

PROwatt™ 400 Inverter

Owner's Guide



About Xantrex

Xantrex Technology Inc. is a world-leading supplier of advanced power electronics and controls with products from 50 watt mobile units to 1 MW utility-scale systems for wind, solar, batteries, fuel cells, microturbines and backup power applications in both grid-connected and standalone systems. Xantrex products include inverters, battery chargers, programmable power supplies, and variable speed drives that convert, supply, control, clean, and distribute electrical power.

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Contents

1. Introduction	1
About the PROwatt 400	1
About This Guide	2
2. Important Safety Information	3
Warnings and Cautions	3
Additional Safety Guidelines	4
3. PROwatt 400 Features	5
AC (Front) Panel	5
DC (Back) Panel	7
Lighter Plug Cable	8
Cable For Direct Connection to Battery	8
4. Connecting the PROwatt 400	9
Determining Power Requirements	9
Choosing a Location	10
Connecting the PROwatt 400 for Loads Under 150 Watts	11
Connecting the PROwatt 400 for Loads Over 150 Watts	12
5. Operating the PROwatt 400	14
Operating Conditions and Guidelines	14
Manual Reset After Automatic Shutdown	15
Shutting the Inverter Off	15
Operating Normal Loads	15
Operating Loads With High Surge Requirements	15

6. Maintaining Battery Condition	17
7. Troubleshooting	18
Common Problems	19
Buzz in Audio Systems	19
Television Interference	19
Troubleshooting Reference	20
8. Specifications	24
9. Warranty Information	25
Returning a Product	27
Out of Warranty Service	29
10. Other Xantrex Products	30

1 Introduction

Thank you for purchasing the PROwatt™ 400 Power Inverter. The PROwatt 400 is part of a family of advanced high-performance power inverters from Xantrex Technology Inc., the leader in high-frequency inverter design.

About the PROwatt 400

Quality Power Connected to the 12 volt outlet in your vehicle or boat or directly to your battery for loads over 150 watts, the PROwatt 400 efficiently and reliably powers a wide variety of household AC products such as TVs, VCRs, laptop computers, camcorder and cell phone chargers, compact fluorescent lights, soldering irons, and other similar products.

Comprehensive Protection The PROwatt 400 employs reliable solid state power electronics for years of safe, trouble-free operation, and includes the following automatic features to ensure safe and trouble-free operation:

- Low battery alarm
- Low voltage shutdown
- High voltage shutdown
- Overload shutdown
- Over temperature shutdown

About This Guide

To get the best performance from your PROwatt 400 inverter, Xantrex recommends that you read this guide before connecting and using the inverter, and save it for future reference.

This guide contains:

- Important safety information
- Instructions for connecting the inverter
- Operating guidelines
- Troubleshooting guidelines
- Warranty and service information

2 Important Safety Information

Connecting the PROwatt 400 incorrectly or misusing it 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.

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

Cautions identify conditions or practices that may damage the PROwatt 400 or other equipment.

Warnings and Cautions



Warning! Shock Hazard

Keep children away from the PROwatt 400 inverter. The inverter generates the same potentially lethal AC power as a normal household wall outlet. Treat the outlet with respect!



Warning! Heated Surface

The PROwatt 400 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.

**Caution!**

Do not connect the PROwatt 400 to any AC wiring or AC product in which the AC neutral is connected to the AC ground.

**Caution!**

Some chargers for small nickel-cadmium batteries can be damaged if connected to the PROwatt 400. 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.

Additional Safety Guidelines

- Do not insert foreign objects in the PROwatt 400 outlets.
- Never connect the inverter to power utility AC distribution wiring.
- Do not use the PROwatt 400 in temperatures over 100° F (40° C).
- Do not expose the PROwatt 400 to water, rain, snow, or spray.

Failure to follow these safety guidelines may cause personal injury and/or damage to the PROwatt 400. It may also void your product warranty.

3 PROwatt 400 Features

This section describes the main features of the PROwatt 400 inverter.

AC (Front) Panel

Figure 1 shows the AC panel of the PROwatt 400 inverter.

