

Smart choice for power

xantrex

PathMaker

Owner's Manual

**Xantrex
PathMaker
Automatic Battery Switch**

www.xantrex.com

The Easy-to-Install Automatic Battery Switch For Marine, RV, Alternative Energy and Car Audio use.

Pick the unit that's right for your installation:

100 Amps - 2 Battery Banks

100 Amps - 3 Battery Banks

250 Amps - 2 Battery Banks

250 Amps - 3 Battery Banks

Manual Contents

Operations	4
Installation	7
Remotes	13

Notice of Copyright

Xantrex PathMaker Automatic Battery Switch © March 2004 Xantrex International. All rights reserved. Xantrex is a registered trademark of Xantrex International.

Disclaimer

UNLESS SPECIFICALLY AGREED TO IN WRITING, XANTREX TECHNOLOGY INC. ("XANTREX")

- (a) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION.
- (b) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION. THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK.

Date and Revision March 2004, Revision B

Part Number 975-0119-01-01

Contact Information Web: www.xantrex.com Email: customerservice@xantrex.com
Phone: 1 800 670 0707 (toll free in North America) 1 360 925 5097 (direct) Fax: 1 360 925 5143

Introduction

The PathMaker provides automatic battery switching in a wide range of environments and applications including marine, recreational vehicles, renewable energy, military, and mobile audio. The PathMaker has two primary functions—first, it automatically parallels (connects together) multiple batteries (*combining them*) when charging sources are available, and second, it automatically disconnects the starting battery from the system loads when there are no active charging sources. This ensures that the engine starting battery is only used for starting. Additionally, the PathMaker can be used to connect loads and sources.

The PathMaker consists of the following major components:

A control module that provides user-adjustable set points, operator indicators, and a local control switch. Additionally, a telephone jack on the right hand side of the module allows the user to plug in an *optional* remote control panel.

A terminal strip is fitted on the control module. This terminal strip is where the user connects a negative wire to the terminal labeled negative (*system ground*), and makes optional connections. All other connections are pre-wired at the factory and require no changes.

The PathMaker Power Switch(es) are mounted below the terminal strip. They provide the connection for the path of battery current flow when enabled by the control module.

Remote Control Panel (optional) Use of this *optional* panel is strongly recommended, as the PathMaker may be mounted where access to the local control switch may not be convenient.

Operations

The PathMaker has power switch(es) that connect batteries, loads or sources together.

Connected Light

The Connected light turns on to indicate that the batteries, loads or sources are connected.

Disabled Light

The Disabled light is on whenever the power switch(es) is(are) not on.

High Voltage Disconnect Light

The High Voltage Disconnect light is on solid whenever the batteries are not connected due to a voltage higher than the High Voltage Disconnect set point. The High Voltage Disconnect light will flash based on the following condition. If a charge source is connected to a smaller battery bank, it is possible that when the Pathmaker connects the banks together, the larger battery bank (or depleted battery bank) will pull the battery voltage down below the Low Voltage Disconnect Setpoint. This will cause the unit to disconnect. If this happens more than five times, the unit will shut down and the High Voltage Disconnect light will begin to flash. After six minutes—to allow the battery connected to the charge source to charge longer—the unit will try to reconnect and resume normal operation.

The Control Module Switch

The switch on the Control Module should normally be in the **Auto** position. If it is in the **O (Disabled)** position, the batteries will not connect when a charge source is available. To test the PathMaker hold the switch in the **I (ON)** position. While the switch is in the **I (ON)** position, the power switch(es) will be on and the green “Connected” light will turn on. If emergency starting is required, **pushing the switch to the I (ON)** position will momentarily connect the battery switches as long as the switch is held. If two batteries are connected to the PathMaker, this provides a jump start for the starter.

Remember: The local switch on the PathMaker must be in the “AUTO” position for any remote switch to work.

Setup and Operation

Adjustments

Default settings are at the 12 o'clock position.

