

# ENERGY<sup>®</sup>

Power for life

MODEL: T20000FULL

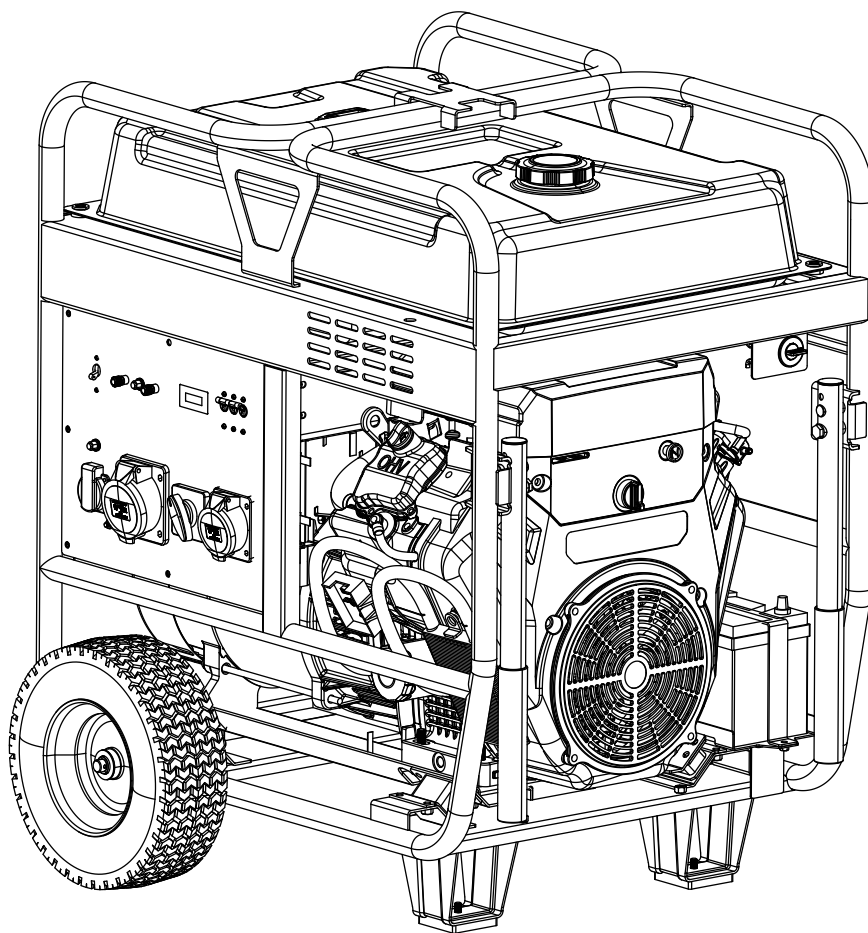
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## OPERATOR'S MANUAL

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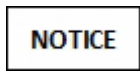
This manual provides information regarding the operation and maintenance of these products. We have made every effort to ensure the accuracy of the information in this manual. We reserve the right to change this product at any time without prior notice.

## INTRODUCTION

Congratulations on your selection of a this generator. We are certain you will be pleased with your purchase of one of the finest generators on the market.

We want to help you get the best results from your new generator and to operate it safely. This manual contains all the information on how to do that; please read it carefully.

As you read this manual, you will find information preceded by a symbol.



That information is intended to help you avoid damage to your generator, other property, or the environment.

We suggest you read the warranty policy to fully understand its coverage and your responsibilities of ownership.

When your generator needs scheduled maintenance, keep in mind your this servicing dealer is specially trained in servicing this generators. Your authorized this servicing dealer is dedicated to your satisfaction and will be pleased to answer your questions and concerns.

## A FEW WORDS ABOUT SAFETY

Your safety and the safety of others are very important. And using this generator safely is an important responsibility.

To help you make informed decisions about safety, we have provided operating procedures and other information on labels and in this manual. This information alerts you to potential hazards that could hurt you or others.

Of course, it is not practical or possible to warn you about all the hazards associated with operating or maintaining a generator. You must use your own good judgement.

You will find important safety information in a variety of forms, including:

- **Safety Labels** on the generator.
- **Safety Messages** preceded by a safety alert symbol and one of three signal words, DANGER, WARNING, or CAUTION.
- **Safety Headings** such as IMPORTANT SAFETY INFORMATION.
- **Safety Section** such as GENERATOR SAFETY.
- **Instructions** how to use this generator correctly and safely.

This entire book is filled with important safety information please read it carefully.

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# GENERATOR SAFETY

## IMPORTANT SAFETY INFORMATION

This generators are designed for use with electrical equipment that has suitable power requirements. Other uses can result in injury to the operator or damage to the generator and other property.

Most accidents can be prevented if you follow all instructions in this manual and on the generator. The most common hazards are discussed below, along with the best way to protect yourself and others.

### Operator Responsibility

- Know how to stop the generator quickly in case of emergency.
- Understand the use of all generator controls, output receptacles, and connections.
- Be sure that anyone who operates the generator receives proper instruction. Do not let children operate the generator without parental supervision.

### Carbon Monoxide Hazards

- Exhaust contains poisonous carbon monoxide, a colorless, odorless gas. Breathing carbon monoxide can cause loss of consciousness and may lead to death.
- If you run the generator in an area that is confined, or even partly enclosed area, the air you breathe could contain dangerous amount of exhaust gas.
- Never run your generator inside a garage, house, or near open windows or doors.

### Electric Shock Hazards

- The generator produces enough electric power to cause a serious shock or electrocution if misused.
- Using a generator or electrical appliance in wet conditions, such as rain or snow, or near a pool or sprinkler system, or when your hands are wet, could result in electrocution. Keep the generator dry.
- If the generator is stored outdoors, unprotected from the weather, check all of the electrical components on the control panel before each use. Moisture or ice can cause a malfunction or short circuit in electrical components that could result in electrocution.
- Do not connect to a building's electrical system unless an isolation switch has been installed by a qualified electrician.
- Do not use the generator without protective switch-off device.

### Fire and Burn Hazards

- The exhaust system gets hot enough to ignite some materials.
  - Keep the generator at least 1 meter away from buildings and other equipment during operation.
  - Do not enclose the generator in any structure.
  - Keep flammable materials away from the generator
- The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Let the engine cool before storing the generator indoors.

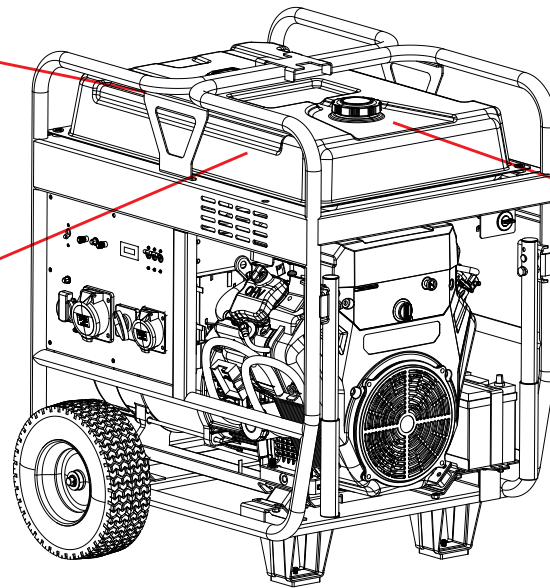
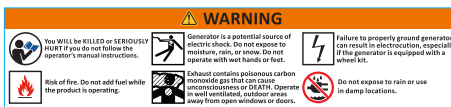
### Refuel With Care

Gasoline is extremely flammable, and gasoline vapor can explode. Allow the engine to cool if the generator has been in operation. Refuel only outdoors in a well ventilated area with the engine OFF. Do not overfill the fuel tank. Never smoke near gasoline, and keep other flames and sparks away. Always store gasoline in an approved container. Make sure that any spilled fuel has been wiped up before starting the engine.

# GENERATOR SAFETY

## SAFETY LABEL LOCATIONS

These labels warn you of potential hazards that can cause serious injury. Read them carefully. If a label comes off or becomes hard to read, contact your servicing dealer for a placement.

