

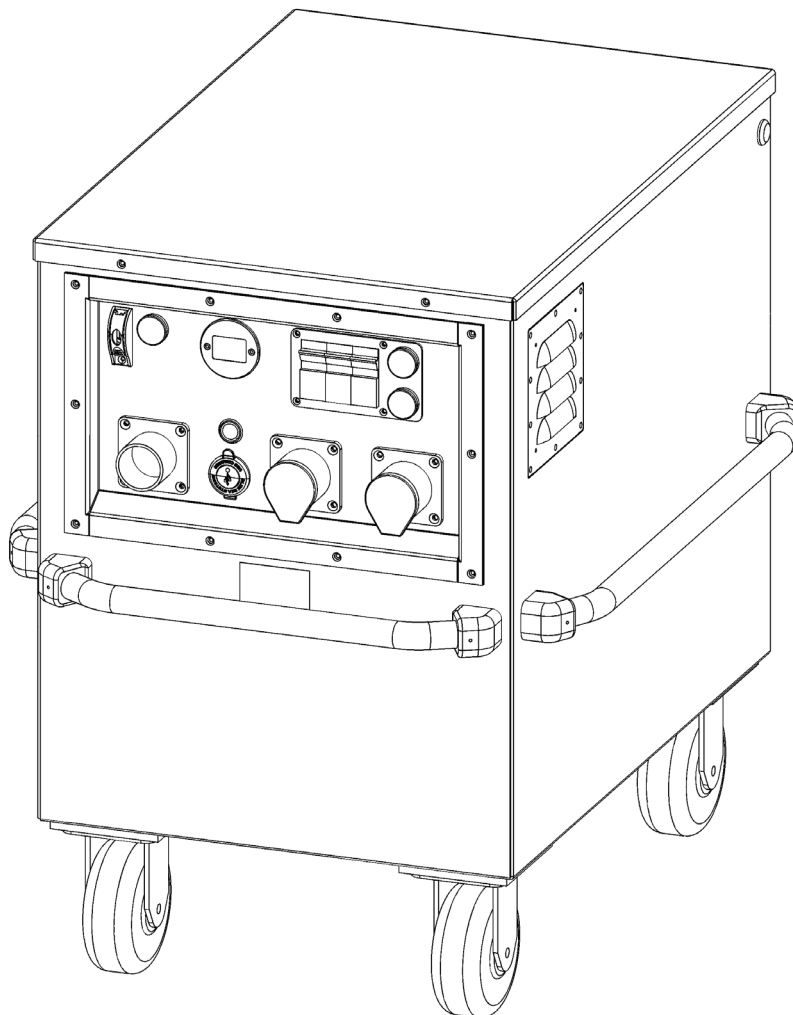
PortableElectric®

THE FUTURE OF POWER.™

OWNER'S MANUAL

VOLTstack® 5k

UK/Europe



VERSION	DATE	APPROVED	DETAILS
1.0	November 2019	JC	Initial Release

INTRODUCTION

Congratulations on your selection of a VOLTstack[®]. In using this product you are ensuring a cleaner, healthier local environment, while reducing GHG emissions that contribute to global climate change. You are proving that a gas generator is no longer the only option. We are certain you will be pleased and pleasantly surprised with your purchase of one of the finest electric generators on the market.

We want to ensure you get the best results from your new VOLTstack[®], and operate it without issue. This manual contains the information on how to use your VOLTstack[®] effectively and safely, please read it carefully.

As you read this manual, you will find information preceded by a section like this

INFORMATION

That information is intended to help you use your VOLTstack[®] to its utmost potential, and avoid damage to your unit, other property or your environment.

We are confident you will find the experience of using a VOLTstack[®] simple and enjoyable. It is the future of power; simple, silent, emissions-free and efficient.

Best wishes,

Portable Electric Ltd.

HELPFUL TIPS

Your VOLTstack DOES NOT produce any hazardous emissions or chemicals of any kind.
Congratulations on choosing a safer product for yourself, others and the environment.

WARNING

It is the operator's responsibility to read and understand all safety instructions in this Owner's Manual before operating the VOLTstack. **Failure to do so may result in serious injury or death.**

This Owner's Manual should be regarded as a permanent component of the VOLTstack and be available for reference at all times.

DANGER

This VOLTstack produces lethal voltage and may cause an electric shock or electrocution if misused.
Read and understand all safety instructions before operating.

WARNING

Do not use electrical equipment in wet or damp conditions, such as rain or snow. Doing so may result in an electrical shock that may result in serious injury or electrocution.

The information and specifications provided in this Owner's Manual were approved by Portable Electric Ltd at the time of publication. Portable Electric Ltd reserves the right to change or discontinue products at any time without notice. No content in this publication is to be reproduced without the written permission of Portable Electric Ltd.

SAFETY OVERVIEW

The safety of the operator and those around them is of absolute importance. It is the operator's responsibility to ensure the VOLTstack is used safely and responsibly.

While it is not practical to outline all possible hazardous situations, we have provided many operating procedures and precautions to allow the operator to use the VOLTstack safely with good judgment.

Safety Instruction Convention

Important safety instructions will be outlined throughout this Owner's Manual following the **DANGER** and **WARNING** convention below.

DANGER

If not avoided, this hazardous situation will result in serious injury or death.

WARNING

If not avoided, this hazardous situation may result in serious injury or death.

Operational Tips and Instruction Convention

Beyond safety, there are good practices and operating procedures that should be followed to ensure optimal performance and reliability of the unit.

Important operating procedures and helpful tips will be outlined throughout this Owner's Manual following the **IMPORTANT** and **HELPFUL TIPS** convention below.

IMPORTANT

Important information that should be considered to avoid damage to the equipment or other property.

HELPFUL TIPS

Helpful tips and best practices to ensure optimal performance.

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TERMINOLOGY

VOLTstack Power Modes

Off:

Zero power state with no AC output power

Use: *Shipping and long term storage*

Indicators: No lights ON Face Plate and Rear Plate

Standby:

DC Systems on with no AC output power

Use: *low power consumption mode, can be used for charging or between operations*

Indicators: Battery Monitor ON, Master Battery ON, ON/OFF button OFF

Power On:

All systems on with AC output

Use: *For full power output & usage*

Indicator: ON/OFF button ON, Green Output Lights ON

VOLTstack Power States

Discharging (negative Net Power):

Power State in which the net power is less than zero, and the VOLTstack State of Charge is decreasing

Charging (positive Net Power):

Power State in which the net power is greater than zero, and the VOLTstack State of Charge is increasing

Idle (zero Net Power):

Power State in which the net power is zero and the State of Charge is decreasing according to the self consumption of the VOLTstack Power Mode.

Amp Hour (Ah)

Amp hour is a unit of measurement for electrical capacity commonly used for battery storage devices. One amp hour is equivalent to one amp being used continuously over a 1 hour period.

Battery Management System (BMS)

Battery Management System is an integrated controller that monitors and protects a Battery Pack from harmful conditions such as short circuits, over charging, over discharging and temperature effects.

Battery Pack

A Battery Pack consists of a fixed number of battery cells combined in series and/or parallel to form a higher voltage and capacity battery. The cells are assembled into a protective enclosure with an integrated Battery Management System.

Face Plate

The Face Plate is located at the front of the VOLTstack. It serves as the user interface and contains all charging and output controls. See the Component Identification and Location section for details.

KiloWatt Hour (kWh)

Kilowatt hour is a unit of measurement for electrical energy, it is analogous to “litres of gasoline”. One kilowatt hour is the amount of energy equivalent to 1000 watts being used continuously over a 1 hour period.

TERMINOLOGY CONT.

Net Power

Net Power is the summation of the total charging power less the total device load power. Net Power can be positive or negative.

$$\text{Total Charging Power (W)} - \text{Total Device Load (W)} = \text{Net Power}$$

Rear Plate

The Rear Plate is located at the rear of the VOLTstack. It contains the Master Battery On/Off buttons, USB Data Ports, Solar Charging Ports and Rear Vents. See the Components Identification and Location sections for details.

Run Time

Run time is defined as the total amount of time your VOLTstack will output power until the unit needs to be re-charged.

State of Charge

State of Charge is a numerical value (0%-100%) representing the energy remaining in a battery system. It refers to the usable energy remaining as opposed to the maximum storage capacity of the battery.

SUNstack™ Solar Kit

SUNstack Solar Kits are a plug and play system developed by Portable Electric which include a SUNstack Solar Panel, and SUNstack Carry Bag and a SUNstack Cable.

