES

- **LOW-NOISE**

Mounting of Air-cooled, 4-Cycle, Super Side Valve ROBIN Engine (EY15D-SSVR) and introduction of a larger muffler into the machine realized low-noise operation.

- **LIGHT-WEIGHT • COMPACT**

The machine is easy to carried about due to its light-weight (27.5kg) and compact design.

- **HIGH OUTPUT (Increased maximum output)**

The 1300W output is an increase of 100W over the 60Hz maximum output of the current R1210.

- **EASY OPERATION**

The one-touch engine control switch integrates the engine on/off switch and the choke. All controls are conveniently located on the front panel.

- **LONG OPERATION**

The large 0.9 U.S. gal. (3.5 liter) fuel tank allows about 3.6 hours of continuous operation at 60Hz rated load.

- **MINIMAL MAINTENANCE**

The brushless design and condenser voltage regulator system ensure maintenance free operation.

- **FUNCTIONAL FEATURES**

- The AC/DC push button circuit breaker allows for easy and safe operation when an overload occurs or when the machine is not functioning properly.
- Equipped with voltmeter for reading AC output voltage.
- DC output can be obtained for the re-chargeable battery.

- **NOISE PREVENTION**

Resistor spark plug prevent electric-wave noise for radio, T.V., etc.

- **OIL SENSOR (optional)**

The oil sensor detects when oil decreases below the designated level, stopping the engine and preventing engine damage.

# 4. GENERAL DESCRIPTION

## 4-1 EXTERNAL VIEW of GENERATOR

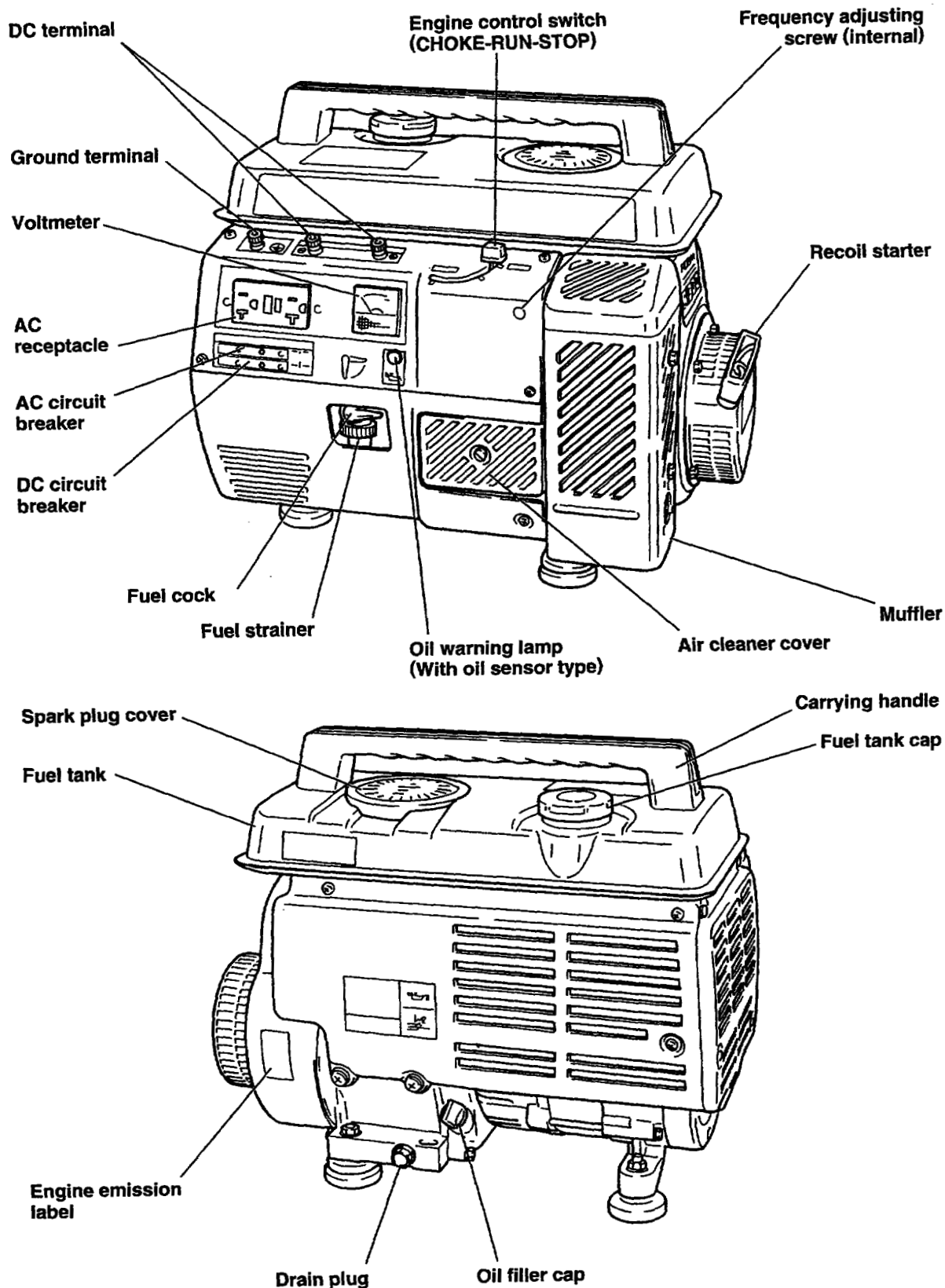


Fig. 4-1

#### 4-2 LOCATION of SERIAL NUMBER and SPECIFICATION NUMBER

Serial number and specification number are stamped on the LABEL (MODEL NAME) stuck on the fuel tank.

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

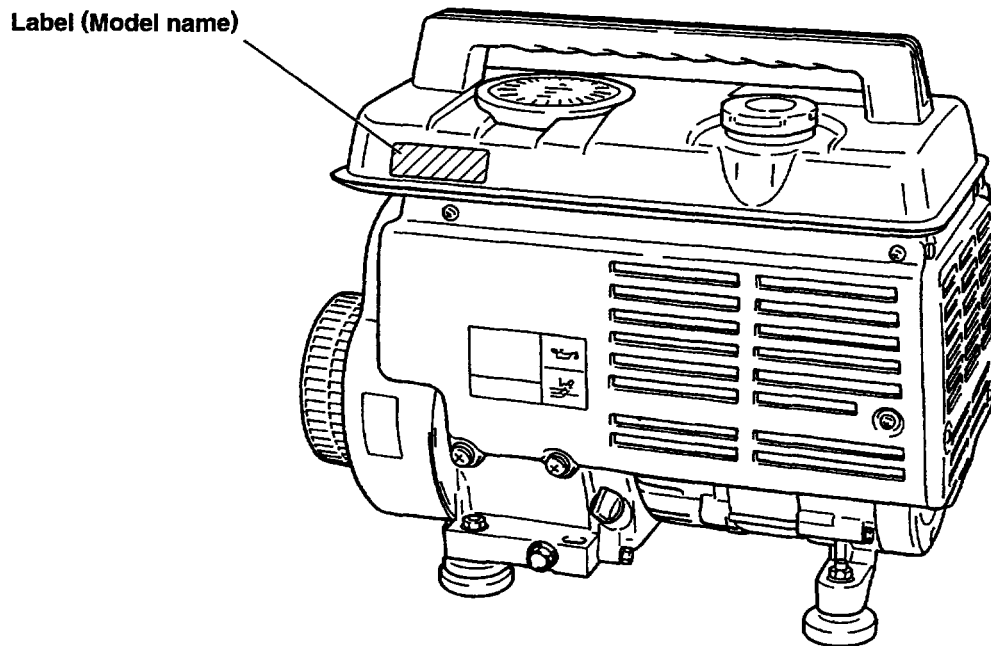


Fig. 4-2

# 5. CONSTRUCTION AND FUNCTION

## 5-1 CONSTRUCTION

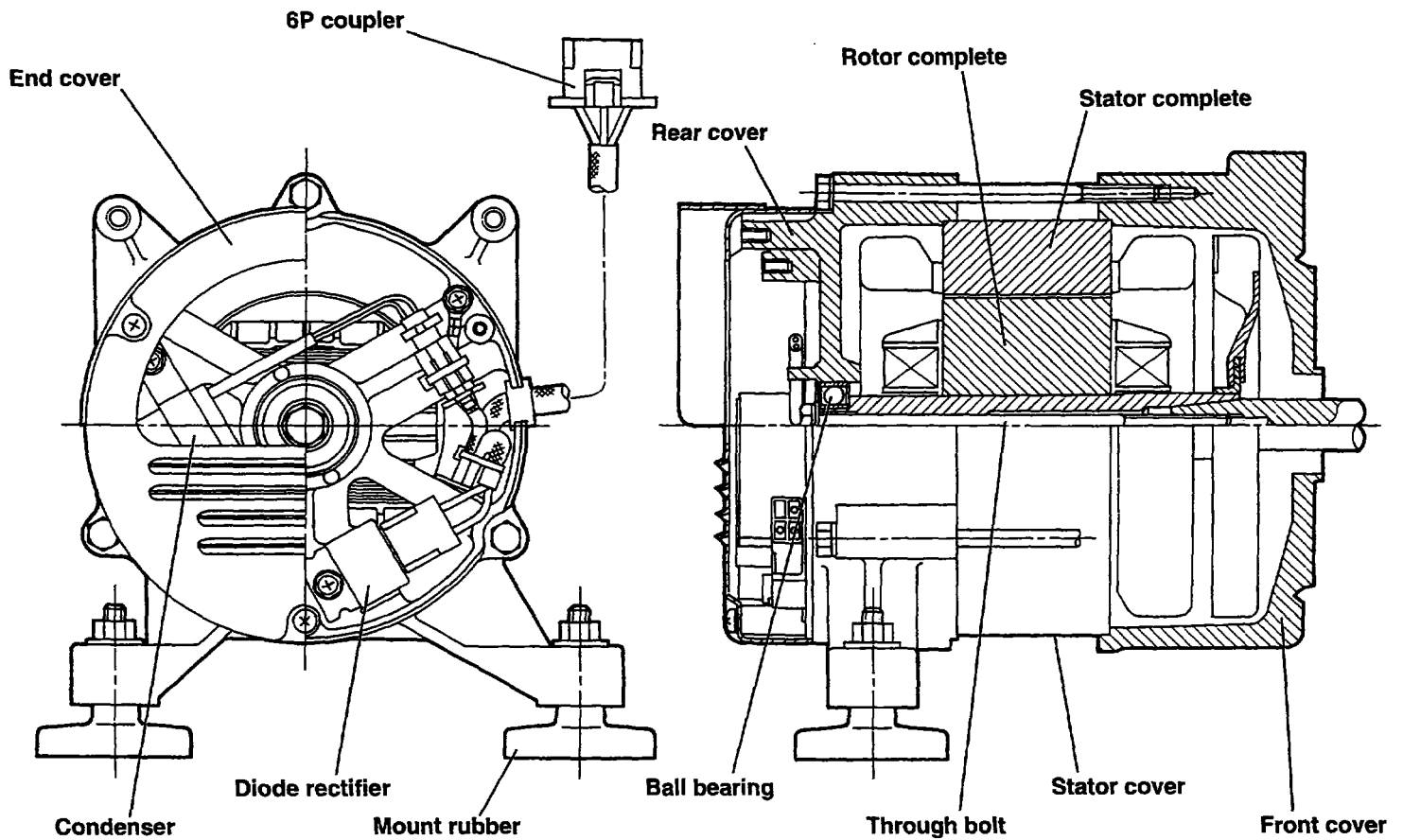


Fig. 5-1

## 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.

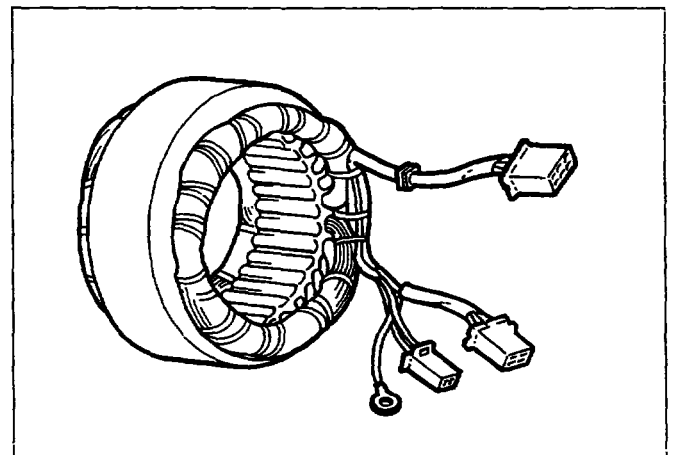


Fig. 5-2

### 5-2-2 CONDENSER

A condenser is mounted on the rear cover and is connected to the condenser coil which is wound on the stator. This condenser and condenser coil regulate the output voltage.

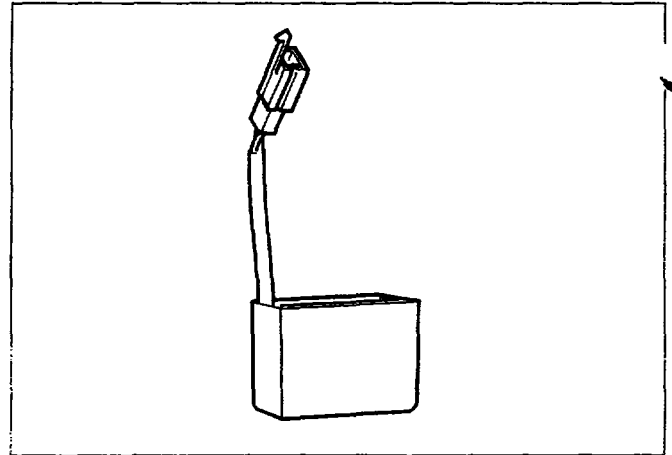


Fig. 5-3

### 5-2-3 ROTOR

The rotor consists of a laminated silicon steel sheet core and 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. A cooling fan is pressure-fitted on the end of the rotor shaft to cool the coils, cores, rectifier, and other generator parts. (See Fig. 5-4)

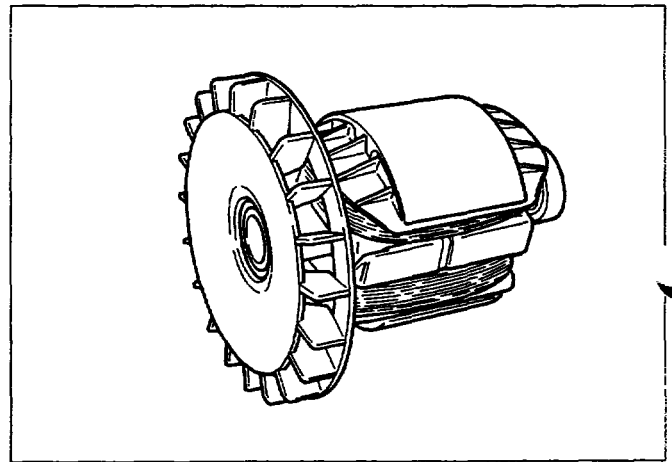


Fig. 5-4

A diode rectifier and resistor are mounted inside of the insulator. (See Fig. 5-5)

Cooling air is sucked by the rotor fan through the slits of the rear cover and is expelled through the outlets of the front cover.

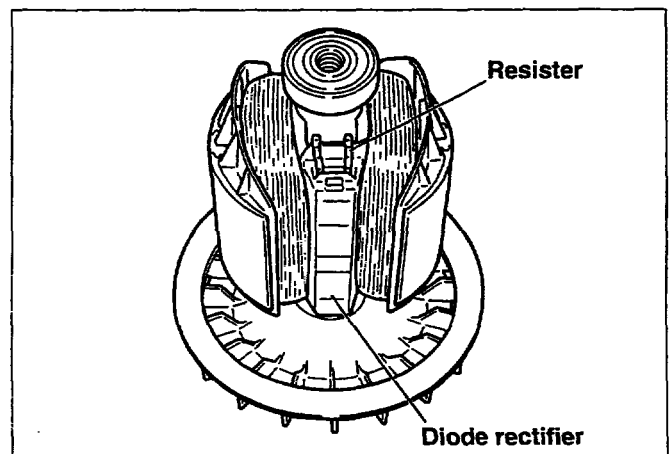


Fig. 5-5

#### 5-2-4 CONTROL PANEL

The control panel has a double AC receptacle with a ground terminal, and DC terminals.

The voltmeter displays output voltage of the generator. The circuit breaker for AC and DC protects the generator from getting damages caused by overloading or defective appliance.

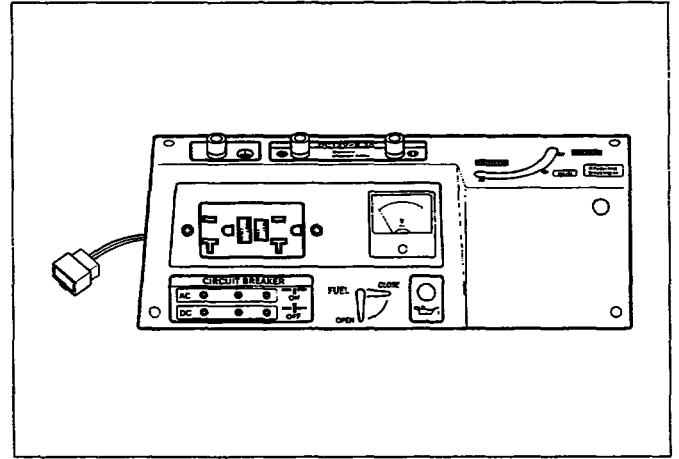


Fig. 5-6

## 5-3 GENERATOR OPERATION

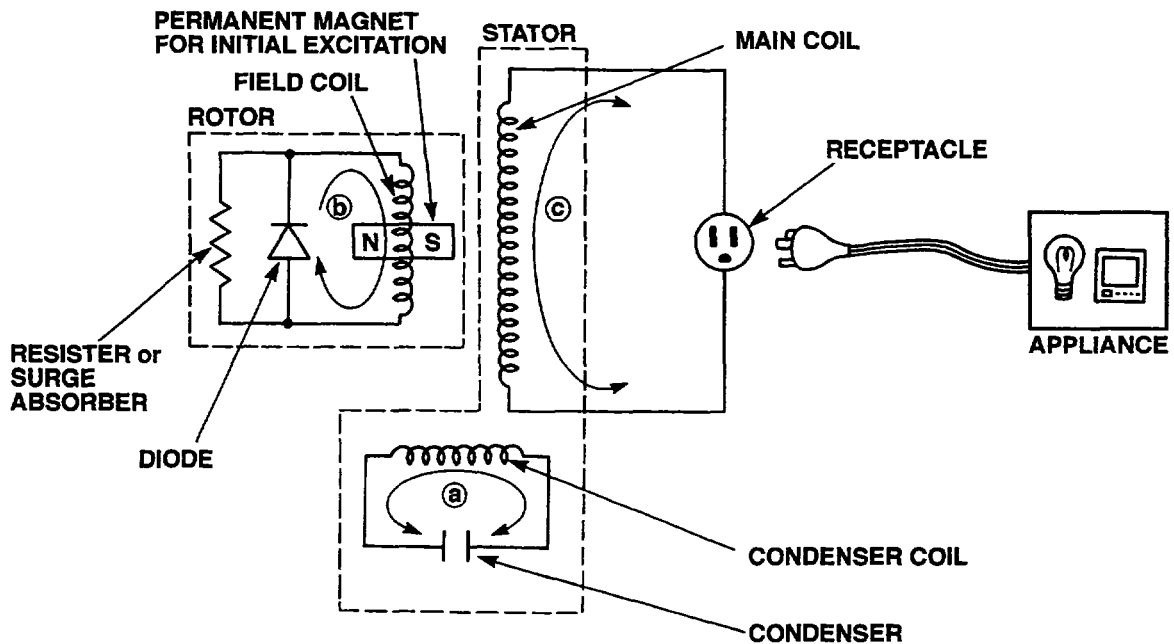


Fig. 5-7

### 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 one or two condensers are connected to the condenser coil, the small voltage at the condenser coil generates a minute current **(a)** 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 **(a)** 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 **(b)** flows through the field coil and magnetizes the rotor core to generate an output voltage in the main coil.
- (4) When generator speed reaches 3000 to 3300 r.p.m. , 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 **(c)** flows through the main coil to the appliance, a magnetic flux is produced and serves to increase current **(a)** in the condenser coil. When current **(a)** 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 DC OUTPUT

DC output is taken out from the DC coil and is fed to the diode stack (rectifier) where the output undergoes full-wave rectification and is then supplied to the load. The diode works to allow the current to flow in the direction (a), but does not allow the current to flow in the direction (b), as shown in Fig. 5-8-1.

