



# POWERHORSE®

## Owner's Manual

### M83171A.1

ITEM NUMBER: 83171

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

**Instructions for Installation/Set-up, Operation, Servicing, & Storage**

### **Portable, Outdoor Use-Only, Gasoline Generator**

**Item #83171 – 3,700 Watt Continuous (4,500 Watt Surge) Capacity**

Can be used to power individual appliances plugged directly into the generator's outlets, or as a back-up connection to a building's power supply (via a professionally installed UL-listed transfer switch).

#### **▲ WARNING**

**READ and UNDERSTAND this manual completely before using the generator!** Failure to properly set up, operate, and maintain this generator could result in *serious injury or death* from *carbon monoxide poisoning, electric shock, fire/explosion, or burns*. In particular, be aware of the following hazards:

##### **CO Poisoning**

Generators give off carbon monoxide, a poisonous gas that can kill you. You CANNOT smell it, see it, or taste it.

- ONLY run generator OUTDOORS and AWAY from building air intakes. NEVER run generator inside any enclosed or semi-enclosed spaces, including homes, basements, garages, sheds, boxes, RVs, boats or pick-up truck beds. These spaces can trap poisonous gases, EVEN if you run a fan or open windows.
- Install carbon monoxide alarms inside nearby structures/buildings (battery-operated, or plug-in with battery backup).

##### **Electric shock / Electrocutation**

- High voltage electricity from generator can kill. DO NOT operate in wet locations. Be sure generator is properly grounded. Use only UL-listed, outdoor-rated grounded extension cords of proper size.
- NEVER plug the generator directly into a wall outlet. ANY connection to a building's electrical system MUST ISOLATE THE GENERATOR FROM UTILITY POWER via a UL-listed transfer switch installed by a licensed electrician. Otherwise, back feed from the generator into the power grid could kill utility workers.

##### **Fire / Explosion**

- DO NOT overload generator (per rated capacity), and OPERATE ONLY in an area with adequate cooling ventilation so engine does not overheat. Exhaust can be extremely hot. Keep muffler at least 7 feet from all combustible objects.
- All fuels are flammable. Never fuel a running or hot engine. Never pump fuel directly into generator at gas station – use approved container to transfer fuel. Ensure there are no fuel leaks, and keep sources of sparks and flames away.
- ALWAYS keep a fire extinguisher rated "ABC" nearby.

#### **STOP!**

**CHOOSE THE RIGHT GENERATOR FOR YOUR NEEDS.** See the "Power Load Planning & Management" section of this manual to determine your power load requirements and then compare to the generator's rated capacity.

**INSPECT COMPONENTS:** Closely inspect to make sure no components are missing or damaged. See the "Unpacking & Delivery Inspection" section for instructions on whom to contact to report missing or damaged parts.

**ARRANGE FOR PROFESSIONAL INSTALLATION of a transfer switch if you will be connecting the generator to your building's electrical system.** See the "Installation/Initial Set-Up" section for more information about this requirement.

**ADD ENGINE OIL:** Engine is shipped without oil. See engine section of this manual for instructions on capacity and viscosity recommendations.

**Any Questions, Comments, Problems, or Parts Orders**

**Call Powerhorse Product Support 1-866-443-2576**

## Hazard Signal Word Definitions

	<p>This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.</p>
	<p>DANGER (red) indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</p>
	<p>WARNING (orange) indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</p>
	<p>CAUTION (yellow) indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</p>
	<p>CAUTION (yellow) used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.</p>

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# Table of Contents

- Hazard Signal Word Definitions** ..... 2
- About Your Generator**..... 4
- Specifications** ..... 6
- Safety Label Locations** ..... 7
- Machine Component Identification** ..... 9
- Installation / Initial Set-Up:**
  - 1. Unpacking & Delivery Inspection ..... 11
  - 2. Planning the Power Load ..... 11
  - 3. Set-up as a BUILDING BACK-UP or PORTABLE Power Source..... 14
  - 4. Selecting a Suitable Site..... 16
  - 5. Grounding the Generator ..... 18
  
- Operation:**
  - 1. General Safety Rules for Operation ..... 19
  - 2. Preparing for Operation ..... 22
  - 3. Starting the Engine..... 25
  - 4. Checking Generator Output ..... 26
  - 5. Connecting Loads ..... 27
  - 6. Stopping the Engine ..... 27
  - 7. Storage & Exercise ..... 28
  
- Maintenance & Repair**..... 30
- Troubleshooting**..... 35
- Summary of Important Safety Information for Operation** ..... 36
- Engine Operation**..... 40
- Exploded Views** ..... 46
- Warranty**..... 52

# About Your Generator

Thank you for purchasing your Powerhorse portable generator!

## About Your Generator

**This engine-driven, portable inverter generator is designed to provide up to 4,500 Watts of electrical power** (3,700 watts continuous, 4,500 watts surge).

It can supply power:

1. As a portable power source. You can plug appliances directly into the generator's electrical outlets.
2. As a back-up, standby power source for a building. A licensed electrician can connect the generator to your building's electrical system via the installation of an **UL-listed transfer switch**. (See the "Installation & Initial Set-up" section of this manual to learn more about specific requirements and precautions relating to wiring the generator to your building's electrical system.)

**You must select a generator adequately sized for your power needs.** You need to determine the power needs of all the appliances/tools you wish to power at the same time and choose a generator rated to provide at least that power level. See the "Planning the Power Load" section of this manual to determine your specific power load requirements and then compare them to this generator's rated capacity. You must not overload the generator. Overloading will cause damage to the generator and attached electrical devices, and may also result in fire.

**Be sure to read about site selection and grounding requirements for running this generator.** More detailed information can be found in the "Installation & Initial Set-up, Steps 4 & 5" of this manual.

**Contact Powerhorse Product Support at 1-866-443-2576 with questions about optional accessories or to order parts.**

## Read this Manual

### **WARNING**

Improper use or maintenance of this generator can result in **serious injury or death** from **carbon monoxide poisoning, electric shock/electrocution, fire/explosion, or burns**.

**Read this manual completely** before using the generator and follow all instructions and safety rules.

You must follow all instructions and safety precautions presented throughout this manual. A summary of important safety information can be found at the end of the manual. Keep this manual for reference and review.

## About Your Generator (cont'd)

Proper preparation, operation, and maintenance will result in operator safety, as well as best performance and long life of the generator. For detailed engine operation and maintenance information, always refer to the engine section of this manual.

Powerhorse is constantly improving its products. The specifications outlined herein are subject to change without prior notice or obligation. The purchaser and/or user shall assume liability for any modification and/or alterations of this equipment from original design and manufacture.

Before using, the user shall determine the suitability of this product for its intended use and assumes liability therein.

**Contact Powerhorse Product Support at 1-866-443-2576 for any questions about the appropriate use of this generator.**

### Warranty Registration

Please fill in the warranty registration information and have it on hand when you call in on a warranty claim or replacement parts.

#### **ATTENTION:**

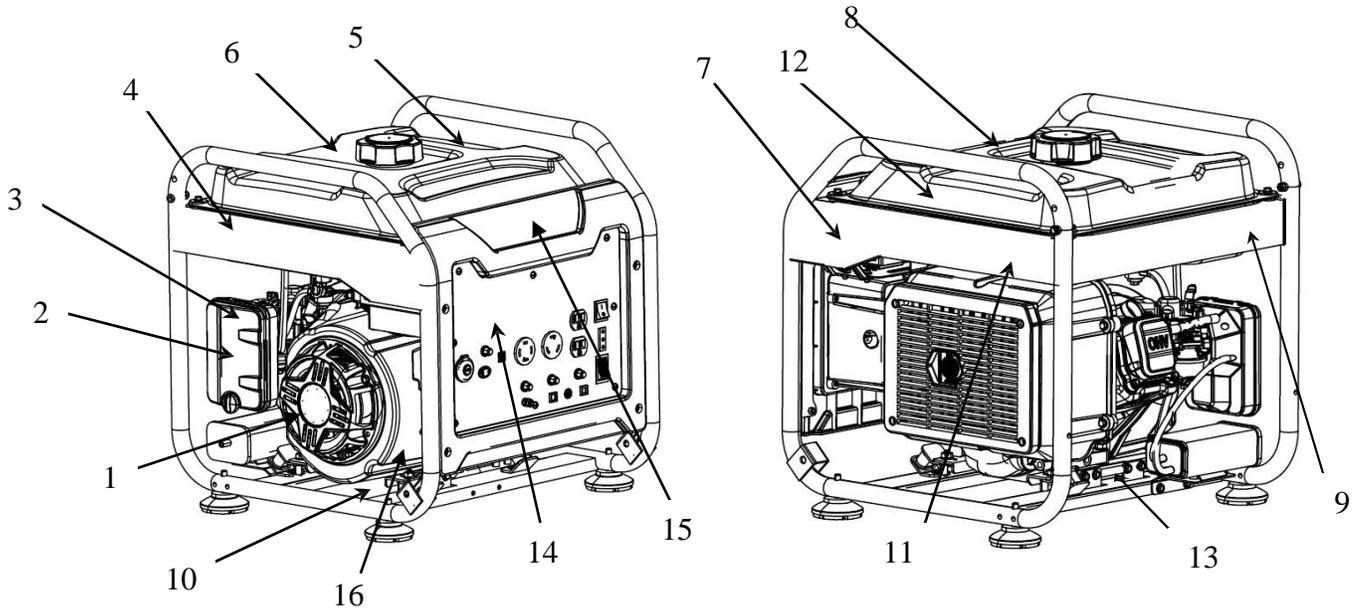
**All Rental Companies and Private Owners who loan this equipment to others!**

*All persons to whom you rent/loan this generator must have access to and read this manual. Keep this owner's manual with the generator at all times and advise all persons who will operate the machine to read it. You must also provide personal instruction on how to safely operate the generator and remain available to answer any questions a renter/borrower might have.*

## Specifications

Item Number	#83171
Maximum Output	4,500 Watts (W)
Continuous Output	3,700 Watts (W)
Voltage	120/240 Volt (V)
Phase	Single Phase
Frequency	60 Hertz (Hz)
Power Factor	1.0 p.f.
Run Time at 25% Load	15 Hours
Engine	224cc
Engine Speed	3600 RPM
Fuel Type	Unleaded Gasoline
Fuel Capacity	3.7 gallons (14L)
Oil Capacity	0.63 US quarts (0.6 L)
Starting Method	Recoil Start
120/240 Volt Receptacles	2 – 20 Amp 120V duplex (NEMA 5-20R) 1 – 30 Amp 120V locking (NEMA L5-30R) 1 – 30 Amp 120/240V locking (NEMA L14-30R)
12 Volt Receptacles	1 – 8 Amp 12V
AC Circuit Breakers	2 – 30 Amp (A) thermal, push to reset 1 – 20 Amp (A) thermal, push to reset
DC Circuit Breakers	1 – 8 Amp (A) thermal, push to reset
Dimensions	
Length	21.06in.
Width	20.47in.
Height	21.46in.
Dry Weight	90.4 lbs.

## Safety Label Locations



Ref. #	Part #	Description	Qty.
1	801767	Recoil Decal	1
2	793048	Air Filter Decal	1
3	795119	Choke Decal	1
4	795135	Starting Instruction Decal	1
5	795126	Shock/Fire Decal	1
6	795124	Ethanol Decal	1
7	795127	CPSC Decal	1
8	795123	Fire & Overheating Warning	1
9	782633	Low Oil Decal	1
10	801881	4500W Nameplate	1
11	790852	Burn Warning Decal	2
12	801766	Powerhorse Tank Decal	1
13	782629	Oil Level Decal	1
14	801764	Control Panel Decal	1
15	801765	Branding Decal	1
16	N/A	CARB Decal	1

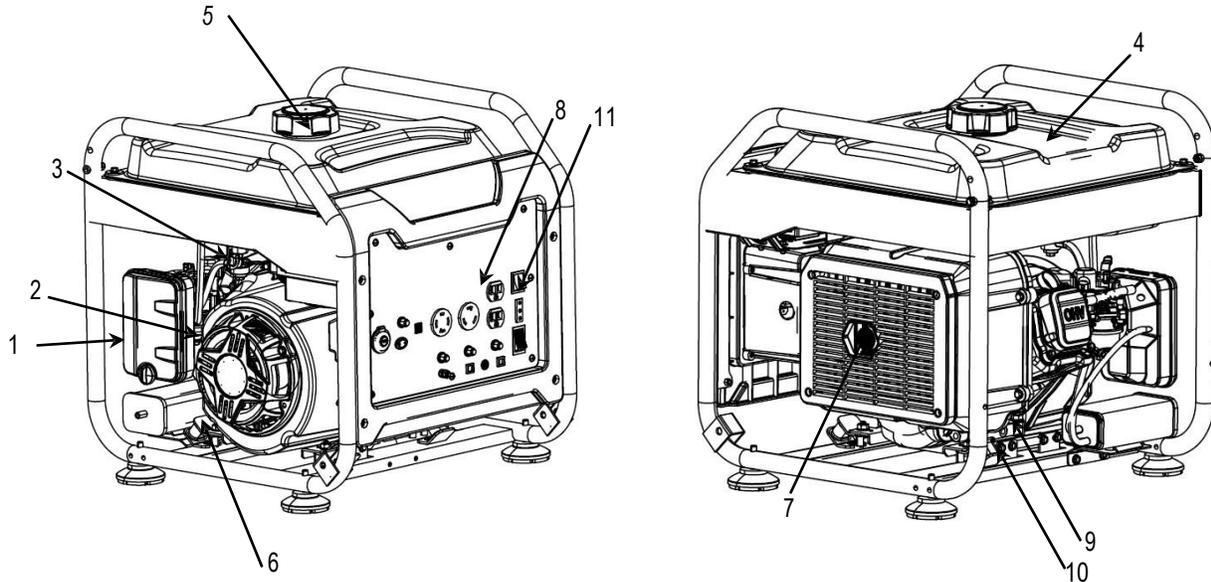
**Always make sure safety labels are in place and in good condition.** If a safety label is missing or not legible, order new labels or unsafe operation could result.