Surge

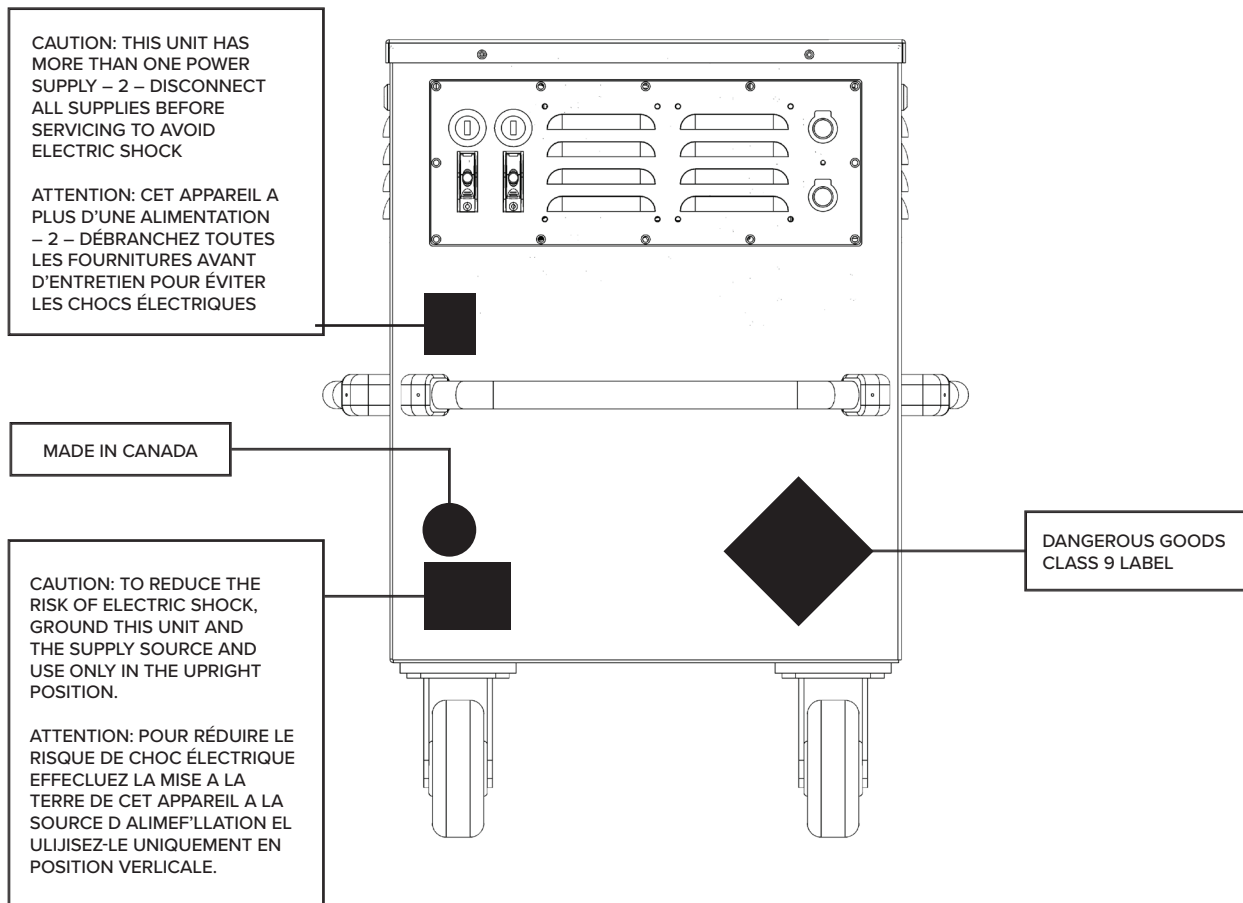
A temporary increase in the current or voltage of an electrical circuit. Surges often occur when power is initially supplied to a device to switch on components such as motors or compressors.

VOLTstack Power Block

The Power Block is located inside of the VOLTstack and is the source of AC Power. See the Components Identification and Location sections for details.

VOLTSTACK SAFETY

Safety Label Locations



The safety labels that are applied to the VOLTstack by the manufacturer must remain on the unit throughout its lifetime. Should a label come off or get damaged, contact the manufacturer to receive a replacement. Application instructions will be supplied.

Important Safety Information

VOLTstacks are designed to give safe and dependable service when operated according to the instructions. It is important for all operators to read and understand this Owner's Manual before use. Operating the unit safely by observing safe operating procedures will help prevent accidental injury.

Operator Responsibility

Be sure that anyone who operates a VOLTstack receives proper instruction and understands:

- How to stop the unit quickly in the event of any emergency
- How to use all of the VOLTstack controls, output receptacles, and connections

Do not let children operate the unit without supervision.

WARNING

The unit should be properly monitored by the operator at all times. Do not leave the unit unattended during use.

Environmental Considerations

VOLTstack units are Type 1 Enclosures and are designed for use in dry environments. Usage when snow, rain or other moisture is present could result in an electric shock or electrocution and should therefore be avoided. Ensure that both the VOLTstack and your hands are dry during operation.

Storage of the VOLTstack in an unsheltered environment could result in moisture or ice build-up on the Face Plate or on other electrical components. To avoid potential malfunctions, short circuits and electrocution, check components before each use to make sure they are free from moisture.

WARNING

Ensure the unit is free from moisture before and during use.

Paralleling Outputs

Outputs from separate VOLTstack units cannot be connected together in parallel. Contact your distributor for more information.

IMPORTANT

Do not parallel the outputs of multiple VOLTstacks. Contact your distributor for more information and options regarding parallel operation.

Electrical Arcing

The VOLTstack can cause electrical arcing; do not operate near combustible fumes.

WARNING

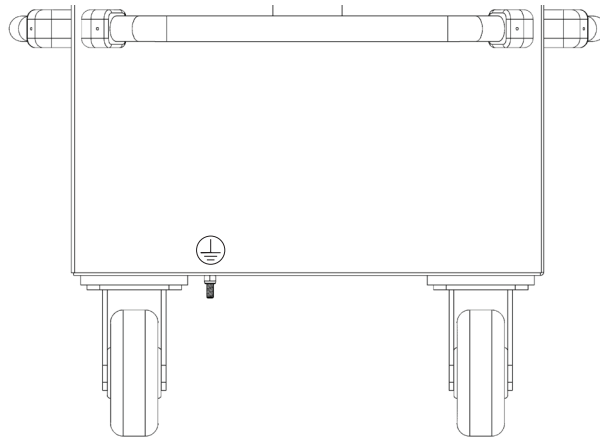
Do not operate your VOLTstack near combustible fumes. Electrical arcing within the unit or arcing on inlet/outlet connections can ignite combustible fumes.

Grounding

VOLTstack units have a ground system that connects frame components to the ground terminals of the AC Input and Output Receptacles. The Grounding Lug should be connected to a reliable external ground source when in use using a ¼-20 nut.

WARNING

Make sure the unit is properly grounded according to local regulations.



Neutral Bonding

The VOLTstack system is a bonded neutral configuration and the AC neutral is connected to the earth grounding terminal. When using a receptacle tester, this will show the same earth ground circuit condition as a home receptacle.

IMPORTANT

The VOLTstack uses a bonded neutral to earth ground configuration. Understand the implications of this configuration before operating.

Connecting to Grid

The VOLTstack AC output should not be connected to a grid system.

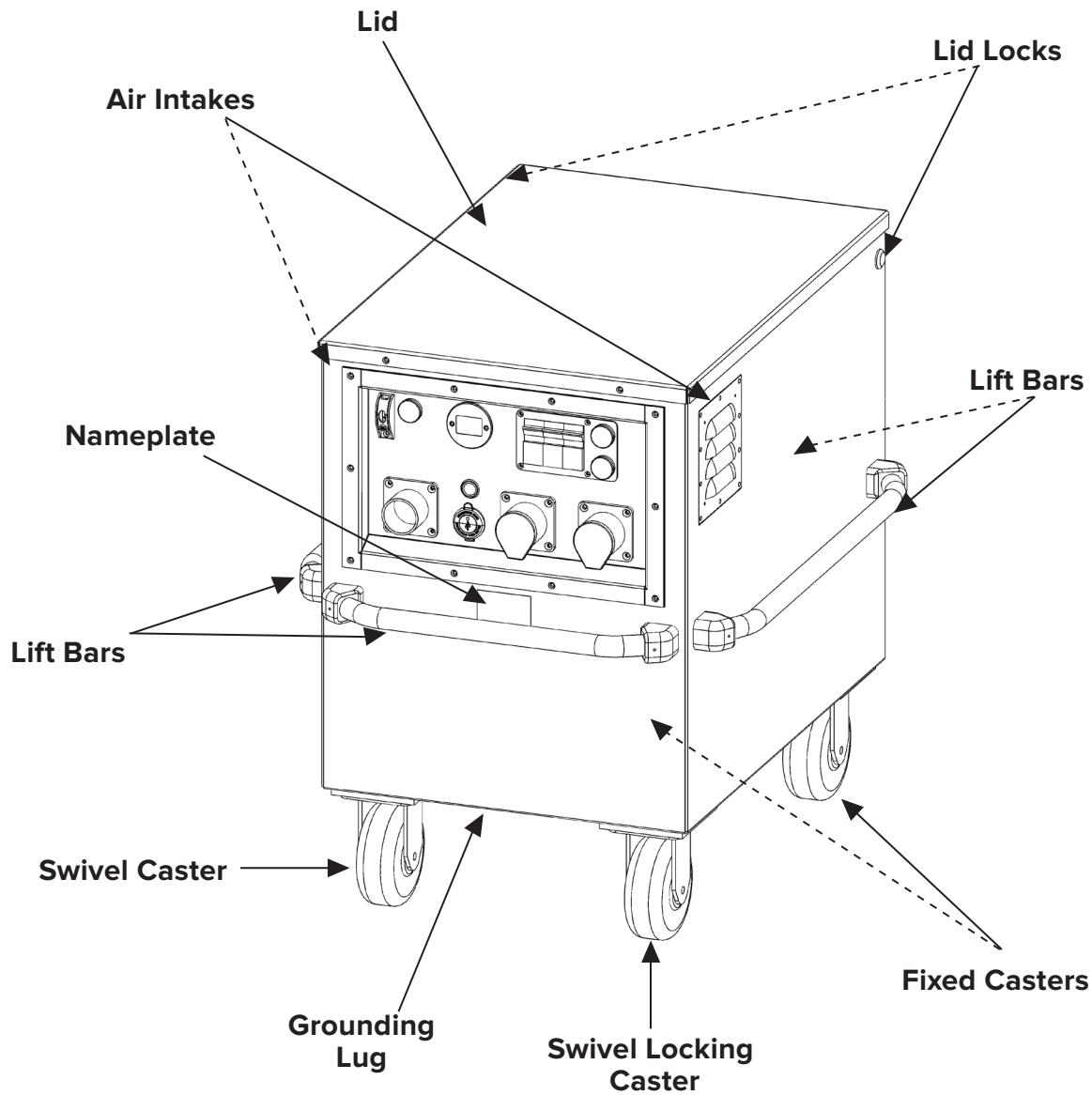
DANGER

Do not connect the VOLTstack AC output to any other AC sources such as grid power or generators.
Doing so will permanently damage the unit and may cause an electric shock.

