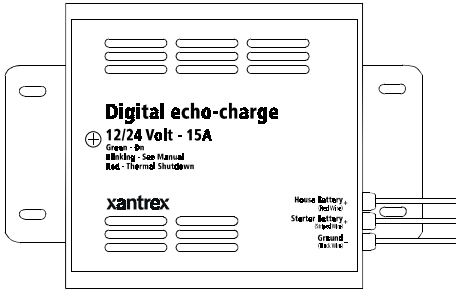


Smart choice for power

**xantrex**



**Digital  
echo-charge**

**Owner's Manual**

**Xantrex Digital  
echo-charge Battery Charger**

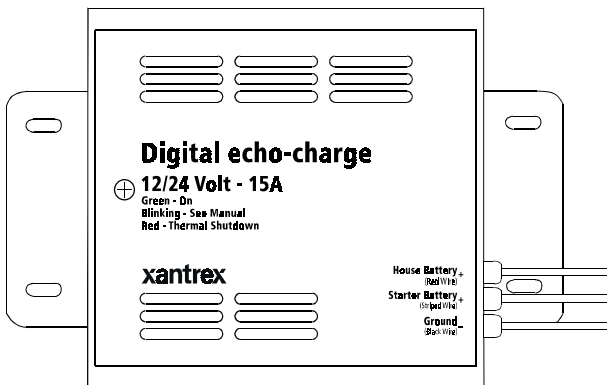
# INTRODUCTION

The Xantrex Digital echo-charge is specially developed for charging an auxiliary battery with Freedom™ or Fleet Power® Inverter/Chargers or with any charging source. The Digital echo-charge automatically switches ON and OFF, charging a starter or auxiliary battery without affecting the main house battery bank. The maximum charge current is 15 amps when the starting battery is 1/2 volt to 1 volt DC less than the house battery. The Digital echo-charge is designed to work on 12 VDC or 24 VDC systems.

The Digital echo-charge is a voltage-follower, following the three-stage charge modes of the Freedom Charger. This method protects the starter battery from over-charging and ensures a long life for the battery. If using another charge source, the Digital echo-charge will follow the charge stages of the source. Refer to the source's Owner's Manual for charge modes.

The Digital echo-charge unit is complete with:

- 2 feet of 16 gauge wire with ring terminal (quantity 1)
- 2 feet of 16 gauge wire with ring terminal and 20 amp in-line fuse (quantity 2)
- Digital echo-charge Owner's Manual



# THINGS YOU SHOULD KNOW

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Use only deep-cycle batteries in your house battery bank.

Only similar batteries should be connected together in one bank. Do not connect old and new batteries together or wet and gel cell batteries together.

Always use properly sized terminals and cables for your interconnecting battery cables.

Starter battery and house battery banks should not be mixed in the same bank.

# BEFORE YOU BEGIN

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The Digital echo-charge should be unpacked immediately upon receipt, and inspected to determine if any shipping damage has occurred. No special handling is necessary; however, care should be used to avoid dropping the unit or exposing it to dust and moisture.

## **Needed for Installation**

- Flat head and Phillips screwdrivers
- Wire cutters
- Wire strippers
- Mounting screws
- #12 gauge wire, if an extension is needed
- Miscellaneous assortment of wire ties and connectors

# INSTALLATION PRECAUTIONS

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**Caution:** To reduce the risk of electric shock and prevent premature failure from corrosion, do not mount where exposed to rain, drip or spray.

**Caution:** Risk of electrical shock. Do not remove cover. No user serviceable parts inside. Refer service to qualified service personnel at a factory authorized service center or at the factory.

**Caution:** Always wear safety glasses for eye protection when working with batteries. Protect your skin from harm by wearing clothing that will cover your arms and legs when working with batteries.

The Digital echo-charge is intended for vertical mounting. Mount in a location that provides the greatest convenience when making the wire connections to the batteries. Select a location that is within two feet of the house battery and within two feet of the starter battery, for maximum charging current. Mount the unit using the holes on the flanges. Ensure that the mounting location is well ventilated and not exposed to harsh environments of dust and moisture or in the presence of flammable fumes. Do not mount on carpet or other heat-sensitive surfaces.

Before making any connections, remove all charging sources—disconnect from shorepower, turn the generator OFF and do NOT run the engine. If using a Freedom charger controlled by a Freedom Remote or Link monitor, the remote must be OFF. No charging voltage should be present during installation. If you are using a stand-alone charger or other power source, follow the manufacturer's instructions for disabling the charge function before beginning installation.

