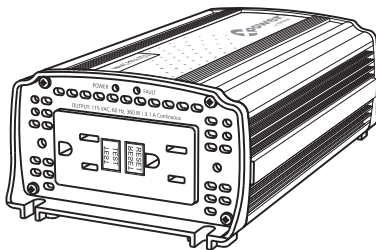




XPower™ Inverter 450



Owner's Manual

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Date and Revision

June 2014 Revision B

Product Numbers

851-0451 (no accessories)

851-0452 (with accessories)

Part Number

975-0129-01-01

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1 Introduction

Thank you for purchasing the XPower Inverter 450. The XPower 450 is part of a family of advanced high-performance power inverters from Xantrex, the leader in high-frequency inverter design.

The XPower 450 efficiently powers a wide variety of AC loads, such as compact TVs and VCRs, laptops, camcorder and cell phone chargers, compact fluorescent lights, and soldering irons. Depending on the model, the XPower 450 can connect to the 12-volt battery in your vehicle to power your devices.

The XPower 450 uses solid state power electronics that includes automatic safety monitoring circuitry to protect it, and your battery, from inadvertent overload conditions.

Read this guide before connecting or using the XPower 450, and save it for future reference. The main topics in the guide are:

- Safety information ([page 2](#))
- XPower 450 features ([page 7](#))
- Instructions for connecting the inverter ([page 10](#))
- Operating guidelines ([page 19](#))
- Troubleshooting information ([page 24](#))
- Specifications ([page 30](#))

2 Important Safety Information

Misusing or incorrectly connecting the XPower Inverter 450 may damage the equipment or create hazardous conditions for users. Read the following safety instructions and pay special attention to all Caution and Warning statements in the guide.

Danger and Warnings identify conditions that may result in personal injury or loss of life.

Cautions identify conditions or practices that may damage the unit or other equipment.

Warnings and cautions

 **DANGER**

ELECTRICAL SHOCK HAZARD

- Keep children away from the XPower Inverter 450 inverter. The inverter generates the same potentially lethal AC power as a normal household wall outlet. Treat the outlet with respect!
- Do not use the XPower Inverter 450 in the presence of flammable fumes or gases, such as in the bilge of a gasoline powered boat, or near propane tanks. Do not use the XPower Inverter 450 in an enclosure containing automotive-type, lead-acid batteries. These batteries, unlike sealed batteries, vent explosive hydrogen gas, which can be ignited by sparks from electrical connections.

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

WARNING

HEATED SURFACE HAZARD

The XPower Inverter 450 housing may become uncomfortably warm, reaching 140° F (60° C) under extended high power operation. Ensure that at least 2 inches (5 cm) of air surround the inverter. During operation, keep it away from materials that may be affected by high temperatures.

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

WARNING

HEATED SURFACE HAZARD

1. Batteries generate explosive gases during normal operation. Read this guide and follow the instructions exactly before installing or using your inverter.
2. This equipment contains components that tend to produce arcs or sparks. To prevent fire or explosion, do not install the inverter in compartments containing batteries or flammable materials, or in locations that require ignition-protected equipment. These locations include any space containing gasoline-powered machinery, fuel tanks, as well as joints, fittings, or other connections between components of the fuel system.

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

WARNING

EXPLOSION AND FIRE HAZARD

1. Follow all instructions published by the battery manufacturer and the manufacturer of the equipment in which the battery is installed.
2. Make sure the area around the battery is well ventilated.
3. Never smoke or allow a spark or flame near the engine or batteries.
4. Use caution to reduce the risk of dropping a metal tool on the battery, which could spark or short circuit the battery or other electrical parts and could cause an explosion.
5. Remove metal items like rings, bracelets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short-circuit current high enough to weld a ring or the like to metal, and thus cause a severe burn.
6. If you need to remove a battery, always remove the ground terminal from the battery first. Make sure all accessories are off so you don't cause a spark.

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

CAUTION

RISK OF DAMAGE TO EQUIPMENT: OUTPUT IS NON-SINUSOIDAL

Some chargers for small nickel-cadmium batteries can be damaged if connected to the XPower Inverter 450. Do not use the inverter with the following appliances:

- Small battery-operated appliances like rechargeable flashlights, some rechargeable shavers, and night lights that are plugged directly into an AC receptacle to recharge.
- Battery chargers used in hand power tools. These chargers display a warning label stating that dangerous voltages are present at the charger battery terminals.
- Do not connect any AC load, which has its neutral conductor connected to ground, to the XPower 450.

