

Owner's Guide

PurePower 1800 Sine Wave Inverter

PurePower 1800

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About This Guide

Purpose

The purpose of this Owner's Guide is to provide explanations and procedures for operating, installing, maintaining, and troubleshooting the PurePower 1800 Sine Wave Inverter.

Scope

The Guide provides safety guidelines, as well as information about operating, installing, and troubleshooting the inverter. It does not provide details about particular brands of batteries. You need to consult individual battery manufacturers for this information.

It is recommended that installation should be handled by qualified installers including licensed technicians and electricians. Qualified installers have knowledge and experience in installing electrical equipment, knowledge of the applicable installation codes, and awareness of the hazards involved in performing electrical work and how to reduce those hazards.

Audience

The Guide is intended for users and operators of the PurePower 1800 Sine Wave Inverter.

Conventions Used

The following conventions are used in this guide.

DANGER

STATEMENT OF HAZARD

Contains statements of avoidance or strict compliance.

Failure to follow these instructions will result in death or serious injury.

WARNING

STATEMENT OF HAZARD

Contains statements of avoidance or strict compliance.

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CAUTION

STATEMENT OF HAZARD

Contains statements of avoidance or strict compliance.

Failure to follow these instructions can result in minor or moderate injury.

CAUTION

STATEMENT OF HAZARD

Contains statements of avoidance or strict compliance.

Failure to follow these instructions can damage the unit and/or damage other equipment.

IMPORTANT: These notes describe things which are important for you to know, however, they are not as serious as a danger, warning, or caution.

Related Information

You can find more information about Grape Solar Inc. as well as its products and services at **www.grapesolar.com**.



The product marking on the left when found imprinted on electrical and electronic units and appliances means that you are to refer to this guide for cautions and warnings.

Important Safety Instructions

IMPORTANT: READ AND SAVE THIS OWNER'S GUIDE FOR FUTURE REFERENCE.

This chapter contains important safety instructions for the PurePower 1800 Sine Wave Inverter.

Before using the PurePower 1800 Sine Wave Inverter, READ ALL instructions and cautionary markings on or provided with the PurePower 1800 Sine Wave Inverter, the batteries, and all appropriate sections of this guide.

 **DANGER**

ELECTRICAL SHOCK HAZARD

- Do not expose the PurePower 1800 inverter to rain, snow, spray, or bilge water.
- Do not operate the inverter if it has received a sharp blow, been dropped, has cracks or openings in the enclosure including if the fuse cover has been lost, damaged, or will not close, or otherwise damaged in any other way.
- Do not disassemble the inverter. Internal capacitors remain charged after all power is disconnected.
- Disconnect DC power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the battery charger. See note below.
- Do not operate the inverter with damaged or substandard wiring. Make sure that all wiring is in good condition and is not undersized.

Failure to follow these instructions will result in death or serious injury.

NOTE: Turning off the inverter using the power switch button will not reduce an electrical shock hazard.

Precautions When Working With Batteries

WARNING

BURN FROM HIGH SHORT-CIRCUIT CURRENT, FIRE AND EXPLOSION FROM VENTED GASES HAZARDS

- Always wear proper, non-absorbent gloves, complete eye protection, and clothing protection. Avoid touching your eyes and wiping your forehead while working near batteries. See note #4.
- Remove all personal metal items, like rings, bracelets, and watches when working with batteries. See notes #5 and #6.
- Never smoke or allow a spark or flame near the engine or batteries.
- Do not operate the inverter in compartments containing batteries or flammable materials, or in locations that require ignition-protected equipment. See note #8.

Failure to follow these instructions can result in death or serious injury.

NOTES:

1. Locate the PurePower 1800 Sine Wave Inverter unit away from batteries in a well ventilated compartment.
2. Always have someone within range of your voice or close enough to come to your aid when you work near a lead-acid battery.

3. Always have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.
5. Use extra caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
6. Batteries can produce a short circuit current high enough to weld a ring or metal bracelet or the like to the battery terminal, causing a severe burn.
7. When removing a battery, always remove the negative terminal from the battery first for systems with grounded negative. If it is grounded positive, remove the positive terminal first. Make sure all loads connected to the battery and all accessories are off so you don't cause an arc.
8. This inverter contains components which tend to produce arcs or sparks. Other locations that require ignition-protected equipment include any space containing gasoline-powered machinery, fuel tanks, as well as joints, fittings, or other connections between components of the fuel system.