**To order replacement safety labels,** call Powerhorse Product Support at **1-866-443-2576**.

# Safety Label Locations



# Machine Component Identification

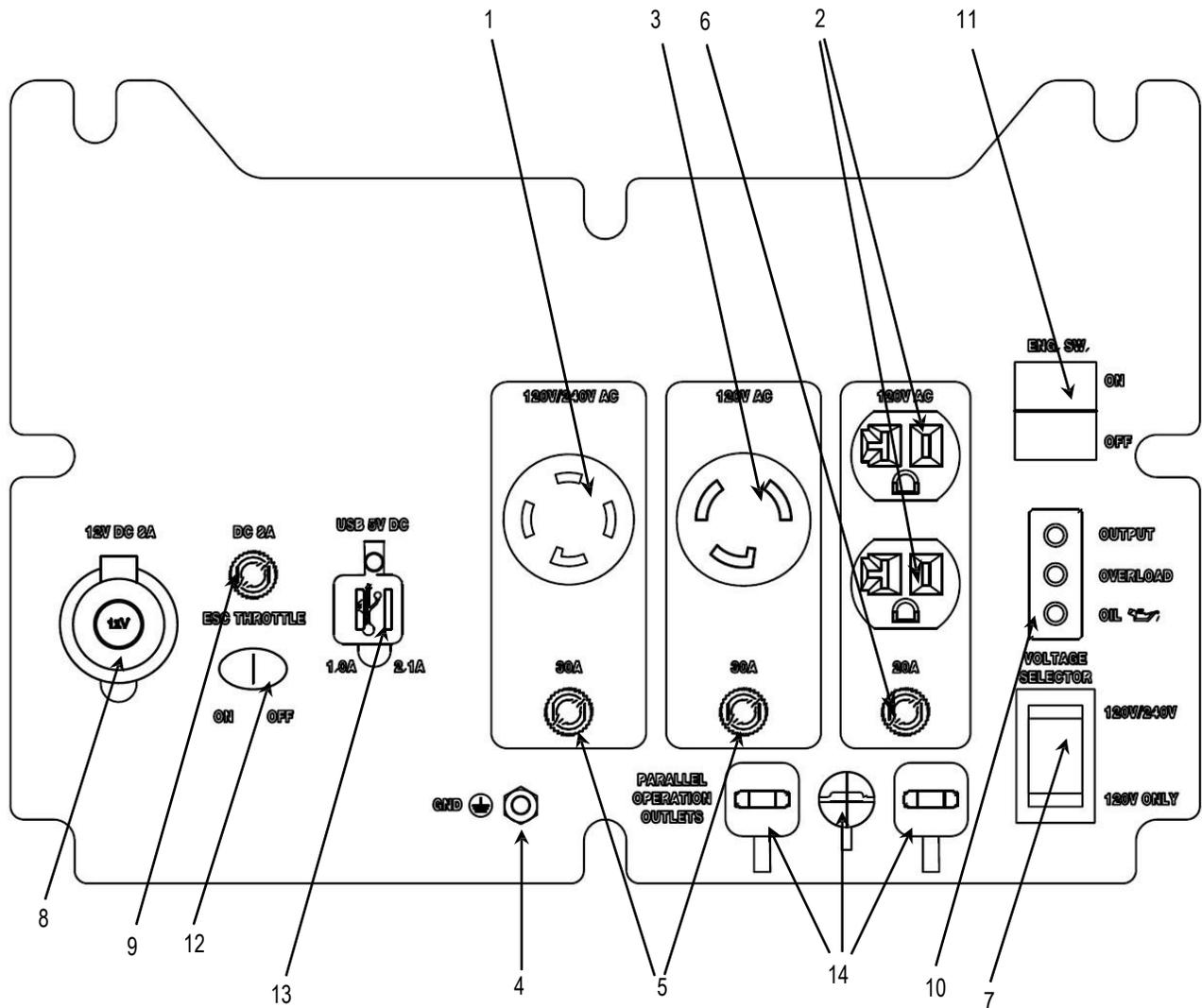


Reference	Description	Reference	Description
1	Air Cleaner	8	Control Panel
2	Recoil Starter Grip	9	Oil Fill
3	Fuel Valve	10	Oil Drain Plug
4	Gas Tank	11	ON / OFF Switch
5	Gas Cap		
6	Vibration Isolation Mount		
7	Muffler		

## REFERENCE GUIDE

<b>Reference 1 – Air Cleaner</b>	Filter element that removes particles from incoming air. See the engine section of this manual for maintenance and replacement.
<b>Reference 2 – Recoil Starter Grip</b>	Grasp firmly when manually starting engine to engage the engine cranking.
<b>Reference 3 – Fuel Valve</b>	ON / OFF valve to control the fuel flow into the engine. Located on the left side of the recoil. <b>ALWAYS</b> keep valve closed when the generator is not in use.
<b>Reference 4 – Gas Tank</b>	A large tank that allows for extended run capabilities. <b>ALWAYS</b> allow room for gasoline expansion by not filling the gas tank completely.
<b>Reference 5 – Gas Cap</b>	The gas cap is extra-large, creating a large hole for refilling and has a comfortable grip.
<b>Reference 6 – Vibration Isolation Mount</b>	The engine and generator head are mounted on rubber mounts that absorb most of the engine vibration. This feature eliminates the tendency of the machine to “walk” while engine is running.
<b>Reference 7 - Muffler</b>	An acoustic device installed onto the exhaust system that is designed to reduce noise. The outlet also includes a spark arrester.
<b>Reference 8 – Control Panel</b>	An electrical device that contains receptacles, switches and other electrical devices.
<b>Reference 9 – Oil Fill</b>	Cap with dipstick for checking oil level. Also provides access port to fill oil.
<b>Reference 10 –Oil Drain Plug</b>	Bolt located on the engine crankcase that allows oil to be drained.
<b>Reference 11 – Engine Switch</b>	ON / OFF switch. Switch must be ON for the generator to run, turn the switch OFF to

# Machine Component Identification



Ref. #	Description	Qty.
1	120/240V, 30A Locking Receptacle (NEMA L14-30R)	1
2	120V, 20A Duplex Receptacle (NEMA 5-20R)	2
3	120V, 30A Locking Receptacle (NEMA L5-30R)	1
4	Grounding Post	2
5	Circuit Breaker, 30A	2
6	Circuit Breaker, 20A	1
7	Full Power Switch	1
8	12V DC, 8A Receptacle	1
9	Circuit Breaker, 8A, 12V DC	1
10	Status LED	1
11	Engine Switch	1
12	Eco Throttle	1
13	USB	1
14	Parallel port	3

## Installation / Initial Set-Up (cont'd)

There are a number of important steps required to set up your generator for initial use. These steps are:

### Steps for Installation / Initial Set-Up

1. **Unpacking & delivery inspection.**
2. **Planning the power load to stay within the generator's rated capacity.**
3. **Setting up generator for the type of power generation you need:**
  - a. **portable power source, or**
  - b. **connect to a building as a back-up power source.**
4. **Selecting a site for using the generator.**
5. **Grounding the generator.**

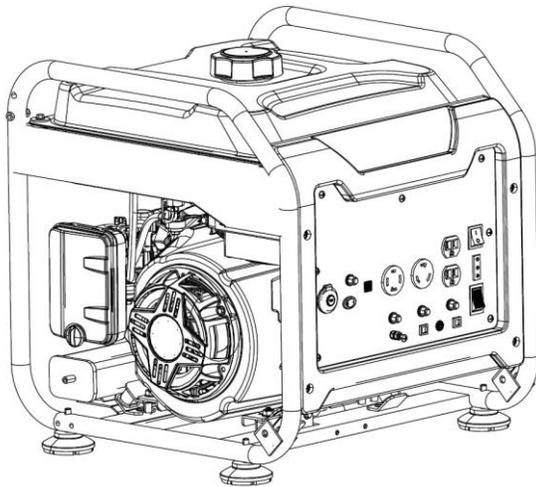
Each of these steps is discussed in detail below:

### 1. Unpacking & Delivery Inspection

You should inspect the generator immediately after you receive delivery.

See the "Machine Component Identification" section of this manual for a diagram of the generator and its components.

- If you are *missing* or have damaged components, contact Product Support at 1-866-443-2576.



Generator



Funnel  
Part # 801853



Spark Plug Wrench  
and Handle Bar  
Part # 801853

### 2. Planning the Power Load

Plan your power load so that you do not exceed the generator's rated capacity.

#### **⚠ WARNING**

NEVER exceed the rated wattage capacity of your generator.

OVERLOADING may cause SERIOUS DAMAGE to the generator and attached electrical devices, and may result in fire.

## Installation / Initial Set-Up (cont'd)

Your generator **MUST BE SIZED PROPERLY** to provide both the running and starting (surge) wattage of the devices you will be powering. Before using your generator, determine the running and starting wattage requirements of all the electrical devices you will be powering simultaneously. The sum of the running and starting wattages of the devices being powered must not exceed the continuous output rating of your generator. (The continuous output rating of your generator is listed in the "Specifications" section of this manual.) Note that:

- Devices without electric motors such as light bulbs, radios, and televisions have the same running and starting wattage.
- Devices with electric motors such as refrigerators, compressors, and hand tools typically require a starting wattage that is 3 to 5 times greater than the running wattage.

The running and starting wattage requirements are often listed on a device's nameplate. If wattage is not given on the device's nameplate, the wattage may be calculated by multiplying the nameplate voltage by nameplate amperage,  $\text{Watts} = \text{Volts} \times \text{Amps}$ .

### Example conversion to watts:

$$120 \text{ Volts} \times 5 \text{ Amps} = 600 \text{ Watts}$$

If only the running voltage is given on the nameplate for a device with an electric motor, the starting wattage can be approximated to be three to five times the running wattage.

Estimates for the running wattage requirements for common devices are listed in **Table 1** below. Guidance for starting wattages is provided in the table's footnotes.

**Table 1**

Device	Running Watts	Device	Running Watts
Air conditioner (12,000 BTU)	1700 (a,b)	Jet pump	800 (a)
Battery charger (20 Amp)	500	Lawn mower	1200
Belt sander (3")	1000	Light bulb (100 Watt)	100
Chain saw	1200	Microwave oven	700
Circular saw (6½")	2000 (a,b)	Milk cooler	1100 (a)
Coffee maker	1800 (a,b)	Oil burner on furnace	300
Compressor (1 HP)	1400 (a,b)	Oil-fired space heater (140,000 Btu)	400
Compressor (¾ HP)	1800 (a)	Oil-fired space heater (85,000 Btu)	225
Compressor (½ HP)	1400 (a)	Oil-fired space heater (30,000 Btu)	150
Curling iron	700	Oven	4500
Dishwasher	1200	Paint sprayer, airless (1/3 HP)	600 (a)
Edge trimmer	500	Paint sprayer, airless (handheld)	150
Electric nail gun	1200	Radio	200
Electric range (1 element)	1500	Refrigerator	600 (b)
Electric skillet	1250	Slow cooker	200
Furnace fan (1/3 HP)	1200 (a)	Submersible pump (1-1/2 HP)	2800 (a)
Freezer	800 (b)	Submersible pump (1 HP)	2000 (a)
Hair dryer	1200	Submersible pump (1/2 HP)	1500 (a)
Hand drill (1")	1100	Sump pump	600 (a)
Hand drill (1/2")	875	Table saw	2000 (a)
Hand drill (3/8")	500	Television	500
Hand drill (1/4")	250	Toaster	1000
Hedge trimmer	450	Vacuum cleaner	250
Home computer	150	VCR	70
Impact wrench	500	Water heater	3000
		Weed trimmer	500

## Installation / Initial Set-Up (cont'd)

- (a) Hard-starting motors require 3-5 times the rated running watts
- (b) For extremely hard to start loads such as air conditioners and air compressors, consult the equipment dealer to determine maximum wattage

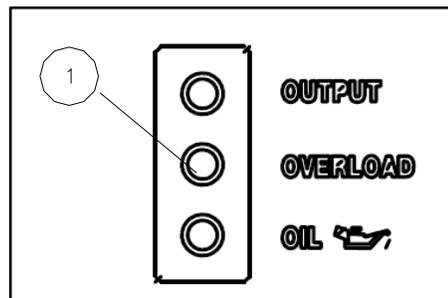
**To calculate the running and starting wattage requirements for the devices you will be powering, follow these steps:**

1. Make a list of all electrical devices you will be powering at the same time with the generator.
2. List the greater of the running or starting wattage next to each device as obtained from the devices' nameplate or **Table 1**. If only the running wattage for a device with an electric motor is known, the starting wattage can be estimated to be at least 3 times the running wattage.
3. Add the wattages for all devices on your list. This total must be lower than the continuous output rating of your generator.

**Example:**

Device to be Powered	Greater of Starting/Running Wattage
Light bulb	75 W
Refrigerator – 18 cu. ft.	1600 W
Microwave	700 W
Window AC	1800 W
Sump pump (1/3 hp)	2100 W
<b>Total</b>	<b>6275W</b>

In this example, the generator must have a continuous output of at least 6275 W in order to power all of the devices simultaneously.



The overload indicator light ① comes on when the total wattage exceeds the generators capability. If that happens, proceed as follows:

1. Turn off any connected electric devices and stop the generator.
2. Reduce the total wattage of connected electric devices within the rated output.
3. Check for blockages in the cool air intake (louver) and around the control unit. If any blockages are found remove.
4. After checking, restart the generator.

### STAGGERING LOADS

You can increase the number of devices your generator can power by staggering the load on the generator. For example, you could alternately power your refrigerator and air conditioner for limited periods of time -- powering only one of the devices at a time and never powering both at the same time.

## Installation / Initial Set-Up (cont'd)

### 3. Set-up either as a BUILDING BACK-UP or PORTABLE Power Source

This generator is designed to provide up to its rated amount of electrical power. It can supply electricity in two ways:

1. **As a back-up, standby power source for a building.** For this application, you must arrange for a licensed electrician to connect the generator to your building's electrical system via the installation of an UL-listed transfer switch. The transfer switch must be installed in accordance with building electrical code and guidelines supplied by your power company.
2. **As a portable power source.** You can plug appliances or tools directly into the generator's electrical outlets.

Specific requirements for each are given below.

Note: Regardless of whether you use your generator as a back-up power source connected to a building or as a portable power source, you must not overload the generator. Overloading may cause serious damage to the generator and attached electrical devices.

#### Using as a back-up power source for a building

**Contact a licensed electrician to install a UL-listed transfer switch** if you want to use your generator as a back-up power source for a building.

What does a transfer switch do? It:

- a) Safely connects the generator to your building's electrical system by isolating your generator from your utility company's power lines, AND
- b) Connects your generator to a critical subset of your building's circuits that are needed for emergency power needs.

If your generator will be connected to your building's electrical system, it **MUST ALWAYS** be isolated from the utility power grid with a *UL-listed transfer switch installed by a licensed electrician* in compliance with all applicable building and electrical codes, and in accordance with guidelines supplied by your power company.

#### **⚠ DANGER:**

A transfer switch must be installed in order to isolate your generator from the utility power grid. If your generator is NOT properly isolated from the utility system, serious hazards will arise:

- When your generator is running, its output will back feed into the utility power line and transformer that are normally used to provide you with power. The transformer will step up the current to the normal line voltage. An unsuspecting utility line worker working on what he thinks is a deactivated line could be electrocuted.
- If your generator is connected (running or not) when utility power is restored, your generator will be destroyed. It could also explode or cause fire.

In addition to isolating your generator from the utility system, the transfer switch connects your generator to a limited set of circuits in your building that have been chosen as critical to operate during a power outage.

The generator cannot power your entire home -- you must work with the installing electrician to determine which devices/appliances you wish to power during an outage. The electrician can help you determine which circuits and devices can be powered simultaneously without overloading the generator.

(See the previous section of this manual entitled "**Planning the Power Load**" for more information on load application and selection.)

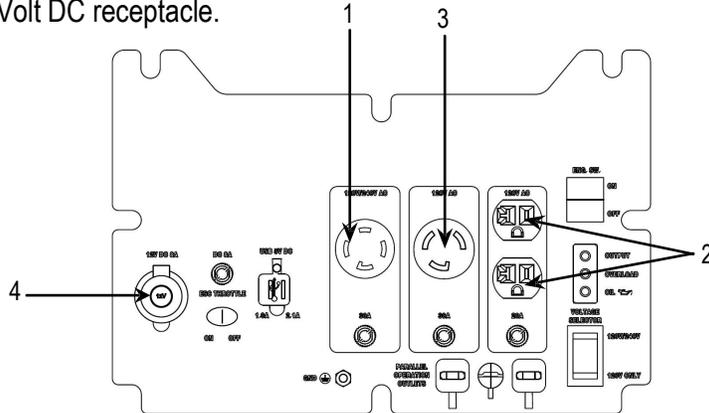
## Installation / Initial Set-Up (cont'd)

### Using as a portable power source

**When using the generator as a portable power source, you can plug electric devices and appliances directly into the generator's electrical outlets.**

There are five different electrical outlets on the generator:

1. One 120/240 Volt, 30 Amp Locking receptacle (NEMA L14-30R compatible with NEMA L14-30P mating plugs).
2. Two 120 Volt, 20 Amp Duplex Straight-Blade receptacles (NEMA 5-20R duplex receptacles compatible with NEMA 5-20P or 5-15P mating plugs).
3. One 120 Volt, 30 Amp Locking receptacle (NEMA L5-30R compatible with NEMA L5-30P mating plugs).
4. One 12 Volt DC receptacle.



- Make sure you plug each electrical device/appliance into the correct generator outlet based on the device's plug configuration and voltage/amperage rating. Never exceed the amperage rating of an outlet.
- Extension cords may be used to power devices that are located at a distance from the generator. However, use only UL-listed, outdoor-rated, grounded extension cords of the proper size. Use Table 2 below to choose an adequately sized extension cord according to the amperage of the device being used and the length of the cord.