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

CAUTION

RISK OF DAMAGE TO THE XPOWER 450 INVERTER

- Do not insert foreign objects in the XPower 450 outlets or openings.
- Never connect the inverter to power utility AC distribution wiring.
- Do not use the XPower 450 in temperatures over 100° F (40° C).
- Do not expose the XPower 450 to water, rain, snow, or spray.
- Do not connect live AC power to the XPower 450's AC outlets. The inverter will be damaged even if it is switched OFF.

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

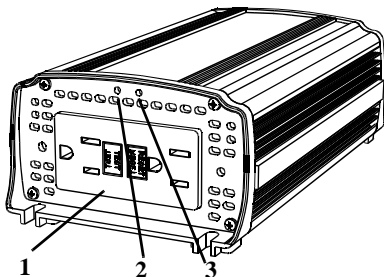
Safety features

These advanced safety features are built into the XPower 450:

- Electronic overload protection with automatic shutdown
- Built-in internal backup DC fuse
- Low battery voltage warning followed by automatic shutdown
- High-input voltage protection with automatic shutdown
- Overheating protection with automatic shutdown
- Output short circuit protection
- GFCI (Ground Fault Circuit Interrupter) outlet

3 Features

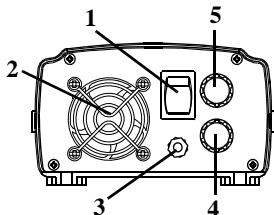
AC panel



Number	Feature
1	GFCI AC Outlet The XPower 450 has one dual GFCI AC outlet. It allows you to plug in any combination of 120 V AC products with a total continuous power consumption of 360 W.
2	Power Light The green POWER light indicates that AC power is present at the GFCI outlet and the XPower 450 is operating normally.
3	Fault Light The red FAULT light indicates that the inverter has shut down because of low or high battery voltage, AC overload, or excessively high temperatures.

Number	Feature
Not shown	Audible Alarm An audible alarm warns you of a high- temperature shutdown or of an impending low battery voltage shutdown.

DC panel

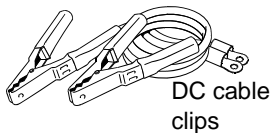
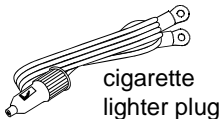


Number	Feature
1	<p>On/Off Switch The two positions on the On/Off switch are indicated as follows:</p> <p>⏻ = Off (Standby) and I = On.</p> <p>When the inverter is connected to a DC power source and the switch is on, AC power is available at the AC outlet.</p>
2	<p>Cooling Fan When output power is greater than approximately 50 W, the fan turns on to help maintain optimum operating temperature.</p>

Number	Feature
3	Chassis Ground Screw During installation, the chassis ground screw is connected to a chassis ground wire that connects to the grounding point on your boat or vehicle.
4	Negative DC Terminal Connection point to the negative battery terminal.
5	Positive DC Terminal Connection point to the positive battery terminal.

Accessories

Applicable only to product number 851-0452.



4 Installation

Installing the XPower 450 requires five steps:

1. Choosing a location.
2. Mounting the inverter.
3. Connecting DC power to the inverter using either:
 - the cigarette lighter plug (applicable only to product number 851-0452)
 - DC cable clips (applicable only to product number 851-0452) and a battery
 - hardwiring the inverter to the battery
4. Connecting the chassis ground.
5. Testing the AC outlet.

Choosing a location

For best performance, choose a location that is:

- **Dry** Do not expose the inverter to water drip or spray.
- **Cool** Operate the inverter in ambient temperatures between 0° C and 40° C (32° F and 100° F). Keep it away from heating vents and direct sunlight.
- **Well ventilated** For proper cooling, allow at least 5 cm (2 in.) of clearance around the inverter.
- **Clean and free of dust and dirt** Choose a location that is free of any debris that could get into the inverter.

Mounting the inverter

Before mounting the inverter, please see “[Choosing a location](#)”.