Low Voltage Disconnect*

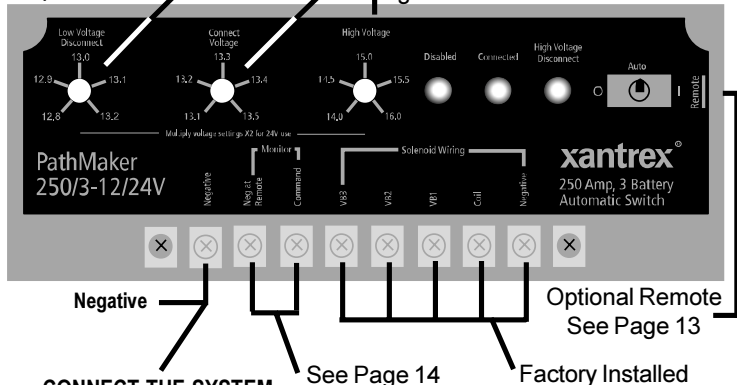
Below this voltage, the PathMaker power switch(es) is(are) disabled (the batteries are not connected together). The default voltage is set at 13.0 V. The yellow "disabled" light will be lit whenever the batteries level falls below the set point.

Connect Voltage*

Above this voltage the PathMaker power switch(es) are enabled: thus the batteries are in parallel for charging. The default voltage setting is 13.3 V. The green "connected" light is on whenever the banks are connected. (Light may flicker below 12.6 V.)

High Voltage Disconnect*

Above this voltage, the power switch(es) are disabled. The default voltage setting is 15.0 V. The red "High Voltage Disconnect" light is on solid when active.



**CONNECT THE SYSTEM
NEGATIVE (ground) TO
THIS TERMINAL LAST.**
(Use #14 AWG wire or larger)

***Multiply voltage values times 2
for use on 24 V systems.**

Connecting with a Remote

You can force the PathMaker to “Connect” for five minutes for emergency starting by momentarily pressing the “Manual On” switch on the remote panel. You may cancel the forced connection only by pressing the “Manual On” switch a second time (for less than one second).

While in the forced “Connect” mode, placing the switch to the “Disabled” position will break the connection. However, returning the switch to the “Auto” position will allow the forced “Connect” to resume until the five-minute timer expires or until the switch is again placed over to the ON for at least one second to cancel the five-minute timer.

Troubleshooting

The PathMaker is internally protected against most faults. If the Green light does not come on when the switch on the unit is held in the ON position, disconnect the wire connected to the system negative terminal, wait one minute and reconnect it.

Installation

The terms “battery” and “bank” are used interchangeably. A “bank” means a group of batteries that are connected, in series or parallel, to create a higher capacity, or higher voltage, “battery”. Installation requires three wires for two bank units and four wires for three bank units. Generally no set up is required.

Connect the wire to system negative (ground) to the PathMaker terminal strip last.

All wiring to PathMaker power switch terminals must be sufficiently sized. Starter current of several hundred amps may pass through these wires. If in doubt, please consult a professional.

Battery cables must be properly strain relieved. Although no exposed contacts are used, the PathMaker is NOT approved for explosive environments.

CAUTION!! If B+ (Battery Positive) is shorted to the NEGATIVE terminal of the Control Module, COIL NEGATIVE, the electronics may be destroyed. THIS IS NOT COVERED BY THE WARRANTY!

Fuses, Battery Switches, and Protective Terminal Caps

To simplify installation diagrams we have not included fusing or optional on/off battery switches. Check the latest ABYC (American Boat and Yacht Council) and NEC (National Electrical Code) for fusing requirements for your installation. Install protective terminal caps as needed to protect against shorting of terminals.

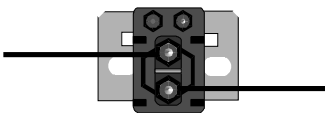
Alternator Protection

An alternator may be damaged if operated with no battery (or load) attached. For this reason, we recommend the use of a Xantrex **ZapStop™** to protect an alternator that experiences a brief open output condition. The **ZapStop** prevents momentary overvoltage.

Power Switch Connections

When wiring to the power switch(es), remove the supplied voltage sense leads and place your heavy battery wiring on the terminal post first. Then replace the supplied voltage sense wire **on top** of the heavy battery wires. This eliminates voltage sensing errors under high current conditions. The drawings below indicate the terminal designations for each model. May not be exactly as shown.