**Table 2**

Current/Power		Maximum Extension Cord Length			
Amps at 240V	Load (watts)	#10 Ga. Cord	#12 Ga. Cord	#14 Ga. Cord	#16 Ga. Cord
10	2400	250'	150'	100'	75'
20	4800	125'	75'	50'	25'
30	7200	60'	35'	25'	10'
40	9600	30'	15'	10'	*
50	12000	15'	*	*	*

**⚠ WARNING:** Use of undersized extension cords can cause electric shock, fire, or damage to connected devices.

- All extension and appliance cords must be in good condition and not worn, bare, frayed, or otherwise damaged.

**⚠ WARNING:** Use of damaged electric cords can cause electric shock or fire.

Note: If an extension cord becomes hot to the touch, it is overloaded or damaged and must be replaced. Northern Tool is NOT responsible for damage or injury resulting from customer use of inadequate extension cords.

## Installation / Initial Set-Up (cont'd)

### 4. Select a Suitable Site

Before using the generator, you must select a suitable **OUTDOOR** location for installation and operation. This location should meet all of the criteria listed below.

**⚠ WARNING:**

You must choose a suitable site for operating your generator to avoid equipment damage and/or injury and possible death from carbon monoxide poisoning, electric shock, or fire. Choose a site that meets all of the criteria specified.

**Dry, level surface**

**The generator should be positioned on a dry, firm, level surface.**

Ensure that the generator sits level and will not slide or shift during operation. If applicable, block the generator's wheels to prevent sliding and shifting.

**Outdoors only – dangerous carbon monoxide exhaust**

**⚠ WARNING: Carbon monoxide poisoning hazard**

The exhaust from your generator contains carbon monoxide (CO), a poisonous gas that can kill. You cannot smell it, see it, or taste it. *Carbon monoxide exhaust is given off whether you are using gasoline, natural gas, or propane as the fuel source to power the generator.* Follow the directions below for choosing a location to operate your generator in order to avoid carbon monoxide poisoning.

**The location you choose to operate the generator must be OUTDOORS and away from all air intakes:**

- Never run the generator inside any closed or semi-enclosed spaces (even if outdoors), including homes, garages, basements, sheds, or boxes. *These spaces can trap poisonous gases, even if you run a fan or open windows.*
- Place the generator so that the exhaust fumes will not be directed towards people or building air intakes.
- Ensure that working, battery-operated or battery back-up carbon monoxide alarms are used in any dwelling/structure that is in close proximity to the running generator.
- Note that this generator is NOT designed or approved for use in vehicles or marine applications. Never run the generator inside RVs or other vehicles, on boats, or on pick-up truck beds.

**⚠ WARNING:**

Never attempt to attach ductwork to the muffler system to allow for installation inside an enclosure. This could cause hot air deflection, heat build-up, and increased exhaust back-pressure, resulting in possible exhaust leakage or damage to the generator.

**Adequate cooling ventilation**

**The generator needs adequate, unobstructed flow of air to allow for proper cooling of engine and generator head.**

**⚠ WARNING:**

Heat build-up from inadequate ventilation can result in fire, posing a serious risk to nearby persons and structures.

- Situate so there is adequate clearance around generator to allow for cooling airflow so that heat does not build up.
- Never place the generator immediately adjacent to a building or other structure – allow at least 7 feet clearance.

## Installation / Initial Set-Up (cont'd)

	<ul style="list-style-type: none"> <li>• DO NOT run the generator in close proximity to other heat-generating equipment, such as another generator. The combined heat that is generated may raise air temperature in the immediate area and there will not be adequate cooling ventilation.</li> <li>• DO NOT allow debris to accumulate and block airflow.</li> <li>• DO NOT operate with a tarp, blanket, or cover surrounding the generator.</li> </ul>
<b>No wet conditions</b>	<p><b>Choose a location where the generator will NOT be exposed to rain, snow, or direct sunlight.</b> Exposure to water can cause electric shock.</p> <p>You may operate the generator under an outdoor, canopy-like structure of heat-resistant material that is open on all sides. Make sure that all parts of canopy are at least 7 feet from exhaust, and allow for adequate clearance above generator so that heat does not build up.</p>
<b>Hot exhaust clearance</b>	<p><b>The exhaust gas from your generator is extremely hot and can cause combustible materials to catch on fire.</b></p> <ul style="list-style-type: none"> <li>• Make sure your generator's exhaust system is at least 7 feet from all combustible materials and buildings/structures.</li> <li>• The engine is equipped with a spark arrester if the generator will be used near any ignitable forest, brush, or grassy land. Make sure you comply with applicable local, state, and federal codes.</li> <li>• Keep a fire extinguisher rated "ABC" nearby. Keep it properly charged and be familiar with its use.</li> </ul>
<b>Away from dust/dirt</b>	<p><b>DO NOT use the generator in extremely dusty or dirty conditions.</b> Excessive dust and dirt can cause premature failure of the machine.</p>
<b>Hearing protection</b>	<p><b>Generators can produce noise levels in excess of 95 dB in close proximity, which can be dangerous to human hearing with prolonged exposure.</b></p> <p>Hearing protection may be required for persons working within 15-20 feet of the running generator for an extended period of time.</p> <p><b>⚠ WARNING:</b>          Never attempt to attach ductwork to the muffler system to lower noise levels. This could cause hot air deflection, heat build-up, and increased exhaust back-pressure, resulting in possible exhaust leakage or damage to the generator.</p>

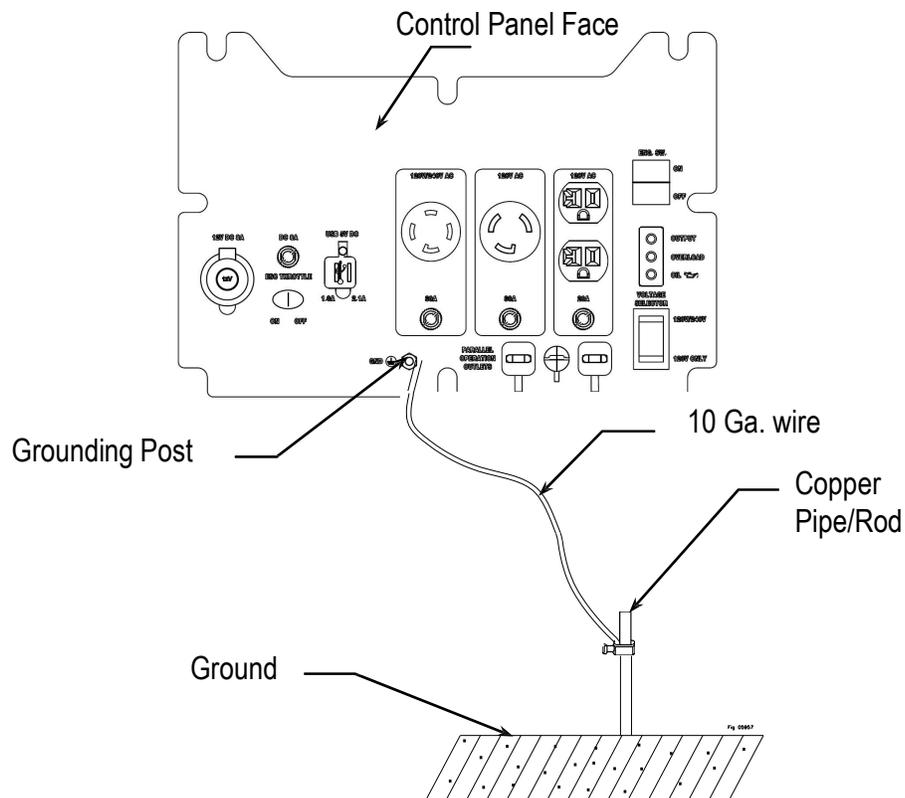
## Installation / Initial Set-Up (cont'd)

### 5. Grounding the generator

**Always ensure the generator is properly grounded to prevent electrical shock.**

You must always ground the generator by the following method when using the generator as a portable electrical source:

1. Drive a  $\frac{3}{4}$ " or 1" copper pipe or rod into the ground close to the generator. The pipe/rod must penetrate moist earth – the depth required will be dictated by local soil conditions. Consult with an electrician.
2. Connect an approved ground clamp to the pipe.
3. Run a 10 gauge wire from the clamp to the generator grounding post which is located on the base of the generator frame to the right of the battery location.
4. DO NOT connect the generator grounding post to a water pipe or a ground used by a radio system.



If a licensed electrician installs the generator with a connection to your building's electrical circuit for use as a back-up power system, grounding may alternatively be completed through the building's grounding system. Ask your electrician. If the generator is not grounded through your building's electrical system, follow the procedure above.

**⚠ WARNING:**

Operating the generator when it is not properly grounded can result in electrical shock.

# Operation

Once you have set up your generator for use, it is time to start your generator. The following are the procedures necessary for safe, successful operation of your generator.

## Operation Procedures

1. **General Safety Rules for Operation**
2. **Preparing for Operation**
3. **Starting the Engine**
4. **Checking Generator Output**
5. **Connecting Electrical Loads (Portable Power Generation)**
6. **Stopping the Engine**
7. **Storage & Exercise of Generator**

Each of these procedures is discussed in detail below:

## 1. General safety rules for operation

**Before starting the generator, review the following general safety rules for operation:**

**▲ WARNING:**

Failure to follow safety rules may result in serious injury or death to the operator or bystanders.

- **Know proper use/how to stop.** Be thoroughly familiar with proper use of the equipment and all generator controls, output receptacles, and connections. Know how to stop the generator quickly if needed (see "Operation, Step 6 - Stopping the Engine").
- **Instruct operators.** The generator owner must instruct all operators in safe generator set-up and operation. Only trained adults should set up and operate the generator – DO NOT let children operate.
- **Intended use.** Carefully read about and understand the intended use of this generator. DO NOT use for other purposes, as unforeseen hazards or equipment damage may result.
- **Under the influence.** Never operate, or let anyone else operate, the generator while under the influence of alcohol, drugs, or medication.
- **Safety equipment / controls.** DO NOT operate the generator unless all safety covers, guards, and barriers are in place and in good working order, and all controls are properly adjusted for safe operation.
- **Damaged.** DO NOT operate the generator with damaged, missing, or broken parts.
- **Modifications.** DO NOT modify the generator in any way. Modifications can create serious safety hazards and will also void the warranty.
- **Engine speed.** Never attempt to modify the engine speed setting. The engine speed is preset at 3600 RPM for safe and optimal performance of the generator. If speed needs adjusting, it must be done by factory-authorized personnel.
- **External fuel sources.** Never attempt to connect external gasoline/diesel sources in order to increase engine run time. Larger tank at pressure or higher elevation will cause gasoline to leak from carburetor during operation. Fire or explosion could result.

## Operation (cont'd)

- **Malfunction during operation.** Immediately turn off the generator if any of the following conditions arise during operation:
  - Excessive change in engine speed, slow or fast
  - Overheating in load connecting devices
  - Sparking or arcs from generator
  - Loss of electrical output
  - Receptacle damage
  - Engine misfire
  - Excessive vibration
  - Flame or smoke
  - Abnormal noise
- **Adjusting / repairing.** Always turn off generator and remove spark plug(s) or spark plug wire(s) before working on the generator to prevent accidental starting. Always discharge the capacitor before working on the generator head to prevent electrical shock. (See Maintenance & Repair section of this manual for instructions on how to do this.)
- **Carbon monoxide poisoning.** The running engine gives off carbon monoxide, a poisonous gas that can kill you. You CANNOT smell it, see it, or taste it. Follow all instructions for site selection and positioning the generator, and avoid inhaling the exhaust. If you start to feel sick, dizzy, or weak while using the generator, shut off the engine and get to fresh air RIGHT AWAY. See a doctor. You may have carbon monoxide poisoning.
- **Other exhaust dangers.** This product contains or emits chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Avoid inhalation of exhaust.
- **Wet conditions.** DO NOT operate the generator or handle any electrical equipment while standing in water, while barefoot, while hands are wet or while in the rain or snow. Electric shock may result.
- **Ground fault circuit interrupter.** Always use a ground fault circuit interrupter (GFCI) protected extension cord (or outlet, if generator is equipped) in damp or highly electrical conductive areas and on construction jobsites to prevent electrical shock.
- **Avoid contact.** Avoid contact with bare wires, terminals, connections, etc., while the unit is running.
- **Electric shock accident.** If an electric shock accident occurs, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. Avoid direct contact with victim. Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. Apply first aid and get immediate medical help.
- **Smoking/sparks.** Never smoke near the running generator, and never operate near sources of sparks or flames.
- **Hot muffler.** Never touch a hot muffler, hot exhaust manifold, or engine cooling fins. Exhaust and engine parts can be very hot and will burn you.
- **Moving parts.** Keep hands, feet, and apparel away from drive belts, fans, and other moving parts. Never remove any drive belt or fan guard while the unit is operating.
- **Proper maintenance.** Improper maintenance or failure to correct a problem before operation can cause a malfunction in which you can be seriously hurt or killed. **ALWAYS** perform a pre-operation inspection before each operation, and correct any problems. **ALWAYS** follow the inspection and maintenance recommendations and schedules in this owner's manual.

## Operation (cont'd)

### Static electricity and filling the gasoline tank:

**Static electricity can initiate from ungrounded gasoline tanks or containers, from flowing gasoline, and from persons carrying a static electric charge**

Static electricity can explosively ignite gasoline vapors that are present during the fueling process, resulting in serious burns to nearby persons. To avoid static electricity while fueling, certain steps must be followed before and during the fueling process in order to minimize and safely dissipate static charge build-up:

- **Touch a grounded metal object before starting.** Always dissipate static charge from your body before beginning the fueling process by touching a grounded metal object at a safe distance away from fuel sources.
- **Use a portable container to fill tank.** Never fill the generator's gas tank directly from the fuel pump – the generator's tank is not grounded and the high velocity flow of gasoline from a fuel pump can cause static electric build-up. Use an approved portable container to transfer gasoline to the generator's tank.
- **Fill container on the ground.** Never fill the portable gas container while it is sitting inside a vehicle, trailer, trunk, or pick-up truck bed. ALWAYS place container on the ground to be filled.
- **Keep nozzle in contact with container.** Keep nozzle in contact with the portable container at all times while filling. Manually control the flow of gasoline; DO NOT use the nozzle's lock-open device.
- **Use a portable container made of metal or conductive plastic.** It will dissipate the charge to ground more readily.

### About static electricity and fueling

Many common objects can accumulate and retain a static electric charge. Objects made of non-conductive materials (e.g. plastics) easily accumulate and retain static electric charge, as can objects made of conductive material (e.g. metal, water) if they are not electrically grounded. The static electric charge on an object, such as a human body or plastic fuel tank/container, can reach as high as several thousand volts!

A static electric spark can be generated if the static electric charge stored on an object "jumps" to another, less charged object. Such a spark can ignite invisible gasoline vapors that are present during fueling situations.

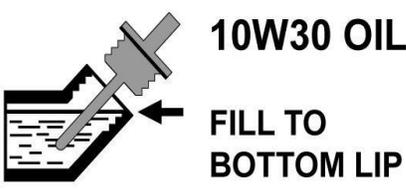
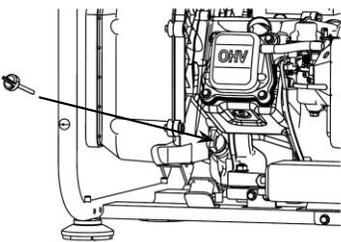
### Typical sources of static electric hazards during fueling

The following objects can accumulate a static electric charge and cause an ignition spark in typical fueling situations:

1. Ungrounded tanks/containers. Any ungrounded fuel tank or container can accumulate a static electric charge as a result of contact with other objects or friction during transportation. This static electricity can discharge as a spark to the grounded gasoline dispenser nozzle, as the nozzle is first brought close to the tank/container at the beginning of the fueling process.
2. Flowing gasoline. Most people are not aware that gasoline accumulates static electric charge while flowing through a hose or pipe. This charge then transfers to and accumulates in the gas tank or container that is being filled. The total amount of charge accumulation depends on the amount of gas pumped into the container, the speed with which it is pumped, and whether or not the tank/container is grounded. If sufficient static electric charge accumulates in the fuel tank or container during the fueling process, the tank/container may discharge a spark to the grounded gasoline dispenser nozzle.
3. Persons. A person dispensing the gasoline can carry a static electric charge on their body, typically resulting from contact with their car seat or electronics. The static electricity can discharge as a spark between that person's hand and either the grounded dispenser nozzle or the fuel tank opening.