To mount the inverter:

1. Make sure the ON/OFF switch is in the OFF position.
2. Select an appropriate mounting location and orientation. The inverter must be oriented in one of the following ways:
 - Horizontally on a vertical surface. Do not mount with the fan pointing up or down.
 - On or under a horizontal surface
3. Hold the inverter against the mounting surface, mark the positions of the mounting screws, and then remove the inverter.
4. Pilot drill the four mounting holes.
5. Fasten the inverter to the mounting surface using corrosion-resistant #8 screws.

Using the DC cable with cigarette lighter plug

Due to the limitations of 12 V outlets in boats and vehicles, the XPower 450 should be used with the DC cable with cigarette lighter plug (supplied only with product number 851-0452) only to supply AC power to products that require 150 W (about 1.3 A) or less. If your application requires more than 150 W or has a high start-up surge, see **Using the DC cable clips**.

CAUTION

REVERSE POLARITY DAMAGE

A reverse polarity connection (positive to negative) may damage the power inverter. Damage caused by a reverse polarity connection is not covered under warranty.

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

1. Attach the ring-type connector marked with red to the positive (+) DC terminal on the power inverter, and attach the ring connector marked with black to the negative (-) DC terminal.
2. With star washer in place, tighten the nut on each DC terminal by hand until it is snug. Do not over-tighten.
3. Insert the plug of this cable into the 12 V outlet and switch the power inverter “ON”.
4. When the power inverter is not in use, unplug it from the 12 V outlet to prevent slight discharge of the battery.

Using the DC cable clips

By directly connecting the power inverter to a 12 V battery using the DC cable clips (supplied only with product number 851-0452), you can operate products with power requirements up to 360 W continuous.

1. Follow steps 1 and 2 under “[Using the DC cable with cigarette lighter plug](#)” to attach the ring-type connectors.
2. Attach the negative (black) clip to the negative (–) battery terminal.
3. Attach the positive (red) clip to the positive (+) battery terminal. Make sure both clips are securely connected to the battery terminals, as a loose connection will cause the voltage to drop and may cause the cables to overheat, resulting in equipment damage or fire.
4. Switch the power inverter “ON”.
5. When the power inverter is not in use, disconnect the DC cable clips from the battery to prevent slight discharge of battery.

Hardwiring the inverter to the battery

A hardwiring illustration is shown in [Figure 1](#).

WARNING

SHOCK AND FIRE HAZARD

Have a qualified installer perform a hardwired installation.

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

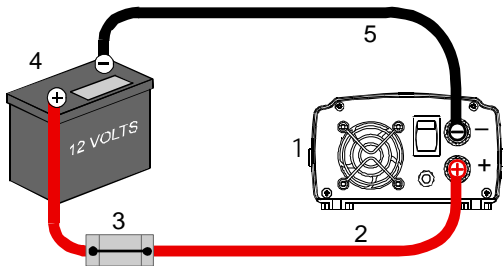


Figure 1 Hardwiring the inverter to a 12 V battery

1. XPower Inverter 450

4. 12 V battery

2. 8 AWG red wire from the positive inverter terminal to the positive battery terminal (via the fuse)

5. 8 AWG black wire from the negative inverter terminal to the negative battery terminal

3. 60 ADC automotive or marine fuse

To hardwire the inverter to a 12 V battery:

1. Make sure the power inverter's ON/OFF switch is in the OFF position.
2. Use an 8 AWG (or heavier) wire to a maximum total length of 2 m (6.5').
3. Install a 60 ADC automotive fuse in the positive (red) wire, close to the end that will attach to the battery.

4. Solder or crimp the heavy-duty terminals to the positive and negative wires. Use terminals that mate properly with the battery terminals or existing battery cable clamps.

CAUTION

INVERTER DAMAGE

- Reversing the positive and negative battery cables will damage the inverter and will void your warranty.
- Before connecting the inverter to the battery, double check the connections: The red wire must be connected to the red terminal on the inverter and the positive (+) terminal on the battery; the black wire must be connected to the black terminal on the inverter and the negative (-) terminal on the battery.