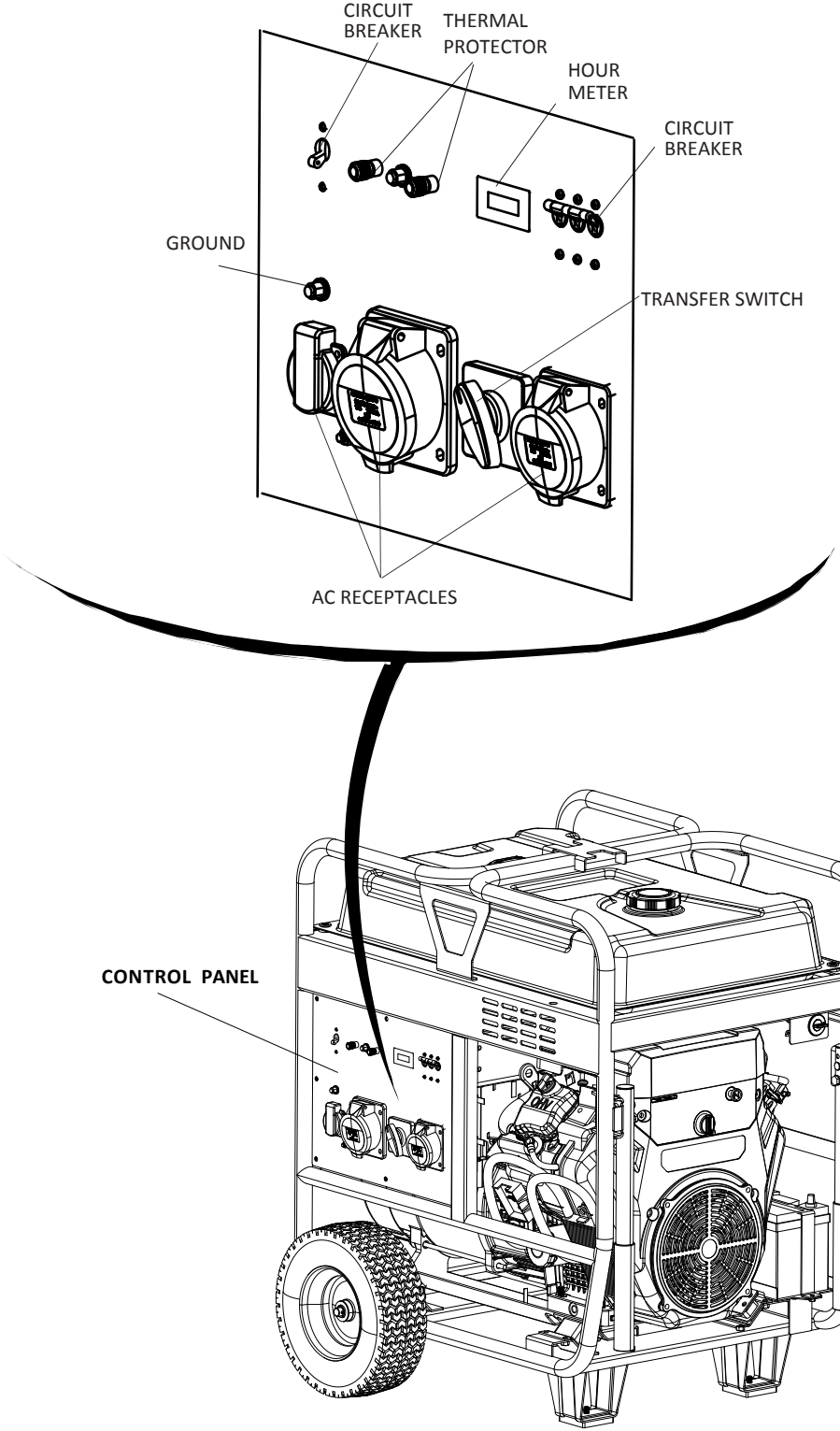


- This generator is designed to give safe and dependable service if operated according to instructions.
- Read and understand the Owner's Manual before operating the generator. Failure to do so could result in personal injury or equipment damage.
- Exhaust contains poisonous carbon monoxide, a colorless, odorless gas. Breathing carbon monoxide can cause loss of consciousness and may lead to death.
- If you run the generator in an area that is confined, or even partially enclosed area, the air you breathe could contain a dangerous amount of exhaust gas.
- Never run your generator inside a garage, house or near open windows or doors.
- Do not connect to a building's electrical system unless an isolation switch has been installed by a qualified electrician.
- Connections for standby power to a building's Electrical system must be made by a qualified Electrician and must comply with all applicable laws and electrical codes. Improper connections can allow electrical current from the generator to back feed into the utility lines. Such back feed may electrocute utility company workers or others who contact the lines during a power outage, and when utility power is restored, the generator may explode, burn, or cause fires in the building's electrical system.
- A hot exhaust system can cause serious burns. Avoid contact if the engine has been running.

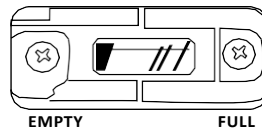
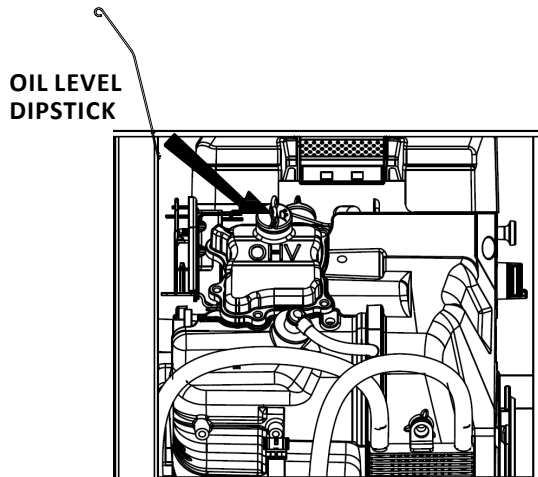
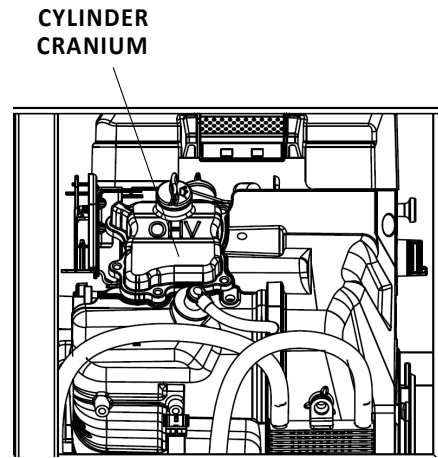
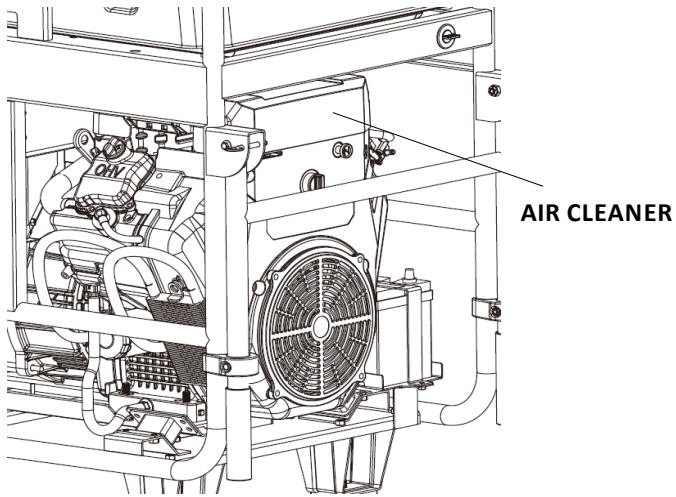
# CONTROLS & FEATURES

## COMPONENT & CONTROL LOCATIONS

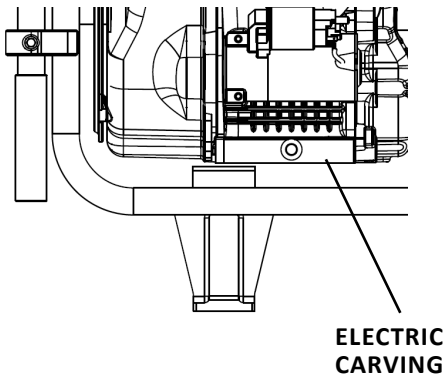
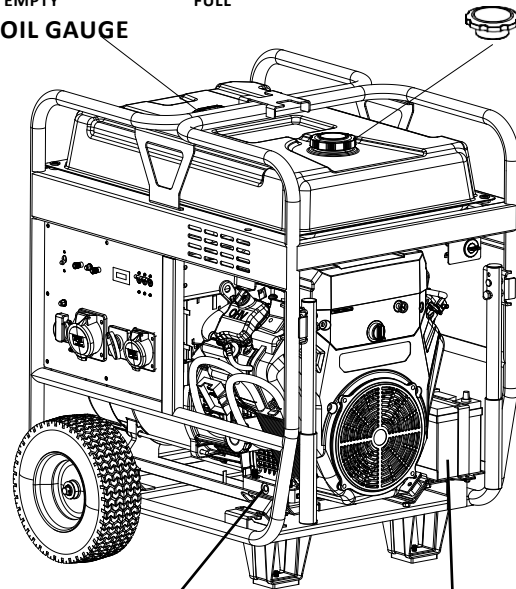
Use the illustrations on these pages to locate and identify the most frequently used controls.



# CONTROLS & FEATURES



OIL TANK CAP

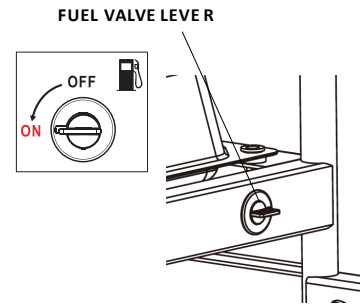


BATTERY

## CONTROLS

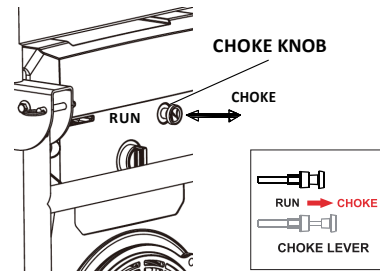
### Fuel Valve Lever

- The fuel valve lever is located between the fuel tank and carburetor.
- The fuel valve lever must be in the ON position for the engine to run.
- After stopping the engine, turn the fuel valve lever to the OFF position.



### Choke Knob

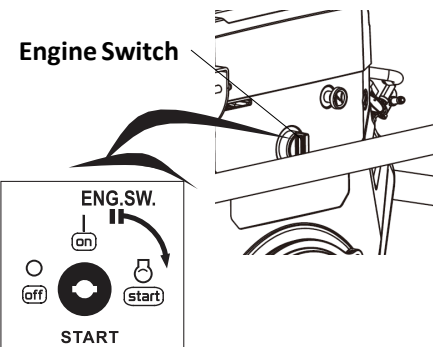
- The choke knob opens and closes the choke valve in the carburetor.
- The CHOKE position enriches the fuel mixture for starting a cold engine.
- The RUN position provides the correct fuel mixture for operation after starting, and for restarting a warm engine.