## Operation (cont'd)

### 2. Preparing for Operation

<b>Position generator</b>	<p><b>Position generator in accordance with the instructions given in “Installation &amp; Initial Set-up, Step 4: Select a Suitable Site” of this manual.</b></p> <p>Operate outside only, on dry, level ground with adequate clearance and ventilation.</p> <p><b>⚠ WARNING: Carbon monoxide poisoning hazard</b> Generators give off carbon monoxide exhaust, a poisonous gas that can kill. You CANNOT smell it, see it, or taste it. ONLY run generator OUTDOORS and away from air intakes. NEVER run generator inside any enclosed or semi-enclosed spaces, including homes, garages, basements, sheds, boxes, pick-up truck beds, RVs, or boats. These spaces can trap poisonous gases, EVEN if you run a fan or open windows. <i>Carbon monoxide exhaust is given off whether you are using gasoline, natural gas, or propane to power the generator.</i></p>
<b>Ground generator</b>	<p><b>Make sure the generator is grounded in accordance with instruction given in “Installation &amp; Initial Set-up, Step 5: Grounding the Generator” of this manual.</b></p> <p><b>⚠ WARNING: Electric shock hazard</b> Always ensure generator is properly grounded to prevent electrical shock.</p>
<b>Perform scheduled maintenance as needed</b>	<p><b>Make sure that any regular maintenance has been performed as prescribed in this manual in the “Maintenance &amp; Repair” section.</b></p> <ol style="list-style-type: none"> <li>1. Refer to the engine section of this manual for engine maintenance instructions.</li> <li>2. Make sure battery is charged. Charge as needed according to your battery manufacturer’s instructions.</li> </ol>
<b>Check/add oil</b>	<p><b>Check the oil level and add oil as needed.</b></p> <p>Using a funnel, add oil up to the bottom lip of the oil fill neck with the recommended oil.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;">  </div> </div> <p>(See engine section for oil type and capacity, and more detailed oil check/fill instructions.)</p> <p><b>⚠ WARNING: Burn hazard</b> Never open oil port while engine is running. Hot oil can spray over face and body.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Low oil shutdown feature prevents the generator from starting without sufficient oil.</li> <li>• Engine is shipped <u>without</u> oil. You must add oil before first use.</li> </ul> <p><b>IMPORTANT:</b> Under long, continuous-run operating conditions, be prepared to:</p> <ul style="list-style-type: none"> <li>• Check engine oil level every time you refuel the engine.</li> <li>• Change oil after the first 20 operating hours, and at least every 100 operating hours thereafter, or as directed in engine section of this manual.</li> </ul>

## Operation (cont'd)

### Check/fill gasoline tank

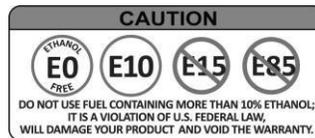
Check the gasoline level in the generator's tank using the fuel gauge. If needed, fill tank with fresh UNLEADED gasoline from a portable container, after first reading the warnings and instructions below.

**⚠ WARNING: Gasoline fire/explosion hazard**

Gasoline is highly flammable and explosive. Heat, sparks, and flames can ignite gasoline vapors, which can become widespread during fueling. A flash fire and/or explosion could result and cause serious injury or death. Use extreme care when handling gasoline. Carefully follow all the instructions in this section to avoid the following conditions which could result in gasoline ignition:

- gas vapor collection inside enclosures
- static electric sparks
- sparks from electric wiring, batteries, or running engines
- sources of heat (such as a hot engine or exhaust)
- open flames, including pilot lights

1. Before starting, review the following general safety precautions for fueling:
  - a. Never pump gasoline directly into the generator's gas tank at a gas station – high velocity flow from the pump could result in a static electric build-up in the generator's tank. Always use a portable container to fill the tank. See *warning section about static electric spark hazards below*.
  - b. Fill gasoline tank OUTDOORS – never indoors.
  - c. Stay away from all sources of heat, sparks, and flames. DO NOT smoke.
  - d. DO NOT use fuel containing more than 10% Ethanol.



2. Turn generator engine off and allow to cool for at least two minutes before removing gas cap.

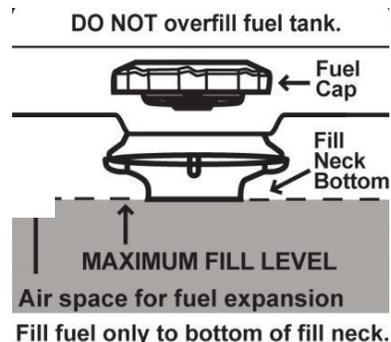
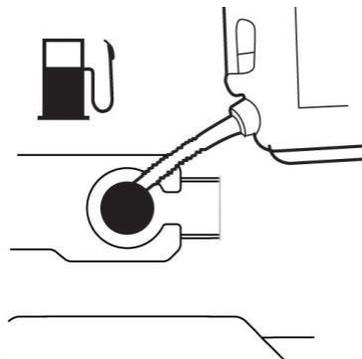
Note: A running or still-hot engine is hot enough to ignite fuel.

3. Remove generator gasoline cap.

4. Add gasoline through the fill opening:

- Use only a UL-listed portable gasoline container to transfer the gasoline to the generator's tank. Follow the safety warning and instructions below to avoiding static electric sparking.

- DO NOT overfill the gasoline tank. Allow at least 1/2 inch of empty space below the fill neck to allow for fuel expansion.



## Operation (cont'd)

	<p><b>⚠ WARNING: Static electric spark hazard</b>  A static electric spark can explosively ignite gasoline vapor, resulting in a flash fire that could cause serious injury or death.</p> <p>To avoid static electric sparking while filling the gasoline tank, <b>the following steps must be followed to minimize and safely dissipate static electric charge build-up before and during the fueling process:</b></p> <ul style="list-style-type: none"> <li>• Always dissipate static charge from your body before beginning the fueling process by touching a grounded metal object at a safe distance from fuel sources.</li> <li>• Never fill the generator's gas tank directly from the fuel pump – the generator's tank is not grounded and high velocity flow from the pump can cause static electricity build-up. Use an approved portable container to transfer gas to the generator's tank.</li> <li>• Never fill the portable gas container while it is sitting inside a vehicle, trailer, trunk, or pick-up truck bed. ALWAYS place container on the ground to be filled.</li> <li>• Keep nozzle in contact with portable container while filling. Manually control the flow of gasoline; DO NOT use the nozzle's lock-open device.</li> <li>• A portable container made of metal or conductive plastic is preferred because it dissipates charge to ground more readily.</li> </ul> <p>5. Clean up gasoline spills /splashes immediately.</p> <ol style="list-style-type: none"> <li>a) If possible, move the generator away from spilled gasoline on the ground.</li> <li>b) Wipe up spilled gasoline, and wait 5 minutes for excess gasoline to evaporate before starting engine.</li> <li>c) Gasoline soaked rags are flammable and should be disposed of properly.</li> <li>d) If gasoline is spilled on your skin or clothes, change clothes and wash skin immediately.</li> </ol> <p>6. Replace gasoline cap securely before starting engine.</p> <p>7. Store extra gasoline in a cool, dry place in an UL-listed, tightly sealed container.</p> <p><b>IMPORTANT:</b>  <b>For continuous operation, be prepared to check and refuel the engine on a regular basis. A tank of gasoline should last about 15 hours under 25% load.</b></p>
<p><b>Inspect fuel system / check for leaks</b></p>	<p><b>Inspect fuel system &amp; check for leaks BEFORE starting generator.</b>  DO NOT start generator until all needed repairs have been completed.</p> <p><b>⚠WARNING: Fuel leak hazard</b>  Gasoline is highly explosive and fuel leaks can result in fire or explosions. You can be burned and seriously injured if the fuel system is not properly hooked up or there is a fuel leak when you start the engine.</p> <p>Inspect the entire fuel system.  <i>Look for:</i></p> <ul style="list-style-type: none"> <li>• signs of leaks or deterioration,</li> <li>• chafed or spongy fuel hose,</li> </ul>
<p><b>Personal protection</b></p>	<ol style="list-style-type: none"> <li>1. Hearing can be damaged from prolonged, close-range exposure to the type of noise produced by this generator. <b>The use of ear plugs or other hearing protection is recommended</b> for persons working within 15-20 feet of the running generator for an extended period of time.</li> <li>2. Loose or dangling apparel can become entangled in moving parts. Metal jewelry can conduct electricity. <b>Never wear jewelry or loose-fitting clothing when starting or operating the generator.</b></li> </ol>

## Operation (cont'd)

### 3. Starting the Engine

**After you have completed the pre-start checklist procedures, you are ready to start the engine.**

**To start the engine:**

- 1) Disconnect all loads to the generator.
- 2) Turn the gasoline line valve to the ON position.
- 3) For cold engine, move choke lever to full choke position. To restart a warm engine, move choke lever to half choke or to RUN position.
- 4) Start the engine:
  - a) Using recoil start –
    - i) Turn the engine switch to the ON position.
    - ii) Pull the starter grip lightly until you feel resistance, then pull the starter cord out briskly and rapidly.
    - iii) Allow starter cord to return slowly.
- 5) When engine starts, move choke lever to RUN position.
- 6) Under long, continuous-run operating conditions, be prepared to:
  - a) Check and refuel the engine on a regular basis. A tank of gas should last about 15 hours under 25% load.

**▲ WARNING:**

A running engine is hot enough to ignite fuel. Never add fuel or remove gas cap if engine is running or still hot. Let cool at least 2 minutes.

- b) Check engine oil level each time you refuel.
- c) Change oil after the first 20 operating hours, and at least every 100 operating hours thereafter, as directed in the engine owner's manual.

**▲ WARNING:**

Never open oil port while engine is running. Hot oil can spray over face and body.

## Operation (cont'd)

### 4. Checking Generator Output

Although the speed of the engine was carefully adjusted at the factory so that the generator produces the proper voltage and frequency, **output voltage should be checked periodically to ensure the generator is working properly before connecting loads to the generator.**

**⚠ WARNING:**

The generator must be run at the correct speed in order to produce the proper electrical voltage and frequency. Failure to do so could result in damage to equipment powered by the generator and possible injury to the individual.

Output voltage can be checked with a portable voltage meter:

1. Start engine and allow to warm up for 5 minutes. DO NOT connect any loads.
2. Use data meter on control panel to check generator output or use a voltage meter to check output voltage at the generator's outlets/receptacles.
3. Measured voltage should be within the following ranges:
  - a) 120V +/- 10% at 120V receptacles.
  - b) 240V +/- 10% at 240V receptacles.
4. If measured voltage is not within the specified range, have generator adjusted by factory authorized personnel. DO NOT attempt to adjust the engine speed yourself.

**Note:**  
**Slight variation in voltage/speed with changing electrical loads**

All engines have a tendency to slow down when a load is applied. When electrical loads are connected to the generator, the engine is more heavily loaded and as a result the speed drops slightly.

This slight decrease in speed, together with the voltage drop within the generator itself, results in a slightly lower voltage when the generator is loaded to its full capacity than when it is running with no load. Additionally, there may be small brief surges and drops in voltage as motors connected to the generator cycle on or off.

The slight variation has no appreciable effect in the operation of motors, lights, and most appliances.

## Operation (cont'd)

### 5. Connecting Electrical Loads

You will want to be careful when connecting loads so as not to overload the generator, especially if you are powering devices with motors that require a higher starting powerload.

Instructions are provided below for connecting loads when you are using the generator:

- As a portable power source
- Connected to a building as a back-up power source

**⚠ WARNING:**

DO NOT overload generator. Make sure that combined starting and running loads do not exceed rated capacity of generator. Overloading the generator can cause damage to the generator and attached electrical devices, and may result in fire.

#### Using as a portable power source

#### Connect electrical loads one at a time according to the following instructions:

1. Allow engine to reach operating speed by allowing it to warm up for approximately 5 minutes before connecting electrical devices.
2. After engine is warmed up, begin by connecting the items that require the highest wattage first. The recommended sequence is as follows:
  - a) Connect items with motors such as refrigerators, freezers, air conditioners, or small hand tools, one at a time. Let each motor stabilize before connecting the next device.
  - b) Connect any lights you are planning on powering.

Connect voltage sensitive equipment such as electronics via surge protectors. Plug devices such as TV's, computers, and microwaves into a UL listed voltage surge protector, then plug the surge protector into the generator.

#### Using as a back-up power source for a building

Each transfer switch installation will be unique.

Proper instructions for how to safely bring the generator online with the building's electrical system should be provided by the installing electrician, who should also provide personal instruction to the owner/operator.

Failure to follow the proper procedure as provided by the electrician could expose persons to the hazards noted above.

### 6. Stopping the Engine

#### Stop the engine using the following steps:

1. Turn the ESC switch to "OFF", if applicable.
2. Disconnect all loads to the generator.
3. Turn engine switch to OFF position.
4. Turn gasoline line shut-off valve to OFF position.

**⚠ WARNING:**

Let generator cool for at least five minutes before moving or storing. A hot generator can be a fire hazard. Generator and engine surface temperature is still hot after shutdown.

## Operation (cont'd)

### 7. Storage & Exercise

**When you are finished using the generator, you must:**

- Disconnect all loads
- Shut off fuel supply
- Store the generator properly
- Plan on exercising the engine regularly unless the generator is prepared for long-term storage

Detailed instructions are provided below.

<b>Disconnect loads &amp; turn off fuel valve</b>	<p><b>When you are finished using the generator, disconnect all loads and turn off fuel valve:</b></p> <ol style="list-style-type: none"> <li>1. Make sure all devices that were connected to the generator's outlets have been disconnected.</li> </ol> <p>Check to be sure fuel valve is in OFF position.</p>
<b>Cool engine before storing</b>	<p><b>Let engine cool for at least five minutes before storing.</b> A hot engine can be a fire hazard.</p>
<b>Choose a storage location</b>	<p><b>Store the generator in a location that is:</b></p> <ul style="list-style-type: none"> <li>• Clean and dry</li> <li>• Away from sources of heat, open flames, sparks, or pilot lights, even if the generator's fuel tank is empty. Residual fuel in the tank could ignite.</li> <li>• Away from extreme high or low temperatures.</li> </ul>
<b>Prevent accidental starting</b>	<p><b>Remove spark plug(s)</b> in order to ensure the generator cannot be started accidentally in a storage location or by untrained persons.</p>
<b>Exercise generator every 4 weeks</b>	<p><b>The generator should be exercised regularly.</b></p> <p>At least every four weeks, start the engine and let it run for 10 to 15 minutes with a small load plugged in, such as a lamp or fan.</p> <p>Monthly exercising of the generator will:</p> <ul style="list-style-type: none"> <li>• Dry out any moisture that has accumulated in the windings. If left, this moisture can cause corrosion in the winding.</li> </ul>
<b>Perform regular maintenance</b>	<p><b>Perform periodic maintenance</b> as directed in the "Maintenance and Repair" section of this manual to keep the generator in safe working condition.</p>

## Operation (cont'd)

### STORAGE

When preparing the generator for storage, allow the unit to cool for 30 minutes then follow the guidelines below.

STORAGE TIME	PRIOR TO STORING
<b>Less than 2 months</b>	<ul style="list-style-type: none"> <li>• Drain gasoline from tank and dispose of in a suitable container according to state and local ordinances.</li> </ul>
<b>2 months to 1 year</b>	<ul style="list-style-type: none"> <li>• Drain fuel from carburetor.</li> <li>• Drain gasoline from tank and dispose of in a suitable container according to state and local ordinances.</li> </ul>
<b>1 year or more</b>	<ul style="list-style-type: none"> <li>• Drain fuel from the carburetor.</li> <li>• Remove spark plug.</li> <li>• Drain gasoline from tank and dispose of in a suitable container according to state and local ordinances.</li> <li>• Put a tablespoon of engine lubricant into the spark plug cylinder. Turn the engine slowly with the pull rope to distribute the lubricant.</li> <li>• Reinstall spark plug.</li> <li>• Change engine lubricant. After removal from storage:</li> <li>• Fill with fresh gasoline.</li> </ul>
<p><b>NOTE: If storing gasoline in suitable container for later use, make sure gasoline has been treated with fuel stabilizer according to stabilizer manufacturer's instructions.</b></p>	

# Maintenance & Repair

Inspect and maintain your generator as specified below in order to keep it in safe and optimal working order. Follow all safety rules and recommended maintenance steps.