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

5. Remove the nuts from the DC terminals on the inverter.
6. Place the red ring connector on the red (positive +) DC terminal on the inverter. With star washer in place, screw the red nut on until it is snug. Do not over-tighten.
7. Fasten the positive terminal (red wire) to the positive battery post.
8. Fasten the negative terminal (black wire) to the negative battery post.
9. Place the black ring connector on the black (negative -) DC terminal on the inverter. With star washer in place, screw the black nut on until it is snug. Do not over-tighten.
10. Switch the inverter's ON/OFF switch to the "ON" position. The green power light comes on, and AC power is available at the outlet.

Connecting the chassis ground




DANGER

ELECTRICAL SHOCK HAZARD

Never operate the inverter without properly connecting the chassis ground. An electrical shock hazard could result from improper grounding.

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

The inverter has a chassis ground terminal screw on the rear panel marked . Follow the guidelines under “[Grounding locations](#)” to connect the inverter’s chassis to the ground.

Grounding locations

You must connect the chassis ground terminal to a grounding point. The grounding point varies depending on where you install the inverter.

Follow the instructions that correspond to your type of installation.

To connect the chassis ground terminal to a grounding point:

- Connect the chassis ground screw to the boat’s DC ground bus or engine negative bus using recommended copper wire (if insulated, use green insulation with or without one or more yellow stripe) or larger.
- Connect the chassis ground screw to the vehicle’s chassis using recommended copper wire (if insulated, use green insulation with or without one or more yellow stripe) or larger.

Chassis ground screw

We recommend that you attach the cable to the chassis ground screw with a ring terminal. This procedure will ensure that the wire does not slip off the chassis ground screw. See [Figure 2](#).

To connect the cable to the chassis ground screw:

1. Make sure the inverter's ON/OFF switch is in the OFF position.
2. Strip 1/2" (13 mm) to 3/4" (19 mm) of insulation from one end of each cable.
3. Attach the ring connector that will join the cable to the chassis ground screw. The connector you use must create a permanent, low-resistance connection.
4. Remove the chassis ground nut and split washer from the chassis ground screw.
5. Place the ring connector over the chassis ground screw and against the flat washer.
6. Replace the split washer and tighten the chassis ground nut.

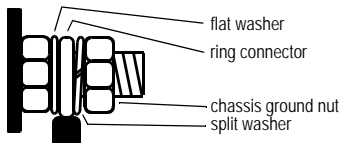


Figure 2 Connecting the grounding cable

Testing the GFCI-protected AC outlet

The outlet on the XPower 450 is a Ground Fault Circuit Interrupter (GFCI) outlet. A GFCI outlet protects you against hazardous electrical shocks that could be caused by dampness, faulty mechanism, worn insulation, and so on. You might still feel shock, but the GFCI should cut it off quickly enough so an adult in normal health is not seriously injured (infants and small children may still be affected).

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

To test the GFCI protection:

1. Switch the power inverter “ON”.
2. Plug a test lamp into the outlet.
3. Push the “TEST” button.

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, take the product back to the store where it was purchased and get a replacement or contact Xantrex for under warranty replacement.

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

5 Operation

Operating statuses

This section describes normal operation as well as problems that could occur when you use the inverter. If you have a problem, see [“Troubleshooting” on page 24](#).

The XPower Inverter 450 is capable of continuously powering most 120 V AC products that use 360 W or less. Its AC output waveform, called “modified sine wave,” is designed to function similarly to the sine wave shape of utility power.

The power, or “wattage,” rating of AC products is the average power they use. When most AC products are first switched on, they initially consume more power than their power rating. TVs, monitors, and electric motors are examples of products that have high “surge” requirements at start up. Although the XPower 450 can supply momentary surge power as high as 700 W, occasionally some products rated less than 360 W may exceed its surge capabilities and trigger its safety overload shutdown feature. If this problem occurs when attempting to operate several AC products at the same time, first try switching on the inverter with all AC products switched off, then one by one switch each on, starting with the high surge product first.

Inverter operation

1. When properly connected to a 12 V outlet or battery, turning the inverter switch “ON” will illuminate the green “POWER” light, and deliver AC power to the outlet(s).
2. Plug the AC product(s) you wish to operate into the GFCI outlet(s) and switch them on, one at a time.
3. As the battery is used, voltage begins to fall. When the XPower 450 senses that the voltage at its DC input has dropped to 11 V, an audible alarm sounds. This alarm warning allows time for computers or other sensitive devices to be shut down.
4. If the audible alarm is ignored, the XPower 450 will automatically shut down when the battery voltage drops to 10.5 V. This auto-shutdown prevents the battery from being damaged. After auto-shutdown, the red “FAULT” light illuminates and the alarm will sound.