### Engine Switch

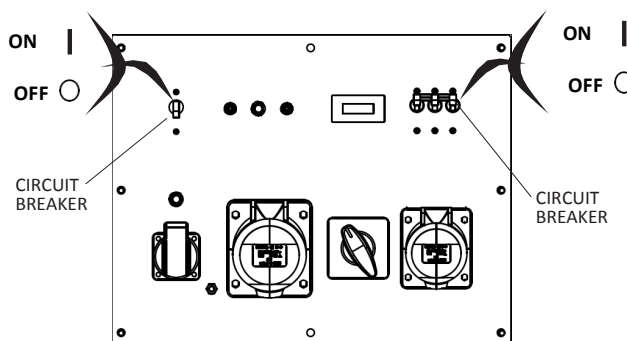
The engine switch controls the ignition system, and it operates the electric starter.

- OFF -- Stops the engine. The engine switch key can be removed/inserted.
- ON -- Running position.
- START -- Operates the electric starter.



### Circuit Breaker

- The circuit breaker will automatically switch OFF, if there is a short circuit or a significant overload at the receptacles or output terminals.
- The circuit breaker may be used to switch the generator power ON or OFF.



# CONTROLS & FEATURES

## FEATURES

### Oil Alert System

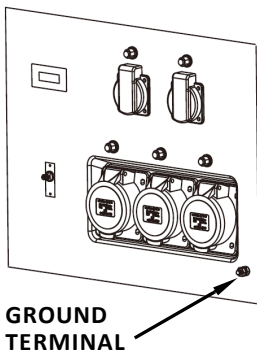
The Oil Alert system is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase can fall below a safe limit, the Oil Alert system will automatically stop the engine (the engine switch will remain in the ON position).

If the engine stops and will not restart, check the engine oil level (see Page 21) before trouble shooting in other areas.

### Ground Terminal

The ground terminal is connected to the frame of the generator, the metal noncurrent carrying parts of the generator, and the ground terminals of each receptacle.

Before using the ground terminal, consult a qualified electrician, electrical inspector, or local agency having jurisdiction for local codes or ordinances that apply to the intended use of the generator.



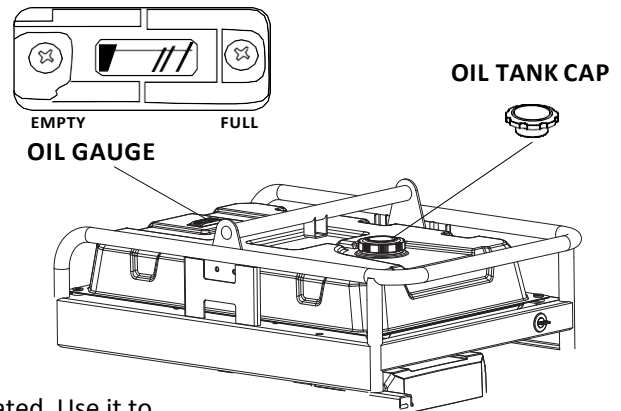
Attention ! It is compulsorily to make protective earthing before operating the generator. Protective earthing must correspond to Rules for Installing Electrical Facilities.

Earthing devices and grounding conductors must be selected in accordance with chapters 1.7 and 1.8 of Rules for Installing Electrical Facilities.

Usually, copper grounding conductor needed of minimum 4mm<sup>2</sup> section.

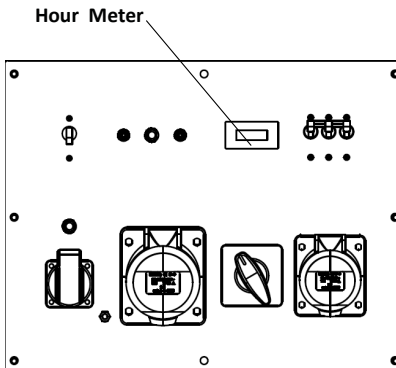
### Fuel Gauge

The fuel gauge is a mechanical device that measures the fuel level in the tank. The red indicator in the window will reflect the level in relation to full or empty. To provide increased operating time, start with a full tank before beginning operation. Check the fuel level with the generator on a level surface. Always refuel with the engine OFF and cool.



### Hour Meter

The hour meter indicates the hours the generator has been operated. Use it to determine when scheduled maintenance should be Performed .



## **BEFORE OPERATION**

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### **ARE YOU READY TO GET STARTED?**

Your safety is your responsibility. A little time spent in preparation will significantly reduce your risk of injury.

#### **Knowledge**

Read and understand this manual. Know what the controls do and how to operate them. Familiarize yourself with the generator and its operation before you begin using it. Know how to quickly shut off the generator in case of an emergency.

If the generator is being used to power appliances, be sure that they do not exceed the generator's load rating .

### **IS YOUR GENERATOR READY TO GO?**

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the generator to check its condition. Be sure to take care of any problem you find, or have your servicing

<b>⚠ WARNING</b>
Improperly maintaining this generator, or failing to correct a problem before operation, could cause a malfunction in which you could be seriously injured.
Always perform a preoperation inspection before each operation, and correct any problem.

To prevent a possible fire, keep the generator at least 1 meter away from building walls and other equipment during operation. Do not place flammable objects close to the engine.

Before beginning your preoperation checks, be sure the generator is on a level surface and the engine switch is in the OFF position.

#### **Check the Engine**

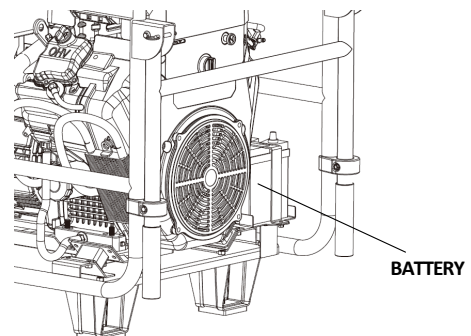
Check the oil level (see page 19). A low oil level will cause the Oil Alert system to shut down the engine.

Check the air cleaner (see page 21). A dirty air cleaner element will restrict air flow to the carburetor, reducing engine and generator performance.

Check the fuel level (see page 18). Starting with a full tank will help to eliminate or reduce operating interruptions for refueling.

#### **Check the Battery**

Check the fuel electrolyte level (see page 24). If the electrolyte level is below the LOWER level, sulfation and battery plate damage will occur.





## OPERATION

### SAFE OPERATING PRECAUTIONS

Before operating the generator for the first time, please review the GENERATOR SAFETY section and the chapter titled BEFORE OPERATION.

For your safety, do not operate the generator in an enclosed area such as a garage. Your generator's exhaust contains poisonous carbon monoxide gas that can collect rapidly in an enclosed area and cause illness or death.

**⚠ WARNING**

Carbon monoxide gas is toxic.  
Breathing it can cause  
unconsciousness and even kill you.

Avoid any enclosed areas or  
activities that expose you to carbon  
monoxide.

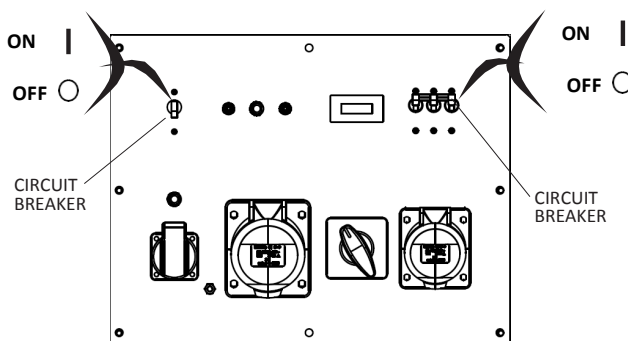
Before connecting an AC appliance or power cord to the generator:

- Use grounded 3 prong extension cords for single phase generator and 5 prong extension cords for three generator, tools, and appliances, or double insulated tools and appliances.
- Inspect cords and plugs, and replace if damaged.
- Make sure that the appliance is in good working order. Faulty appliances or power cords can create a potential for electric shock.
- Make sure the electrical rating of the tool or appliance does not exceed that of the generator. Never exceed the maximum power rating of the generator. Power levels between rated and maximum may be used for no more than 30 minutes.
- Operate the generator at least 1 meter away from buildings and other equipment.
- Do not operate the generator in an enclosed structure.

### STARTING THE ENGINE

1. Make sure that the circuit breaker is in the OFF position.

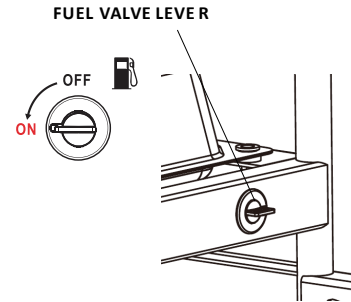
The generator maybe hard to start if a load is connected.





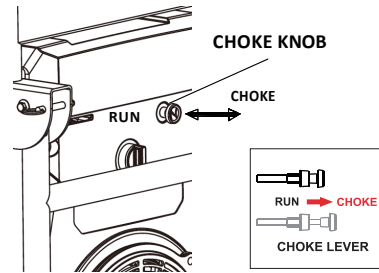
## OPERATION

- Turn the fuel valve lever to the ON position.



- Pull the choke knob to the CHOKE position to start a cold engine.

Leave the choke knob in the RUN position to restart a warm engine.