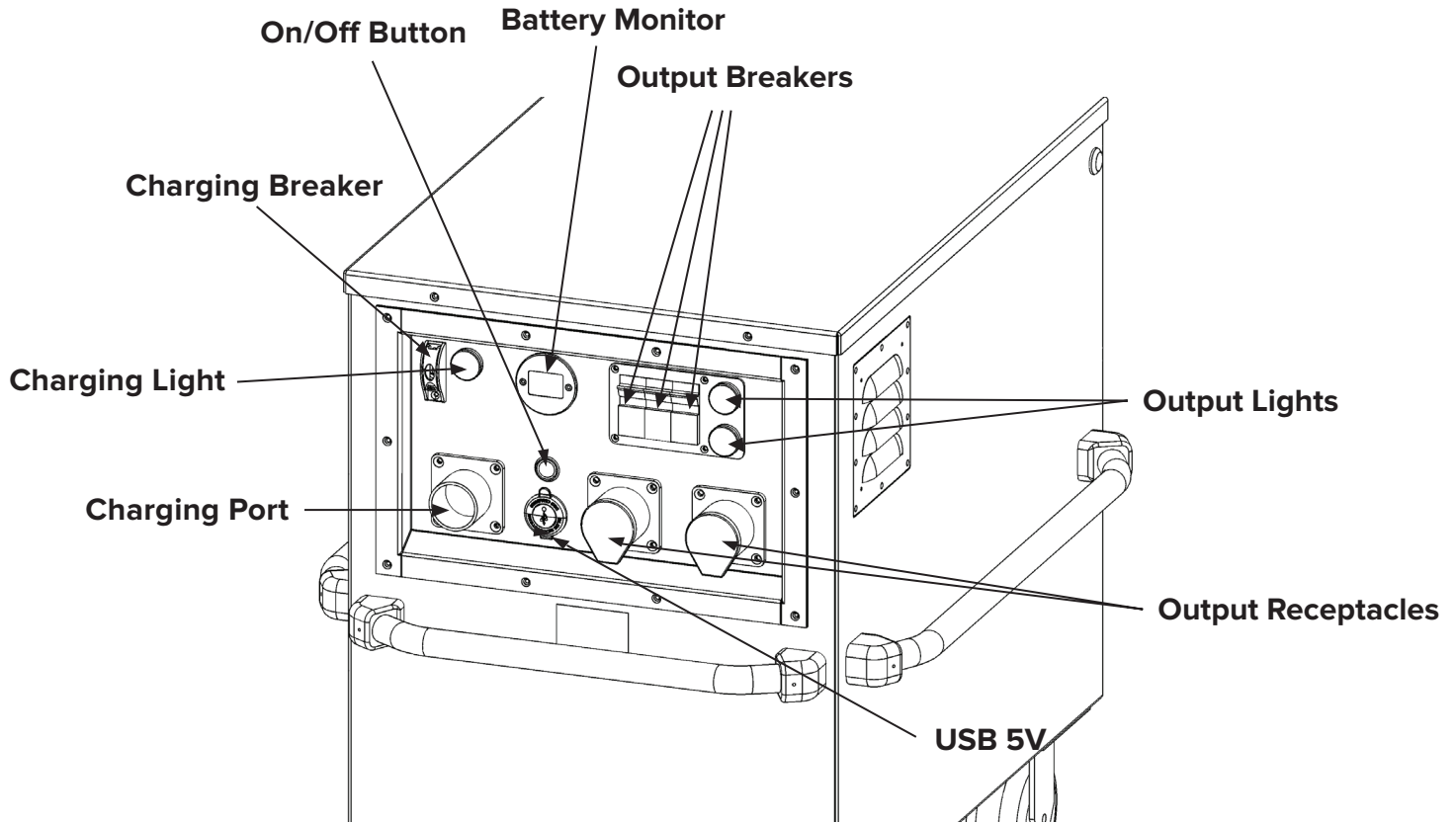
COMPONENT IDENTIFICATION AND LOCATION

Use the following diagrams to reference component names and locations discussed throughout this Owner's Manual.

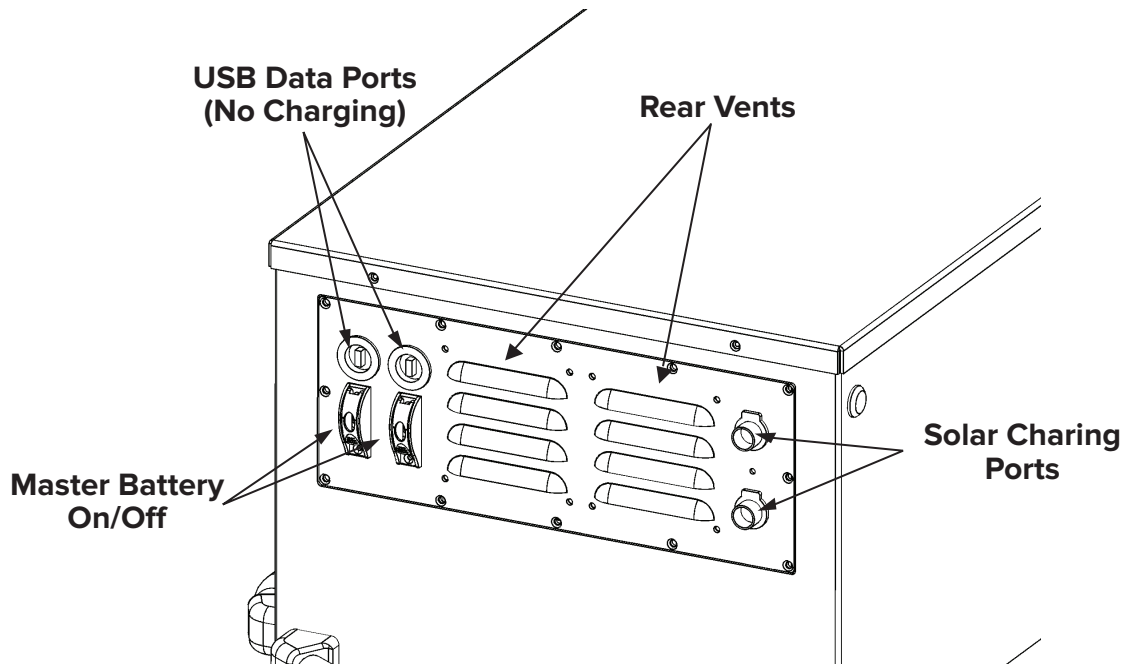
Exterior



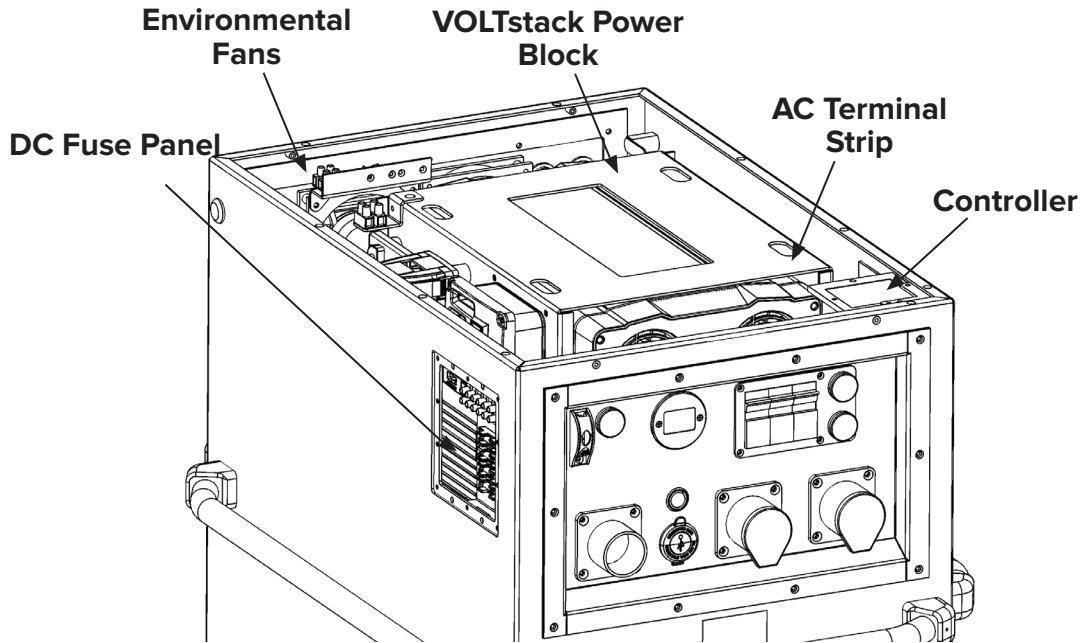
Face Plate



Rear Plate

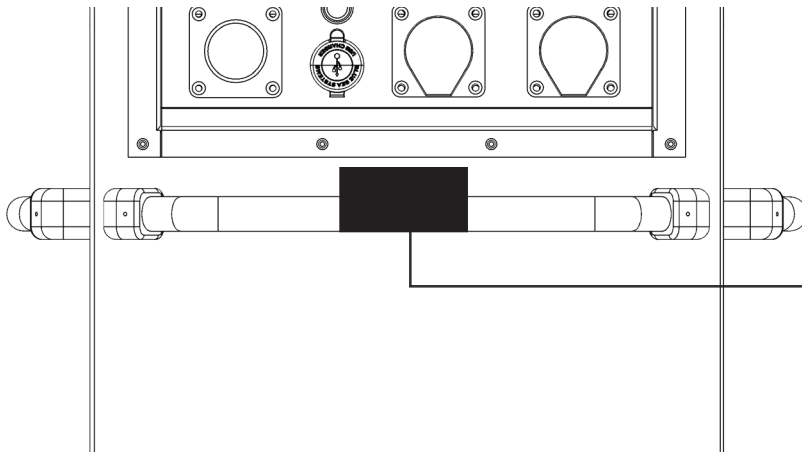


Interior



Serial Number

Refer to your VOLTstack by the serial number indicated on the nameplate.