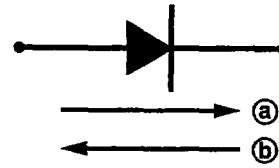


Fig. 5-8-1

Fig. 5-8-2 shows the DC output circuit of the generator. DC voltage is generated in the DC coil. When the voltage in A is higher than that in C, the current (c) flows in the direction shown in the figure, while no current flows between B and C because the current is cut off by the diodes D<sub>1</sub>.

On the contrary, when the voltage in C is higher than that in A, the current (d) flows in the direction as shown in the figure. No current flows between A and B because the current is cut off by the diodes D<sub>1</sub>.

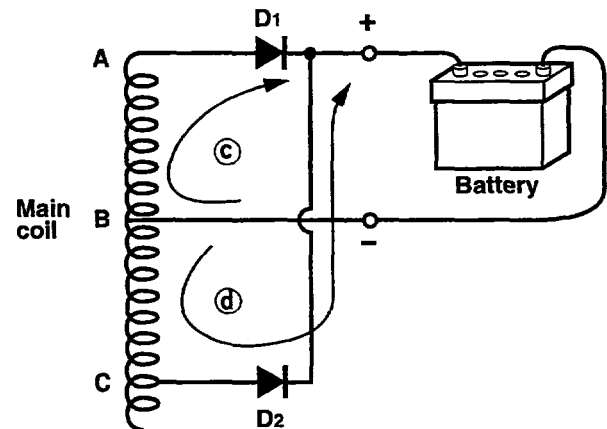


Fig. 5-8-2

As a result, the voltage generated at the output terminal has a wave form with two peaks in one cycle, as in the case of the output wave form shown in Fig. 5-8-3.

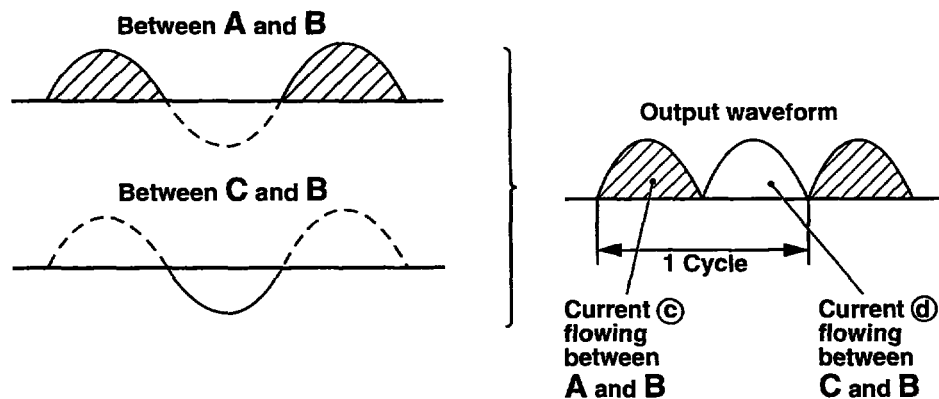


Fig. 5-8-3

**CAUTION : Do not use DC and AC output simultaneously.**

Due to a characteristic of the condenser voltage regulation, simultaneous use of DC and AC output creates voltage drop in DC output resulting in incapability for charging batteries.

## 5-4 ELECTRONIC IGNITION SYSTEM

The electronic ignition system features a power transistor as the current control element. Therefore, the ignition system is an electronic contact point-free type that operates with the power transistor impulses controlling the current. This system is also called TIC (transistor igniter circuit) and is virtually free of ignition failure which generally results from contamination of the contact points, a typical problem with contact type ignition systems.

Because this ignition system has no contact points, it is not affected by moisture, oil, dust, or other contaminants. As a result, this electronic ignition system ensures sure and positive ignition with reduced maintenance.

The TIC mechanism consists of a transistor-incorporated ignition coil and a permanent magneto built-in flywheel which is press-fitted on the rotor shaft of the generator.

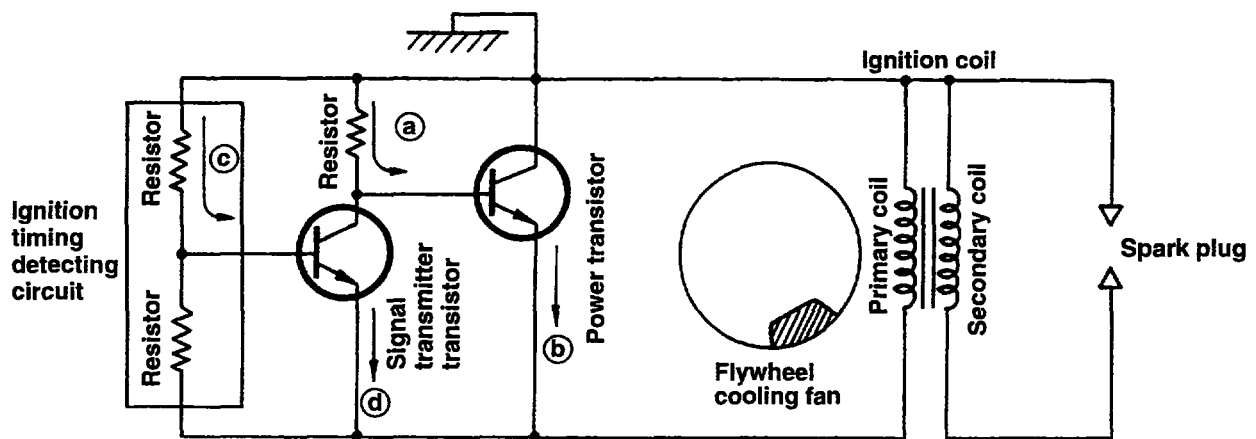


Fig. 5-9

- (1) When the permanent magneto built-in flywheel start rotating, power is generated in the primary coil of the ignition coil and current flows to the resistor (a). From the resistor, current flows the power transistor. With this current, the power transistor turns on, releasing current (b). This stage corresponds to the closing of contact points.
- (2) As the flywheel comes to the point of ignition, timing detecting circuit is activated while the current (c) is flowing through the circuit. When the ignition timing detecting circuit is activated, the signal transmitter transistor actuates with current (d) flowing. When current (d) starts flowing, current (b) flowing through the power transistor is cut quickly. As a result, high voltage is produced in the secondary coil and this voltage is applied simultaneously to the spark plug which ignites for ignition. This stage corresponds to the opening of contact points.

## 5-5 OIL SENSOR (OPTION)

### 5-5-1 DESCRIPTION

- The oil sensor mainly functions to detect position of the surface of engine oil in the crankcase of engines for general use and to stop the engine automatically when the oil level goes down below the lower limit specified.

This prevents seizure of engine from occurring due to insufficient amount of oil in the crankcase.

- Since the sensor has been designed to consume a part of power supplied to the igniter to energize its electronic circuit, any other external power supply is not necessary so that it can be mounted at the oil filler port.

Introduction of newly developed sensing principle features super durability and no change with the passage of time as it does not use any moving part.

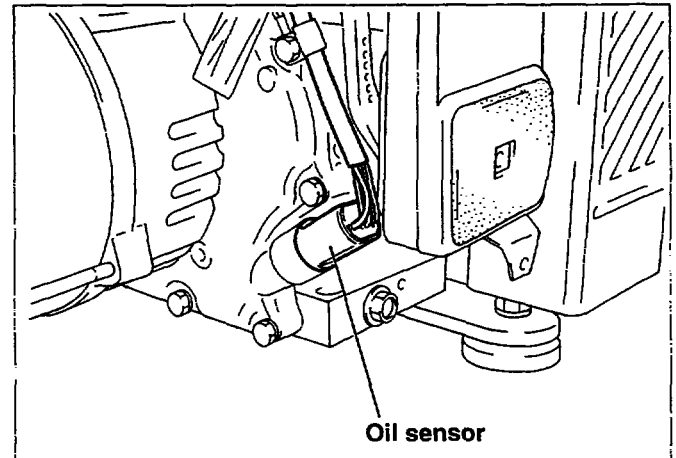


Fig. 5-10

Merits due to introduction of electrical conductivity detection are as follows;

- ① It has resistance to mechanical shocks and property of no change with the passage of time as sensing element consists simply of electrodes having no moving parts.
- ② At the same time, it is capable of detecting the oil level stably as it is not influenced by engine vibrations.
- ③ No error occurs due to foam and flow of the oil.
- ④ Influence against the ignition system or the electronic units can be neglected because an electric current supplied to the sensor can be decreased.

### 5-5-2 PRINCIPLE OF SENSING OIL LEVEL

There is a great difference between electric resistance of air and that of oil.

Since the resistance of air is far higher than that of oil, more electric current passes through the oil than through the air, although absolute value of the current is very small.

The sensor detects this current difference and make use of it.

The sensor judges the oil quantity, by comparing a current flowing across a pair of electrodes (inner and outer) with the reference, in such a way that if a current flows between the electrodes more than the reference, sufficient oil is in the crankcase, on the other hand, if a current flows less than the reference, oil is not sufficient.

Since an electric current is flown to detect oil quantity, this is called the "electrical conductivity detection" type of sensor.

The oil level to be detected is determined by the length of electrodes and their mounting positions with the engine.

### 5-5-3 HOW IT OPERATES

#### [Power supply]

The sensor makes use of a part of primary power source for ignition of the engine (igniter) to drive the sensor circuit. Power to the sensor can usually be derived from the "stop button" by branching wires out.

### [Judgement of oil level]

When sufficient oil is in the crankcase, both of inner and outer electrodes are immersed in the oil through which current flows across the electrodes. The sensor judges that oil in the crankcase is sufficient.

When oil level goes down and the inner electrode is exposed to the air due to consumption of oil, no current flow between the electrodes as air is considered to be electrically non-conductive.

The sensor in this case judges that oil is insufficient.

### [Decision of oil shortage]

Oil level at the electrodes may go down momentarily probably due to the engine being slanted or affected by vibration even if a sufficient oil is in the crankcase.

For that reason, the sensor has an electronic timer circuit to prevent it from interpreting as short of oil when amount of oil is sufficient. The sensor has been designed so that the engine is to be stopped only when oil-shortage is detected for 5 seconds uninterrupted.

The timer employs an integration circuit and it is to be reset when the inner electrode is soaked in the oil again before the sensor decides it as oil-shortage.

The oil level where the sensor decides as oil-shortage, when oil level goes down gradually, is called "threshold level".

### [Automatic stop of engine]

When the sensor decides as oil-shortage, it makes the engine to stop running automatically for protection of engine.

Once the stopping circuit is activated, it keeps functioning until it confirms that the engine has made a complete stop, then the circuit stops functioning automatically.

## 5-5-4 BLOCK DIAGRAM OF THE CIRCUIT

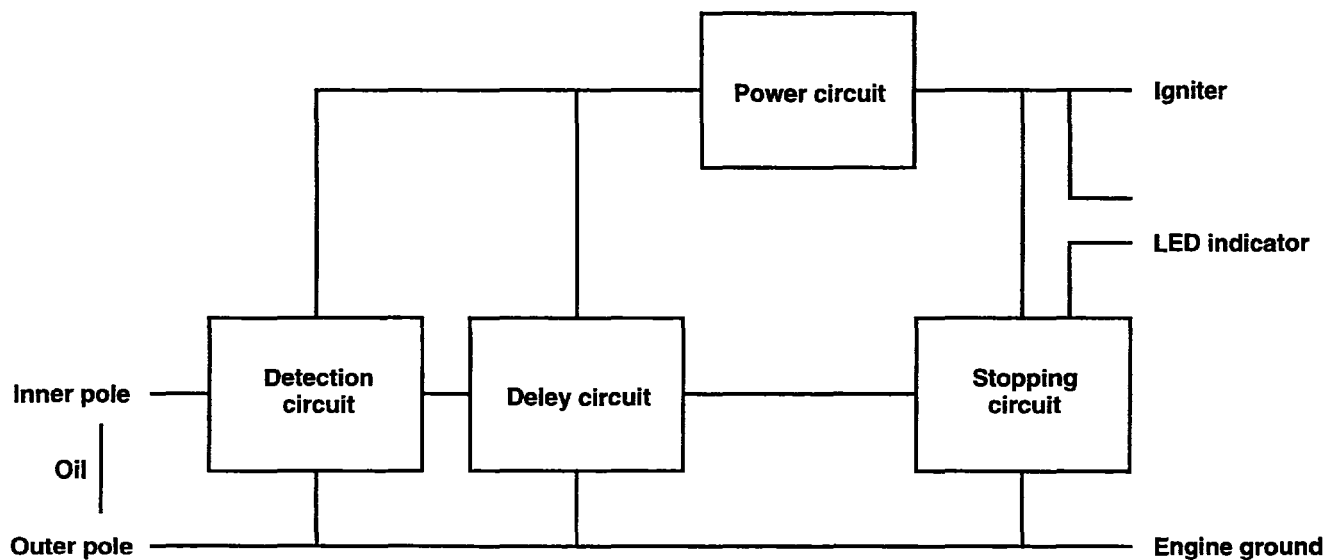


Fig. 5-11

- ① Power circuit.....This rectifies a part of power to the igniter and regulates it to supply the stabilized power to necessary circuits.

- ② Detection circuit.....This detects quantity of oil, sufficient or not, according to difference of electric resistance across inner and outer electrodes.
- ③ Delay circuit .....This prevents the sensor from making an unnecessary stop of the engine by momentary lowering of the oil level due to the engine being slanted or affected by vibration in spite of sufficient oil in the crankcase.
- ④ Stopping circuit.....This automatically stops the engine running.  
Also, the LED indicator for warning can be lit while the engine is being stopped. We have the wires to be connected to LED available.

### 5-5-5 CAUTIONS TO BE TAKEN ON HANDLING THE SENSOR

#### (1) Oil sensor unit

- ① Be sure not to damage each wire.  
Broken or short-circuited power supply wires and/or a grounding wire in particular may lead to malfunction or breakdown.

#### (2) Mounting and wiring of oil sensor unit

- ① Although this has been designed to have enough anti-noise properties in practical use, do not route the sensor wirings in the vicinity of noise-generating sources such as ignition plugs or high voltage cords. This may cause malfunction or breakdown.
- ② Since capacity of power source is limited, current flow in the electronic circuit of the sensor is kept as low as possible.  
Be sure to use terminals with a high contact reliability of more than that of tinned terminals.

#### (3) Operation of oil sensor

- ① If operating with the engine kept tilted, oil surface inside of the engine varies and the correct oil level can not be detected which in turn obstructs the preventing function of engine seizure.  
Operate the engine by keeping it level.
- ② When starting the engine with an insufficient oil in the crankcase, engine starts once then it stops automatically after it runs for about 5 seconds.
- ③ When the engine has been stopped by the oil sensor, voltage remained in the electronic circuit prevents the sensor from being re-started for 3 seconds after the engine stop.  
Try to re-start the engine after 3 seconds or more.

## 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.

Never connect the generator to the existing house wiring. If connected, the generator will burn out when the commercial power source is recovered.

**7. Don't operate the generator with its cover removed.**

The operator may be injured or suffer electric shock.

**CAUTION; If 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 plugs for faulty wiring.**

## 7. RANGE OF APPLICATIONS

### 7-1 AC OUTPUT

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 calculate 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 1000W generator can turn ten 100W incandescent lamps on.

#### (2) Fluorescent lamps, Motor driven tools, light electrical appliances, 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. 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.

*NOTE 1: If a power factor correction capacitor is not applied to the fluorescent lamp, the more power shall be required to drive the lamp.*

*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) Mercury lamps with a smaller power factor

Loads for mercury lamps require 2 to 3 times the indicated wattage during start-up.

**Example:** A 400W mercury lamp requires 800W to 1200W power source to be turned on.

A rated 1000W generator can power one 400W mercury lamp

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

These appliances require 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	} The smaller the motor, the lower the efficiency.
Three-phase motor	..... 0.65 ~ 0.9	
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  $40 \div 0.7 = 57W$ . 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  $400 \div 0.7 = 570W$ . When this motor is used for a motor-driven tool, the capacity of the generator should be multiplied by 1.2 to 3 and 570W as explained in the **Item(3)**.

Appliance	Applicable wattage
	60Hz
Incandescent lamp, hot plate	up to 1000W
Fluorescent lamp, mercury lamp , Electric tool	up to about 800W
Pump, compressor	up to about 250W

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. Cable length**

If a long cable is used, a voltage drop occurs due to the increased resistance in the conductors decreasing the input voltage to the load (electrical appliance). As a result, the load can be damaged.

Table 7-2 shows voltage drops per 100 meters of cable.