IMPORTANT: Boat or vehicle starting batteries are designed to provide brief periods of very high current needed for engine starting, and are not intended for constant deep discharge. Regularly operating the XPower 450 from a boat battery until the low voltage alarm sounds will shorten the life of the battery. Consider connecting the power inverter to a separate deep-cycle battery if you will be frequently running electrical products for extended periods of time.

5. If an AC product rated higher than 360 W (or which draws excessive surge power) is connected, the XPower 450 will shut down. The red “FAULT” light will turn on.
6. If the XPower 450 exceeds a safe operating temperature due to insufficient ventilation or a high-temperature environment, it will automatically shut down. The red “FAULT” light will turn on and the audio warning will sound.

7. Should a defective battery charging system cause the battery voltage to rise to dangerously high levels, the XPower 450 will automatically shut down. The red “FAULT” light will turn on.

CAUTION

INVERTER DAMAGE

Although the XPower 450 incorporates protection against over-voltage, it may still be damaged if the input voltage exceeds 16 V. Damage may void the warranty.

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

8. The cooling fan on the unit is designed to operate only when output power is greater than approximately 50 W. When inverter is turned on, the fan may operate momentarily.
9. In the event of an overload, low battery voltage or overheating, the XPower 450 will automatically shut down.

Battery operating time

Operating time will vary depending on the charge level of the battery, its capacity and the power level drawn by the particular AC load. With a typical boat battery (60 Ah) and a 100 W load (such as a small TV), an operating time of 2 to 3 hours or more can be expected.

When using a boat battery as a power source, it is strongly recommended to start the boat every hour or two to recharge the battery before its capacity drops too low. The XPower 450 can operate while the engine is running, but the normal voltage drop that occurs during starting of the engine may trigger the inverter's

low voltage shutdown feature. Because the power inverter draws less than 0.25 A with the ON/OFF switch in the “ON” position and with no AC products connected, it has minimal impact on battery operating times.

The battery operating time of the XPower 450 depends on the charge level of the battery, battery capacity, and the amount of power drawn by the AC loads you are operating. With a typical vehicle battery, you can expect the following:

Table 1 Battery Operating Times

Load	Sample Appliance	Operating Time (continuous)
50 watts	CD player	5–6 hours
100 watts	small TV	3–4 hours
200 watts	computer system	1–2 hours

6 Maintaining Battery Condition

Here are some guidelines that will help to preserve your battery.

Using vehicle batteries

- Vehicle batteries are not designed for repeated deep-discharge cycles, and constantly recharging a vehicle's battery will shorten its life. Therefore, when you are using a vehicle battery as a power source, start the vehicle every hour or two to recharge the battery.
- The XPower 450 will operate while the engine is running, but the voltage drop that occurs when the engine starts may trigger a low voltage shutdown.
- Vehicle batteries are designed to provide brief periods of very high current needed for engine starting. They are not intended for constant deep discharge. Regularly operating the XPower 450 from a vehicle battery until the low voltage alarm sounds will shorten the life of the battery. Consider connecting the XPower 450 to a separate deep discharge type battery if you will be frequently running electrical products for extended periods of time.

Minimizing power draw

- If you are not going to use the XPower 450 for more than a week, turn off the On/Off switch. The inverter draws less than 0.2 amps when the On/Off switch is on and no load is connected, but it will eventually discharge the battery.

7 Troubleshooting

This section will help you identify the source of most problems that can occur with the XPower 450.

If you have a problem with the inverter, please review this section before contacting Xantrex Customer Service. If you are unable to solve a problem and need to contact Xantrex, please prepare for the call by writing down the following details:

- When and where purchased
- Inverter's serial number
- How long the inverter has been in use
- Where it is installed
- Appliances operating when the problem occurred
- A brief description of the problem

Common problems



DANGER

ELECTRICAL SHOCK HAZARD

Do not dismantle the XPower 450. It does not contain any user-serviceable parts. Attempting to service the inverter yourself could result in an electrical shock or burn.

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

Buzz in audio systems

Some inexpensive stereo systems have inadequate internal power supply filtering and buzz slightly when powered by the XPower 450. The best solution is to use an audio system with a good quality filter.