Portable Electric Ltd	
Model Name:	VOLTstack 5K
Max A/C Output:	240V / 50 Hz / 20A
Max A/C Input:	240V / 50 Hz / 15A
Enclosure:	Type 1 Enclosure
Serial#	005kXXXX-XXXXXX-XXXXXXXX-X
Wattage:	4800W
Capacity:	5600Wh

GETTING STARTED

Pre-Operation Check

Before starting your VOLTstack, perform a pre-operation check to avoid any potential issues during use.

- Ensure Air Intakes and Rear Vents are clear from debris
- Ensure unit is in upright position during usage
- Ensure proper grounding of the Grounding Lug
- Ensure device power rating is within the maximum power output of the VOLTstack displayed on the nameplate

Recharging

When the State of Charge of your VOLTstack reaches 0%, it will need to be recharged. Before using your VOLTstack, it is recommended to plan out your recharging method. Recharging can be done from either an AC power source or from a SUNstack solar product. For fastest recharge rates, AC charging is recommended.

Turning Power On

1. Complete Pre-Operation check
2. Turn unit from Off to Standby
 - a. From the Rear Plate, lift the covers on both of the Master Battery On/Off buttons.
 - b. Press both of the buttons beneath and the blue button lights will illuminate.
3. Turn unit from Standby to Power On
 - a. From the Face Plate, press the On/Off Button. The blue light will illuminate.
 - b. You will hear two beeps and after 6 seconds the two green Output Lights will illuminate. You now have power!

Turning Power Off

1. Turn unit from Power On to Standby
 - a. Turn off and unplug devices being powered.
 - b. From the Face Plate, press the On/Off Button. This will cut power to the Output Receptacles and the green Output Lights will turn off.
2. Turn unit from Standby to Off
 - a. From the Rear Plate, lift the covers on both of the Master Battery On/Off buttons.
 - b. Press both of the buttons beneath and the blue button lights will turn off.

OPERATION

Applications

VOLTstack units can be used to power any device that uses 220-240V AC power and does not exceed a sustained current draw of 20A. The power rating of the device will determine how fast the State of Charge decreases.

HELPFUL TIPS

Choose lower energy devices when possible to extend the remaining capacity of the VOLTstack. For example, use LED lighting in place of incandescent lighting.

Before operation, check the power rating of your device to ensure it is within the maximum power output of the VOLTstack.

The following devices are examples of low and medium load applications. See Technical Info section for more information on common device loads.

TYPICAL APPLIANCE POWER CONSUMPTION			
LOAD LEVEL	DEVICE	TYPICAL CONSTANT POWER RATING (W)	TYPICAL SURGE POWER RATING (W)
Low	LED Light Bulb	4-10	N/A
	Computer w/ Monitor	300	N/A
Medium	Drill 1/2"	600	900
	Small Refrigerator	350	500
High	Circular Saw	1500	3000
	Space Heater	750-1500	N/A

Battery Storage Capacity

The State of Charge operating range of the VOLTstack (0-100%) is based on the capacity listed below, and incorporates a reserve from the maximum capacity of the battery. The VOLTstack can be used from 0 to 100% State of Charge on a regular basis.

The DC operating voltage range and nominal storage capacity of your VOLTstack is listed in the table below.

BATTERY SPECIFICATIONS		
Battery Cell Chemistry		LiFePO4
Voltage	Minimum	24.0
	Nominal	25.6
	Maximum	27.2
Watt Hours (Wh)	Total	5600
Amp Hours (Ah)	Total	220

*Electrical Specifications at 25°C

Battery Monitor State of Charge

The State of Charge of the VOLTstack will reduce over time according to the Power Mode and Power State. This is shown on the Battery Monitor. The expected Run Time of the VOLTstack can be estimated with the formula below using the total storage capacity, the State of Charge remaining, and the power rating of the device being powered.

$$\frac{\text{VOLTstack Capacity (Wh)} \times \text{State of Charge}}{\text{Device Power Rating (W)}} = \text{Run Time (h)}$$

For example, when using a 1000W heater with a VOLTstack 5k at 70% State of Charge:

$$\frac{5600 \text{ Wh} \times 0.7}{1000 \text{ W}} = 3.92 \text{ hours Run Time}$$

Run Time assumes the device is using constant power. Equipment can be plugged in without drawing any power. In this case, see the Idle Power Consumption section. Some other factors such as ambient temperature and device load duty cycle can affect the Run Time, however this method described above will provide a good estimate.

Battery Monitor Operation

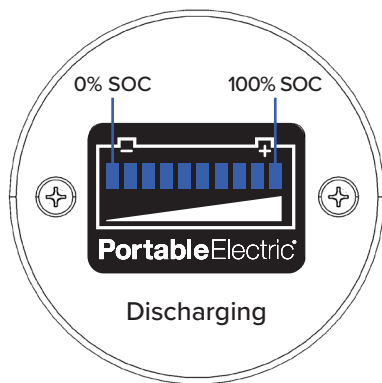
The Battery Monitor located on the Face Plate is used to display the State of Charge remaining, as well as the VOLTstack Power State. The Power State is based on the Net Power of the VOLTstack.

Type 1 Battery Monitor

The Type 1 Battery Monitor has ten blue LEDs. Full illumination of the ten LED's indicates 100% State of Charge.

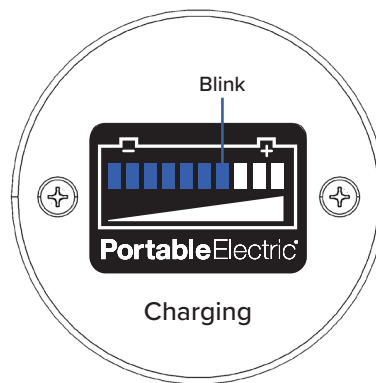
Discharging

The Battery Monitor will show the State of Charge when discharging.



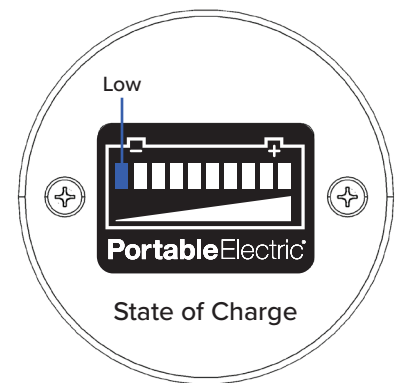
Charging

The right most blue LED will blink.



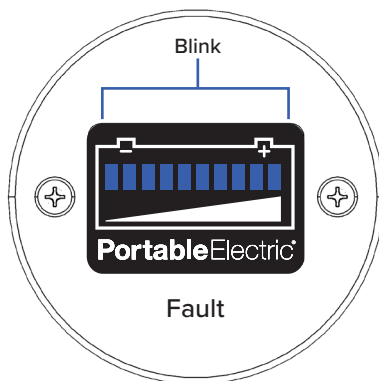
State of Charge Low

The last remaining LED will blink indicating the State of Charge is approaching zero.



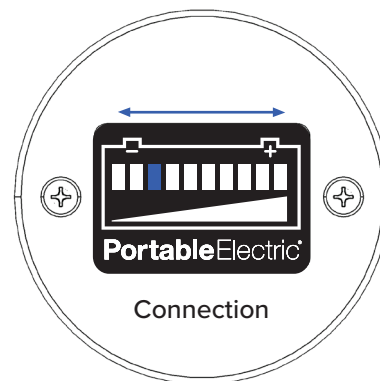
Fault Warning

All of the LEDs will blink. This can indicate an overload fault warning, or over temperature fault warning.



Connection Error

A single blue LED will move continually from left to right and back again. This indicates a connection error in the Battery Monitor.



Standby Operation

In Standby mode, all DC power systems are available as well as the unit's State of Charge. USB charging output, solar charging, as well as AC charging can be accomplished in Standby Mode. Use this mode between operations where lower power consumption is desirable.

Power ON Operation

In Power ON mode, all systems are functional including AC power output at the Output Receptacles. The Output Receptacles are protected by residual current circuit breakers with overcurrent protection. Solar charging and AC charging can also be done in Power ON mode. Use this mode when full power output is desired.

Low State of Charge Cut-off

When the Battery Monitor shows one remaining bar flashing, the State of Charge of your VOLTstack is less than 15%. When the State of Charge reaches zero, the unit will automatically turn off the AC output, indicated by the green Output Lights turning off. At this point, it is time to charge the unit.

Load vs Run Time

You may notice your VOLTstack will last longer if you reduce the load it is powering. This is normal behaviour; a smaller load is able to utilize more of the battery pack energy than a maximum power load.

WARNING

Do not use Power ON operation in wet or damp conditions.

AC Charging Operation

Charging times and charging source requirements are listed in the Table below

To initiate AC Charging, from Standby or Power On mode, plug AC power into a Charging Port. Ensure the corresponding Charging Breaker is in the On position. The Charging Light should illuminate orange indicating AC power supplied to VOLTstack is functioning. The Battery Monitor will indicate charging.

Check your AC charging source to ensure you have enough power available. The VOLTstack will draw maximum power regardless of your source power limitations.

