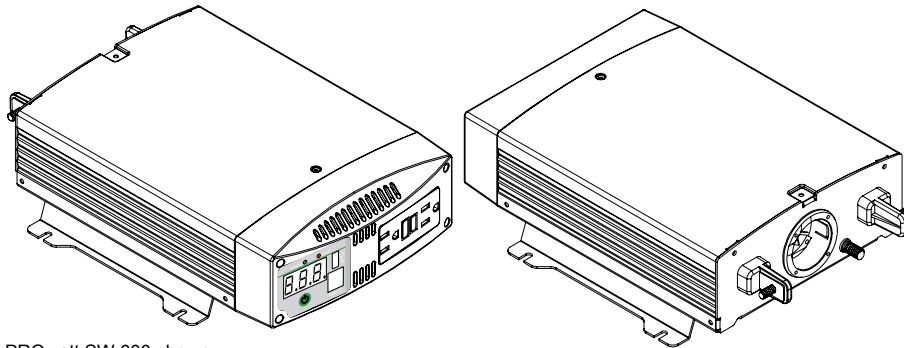


Smart choice for power™

xantrex™



PROwatt SW 600 shown.

***PROwatt™* SW Sine Wave Inverter**

Owner's Guide

PROwatt SW 600
PROwatt SW 1000
PROwatt SW 2000

About This Guide

Purpose

The purpose of this Owner's Guide is to provide explanations and procedures for operating, installing, maintaining, and troubleshooting the PROwatt™ SW 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.

Xantrex recommends 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 PROwatt™ SW 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.

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

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.

Important Safety Instructions

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

This chapter contains important safety instructions for the PROwatt™ SW Sine Wave Inverter.

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

DANGER

ELECTRICAL SHOCK HAZARD

- Do not expose the PROwatt SW 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 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 PROwatt™ SW 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 A 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 PROwatt™ SW Sine Wave Inverter. The PROwatt SW 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 PROwatt™ SW Sine Wave Inverter, carefully read and follow the instructions in this guide.

PROwatt SW Inverter Series

There are three PROwatt SW Inverter models in the series namely:

- PROwatt SW 600,
- PROwatt SW 1000, and
- PROwatt SW 2000.

This Guide contains information about all three models. Unless specified by the model name, all features, functions, and instructions will pertain to all models. All the models of the inverter will be referred to collectively as PROwatt SW Inverter.

Quality Power

The PROwatt SW 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 PROwatt SW 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.

Model	Continuous	Surge Power
PROwatt SW 600	540 watts	1200 watts
PROwatt SW 1000	900 watts	2000 watts
PROwatt SW 2000	1800 watts	3000 watts

- The unit's low standby battery demand means you don't 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.

Introduction

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 PROwatt 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 PROwatt SW 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 PROwatt SW Inverter. We recommend that you familiarize yourself with these features before installing and operating the unit.

Materials List

Your PROwatt SW Inverter package includes these items:

- PROwatt SW Inverter unit,
- Owner's Guide.

If any of these materials are missing or are unsatisfactory in any way, please contact Customer Service (see "Contact Information" on page i of this guide).

Optional Accessory

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

In marine applications, Xantrex recommends the use of additional drip protection such as drip shields (part number 808-1050). See notes on page 8.

For ordering information, please contact Customer Service (see "Contact Information" on page i of this guide). Please reference the part number above when ordering.