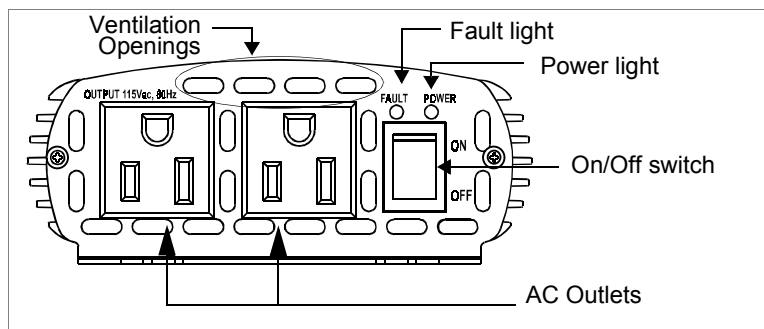


Figure 1 AC Panel of PROwatt 400

AC Outlets Two AC receptacles are located on one end of the PROwatt 400. You can plug in any combination of 115 Vac appliances with a total power consumption of 150 watts or less when the inverter is plugged into a vehicle's lighter socket. Or you can plug in appliances with a total power consumption of 400 watts or less when the inverter is hardwired to a battery.

On/Off Switch When the On/Off switch is on, AC power is available at the outlets. The switch also acts as a manual reset for overload, low battery voltage, and over temperature conditions.

POWER Light The green **POWER** light indicates that AC power is present at the outlets and that the PROwatt 400 is operating normally.

FAULT Light The red **FAULT** light indicates that the inverter has shut down. Shutdown is caused by low or high battery voltage, overload, or excessively high temperatures.

Audible Alarm An audible alarm warns of an impending low voltage shutdown.

Ventilation Openings To prevent overheating, ensure that the ventilation openings on the front and back panels are kept clear.

DC (Back) Panel

Figure 2 shows the DC panel of the PROwatt 400 inverter.

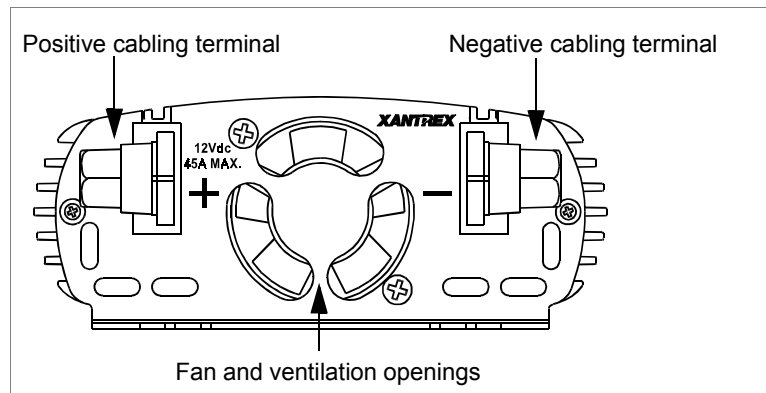


Figure 2 DC Panel of PROwatt 400

Fan and Ventilation Openings The fan runs continuously while the inverter is on. If the inverter overheats, let the fan run to cool it down. However, if the inverter is in low-voltage shutdown mode as indicated by the audible alarm, turn the inverter off to conserve battery capacity.

Positive and Negative Cabling Terminals You connect the ring terminals on the power cables to these terminals. To ensure correct polarity, red must be connected to red and black must be connected to black.

Lighter Plug Cable

Figure 3 shows the lighter plug cable that you use when you are going to power loads less than 150 watts.

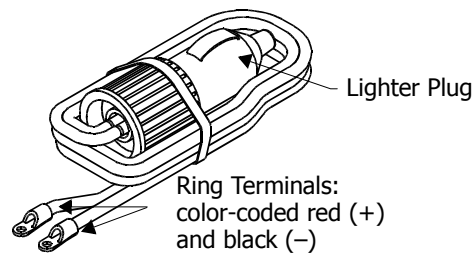


Figure 3 Lighter Plug Cable

Cable For Direct Connection to Battery

Figure 4 shows the cable you install when the highest loads you are going to power are greater than 150 watts.

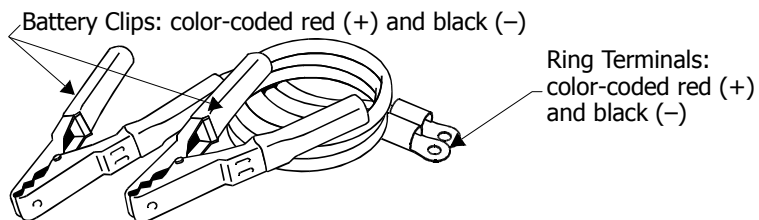


Figure 4 Cable for Direct Connection to 12 Volt Battery

4 Connecting the PROwatt 400

This section gives guidelines for choosing a suitable location for the PROwatt 400 and also gives procedures for:

- Connecting the PROwatt 400 to your vehicle's 12 volt power receptacle
- Connecting the inverter directly to the vehicle's battery



Caution!