CHARGING SOURCE REQUIREMENTS		
Charging Voltage	220-250 VAC	
Charging Frequency	50 - 60 Hz	
Charging Current	11.4A @ 230 VAC	11.0A @ 240 VAC
Charging Time*	2.5 hrs	

*Charging Time is based on 0%-90% charge @ 25°C

HELPFUL TIPS

If the VOLTstack is fully charged, the Battery Monitor will NOT indicate charging.

HELPFUL TIPS

The Battery Monitor will not indicate charging if the Net Power is negative.

Solar Charging Operation

Your VOLTstack has the ability to be recharged from solar energy using SUNstack™ Solar Kits by Portable Electric. Follow the steps below for safe and reliable solar charging. The solar charging input requirements are listed below.

SOLAR CHARGING REQUIREMENTS	
Input Current Max SOL1	20A
Input Current Max SOL2	20A
Input Voltage Range	33-150 VDC

Important Safety Information

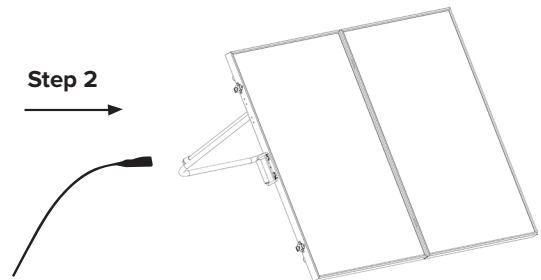
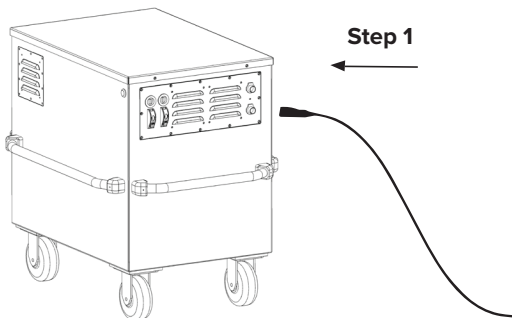
The SUNstack Solar Kit is designed to provide safe and dependable VOLTstack charging when operated according to the instructions. When using a SUNstack Solar Kit to charge a VOLTstack, it is important for all operators to understand warnings and instructions in both this Owner's Manual and the SUNstack Owner's Manual. Operating the SUNstack and the VOLTstack safely by observing safe operating procedures will help prevent accidental injury.

WARNING

Understand and follow all warnings and instructions in the SUNstack Owner's Manual before charging with a SUNstack Solar Kit.

Getting Started

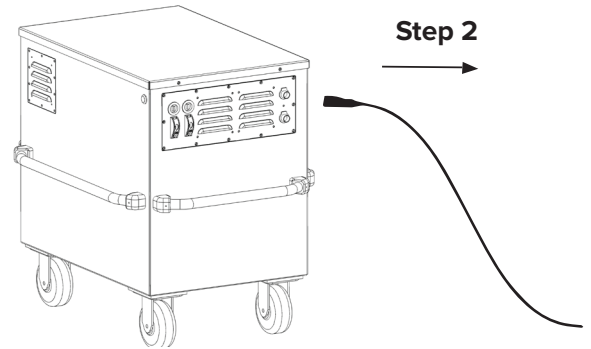
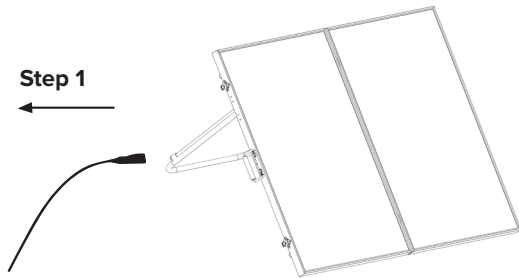
1. From Standby or Power On mode, connect a SUNstack Cable into Solar Charging Port SOL 1 and/or SOL2.
2. Connect the opposite end of the SUNstack Cable into a SUNstack Solar Panel.



3. The Battery Monitor will indicate charging.

Charging Complete

1. Disconnect the SUNstack Cable from the SUNstack Solar Panel.
2. Disconnect the SUNstack Cable from the VOLTstack.



3. The Battery Monitor will no longer indicate charging.

Do not connect third party solar panels to the VOLTstack unit, this could cause damage to the VOLTstack and void your warranty.

WARNING

Do not connect solar panels or solar cables that have not been supplied by Portable Electric to your VOLTstack.

WARNING

Follow the steps of connecting your SUNstack Solar Panel in the correct order.

WARNING

Exceeding the input voltage limits can cause permanent damage to your unit.

HELPFUL TIPS

If the VOLTstack is fully charged, the Battery Monitor will NOT indicate charging.

HELPFUL TIPS

The Battery Monitor will not indicate charging if the Net Power is negative.

Power On While Charging

Your VOLTstack has the ability to output AC power and charge at the same time. Charging can be done from an AC power source or from a SUNstack Solar Kit, or both. See sections above on how to initiate Power ON, AC charging, or solar charging. The VOLTstack has no transfer switch and can be operated as a true uninterrupted power supply.

The Battery Monitor will display the VOLTstack Power State. For a Discharging Power State (negative Net Power), the State of Charge will decrease and the Battery Monitor will not indicate charging. For a Charging Power State (positive Net Power), the State of Charge will show as charging on the Battery Monitor.

$$\text{Total Charging Power (W)} - \text{Total Device Load (W)} = \text{Net Power}$$

USB 5V Charging

From Standby or Power ON mode, plug your USB device into one of the USB 5V charging ports located on the Face Plate.

Self Consumption

Even when not in use, The VOLTstack's State of Charge will still decrease over time. The rate of decrease depends on the Power Mode of the unit. The Table below lists each Power Mode and the corresponding rate of decrease of State of Charge.

IDLE POWER CONSUMPTION	
Mode	Rate of Self-Consumption
Off	5% per month
Standby	5% per day
Power ON	40% per day

Controller Settings

Your VOLTstack's operating settings are factory set. The Controller manages these settings and provides troubleshooting information for your VOLTstack Service Technician. Only a qualified VOLTstack technician should modify operating settings.

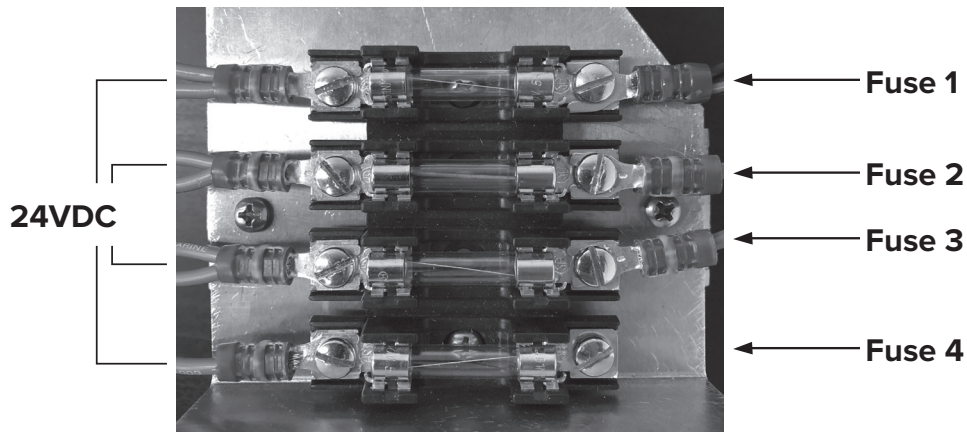
IMPORTANT

Do NOT modify Controller settings.

DC Operating Fuse Replacement

DC operating fuses are located in the DC Fuse Panel. If there is an issue with one of the devices listed below, check if the DC fuses have blown. If the fuse needs to be replaced, use a ¼" x 1-¼" glass cartridge-type with the same rating for the replacement fuse to ensure safe operation of your VOLTstack.

POSITION	DEVICE	FUSE RATING
1	Environmental Fans & Temperature Sensors	2A
2	ON/OFF Button LED & 12VDC Supply	1A
3	USB 5V Charging	2A
4	Reserved	-



IMPORTANT

Replace a blown fuse with a suitable replacement of equivalent rating. Do NOT bypass a fuse.

Hot and Cold Temperature Operation

It is important to operate your VOLTstack within the temperature ranges specified below. For optimal performance, 15-25°C ambient temperature environment is recommended. Operating outside the ranges specified below can cause permanent damage to your unit.

OPERATING TEMPERATURE SPECIFICATIONS		
Operation	Ambient Temperature	
AC Charging, Solar Charging	0° – 50°C	32° – 122°F
AC Output	-20°C – 50°C	-4°F – 122°F

High Temperature AC Output

In order to prevent internal damage, your VOLTstack will automatically turn off the AC output power if the ambient temperature exceeds the rated value. In this case, moving the VOLTstack into a cooler environment is recommended.

High Temperature AC Charging

In order to prevent internal damage, your VOLTstack will automatically de-rate the charging power as the ambient temperature approaches the maximum rated value. If charging time is longer than expected under high ambient temperatures, move the VOLTstack into a cooler environment.

High Temperature Shut-Down

Under extreme heat conditions above the rated values, your VOLTstack will automatically shut-down all functions into Off mode. This condition indicates the VOLTstack should be moved into a cooler environment as soon as possible.

Cold Temperature AC Output

Run times will decrease when your VOLTstack is operating in ambient temperatures below freezing. Decreased Run Times are affected by how close the ambient temperature is to the lower temperature limit, as well as by the size of the load. The VOLTstack will generate its own heat when operating, try starting with a low load device to increase the overall temperature of the unit before using a high load device.

Cold Temperature AC Charging

The VOLTstack should not be charged in temperatures below freezing.