FCC Statement



WARNING

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) this device must accept any interference received, including interference that might cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Introduction

Thank you for purchasing the PurePower 1800 Sine Wave Inverter. The PurePower 1800 inverter is a high quality, true sine wave output inverter. It is designed to operate AC loads as if these loads were operating from grid/utility supplied power in household AC outlets.

To get the most out of your PurePower 1800 Sine Wave Inverter, carefully read and follow the instructions in this guide.

Quality Power

The PurePower 1800 inverter is a professional-quality, mid-range inverter designed to handle a variety of applications including compact microwaves, TVs, VCRs, coffee makers, and small power tools.

- The PurePower 1800 inverter provides optimal continuous power, making it ideal for large single loads, intermittent loads, or multiple smaller loads.
- The inverter's high surge capability lets you handle many hard-to-start loads, including large TVs, refrigerators, and freezers.

	Continuous	Surge Power
PurePower 1800	1800 watts	3000 watts

- The unit's low standby battery demand means you do not have to worry about excessive drain on your battery if you leave the inverter on for a few days. When the inverter is on but no power is being supplied to a load, the inverter draws less than 800 mA from the battery.

Ease of Use

Superior features and rugged durability have been combined with ease of use:

- The unit is compact, light weight, and easy to install.
- You can power loads directly from the dual GFCI-protected AC receptacles on the front panel.
- Easy-to-read digital display on the front panel lets you monitor system performance at a glance.
- The optional PurePower 1800 Remote Panel lets you control the inverter from a convenient location—up to 25 feet (7.6 m) away—while the inverter itself is mounted out of sight and close to the batteries.
- A convenient USB port powers most modern electronic products.

Comprehensive Protection

The PurePower 1800 inverter is equipped with the following protection features:

GFCI protection	De-energizes the AC circuits and thereby protects the user from electric shock if a ground fault occurs.
Low battery voltage alarm	Alerts you if the battery has become discharged to 11 V or lower.
Low battery voltage shutdown	Automatically shuts the inverter down if the battery voltage drops below 10.5 V. This feature protects the battery from being completely discharged. Within five minutes after shutdown, the unit recovers automatically once the battery voltage reaches above 11.5 Vdc. After five minutes, the unit turns itself off.
High battery voltage shutdown	Shuts the inverter down automatically if the input voltage rises to more than 15.5 V. Within five minutes after shutdown, the unit recovers automatically once the battery voltage falls below 15.5 Vdc. After five minutes, the unit turns itself off.
AC output overload shutdown	Shuts the unit down automatically if a short circuit occurs or if the loads attached to the inverter exceed the operating limits.

Over temperature shutdown

Turns the inverter off if its temperature rises above an acceptable level. Within five minutes after shutdown, the unit recovers automatically once the temperature of the unit cools down. After five minutes of operating in high temperature, the unit turns itself off.

Features

The following information describes the main features of the PurePower 1800 inverter. We recommend that you familiarize yourself with these features before installing and operating the unit.

Materials List

Your PurePower 1800 inverter package includes these items:

- PurePower 1800 inverter unit
- Owner's Guide

If any of these materials are missing or are unsatisfactory in any way, please contact Customer Service.

Optional Accessory

The PurePower 1800 inverter can also be installed with the PurePower 1800 Remote Panel that comes with a 25-foot (7.6 m) communications cable (part number 808-9001).

In marine applications, it is recommended to use additional drip protection such as drip shields (part number 808-1050). See notes on page 8.

For ordering information, please contact Customer Service. Please reference the part number above when ordering.