The PROwatt 400 must only be connected to a battery that has a nominal output of 12 volts. It will not operate if connected to a 6 volt battery and will be damaged if connected to a 24 volt battery.

Determining Power Requirements

You will need to find the power requirement of each appliance you want to run to determine if you should connect the PROwatt 400 to a 12 volt power receptacle (cigarette lighter socket) or directly to the vehicle battery. If the total watts of *all* appliances will always be less than 150 watts you can use a 12 volt power receptacle; otherwise you must connect the inverter directly to the battery.

You can find the power requirements of an appliance recorded on a label located near the power cord. Add up the watts of all the appliances you will be running at one time. The total shouldn't be more than 400 watts.

Choosing a Location

For the best performance, place the inverter in a location that is:

- | | |
|------------------------|--|
| Dry | Do not allow water or other liquids to splash on the inverter. |
| Cool | Ambient temperatures should be between 32° F and 100° F (0° C and 40° C)—the cooler the better within this range. Keep the inverter away from heating vents. |
| Well ventilated | Allow at least 2 inches (5 cm) of clearance all around the inverter, and keep the ventilation openings clear. |
| Clean | Use the inverter in a clean environment.
Dust, metal shavings, smoke, soot, exhaust, and other airborne contaminants may cause the unit to fail. |

Connecting the PROwatt 400 for Loads Under 150 Watts

Follow these steps to connect the PROwatt 400:

1. Place the inverter on a flat surface like the floor of your vehicle.
2. Make sure the On/Off switch on the front panel is off.
3. Take the power cord equipped with the lighter plug ([Figure 3](#)) and place the ring terminals over the two cabling terminals on the back of the inverter. (The cabling terminals are shown in [Figure 2](#).)
Make sure you connect red to red and black to black, and make sure you screw the nuts on tightly.
4. Place the inverter's plug in the vehicle's cigarette lighter socket or a 12 volt outlet.
5. Turn on the front panel On/Off switch.
The green **POWER** light indicates that the PROwatt 400 is operating normally and that AC power is available at the outlets.
6. Plug in the AC loads you want to operate.

Connecting the PROwatt 400 for Loads Over 150 Watts

You must connect the PROwatt 400 directly to a 12 volt battery if you are going to operate loads greater than 150 watts. (When the inverter is connected this way, you can operate loads of any size up to 400 watts.)



Warning!

Batteries contain corrosive materials and present an electrical shock hazard. To prevent irritation and burns, wear protective eyewear and clothing when you install the inverter or work with the batteries. Take special care to ensure that metal tools and personal metal objects like rings and bracelets do not contact the battery terminals.

Follow these steps to make a direct battery connection:

1. Place the inverter on a flat surface.
2. Make sure the On/Off switch on the front panel is off.



Caution! Reverse Polarity

Power connections to the PROwatt 400 must be positive to positive and negative to negative.

A reverse polarity connection (positive to negative) 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.

3. Take the cables equipped with battery clips on one end (Figure 4) and place the ring terminals over the two cabling terminals on the back of the inverter. (The cabling terminals are shown in Figure 2.) Make sure you connect red to red and black to black, and make sure you screw the nuts on tightly.



Warning! Explosion or fire hazard

Ensure there are no flammable gases or flammable materials close by when you connect the positive clip to the battery post. The connection may cause sparks.

4. Fasten the negative (black) clip to the negative battery post.
5. Double check that the polarity is correct.
6. Fasten the positive (red) clip to the positive battery post.
You may see sparks as you make the connection.
7. Turn on the front panel On/Off switch.
The PROwatt 400 is now ready for operation.
The green **POWER** light indicates that AC power is available at the outlets and that the inverter is operating normally.
8. Plug in the AC loads you want to operate.
9. If you disconnect the battery, turn the inverter off first.

5 Operating the PROwatt 400

This section explains how to operate the PROwatt 400 most efficiently.

Operating Conditions and Guidelines

This section describes normal operation as well as conditions that trigger an alarm or automatically shut down the PROwatt 400.