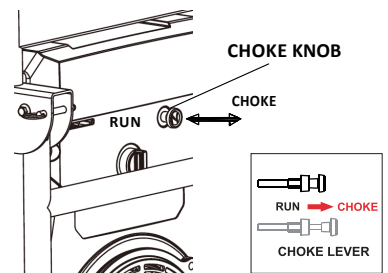
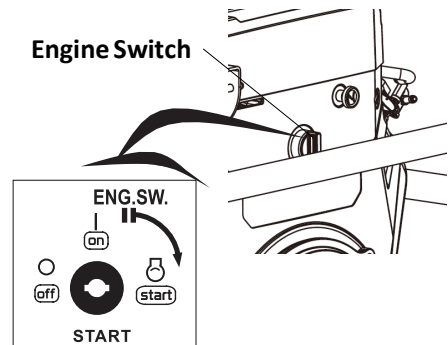
- Start the engine. Turn the engine switch to the START position, and hold it there until the engine starts. When the engine starts, release the key, allowing the switch to return to the ON position.

If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.

### NOTICE

*Using the electric starter for more than 5 seconds at a time will Overheat the starter motor and can damage it.*

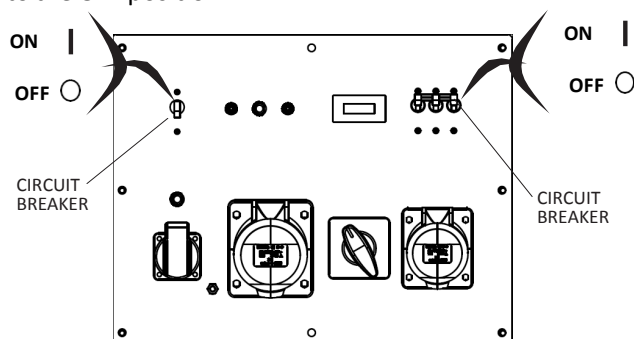
- If the choke knob was pulled to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.
- Generator needs to operate for 3-5 minutes without load, then it can out put power.



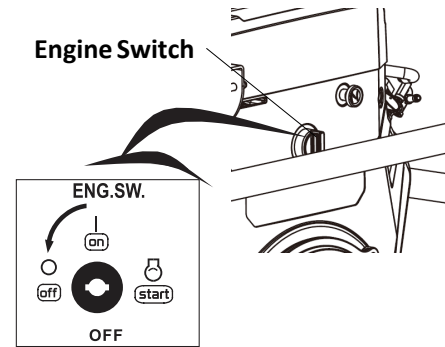
## STOPPING THE ENGINE

To stop the engine in an emergency, simply turn the engine switch to the OFF position. Under normal conditions, use the following procedure.

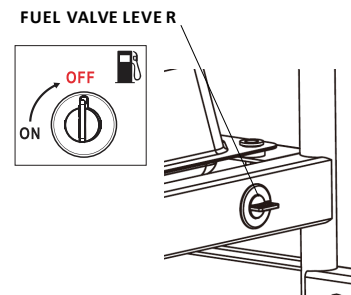
- Move the circuit breaker to the OFF position.



2. Turn the engine switch to the OFF position.



3. Turn the fuel valve lever to the OFF position.



## AC OPERATION

If an appliance begins to operate abnormally, becomes sluggish or stops suddenly, turn it off immediately. Disconnect the appliance, and determine whether the problem is in the appliance or the rated load capacity of the generator has been exceeded.

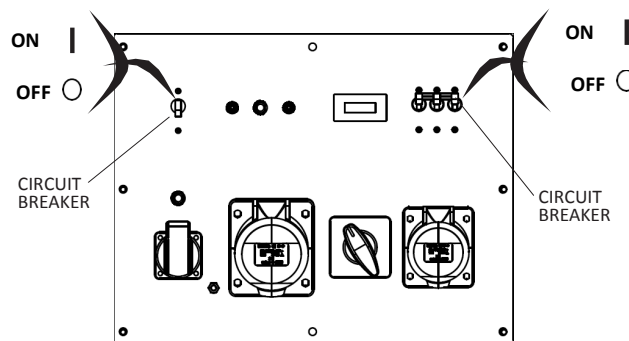
Substantial over loading may damage the generator. Marginal over loading may shorten the service life of the generator.

### NOTICE

#### AC Receptacle

1. Start the engine (see page 11).
2. Switch ON the circuit breaker.
3. Plug in the appliance.

Most motorized appliances require more than their rated wattage for startup.



### AC Applications

Before connecting an appliance or power cord to the generator:

- Make sure that it is in good working order. Faulty appliances or Power cords can create a potential for electrical shock.
- If an appliance begins to operate abnormally, becomes sluggish, or stops suddenly, turn it off immediately. Disconnect the appliance, and determine whether the problem is the appliance or the rated load capacity of the generator has been exceeded.
- Make sure that the electrical rating of the tool or appliance does not exceed that of the generator. Never exceed the maximum power rating of the generator. Power levels between rated and maximum may be used for no more than 30 minutes.

#### NOTICE

*Substantial overloading will open the circuit breaker. Exceeding the time limit for maximum power operation or slightly overloading the generator may not switch the circuit breaker OFF, but will shorten the service life of the generator.*

Limit operation requiring maximum power to 30 minutes.

Maximum power is:

50Hz 230V 16kW/ 400V 17 kW;

For continuous operation (longer than 30 minutes), do not exceed the rated power.

Rated power is:

50Hz 230V 15kW/ 400V 16 kW;

## OPERATION

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The total power requirements (VA) of all appliances connected must be considered. Appliance and power tool manufacturers usually list rating information near the model number or serial number.

### STANDBY POWER

#### Connections to a Building's Electrical System

Your generator can supply power to a building's electrical system. If the generator will be used as an alternative to utility company power, an isolation switch must be installed to disconnect the utility lines from the building when the generator is connected. Installation must be performed by a qualified electrician and must comply with all applicable laws and electrical codes.

#### **⚠ WARNING**

Improper connections to a building's electrical system can allow current from the generator to backfeed into the utility lines.

Such backfeed may electrocute utility company workers or others who contact the lines during a power outage, and the generator may explode, burn, or cause fires when utility power is restored.

Consult the utility company or a qualified electrician prior to making any power connections.

In some areas, generators are required by law to be registered with local utility companies. Check local regulations for proper registration and use procedures.

#### System Ground

This generators have a system ground that connects the generator frame components to the ground terminals in the AC output receptacles. The system ground is not connected to the AC neutral wire. If the generator is tested with a receptacle tester, it will not show the same ground circuit condition as for a home receptacle.

- **Special Requirements**

In some areas, generators are required to be registered with local utility companies.

If the generator is used at a construction site, there may be additional regulations that must be observed.

# SERVICING YOUR GENERATOR

## THE IMPORTANCE OF MAINTENANCE

Good maintenance is essential for safe, economical, and trouble free operation. It will also help reduce air pollution.

To help you properly care for your generator, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult or require special tools are best handled by professionals and are normally performed by a this technician or other qualified mechanic.

The maintenance schedule applies to normal operating conditions. If you operate your generator under unusual conditions, such as sustained high load or high temperature operation, or use it in dusty conditions, consult your servicing dealer for recommendations applicable to your individual needs and use.

<b>⚠ WARNING</b>
Improper maintenance, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed.
Always follow the inspection and maintenance recommendations and schedules in this owner's manual.

Remember that your servicing dealer knows your generator best and is fully equipped to maintain and repair it.

## MAINTENANCE SAFETY

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

<b>⚠ WARNING</b>
Failure to properly follow maintenance instructions and precautions can cause you to be seriously hurt or killed.
Always follow the procedures and precautions in the owner's manual.

### Safety Precautions

Make sure the engine is off before you begin any maintenance or repairs. This will eliminate several potential hazards:

- **Carbon monoxide poisoning from engine exhaust.**  
Be sure there is adequate ventilation whenever you operate the engine.
- **Burns from hot parts.**  
Let the engine and exhaust system cool before touching.
- **Injury from moving parts.**  
Do not run the engine unless instructed to do so.

## SERVICING YOUR GENERATOR

- Read the instructions before you begin, and make sure you have the tools and skills required.
- To reduce the possibility of fire or explosion, be careful when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks, and flames away from all fuel related parts.

### MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (3)			First month or 20 Hrs.	Every 3 months or 50 Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
Engine oil	Check level	○				
	Change		○		○	
Engine oil filter	Replace					Every 200 Hrs.
Air cleaner	Check	○				
	Clean			○(1)		
	Replace					○ (* )
Battery electrolyte	Check level	○				
Spark plug	Check-adjust				○	
	Replace					○
Sediment cup	Clean				○	
Valve clearance	Check-adjust					○(2)
Combustion chamber	Clean					After every 500 Hrs. (2)
Fuel tank and filter	Clean	Every year (2)				
Fuel tube	Check	Every 2 years (Replace if necessary) (2)				

**NOTE:** (\*) Replace the paper element only.

(1) Service more frequently when used industry areas.

(2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to our shop manual for service procedures.

(3) For commercial use, log hours of operation to determine proper maintenance intervals.

Failure to follow this maintenance schedule could result in nonwarrantable failures.

### REFUELING

With the engine stopped, check the fuel gauge. Refill the fuel tank if the fuel level is low.