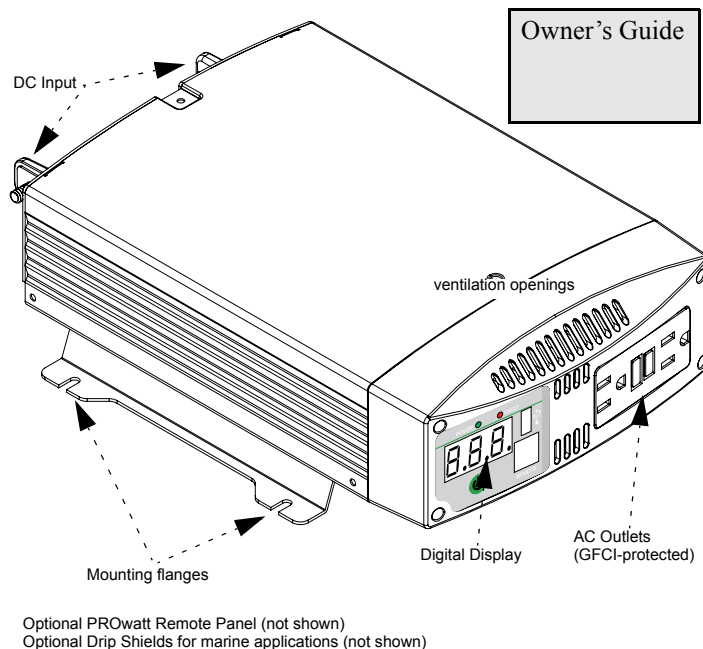


Figure 1 PROwatt SW Inverter (PROwatt SW 600 shown)

Front Panel Details

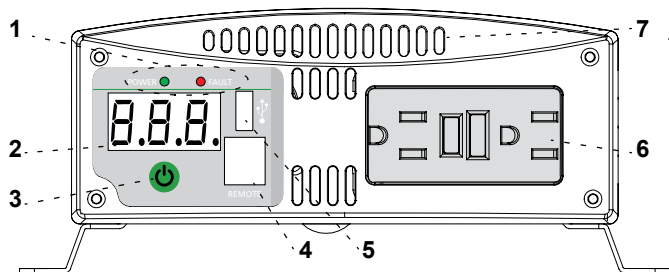


Figure 2 PROwatt SW Inverter Front Panel (PROwatt SW 600 shown)

Feature	Description
3	Power Switch Button Turns the inverter ON or OFF.
4	Remote Switch Port Use to connect the optional PROwatt 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.

Back Panel Details

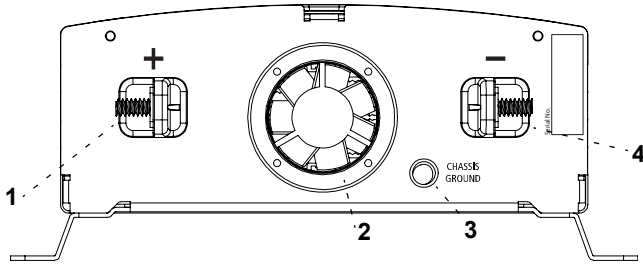


Figure 3 PROwatt SW Inverter Back Panel (PROwatt SW 600 shown)

Feature	Description
3	Chassis Ground (GND) Terminal
4	Negative (-) DC Terminal 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.

Feature	Description
1	Positive (+) DC Terminal 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.
2	Cooling Fan 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).

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.

CAUTION

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 damage the unit and/or damage other equipment.

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 PROwatt SW 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. Xantrex recommends 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.

Choose A Location

Install the PROwatt SW 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.

Installation

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.
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 PROwatt SW Inverter, be sure that you consider the location and orientation carefully.

The inverter may be used in marine applications such as inside boat compartments 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.

1. Drip shields order part number 808-1050.

Mount The Inverter

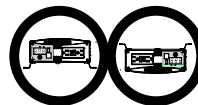
1. Select an appropriate mounting location and orientation. The unit can be oriented in any way, such as:

- 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

⚠ DANGER

ELECTRICAL SHOCK HAZARD

Never operate the PROwatt SW Inverter without connecting it to the ground.

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

The PROwatt SW Inverter has a screw terminal labeled CHASSIS GND on the outside of the rear panel as shown in Figure 3, “PROwatt SW Inverter Back Panel (PROwatt SW 600 shown)” 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 PROwatt SW 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.Xantrex recommends 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 PROwatt SW Inverter needs proper DC cables and DC-rated fuse(s). Because the PROwatt SW 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.