Sectional area mm <sup>2</sup>	Allowable current A	Gauge No./ wire element No./mm	Resistance Ohm/100 m	Voltage drop per 100 m							
				1A	3A	5A	8A	10A	12A	15A	
0.75	7	30/0.18	2.477	2.5V	8V	12.5V					
1.25	12	50/0.18	1.486	1.5V	5V	7.5V	12V	15V	18V		
2.0	17	37/0.26	0.952	1.0V	3V	5.0V	8V	10V	12V	15V	
3.5	23	45/0.32	0.517		1.5V	2.5V	4V	5V	6.5V	7.5V	
5.5	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 ( $\Omega$  /100 m) on the above table.

I means electric current through the wire (A).

$\ell$  means the length of the wire (m).

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

## 7-2 DC OUTPUT

*NOTE : Do not use DC and AC output simultaneously.*

*Due to a characteristic of the condenser voltage regulation, simultaneous use of DC and AC output creates voltage drop in DC output resulting in incapability for charging batteries.*

When the generator is employed to charge batteries, attentions should be paid to the specific gravity of electrolyte in the battery.

### 7-2-1 SPECIFIC GRAVITY OF BATTERY ELECTROLYTE

The specific gravity of electrolyte varies by temperature ; so it must be converted to the one at 20°C.

$$S_{20} = S_t + 0.0007 (t-20)$$

where

$S_{20}$  : The specific gravity at 20°C

$S_t$  : Measured value

t : Temperature at the time of measurement (Electrolyte)

### 7-2-2 SPECIFIC GRAVITY OF BATTERY ELECTROLYTE AND CHARGING CONDITION

Specific gravity (20°C)	Charging condIntion	Remarks
1.260	100	Charging is not necessary.
1.240	87	
1.220	75	Charging is necessary.
1.200	62	Immediate Charging is necessary.
1.180	50	
1.160	37	
1.140	25	

Table 7-3

### 7-2-3 BATTERY CAPACITY

The battery capacity is expressed in the unit of AH (ampere-hour). One AH stands for the capacity capable of one ampere current for one hour.

# 8. MEASURING PROCEDURES

## 8-1 MEASURING INSTRUMENTS

### 8-1-1 "Dr. ROBIN" GENERATOR TESTER

The "Dr. Robin" generator tester is exclusively designed for fast, easy diagnosis and repair of Robin generators.

The "Dr. Robin" has the following features:

- (1) Functions of voltmeter, frequency meter, megger tester, capacitance meter and circuit tester are combined in one unit.
- (2) Fast and easy readout by digital indicator.
- (3) Built-in automatic battery checker indicates the time to change batteries.
- (4) Tester and accessories are installed in a handy, sturdy case for easy carrying.

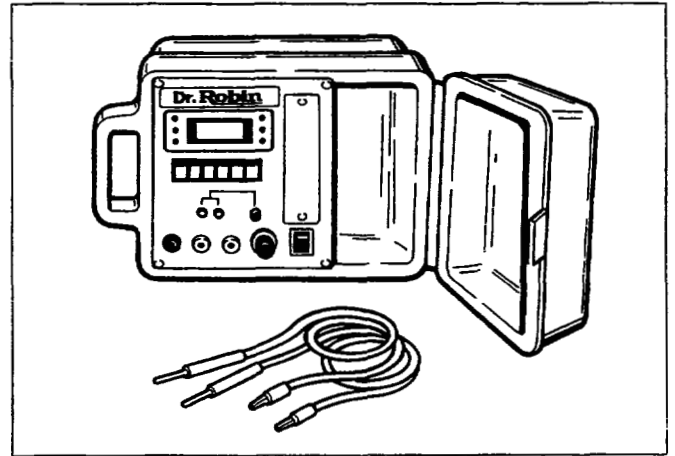


Fig. 8-1

### ● SPECIFICATIONS

<b>Model</b>		<b>Dr. Robin</b>
<b>Part Number</b>		388-47565-08
<b>Measuring Range</b>	Voltage	0-500V AC
	Frequency	25-70Hz
	Resistance	0.1-1,999 Ω
	Condenser Capacity	10-100 μF
	Insulation Resistance	3MΩ
<b>Circuit Protector</b>		Fuse
<b>Power Source</b>		2 × 6F44P (006P) Dry Cell Battery
<b>Accessories</b>		Test leads with needle probes . . . 1 set Test leads with jack plugs . . . . . 1 set
<b>Dimensions (L × W × H)</b>		285 mm×200 mm×110 mm
<b>Weight</b>		1.6kg

Table 8-1

The "Dr. Robin" generator tester can be ordered from Robin generator distributors by the following part number.

**Dr. Robin Part Number : 388-47565-08**

If you do not have a "Dr. Robin" generator tester, use the instruments described in the following section for checking generator parts.

## 8-1-2 INSTRUMENTS

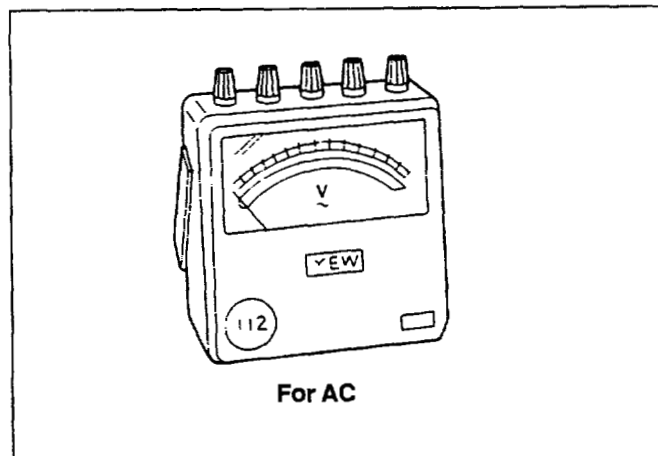
### (1) VOLTMETER

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 330V: Dual voltage type

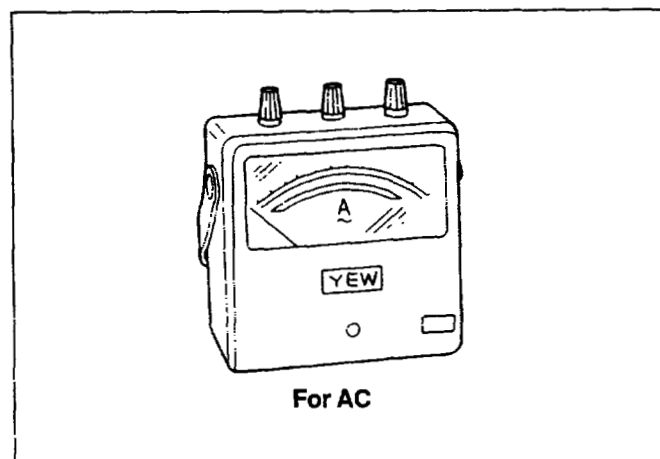


For AC

Fig. 8-2

### (2) AMMETERS

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)



For AC

Fig. 8-3

### (3) FREQUENCY METER

Frequency range : About 45 to 65Hz

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

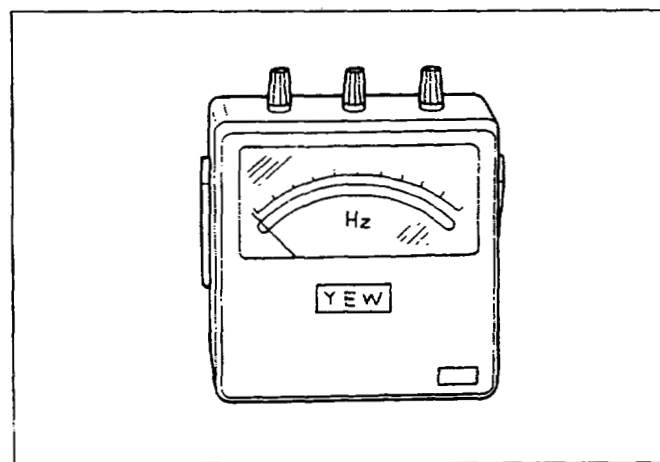


Fig. 8-4

**(4) CIRCUIT TESTER**

This circuit tester is used for measuring resistance, etc.

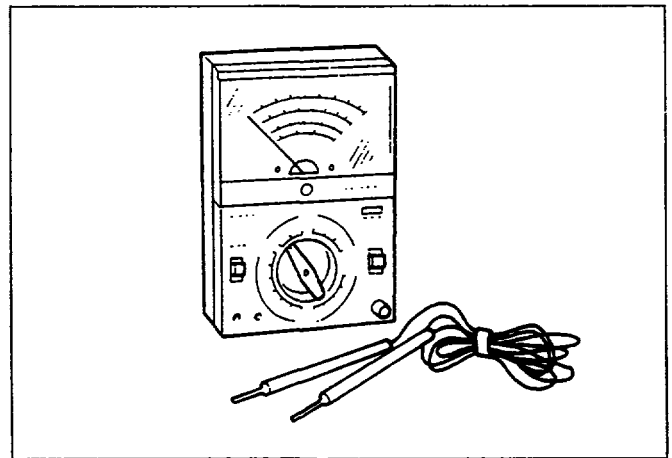


Fig. 8-5

**(5) MEGGER TESTER**

Used for measuring generator insulation resistance.

Select one with testing voltage range of 500V.

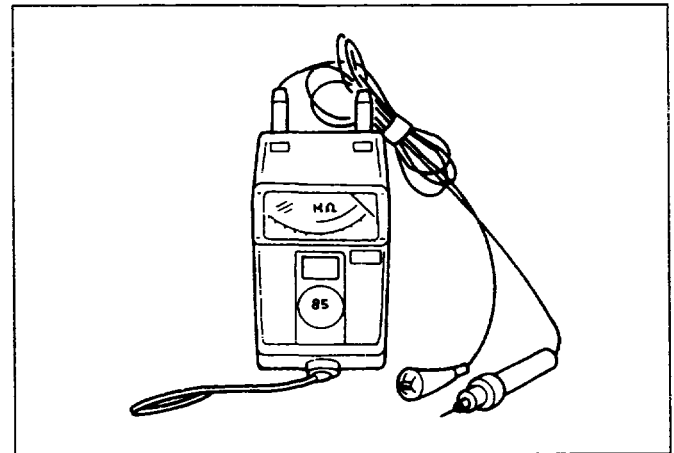


Fig. 8-6

**(6) ENGINE 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.

The PET-2100E engine tachometer is available from your Robin distributors.

Please inquire by the part number PET-2100E.

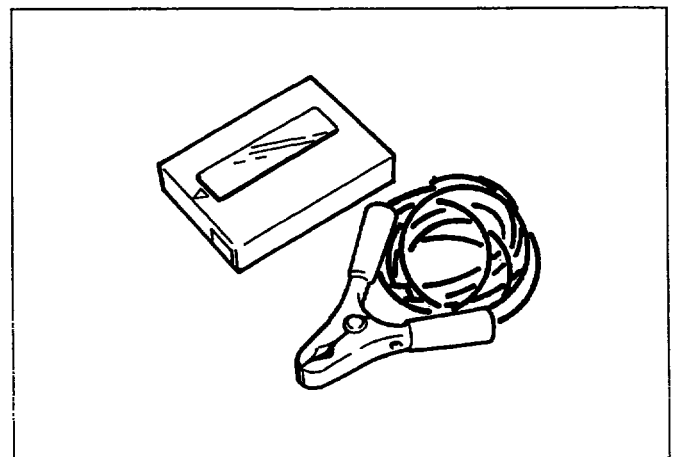


Fig. 8-7

## 8-2 AC OUTPUT MEASURING

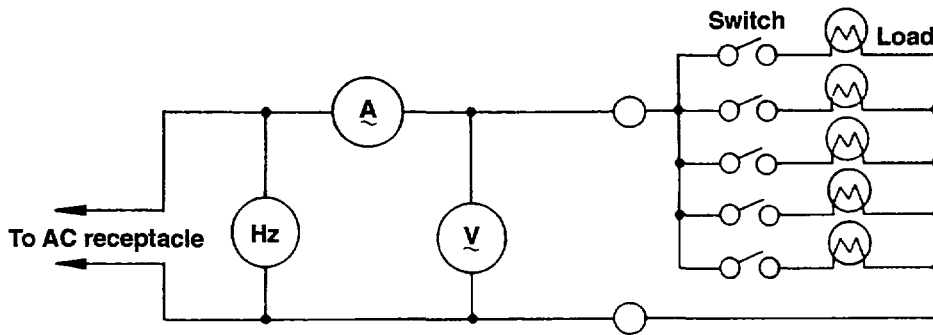


Fig. 8-8

Measurement is executed with the circuit as shown in Fig. 8-8. An electric heater or an incandescent lamp with a power factor of 1.0 is suitable as a load for the generator. When the AC output measured at the rated load and rated speed is confirmed to be within the voltage range specified in the table below, the AC output is normal.

Rated voltage	120V
Voltage range	117~130V

Table 8-2

## 8-3 DC OUTPUT MEASURING

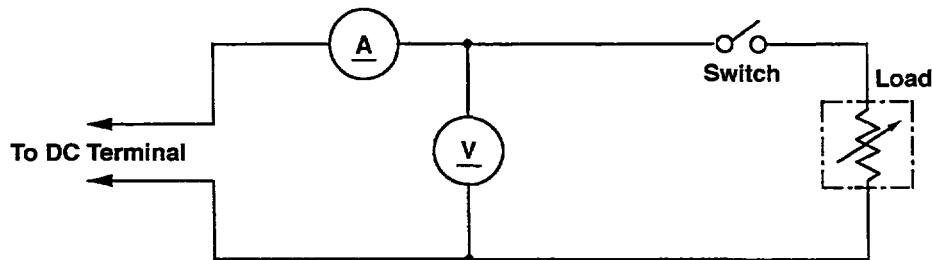


Fig. 8-9

Measurement of DC output is executed with the switch turned ON while the current is regulated at 8.3A by adjusting the load to the generator. If the voltage is within the range from 6V to 14V, the voltage output is normal.

*Note :* If a battery is connected as a load to the generator, the DC output voltage will increase by approximately 1 to 2V. Therefore, carefully observe the electrolyte level and do not overcharge the battery.

## 8-4 MEASURING INSULATION RESISTANCE

Use a "Dr. Robin" generator tester in megger tester mode or use a megger tester to check the 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 megohm 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.

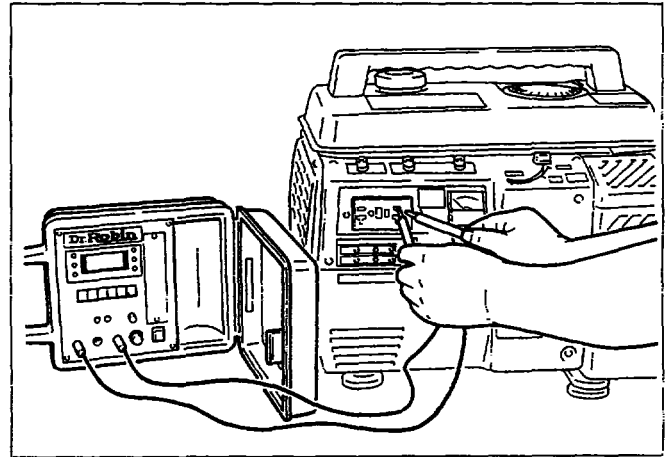


Fig. 8-10

### ● STATOR

- (1) Measure the insulation resistance between BROWN lead and the core.
- (2) Measure the insulation resistance between YELLOW lead and the core.
- (3) Measure the insulation resistance between BLACK lead and the core.

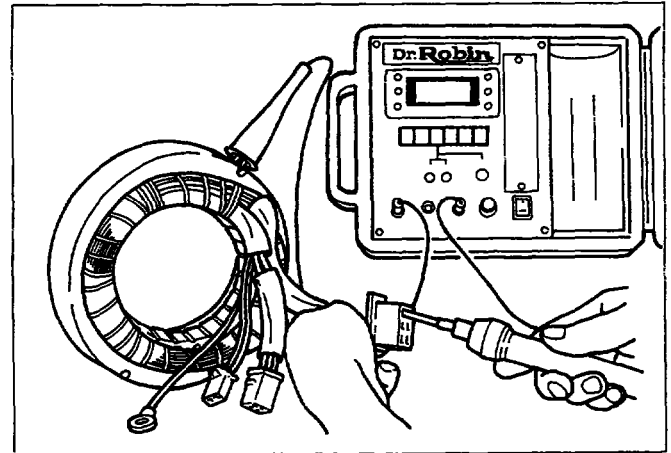


Fig. 8-11

### ● ROTOR

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

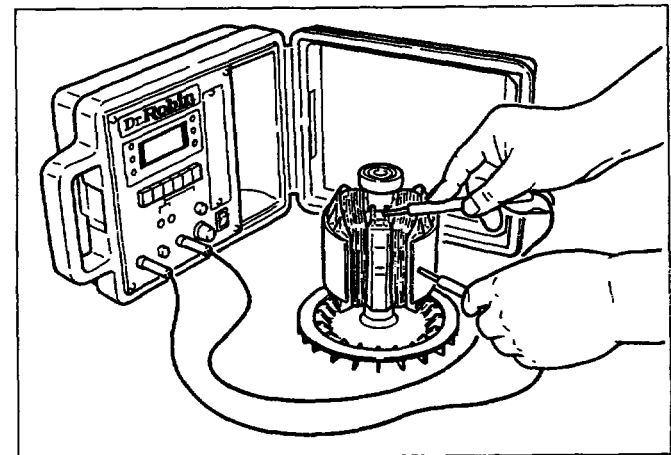


Fig. 8-12

● **CONTROL PANEL**

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

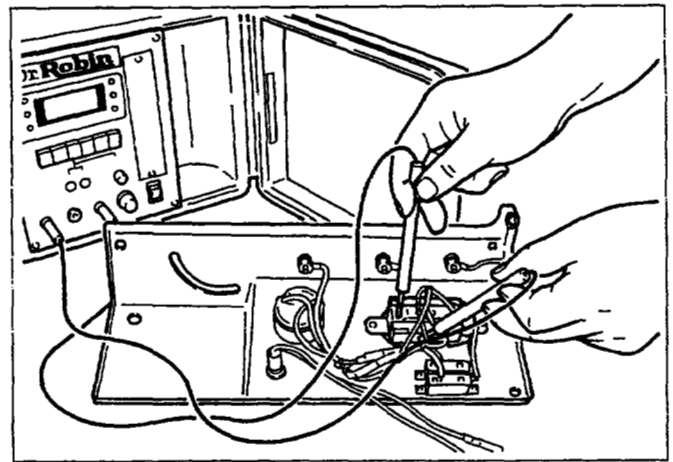


Fig. 8-13

Any part where the insulation resistance is less than  $1M\Omega$  has faulty insulation, and may cause electric leakage and electric shock.

Replace the faulty part.