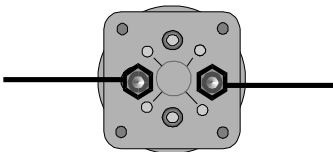
Batt, Load or
Source #1
(VB1)



100 Amp Two-Bank PathMaker

Batt, Load or
Source #2 (VB2)

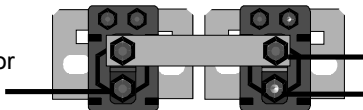
Batt, Load or
Source #1
(VB1)



250 Amp Two-Bank PathMaker

Batt, Load or
Source #2 (VB2)

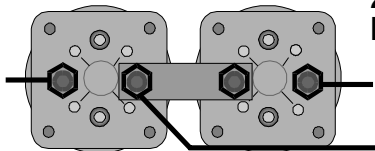
Batt, Load, or
Source #1
(VB1)



100 Amp Three-Bank PathMaker

Batt, Load or Source
#2 (VB2)
Batt, Load or Source
#3 (VB3)

Batt, Load or
Source #1
(VB1)



250 Amp Three-Bank PathMaker

Battery, Load or
Source #3 (VB3)
Battery, Load or
Source #2 (VB2)

Diagram Table

Many configurations are possible with a PathMaker. This table is a guide to help select the correct diagram for your installation:

<u>System:</u>	<u>Use Diagram</u>	<u>Page</u>
2 Banks single or multi-engine (Marine, RV, Renewable Energy or Car Audio)	Diagram 1	10
3 Banks		
2 House, 1 Start	Diagram 2	11
1 House, 2 Start (Marine or RV)	Diagram 3	12

Sources such as battery chargers, solar panels, wind generators, or alternators may be wired to any battery. When a battery's voltage rises above the Connect Voltage all batteries are paralleled and charged by the source. If there are multiple sources connected, the source with the highest voltage will charge the batteries to that level. Alternators will not "fight" against each other; the batteries will simply charge at the voltage of the alternator having the highest output voltage.

Diagram 1 (2 Banks)

This is the recommended installation method. In this diagram the starter is wired directly to the starting battery. The battery switch always stays in the #1 position, the house battery supplies the DC loads. The engine starting battery always supplies starting. The PathMaker connects the batteries in parallel when a charging source is present and disconnects them when there is no charging source present.

The battery switch shown is *not required* but may be left installed as a redundant switch, if desired.

Note: Install Negative (ground) to PathMaker last.

Fusing, breakers, wire size, and optional battery switches that may be required by ABYC or NEC are not shown.

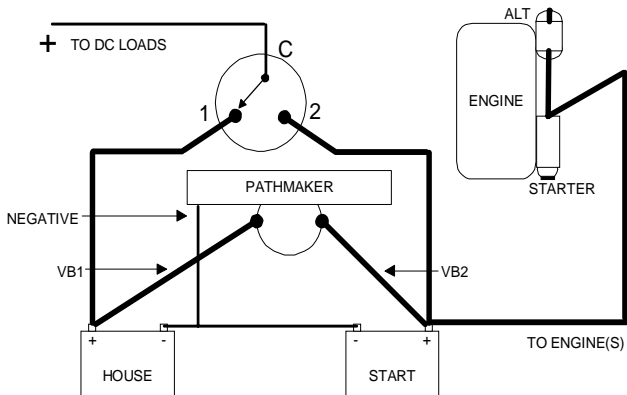


Diagram 2 (3 Banks)

This diagram shows an installation with one engine starting battery and two house banks. This type of installation uses a three-bank version of the PathMaker.

Note: Install Negative (*ground*) to PathMaker last.

Fusing, breakers, wire size, and optional battery switches that may be required by ABYC or NEC are not shown.