Cablings Guidelines

Follow these guidelines and refer to Table 1 : Voltage Drop Per Foot of DC Cable on page 10 to determine battery cable lengths.

- Use 4 AWG copper (90 °C insulation rating) as the smallest battery cable size. This 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.
- Keep all cables as short as possible, and ensure that each cable between the inverter and the battery is no longer than 6 feet (1.8 m).
- 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. It has about 1/3 more resistance than copper cable of the same size, and it is difficult to make good, low-resistance connections to aluminum wire.

Table 1 : Voltage Drop Per Foot of DC Cable

	Inverter Output (W)	600	1000	1500	3000
	Current (A)	60	100	150	300
Wire Size (AWG)	Resistance (ohms/ft) @ 25 °C	Voltage Drop per Foot			
4	0.000253	0.0152	0.0253	0.0380	0.0759
3	0.000201	0.0121	0.0201	0.0302	0.0603
2	0.000159	0.0096	0.0159	0.0239	0.0477
1	0.000126	0.0076	0.0126	0.0189	0.0378
0	0.000100	0.0060	0.0100	0.0150	0.0300
2/0	0.000079	0.0048	0.0079	0.0119	0.0237
3/0	0.000063	0.0038	0.0063	0.0095	0.0189
4/0	0.000050	0.0030	0.0050	0.0075	0.0150

Note: Xantrex recommends a size 0 cable with a maximum cable length of 6 feet (1.8 m).

For example:

Note: Voltage Drop per foot = Current value × Resistance value
 So for a 600 W inverter output with a DC cable of size 0, multiply the maximum current of 60 A with 0.000100. The result is 0.00600 voltage drop per feet. If the cable is 6 feet long, the total voltage drop is $0.00600 \times 6 (\times 2) = \mathbf{0.072}$. (Cable length multiplied by 2.)
 So for a battery operating at 12.6 V at battery terminal the voltage at the inverter terminal drops to 12.53 V.

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

Model	ANL Fuse	Class T
PROwatt SW 600	80 A	80 A
PROwatt SW 1000	150 A	150 A
PROwatt SW 2000	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.