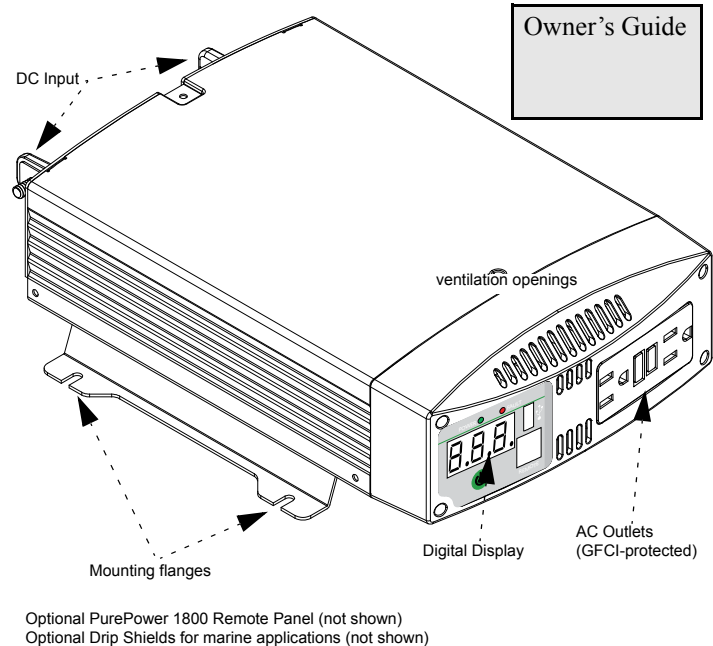


Figure 1 PurePower 1800 inverter

Front Panel Details

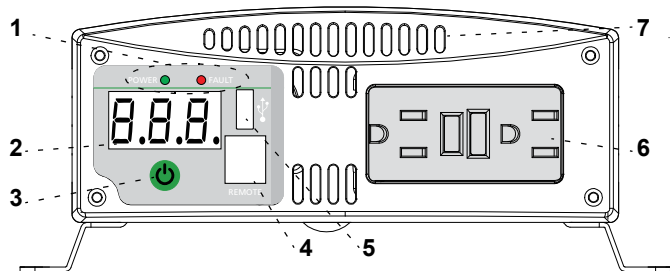


Figure 2 PurePower 1800 inverter front panel

Feature	Description
4	Remote Switch Port Use to connect the optional PurePower 1800 Remote Panel via a communications cable.
5	USB Port Powers and charges USB-enabled devices.
6	GFCI-protected AC Outlets Equipped with two AC outlets that are protected by a standard Ground Fault Circuit Interruptor (GFCI) device with reset and test buttons.
7	Ventilation Holes Allows internal heat to escape.

Feature	Description
1	Indicator LEDs Green LED indicates that the unit is on and receiving power. When a shutdown occurs due to an error condition the Green LED remains on. Red LED indicates an error or alarm condition.
2	Digital Display Shows input voltage (in volts), output power (in kilowatts), and error code information.
3	Power Switch Button Turns the inverter ON or OFF.

Back Panel Details

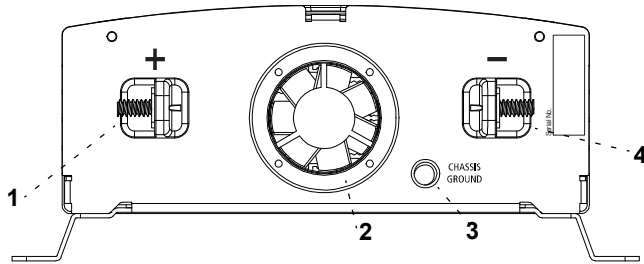


Figure 3 PurePower 1800 inverter Back Panel

Feature	Description
1	<p>Positive (+) DC Terminal</p> <p>Accepts lug or ring connectors appropriate to the cable size being used. See Table 1 : Voltage Drop Per Foot of DC Cable on page 10 for recommendations.</p>
2	<p>Cooling Fan</p> <p>Automatically turns on when internal temperature reaches more than 122 °F (50 °C). It turns off when the internal temperature falls below 122 °F (50 °C).</p>
3	<p>Chassis Ground (GND) Terminal</p>
4	<p>Negative (-) DC Terminal</p> <p>Accepts lug or ring connectors appropriate to the cable size being used. See Table 1 : Voltage Drop Per Foot of DC Cable on page 10 for recommendations.</p>

Installation

Guidelines

Follow all instructions from this guide and instructions including safety guidelines from the battery manufacturer. Installing battery cables require some electrical knowledge and local electrical codes.

WARNING

IMPROPER INSTALLATION BY AN UNQUALIFIED INSTALLER

If you do not have some electrical knowledge and knowledge of local electrical codes or are not comfortable installing cables yourself, use a qualified installer including a licensed technician and electrician. Qualified installers have knowledge and experience in installing electrical equipment, knowledge of the applicable installation codes, and awareness of the hazards involved in performing electrical work and how to reduce those hazards.

Failure to follow these instructions can result in death or serious injury.

Tools and Materials

- Adjustable wrench for fastening DC terminal bolts,
- Two battery cables (copper, appropriately sized according to application) with connectors already crimped by the company or store where you purchased the cables,
- Ground cable (copper, appropriately sized) for attaching to the ground chassis,
- DC-rated fuses (and fuse holders),
- Screwdriver (flathead and Philips), power screwdriver, or power drill for use in mounting the inverter,
- Mounting screws (4) size #10.