**⚠ WARNING**

ALWAYS shut off the engine, disconnect the spark plug(s) and discharge the capacitor before cleaning, adjusting, or servicing the generator. Make sure all guards and shields are replaced before using.

Note: The generator head is a brush style and requires maintenance. The bearing is a heavy-duty sealed ball bearing which requires no maintenance or lubrication.

<b>Maintenance &amp; Repair</b>	
<b>Follow safety rules</b>	<p><b>Read and follow these safety rules whenever you will be servicing the generator:</b></p> <ul style="list-style-type: none"> <li>• <b>Turn off generator.</b> Always turn off generator and remove spark plug(s) or spark plug wire(s) before working on the engine or generator to prevent accidental starting.</li> <li>• <b>Discharge capacitor.</b> When the generator is shut down, the capacitor may maintain a charge. Always discharge the capacitor before working on the generator head to prevent electrical shock. Discharge using a screwdriver with an insulated handle. While wearing safety glasses, touch opposite terminals of the capacitor together with the tip of the screwdriver. If there is stored charge in the capacitor, a spark will be generated thereby discharging the capacitor.</li> <li>• <b>Replace guards.</b> Make sure all guards and shields are replaced after servicing the generator.</li> <li>• <b>Repair.</b> Major service, including the installation or replacement of parts, should be performed only by a qualified electrical service technician. Obtain factory approved parts from Powerhorse Product Support at 1-866-443-2576.</li> <li>• <b>Replacement parts.</b> If a part needs replacement, only use factory approved repair parts. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the generator and will void the warranty.</li> <li>• <b>Transporting.</b> Ensure the engine switch is OFF. Ensure the fuel valve is OFF. DO NOT leave generator inside an enclosed vehicle for an extended period of time and/or operate the generator while inside a vehicle. See moving and lifting instructions below.</li> </ul>
<b>Perform engine maintenance</b>	<p><b>Perform engine maintenance as specified in the “Engine” section of this manual.</b></p> <p>Engine maintenance items include:</p> <ol style="list-style-type: none"> <li>1. Changing oil and oil filter           <p style="margin-left: 20px;">For best performance, engine lubricant should be changed after every 100 hours or 6 months of operation.</p> <ul style="list-style-type: none"> <li>• Remove the oil fill cap/dipstick.</li> <li>• Unscrew the oil drain plug and remove.</li> <li>• Allow lubricant to drain completely into an approved container.               <p style="margin-left: 20px;"><b>NOTE:</b> Drain the Oil while the engine is still warm but not hot. Warm lubricant will drain quickly and more completely.</p> <p style="margin-left: 20px;">Do not change engine lubricant while it is hot. Accidental contact with hot engine lubricant could result in serious burns.</p> </li> <li>• Reinstall the oil drain plug and tighten securely.</li> <li>• Refill with lubricant following the instructions in the <b>Checking/Adding Lubricant</b> section. For amount of lubricant needed to refill, see <b>Product Specifications</b> earlier in this manual or the accompanying engine manual, if applicable.</li> </ul> </li> </ol>

# Maintenance & Repair

## Perform engine maintenance

- Replace and secure the oil cap/dipstick.

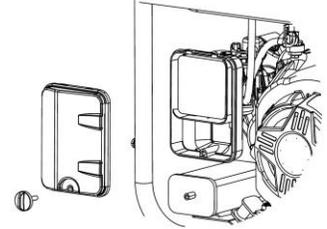
**NOTE:** Used lubricant should be disposed of at an approved disposal site. See your local retailer for more information.

### 2. Air filter check/replacement

For proper performance and long life, keep air filter clean.

- Rotate knob counterclockwise to release. Remove cover and set aside.
- Remove the filter element.
- If the filter element is dirty, clean with warm, soapy water. Rinse and let dry.
- Apply a light coat of engine lubricant to the element, then squeeze it out.
- Replace the element in the air filter unit.
- Replace the air filter cover and rotate knob clockwise to secure.

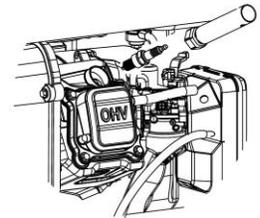
**NOTE:** Make sure the filter is seated properly inside the generator. Installing the filter incorrectly will allow dirt to enter the engine, causing rapid engine wear.



### 3. Spark plug cleaning and replacement

The spark plug must be properly gapped and free of deposits in order to ensure proper engine operation. To check:

- Remove the spark plug cap.
- Clean any dirt from around base of spark plug.
- Remove spark plug using spark plug wrench or socket.
- Inspect spark plug for damage, and clean with a wire brush before reinstalling. If insulator is cracked or chipped, spark plug should be replaced. For replacement spark plug, see Product Specifications earlier in this manual or the accompanying engine manual, if applicable.



- Measure plug gap. The correct gap is 0.024–0.028 in. (0.60–0.70 mm). To widen gap, if necessary, carefully bend the ground (top) electrode. To lessen gap, gently tap ground electrode on a hard surface.
- Seat spark plug in position; thread in by hand to prevent cross-threading.
- Tighten with wrench to compress washer. If spark plug is new, use 1/2 turn to compress washer appropriate amount. If reusing old spark plug, use 1/8 to 1/4 turn for proper washer compression.

**NOTE:** An improperly tightened spark plug will become very hot and could damage the engine.

- Reinstall the spark plug cap.

# Maintenance & Repair

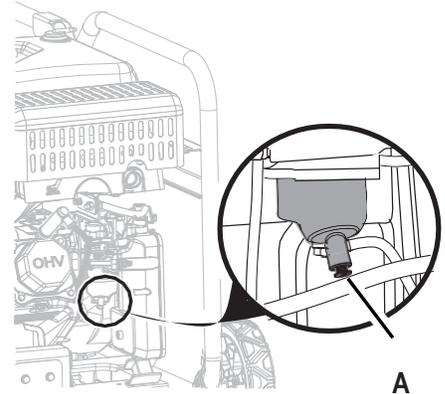
## Perform engine maintenance

### 4. DRAINING FUEL TANK/CARBURETOR

To help prevent gum deposits in the fuel system, drain the fuel from the tank and carburetor before storing.

#### DRAINING THE FUEL TANK

- Place the easy start lever in the **OFF** position.
- Remove the fuel line from the hose barb by squeezing the ends of the retaining clip and sliding the fuel line off. **NOTE:** Make sure you are removing the fuel line that runs between the fuel valve and the carburetor, **NOT** the line that runs between the fuel valve and the fuel tank.



- Install one end of a drain line (not provided) over the hose barb, and place the other end in a fuel container large enough to catch the fuel being drained from the tank.
- Place the easy start lever in the **RUN** position.
- When the fuel has drained from the tank, place the easy start lever in **OFF** position and reinstall fuel line securely onto the hose barb.

#### DRAINING THE CARBURETOR

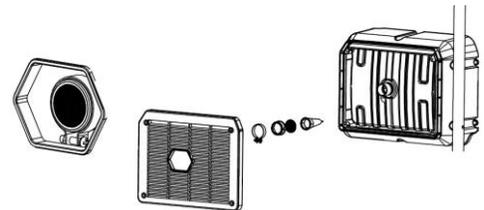
- Place the easy start lever in the **OFF** position.
- Position a suitable container under the carburetor drain screw to catch fuel; loosen the screw.
- Allow fuel to drain completely into container.
- Retighten drain screw.

**NOTE:** Consult hazardous waste management guidelines in your area for the proper way to dispose of used fuel.

### 5. Clean and inspect spark arrester

The spark arrester must be cleaned or replaced every 50 hours or yearly to ensure proper performance of your product.

Spark arrestors may be in different locations depending on the model purchased. Contact customer service or a qualified service center for the location of the spark arrester for your model.



To clean the spark arrester:

- Loosen the screw on the spark arrester cap. Remove the cap and spark arrester.
- Use a brush (not provided) to remove carbon deposits from the spark arrester.
- Replace the spark arrester and cap, tighten screw securely.

## Check receptacles

### Check receptacles before each use to make sure they are not cracked or broken.

If a receptacle is cracked or otherwise damaged, DO NOT use until replaced with an authorized factory part. Using cracked or damaged receptacles can be both dangerous to the operator and destructive to the equipment.

## Maintenance & Repair (cont'd)

<b>Inspect fuel system / check for leaks</b>	<p><b>Inspect the fuel system and check for leaks on a regular basis.</b> Inspect the entire fuel system. Look for: signs of leaks or deterioration, chafed or spongy fuel hose, loose connections, loose or missing fuel hose clamps, damaged gasoline tank, or defective gasoline shut-off valve.</p>
<b>Keep generator clean</b>	<p><b>Keep generator clean.</b> If dust or debris accumulates on the generator, clean the generator with a damp cloth or soft bristle brush. DO NOT allow air intakes to become blocked.</p> <p style="padding-left: 40px;">Note: DO NOT spray generator with a garden hose or pressure washer. Water may enter the generator and cause damage to the rotor, stator, or internal windings.</p>
<b>High Altitude Operation</b>	<p><b>CAUTION:</b> Operating at an altitude of greater than 5000 feet (1500 meters) may affect your engines performance, fuel consumption, and emissions. To remain emissions compliant and improve engine performance at higher altitudes, a high-altitude kit is required. A high altitude kit includes a carburetor jet resized to help correct air / fuel mixture at altitude. To order a high altitude kit or if you have additional questions, go to <a href="http://www.northerntool.com">www.northerntool.com</a> or contact us at 1-866-443-2576 –</p> <p>Powerhorse. Please note, engines with the high-altitude kit installed operated at lower altitudes could cause severe engine damage and affect emissions compliance. When modified, a tag or decal should be added to the product stating that a high-altitude kit was installed and to remind you to re-service the carburetor (re-jet) when operating in lower altitude environments.</p>

**IMPORTANT:** If a part needs replacement, only use parts that meet the manufacturer's specifications. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the generator.

**Contact Powerhorse Product Support at 1-866-443-2576 for any questions,  
problems, or parts orders.**

# Troubleshooting

<b>TROUBLESHOOTING</b>		
<b><u>Problem</u></b>	<b><u>Possible Causes</u></b>	<b><u>Possible Remedies</u></b>
Engine will not start.	<ul style="list-style-type: none"> <li>a) Low oil level.</li> <li>b) Fouled spark plug.</li> <li>c) Out of fuel.</li> <li>d) Engine switch in OFF position.</li> <li>e) Fuel valve in OFF position.</li> <li>f) Choke is in OPEN position.</li> <li>g) Bad fuel.</li> <li>h) Fuel filter restricted.</li> <li>i) Carburetor malfunctioning.</li> <li>j) Ignition malfunctioning.</li> <li>k) Inlet and Outlet valves stuck.</li> </ul>	<ul style="list-style-type: none"> <li>a) Fill crankcase to proper oil level.</li> <li>b) Clean or replace spark plug.</li> <li>c) Fill fuel tank.</li> <li>d) Place engine switch in ON position.</li> <li>e) Turn fuel valve to ON position.</li> <li>f) Move choke lever to CLOSED (cold engine only)</li> <li>g) Drain fuel and refuel.</li> <li>h) Clean or replace filter.</li> <li>i) Clean or replace carburetor.</li> <li>j) Replace ignition switch.</li> <li>k) Check and adjust valve clearance.</li> </ul>
Voltage too low.	<ul style="list-style-type: none"> <li>a) Engine speed too slow.</li> <li>b) Generator is overloaded.</li> </ul>	<ul style="list-style-type: none"> <li>a) Bring generator to a qualified technician for adjustment.</li> <li>b) Reduce the load.(See Power Load Planning &amp; Mgt. section of this manual.)</li> </ul>
Circuit breaker trips.	<ul style="list-style-type: none"> <li>a) Defective load connected to generator.</li> <li>b) Defective receptacle.</li> <li>c) Generator overloaded.</li> </ul>	<ul style="list-style-type: none"> <li>a) Disconnect load.</li> <li>b) Replace receptacle.</li> <li>c) Reduce the load.(See Power Load Planning &amp; Mgt. section of this manual.)</li> </ul>
Voltage too high.	<ul style="list-style-type: none"> <li>a) Engine speed too high.</li> </ul>	<ul style="list-style-type: none"> <li>a) Bring generator to a qualified technician for adjustment.</li> </ul>
Generator overheating.	<ul style="list-style-type: none"> <li>a) Generator is overloaded.</li> <li>b) Insufficient ventilation.</li> </ul>	<ul style="list-style-type: none"> <li>a) Reduce the load.(See Power Load Planning &amp; Mgt. section of this manual.)</li> <li>b) Make sure there is at least 7 feet of clearance on all sides of generator.</li> </ul>
No output voltage.	<ul style="list-style-type: none"> <li>a) Defective load connected to generator.</li> <li>b) Broken or loose wire.</li> <li>c) Defective receptacle.</li> <li>d) Defective stator.</li> <li>e) Defective rotor.</li> <li>f) Circuit breaker tripped.</li> </ul>	<ul style="list-style-type: none"> <li>a) Disconnect load.</li> <li>b) Bring generator to a qualified technician for repair.</li> <li>c) Replace receptacle.</li> <li>d) Bring generator to a qualified technician for repair.</li> <li>e) Bring generator to a qualified technician for repair.</li> <li>f) Reset circuit breaker and reduce loads connected to the generator.</li> </ul>
Engine lacks power.	<ul style="list-style-type: none"> <li>a) Generator is overloaded.</li> <li>b) Dirty air filter.</li> <li>c) Bad fuel.</li> <li>d) Fuel filter restricted.</li> <li>e) Carburetor malfunctioning.</li> <li>f) Ignition malfunctioning.</li> <li>g) Inlet and Outlet valves stuck.</li> <li>h) Spark arrester clogged.</li> </ul>	<ul style="list-style-type: none"> <li>a) Reduce the load.(See Power Load Planning &amp; Mgt. section of this manual.)</li> <li>b) Clean or replace air filter.</li> <li>c) Drain fuel and refuel.</li> <li>d) Clean or replace filter.</li> <li>e) Clean or replace carburetor.</li> <li>f) Replace ignition switch.</li> <li>g) Check and adjust valve clearance.</li> <li>h) Clean screen or replace spark arrester.</li> </ul>
Engine shuts down during operation.	<ul style="list-style-type: none"> <li>a) Out of fuel.</li> <li>b) Low oil level.</li> </ul>	<ul style="list-style-type: none"> <li>a) Fill fuel tank.</li> <li>b) Fill crankcase to proper oil level.</li> </ul>

## Summary of Important Safety Information for Operation

This section provides a summary of the various safety procedures and measures that have been presented throughout the manual. Keep this summary handy and refer to it to refresh your memory about how to safely use your generator.

### WARNING

Carefully read and make sure you understand the following safety information before using the generator. Improper use or maintenance of the generator can result in **serious injury or death** from **carbon monoxide poisoning, electric shock, fire/explosion, or burns**.

### General

- **Read manual.** Read this Owner's Manual and the engine Owner's Manual completely before attempting to set-up and use the generator. Serious injury or death can result if safety instructions are not followed.
- **Instruct operators.** The generator owner must instruct all operators in safe generator set-up and operation. DO NOT allow anyone to operate the generator who has not read the Owner's Manual and been instructed on its safe use.
- **Adults only.** Only trained adults should set up and operate the generator. DO NOT let children operate.
- **Under the influence.** Never operate, or let anyone else operate, the generator while under the influence of alcohol, drugs, or medication.
- **Intended use.** Carefully read about and understand the intended use of this generator. DO NOT use for other purposes, as unforeseen hazards or equipment damage may result.