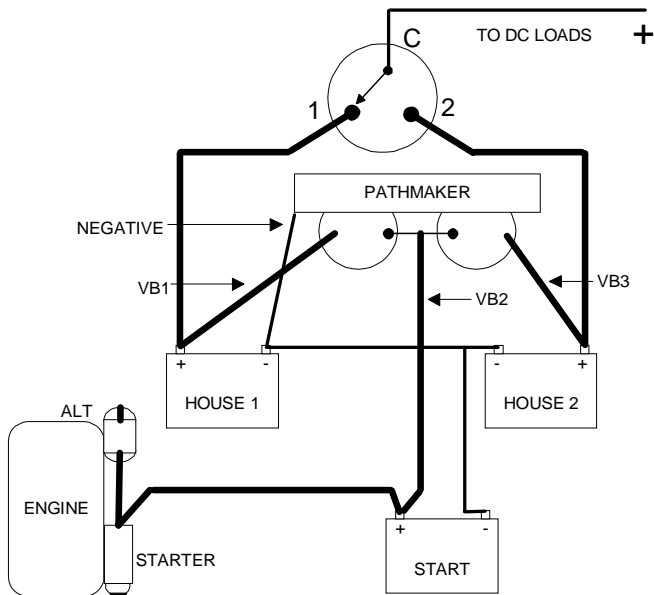
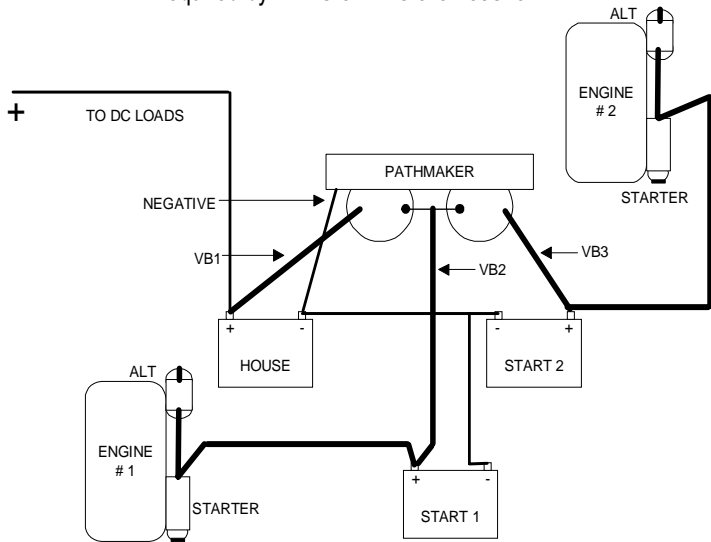


Diagram 3 (3 Banks)

In this twin engine, three-battery bank installation, each engine has a dedicated starting battery. All batteries are charged when either of the engines is running, or when there is any charging source on the system. In an emergency all batteries may be connected together using the optional Remote Switch. This diagram is shown without any battery switches, since a PathMaker can replace battery switches.

Note: Install Negative (ground) to PathMaker last.

Fusing, breakers, wire size, and optional battery switches that may be required by ABYC or NEC are not shown.



Optional PathMaker Remote

We highly recommend using the *optional* Remote Control Switch to provide a clear indication of the PathMaker status and to simplify emergency starting. Please contact your dealer to purchase the Remote Control Switch panel.

Emergency Starting

If you cannot start the engine, momentarily press the Manual On switch. The PathMaker then connects all batteries together (for five minutes) to provide maximum starting power.

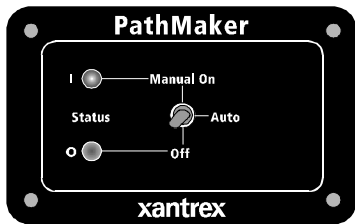
Using the PathMaker Remote Control Panel

The PathMaker Remote switch is normally left in the **AUTO** position. In this position the power switch(es) are energized (connecting the batteries together) when the “Connect” voltage is reached, and de-energized below the “Disconnect” voltage.

To **disable** the PathMaker place the switch in the “**O**” [OFF] position. In this position the battery banks are separated. The yellow “Disabled” light is ON.

To **manually** energize the PathMaker power switch(es), momentarily press and hold the switch to the “**I**” [ON] position until the green ON light is lit (about one second). This connects the batteries for five minutes. Moving the switch momentarily to the ON position for at least one second will cancel the five-minute connect timer.

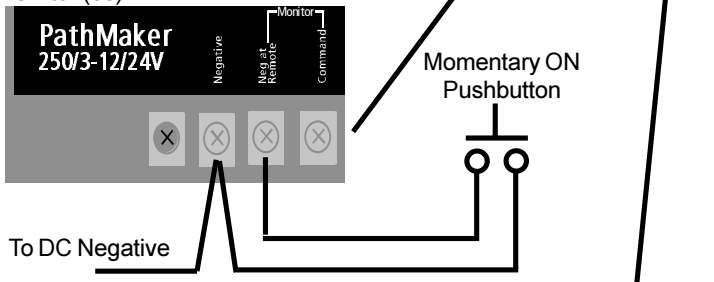
Momentarily press switch in **MANUAL ON** position to turn on power switch(es).



To **disable** PathMaker switch to off position.