# 9. CHECKING FUNCTIONAL MEMBERS

## 9-1 CONTROL PANEL

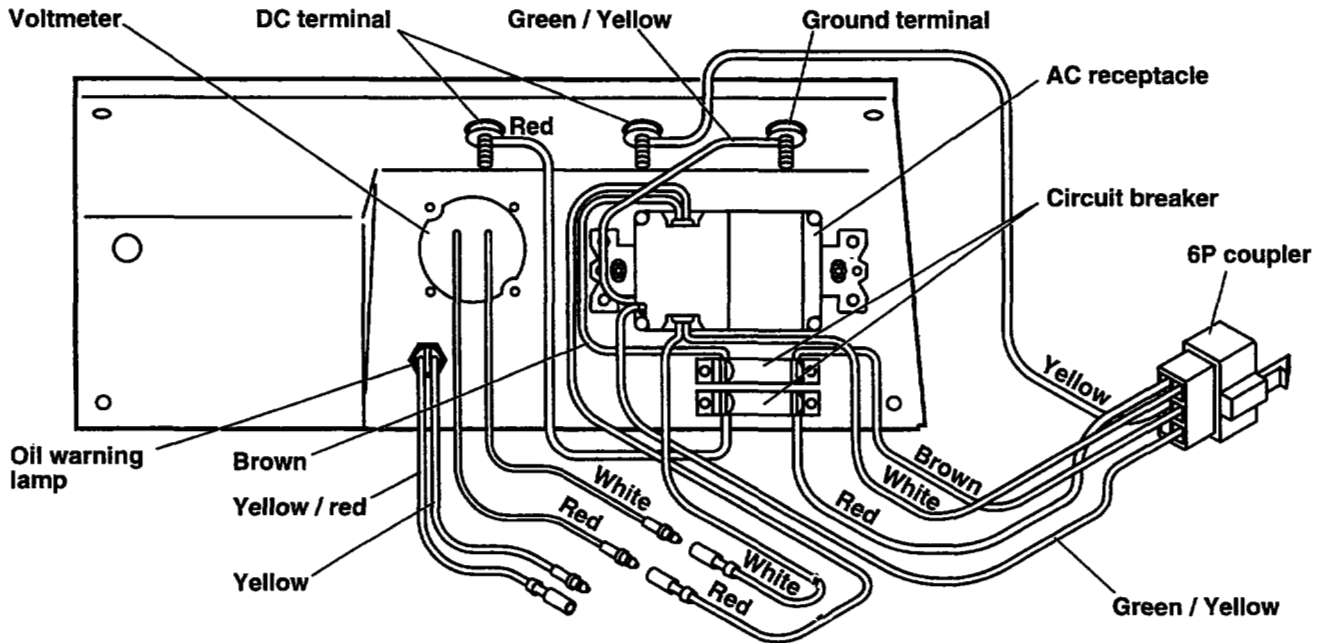


Fig. 9-1

### 9-1-1 AC RECEPTACLES

Using a "Dr. Robin" or 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.

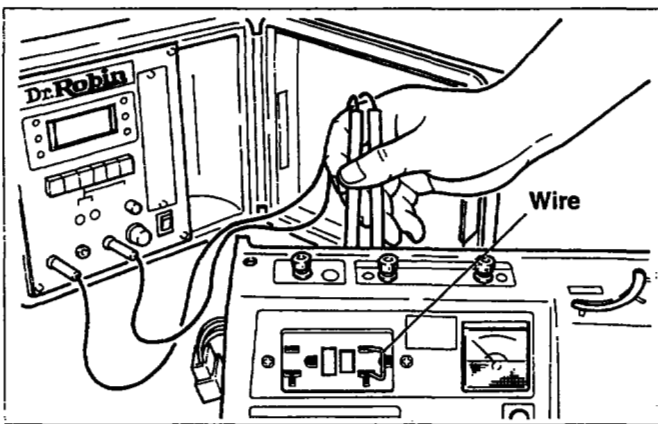


Fig. 9-2A

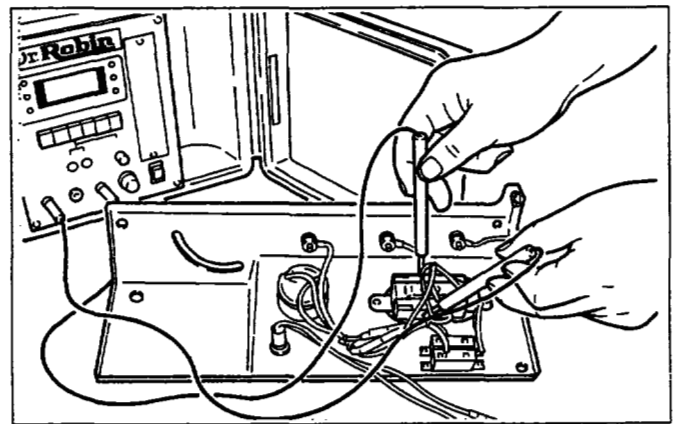


Fig. 9-2B

### 9-1-2 DC TERMINAL

Check continuity between the DC terminals at the rear of the control panel using a circuit tester, under the condition that the DC terminals is mounted on the control panel. (See Fig. 9-1.)

When continuity between the DC terminals is confirmed with a wire connected across the terminals, and is not confirmed if the wire is removed, the DC terminals are normal. (See Fig. 9-1.)

### 9-1-3 CIRCUIT BREAKER

Check continuity between the two terminals at the rear side of the circuit breaker using a circuit tester while it is mounted on the control panel.

If continuity is confirmed when the breaker is ON, and no continuity is confirmed when the breaker is OFF, the circuit breaker is normal.

### 9-1-4 VOLTMETER

Check the voltmeter if it operates correctly by applying specified voltage. Voltmeters cannot be checked with a circuit tester because its internal resistance is too large.

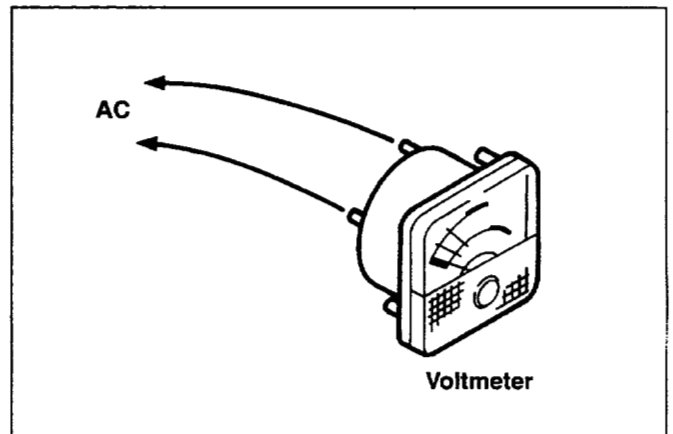


Fig. 9-3

### 9-2 STATOR

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

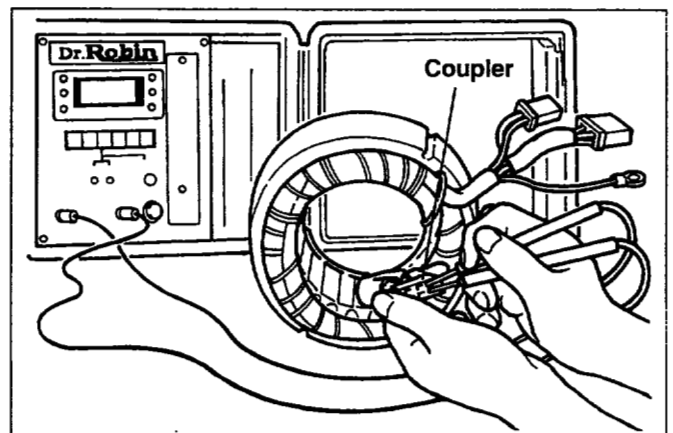


Fig. 9-4

(R × 1 Ω ± 10%)

Specification		AC Winding	DC Winding	Condenser Winding
Hz	Voltage	Brown / White	Green / Green	Black / Black
60	120V	1.4 Ω	0.62 Ω	4.8 Ω

Table 9-1

**NOTE:** 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).

### 9-3 ROTOR

- 1) Using the "Dr. Robin" or a circuit tester, measure the resistance of the field coil.  
(See Fig. 9-5.)

(R × 1 Ω ± 10%)

<b>Resistance</b>
6.3 Ω

**NOTE 1:** Because a diode is soldered to the coil ends at the terminals, resistance may be measured only when tester probes touch the terminals in one combination of polarity. Therefore, if no resistance reading appears, try checking in reverse polarity.

**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).

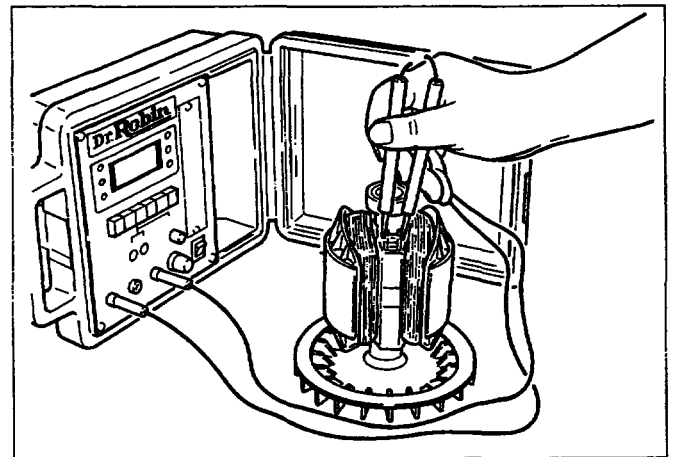


Fig. 9-5

- 2) Measure the resistance of the resistor.

<b>Normal resistance</b>
5.1 kΩ

## 9-4 CONDENSER

- Use a "Dr. Robin" in capacitance meter mode to check the capacity of condensers. (See Fig. 9-6.)

**NOTE:** Be sure to discharge condensers by shorting condenser leads each other before checking their capacitance, or the accurate reading cannot be obtained.

Normal Capacity of Condenser
10 $\mu$ F

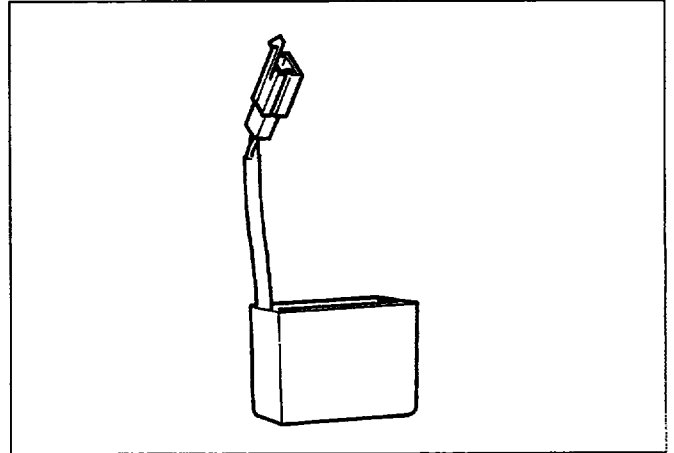


Fig. 9-6

- 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.

## 9-5 DIODE RECTIFIER

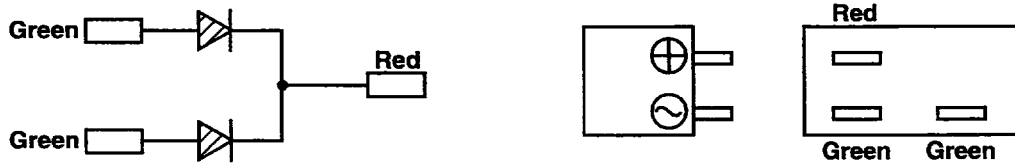


Fig. 9-7

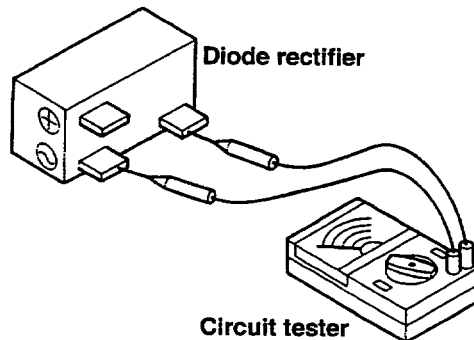


Fig. 9-8

The internal circuit of the diode rectifier is as shown in Fig. 9-7. Check continuity between each terminal using a circuit tester as shown in Fig. 9-8.

■ Checking table for analogue circuit tester.

Analogue circuit tester		Apply black $\ominus$ needle of the circuit tester		
		Green	Green	Red
Apply red $\oplus$ needle of the circuit tester	Green		No continuity	No continuity
	Green	No continuity		
	Red	Continuity	Continuity	

Table 9-2-1

■ Checking table for digital circuit tester.

Digital circuit tester		Apply red $\oplus$ needle of the circuit tester		
		Green	Green	Red
Apply black $\ominus$ needle of the circuit tester	Green		No continuity	No continuity
	Green	No continuity		
	Red	Continuity	Continuity	

Table 9-2-2

**NOTE 1:** Because of the difference of measuring method between the analogue circuit tester and the digital circuit tester, polarity of tester needles should be reversed.

**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 result of the checking indicates failure even in one section, replace with a new one.

**NOTE 3:** "Simpson" brand analogue testers have the characteristic as same as the digital circuit tester.

## 9-6 OIL SENSOR (OPTION)

1. Disconnect two (2) wires coming from the sensor at the connection.
2. Loosen the sensor to remove it from the engine.
3. Plug the opening of oil filler hole (created after sensor is removed) with suitable means such as oil gauge.
4. Connect the removed wires again with the oil sensor.
5. Start the engine with the oil sensor removed and confirm if;
  - a. Engine stops after 5 seconds which is normal, or
  - b. Engine does not stop after more than 10 seconds which is unusual.

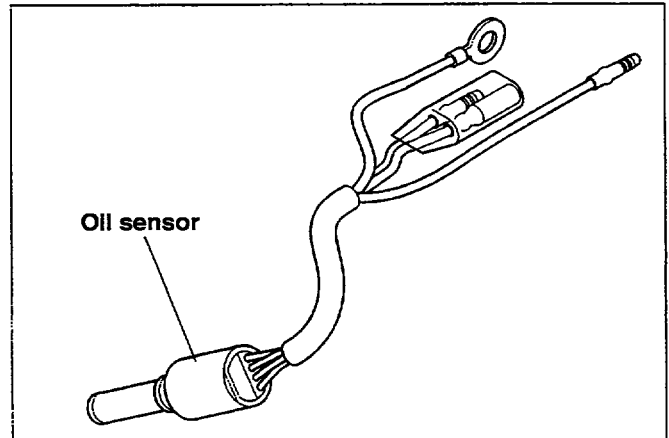


Fig. 9-9

**NOTE :** *The sensor will not operate properly when wire is broken or poorly connected. Check the wires for correct connection. If it fails to stop within 5 seconds after the wirings have checked, the sensor is wrong. Replace the sensor with 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 reassembled correctly. Tag the disassembled part with the necessary information to facilitate easier and smoother reassembling.
- 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 DISASSEMBLY PROCEDURES

Step	Part to remove	Description	Remarks	Tool
1.	Side cover	(1) Remove the side cover by unscrewing four M5 × 8 screws. (See Fig. 10-1.)		(+) Plus screw driver
2.	Rear cover	(1) Remove the rear cover by unscrewing three M5 × 8 screws and two M8 × 10 screws. (See Fig. 10-2.)		(+) Plus driver

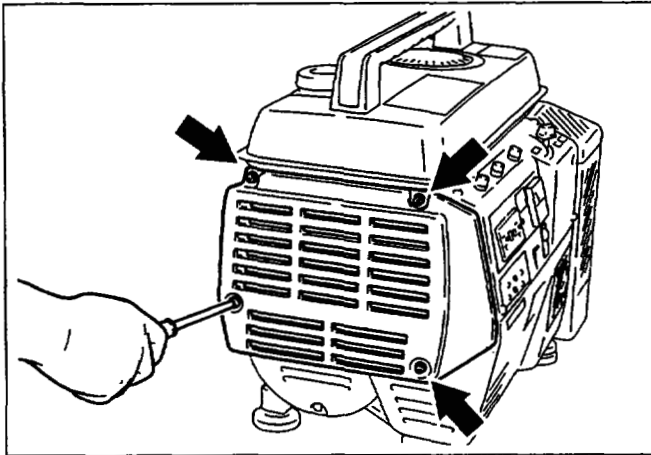


Fig. 10-1

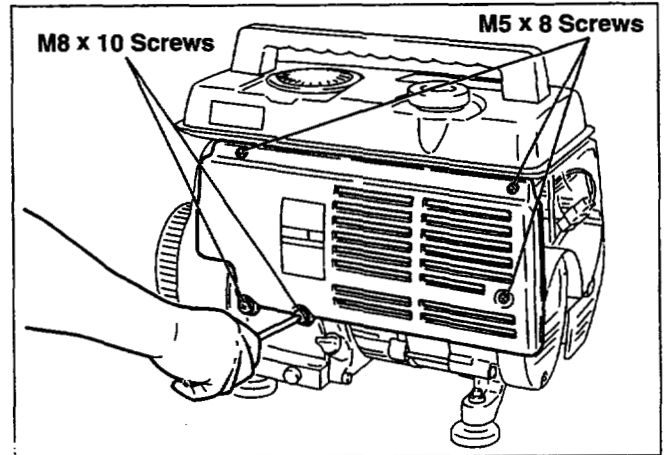
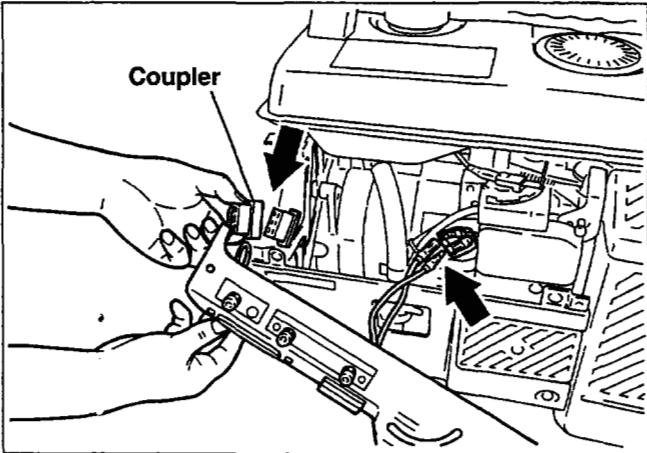
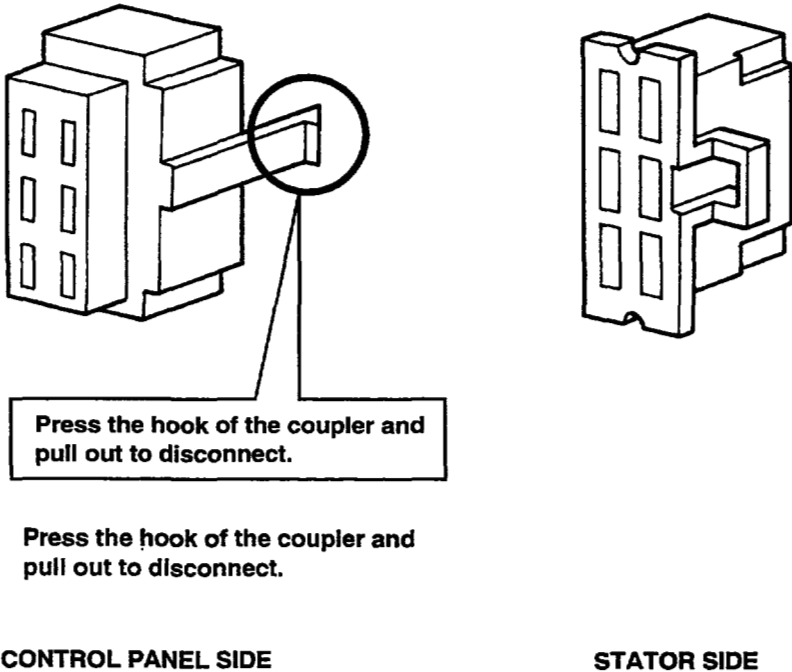