### Prohibition Against Modifications

Never modify or alter the generator in any way. Modifications can create serious safety hazards and will also void the warranty.

- **Engine speed.** Never attempt to modify the engine speed setting. The engine speed is preset at 3600 RPM for safe and optimal performance of the generator. If speed needs adjusting, it must be done by factory-authorized personnel.
- **Fuel/exhaust system.** Never modify the exhaust system, fuel tanks, or fuel lines. Carbon monoxide poisoning, fire, or explosion could result.
- **Guards.** DO NOT operate generator unless all guards and cover shields, which prevent access to moving parts and pinch points, are in place. Failure to guard the power transmission mechanisms **may result in serious injury or death**.

### Safety – Installation & Set-up

#### Installation / Initial Set-up Safety

- **Dry, level surface.** Situate generator on a dry, firm, level surface. Ensure generator sits level and will not slide or shift during operation. Block wheels if applicable.
- **Operate OUTSIDE only – dangerous carbon monoxide exhaust!** Generators give off carbon monoxide exhaust, a poisonous gas that can kill. You CANNOT smell it, see it, or taste it. ONLY run generator OUTDOORS and away from building air intakes. NEVER run generator inside homes, garages, sheds, or other semi-enclosed spaces. These spaces can trap poisonous gases, EVEN if you run a fan or open windows. Carbon monoxide is given off whether you are using gasoline, natural gas, or propane to power the generator.
- **No vehicle/marine use.** This generator is NOT designed or approved for use in vehicles or marine applications. Never run the generator inside RVs or other vehicles, on boats, or on pick-up truck beds.
- **Cooling ventilation.** The generator needs adequate, unobstructed flow of air to allow for proper cooling of engine and generator head. Situate so there is adequate clearance around generator to allow for cooling airflow. DO NOT allow debris to accumulate and block airflow.
- **Grounding.** Always ensure generator is properly grounded to prevent electrical shock. This generator is equipped with a grounding post. Always complete the grounding path from the generator to a copper pipe/rod driven into moist earth to a sufficient depth. Check with an electrician for local grounding requirements. If a licensed electrician installs the generator with a connection to your building's electrical circuit for use as a standby power system, grounding will be complete through the building's grounding system.
- **Isolate connection to building's electrical circuit.** Never plug the generator directly into a wall outlet. ANY connection to a building's electrical system MUST ISOLATE THE GENERATOR FROM UTILITY POWER via an UL-listed transfer

## Summary of Important Safety Information for Operation (cont'd)

switch installed by a licensed electrician in compliance with all applicable local building and electrical codes. If the generator is not isolated from the utility power system by such means, generator output will back feed into the utility power grid. This may result in injury or death to utility power workers or others who contact the lines during a power outage. It may also cause the generator to explode or cause fires when utility power is restored.

- **Wet conditions.** Water conducts electricity. DO NOT operate generator where it is wet. Operate on a dry surface under an open, canopy-like structure.
- **CO alarms.** Ensure that working, battery-operated or battery back-up carbon monoxide alarms are used in any dwelling/structure that is in close proximity to the running generator.
- **Hot exhaust - fires.** Exhaust from engine can be extremely hot and cause fire. Position muffler at least 7 feet from combustible objects during operation.
- **Spark arrester.** Equip engine with a spark arrester if generator will be used near any ignitable forest, brush, or grassy land. See the "Specifications" section of this manual to determine if your generator is already equipped. Make sure you comply with applicable local, state and federal codes.
- **Fire extinguisher.** Keep a fire extinguisher rated "ABC" by the National Fire Protection Association nearby. Keep it properly charged and be familiar with its use.

### Safety – Before Use

#### Know how to operate

- **Review safety rules.** Before each use of this generator, review the "Rules for Safe Operation." Failure to follow these rules may result in serious injury or death.
- **Know how to operate.** Be thoroughly familiar with all controls and with the proper use of the equipment. Know how to stop the generator quickly if needed.

#### Personal protective equipment

- **Hearing protection.** The use of ear plugs or other hearing protection device is recommended for those in close proximity to the generator while it is operating.
- **Loose / dangling.** Loose or dangling apparel can become entangled in moving parts. Metal jewelry can conduct electricity. Never wear jewelry or loose-fitting clothing when operating the generator.

#### Gasoline Safety

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel. Use extreme care when handling:

- **Fuel outdoors.** Fill fuel tank outdoors – never indoors. Gasoline vapors can ignite if they collect inside an enclosure. Explosion can result.
- **Use approved container.** Never pump fuel directly into engine at gas station. Static charge can build and ignite fuel. Use an UL approved fuel container to transfer gas to the engine.
- **Running / hot engine.** A running engine is hot enough to ignite fuel. Never add fuel or remove gas cap if engine is running or still hot. Stop the engine and allow to cool at least two minutes before adding fuel.
- **Heat / flames / sparks.** Stay away from sources of heat, flame, or sparks while adding fuel.
- **Don't overfill.** DO NOT overfill the gas tank. Allow at least 1/2 inch of empty space below the fill neck to allow for fuel expansion.
- **Replace cap.** Replace gas cap securely before starting engine.
- **Spills.** Clean up fuel spills immediately. Move generator away from spilled fuel on the ground. Wipe fuel off engine and wait 5 minutes for excess fuel to evaporate before starting engine. Gas soaked rags should be disposed of properly.
- **On skin / clothes.** If gasoline is spilled on your skin or clothes, change clothes and wash skin immediately.
- **Inspect fuel system.** Check fuel system on a regular basis. Look for signs of leaks, deterioration, chafed or spongy fuel hose, loose or missing fuel hose clamps, damaged fuel tank, or a defective fuel shut-off valve. DO NOT start generator until needed repairs have been completed.
- **Gasoline storage.** Store gasoline in a cool, dry place in an UL-listed, tightly sealed container.

## Summary of Important Safety Information for Operation (cont'd)

### Safety – During Use

- **Safety equipment / controls.** Always operate the generator with all safety covers, guards, and barriers in place and in good working order, and all controls properly adjusted for safe operation.
- **Know how to stop.** Be thoroughly familiar with proper use of the equipment and all generator controls, output receptacles, and connections. Know how to stop the generator quickly if needed.
- **Damaged.** DO NOT operate the generator with damaged, missing, or broken parts.
- **Carbon monoxide exhaust.** The running engine gives off carbon monoxide, a poisonous gas that can kill you. You CANNOT smell it, see it, or taste it. If you start to feel sick, dizzy, or weak while using the generator, shut off the engine and get to fresh air RIGHT AWAY. See a doctor. You may have carbon monoxide poisoning.
- **Smoking/sparks.** Never smoke near the running generator, and never operate near sources of sparks or flames.
- **Check output voltage.** Check output voltage to ensure the generator is working properly before connecting loads to the generator. Failure to do so could result in damage to equipment powered by the generator and possible injury to the individual. DO NOT adjust output speed of engine to change voltage. If voltage is not within specified range, have generator repaired by factory-authorized personnel.
- **Stabilize before connecting loads.** Start generator and let engine stabilize before connecting electrical loads.
- **DO NOT overload.** DO NOT overload the generator. Make sure that combined starting and running loads do not exceed rated capacity of generator or damage will result.
- **Protect sensitive electronics.** Some electronic equipment, such as computers and audio/video equipment, can be damaged by small fluctuations in the flow of power. Use a surge suppressor for any voltage-sensitive electronic equipment you will be powering with the generator.
- **Wet conditions.** DO NOT operate the generator or handle any electrical equipment while standing in water, while barefoot, while hands are wet or while in the rain or snow. Electric shock may result.
- **Ground fault circuit interrupter.** Always use a ground fault circuit interrupter (GFCI) protected extension cord (or outlet, if generator is equipped) in damp or highly electrically conductive areas and on construction jobsites to prevent electrical shock.
- **Electrical cords.** Use only UL-listed, outdoor-rated, three prong extension cords of the proper size. All extension and appliance cords must be in good condition and not worn, bare, frayed, or otherwise damaged. Use of inadequate or damaged electric cords can cause electric shock or fire.
- **Avoid contact.** Avoid contact with bare wires, terminals, connections, etc. while the unit is running.
- **Electric shock accident.** If an electric shock accident occurs, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. Avoid direct contact with victim. Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. Apply first aid and get immediate medical help.
- **Hot muffler.** Never touch hot muffler, hot exhaust manifold, or engine cooling fins. Exhaust and engine parts can be very hot and will burn you.
- **Moving parts.** Keep hands, feet, and apparel away from drive belts, fans, and other moving parts. Never remove any drive belt or fan guard while the unit is operating.
- **Refueling.** DO NOT refuel the engine until it has cooled at least two minutes.
- **Malfunction during operation.** Immediately turn off the generator if any of the following conditions arise during operation:
  - Excessive change in engine speed, slow or fast
  - Overheating in load connecting devices
  - Sparking or arcs from generator
  - Loss of electrical output
  - Receptacle damage
  - Engine misfire
  - Excessive vibration
  - Flame or smoke
  - Abnormal noise
- **Adjusting / repairing.** Always turn off generator and remove spark plug(s) or spark plug wire(s) before working on the generator to prevent accidental starting.

## Summary of Important Safety Information for Operation (cont'd)

### Safety – After use

- **Cool engine before storing.** Let engine cool for at least five minutes before storing. A hot engine can be a fire hazard.
- **Shut off fuel supply.** Make sure gasoline shut-off valve is in the OFF position.
- **Prevent accidental starting.** When generator is not in use, remove spark plug wire in order to ensure that generator cannot be started in a storage location or by untrained persons.
- **Storage location.** Store the generator in a dry location away from sources of heat, open flames, sparks or pilot lights – such as water heaters, space heaters, furnaces, clothes dryers, or other gas appliances – EVEN IF the generator's gas tank is empty. Residual gasoline could ignite.
- **Exercise regularly.** Exercise generator every four weeks to dry out moisture that accumulates in the windings. If generator cannot be exercised on a regular basis, prepare generator for long term storage.
- **Periodic maintenance.** Perform periodic maintenance as directed in this manual to keep the generator in safe working condition.

### Safety - Inspection/Maintenance

Inspect and maintain your generator on a regular basis and repair as needed to keep it in safe working condition:

- **Turn off generator.** Always turn off generator and remove spark plug(s) or spark plug wire(s) before working on the engine or generator to prevent accidental starting.
- **Discharge capacitor.** When the generator is shut down, the capacitor may maintain a charge. Always discharge the capacitor before working on the generator head to prevent electrical shock.
- **Replace guards / shields.** Make sure all guards and shields are replaced after servicing the generator.
- **Replacement parts.** If a part needs replacement, only use parts that meet the manufacturer's specifications. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the generator and will void the warranty.

# Engine

## ⚠ WARNING

BEFORE operating the engine, be sure to read this section of the manual, otherwise injury to personnel or damage to equipment may occur.

### Engine starting components

1. Fuel Valve

When the fuel valve is in the ON position, fuel is allowed to flow from the fuel tank to the carburetor. Be sure to return the fuel valve to the OFF position after stopping the engine.



2. Choke Lever

The choke is used to provide an enriched fuel mixture when starting a cold engine. It can be opened and closed by operating the choke lever manually. Move choke lever to the left toward CLOSED to enrich the mixture for cold starting.

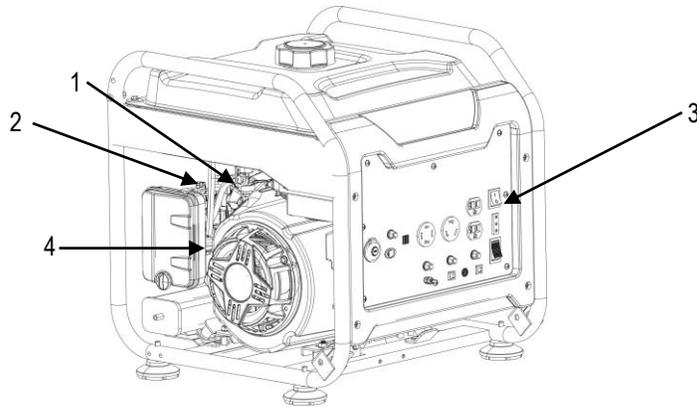


3. Engine Switch/Engine Key Switch (Electric Start Models Only)

Turn the switch ON, and pull recoil or turn engine switch to START (for electric start models) to run the engine. To stop the engine, turn the switch OFF.

4. Recoil

To start the engine, pull the starter rope lightly until resistance is felt, then pull briskly.



Displacement	224cc
Starting Type	Recoil
Ignition Type	Transistorized Magneto Ignition
Lubricating Type	Splash
Model	224cc
Spark Plug Gap	0.7~0.8mm (0.028~0.03in)
Spark Plug Torque	20-30N.m
Intake Valve Clearance	0.08~0.12mm (0.003~0.005in)
Exhaust Valve Clearance	0.13~0.17mm (0.005~0.007in)

### ⚠ WARNING:

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 manual.

## Engine (cont'd)

Maintenance schedule	REGULAR SERVICE PERIOD	Before each use	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		○		○	
	Air filter	Check	○				
		Clean			○(1)		
		Replace					○
	Fuel Valve Sediment cup	Clean				○	
	Spark plug	Check-adjust				○	
		Replace					○
	Spark arrester	Clean				○	
	Idle speed	Check-adjust					○(2)
	Valve clearance	Check-adjust					○(2)
	Cylinder head	Clean	After every 500Hrs. (2)				
	Fuel tank and filter	Clean	Every 2 years (Replace if necessary) (2)				
Fuel tube	Check	Every 2 years (Replace if necessary) (2)					
	(1) Service more frequently when used in dusty areas. (2) These items should be serviced by an authorized generator service center, unless the owner has the proper tools and is mechanically proficient.						
Engine oil recommendations	<p><b>CAUTION: Engine damage</b>                      The generator has been shipped WITHOUT oil. Any attempt to start generator without oil may result in engine damage and failure.</p> <ul style="list-style-type: none"> <li>• Engine oil is a key factor in deciding the engine's performance. DO NOT use engine oil with additives or 2-stroke gasoline oil, as they do not lubricate properly, which may shorten the engine's service life.</li> <li>• Check the engine oil level with the generator stopped on a level ground.</li> <li>• Due to viscosity variances with regions and temperatures select the correct type of oil using the chart below.</li> </ul> <p>Engine oil recommended: SAE10W-30</p> <div style="text-align: center;"> <p>The chart shows three oil grades with their recommended temperature ranges:</p> <ul style="list-style-type: none"> <li><b>SAE 5W-30:</b> Recommended for ambient temperatures from -30°C to 0°C.</li> <li><b>SAE 10W-30:</b> Recommended for ambient temperatures from -20°C to 30°C.</li> <li><b>SAE 30:</b> Recommended for ambient temperatures from 10°C to 40°C.</li> </ul> </div>						

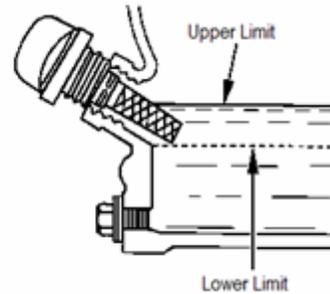
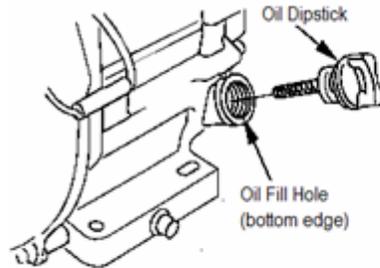
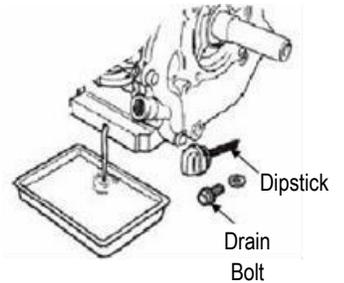
## Engine (cont'd)

### Oil draining and checking oil level

**⚠ WARNING: Burn hazard**

Never open oil port while engine is running. Hot oil can spray over face and body.