Normal Operation When you connect the inverter to the vehicle's 12 volt outlet and turn on the On/Off switch, the **POWER** light illuminates and AC power is available at the outlets.

Low Battery Alarm and Shutdown As the battery discharges, its voltage decreases. When the PROwatt 400 senses that the voltage at its DC input has dropped to 10.7 volts, it sounds an alarm. If you ignore the alarm, at 10.0 volts the inverter shuts down all loads to save the battery from further discharge. The **POWER** light goes out, and the **FAULT** light comes on.

Overload Shutdown If you connect an AC load rated higher than 150 watts / 1.25 amps or a load that draws excessive surge power, the PROwatt 400 shuts down. The **POWER** light goes out and the **FAULT** light comes on, indicating that the inverter is overloaded. The alarm may also sound.

Over Temperature Shutdown The PROwatt 400 shuts down automatically if it exceeds its safe operating temperature. The **POWER** light goes out and the **FAULT** light comes on.

High Input Voltage Shutdown If a defective battery charging system causes the battery voltage to rise to dangerously high levels, the PROwatt 400 shuts down automatically. The **POWER** light goes out and the **FAULT** light comes on.

Manual Reset After Automatic Shutdown

If any of the conditions listed on [page 14](#) has caused an automatic shutdown, correct the problem (for example, remove the loads or allow the inverter to cool) and then reset the inverter. See “[Troubleshooting Reference](#)” on [page 20](#) for specific problems and solutions.

To reset the inverter, turn the On/Off switch off for 5 seconds, and then turn it on again. This manual reset feature prevents unexpected or hazardous restarting of connected AC loads.

Shutting the Inverter Off

- If you are going to disconnect the battery, turn the inverter off first.
- Turn the inverter off using the front panel On/Off switch.

Operating Normal Loads

The PROwatt 400 can power most loads within its rating (400 watts / 3.5 amps). Some appliances, however, may be difficult or impossible to operate. Please read “[Operating Loads With High Surge Requirements](#)”.

Operating Loads With High Surge Requirements

The power, or wattage, rating of AC loads is the average amount of power they use. Some appliances consume more power than their power rating when they are first turned on. TVs, monitors, and electric motors are some products that have high surge requirements at start up.

Although the PROwatt 400 can supply momentary surge power to 800 watts, some products rated less than 400 watts may exceed its surge capability and trigger an overload shutdown.

6 Maintaining Battery Condition

The battery operating time of the PROwatt 400 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 and a 400 watt load, you can expect one or more hours of operating time.

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

- 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.



Caution!

The PROwatt 400 will operate while the engine is running, but the voltage drop that occurs when the engine starts may trigger a low voltage shutdown.

- If you are not going to use the PROwatt 400 for more than a week, turn off the On/Off switch. The inverter draws less than 0.21 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 PROwatt 400.

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:

- 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

If you do require warranty service, you will be asked for proof of purchase.

Common Problems



Warning! Electrical Shock and Burn Hazard

Do not dismantle the PROwatt 400. It does not contain any user-serviceable parts. Attempting to service the inverter yourself could result in an electrical shock or burn.

Buzz in Audio Systems

Some inexpensive stereo systems have inadequate internal power supply filtering and buzz slightly when powered by the PROwatt 400. The best solution is to use an audio system with a good quality filter.

Television Interference

The PROwatt 400 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:

- Use an extension cord to increase the distance between the PROwatt 400 and the TV, antenna, and cables.
- Adjust the orientation of the PROwatt 400, 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.

The AC load will not operate. The FAULT light is on.

Symptom The AC load is plugged in or turned on and operates for one to ten seconds, and then the **FAULT** light illuminates.

Possible Cause	Suggested Remedy
The AC load is rated at more than 400 watts; the safety overload circuit has tripped.	Use a product with a power rating lower than 400 watts (or 120 volts / 2.5 amps).
The AC load is rated at less than 400 watts; a high starting surge has tripped the overload circuit.	The product exceeds the inverter's surge capability. Use a product with a starting surge power within the PROwatt 400's capability.

Symptom The AC load does not operate. The **FAULT** light comes on when the inverter is turned on, or when the load is turned on or plugged in, and the alarm may sound.

Possible Cause	Suggested Remedy
The battery is discharged.	Recharge the battery.
Excessive battery voltage	Check the charging system.
The load exceeds the 150 watt rating for the lighter socket.	Hardwire the inverter to the battery as explained on page 12 .