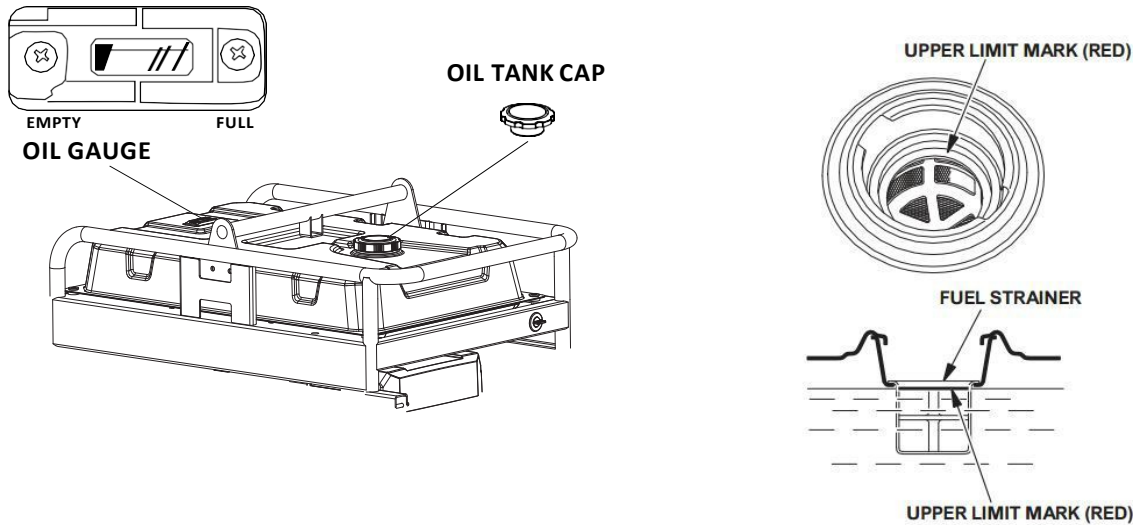
**⚠ WARNING**

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Stop the engine and keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

## SERVICING YOUR GENERATOR



Refuel in a well ventilated area before starting the engine. If the engine has been running, allow it to cool. Refuel carefully to avoid spilling fuel. Do not fill the fuel tank above the upper limit mark (red) on the fuel strainer. Never refuel the engine inside a building where gasoline fumes may reach flames or sparks. Keep gasoline away from appliance pilot lights, barbecues, electric appliances, power tools, etc. Spilled fuel is not only a fire hazard, it causes environmental damage. Wipe up spills immediately.

### NOTICE

*Fuel can damage paint and plastic. Be careful not to spill fuel when filling your fuel tank. Damage caused by spilled fuel is not covered under warranty.*

### NOTE:

Gasoline spoils very quickly depending on factors such as light, exposure, temperature and time. In worst cases, gasoline can be contaminated within 30 days. Using contaminated gasoline can seriously damage the engine (carburetor clogged, valve stuck). Such damage due to spoiled fuel is disallowed from coverage by the warranty.

To avoid this please strictly follow these recommendations:

- Only use specified gasoline .
- Use fresh and clean gasoline.
- To slow deterioration, keep gasoline in a certified fuel container.
- If long storage (more than 30 days) is foreseen, drain fuel tank and carburetor (see page 27).

### FUEL RECOMMENDATIONS

Use automotive unleaded gasoline with a Research Octane Number of 91 or higher (a Pump Octane Number of 86 or higher).

Never use stale or contaminated gasoline or an oil/gasoline mixture.

Avoid getting dirt or water in the fuel tank.

## SERVICING YOUR GENERATOR

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### Gasolines Containing Alcohol

If you decide to use a gasoline containing alcohol (gasohol), be sure it's octane rating is at least as high as that recommended by this. There are two types of "gasohol": one containing ethanol, and the other containing methanol. Do not use gasohol that contains more than 10% ethanol. Do not use gasoline containing methanol (methyl or wood alcohol) that does not also contain cosolvents and corrosion inhibitors for methanol. Never use gasoline containing more than 5% methanol, even if it has cosolvents and corrosion inhibitors.

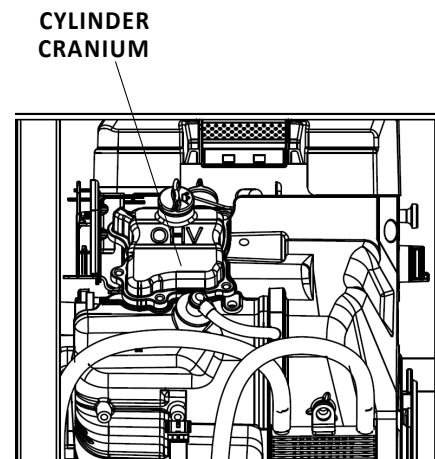
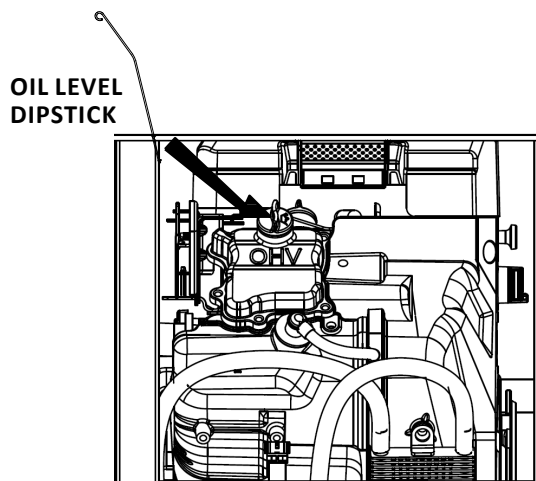
#### NOTE:

- Fuel system damage or engine performance problems resulting from the use of fuels that contain alcohol is not covered under the warranty.  
This cannot endorse the use of fuels containing methanol since evidence of their suitability is as yet incomplete.
- Before buying fuel from an unfamiliar station, try to find out if the fuel contains alcohol, if it does, confirm the type and percentage of alcohol used.  
If you notice any undesirable operating symptoms while using a gasoline that contains alcohol, or one that you think contains alcohol, switch to a gasoline that you know does not contain alcohol.

### ENGINE OIL LEVEL CHECK

Check the engine oil level with the generator on a level surface and the engine stopped.

1. Remove the oil level dipstick and wipe it clean.
2. Fully insert the dipstick, then remove it to check the oil level.
3. If the level is near or below the lower limit mark on the dipstick, open the maintenance cover to access the oil filler cap. Remove the oil filler cap, and fill with the recommended oil to the upper limit mark.
4. Reinstall the oil level dipstick and filler cap.



The Oil Alert system will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, check the oil level regularly.



# SERVICING YOUR GENERATOR

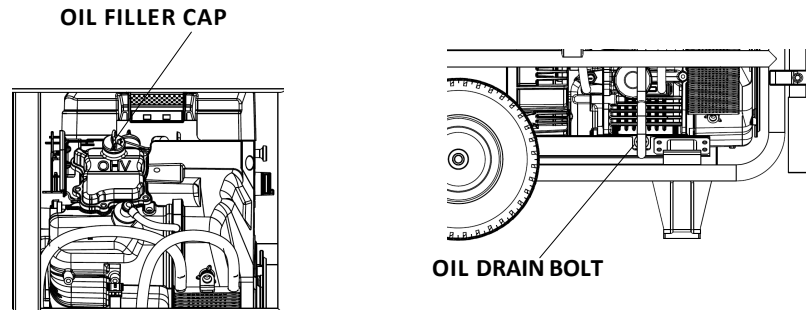
## ENGINE OIL CHANGE

Drain the oil while the engine is warm to assure rapid and complete draining.

1. Place the generator on wooden blocks to make space for placing a suitable container.
2. Open the maintenance cover to access the oil filler cap.
3. Remove the oil filler cap, oil drain bolt and sealing washer, and drain the oil into the container.
4. Install a new sealing washer and the oil drain bolt, and tighten the bolt securely.
5. Refill to the upper limit mark on the dipstick with the recommended oil. Tighten the oil filler cap securely.

### Engine oil capacity:

With oil filter replacement:  
Approximately 1.6L



Wash your hands with soap and water after handling used oil.

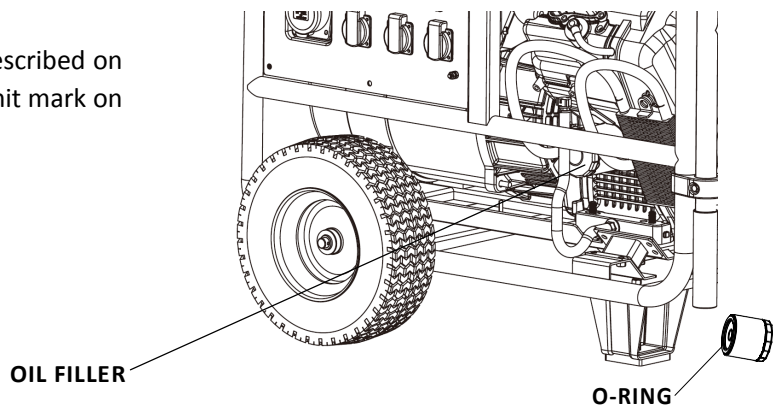
Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take it in a sealed container to your local service station or recycling center for reclamation. Do not throw it in the trash, pour it on the ground, or pour it down a drain.

## OIL FILTER CHANGE

1. Drain the engine oil, and tighten the drain bolt securely.
2. Remove the oil filter, and drain the oil into a suitable container. Discard the used oil filter.
3. Clean the filter mounting base, and coat the O-ring of the new oil filter with clean engine oil.
4. Screw on the new oil filter by hand, until the O-ring contacts the filter mounting base, and then use an oil filter socket tool to tighten the filter an additional 7/8 turn.