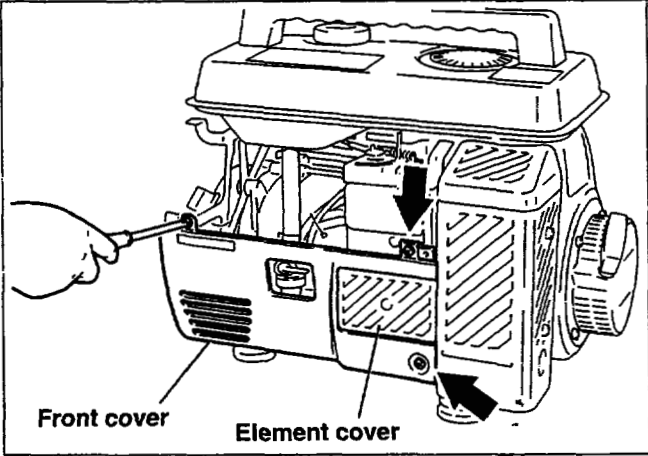
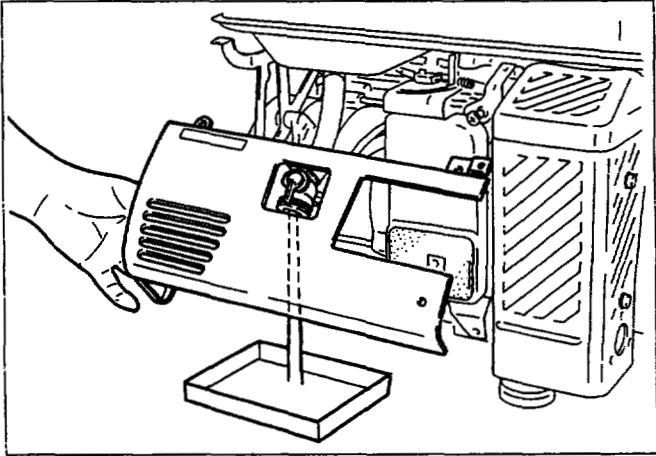
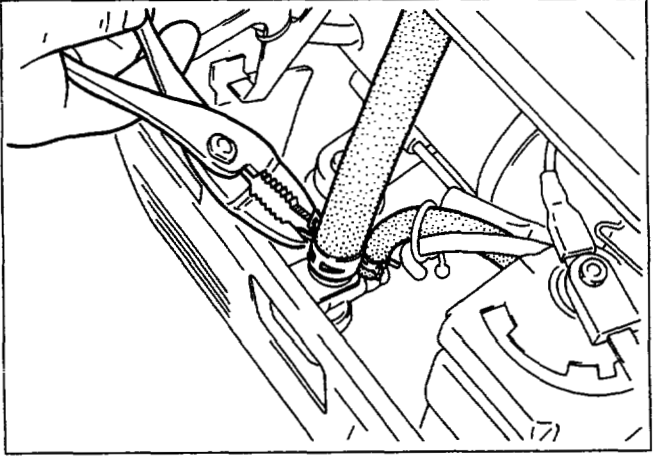
Fig. 10-2

3.	Control panel	(1) Pull the knob off the control lever and remove the control panel by unscrewing four M5 × 8 screws. (See Fig. 10-3.)		(+) Plus driver
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Fig. 10-3

Step	Part to remove	Description	Remarks	Tool	
4.	Couplers and plugs (Disconnection)	<p>(1) Disengage the couplers of stator wires from the wires of control panel. 6P couplers (Yellow, Red, Green/Yellow, Brown, White) (See Fig. 10-4.)</p> <p>(2) Disengage the connectors of oil warning lamp (option) (See Fig. 10-5.)</p>	Pull the couplers while pushing the locking hook.		
		 <p style="text-align: center;">Fig. 10-4</p>			
		 <p style="text-align: center;">Press the hook of the coupler and pull out to disconnect.</p> <p style="text-align: center;">Press the hook of the coupler and pull out to disconnect.</p> <p style="text-align: center;"><b>CONTROL PANEL SIDE</b> <span style="margin-left: 200px;"><b>STATOR SIDE</b></span></p> <p style="text-align: center;">Fig. 10-5</p>			



Step	Part to remove	Description	Remarks	Tool
5.	Front cover	(1) Remove the element cover by unscrewing M6 × 12 screw. (See Fig. 10-6.)		(-) Driver
		(2) Remove the front cover by unscrewing three M5 × 8 screws. (See Fig. 10-6.)   <p style="text-align: center;">Fig. 10-6</p>		(+) Driver
6.	Fuel pipe and plug (Disconnection)	(1) Discharge fuel from the tank. 1. Shut the fuel strainer. 2. Remove the strainer cup. 3. Put a vessel to receive fuel under the strainer and open the fuel cock to discharge fuel. (See Fig. 10-7.) 4. Attach the strainer cup to the strainer body	Use utmost care about fire hazard.  Wipe off spilt fuel thoroughly.  Do not lose the filler screen.	
		(2) Disconnect fuel hose from the strainer. Loosen the hose clamp on top of the strainer and pull out the fuel hose from the strainer. (See Fig. 10-8.)		Pliers
 <p style="text-align: center;">Fig. 10-7</p>		 <p style="text-align: center;">Fig. 10-8</p>		

Step	Part to remove	Description	Remarks	Tool
7.	Fuel tank handle	<p>(1) Remove the handle cover by unscrewing the two M3 ×10 screws.</p> <p>(2) Pull off the breather pipe.</p> <p>(3) Remove the handle body by taking off the two M8 nuts.</p>	The fuel tank can be removed without disassembling the handle.	<p>(+) Driver</p> <p>12mm box wrench</p>

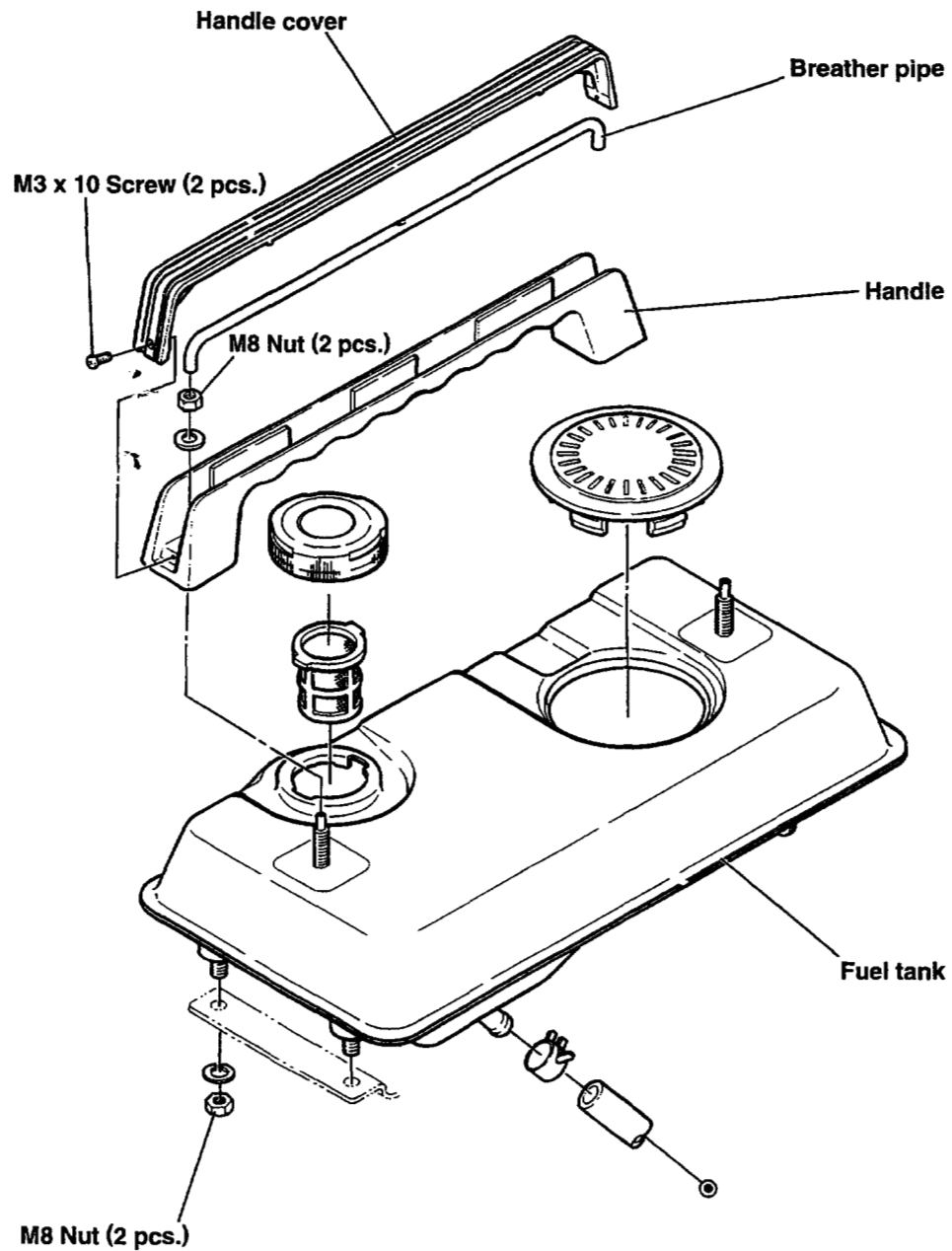
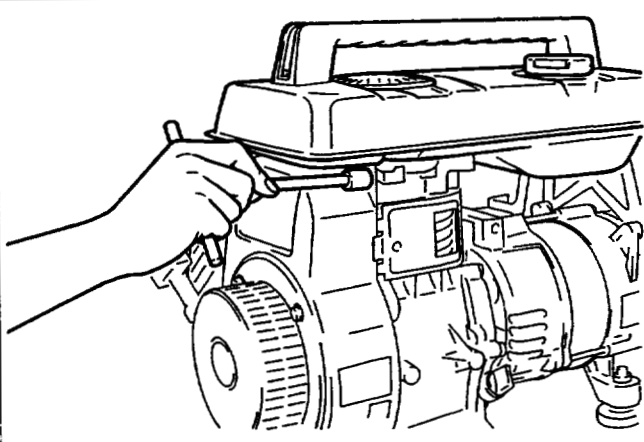
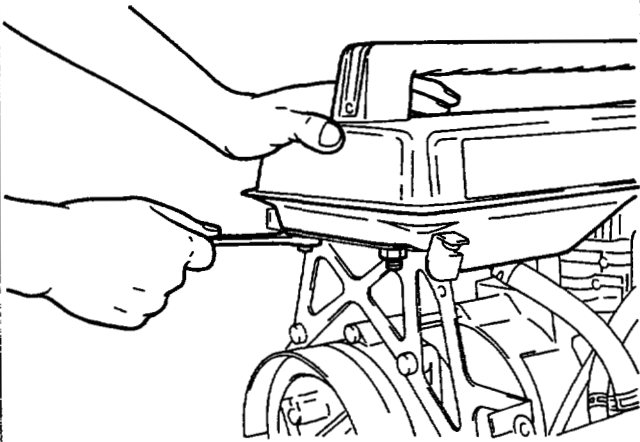
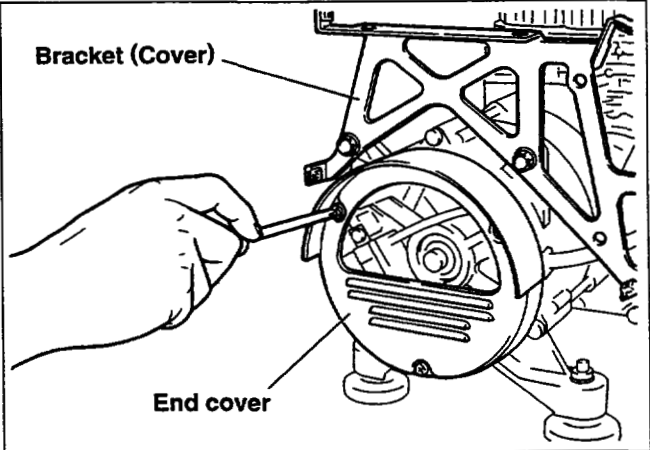


Fig. 10-9

Step	Part to remove	Description	Remarks	Tool
8.	Fuel tank	(1) Remove the two M6×12 flange bolts from the blower housing. (See Fig. 10-10.) (2) Remove the fuel tank by taking off the two M8 nuts from the bottom of the tank. (See Fig. 10-11.)		10mm box wrench  12mm box wrench
				
				Fig. 10-10
9.	Bracket (Cover)	(1) Remove the bracket cover from the generator by loosening the two M8 × 30 bolts. (See Fig. 10-12.)		12mm box wrench
10.	End cover	(1) Remove the end cover from the generator by unscrewing the four M5 × 10 screws. (See Fig. 10-12.)		(+ ) Driver
				
		Fig. 10-12		

Step	Part to remove	Description	Remarks	Tool
11.	Rear bracket	<p>(1) Loosen and take out the three M6 cover bolt. (See Fig. 10-13.)</p> <p>(2) Remove condenser from rear bracket.</p> <p>(3) Remove the connector of the diode rectifier and then remove the earth cable terminal from the rear bracket. (See Fig. 10-14.)</p>		<p>10mm box wrench</p> <p>Box spanner</p> <p>Box spanner and screw driver (+)</p>

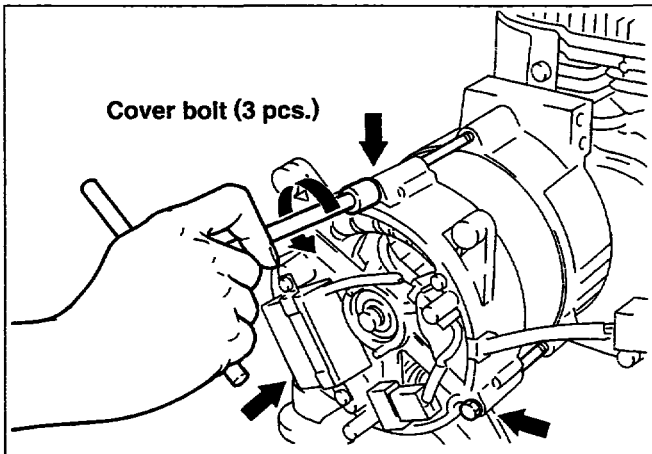


Fig. 10-13

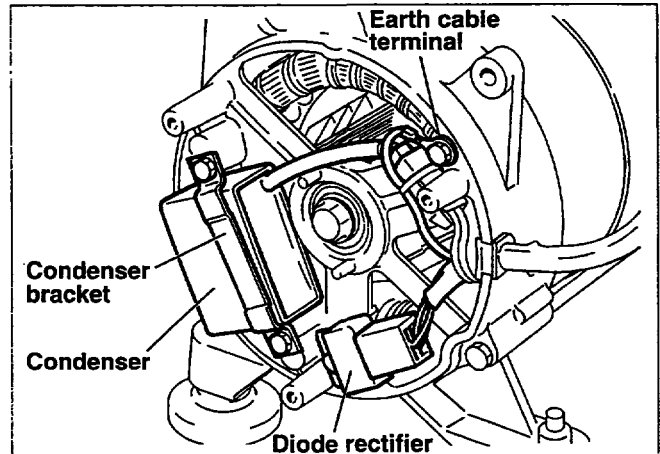


Fig. 10-14

		<p>(4) Remove the rear bracket, tapping it evenly with a plastic mallet. (See Fig. 10-15.)</p> <p>(5) Remove mount rubbers from rear cover. (See Fig. 10-16.)</p>		<p>Plastic mallet</p> <p>Wrench</p>
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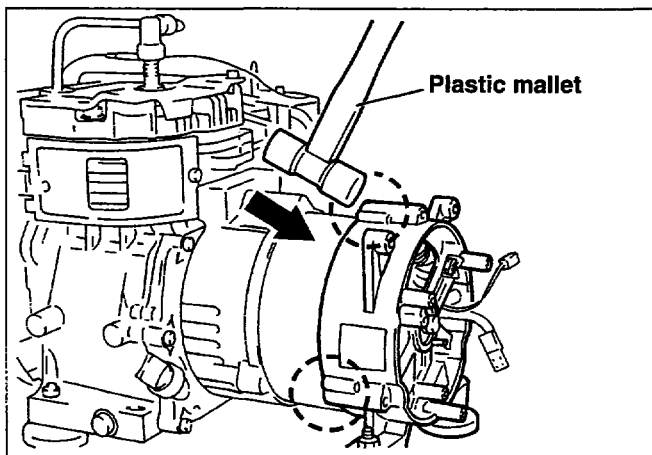