Basic Installation Steps

1. Determine battery capacity.
2. Determine a charging system.
3. Choose a location.
4. Mount the inverter.
5. Connect the chassis ground.
6. Connect the battery cables.

Determine Battery Capacity

Battery type and battery size strongly affect the performance of the PurePower 1800 inverter. Therefore, you need to identify the type of loads your inverter will be powering and how much you will be using them between charges. Once you know how much power you will be using, you can determine how much battery capacity you need. It is recommended that you purchase as much battery capacity as possible.

CAUTION

RISK OF INVERTER DAMAGE

Connect only to a battery that has a nominal output of 12 volts.
Do not connect to 6-volt or 24-volt battery systems.

Failure to follow these instructions can damage the unit and/or damage other equipment.

Determine A Charging System

The charging system must be appropriate for your particular installation. A well-designed charging system will ensure that power is available when you need it and that your batteries remain in top condition. Inadequate charging will degrade system performance and the wrong type of charger will reduce battery life. Contact Customer Service for battery recommendations.

Choose A Location

Install the PurePower 1800 inverter in a location that meets the following requirements:

Dry	Do not allow water or other liquids to drop or splash on the inverter.
Cool	Ambient air temperature should be between 32 °F and 104 ° F (0 °C and 40 ° C)—the cooler the better within this range.
Ventilated	Allow at least 2 inches (5 cm) of clearance around the inverter for air flow. Ensure that ventilation openings on the DC end and the bottom of the unit are not obstructed.
Safe	Do not install the inverter in the same compartment as batteries or in any compartment capable of storing flammable liquids like gasoline.
Close to battery	Do not use excessive DC cable lengths: they increase wire resistance and reduce input power.

Installation

Protected from battery gases | Do not mount the inverter where it will be exposed to gases produced by the batteries. These gases are very corrosive and prolonged exposure will damage the inverter.

NOTES:

When planning to install the PurePower 1800 inverter, be sure that you consider the location and orientation carefully.

The inverter may be used in marine applications beneath the weather deck that are always dry and protected from prolonged and sustained exposure to moisture and water. Even with the installation of additional drip protection such as drip shields¹, this will not prevent the entry of dripping water when the inverter is installed in outside areas of boats such as on the promenade or on the main and weather decks.

CAUTION

ELECTRICAL SHOCK HAZARD

Do not install in an open cockpit or on the weather deck of a marine vessel.

Failure to follow these instructions can result in minor or moderate injury.

¹. Drip shields order part number 808-1050.

Mount The Inverter

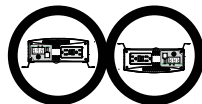
1. Select an appropriate mounting location and orientation. The unit can be oriented in any way, such as:

- Horizontally on a vertical surface or



DC connections should NOT point up or down.

- On or under a horizontal surface.



2. Hold the inverter against the mounting surface and mark the positions using the mounting flanges as guide.
3. Pilot-drill the four mounting holes.
4. Fasten the inverter to the mounting surface using corrosion-resistant hardware sized #10.

Connect the Chassis Ground



ELECTRICAL SHOCK HAZARD

Never operate the PurePower 1800 inverter without connecting it to the ground.

Failure to follow these instructions will result in death or serious injury.

The PurePower 1800 inverter has a screw terminal labeled CHASSIS GND on the outside of the rear panel as shown in Figure 3, “PurePower 1800 inverter Back Panel” on page 5.

Follow the guidelines below to connect the inverter’s chassis to the ground.

Grounding Locations

The chassis ground terminal must be connected to a grounding point. The grounding point varies depending on where you install the PurePower 1800 inverter. Follow the guidelines that correspond to your type of installation.

Recreational
Vehicle

Connect the CHASSIS GND screw to the vehicle’s chassis using a minimum 8 AWG copper wire^a (preferably with green/yellow insulation).

Fixed Location

Connect the CHASSIS GND screw to your system’s DC grounding point using a minimum 6 AWG wire^a. The system’s grounding point is usually the AC service entrance grounding point or a separate ground rod. For a solar PV (photovoltaic) installation, this is usually the same rod used to ground the PV array.

^a.It is recommended that the grounding conductor (grounding wire) should be the same wire size as the DC cables.