IMPORTANT

Operation below the minimum temperature specifications can cause permanent damage to your unit.

IMPORTANT

Operation above the maximum temperature specifications can cause permanent damage to your unit.

HELPFUL TIPS

For optimal performance of your VOLTstack, keep the ambient temperature between 15-25°C at all times.

HELPFUL TIPS

In ambient temperatures below freezing, keep your VOLTstack operating a low load to maintain a higher internal temperature.

MAINTENANCE

Good maintenance practices are important in order to keep your VOLTstack operating at its full potential. The following section will suggest a maintenance schedule, including inspection and cleaning procedures, that can be completed by the owner. Maintenance tasks that are more difficult, or those which require specialized tools should be completed by a certified VOLTstack technician.

Maintenance Safety

Portable Electric has made suggestions for safe maintenance procedures, however we cannot warn of every possible dangerous scenario. It is the responsibility of the owner to decide whether or not to complete a maintenance task.

DANGER

Ensure the VOLTstack is in Off mode before performing any maintenance. Serious injury or electrocution can occur while performing maintenance while the VOLTstack is in Standby or Power On modes.

WARNING

Always follow the maintenance recommendations in this Owner's Manual. Failure to properly maintain your VOLTstack, or to correct potential hazards before operation, may result in damage to equipment, serious injury, or death.

Maintenance Schedule

The table below outlines the recommended maintenance schedule based on normal operating conditions and usage. If your use extends into unusual scenarios or environments, consult your Portable Electric representative for suggestions on modifications to the maintenance schedule.

Inspection

Inspection is defined as a visual examination of the part or section. This means looking for loose connections, interference, debris, or any other potentially harmful scenarios.

Cleaning

Cleaning is defined as removing any dirt, dust or debris from the part or section. A vacuum and an anti-static cloth should be used on all surfaces. Cleaning solvents and/or water should not be used for interior cleaning or on external electrical components.

Connection Points

Connection Points are defined as all fasteners on the unit. This includes bolts, nuts and screws.

WARNING

When cleaning inside your VOLTstack or any exterior electrical components, do not use solvents or water.

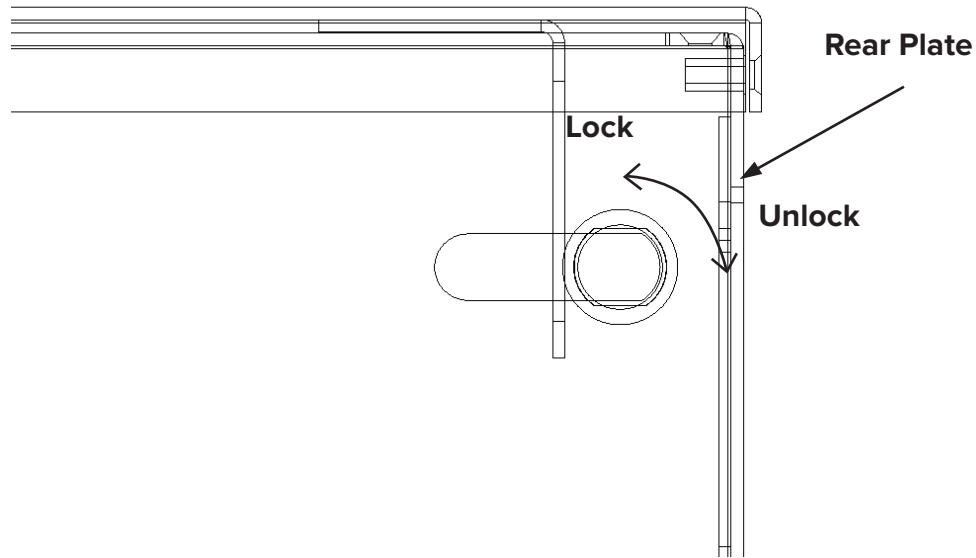
IMPORTANT

Use an anti-static cloth when cleaning all surfaces. Static discharge may damage the internal electronics of your VOLTstack.

ITEM	ACTION	DAILY	3 MO	6 MO	1 YR	2 YR	4 YR
Casters	Inspection	•					
	Cleaning		•				
	Greasing			•			
	Torque			•			
Air Intake Filters	Cleaning		•				
	Replacement				•		
Environmental Fans	Cleaning					•	
Interior & Power Block	Inspection					•	
	Cleaning					•	
Connection Points	Inspection					•	
	Torque					•	
Battery System	Diagnostic					•	
	Lifecycle Analysis						•

Opening the Lid

To lock and unlock the VOLTstack Lid, use your VOLTstack Key and rotate the Lid Locks in the direction shown below.



Caster Maintenance

The Casters on your VOLTstack should be maintained as per the Maintenance Schedule. Casters should be greased every 6 months or as needed in particularly dirty locations.

IMPORTANT

Grease the Casters more frequently when operating in dusty environments

Caster Greasing & Torque Check

1. Apply NLGI-2 lithium grease to the Swivel Casters through the Grease Port. Ensure that the entire bearing is full and any old grease containing debris has been expelled.
2. Wipe excess grease clean.
3. Check the 4 x Mounting Bolts are torqued to 10 ft.lbs

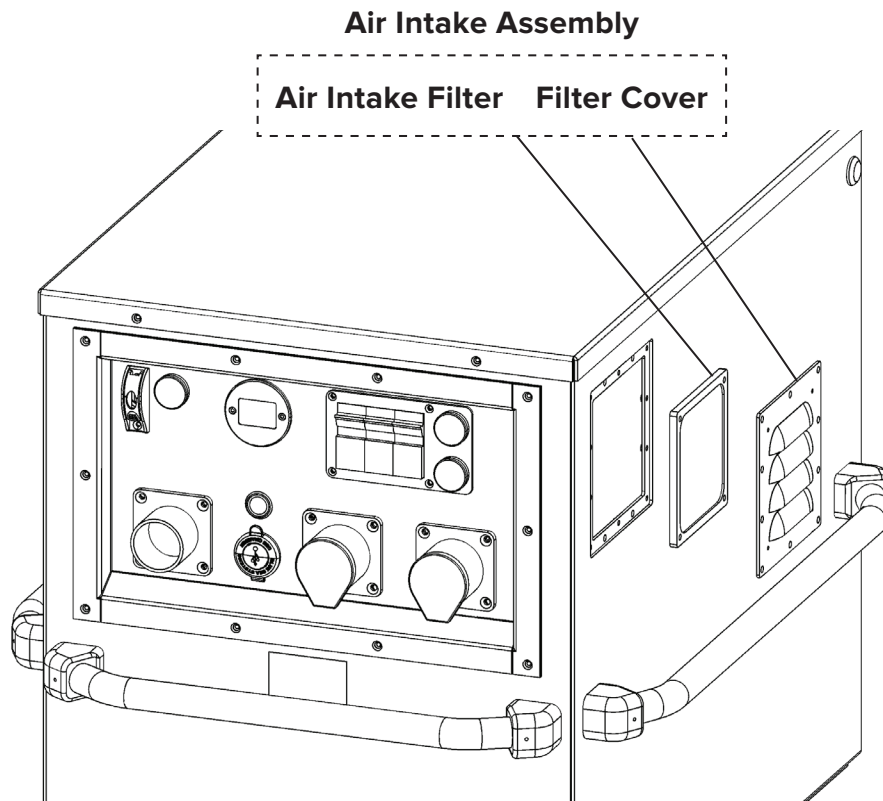


Air Intake Filter Maintenance

Proper intake of air is critical for reliable operation of your VOLTstack. The Air Intake Filters should be checked as per the Maintenance Schedule and replaced when they are dirty or clogged.

IMPORTANT

Check the Air Intake Filters more frequently when operating in dusty environments.



Air Intake Filter Replacement

1. Remove the Air Intake Assembly screws on the Filter Cover using a #1 phillips screw driver.
2. Separate the Filter Cover from the Air Intake Filter using a 1/16" Allen wrench and a 1/4" wrench or socket.
3. Replace the Air Intake Filter with a new filter provided by Portable Electric.
4. Reassemble the Air Intake Assembly and re-install it on the unit.

Environmental Fan Maintenance

The Environmental Fans exhaust heat created by the internal electronics and allow the VOLTstack to maintain operation at optimal temperature. It is recommended to do a full cleaning of the Environmental Fans during your 2 year maintenance checkup.

HELPFUL TIPS

Accumulation of large quantities of dust on fan blades indicates that Air Intake Filter cleaning/replacement should be done more frequently.

Interior and Power Block Maintenance

It is recommended to do a full interior inspection and cleaning during your 2 year maintenance checkup.

HELPFUL TIPS

Have your VOLTstack technician perform a full interior cleaning of the unit during the 2 year maintenance checkup.

Connection Points Maintenance

It is recommended to do an inspection and torque check of all Connection Points during your 2 year maintenance checkup.

HELPFUL TIPS

Have your VOLTstack technician perform a full Connection Point torque check during your 2 year maintenance checkup.

Battery System Maintenance

Your VOLTstack battery system is made up of Li-ion battery cells connected together to make a Battery Pack. Each Battery Pack is monitored and protected by the Battery Management System. Regular use under normal operating conditions is healthy for your Battery Pack's longevity. It is important to have your Battery Pack's health formally assessed by a VOLTstack technician through a diagnostic and/or a lifecycle analysis.

IMPORTANT

At least once a year, do one full discharge and one full recharge.

Diagnostic

To ensure your Battery Pack is operating at optimal performance over time, a full battery diagnostic should be completed by a certified Portable Electric technician at least every 2 years.

IMPORTANT

A diagnostic of your Battery Pack can help to predict potential failures in your system before they occur.

HELPFUL TIPS

Replace or repair an underperforming Battery Pack before it affects your operation.