**TORQUE:** 12N·m (1.2kgf·m)

5. Refill the crankcase with the specified amount of the recommended Oil (see pages 21). Reinstall the oil filler cap.
6. Start the engine and check for oil filter leaks.
7. Stop the engine, and check the oil level as described on page 21. If necessary, add oil to the upper limit mark on the dipstick.



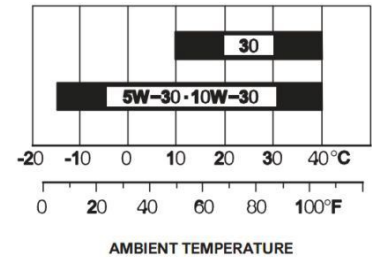
# SERVICING YOUR GENERATOR

## ENGINE OIL RECOMMENDATIONS

Oil is a major factor affecting engine performance and service life.

Use 4-stroke automotive detergent oil that meets or exceeds the requirements for API service category SE or later (or equivalent).

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range.



The SAE oil viscosity and service category are on the API label on the oil container.

## AIR CLEANER SERVICE

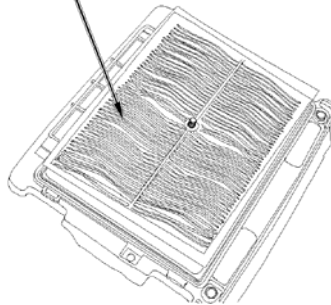
1. Release four latch tabs from the air cleaner cover, and remove the cover.
2. Foam air filter:
  - a. Remove the foam air filter from the air cleaner housing.
  - b. Check the foam air filter to be sure it is clean and in good condition. Replace the foam air filter if it is damaged.
  - c. Reinstall the foam air filter in the air cleaner housing.
3. Paper air filter:

If the paper air filter is dirty, replace it with a new one. Do not clean the paper air filter.
4. Reinstall the air cleaner cover.
5. Close the maintenance cover.

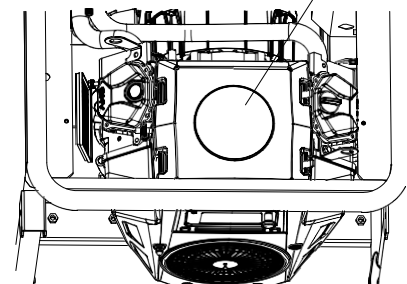
FOAM AIR FILTER



PAPER AIR FILTER



AIR CLEANER COVER



## SERVICING YOUR GENERATOR

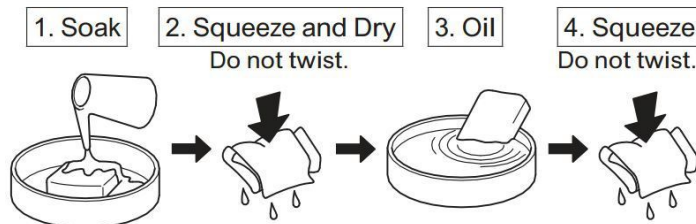
### NOTICE

Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear.

### FOAM AIR FILTER CLEANING

A dirty foam air filter will restrict air flow to the carburetor, reducing engine performance. If you operate the generator in very dusty areas, clean the foam air filter more frequently than specified in the Maintenance Schedule.

1. Clean the foam air filter in warm soapy water, rinse, and allow to dry thoroughly, or clean in non-flammable solvent and allow to dry.
2. Dip the foam air filter in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam air filter.



### SEDIMENT CUP CLEANING

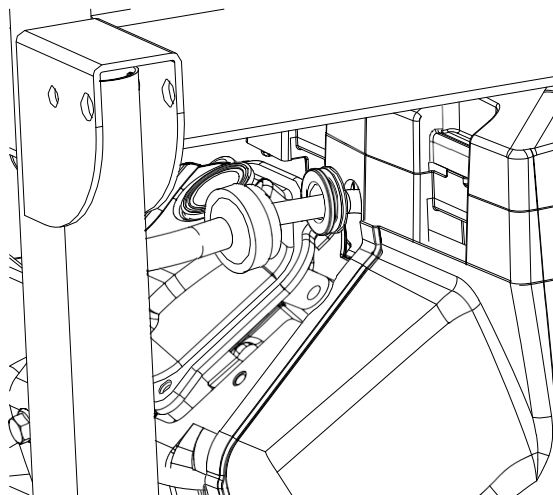
1. Turn the fuel valve lever to the OFF position, then remove the Sediment cup and the O-ring. Discard the O-ring.
2. Wipe dirt from the air cleaner housing and cover using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.

### **⚠ WARNING**

Gasoline is highly flammable and explosive.

You can be burned or seriously injured when handling fuel.

- Stop the engine and keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.



## SERVICING YOUR GENERATOR

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2. Clean the sediment cup in nonflammable solvent, and dry them thoroughly.
3. Install the new O-ring and sediment cup, and tighten the sediment cup securely.
4. Make sure there is no fuel leakage.

### SPARK PLUG SERVICE

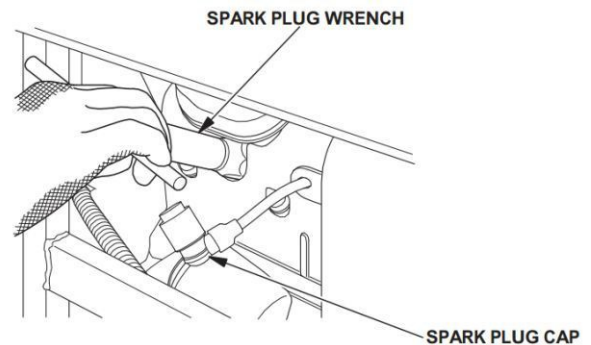
Recommended spark plugs:F7TC

#### NOTICE

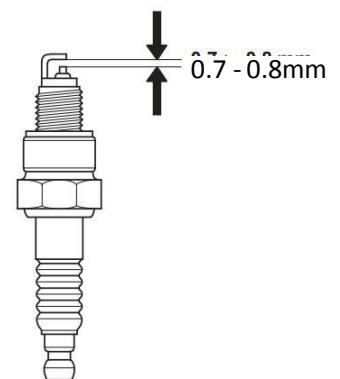
*An incorrect spark plug can cause engine damage.*

If the engine is hot, allow it to cool before servicing the spark plug.

1. Disconnect the spark plug caps, and remove any dirt from around the spark plug area.
2. Remove the spark plugs with a 180mm spark plug wrench (commercially available).



3. Inspect the spark plugs. Replace them if the electrodes are worn or if the insulator is cracked, chipped, or fouled.



4. Measure the spark plug electrode gap with a wire type feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode.

The gap should be: 0.7 --0.8mm

5. Make sure that the spark plug sealing washers are in good condition, and thread the spark plug in by hand to prevent cross threading.
6. After the spark plugs seat, tighten with a 21mm spark plug wrench to compress the washer.  
If reinstalling a used spark plug, tighten 1/81/4 turn after the spark plug seats.  
If installing a new spark plug, tighten 1/2 turn after the spark plug seats.

## SERVICING YOUR GENERATOR

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### NOTICE

A loose spark plug can overheat and damage the engine. Over tightening the spark plug can damage the threads in the cylinder head.

7. Attach the spark plugcaps.

### BATTERY SERVICE

Your generator's engine charging system charges the battery while the engine is running. However, if the generator is only used periodically, the battery must be charged monthly to maintain the battery service life.

#### ⚠ WARNING

The battery contains sulfuric acid (electrolyte), which is highly corrosive and poisonous. Getting electrolyte in your eyes or on your skin can cause serious burns.

Wear protective clothing and eye protection when working near the battery.  
**KEEP CHILDREN AWAY FROM THE BATTERY.**

### Emergency Procedures

**Eyes** -- Flush with water from a cup or other container for at least fifteen minutes. (Water under pressure can damage the eye.)

Immediately call a physician.

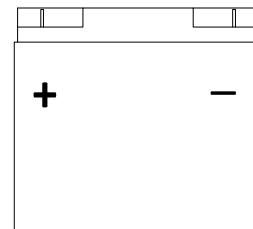
**Skin** -- Remove contaminated clothing. Flush the skin with large quantities of water. Call a physician immediately.

**Swallowing** -- Drink water or milk. Call a physician immediately.

### Battery Removal

**WARNING:** Battery posts, terminals, and related accessories contain lead and lead compounds. **Wash hands after handling.**

1. Remove the negative (-) cable from the battery negative (-) terminal first, and then remove the positive (+) cable from the battery positive (+) terminal.



2. Remove the flange nuts, and remove the battery set plate.
3. Remove the battery from the battery tray.

## SERVICING YOUR GENERATOR

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This symbol on the battery means that this product must not be treated as household waste.

### NOTE:

An improperly disposed of battery can be harmful to the environment and human health.

Always confirm local regulations for battery disposal.

### Battery Charging

<b>⚠ WARNING</b>
The battery gives off explosive hydrogen gas during normal operation.
A spark or flame can cause the battery to explode with enough force to kill or seriously hurt you.
Wear protective clothing and a face shield, or have a skilled mechanic do the battery maintenance.

The battery is rated at 30.0Ah (ampere hours). Charging current should equal 10% of the battery's ampere hour rating.

1. Connect the battery charger following the manufacturer's instructions.
2. Charge the battery.
3. Clean the outside of the battery and the battery compartment with a solution of baking soda and water.

### Battery Installation

1. Install the battery into the generator.
2. Connect the battery positive (+) cable to the battery positive (+) terminal first, and tighten the bolt securely.
3. Slide the battery boot over the positive (+) cable and terminal.
4. Connect the battery negative (-) cable to the battery negative (-) terminal, and tighten the bolt securely.