Connect The Battery Cables

IMPORTANT: Use of a qualified installer strongly recommended.

To operate safely and effectively, the PurePower 1800 inverter needs proper DC cables and DC-rated fuse(s). Because the PurePower 1800 inverter has low-voltage and high-current input, low-resistance wiring between the battery and the inverter is essential to deliver the maximum amount of usable energy to your load.

Cabling Guidelines

Follow these guidelines and refer to Table 1.

- Use 1/0 AWG copper (75 °C insulation rating) as the smallest battery cable size. It is the lightest gauge required by code and it will minimize the voltage drop between the battery and the inverter. If the cables cause an excessive voltage drop, the inverter may shut down when drawing higher currents because the voltage at the inverter input drops below 10.5 volts.
- Have all wires and cables terminated with correct and appropriately-sized connectors and have the connectors crimped at the place of purchase.
- Do not use aluminum wire. It has about 1.5 more resistance than copper cable of the same size, and it is difficult to make good, reliable connections.

Table 1 : Voltage Drop Per Foot of DC Cable

	Inverter Output (W)	1000	1500
	Current (A)	100	150
Wire Size (AWG)	Resistance (ohms/ft) @ 25 °C	Voltage Drop per Foot	
0	0.000100	0.0100	0.0150
2/0	0.000079	0.0079	0.0119
3/0	0.000063	0.0063	0.0095
4/0	0.000050	0.0050	0.0075

Note: It is recommended that a size 0 cable with a maximum cable length of 6 feet (1.8 m) be used.

Fuse/Circuit Breaker Sizing Guidelines

Because batteries can produce thousands of amps, you are required to install DC-rated fuses (or circuit breakers) that can safely withstand the short-circuit current batteries can produce.

To select the correct fuse type and size:

1. Determine the total cold cranking amp rating for your battery(s).

Note: The cold cranking amp rating of each battery is displayed on the battery case. If it is not, contact the battery manufacturer to find out.

For example:

- If you are using one battery to power your inverter and its rating is 500, the total cold cranking amp rating is 500.
 - If you are powering your inverter with two batteries in parallel, and each has a rating of 500, the total cold cranking amp rating is 1000.
2. Once you have determined the total cold cranking amp rating of your batteries, identify the corresponding Ampere Interrupting Capacity (AIC) of the fuse or breaker required for your system by referring to Table 2.

Note: The AIC is the amount of battery short-circuit amperage that the fuse can safely withstand.

- If the Total Cold Cranking Amps indicate that the AIC is 2,700 amps or less, see Table 3 for the correct ANL fuse.
- If the Total Cold Cranking Amps indicate that the AIC is up to 200,000 amps or if you require a “code fuse”, see Table 3 for the correct Class T fuse.

Table 2 Cold Cranking Amps / AIC

Total Cold Cranking Amps	Ampere Interrupting Capacity (AIC)
650 or less	1500
651–1100	3000
over 1100	5000

Table 3 Fuse Ratings

	ANL Fuse	Class T
PurePower 1800	250 A	250 A

Cabling Procedure

Consult the following configurations and determine a match specific to your installation and follow the installation procedure “To connect the battery cables:” that comes next.