Television interference

The XPower 450 is shielded to minimize interference with TV signals. If TV signals are weak, you may see interference in the form of lines scrolling across the screen. Try one of these suggestions to minimize or eliminate the problem:

- Increase the distance between the XPower 450 and the TV, antenna, and cables.
- Adjust the orientation of the XPower 450, television, antenna, and cables.
- Maximize TV signal strength by using a better antenna, and use shielded antenna cable where possible.
- Try a different TV. Different models vary considerably in their susceptibility to interference.

Troubleshooting reference

This section describes problems, their symptoms, possible causes, and specific remedies.

PROBLEM: AC product will not operate, no inverter warning lights are ON.

Possible cause

Remedy

Battery is defective.

Check battery and replace if required.

Inverter has been connected with reverse DC input polarity.

Check connection to battery. Probable inverter damage has occurred. Have unit repaired (not covered by warranty).

Loose cable connections.

Check cables and connections. Tighten as required.

PROBLEM: Inverter will run some small loads, but not larger ones.

Possible cause

Remedy

Voltage drop across DC cables.

Shorten cables or use heavier cables.

PROBLEM: Measured inverter output is too low.

Possible cause

Standard "average reading" AC voltmeter used to measure output voltage, resulting in an apparent reading 5 to 15 V too low.

Battery voltage is too low.

Remedy

Inverter's "modified sine wave" output requires "true RMS" voltmeter for accurate measurements.

Recharge battery.

PROBLEM: Alarm is sounding.

Possible cause

Low voltage shutdown or thermal shutdown has occurred.

Remedy

Shorten cables or use heavier cables. Recharge the battery. Allow the unit to cool. Improve air circulation around the unit. Move the unit to a cooler environment. Reduce the load if continuous operation is required.

PROBLEM: Battery run time is less than expected.

Possible cause

Remedy

The AC load power consumption is higher than rated.

Use a larger battery to make up for the increased power requirement.

The battery is old or defective.

Replace the battery.

The battery is not being charged properly.

Some chargers are not able to fully recharge a battery. Make sure you use a powerful charger.

Power dissipation in DC cables.

Use shorter/heavier DC cables.

PROBLEM: AC product will not operate, red “FAULT” light ON.

Possible cause

Remedy

AC product(s) connected is/are rated at more than the inverter’s continuous power rating; overload shutdown has occurred.

Use a product with a power rating less than the inverter’s continuous power rating.

AC product is rated less than the inverter’s continuous power rating; high starting surge has caused overload shutdown.

Product exceeds inverter’s surge capability. Use a product with starting surge power within the inverter’s capability.

Battery is discharged (alarm is sounding).

Recharge battery.

The inverter has overheated due to poor ventilation and has shut down.

Switch inverter “OFF” and allow to cool for 15 min. Clear blocked fan or remove objects covering unit. Move the inverter to a cooler place. Reduce load if continuous operation is required. Restart.

Input voltage is greater than 15 V.

Verify charging system is properly regulated and battery is 12 V nominal.

Consumer hotline: 1-800-670-0707

8 Specifications

Specifications are subject to change without notice.

Electrical specifications

AC output voltage (nominal)	120 V AC
DC input voltage range	10.5–15.5 V DC
Continuous AC output power	360 W
5 min. AC output power	450 W
Maximum AC output surge power	700 W
AC output frequency	60 ± 4 Hz
AC output waveform	Modified sine wave
Battery drain with no AC current load (at 12 V input)	0.25 A
Efficiency (maximum)	90%
Ambient operating temperature range	32–104 °F (0–40 °C)
Low battery alarm trigger point (nominal)	11.0 V
Low battery shutdown point (nominal)	10.5 V

Overheat shutdown	Yes, automatic
Overload shutdown	Yes, automatic
High battery shutdown point (nominal)	15.5 V

Physical specifications

Dimensions (L x W x H)	8.3 × 4.5 × 2.6" 211 × 115 × 65 mm
Weight	2.25 lb. / 1020 g
Product numbers	851-0451 (no accessories) 851-0452 (with accessories)

xantrex

1-800-670-0707 (toll free in North America)

1-408-987-6030 (direct)

www.xantrex.com

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