Fig. 10-15

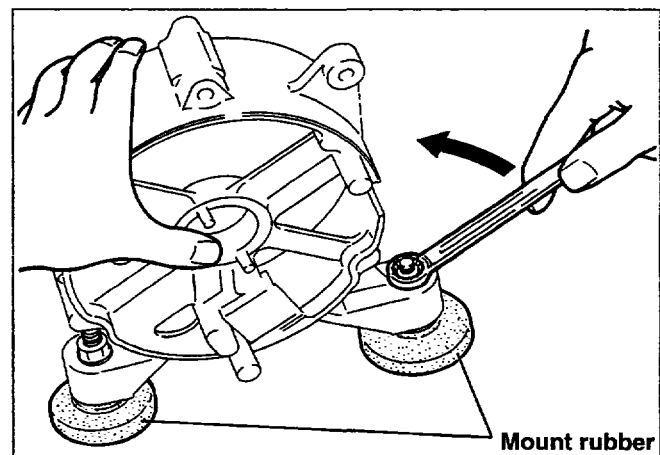


Fig. 10-16

Step	Part to remove	Description	Remarks	Tool
12.	Stator	<p>(1) Remove the stator cover. (See Fig. 10-17.)</p> <p>(2) Pull off the stator from the front cover tapping the core with a plastic mallet. (See Fig. 10-18.)</p>	Never tap on the winding and the lead.	Plastic mallet

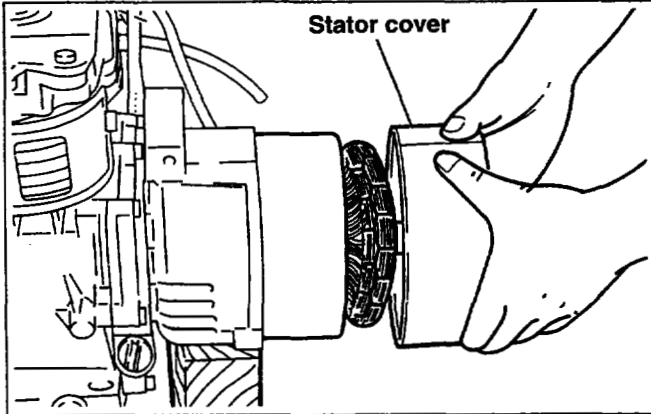


Fig. 10-17

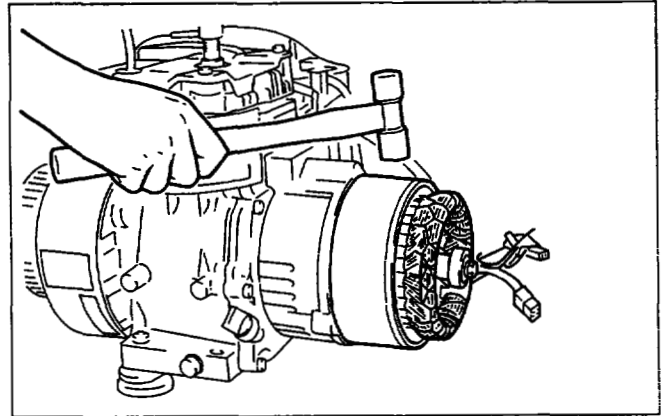


Fig. 10-18

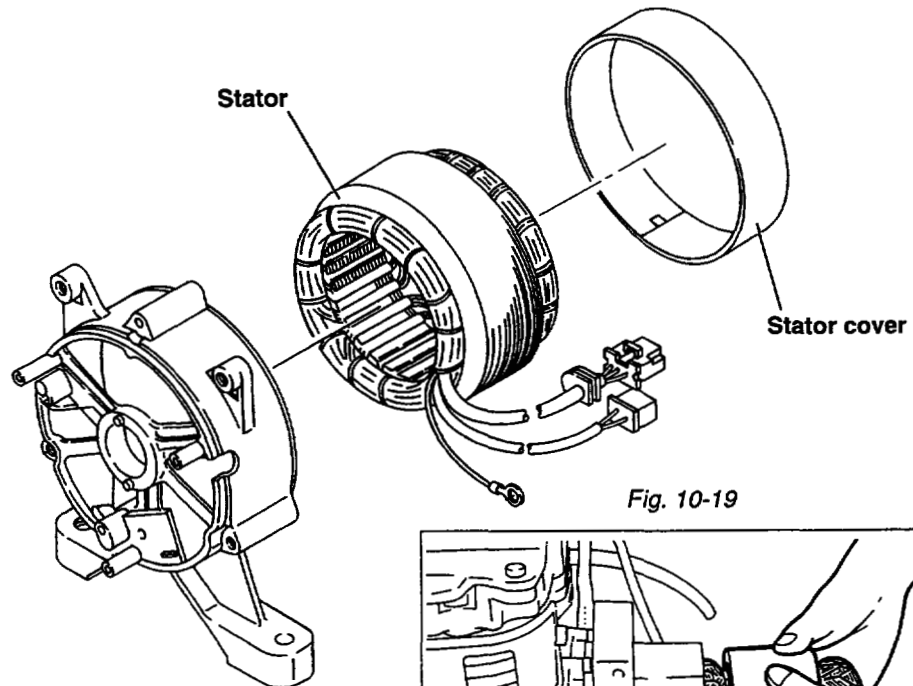


Fig. 10-19

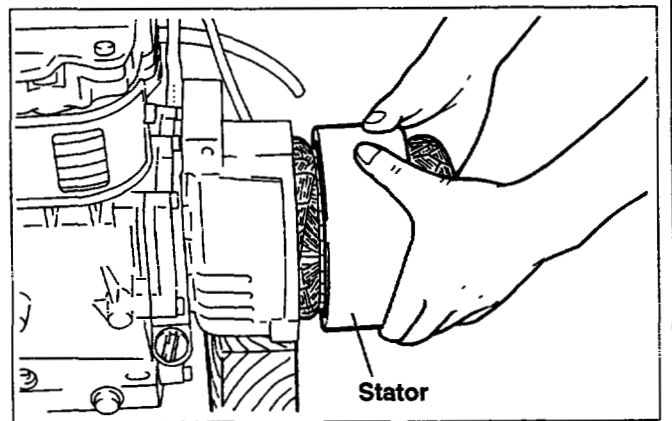
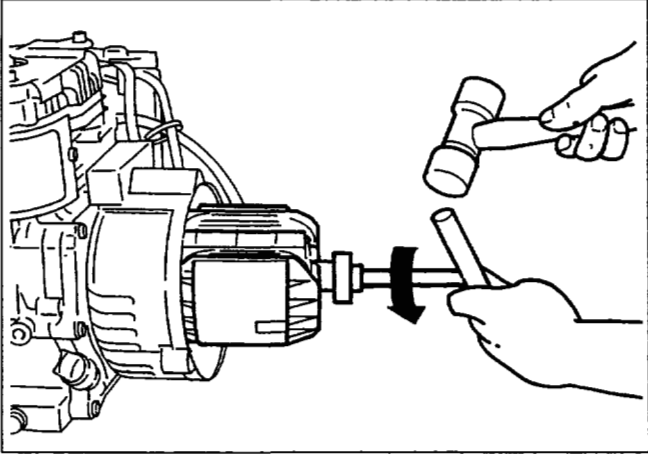
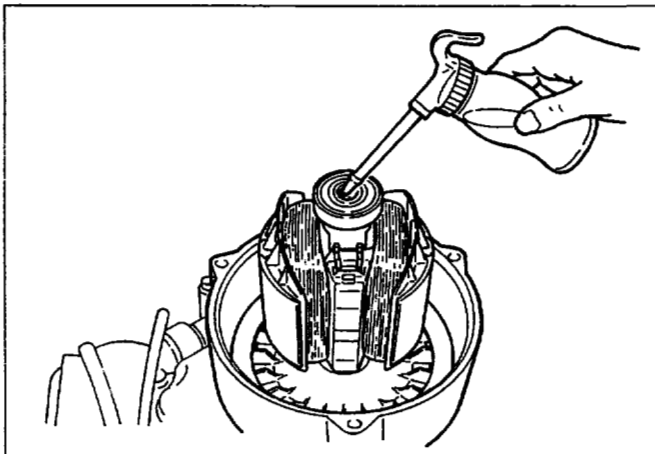
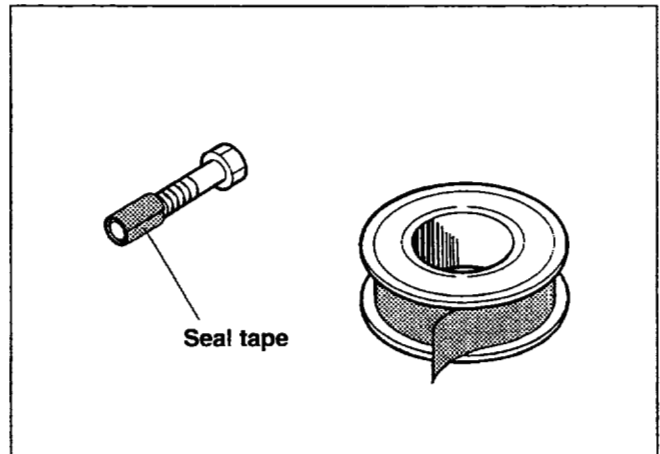


Fig. 10-20

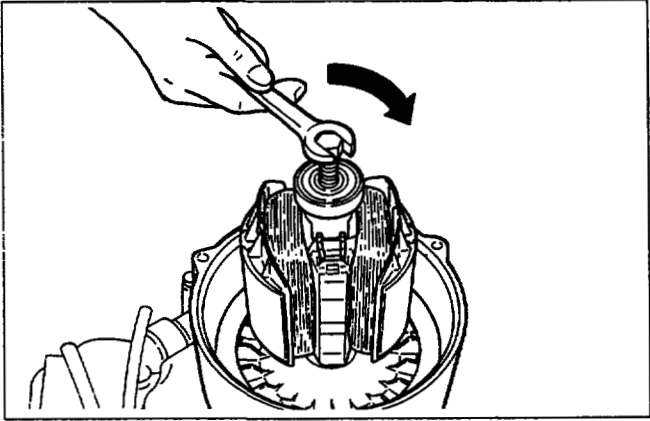
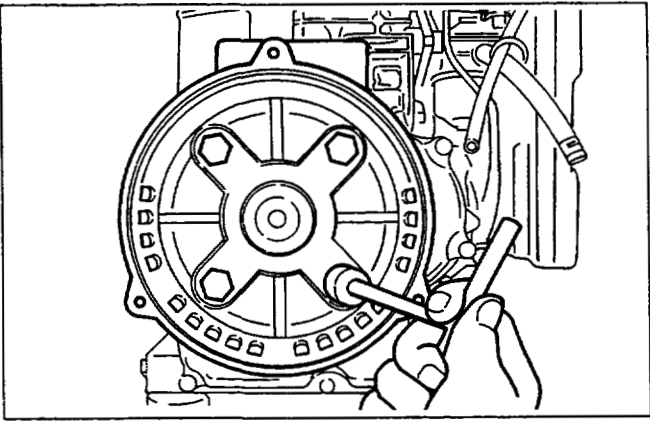
Step	Part to remove	Description	Remarks	Tool
13.	Rotor	<p>(1) Take off the through bolt. Apply a box wrench on the head of through bolt. Hit the wrench handle with a hammer counter-clockwise to loosen.</p>  <p style="text-align: center;"><i>Fig. 10-21</i></p>		Box wrench Plastic hammer
		<p>(2) Put the engine on the working table recoil starter side down.</p>		
		<p>(3) Use a bolt and oil as a tool for pulling out rotor in the following procedures :</p> <ol style="list-style-type: none"> <li>1. Pour engine oil into the center hole of rotor shaft. Fill with oil to the shaft end. (See Fig. 10-22.)</li> <li>2. Prepare a bolt with the following thread size : M8 × P 1.25</li> <li>3. Apply a few turns of seal tape around the tip of the bolt. (See Fig. 10-23.)</li> </ol>		

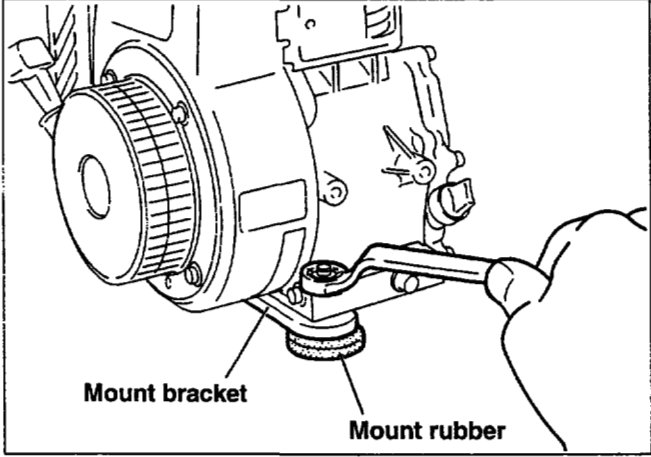


*Fig. 10-22*



*Fig. 10-23*

Step	Part to remove	Description	Remarks	Tool
13.	Rotor	<p>4. Screw the bolt into the thread of the rotor shaft.</p> <p>5. Torque the bolt using a socket wrench until the rotor comes off loose.</p> <p>* The hydraulic pressure inside the rotor shaft takes apart the rotor from the engine shaft.</p> <p>(4) Wipe off oil thoroughly from rotor shaft and engine PTO shaft.</p>		12mm box spanner or Socket wrench
		 <p style="text-align: center;">Fig. 10-24</p>		
14.	Front bracket	<p>(1) Remove the front bracket, which is mounted on the main bearing cover of the engine, by taking out four M8 × 18 bolts. (See Fig. 10-25.)</p>		12mm box spanner
		 <p style="text-align: center;">Fig. 10-25</p>		

Step	Part to remove	Description	Remarks	Tool
15.	Mount rubbers	<p>(1) Remove mount bracket from engine.  Remove mount rubbers from mount bracket.  8 <math>\phi</math> Nut : 3pcs. or 2pcs.</p>  <p style="text-align: center;">Fig. 10-26</p>		12 mm wrench



## 10-3 ASSEMBLY PROCEDURES

### 10-3-1 FRONT BRACKET

Install the front bracket on the main bearing cover of the engine, engaging the faucet joint.

(See Fig. 10-27.)

M8 × 18mm bolt and washer assy ..... 4pcs.

TIGHTENING TORQUE
8.7 ~ 10.1 ft • lbs.
1175 ~ 1370 N • cm
120 ~ 140 kg • cm

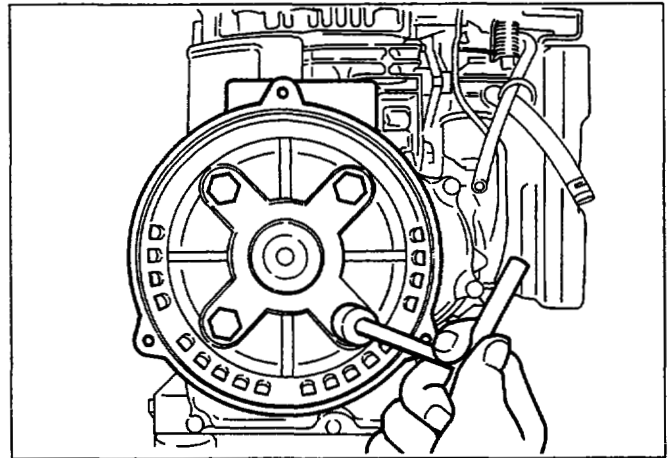


Fig. 10-27

### 10-3-2 ROTOR

1) Wipe off oil from the tapered portion of engine shaft and matching tapered hole of rotor shaft.

(See Figs. 10-28 and 10-29.)

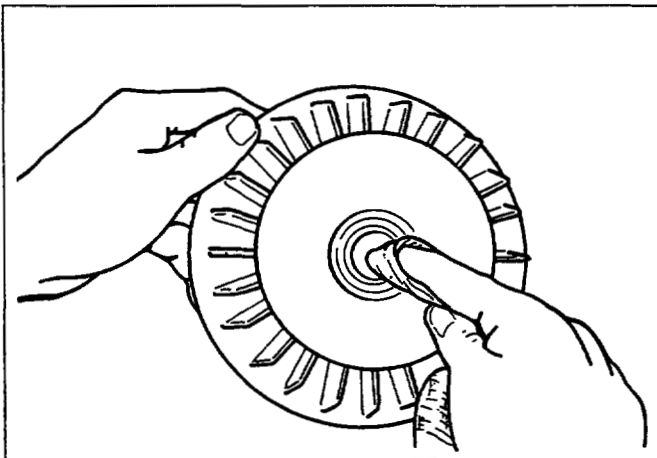


Fig. 10-28

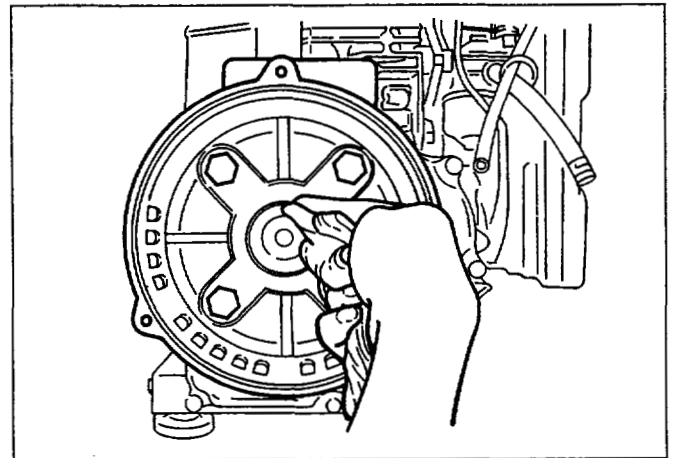


Fig. 10-29

2) Install rotor on the engine shaft and tighten the through-bolt.

Apply a wrench on the head of through bolt and hit wrench handle clockwise with a hammer to tighten. (See Fig. 10-30.)

If an impact wrench is available, use it.

TIGHTENING TORQUE
8.7 ~ 10.1 ft • lbs.
1175 ~ 1370 N • cm
120 ~ 140 kg • cm

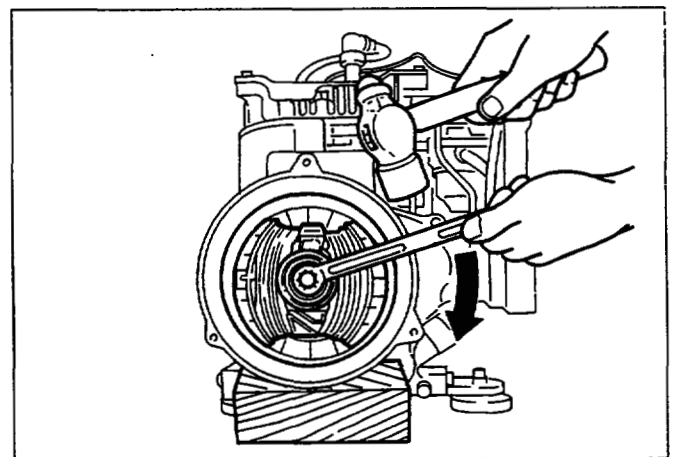


Fig. 10-30

### 10-3-3 STATOR

- (1) Holding the rear bracket and stator, fit them to the front bracket. Match the mounting hole of the rear bracket and that of the rotor bearing, and softly strike the outside periphery of the rear bracket with a plastic hammer. (See Fig. 10-31.)
- (2) Attach the stator cover around the stator.