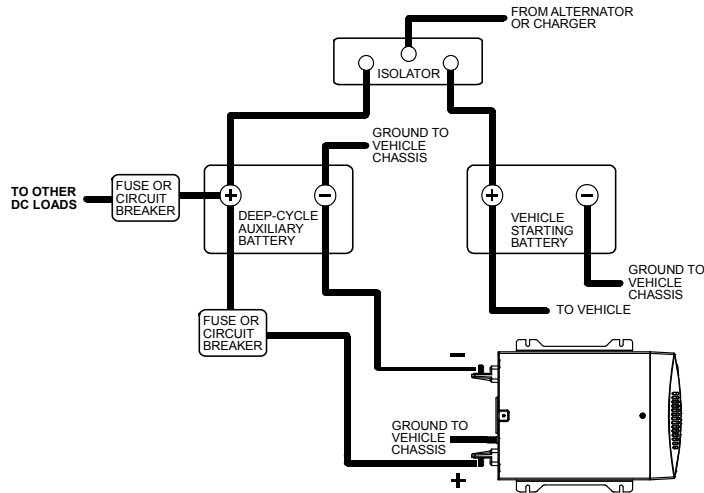


Figure 4 Configuration for Normal Loads

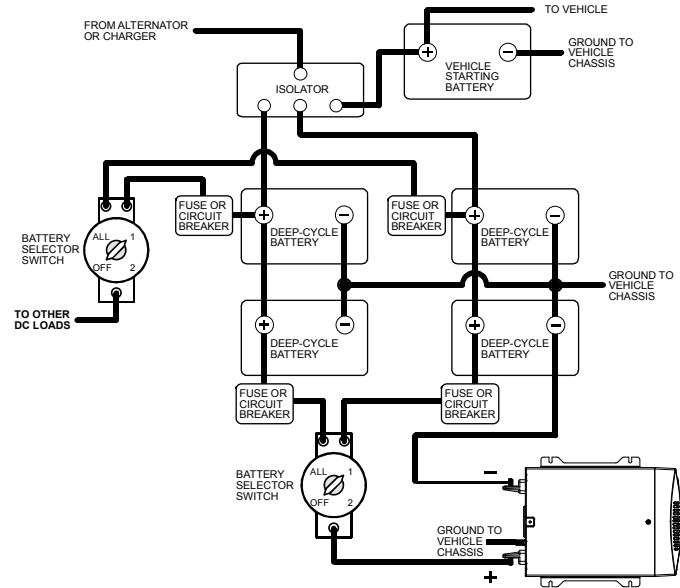


Figure 5 Configuration for Heavy Loads

To connect the battery cables:

1. Make sure the inverter is off and assemble the terminated cables (cables with connectors) that you bought.
2. Line up the connectors that will join the cables to the battery, battery selector switch, and fuse (or circuit breaker).

⚠ DANGER**ELECTRICAL SHOCK AND FIRE HAZARD**

Install a DC-rated fuse (and fuse holder) on the positive battery terminal. Note that the PurePower 1800 inverter does not come with a DC-rated fuse (or circuit breaker) to safely withstand the short-circuit current batteries can produce.

Failure to follow these instructions will result in death or serious injury.

3. Install a DC-rated fuse on the positive battery terminal.
Alternatively, install a DC-rated circuit breaker that connects to the positive battery terminal.
The fuse (or circuit breaker) must have an Ampere Interrupting Capacity (AIC) that exceeds the short-circuit current available from the battery. For guidance, see “Cold Cranking Amps / AIC” on page 11.
4. When configuring for heavy loads (see Figure 5), install a battery selector switch and connect it to the DC-rated fuse (or circuit breaker).
5. On the inverter side, attach the connectors of the positive and negative cables into the cabling terminals of the inverter.

Note: Make a secure connection. Loose connectors cause excessive voltage drop and may cause overheated wires and melted insulation.

Note: The red terminal is positive (+) and the black terminal is negative (-). Power connections to the PurePower 1800 inverter must be positive to positive and negative to negative.

CAUTION**DAMAGE DUE TO REVERSE POLARITY**

Do not connect positive cables to negative terminals (and vice-versa) as this will blow a fuse in the inverter and may permanently damage the unit. Damage caused by a reverse polarity connection is not covered by your warranty.

Failure to follow these instructions can damage the unit and/or damage other equipment.

6. Attach the connector on the positive cable to the DC-rated fuse (or circuit breaker) which is connected to the positive terminal of the battery.
When configuring for heavy loads (see Figure 5), attach the connector on the positive cable to the battery selector switch that is already connected to the DC-rated fuse (or circuit breaker).
Note: Make a secure connection. Loose connectors cause excessive voltage drop and may cause overheated wires and melted insulation.

DANGER

EXPLOSION AND FIRE HAZARD

Do not complete the next step if flammable fumes are present. Thoroughly ventilate the battery compartment before making this connection.

Failure to follow these instructions will result in death or serious injury.

7. Attach the connector on the negative cable to the negative battery terminal.
Note: This is the last cable connection. You may observe a spark when making this last connection.
Note: Make a secure connection. Loose connectors cause excessive voltage drop and may cause overheated wires and melted insulation.
8. If you have installed a battery selector switch, use it to select one of the batteries or battery banks.
9. Turn on the inverter.
10. Check the front panel of the inverter. The digital display should show 12–13 volts, depending on the voltage of the battery. If it does not, check your battery and the connection to the inverter. The other indicators should be off.

Operation

Turning the Inverter On and Off

The power switch on the inverter's front panel turns the control circuit in the PurePower 1800 inverter on and off.

To toggle the inverter on and off from its front panel:

1. Press the inverter's power switch button (for half a second) to turn On the inverter (from Off).
2. Press the inverter's power switch button (for one second) to turn Off the inverter (from On).