Symptom The AC load runs for more than one minute, and then the **FAULT** light turns on. The inverter is warm or hot to touch.

Possible Cause	Suggested Remedy
Poor ventilation has caused the PROwatt 400 to overheat.	Ensure that ventilation is not restricted around the inverter and allow it to cool for ten minutes with the fan running. After ten minutes, turn the inverter off, and then turn it on again after five seconds.
The load is greater than 400 W or the ambient temperature is above 25 °C.	Reduce the load or ambient temperature. Allow the unit to cool, then turn it on again.

The AC load will not operate. No inverter lights are on.

Symptom The lighter works in the lighter socket; the inverter does not.

Possible Cause	Suggested Remedy
Poor contact with the lighter socket or 12 volt outlet.	Press the plug firmly into the socket. Clean the plug or socket if necessary.
The inverter has been connected with reverse DC input polarity.	The inverter has likely been damaged and needs to be repaired. Read the instructions for returning the inverter on page 27 .

Symptom The lighter does not work in the lighter socket.

Possible Cause	Suggested Remedy
The lighter socket or 12 volt outlet may need to have the ignition switched on.	Turn the key to the accessory position.
The cigarette lighter or the 12 volt outlet fuse is blown.	Check the vehicle fuses and replace blown fuses with the correct value.

Measured inverter output is too low.

Symptom The volt meter reading is 5 to 15 volts too low.

Possible Cause	Suggested Remedy
A standard “average-reading” AC voltmeter has been used to measure output voltage.	For accurate measurement, the PROwatt 400 modified sine wave output requires a “true RMS” voltmeter, such as a Fluke 87 series multimeter.
The battery voltage is too low.	Recharge the battery.

Battery run time is less than expected.

Symptom The inverter runs for a while, the alarm sounds and then the **FAULT** light illuminates. The inverter is cool or warm to touch.

Possible Cause	Suggested Remedy
The AC load power consumption is higher than rated.	Use a larger battery to make up for the increased power requirement.

Possible Cause	Suggested Remedy
The battery is old or defective.	Replace the battery.
The battery is not being charged properly.	Have your vehicle electrical system checked by a qualified technician.

8 Specifications

Specifications are subject to change without notice.

AC output voltage (nominal)	115 Vac RMS \pm 10Vac
DC input voltage range	10–15 volts DC
Maximum continuous AC output power	400 watts
Maximum AC output surge power	800 watts
AC output frequency	60 \pm 4 Hz
AC output waveform	Modified Sine Wave
No load current draw (at 12 V input)	0.21 amps
Efficiency (maximum)	90%
Ambient operating temperature range	32° F–100° F 0° C–40° C
Low voltage alarm	At 10.7 volts
Low voltage shutdown	At 10.0 volts
Over temperature shutdown	Yes, automatic
Overload shutdown	Yes, automatic
High battery shutdown point (nominal)	15 volts
AC receptacles	2
Dimensions (L x W x H)	6.3 x 4.7 x 1.8 in 160 x 120 x 46 mm
Weight	2.0 lb / 920 grams

9 Warranty Information

What Does This Warranty Cover? Xantrex manufactures its products from parts and components that are new or equivalent to new, in accordance with industry standard practices. This warranty covers any defects in workmanship or materials.

How Long Does The Coverage Last? This warranty lasts for one (1) year from the date of purchase. Implied warranties of merchantability and fitness for a particular purpose are limited to one year from date of purchase. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

What Does This Warranty Not Cover? This warranty will not apply where the product has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment. Xantrex does not warrant uninterrupted operation of its products. Xantrex shall not be liable for damages, whether direct, incidental, special, or consequential, or economic loss even though caused by the negligence or fault of Xantrex. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

What Will Xantrex Do? At its option, Xantrex will repair or replace the defective product free of charge. Xantrex will, also at its option, use new and/or reconditioned parts made by various manufacturers in performing warranty repair and building replacement products. If Xantrex repairs or replaces a product, its warranty term is not extended. Xantrex owns all parts removed from repaired products.