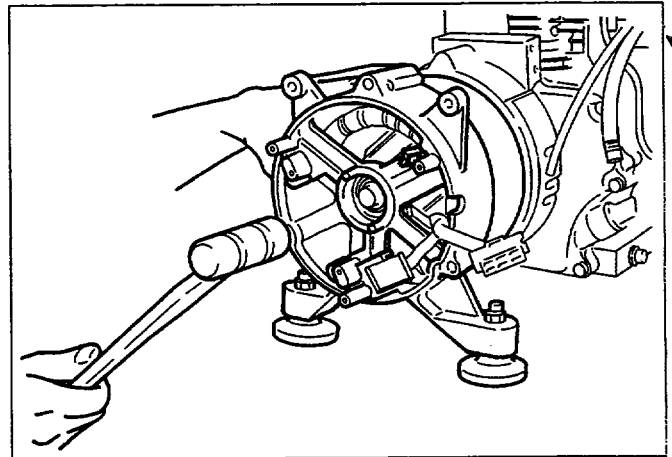


Fig. 10-31

- (3) Tighten the three M6 bolts to fix the rear bracket to the front bracket .

TIGHTENING TORQUE	
4.0 ~	5.4 ft · lbs.
535 ~	735 N · cm
55 ~	75 kg · cm

- (4) Put the grommet in the groove of the rear bracket and secure the wire.

*Note : Fix the wire from the stator and diode stack with the clamp at the bottom of the groove.*

### 10-3-4 CONDENSER

Put condenser to rear cover.

5  $\phi$  × 10 mm tapping screw ..... 2 pcs.

TIGHTENING TORQUE	
2.4 ~	4.0 ft · lbs.
325 ~	535 N · cm
33 ~	55 kg · cm

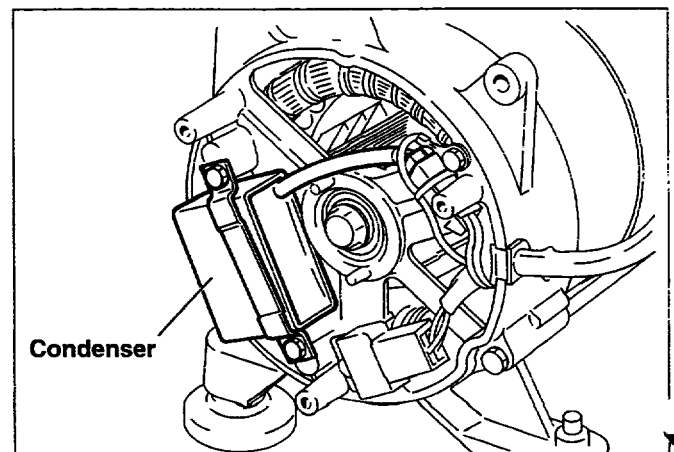


Fig. 10-32

### 10-3-5 END COVER

Set the end cover on the rear bracket with four M5 × 10 screws.

### 10-3-6 BRACKET (COVER)

Mount the bracket (cover) on the rear bracket and secure them with M8 × 30 bolts.

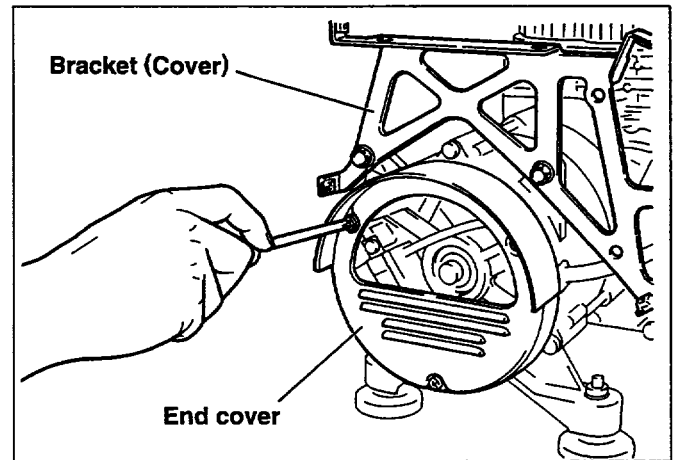


Fig. 10-33

### 10-3-7 FUEL TANK AND FUEL PIPE (CONNECTION)

- (1) Connect the rubber pipe to the engine carburetor and fasten it with a hose clamp. Attach the banjo to the opposite end of the rubber pipe, tighten it with a hose clamp, and fasten the pipe to the fuel strainer with the banjo bolt.

*Note : Mount the fuel strainer with the banjo outlet upward.*

- (2) Fasten the strainer to the front bracket with the joint nuts.
- (3) Secure the mounting tab on the bottom of the fuel tank and the blower housing with M6 × 12 bolts. Insert the attaching bolts on the other end of tank into the mount bracket hole and secure it with two M8 nuts.
- (4) Connect the rubber pipe  
First, fit the hose clamp on the rubber pipe, connect the strainer and fuel tank, then fasten the rubber pipe with the hose clamps.

*Note : Apply a drop of oil to the rubber pipe so that it may easily be connected to the strainer and the fuel tank.*

### 10-3-8 FUEL TANK HANDLE

- (1) Match the handle hole with the bolt on the top of the fuel tank and secure it with M8 nuts.
- (2) Completely insert the breather pipe over the bolt.

*Note : There is a hole at the center of the breather pipe for air bleeding. Set the breather pipe so that the hole is directed upward.*

- (3) Fix both ends of the handle cover with M3 × 10 screws.

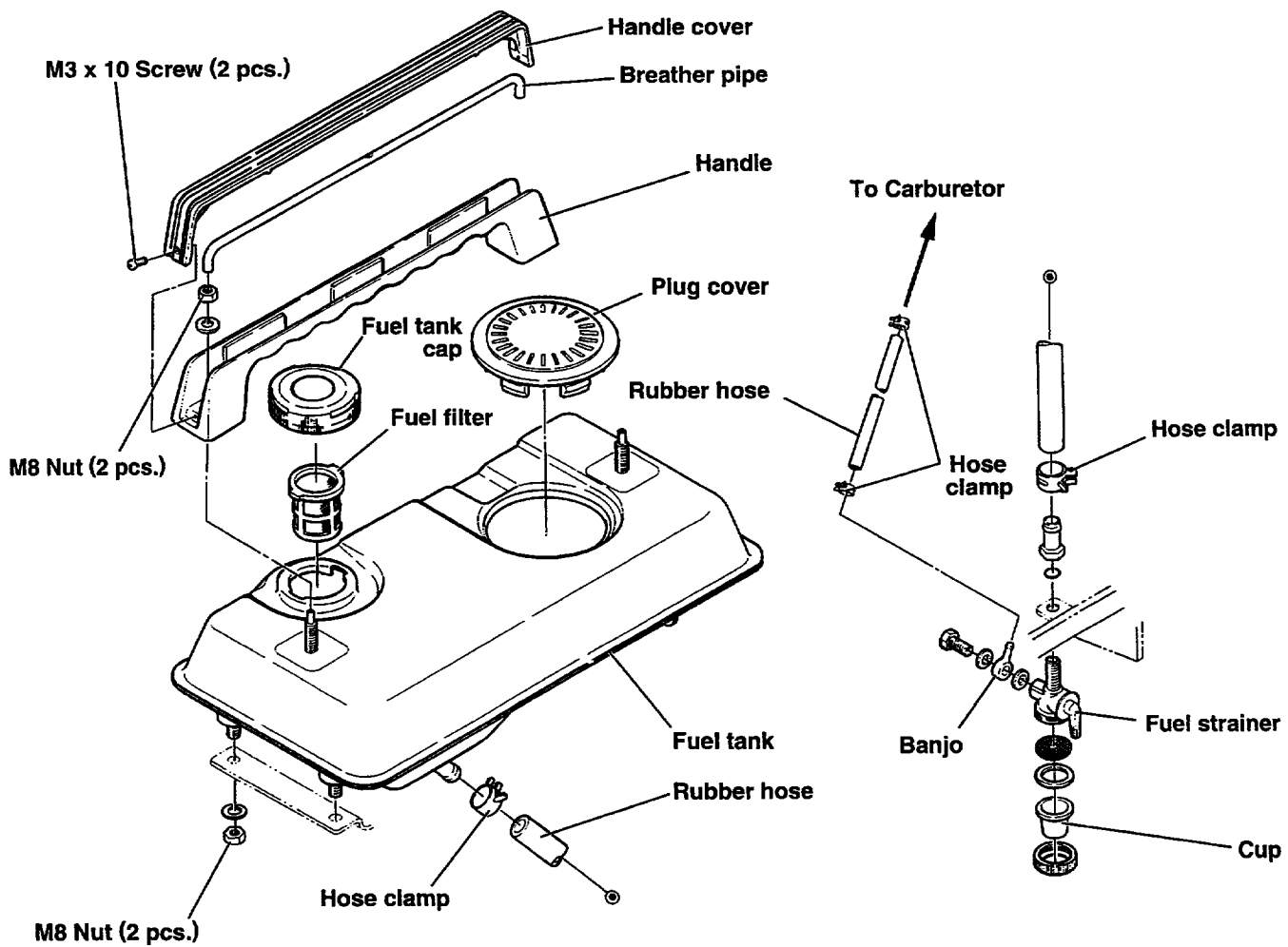


Fig. 10-34

### 10-3-9 FRONT COVER AND ELEMENT COVER

- (1) Secure the front cover, on which fuel strainer have been mounted, with three M5 × 8 screws. (See Fig. 10-35.)
- (2) Secure the element cover with M6 × 12 screws. (See Fig. 10-35.)

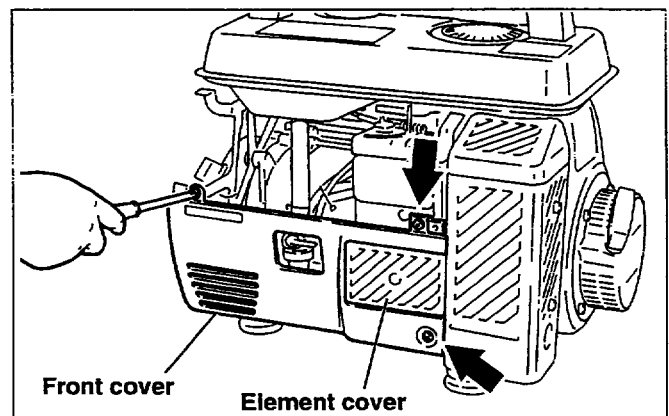


Fig. 10-35

### 10-3-10 CONNECTION OF WIRES

- (1) Connect the wires drawn out from the stator to the wires from the control box.  
(See Fig. 10-36.)
- (2) Press the couplers until the locking hook engages securely.
- (3) Connect the oil warning lamp (option) wire. (See Fig. 10-36.)

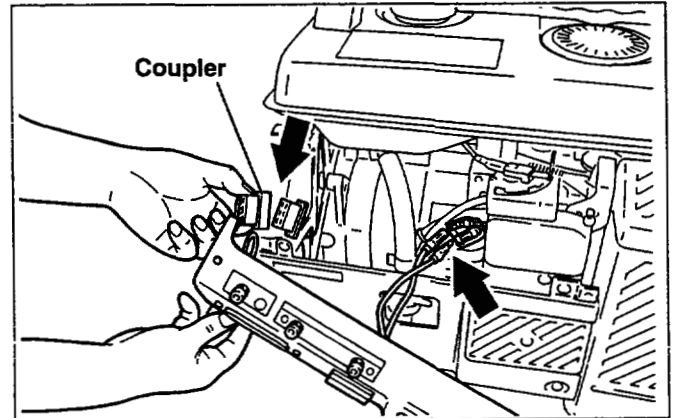
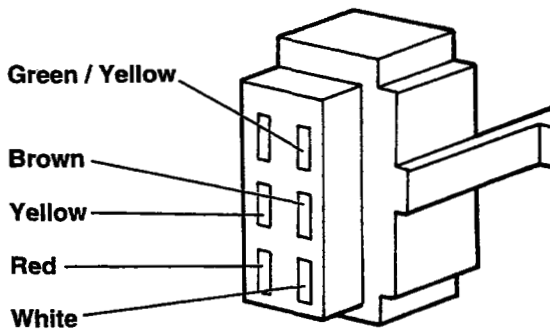


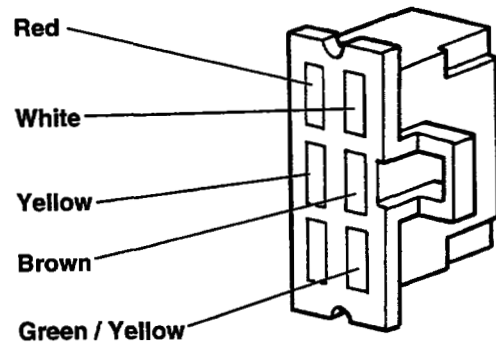
Fig. 10-36

### [WIRE CONNECTIONS BETWEEN CONTROL PANEL AND STATOR]

6P coupler Wire color : Yellow, Red, Green/Yellow, Brown, White



CONTROL PANEL SIDE



STATOR SIDE

### 10-3-11 CONTROL PANEL

- (1) Put the control panel over the control lever and secure it with four M5 screws.
- (2) Attach the knob to the control lever.

*Note : After the couplers and connectors have been connected and secured to the control panel, secure the wires with a wire band to the control panel.*

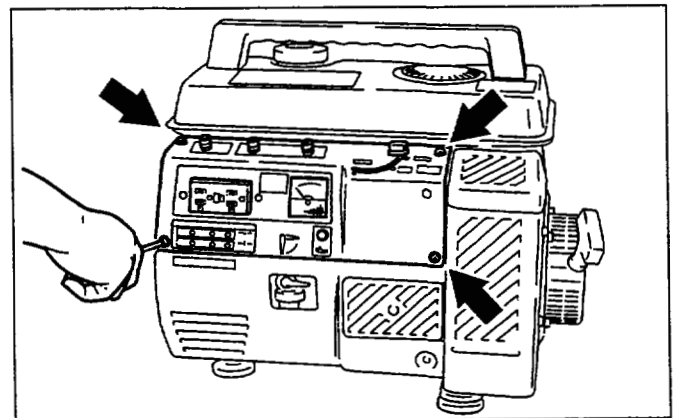


Fig. 10-37

### 10-3-12 REAR COVER

Secure the rear cover with three M5×8 screws and two M8 ×10 screws.

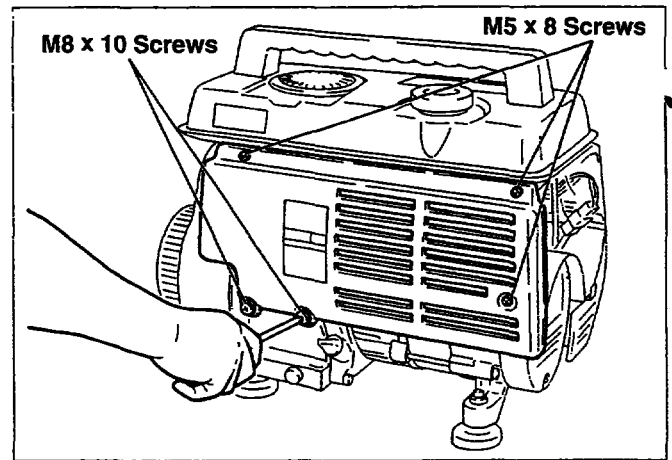


Fig. 10-38

### 10-3-13 SIDE COVER

Secure the side cover with four M5×8 screws.

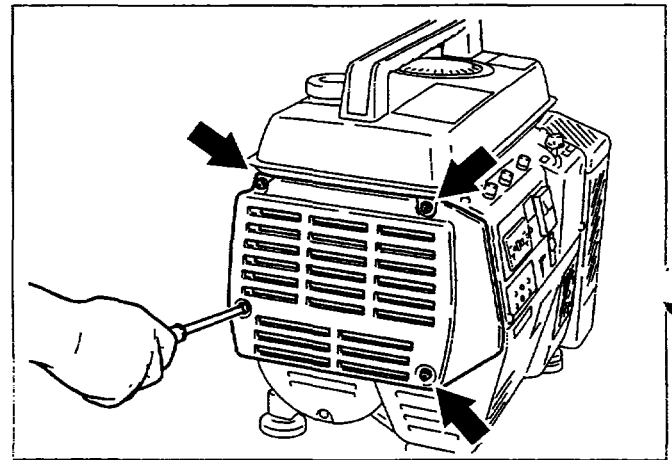


Fig. 10-39

# 11. TROUBLESHOOTING

## 11-1 NO AC OUTPUT

### 11-1-1 CHECKING STATOR

- 1) Remove control panel and disconnect couplers on wiring.
- 2) Measure the resistance between terminals on stator leads.  
Refer to Table 9-1 (page 28) for normal resistance.

#### [Remedy]

If stator is defective, replace with new one.

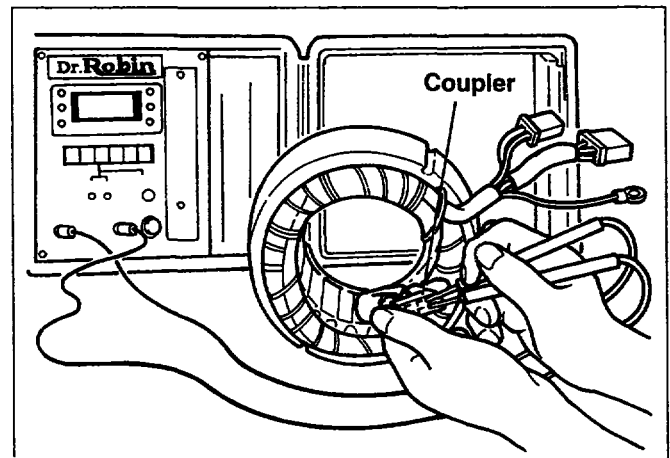


Fig. 11-1

### 11-1-2 CHECKING CONDENSER

- If an instrument (Q.C.-meter or C-meter) for measuring capacity of condenser is available, check the capacity of condenser.

NORMAL CAPACITY OF CONDENSER
10 $\mu$ F

- If you do not have such an instrument, you can check condenser by replacing with new one and test running.  
If the generator perform normally with new condenser, the cause of trouble is defect in original condenser.

### 11-1-3 CHECKING ROTOR

- 1) Remove rear cover and stator.