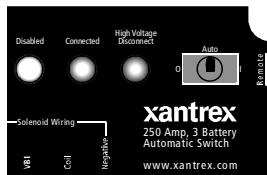
User Remote Switch

You may use your own momentary pushbutton switch installed between the terminal labeled (Negative) and (Neg at Remote) to manually energize the PathMaker power switch(es). Hold the pushbutton down for about 2 seconds to energize the PathMaker power switch(es). They will stay energized for 5 minutes. Momentarily use the pushbutton again to de-energize the power switch(es).



The Control Module Switch

The local switch on the PathMaker must be in the “AUTO” position for the remote switch to work.



Warranty

What does this warranty cover? This Limited Warranty is provided by Xantrex Technology, Inc. ("Xantrex") and covers defects in workmanship and materials in your Xantrex PathMaker Automatic Battery Switch. This warranty lasts for a Warranty Period of 12 months from the date of purchase at point of sale to you, the original end user customer.

This Limited Warranty is transferable to subsequent owners but only for the unexpired portion of the Warranty Period.

What will Xantrex do? Xantrex will, at its option, repair or replace the defective product free of charge, provided that you notify Xantrex of the product defect within the Warranty Period, and provided that Xantrex through inspection establishes the existence of such a defect and that it is covered by this Limited Warranty.

Xantrex will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. Xantrex reserves the right to use parts or products of original or improved design in the repair or replacement. If Xantrex repairs or replaces a product, its warranty continues for the remaining portion of the original Warranty Period or 90 days from the date of the return shipment to the customer, whichever is greater. All replaced products and all parts removed from repaired products become the property of Xantrex.

Xantrex covers both parts and labor necessary to repair the product, and return shipment to the customer via a Xantrex-selected non-expedited surface freight within the contiguous United States and Canada. Alaska and Hawaii are excluded. Contact Xantrex Customer Service for details on freight policy for return shipments outside of the contiguous United States and Canada.

How do you get service? If your product requires troubleshooting or warranty service, contact your merchant. If you are unable to contact your merchant, or the merchant is unable to provide service, contact Xantrex directly at:

Phone: **1 800 670 0707 (toll free in North America), 1 360 925 5097 (direct)**

Fax: **1 360 925 5143**

Email: **Customerservice@xantrex.com**

Direct returns may be performed according to the Xantrex Return Material Authorization Policy described in your product manual. For some products, Xantrex maintains a network of regional Authorized Service Centers. Call Xantrex or check our website to see if your product can be repaired at one of these facilities.

In any warranty claim, dated proof of purchase must accompany the product and the product must not have been disassembled or modified without prior written authorization by Xantrex.

Proof of purchase may be in any one of the following forms:

- The dated purchase receipt from the original purchase of the product at point of sale to the end user, or
- The dated dealer invoice or purchase receipt showing original equipment manufacturer (OEM) status, or
- The dated invoice or purchase receipt showing the product exchanged under warranty

Warranty

What does this warranty not cover?

This Limited Warranty does not cover normal wear and tear of the product or costs related to the removal, installation, or troubleshooting of the customer's electrical systems. This warranty does not apply to and Xantrex will not be responsible for any defect in or damage to:

- a) the product if it 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;
- b) the product if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Xantrex product specifications including high input voltage from generators and lightning strikes;
- c) the product if repairs have been done to it other than by Xantrex or its authorized service centers (hereafter "ASCs");
- d) the product if it is used as a component part of a product expressly warranted by another manufacturer;
- e) the product if its original identification (trade-mark, serial number) markings have been defaced, altered, or removed.

Disclaimer

Product

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY PROVIDED BY XANTREX IN CONNECTION WITH YOUR XANTREX PRODUCT AND IS, WHERE PERMITTED BY LAW, IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, GUARANTEES, REPRESENTATIONS, OBLIGATIONS AND LIABILITIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE IN CONNECTION WITH THE PRODUCT, HOWEVER ARISING (WHETHER BY CONTRACT, TORT, NEGLIGENCE, PRINCIPLES OF MANUFACTURER'S LIABILITY, OPERATION OF LAW, CONDUCT, STATEMENT OR OTHERWISE), INCLUDING WITHOUT RESTRICTION ANY IMPLIED WARRANTY OR CONDITION OF QUALITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE TO THE EXTENT REQUIRED UNDER APPLICABLE LAW TO APPLY TO THE PRODUCT SHALL BE LIMITED IN DURATION TO THE PERIOD STIPULATED UNDER THIS LIMITED WARRANTY.