Lifecycle Analysis

Throughout your VOLTstack ownership, the performance of your Battery Pack will change as a result of total kWh used and length of time owned. You will notice a decrease in total capacity over time and at some point, you may want to consider replacing your Battery Pack. Have a lifecycle analysis performed by a VOLTstack technician in order to assess the usable life remaining in your Battery Pack. This will allow you to determine how much usable life your VOLTstack still has and whether you need to have your Battery Pack replaced.

Replacement Parts

We recommend the use of genuine Portable Electric replacement parts whenever maintenance is performed. The use of replacement parts not of original design and quality may negatively affect the performance of your VOLTstack and can affect your VOLTstack warranty. Any consumable part replacements are the responsibility of the VOLTstack owner.

COMPONENT GROUP	CONSUMABLE PART NAME
Air Intake	Air Intake Filter
Fuse	¼" x 1-¼" 1A Fuse
Fuse	¼" x 1-¼" 2A Fuse

Your VOLTstack Warranty outlines the details of coverage for warranty replacement parts. Each VOLTstack owner is responsible for replacement of all parts after the initial warranty period has expired. A list of common replacement parts is provided below. For all other replacement parts, contact your Portable Electric dealer.

COMPONENT GROUP	PART NAME
Caster	5" Fixed Caster
	5" Swivel Caster
	5" Swivel Locking Caster
Gasket	Face Plate Gasket
	Lid Gasket
Graphic	Class 9 Dangerous Goods Sticker

STORAGE

Storing VOLTstacks can be made safe and easy by following precautions and procedures listed below.

Storage Environment

The VOLTstack should be stored in a dry location and free of airborne dust and particulates. The unit should be out of direct sunlight and stored in the following ambient temperature conditions:

STORAGE TEMPERATURE	
Minimum Storage Temperature	0°C / 32°F
Maximum Storage Temperature	40°C / 104°F
Optimal Storage Temperature	20°C / 68°F

Storage Procedure

Before storing your VOLTstack, ensure these conditions are met:

- The Storage Environment meets the conditions listed above.
- The VOLTstack is in an upright position.

Follow these steps to safely store your VOLTstack:

1. From Standby or Power On mode, ensure the State of Charge of the unit is greater than those listed in the table below for the intended duration of storage.
2. Put the unit into Off mode.

STORAGE STATE OF CHARGE	
Storage Time	Minimum Starting State of Charge
Less than 1 month	30%
2 to 3 months	60%
4 months or more	80%

HELPFUL TIPS

Store the VOLTstack at 100% State of Charge.

Storage Precautions

The State of Charge of your VOLTstack will slowly decrease even in Off mode. See Operation section above for details on Self-Consumption. To avoid potential damage to the unit, it is important to keep the state of charge above 0% for long periods of unattended storage. The recommended low end storage target is greater than 20% State of Charge at all times.

IMPORTANT

At 0% State of Charge, the battery can self discharge over time to a state that will permanently damage the unit. Do not allow the battery to reach 0% State of Charge during periods of unattended storage.

HELPFUL TIPS

For long periods of unattended storage, check the State of Charge monthly and charge the battery before it falls below 20%.

VOLTstack Health in Storage

Whether in storage or not, consider the maintenance schedule listed in the Maintenance section above. Some procedures are required at the listed intervals even when the unit has not been in use.

IMPORTANT

Consider the VOLTstack maintenance schedule even when the unit has been in storage.

TRANSPORTATION

The information below is intended as a guideline on how to transport your VOLTstack. It is the responsibility of the owner to ensure safe and legal transport of the unit. Consult your local transportation regulations for the most up-to-date information.

Transportation Preparation

Follow these steps to ensure safe transport of your VOLTstack:

- Always transport in Off mode.
- Ensure the State of Charge is adequate for the length of voyage.
- Ensure your unit is upright and securely fastened.

Ground Transportation

Ground transportation of VOLTstack units is classified as Transport of Dangerous Goods (TDG) Category 9. They are classified as UN3841: Lithium ion batteries contained within equipment.

Lithium and lithium-ion cells and batteries are regulated in the USA in accordance with Part 49 Regulations of the Code of Federal Regulations, (49 CFR Sections 105-180) of the U.S. Hazardous Materials Regulations.



Transportation by Air

VOLTstack units can only be transported by air via cargo aircraft. Do not ship VOLTstacks on passenger aircraft. To transport VOLTstacks by cargo air shipment, an Equivalency Certificate has to be obtained. This certificate is given by each State of Origin, and is not transferable between nations.



WARNING

Do not ship VOLTstacks on passenger aircraft, ship on cargo aircraft only.

IMPORTANT

This Equivalency Certificate only applies to air transportation from each state of origin.

TROUBLESHOOTING

1. IMPORTANT – Initial Troubleshooting Procedure:

- Ensure all breakers are in the ON position.
- Perform a Power Cycle:
 - From Standby mode, turn the unit to Off mode (see Getting Started).
 - Wait 10 seconds.
 - Turn the unit back to Standby and then to Power On.

2. There is no power at the Output Receptacles.

- See Step 1.
- If there is still no power, please call the service provider.

3. The green Output Light(s) do not illuminate.

- Complete Step 1, then check for power at the Output Receptacle.
 - If there is power, it is an issue with the Output Light. The unit is still operational. Please call your service provider.
 - If there is no power, there is an issue with unit. Please call your service provider.

4. The unit is not charging.

- See Step 1.
- If the unit still does not charge, see Step 5.

5. The orange Charging Light(s) do not illuminate.

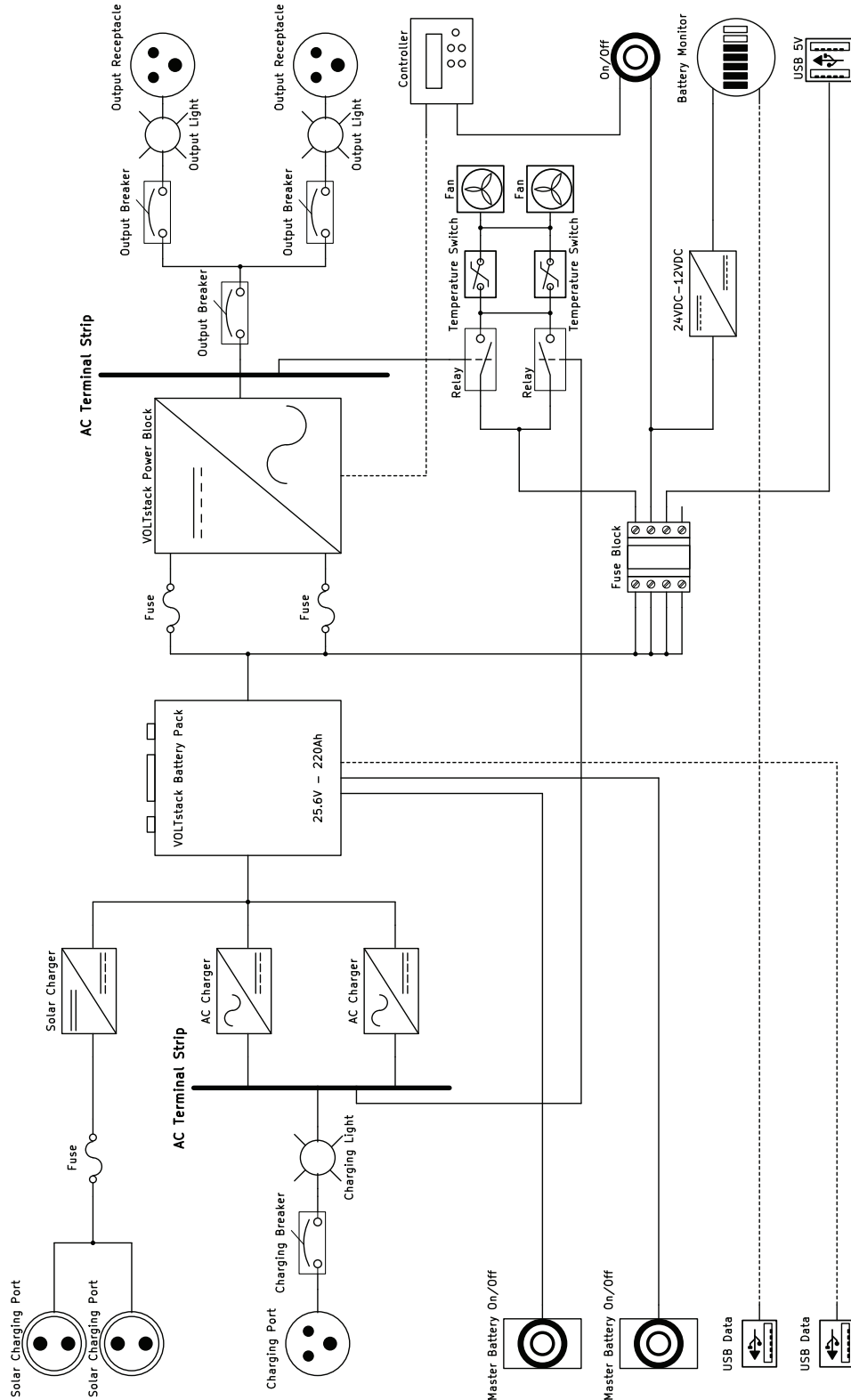
- Check input power source and connection.
- If the unit still does not charge, please call the service provider.