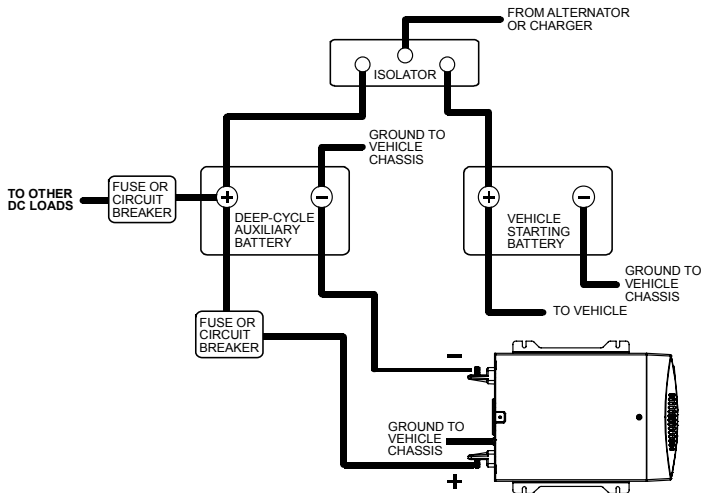


Figure 4 Configuration for Normal Loads

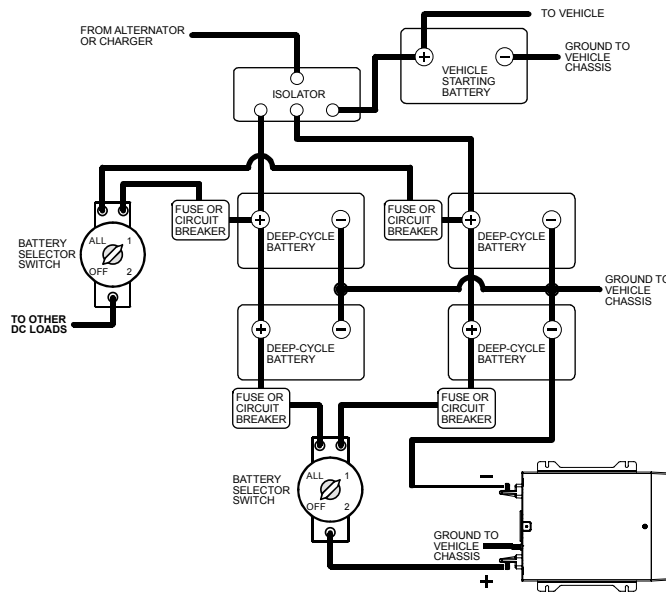


Figure 5 Configuration for Heavy Loads

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 PROwatt SW 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 PROwatt SW 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 PROwatt SW 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 PROwatt SW Inverter.

Operating Several Loads at Once

If you are going to operate several loads from the PROwatt SW 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

When the power switch is on but no power is being supplied to a load, the inverter draws less than 800 mA from the battery. This is a low current draw. It would take a week to discharge a 150 Ah battery at this current, so you don't have to worry about excessive drain on your battery if you leave the inverter switched on for a few days.

If you are not planning to recharge your battery within a week or so, 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. GFCI-protected outlets cut off hazardous electrical shocks quickly enough so an adult in normal health is not seriously injured (infants and small children may still be affected).

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

Operation

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 PROwatt SW 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.

Model	Power ^a	Output Current ^b	Input Voltage	Temperature
PROwatt SW 600	540 W	4.5 A	13 Vdc	Ambient 25 °C (77 °F)
PROwatt SW 1000	900 W	7.5 A		
PROwatt SW 2000	1800 W	15 A		

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.
Operating Condition	Voltage Range	Comment
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 PROwatt SW 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 PROwatt SW 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 induction motors used in freezers, pumps, and other motor-operated equipment need high surge currents to start. The PROwatt SW 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 PROwatt SW Inverter is trying to start the motor, this may explain why the motor won’t start. Make sure the length and

diameter of the battery cables are appropriate. 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 PROwatt SW 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 PROwatt SW 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.

Troubleshooting

Condition	Possible Cause	Solution
E 10 No output voltage.	Short circuit	Check the AC wiring for a short circuit.
	Very heavy load	Remove the load.
	Output circuit overheat	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.

Condition	Possible Cause	Solution
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.
	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	12.2×8.7×3.5 inch. (31×22×8.9 cm)
• PROwatt SW 600	14×9×3.5 inch. (35×22×8.5 cm)
• PROwatt SW 1000	13.8×11.8×3.9 inch. (35×30×10 cm)
• PROwatt SW 2000	
Weight	
• PROwatt SW 600	6.5 lbs. (3.0 kg)
• PROwatt SW 1000	7.2 lbs. (3.3 kg)
• PROwatt SW 2000	10.6 lbs. (4.8 kg)
Operating temperature	32–104 °F (0–40 °C)

DC Input	600	1000	2000
Input power (max at full load)	720 VA	1200 VA	2400 VA
Input current (max at full load)	60 A	93 A	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	600	1000	2000
Peak power (5 minutes)	600 W	1000 W	2000 W
Continuous power	540 W	900 W	1800 W

AC / USB Output	600	1000	2000
Surge power	1200 W	2000 W	3000 W
Output current (continuous)	4.6 A	7.5 A	15 A
Output current (max)	5.8 A	9.6 A	19.2 A
No load current draw	< 600 mA	< 600 mA	< 800 mA
Output voltage (nominal)	120 Vac RMS ±5%		
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 107.1-01	General Use Power Supplies
FCC Part 15, Class A	Electromagnetic Compatibility (EMC)