IN NO EVENT WILL XANTREX BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING WHETHER IN CONTRACT OR TORT INCLUDING WITHOUT RESTRICTION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, ANY PERSONAL INJURY, ANY DAMAGE OR INJURY ARISING FROM OR AS A RESULT OF MISUSE OR ABUSE, OR THE INCORRECT INSTALLATION, INTEGRATION OR OPERATION OF THE PRODUCT.

Exclusions

If this product is a consumer product, federal law does not allow an exclusion of implied warranties. To the extent you are entitled to implied warranties under federal law, to the extent permitted by applicable law they are limited to the duration of this Limited Warranty. Some states and provinces do not allow limitations or exclusions on implied warranties or on the duration of an implied warranty or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply to you. This Limited Warranty gives you specific legal rights. You may have other rights which may vary from state to state or province to province.

Warranty

Warning: Limitations On Use

Please refer to your product user manual for limitations on uses of the product. Specifically, please note that the Xantrex PathMaker Automatic Power Switch is not intended for use in connection with life support systems and Xantrex makes no warranty or representation in connection with any use of the product for such purposes.

Return Material Authorization Policy

Before returning a product directly to Xantrex you must obtain a Return Material Authorization (RMA) number and the correct factory "Ship To" address. Products must also be shipped prepaid. Product shipments will be refused and returned at your expense if they are unauthorized, returned without an RMA number clearly marked on the outside of the shipping box, if they are shipped collect, or if they are shipped to the wrong location.

When you contact Xantrex to obtain service, please have your instruction manual ready for reference and be prepared to supply:

- The serial number of your product
- Information about the installation and use of the unit
- Information about the failure and/or reason for the return
- A copy of your dated proof of purchase

Return Procedure

1. Package the unit safely, preferably using the original box and packing materials. Please ensure that your product is shipped fully insured in the original packaging or equivalent. This warranty will not apply where the product is damaged due to improper packaging.
2. Include the following:
 - The RMA number supplied by Xantrex Technology Inc clearly marked on the outside of the box.
 - A return address where the unit can be shipped. Post office boxes are not acceptable.
 - A contact telephone number where you can be reached during work hours
 - A brief description of the problem

Ship the unit prepaid to the address provided by your Xantrex customer service representative.

If you are returning a product from outside of the USA or Canada

In addition to the above, you **MUST** include return freight funds and are fully responsible for all documents, duties, tariffs, and deposits.

If you are returning a product to a Xantrex Authorized Service Center (ASC)

A Xantrex return material authorization (RMA) number is not required. However, you must contact the ASC prior to returning the product or presenting the unit to verify any return procedures that may apply to that particular facility.

Specifications

Electrical: (all units DC)

Input Voltage Range: 10–32 V (24 V operation if turned on >18.0 V)

Low Voltage Disconnect Range: 12.8–13.2 V (x 2 for 24 V)

Connect Voltage Range: 13.1–13.5 V (x 2 for 24 V)

High Voltage Disconnect Range: 14–16 V (x 2 for 24 V)

Current Ratings: 100 A units: 100 A continuous, 400 A peak
250 A units: 250 A continuous, 2000 A peak

Idle Power Consumed: 0.4 W @ 12 V, 0.8 W @ 24 V

Connected Power: 100 A/2 Bank 6.5 W @12 V, 11 W @ 24 V
100 A/3 Bank 13 W @12 V, 23 W @ 24 V
250 A/2 Bank 2.3 W @12 V, 2.7 W @ 24 V
250 A/3 Bank 4.2 W @12 V, 4.6 W @ 24 V

Physical

Dimensions: 6.3" H x 7.4" W x 3.4" D (100 A)
6.3" H x 7.4" W x 3.2" D (250 A)

Indicator Lights: Disabled: Yellow, Connected: Green; HV
Disconnect: Solid Red
Timed lockout: Flashing Red

External Control: User supplied momentary on/off switch

Remote Panel: Flush mount, 2.25" H x 3.65" W x 0.75" D
(Optional)(3" W x 1.625" H cut out)
Splashproof front, 25' cable included

Operating Ambient Temp Range: -40 to +65 °C

Environmental: Not approved for explosive environments!

Xantrex Technology Inc.

Toll free 1 800 670 0707

Direct 1 360 925 5097

Fax 1 360 925 5143

Customerservice@xantrex.com

www.xantrex.com