## STORAGE

### STORAGE PREPARATION

Proper storage preparation is essential for keeping your generator trouble free and looking good. The following steps will help to keep rust and corrosion from impairing your generator's function and appearance, and will make the engine easier to start when you use the generator again.

#### Cleaning

Wipe the generator with a moist cloth. After the generator has dried, touch up any damaged paint, and coat other areas that may rust with a light film of oil.

#### Fuel

Gasoline will oxidize and deteriorate in storage. Old gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. If the gasoline in your generator deteriorates during storage, you may need to have the carburetor and other fuel system components serviced or replaced.

#### NOTE:

Gasoline spoils very quickly depending on factors such as light exposure, temperature and time. In worst cases, gasoline can be contaminated within 30days. Using contaminated gasoline can seriously damage the engine (carburetor clogged, valve stuck). Such damage due to spoiled fuel is disallowed from coverage by the warranty.

To avoid this please strictly follow these recommendations:

- Only use specified gasoline .
- Use fresh and clean gasoline.
- To slow deterioration, keep gasoline in a certified fuel container.
- If long storage (more than 30days) is foreseen, drain fuel tank and carburetor (see page 27).

You can extend fuel storage life by adding a gasoline stabilizer that is formulated for that purpose, or you can avoid fuel deterioration problems by draining the fuel tank and carburetor.

#### Adding a Gasoline Stabilizer to Extend Fuel Storage Life

When adding a gasoline stabilizer, fill the fuel tank with fresh gasoline. If only partially filled, air in the tank will promote fuel deterioration during storage. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline.

1. Add gasoline stabilizer following the manufacturer's instructions.
2. After adding a gasoline stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.
3. Stop the engine, and turn the fuel valve lever to the OFF position.

# STORAGE

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## STORAGE PROCEDURE

1. Drain the fuel tank and carburetor.

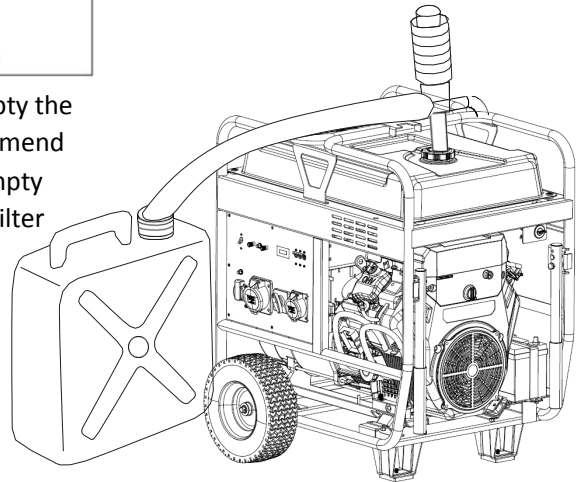
**⚠ WARNING**

Gasoline is highly flammable and explosive.

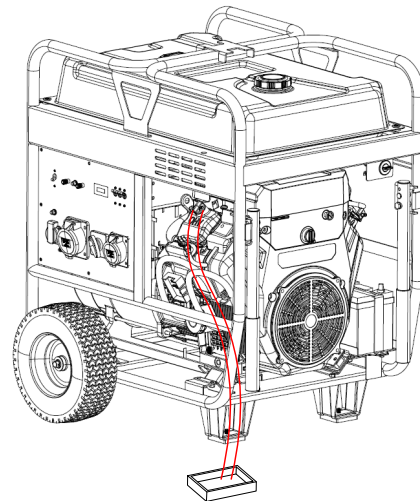
You can be burned or seriously injured when handling fuel.

- Stop the engine and keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

- a. Unscrew the fuel tank cap, remove the fuel filter, and empty the fuel tank into an approved gasoline container. We recommend using a commercially available gasoline hand pump to empty the tank. Do not use an electric pump. Reinstall the fuel filter and the fuel tank cap.



- b. Pull out the carburetor drain tube end under the fan cover of the engine, and place it in a suitable container.
- c. Loosen the carburetor drain screw.
- d. Drain the gasoline from the carburetor into the container.
- e. Tighten the carburetor drain screw securely.



2. Change the engine oil (refer to page 20).
3. Remove the spark plugs (see page 23).
4. Pour a table spoon (5-10cc) of clean engine oil into each cylinder.
5. Turn the engine for a few seconds by turning the engine switch to the START position to distribute the oil in the cylinders.
6. Reinstall the sparkplugs.
7. Remove the battery and store it in a cool, dry place. Recharge it once a month.
8. Cover the generator to keep out dust.



## **STORAGE**

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### **STORAGE PRECAUTIONS**

If your generator will be stored with gasoline in the fuel tank and carburetor, it is important to reduce the hazard of gasoline vapor ignition.

Select a well ventilated storage area away from any appliance that operates with a flame, such as a furnace, water heater, or clothes dryer. Also avoid any area with a spark producing electric motor, or where power tools are operated.

If possible, avoid storage areas with high humidity, because that promotes rust and corrosion.

Unless all fuel has been drained from the fuel tank, leave the fuel valve lever in the OFF position to reduce the possibility of leakage.

Place the generator on a level surface. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the generator to keep out dust. A hot engine and exhaust system can ignite or melt some materials.

Do not use sheet plastic as a dust cover. A nonporous cover will trap moisture around the generator, promoting rust and corrosion.

### **REMOVAL FROM STORAGE**

Check your generator as described in the BEFORE OPERATION chapter of this manual.

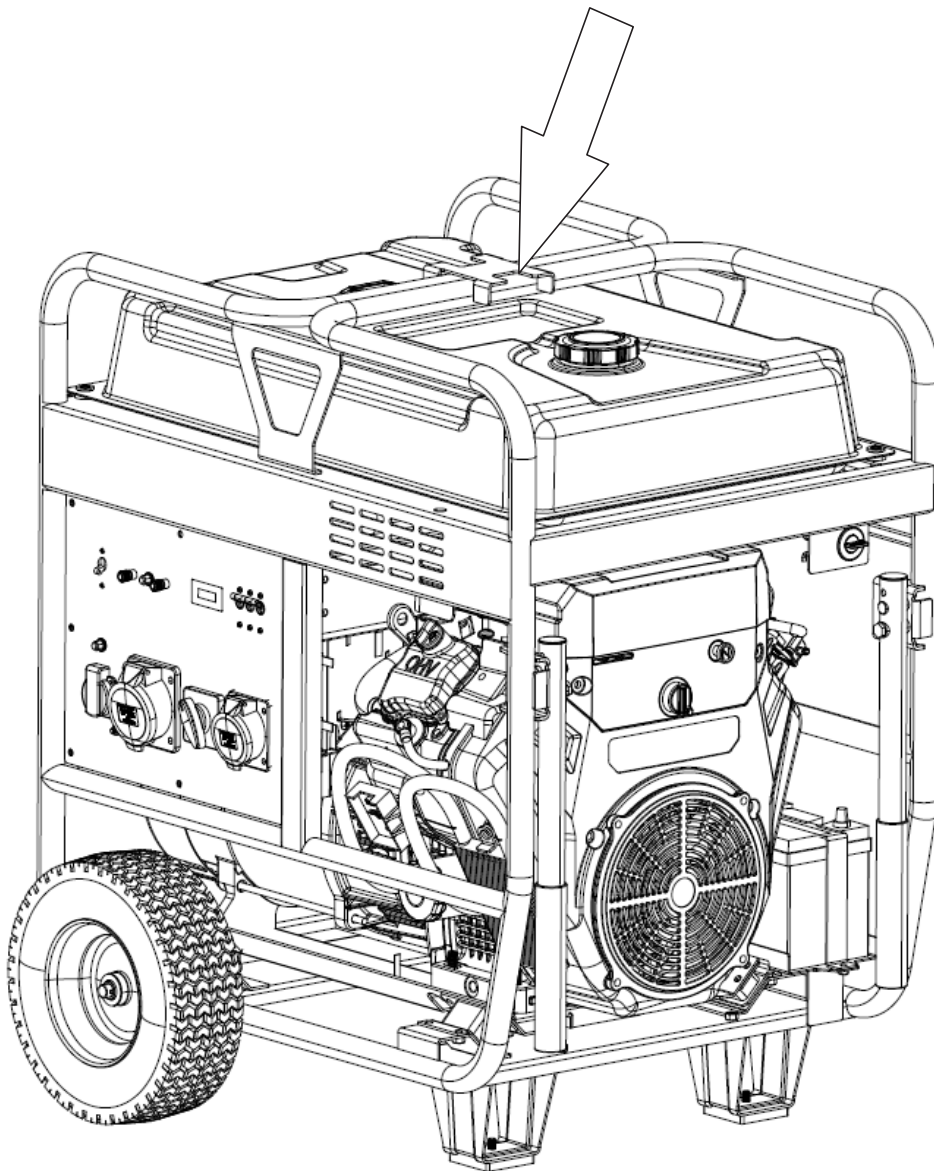
If the fuel was drained during to rage preparation, fill the tank with fresh gasoline. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline. Gasoline oxidizes and deteriorates overtime, causing hard starting.

## TRANSPORTING

If the generator has been running, allow the engine to cool for at least 15 minutes before loading the generator on the transport vehicle. A hot engine and exhaust system can burn you and can ignite some materials.

Keep the generator level when transporting to reduce the possibility of fuel leakage. Move the fuel valve lever to the OFF position.

When using ropes or tied owns traps to secure the generator for transportation, be sure to only use the frame bars as attachment points. Do not fasten ropes or straps to any portions of the generator body.