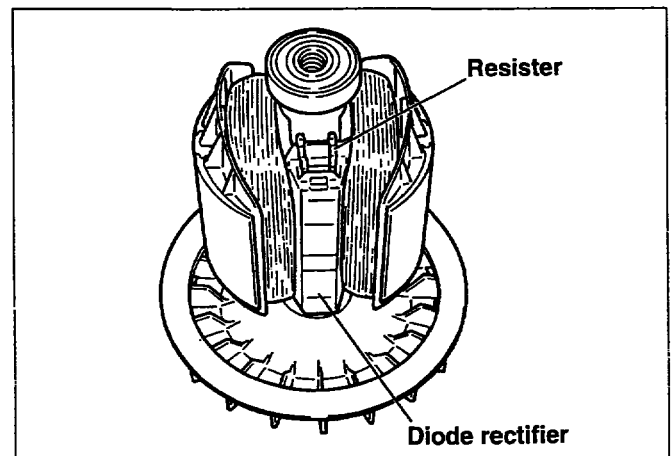


Fig. 11-2

2) Measure the resistance of field coil with a circuit tester. (See Fig. 11-3.)

(R × 1Ω ± 10%)

<b>NORMAL RESISTANCE</b>
6.3 Ω

**[Remedy]**

- If the resistance is not normal, replace rotor with new one.

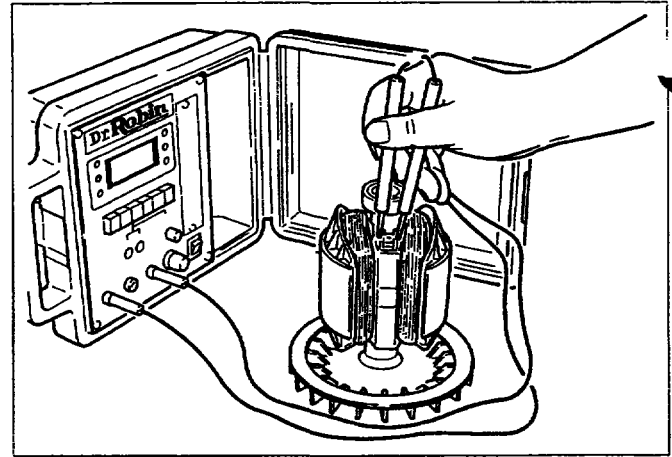


Fig. 11-3

3) Check the magnetic force of magnets molded in the rotor.

**[Remedy]**

1. If the magnetic force is weak, replace the rotor with a new one.
2. If the diode or the resistor is faulty, replace rotor assembly with new one.  
When all removed these parts are good, assemble them and then solder.

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

**11-2-1 CHECKING ENGINE r.p.m. .**

If the engine r.p.m. is too high or too low, adjust it to the rated r.p.m. .

**[How to adjust engine r.p.m. .]**

- Loosen the nut on the adjusting screw.
- Turn the adjusting screw clockwise to in decrease engine speed or counter-clockwise to increase engine speed.

Normal engine speed at no load is :  
3750 ~ 3800 r.p.m.

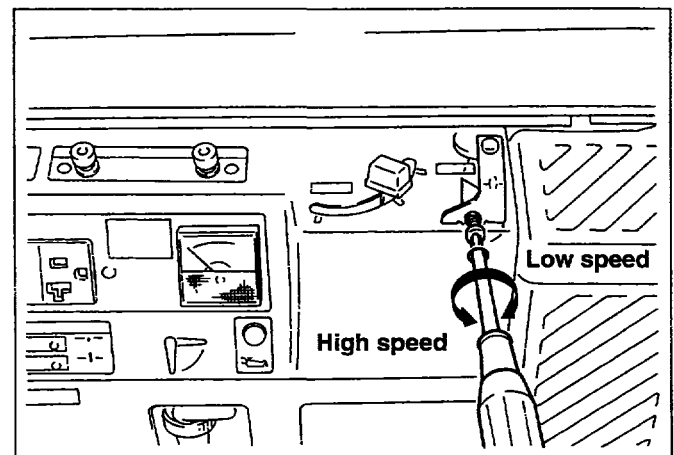


Fig. 11-5

**11-2-2 CHECKING STATOR**

Check stator referring to Step 11-1-1.

**11-2-3 CHECKING CONDENSER**

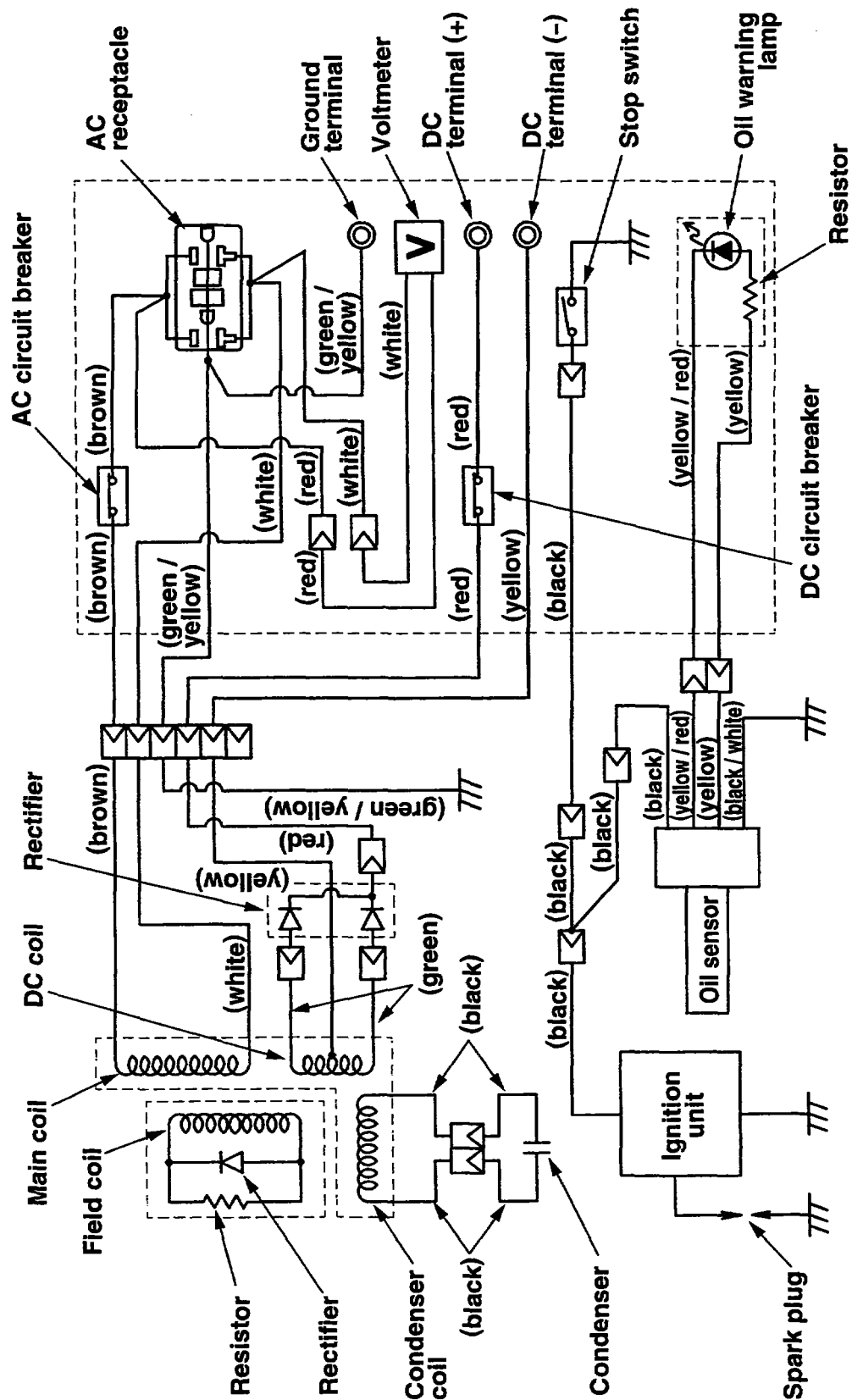
Check condenser referring to Step 11-1-2.

**11-2-4 CHECKING ROTOR**

Check rotor referring to Step 11-1-3.



# 12. WIRING DIAGRAM



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AND

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**3-YEAR WARRANTY**  
**ON**  
**BALDOR GENERATORS**  
**AND**  
**ROBIN SUBARU ENGINES**

SEE ATTACHED WARRANTY STATEMENTS  
FOR DETAILS:

**BALDOR GENERATORS**  
3815 OREGON STREET OSHKOSH WI 54902  
PHONE: (920) 236-4200 FAX: (920) 236-4219  
WWW.BALDOR.COM

# Robin Subaru Limited Engine Warranty For Baldor Generators

(Effective for original Robin Subaru engines powering Baldor portable generators purchased after August 16, 2000)  
Robin America, Inc., a division of Fuji Heavy Industries, Ltd. (herein "Robin"), warrants that each new engine sold by it will be free, under normal use and service, from defects in material and workmanship for a period listed below from the date of sale to the original retail purchaser. Robin's obligation under this Limited Warranty shall be limited to the repair and replacement, at Robin's option of any part or parts which upon examination is/are found, in Robin's judgment, to have been defective in material or workmanship. It shall be a condition of Robin's obligation under this limited warranty that Robin, directly or through one of its Distributors or Service Centers authorized to service the particular engine involved, receive prompt notice of any warranty claim and that the engine or the part or parts claimed to be defective be promptly delivered, transportation prepaid, to such Distributor or Service Center for inspection and repair. All repairs qualifying under this Limited Warranty must be performed by Robin or one of its authorized Distributors or Service Centers.

WARRANTY PERIODS:	Robin Four-Cycle, Air Cooled, Gasoline Engines	Limited 3 Years Warranty
	Robin Four-Cycle, Air Cooled, Diesel Engines	Limited 1 Year Warranty

The repair or replacement of any part or parts under this Limited Warranty shall not extend the term of the engine warranty beyond the original term as set forth above.

LIMITATIONS AND EXCLUSIONS: This limited Warranty shall not apply to:

1. Bent or broken crankshaft or resultant damage caused by vibration related to bent or broken crankshaft. Also, damage caused by loose engine mounting bolts or improper or imbalanced accessories or blades mounted to the crankshaft.
2. Repairs required because of prolonged storage including damage caused by old or contaminated fuel in the fuel tank, fuel lines or carburetor, sticky valves or corrosion and rust of engine parts.
3. Repair required due to overheating (Most often caused by overloaded or clogged or damaged or missing flywheel, fan, inlet air passages, cooling fins or air shrouds).
4. Dirt or grit related wear caused by improper air cleaner maintenance (most often resulting in worn piston rings, cylinders, valve guides, carburetor or other internal components).
5. Broken or scored parts caused by low oil level, dirty or improper grade of oil.
6. Engine tune-ups and normal maintenance service including, but not limited to, valve adjustment, normal replacement of service items, fuel and lubricating oil, etc.
7. Any engine which has been subject to negligence, misuse, accident, mis-application or over -speeding.
8. Any engine that has been installed, repaired or altered by anyone in a manor which in Robin's sole judgment adversely affects its performance or reliability.
9. Any engine which has been fitted with or repaired with parts or components not manufactured or approved by Robin which in Robin's sole judgment adversely affects its performance or reliability.
10. Instances when normal use has exhausted the life of a component or an engine.

The customer is responsible for all transportation charges in connection with any warranty work.

Robin reserves the right to modify, alter or improve any engines or parts without incurring any obligation to modify or replace, any engine or parts previously sold without such modification, alteration or improvement.

No person is authorized to give any other warranty or to assume any additional obligation on Robin's behalf unless made in writing and signed by an officer of Robin.

THIS WARRANTY, AND ROBIN'S OBLIGATION HERE UNDER, ARE IN LIEU OF ANY OTHER WARRANTIES OR OBLIGATIONS OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HERE-OF. ROBIN SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES.

## LIMITED WARRANTY

Unless otherwise provided, Baldor generators are warranted against defects in Baldor workmanship and materials for a period of time as set forth in the Warranty Period chart on the following page. All warranty claims must be submitted to a Baldor Generator repair facility prior to the expiration of the warranty period. Baldor Generators shall have no responsibility or liability for any defect, latent or otherwise, discovered after the expiration of the warranty period provided herein. Extended warranties are available for certain Baldor products. These warranties are described in Baldor's catalog and other sales literature. Extended warranties are subject to the terms and conditions of this Limited Warranty as modified by the additional terms of the extended warranty. If a Baldor product is defective due to Baldor workmanship or materials and the defect occurs during the warranty period, then Baldor will either repair the product or replace it with a new one, whichever Baldor believes to be appropriate under the circumstances. Warranty service is available for all Baldor Generator products from Baldor Generators' Customer Service Department in Oshkosh, Wisconsin, and from Baldor Generator repair facilities. A list of Baldor's generator repair facilities may be obtained by contacting Baldor Generators at: Customer Service, Baldor Generators, 3815 Oregon Street, Oshkosh, Wisconsin 54902, 920-236-4200 (telephone), 920-236-4219 (facsimile). All Baldor products requiring warranty service shall be transported or shipped freight pre-paid, at the risk of the party requiring warranty service, to Baldor Generators' Customer Service Department in Oshkosh, Wisconsin, or to a Baldor Generator repair facility. Written notification of the alleged defect in addition to a description of the manner in which the Baldor generator is used, and the name, address and telephone number of the party requiring warranty service must be included. Baldor is not responsible for removal and shipment of the Baldor product to the service center or for the reinstallation of the Baldor product upon its return to the party requiring warranty service. Customers who are unable to take or ship the Baldor product to a Baldor Generator repair facility, or who desire a repair to be made by other than a Baldor Generator repair facility, should contact Baldor Generators' Customer Service Department at 920-236-4200. Baldor, in advance of such service, must approve a repair by anyone other than a Baldor Generator repair facility in writing. Problems with Baldor products can be due to improper maintenance, faulty installation, non-Baldor additions or modifications, or other problems not due to defects in Baldor workmanship or materials. If a Baldor Generator repair facility determines that the problem with a Baldor product is not due to defects in Baldor workmanship or materials, then the party requiring warranty service will be responsible for the cost of any necessary repairs. Parties requiring warranty service not satisfied with a determination that a problem is outside of warranty coverage should contact Baldor Generators' Customer Service Department at 920-236-4200 for further consideration. EXCEPT FOR THE EXPRESSED WARRANTY SET FORTH ABOVE, BALDOR GENERATORS DISCLAIMS ALL OTHER EXPRESSED AND IMPLIED WARRANTIES INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MECHANICALITY. NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WHETHER OR NOT SIMILAR IN NATURE TO ANY OTHER WARRANTY PROVIDED HEREIN, SHALL EXIST WITH RESPECT TO THE GOODS SOLD UNDER THE PROVISIONS OF THESE TERMS AND CONDITIONS. ALL OTHER SUCH WARRANTIES ARE HEREBY EXPRESSLY WAIVED BY THE BUYER. UNDER NO CIRCUMSTANCES SHALL BALDOR GENERATORS BE LIABLE OR RESPONSIBLE IN ANY MANNER WHATSOEVER FOR ANY INCIDENTAL, CONSEQUENTIAL OR PUNATIVE DAMAGES, OR ANTICIPATED PROFITS RESULTING FROM THE DEFECT, REMOVAL, REINSTALLATION, SHIPMENT OR OTHERWISE. This is the sole warranty of Baldor Generators and no other affirmations or promises made by Baldor Generators shall be deemed to create an expressed or implied warranty. Baldor Generators has not authorized anyone to make any representations or warranties other than the warranty contained herein.

## WARRANTY PERIOD

Generator Series	Labor*	Parts
Portable Products (Premier, PowerChief, DG Series, K Series)	1 Year	3 Years
Towable Products (TS)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
3600 RPM Standby Systems (Some AE Models)	1 Year or 1,000 Hours Whichever comes first	3 Years or 1,000 Hours Whichever comes first
1800 RPM Standby Systems (Some AE Models, DLC, GLC)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
Industrial Standby Systems	1 Year or 1,000 Hours Whichever comes first	2 Years or 1,000 Hours Whichever comes first
Industrial Prime Power Systems	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first
International	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first

\*Labor coverage for warrantable repairs is provided for the applicable period not to exceed published rates as contained in the Baldor Generators Warranty Policy. Mileage is allowed only for permanent installations not to exceed published rates as contained in the Baldor Generators Warranty Policy.

Warranty registration within 30 days of purchase is required for portable and towable products to qualify for any warranty consideration. Proof of purchase date, serial number and model number will be required for all warranty work.

For all other products, a Start-up Inspection Form / Warranty Registration must be completed in its entirety and submitted to Baldor Generators within 30 days of start-up to qualify for any warranty consideration.

### Owner's Responsibilities:

The owner is obligated to operate and maintain the generator in accordance with the recommendations published by Baldor Generators in the Operator's Manual for the generator. The owner is responsible for the costs associated with maintenance and any adjustments that may be required.

The owner is responsible for payment of any of the following expenses that might be incurred as a result of a failure under the terms of this warranty:

1. Rental equipment used to replace the equipment being repaired.
2. Telephone or other communication expenses.
3. Living and travel expenses of persons performing service, except as specifically included within the terms of specific warranty.
4. The premium costs for overtime labor requested by the owner.
5. All parts transportation costs.

**Limitations:**

Baldor Generators is not responsible for the repair of generators required because of normal wear, accident, misuse, abuse, improper installation, lack of maintenance, unauthorized modifications or improper storage.

Normal Wear: This warranty will not cover repair where normal use has exhausted the life of a part or generator. It should be remembered that the service life of any generator is dependent on the care it receives and the conditions under which it has to operate. Some applications are very often used in dusty or dirty conditions, which can cause what appears to be excessive wear. Such wear, when caused by dirt, dust, grit or other abrasive material, which has entered the generator because of improper maintenance, is not covered by Warranty.

For all product lines, the engine manufacturer warrants engine systems. Contact Baldor Generators for current engine warranties.



3815 Oregon Street • Oshkosh, Wisconsin 54902  
Phone: (920) 236-4200 • 800-872-7697 • Fax: (920) 236-4219  
[www.baldor.com](http://www.baldor.com)

Revised\Effective 6/26/03  
Form # S-PSG-003-3

Warranty Policy S-PSG-003-3.doc



# **!! WARNING !!**

**CALIFORNIA PROPOSITION 65 WARNING**  
Engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects, and other reproductive harm.

# **!! WARNING !!**

**CALIFORNIA PROPOSITION 65 WARNING**  
Diesel engine exhaust and some constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

Revised: 4/13/01  
Effective: 2/26/98  
Form#: S-PSG-001-1

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Service is just a phone call away:

800-872-7697

[www.baldor.com/products/generators.asp](http://www.baldor.com/products/generators.asp)

**BALDOR**  
**GENERATORS**  
3815 Oregon Street Oshkosh WI 54902



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