1. Operate the generator for 3 to 5 minutes to thin oil for easier draining.
2. Ensure that the engine is stopped and on a level surface.
3. Remove the drain bolt and washer; drain the oil into an approved container.

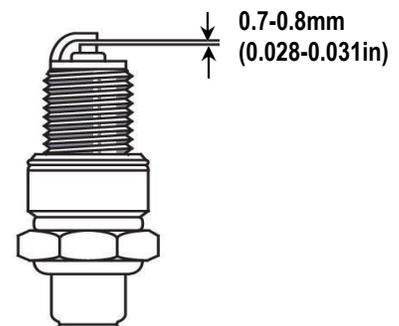
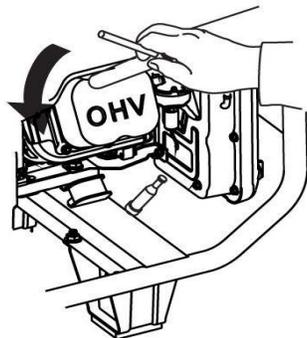


4. Reinstall washer and drain bolt.
5. Remove the dipstick and clean it.
6. Fill crankcase with oil to the bottom lip of the oil filler neck.
7. Reinsert the dipstick into the oil filler without threading in, and check oil level. If the oil level is too low, add recommended engine oil to the oil filler neck.
8. Reinstall the dipstick.

### Spark plug removal, cleaning and replacement

Proper spark plug clearance ensures the engine's normal running.

- a) Remove the spark plug cap.
- b) Remove the spark plug using the supplied spark plug wrench.



**⚠ WARNING**

**Be careful not to touch the muffler during or just after the engine has been running.**

- c) Clean the spark plug with a steel brush. If the insulator is damaged, replace the spark plug.
- d) Measure the spark plug clearance with a feeler. The clearance should be 0.7-0.8mm. If adjustment is necessary, bend the side electrode carefully.
- e) Check if the spark plug gasket is in good conditions, or replace with a new one. Screw on the spark plug to the bottom first by hand and then tighten it up by a spark plug wrench. If a new spark plug is used, twist 1/2 more turns after impacting the gasket; if reinstall the original one, just twist 1/8-1/4 more turns.

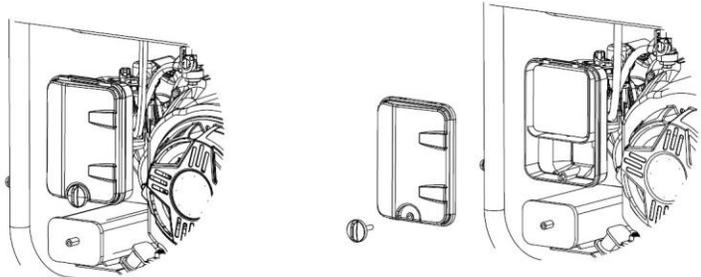
## Engine (cont'd)

### Clean air filter

#### **▲ WARNING**

**Never run the generator without the air filter. Rapid engine wear will result.**

1. Unsnap or unscrew the air cleaner cover clips, remove the air cleaner cover, and remove the element.
2. Wash the air cleaner element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flashpoint solvent. Allow the air cleaner element to dry thoroughly.
3. Soak the air cleaner element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial startup if too much oil is left in the air cleaner element.
4. Reinstall the air cleaner element and the cover.

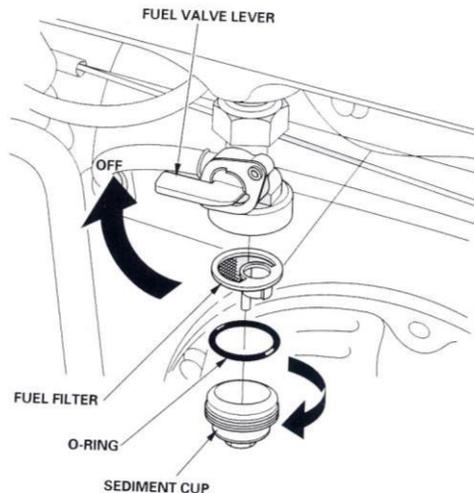


*Note:* Do not use pressurized air or solvents to clean the filter. Pressurized air can damage the filter and solvents will dissolve the filter.

### Clean fuel valve sediment cup

The sediment cup prevents dirt or water which may be in the fuel tank from entering the carburetor. If the engine has not been run for a long time, the sediment cup should be cleaned.

1. Close the fuel valve and remove the sediment cup.
2. Remove the O-ring and filter from the sediment cup.
3. Clean the sediment cup, O-ring, and filter in nonflammable or high flash point solvent.
4. Reinstall the filter, O-ring, and sediment cup.
5. Open the fuel valve and inspect for any leakage.



## Engine (cont'd)

### Prepare engine for long term storage if needed

**If you will not be able to exercise the generator regularly, you must prepare the engine for long term storage** to prevent gum deposits from forming and causing malfunction of the engine.

Prepare engine for long term storage by:

**Removing all gasoline** from the tank and carburetor.

Draining steps:

1. Position a UL approved fuel container below the carburetor drain bolt.
2. Turn fuel valve to the OFF position.
3. Remove the drain bolt and gasket.
4. Turn fuel valve to the ON position and drain fuel from carburetor and tank.
5. Reinstall and tighten the drain bolt and gasket.

### OR

**Adding fuel stabilizer** to the gasoline (following manufacturer's instructions).

Fuel stabilizer steps:

1. Ensure gasoline tank is full.
2. Add fuel stabilizer to fuel tank.
3. Run engine at least 10 minutes after adding stabilizer to allow it to enter the fuel system.
4. Shut off engine.
5. Disconnect spark plug wire and remove spark plug using provided spark plug wrench.
6. Add one teaspoon oil through spark plug hole.
7. Place rag over spark plug hole and turn starter (or pull the recoil) a few times to lubricate the combustion chamber.
8. Replace spark plug, but do NOT reconnect the spark plug wire.

### Removal from storage

**WARNING**  
**Gasoline is highly flammable and explosive, and you can be burned or seriously injured when handling fuel.**

Storage time	Service item
Within one month	Use
One-two months	Drain original fuel and refuel.
Two months - one year	Drain original fuel and refuel; Empty and clean the fuel valve sediment cup. Empty and clean the carburetor bowl.
One year or longer	Drain original fuel and refuel; Empty and clean the fuel valve sediment cup; Empty and clean the carburetor bowl.

Draining fuel:

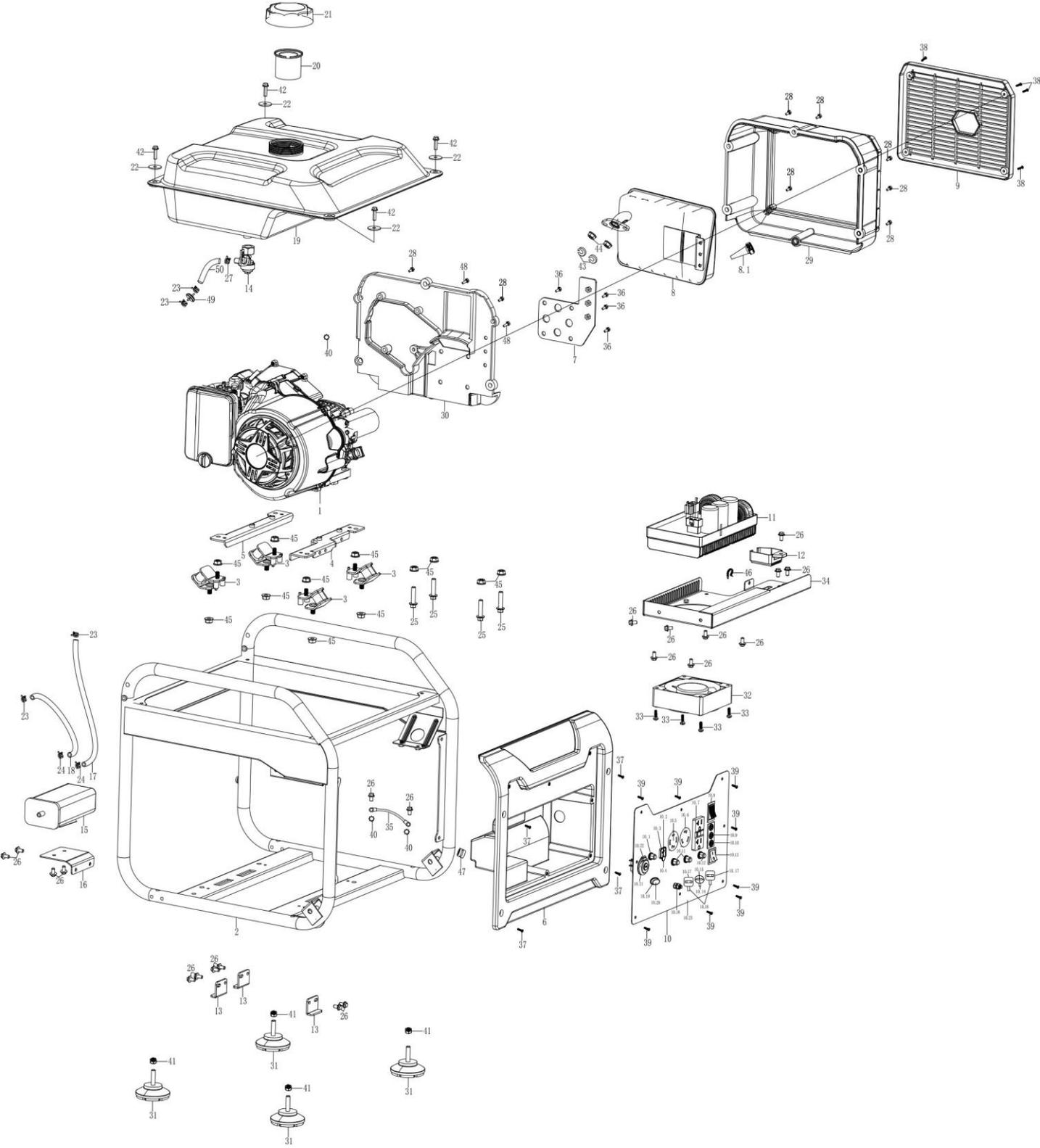
1. Turn the fuel valve to the OFF position.
2. Place a UL approved container below the carburetor; use a funnel to avoid spillage.
3. Remove the carburetor drain bolt and gasket.
4. Turn the fuel valve to the ON position to drain fuel into a UL approved container.
5. Reinstall and tighten the drain bolt and gasket.

## Engine (cont'd)

### High Altitude Operation

**CAUTION:** Operating at an altitude of greater than 2000 feet (610 meters) may affect your engines performance, fuel consumption, and emissions. To remain emissions compliant and improve engine performance at higher altitudes, a high-altitude kit is required. A high altitude kit includes a carburetor jet resized to help correct air / fuel mixture at altitude. To order a high altitude kit or if you have additional questions, go to [www.northerntool.com](http://www.northerntool.com) or contact us at 1-866-443-2576 – Powerhorse. Please note, engines with the high-altitude kit installed operated at lower altitudes could cause severe engine damage and affect emissions compliance. When modified, a tag or decal should be added to the product stating that a high-altitude kit was installed and to remind you to re-service the carburetor (re-jet) when operating in lower altitude environments.

# 83171 Parts Explosion Rev – A.1

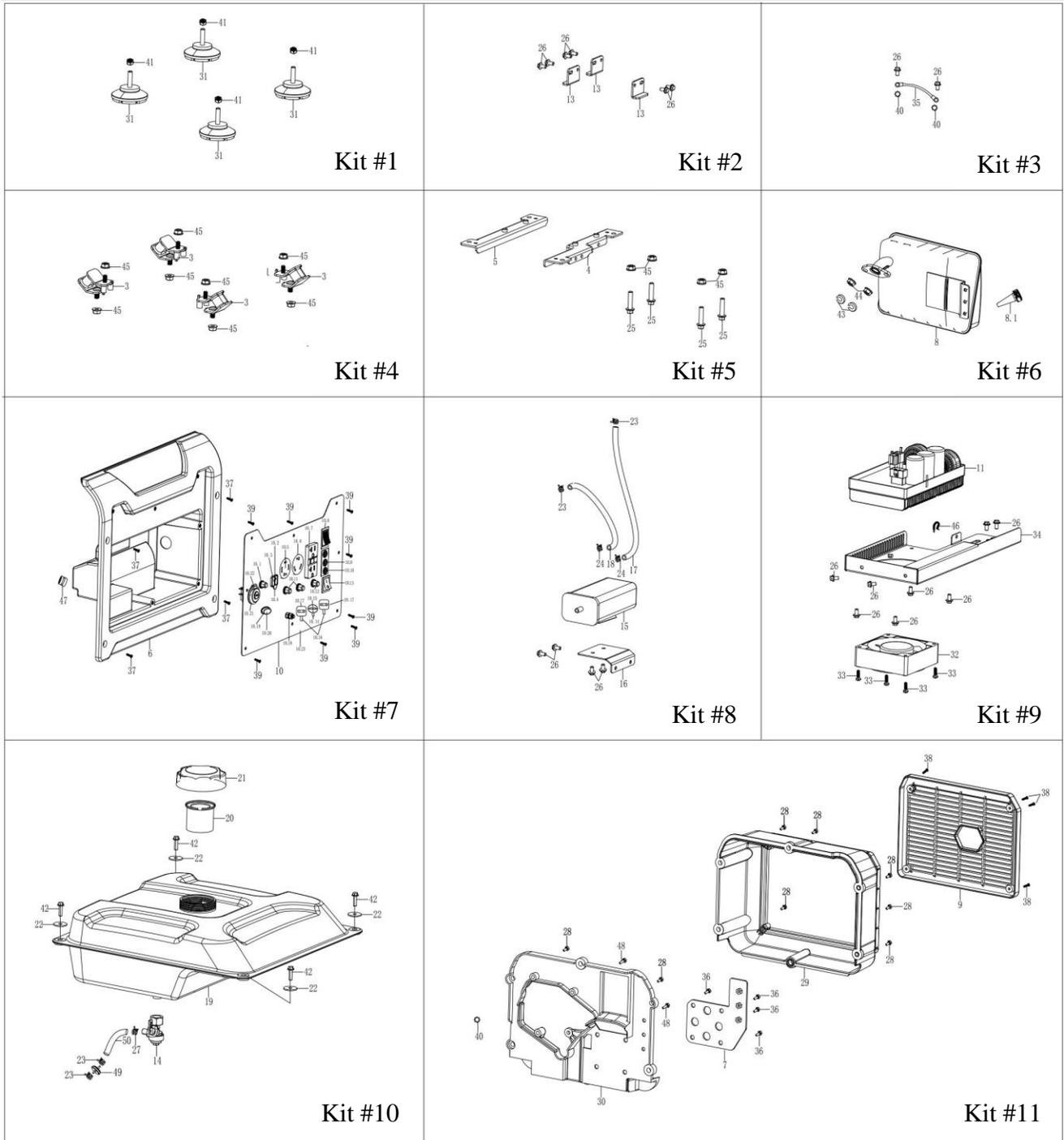


# 83171 Parts Explosion Rev – A.1

REF#	PART #	DESCRIPTION	QTY
1	801928	ENGINE DH225	1
2	801929	FRAME	1
3	Kit #4	ISOLATION MOUNTING	4
4	Kit #5	BASE BOARD	1
5	Kit #5	BASE BOARD	1
6	Kit #7	BACK CONTROL PANEL	1
7	Kit #11	MUFFLER CONNECTING BOARD	1
8	801930, Kit #6	MUFFLER	1
8.1	801931, Kit #6	SPARK ARRESTER	1
9	Kit #11	MUFFLER SHROUND COVER	1
10	Kit #7	CONTROL PANEL ASSEMBLY	1
10.1	801932	THERMAL PROTECTOR	1
10.2	801933	USB	1
10.3	801934	USB DUST COVER	1
10.4	801935	USB PROTECTIVE COVER	1
10.5	795707	RECEPTACLE – NEMA L14-30R	1
10.6	795751	RECEPTACLE – NEMA L5-30R	1
10.7	795696	RECEPTACLE – NEMA 5-20R	1
10.8	801936	ENGINE SWITCH	1
10.9	801937	LED LIGHTS	1
10.10	800887	LED COVER	1
10.11	800838	THERMAL PROTECTOR	2
10.12	800844	THERMAL PROTECTOR	1
10.13	801938	VOLTAGE SWITCH	1
10.14	801939	GRID SOCKET	1
10.15	801942	DUST COVER	1
10.16	801941	GRID SOCKET	2
10.17	801942	DUST COVER	2
10.18	801943	GROUNDING BOLT	1
10.19	801944	ESC SWITCH	1
10.20	801945	WATERPROOF COVER	1
10.21	795703	IGNITOR	1
10.22	801946	IGNITOR COVER	1
10.23	801947	PANEL BODY	1
11	Kit #9	INVERTER MODULE	1
12	801948	DC STABILIZER	1
13	Kit #2	HOOK	3