Note: When the inverter's power switch button is Off, the inverter draws no current from the battery.

IMPORTANT: The unit's power switch when turned off does not disconnect power from the PurePower 1800 inverter.

Operating Several Loads at Once

If you are going to operate several loads from the PurePower 1800 inverter, turn them on separately after you have turned the inverter on. This will ensure that the inverter does not have to deliver the starting current for all the loads at once.

Turning the Inverter Off Between Charges

If you are not planning to recharge your battery for a few days, switch the inverter off.

GFCI-Protected AC Outlets

The AC outlets are Ground Fault Circuit Interrupter (GFCI) outlets. This protects you against hazardous electrical shocks that could be caused by dampness, faulty mechanism in the appliance, worn insulation, etc.

IMPORTANT: Test the GFCI periodically to make sure it is operating correctly.

To test (or reset) the GFCI protection:

1. Press the unit's power switch to turn the inverter On.
2. Plug a test lamp into the AC outlet.
3. Push the TEST button.

Note: The RESET button should pop out and the power should turn Off (the lamp should go out). If the lamp remains lit, or if the RESET button does not pop out, the GFCI may not be functioning.

If the GFCI trips by itself at any time, reset it and perform the preceding test.

Reading the Front Panel Indicators

Indicator LEDs

- If the Green LED is On, it indicates that the unit is On. Under normal operating conditions, the AC outlets and USB port have power. However, even under an error condition such as a shutdown, the Green LED may still remain On.
- If the Red LED is on, it indicates an error or alarm condition and an error code is displayed on the digital display underneath the LED.

Digital Display

- Under normal operating conditions, the digital display shows the input voltage (in volts) and the output power (in kilowatts).
- Under error or alarm conditions, the digital display shows an error code and the Red LED turns on.

Description of LED and Digital Display Codes

LED	Digital Display	Description
Green	13.5	Example: 13.5 volts
Green	0.25	Example: 0.25 kW (250 watts)
Red	E 0 1	Under voltage alarm and/or Under voltage shutdown
Red	E 0 2	Over voltage shutdown
Red	E 0 3	Over load shutdown
Red	E 0 4	Over temperature shutdown
Red	E 1 0	Short circuit or output circuit overheat

Note: The audio alarm will sound for five minutes. After five minutes, the unit will turn off.

Restarting After an AC Output Shutdown

1. Press and hold the unit's power switch to turn it Off.
2. Remove all AC loads or let the unit cool down for 15 minutes.
3. Press and hold the unit's power switch to turn it On.

Operating Limits

Power Output

The PurePower 1800 inverter will deliver the following power continuously, depending on input voltage and ambient temperature. The inverter will deliver more than 10% of its continuous power rating for approximately five minutes. The inverter must cool down for 15 minutes before it can resume operation above its continuous power rating.

	Power ^a	Output Current ^b	Input Voltage	Temperature
PurePower 1800	1800 W	15 A	13 Vdc	Ambient 25 °C (77 °F)

a. Applies to resistive loads such as incandescent lights.

b. Applies to reactive loads such as motors.

Input Voltage

The input voltage limits are shown in the following table.

Operating Condition	Voltage Range	Comment
Normal	10.5–15.5 V	n/a
Peak Performance	13–14.5 V	n/a
Low Voltage Alarm	Voltage is 11.0 V or less	The audible low battery alarm sounds.
Low Voltage Shutdown	Voltage is 10.5 V or less.	The unit shuts down to protect the battery from being over-discharged.
High Voltage Shutdown	Voltage is 15.5 V or more.	The unit shuts down to protect itself from excessive input voltage. Note: Although the PurePower 1800 inverter incorporates over-voltage protection, it can still be damaged if input voltage exceeds 16 V.
Unit restarts after low voltage shutdown	11.5 V	The unit will not restart unless the battery voltage is acceptable for running the load.

Inverter Loads

The PurePower 1800 inverter will operate many AC loads within its power rating. However, some appliances and equipment may be difficult to operate. Please see “Exceptional Loads” below carefully.

USB Loads

A lot of USB-powered devices such as portable music (MP3) players, mobile phones, and video game players can be charged and powered safely via the standard USB port. However, some devices such as portable GPS receivers and certain cameras may not work and even cause damage even if you use the USB cable that came with the product. Be sure that the device only accepts 5 volts and can be charged or powered using other sources of power. See the device’s owner’s guide under specifications for information.