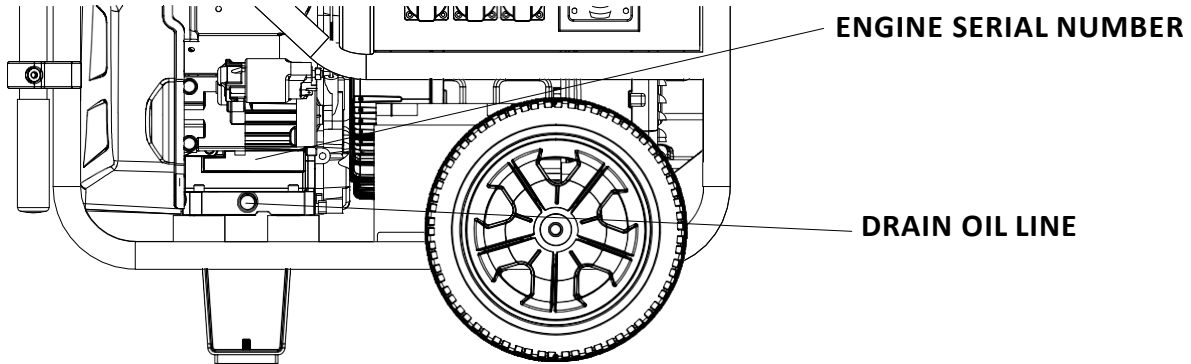


## TAKING CARE OF UNEXPECTED PROBLEMS

<b>Engine Will Not Start</b>	<b>Possible Cause</b>	<b>Correction</b>
1. Check control positions	Fuel valve lever OFF.	Turn lever ON.
	Choke OPEN.	Move to CLOSED
	Engine switch OFF.	Turn engine switch to ON.
2. Check fuel	Out of fuel.	Refuel (p.18).
	Bad fuel; generator stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p.27). Refuel with fresh gasoline (p.18).
3. Check engine oil level.	Low oil level caused Oil Alert to stop engine.	Add oil (p.20). Turn engine switch to OFF and restart the engine.
4. Remove and inspect spark plug.	Spark plug faulty, fouled, or improperly gapped.	Gap, or replace spark plug (p.23).
	Spark plug wet with fuel (flooded engine).	Dry and reinstall spark plug.
5. Take generator to an authorized THIS servicing dealer, or refer to shop manual.	Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck etc.	Replace or repair faulty components as necessary.
<b>Engine Lacks Power</b>	<b>Possible cause</b>	<b>Correction</b>
1. Check air filter.	Air filter restricted.	Clean or replace air filter (p.22)
2. Check fuel.	Bad fuel; generator stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p.27). Refuel with fresh gasoline (p.18)
3. Take generator to an authorized THIS servicing dealer, or refer to shop manual.	Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck etc.	Replace or repair faulty components as necessary.
<b>No Power at the AC Receptacles</b>	<b>Possible cause</b>	<b>Correction</b>
1. Check circuit breaker.	Circuit breaker left in the OFF position after starting.	Switch circuit breaker ON.
2. Check the power tool or appliance at a known good AC power source.	Faulty power tool or appliance.	Replace or repair power tool or appliance. Stop and restart the engine.
3. Take generator to an authorized this servicing dealer, or refer to shop manual.	Faulty generator.	Replace or repair faulty components as necessary.

## TECHNICAL INFORMATION

### SERIAL NUMBER LOCATION



Record the engine and frame serial numbers and date purchased in the spaces below. You will need this serial number when ordering parts, and when making technical or warranty inquiries.

Engine serial number: \_\_\_\_\_

Date purchased: \_\_\_\_\_

### CARBURETOR MODIFICATION FOR HIGH ALTITUDE OPERATION

At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease, and fuel consumption will increase. A very rich mixture will also foul the spark plugs and cause hard starting. Operation at an altitude that differs from that at which this engine was certified, for extended periods of time, may increase emissions.

High altitude performance can be improved by specific modifications to the carburetor. If you always operate your generator at altitudes above 1,500 meters, have your authorized servicing dealer perform this carburetor modification.

Even with carburetor modification, engine horsepower will decrease about 3.5% for each 300 meter increase in altitude.

#### NOTICE

*When the carburetor has been modified for high altitude operation, the air/fuel mixture will be too lean for low altitude use. Operation at altitudes below 1,500 meters with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have your servicing dealer return the carburetor to original factory specifications.*

## TECHNICAL INFORMATION

### SPECIFICATIONS

#### Dimensions

Model	DUAL20000SP
Length	970mm
Width	680mm
Height	955mm
Gross weight	255kg

\*with battery

#### Engine

Model	OHV1000
Engine Type	4-stroke,overheadvalve,2cylinder
Displacement	999cc
Bore & Stroke	90*78.5mm
Cooling System	Forced air
Ignition System	Transistorized magneto ignition
Oil Capacity	With oil filter replacement approximatly 2.2L
Fuel Tank Capacity	65L
Spark Plug	F7TC
Battery	12V/21AH

#### Generator

Model		Single-phase	Three-phase
AC output	Rated voltage	230V	230V/400V
	Rated frequency	50Hz	
	Rated Ampere	77A	32.3A
	Rated output	15kW	15kW
	Max. output	16.5kW	16.5kW
	Power factor	0.9	0.8

#### Tune up Specifications

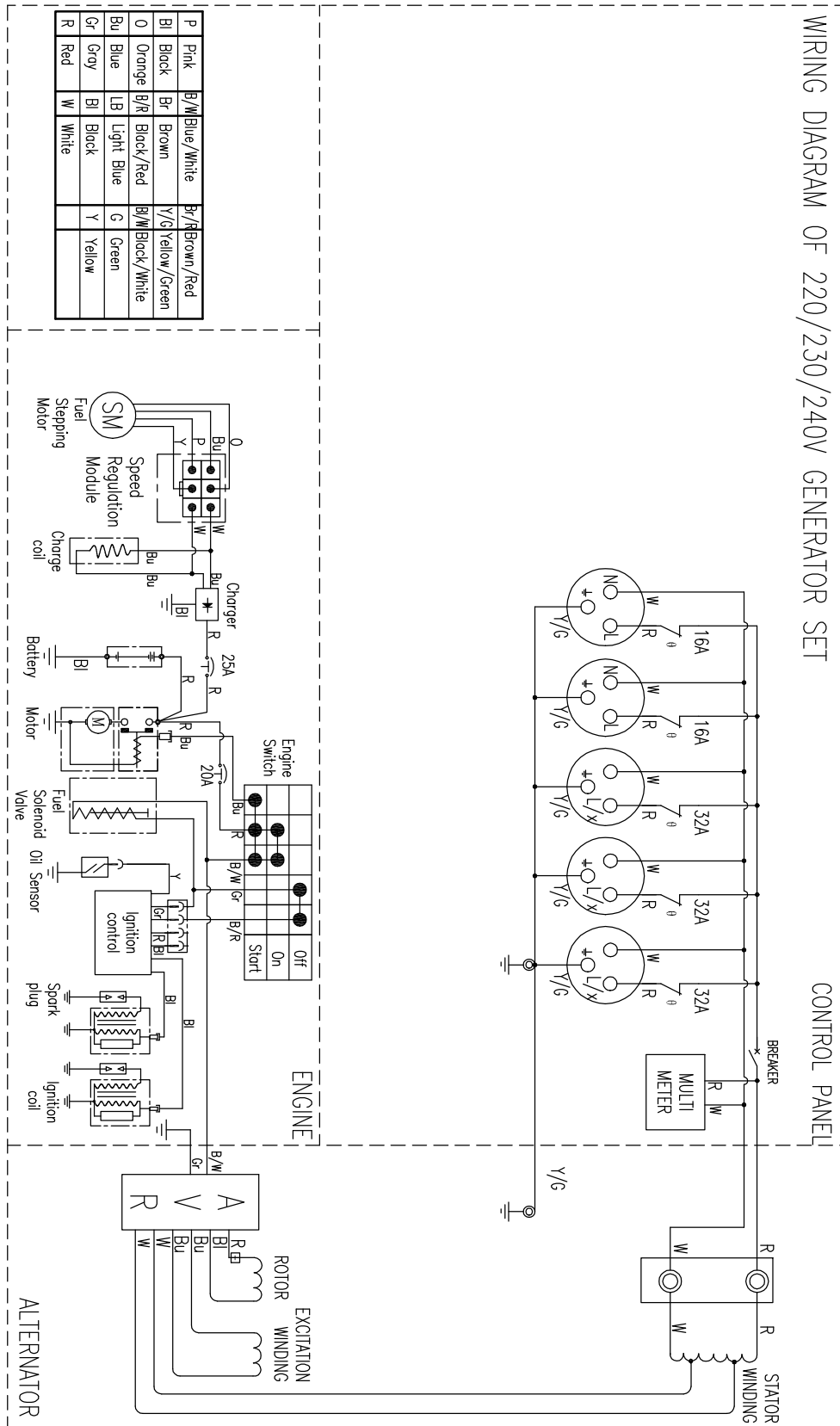
ITEM	SPECIFICATION	MAINTENANCE
Spark plug gap	0.7-0.8mm	Refer to page:23
Valve clearance(cold)	IN:0.08-0.12mm EX:0.13-0.17mm	See your authorized dealer

Specifications may vary according to the types, and are subject to change without notice.

# TECHNICAL INFORMATION

## WIRING DIAGRAM

### SINGLE PHASE DIAGRAM DUAL20000SP



# TECHNICAL INFORMATION

## THREE PHASE DIAGRAM DUAL2000SP