REF#	PART #	DESCRIPTION	QTY
14	795690, Kit #10	FUEL VALVE	1
15	Kit #8	CARBON TANK	1
16	Kit #8	CARBON BRACKET	1
17	Kit #8	HOSE, CARBON& AIR FILTER	1
18	Kit #8	HOSE, CARBON& AIR FILTER	1
19	Kit #10	FUEL TANK	1
20	801949, Kit #10	FILTER	1
21	801950, Kit #10	FUEL CAP	1
22	Kit #10	FUEL GASKET	4
23	Kit #8, Kit #10	FUEL HOSE CLIP φ8.5	4
24	Kit #8	FUEL HOSE CLIP φ12	2
25	Kit #5	BOLT M8*35	4
26	801792, Kit #2, #3, #8, #9	BOLT M6*12	21
27	Kit #10	FUEL HOSE CLIP φ7.5	1
28	Kit #11	BOLT M6*20	9
29	Kit #11	FRONT COVER, MUFFLER	1
30	Kit #11	BACK COVER, MUFFLER	1
31	Kit #1	FOOT WASHER	4
32	Kit #9	FAN	1
33	Kit #9	PAN HEAD SCREW	4
34	Kit #9	INV. MODULE BRACKET	1
35	Kit #3	GROUNDING WIRE	1
36	Kit #11	BOLT M6*16	5
37	Kit #7	PAN HEAD SCREW M 6*16	4
38	Kit #11	TAPPING SCREW ST5*16	4
39	Kit #7	PAN HEAD SCREW M 5*12	8
40	Kit #3, Kit #11	TOOTH WASHER	3
41	Kit #1	NUT M8	4
42	Kit #10	BOLT M6*25	4
43	Kit #6	WASHER φ8	2
44	Kit #6	NUT M8	2
45	Kit #4, Kit #5	NUT M8	12
46	Kit #9	R SHAPE CLIP	1
47	Kit #7	RUBBER PROTECTIVE COVER	1
48	Kit #11	BOLT M6*25	2
49	797265, Kit #10	FILTER	1
50	Kit #10	FUEL HOSE	1

# 83171 Parts Explosion Rev – A.1



KIT REF #	KIT PART #	DESCRIPTION	QTY
1	801917	Rubber Foot Kit	1
2	801918	Vibration Limiter Kit	1
3	801919	Ground Wire Kit	1
4	801920	Vibration Isolation Kit	1
5	801921	Engine Bracket/Bolt Kit	1
6	801922	Muffler Kit (includes Gasket and Exhaust Studs, not pictured)	1
7	801923	Control Panel Kit	1
8	801924	Carbon Canister Kit	1
9	801925	Invertor Kit	1
10	801926	Fuel Tank Kit	1
11	801927	Muffler Housing Kit	1

# 801928 Engine Parts Explosion Rev – A.1

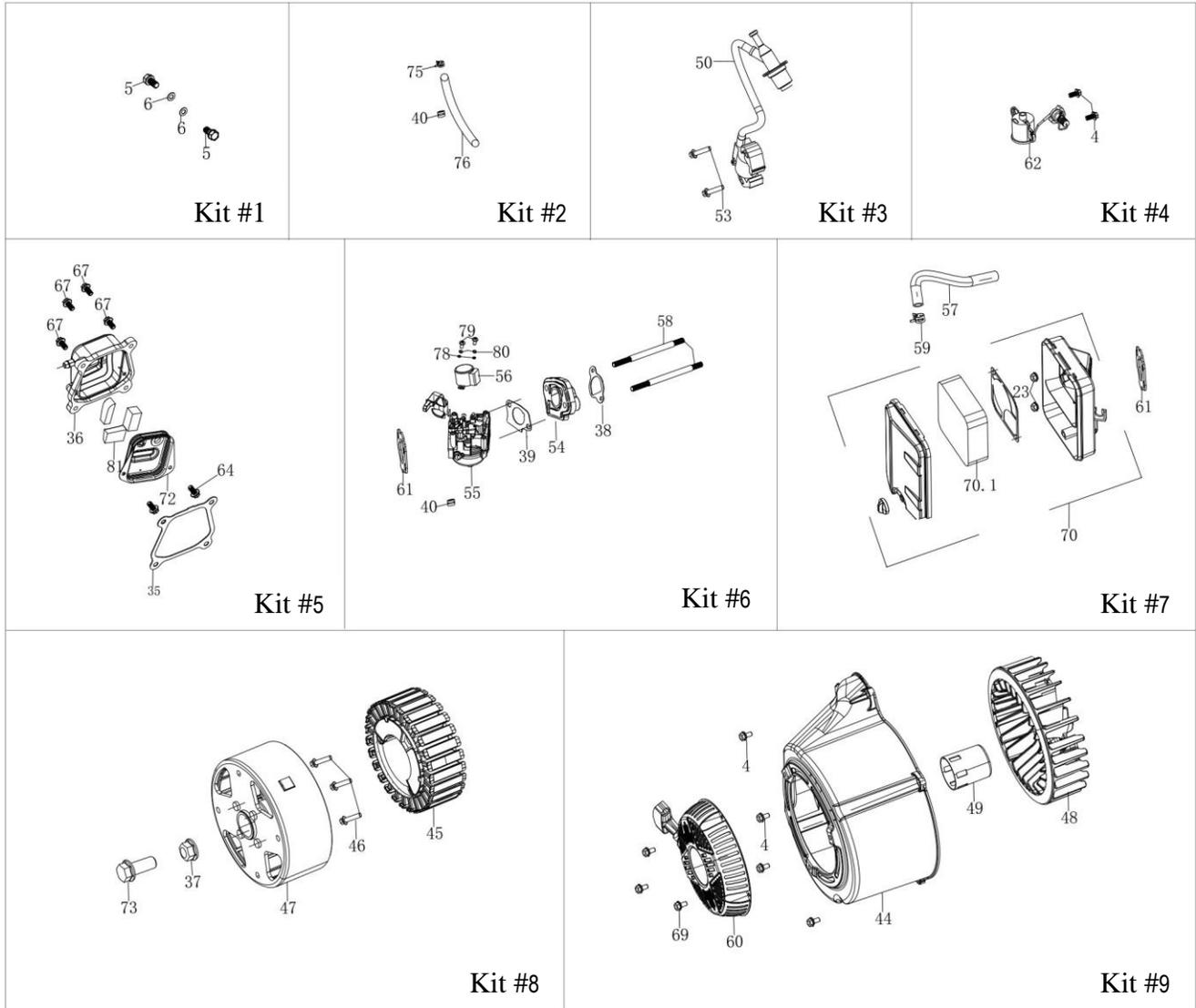


## 801928 Engine Parts Explosion Rev – A.1

REF#	PART #	DESCRIPTION	QTY
1	N/A	CRANKCASE	1
2	N/A	BALL BEARING	2
3	801900, Kit #10	OIL SEAL	1
4	Kit #4, Kit #9	BOLT, M6X16	4
5	Kit #1	BOLT, DRAIN PLUG	2
6	Kit #1	WASHER, DRAIN PLUG	2
7	N/A	DOWEL PIN, CASE COVER	2
8	N/A	PISTON	1
9	N/A	SCRAPER RING SET, PISTON	1
10	N/A	ROD, CONNECTING	1
11	N/A	PIN, PISTON	1
12	N/A	CLIP, PISTON	2
13	N/A	COVER ASSEM, CRANKCASE	1
14	801901	DIPSTICK	1
15	N/A	VALVE, IN	1
16	N/A	VALVE EXHAUST	1
17	N/A	RETURNER, INTAKE VALVE	1
18	N/A	SPRING, VALVE	2
19	N/A	SEAT, VALVE SPRING, IN	1
20	N/A	SEAT, VALVE SPRING, EX	1
21	N/A	ROTATOR	1
22	N/A	BOLT, STUD	2
23	Kit #7	NUT, M6	2
24	N/A	CRANKSHAFT ASSEMBLY	1
25	N/A	LIFTER, VALVE	2
26	Kit #10	PACKING, CASE COVER	1
27	801902	CAMSHAFT ASSEMBLY	1
28	N/A	PIN, DOWEL	2
29	801903	BOLT, M8X30	6
30	Kit #10	GASKET, CYLINDER HEAD	1
31	801904	BOLT, M8X60	4
32	801905	SPARK PULG	1
33	N/A	ROD, PUSH	2
34	801792	BOLT, M6X12	9
35	Kit #5, Kit #10	PACKING, HEADCOVER	1
36	Kit #5	COVER COMP, CYL. HEAD	1
37	801906, Kit #8	NUT	1
38	Kit #6, Kit #10	PACKING, INTAKE	1
39	Kit #6, Kit #10	PACKING, CARBURETOR	1
40	Kit #6, #2	RUBBER SLEEVE FOR FUEL	1
41	Kit #10	EXHAUST GASKET	1
42	801907	ROCKER ASSY	2
43	N/A	ADJUSTER ROCKER ARM	2

REF#	PART #	DESCRIPTION	QTY
44	Kit #9	RECOIL STARTER	1
45	801909, Kit #8	ROTOR	1
46	801910, Kit #8	BOLT, M6X60	3
47	801911, Kit #8	STATOR	1
48	Kit #9	FAN, RECOIL STARTER	1
49	Kit #9	PULLEY, STARTER	1
50	Kit #3	IGNITION COIL	1
51	N/A	UNDER THE WIND	1
52	N/A	SHROUD	1
53	Kit #3	BOLT, M6X30	2
54	Kit #6	INSULATOR, CARB	1
55	Kit #6	CARBURETOR	1
56	Kit #6	STEPPER MOTOR	1
57	Kit #7	TUBE, BREATHER	1
58	Kit #6	BOLT, STUD	2
59	Kit #7	CLIP, FUEL LINE	1
60	801912, Kit #9	STARTER	1
61	Kit #6, Kit #7, Kit #9, Kit #10	SPACER, CARB	1
62	Kit #4	SWITCH ASSEM, OIL	1
63	N/A	PLATE, PUSH ROD	1
64	Kit #5	BOLT, M5X12	2
65	N/A	BOTTOM PLATE	1
66	N/A	CYLINDER HEAD	1
67	Kit #5	BOLT, M6X25	4
68	N/A	WIND DEFLECTOR	1
69	Kit #9	BOLT, M6X8	3
70	Kit #7	AIR CLEANER	1
70.1	801914	FOAM ELEMENT	1
71	N/A	CLIP, FUEL LINE	2
72	Kit #5	CYLINDER HEAD	1
73	801915, Kit #8	BOLT	1
74	801916	OIL PLUG	1
75	Kit #2	CLIP, FUEL LINE $\phi$ 7.5	1
76	Kit #2	FUEL LINE	1
77	N/A	BOLT, M6X20	1
78	Kit #6	FLAT WASHER	2
79	Kit #6	BOLT, M3X8	2
80	Kit #6	SPRING WASHER	2
81	Kit #5	POLYURETHANE	3
82	N/A	CLIP	1
83	N/A	CLIP, WIRE HARNESS	2
84	N/A	CLIP, WIRE HARNESS	1

# 801928 Engine Parts Kits Rev – A.1



KIT REF #	KIT PART #	DESCRIPTION	QTY
1	801891	OIL DRAIN PLUG KIT	1
2	801960	FUEL LINE KIT	1
3	801892	IGNITION COIL KIT	1
4	801893	OIL LEVEL SWITCH KIT	1
5	801894	VALVE COVER KIT	1
6	801895	CARBURATOR KIT	1
7	801896	AIR CLEANER KIT	1
8	801897	ROTOR/STATOR KIT	1
9	801898	RECOIL/HOUSING KIT	1
10	801899	GASKET KIT (NOT SHOWN)	1

# Limited Warranty

Dear Valued Customer:

The Powerhorse Product you just purchased is built with the finest material and craftsmanship. Use this product properly and enjoy the benefits from its high performance. By purchasing a Powerhorse product, you show a desire for quality and durability. Like all mechanical equipment this unit requires a due amount of care. Treat this unit like the high quality piece of machinery it is. Neglect and improper handling may impair its performance. Please thoroughly read the instructions and understand the operation before using your product. Always contact Powerhorse Product Support at 1-866-443-2576 prior to having any service or warranty work performed, as some services performed by parties other than Powerhorse approved service centers may void this warranty. This warranty is in lieu of any other warranty expressed or implied and Powerhorse assumes no other responsibility or liability outside that expressed within this warranty.

### Limited Warranty

Powerhorse shall warranty any piece of equipment manufactured, or parts of equipment manufactured, to be free from defects in material or workmanship for a period of:

<b>Powerhorse Warranty</b>		
<b>Item #</b>	<b>Consumer Warranty Period</b>	<b>Commercial Warranty Period</b>
83171	2 years from date of purchase by user	90 days from date of purchase by user

“Consumer use” means personal residential household use by a consumer. “Commercial use” means all other uses, including use for commercial, income producing or rental purposes or when purchased by a business.

This warranty applies to the original purchaser of the equipment (verification of purchase, in the form of a receipt, is the responsibility of the buyer), is non-transferable, and covers parts and labor. Parts will be replaced or repaired at no charge, except when the equipment has failed due to lack of proper maintenance. If a part is no longer available, the part may be replaced with a similar part of equal function. Any misuse, abuse, alteration or improper installation or operations will void warranty. Determining whether a part is to be replaced or repaired is the sole decision of Powerhorse. Powerhorse will not provide for replacement of complete products due to defective parts. Any costs incurred due to replacement or repair of items outside of a Powerhorse approved facility is the responsibility of the buyer and not covered under warranty. Transportation costs to and from service center is the responsibility of the customer.

In addition to the normal warranty, Powerhorse shall warrant any normal wear item from defects in material or workmanship for a period of 90 days from the date of purchase by user. Normal wear items include, but are not limited to, filter elements.

This warranty specifically excludes the following; failure of parts due to damage caused by accident, fire, flood, windstorm, acts of God, applications not approved by Powerhorse in writing, corrosion caused by chemicals, use of replacement parts which Do not conform to manufacturer’s specifications, damage to accessory parts such as starting batteries, damage related to rodent and/or insect infestation and damage caused by vandalism. Additional exclusions: loss of running time, inconvenience, loss of income, or loss of use, including any implied warranty of merchantability of fitness for a specific use. Also, Outdoor Power Equipment needs periodic parts and service to perform well, and this warranty does not cover instances when normal use has exhausted the life of a component or the engine.

This warranty does not cover any personal injury or damage to surrounding property caused by failure of any part. Repair or replacement of parts does not extend the warranty period.

The engine warranty is covered under the same terms and conditions as outlined above. Normal engine maintenance such as spark plugs, air filters, adjustments, fuel system cleaning and obstruction due to build up is not covered by this Powerhorse warranty.

Tel: 1-866-443-2576

Website: [www.northerntool.com](http://www.northerntool.com)

Please fill in the following information and have it on hand when you call in on a warranty claim.

Customer Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Powerhorse Serial Number: \_\_\_\_\_

Item Number: \_\_\_\_\_

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**⚠ WARNING:** This product can expose you to chemicals including gasoline engine exhaust, which is known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm.

For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



**POWERHORSE<sup>®</sup>**

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