Exceptional Loads

Some household appliances such as freezers, pumps, and other motor-operated equipment need high surge currents to start. The PurePower 1800 inverter may not be able to start some of these motors even though their rated current draw is within the inverter’s limits.

If a motor refuses to start, observe the VOLTS indicator while you are trying to start the motor. If the indicator drops below 11 volts while the PurePower 1800 inverter is trying to start the motor, this

may explain why the motor won’t start. Make sure the length and wire gauge of the battery cables are appropriate. See Table 1. Check that the battery connections are good and that the battery is fully charged. If the cables are sized correctly, the connections are good, and the battery is charged, but the voltage still drops below 11 volts, you may need to use a larger battery.

Battery Charging Frequency

When possible, recharge your batteries when they are about 50% discharged or earlier. This gives them a much longer life cycle than recharging when they are almost completely discharged.

Maintenance

Routine maintenance is required to keep your PurePower 1800 inverter operating properly. Periodically you should:

- Clean the exterior of the unit with a damp cloth to prevent the accumulation of dust and dirt.
- Tighten the screws on the DC input terminals.

Troubleshooting

DANGER

ELECTRICAL SHOCK HAZARD

Do not dismantle the PurePower 1800 inverter. It does not contain any user-serviceable parts.

Do not attempt to service the unit yourself.

Failure to follow these instructions will result in death or serious injury.

Troubleshooting Reference

Condition	Possible Cause	Solution
E 0 1	Under Voltage (low input) shutdown	Recharge the battery. Check cables and connection if secure.
E 0 1 with persistent low battery alarm.	Poor DC wiring and/or poor battery condition	Use proper cable and make secure connections. Charge the battery or install a new battery.

Condition	Possible Cause	Solution
E 0 2	Over Voltage (high input) shutdown	Make sure the inverter is connected to a 12 V battery.
E 0 3	Overload shutdown	Reduce the load within the inverter's continuous power rating.
E 0 4 Heavy load is connected then AC output becomes unavailable.	Over temperature shutdown	Allow the inverter to cool off and reduce the load if continuous operation is required.
E 0 4 Normal load is connected then AC output becomes unavailable.	Over temperature shutdown	Improve ventilation and make sure the inverter's ventilation openings are not obstructed. Reduce the ambient temperature, if possible.

Condition	Possible Cause	Solution
E 10 No output voltage.	Short circuit Very heavy load Output circuit overheat	Check the AC wiring for a short circuit. Remove the load. Turn the unit off. Let the unit cool down, check the fan for any obstructions and clear it, or reduce the load. Turn the unit back on.
No output voltage; no voltage indication.	The unit is off. No power to the inverter. Inverter fuse open. Reverse DC polarity.	Turn the inverter on. Check wiring to the inverter. Have a qualified service technician check and replace the fuse if necessary. Have a qualified service technician check and replace the fuse, making sure to observe correct polarity.

Condition	Possible Cause	Solution
The unit is on and running but there is no AC output.	The GFCI device tripped.	Reset the GFCI. See page 16 for instructions.

Specifications

Note: Specifications are subject to change without prior notice.

Physical and Environmental Specifications

Length × Width × Height	13.8×11.8×3.9 inch. (35×30×10 cm)
Weight	10.6 lbs. (4.8 kg)
Operating temperature	32–104 °F (0–40 °C)
DC Input	
Input power (max at full load)	2400 VA
Input current (max at full load)	200 A
Input voltage range	10.5–15.5 Vdc
Low battery alarm	Audible, 11 V
Low battery cutout	10.5 V
AC / USB Output	
Peak power (5 minutes)	2000 W
Continuous power	1800 W
Surge power	3000 W

AC / USB Output	
Output current (max. continuous)	15 A
No load current draw	< 800 mA
Output voltage (nominal)	120 Vac
Output voltage range	104–127 Vac
Output waveform	True sine wave
Output frequency	60 Hz ±0.5Hz
Efficiency	Approximately 85–90%
USB Output	5 Vdc, 500 mA

Regulatory Approvals

UL 458 5th edition (including marine supplement)	Power Converters/Inverters and Power Converter/Inverter Systems for Land Vehicles and Marine Crafts
CSA C22.2 No. 107.1-01	Power Conversion Equipment
FCC Part 15, Industry Canada ICES-0003, Class B	Electromagnetic Compatibility (EMC)

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