Service During Warranty In order to qualify for the warranty, a dated proof of purchase must be provided and the product must not be disassembled or modified without prior authorization by Xantrex. If your product requires warranty service, please return it to the place of purchase along with a copy of your dated proof of purchase. If you are unable to contact your merchant, or the merchant is unable to provide service, contact Xantrex directly:

Phone (toll free): 1-800-670-0707

Fax: 604 420-2145

Fax (toll free): 1-800-994-7828

Email: support.prowatt@xantrex.com

Returning a Product

You must obtain a Return Material Authorization (RMA) number from Xantrex before returning a product directly to Xantrex. When you contact Xantrex to obtain service, be prepared to supply the following information:

- Serial number of your inverter
- Date of purchase
- Information about the installation and use of the inverter

If you are returning a product from the USA or Canada, follow this procedure:

1. Obtain an RMA number and a shipping address from Xantrex. Products returned without an RMA number or shipped collect will be refused.
2. Package the inverter safely, preferably using the original packing materials. Include the following with your shipment:
 - The RMA number
 - A copy of your dated proof of purchase
 - A return address where the repaired unit can be shipped
 - A contact telephone number
 - A brief description of the problem
3. Ship the inverter to the address provided in Step 1, freight prepaid. Xantrex recommends that you obtain proof of delivery.

How Other Laws Apply This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

For Our Canadian Customers When used herein “implied warranties of merchantability and fitness for a particular purpose” includes all warranties and conditions, express or implied, statutory or otherwise, including without limitation implied warranties and conditions of merchantability and fitness for a particular purpose.

Out of Warranty Service

If the warranty period for your PROwatt 400 has expired, if the inverter was damaged by misuse or incorrect installation, if other conditions of the warranty have not been met, or if no dated proof of purchase is available, your inverter may be serviced or replaced for a flat fee.

To return your PROwatt 400 for out of warranty service, contact Xantrex Customer Service for a Return Material Authorization (RMA) number and follow the other steps outlined in [“Service During Warranty” on page 26](#).

Payment options such as credit card or money order will be explained by the Customer Service Representative. In cases where the minimum flat fee does not apply, as with incomplete inverters or inverters with excessive damage, an additional fee will be charged. If applicable, you will be contacted by Customer Service once your inverter has been received.

10 Other Xantrex Products

To see the range of inverters and chargers offered by Xantrex, visit our web site at **<http://www.xantrex.com>**

Index

A

- AC outlets 5
- alarm, low battery 1, 6, 14, 20
- appliances
 - battery-operated 4
 - camcorders 1
 - cell phone chargers 1
 - fluorescent lights 1
 - laptop computers 1
 - rechargeable flashlights 4
 - rechargeable shavers 4
 - soldering irons 1
 - TVs 1
 - VCRs 1

B

- batteries
 - discharged 20
 - maintaining condition 17
 - nickel-cadmium 4
 - recharging 17, 22

- replacing 23
- vehicle 17

C

- cable (for connection to battery)
 - connecting 13
 - illustrated 8
- cable (lighter plug)
 - connecting 11
 - illustrated 8
- cabling terminals 7
- camcorders 1
- chargers
 - cam corders 1
 - cell phone 1
- computers, laptop 1

F

fan 7
FAULT light 6, 14, 20–22
flashlights, rechargeable 4
fuses 22

L

lights, fluorescent 1
loads
 normal 15
 with high surge requirements 15
low current draw 17

O

On/Off switch 6

P

polarity 12, 13, 21
POWER light 6, 11, 13, 14
PROwatt
 manual reset 15
 out of warranty service 29
PROwatt 400
 automatic shutdown 1, 14

choosing a location 10
connecting to battery 12
connecting to lighter plug 11
current draw 17
disconnecting the battery 15
features 5
illustration of AC panel 5
illustration of DC panel 7
normal operation 14
overheating 21
reset after shutdown 15
returning to Xantrex 27
serial number 18
shutting inverter off 15
specifications 24
warranty 25

R

reset after shutdown 15
Return Material Authorization
 number 27
reverse polarity 7, 12, 13, 21

S

- safety guidelines 3
- serial number 18, 27
- service
 - during warranty 26
 - out of warranty 29
- shavers, rechargeable 4
- shutdown
 - high voltage 1, 15, 20
 - low battery 14
 - low voltage 1, 17
 - over temperature 1, 14
 - overload 1, 14, 20
- soldering irons 1
- specifications 24
- surge power 14, 15

T

- troubleshooting
 - audio systems 19
 - overview 18
 - reference 20
 - television interference 19
- TVs 1

V

- VCRs 1
- ventilation 10, 21
- ventilation openings 6

W

- warranty 25

X

- Xantrex
 - email 26
 - fax number (toll free) 26
 - phone number 26
 - web site 30