6. The unit's charge does not last as long as normal.

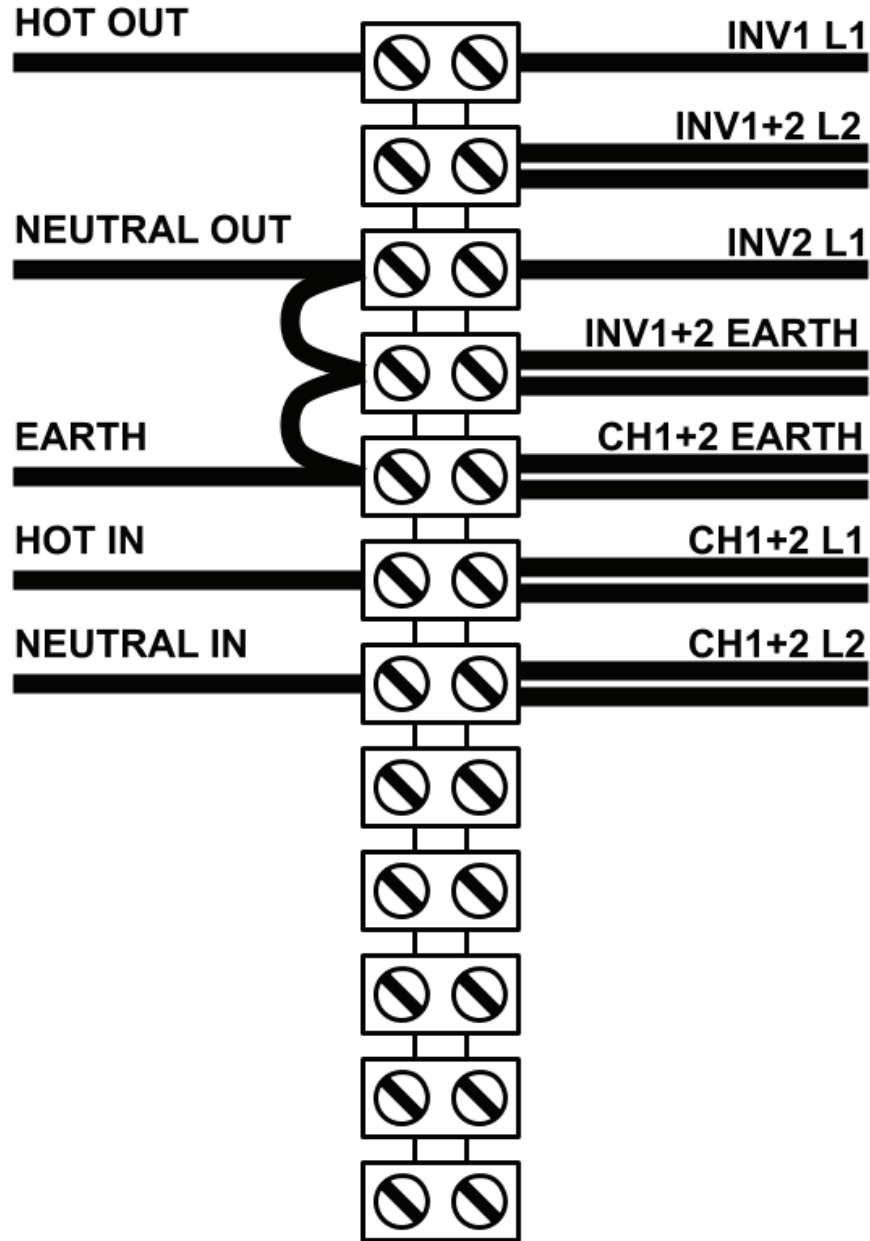
- Ensure that the blue Master Battery On/Off lights are illuminated.
- Charge the unit back to full.
- If the unit's charge still does not last, please call the service provider.

TECHNICAL INFO

5k Wiring Diagram



AC Terminal Strip Wiring



Device Power Ratings

COMMON APPLIANCE POWER CONSUMPTION			
LOAD LEVEL	DEVICE	TYPICAL CONSTANT POWER RATING (W)	TYPICAL SURGE POWER RATING (W)
Low	Phone charger	5-10	N/A
	LED light bulb	4-10	N/A
	LED TV (60")	70	N/A
	20-Inch Box Fan	200	N/A
	Laptop Large	50-75	N/A
	Computer w/ Monitor	300	N/A
Medium	Drill 1/2"	600	900
	Fridge/freezer	700	900
	Microwave oven	600-1000	800-1200
	Coffee pot (4 cup)	650	N/A
	Electric Blanket	80-200	N/A
	Inflatable blower	600-1000	N/A
High	Space Heater	750-1500	N/A
	Circular Saw	1500	3000
	Belt sander	1200	N/A
	Sump Pump 1/2HP	1050	2150
	Air compressor 1HP	1500-2000	3000
	Pressure Washer 1HP	1200	3600

VOLTstack® 5k Unit (230V)

SPECIFICATIONS



RATED OUTPUT

4.8 kW Pure Sine Wave Inverter
(Surge rating: 5.8 kW 3 sec, 7 kW peak)

AC OUTPUT

Single Phase 230V @ 20A

AC CHARGING

1 x 220 - 240VAC 16 Amp Inlet
Recharge time @ 12 Amps (230V) is 2.5 hrs

DC CHARGING

Input: SUNstack™ solar panel and cable supplied by Portable Electric

Max Operating Input Voltage PV: 150 VDC

Max Input Short Circuit Current: 30 Amps DC

OPERATING CONDITIONS

Operating temperature (discharging): -20°C up to 50°C

Operating temperature (charging): 0°C up to 50°C

BOX MECHANICAL SPECS

Weight: 150 kg

Four wheel (two stationary, two swivel) polymer casters

Dimensions (L x W x H):

Box - 79cm x 51cm x 74cm

Shipping - 84cm x 58cm x 79cm

SAFETY

Non-Combustible Aluminum Enclosure

BSI Certification Pending

Recommended storage temperature: 10°C - 30°C

CARBON OFFSET EQUIVALENT

Offsets 20 kg of CO₂e for 8 hours operation

STORAGE

5.6 kWh

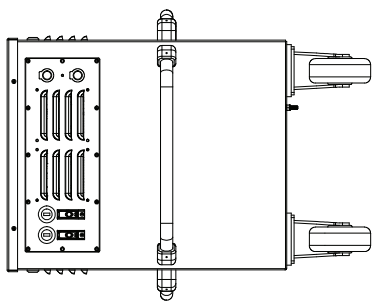
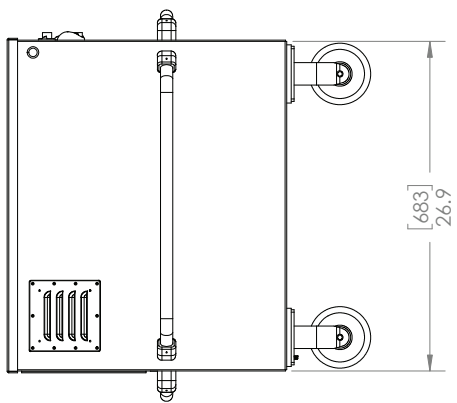
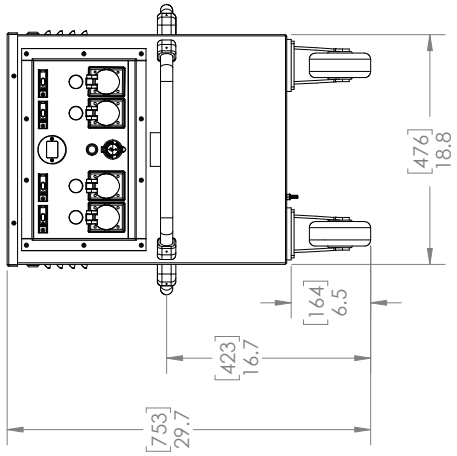
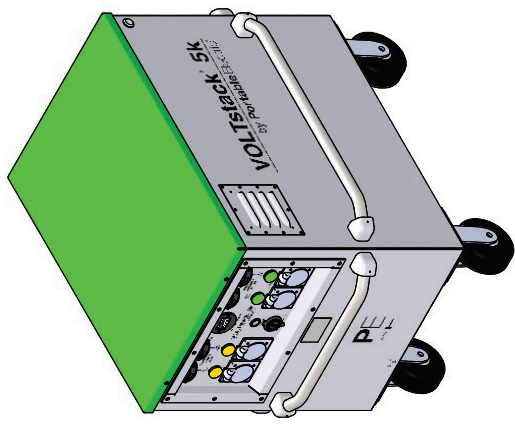
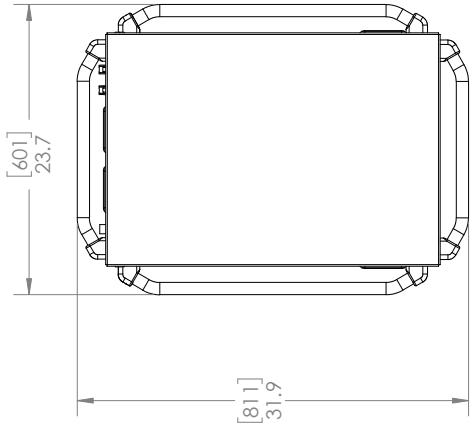
Battery Type: Lithium-Ion

OUTLETS

2 x 230VAC 16 Amp Outlets

2 x 15 Amp Circuits (20 Amp Combined Max)

2 x 5 VDC USB Outlets



UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES (mm)		DRAWN	OR 2019-03-08
FRACTIONAL ± 0.1		CHECKED	JC 2019-03-12
ANGULAR: MACH ± 0.1 BEND ± 0.1		ENG. APPR.	
ONE PLACE DECIMAL ± 0.1		MFG APPR.	
TWO PLACE DECIMAL ± 0.02			
THREE PLACE DECIMAL ± 0.005			
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Portable Electric®
 TITLE: 5k Dimensions (North America 120V)
 SCALE: 1:10 WEIGHT: 330 lbs SHEET 1 OF 1

SIZE	DWG. NO.	REV
B	5K-DIM-02	O