# INSTALLATION

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## WARNING

*Make sure all charging sources are switched OFF and no charging voltage is present before beginning installation.*

**Prevent unnecessary damage by carefully following the installation instructions.**

### **Battery Connections**

Two feet of 16 gauge wire with a ring terminal on the end is connected to the Digital echo-charge unit. Connect the ring terminals to the batteries as indicated.

Connect from the echo-charge:

- Ground wire (black) to the negative battery ground.
- Starter Battery wire (red with yellow trace) to the starter battery positive (+ red) terminal. A 20 amp fuse in this line protects the wire.
- House Battery wire (+ red) to the house battery bank positive (+ red) terminal. A 20 amp fuse in this line protects the wire.

Use 12 gauge wire to extend wire if needed. Avoid using long connection wires. The longer the wires, the less current will flow and the longer it will take to charge the starter battery.

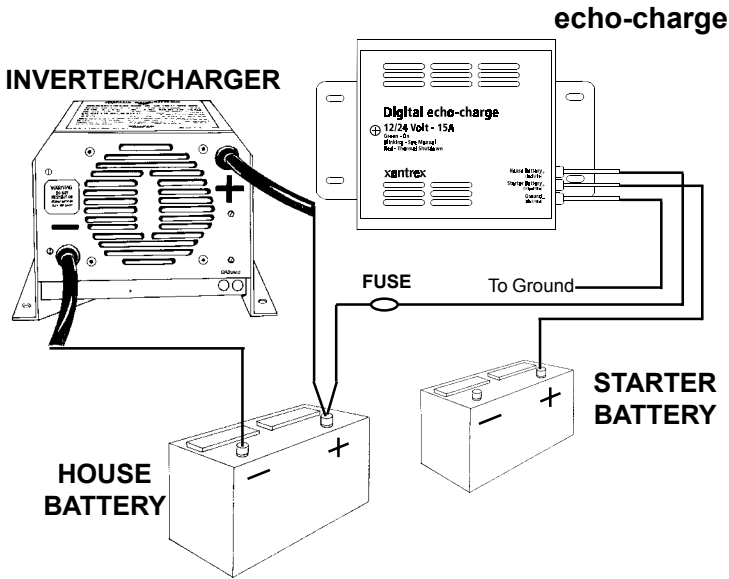
After all connections have been made, turn the charger ON. The Digital echo-charge will follow the charger and begin to charge the starter battery.

Note: When the House Battery and Ground connections have been made, the Digital echo-charge's LED will light Green. When the starter battery connection is made, charging will begin.

# INSTALLATION

## WARNING

*Never disconnect battery cables while the charger is in operation.*



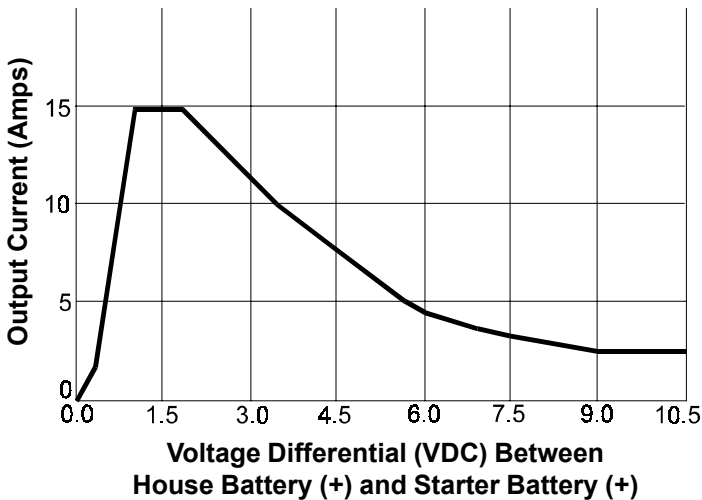
# OPERATION

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When the input voltage is 13.0/25.5 volts DC or higher, echo-charge automatically switches ON. The LED glows a steady green. When the input voltage is lower than 13.0/25.5 volts, the echo-charge automatically switches OFF, and the LED blinks green. The output voltage of echo-charge is limited to 14.4/28.8 volts. When it reaches 14.4/28.8 volts, the charge current will decrease, maintaining a float condition. The starter battery will be fully charged without overcharging.

No load current drain on the house bank is less than 50 milli-amps.

If the input voltage is above 14.4 volts (or 28.8), output will be limited to a maximum of 14.4/28.8 volts.



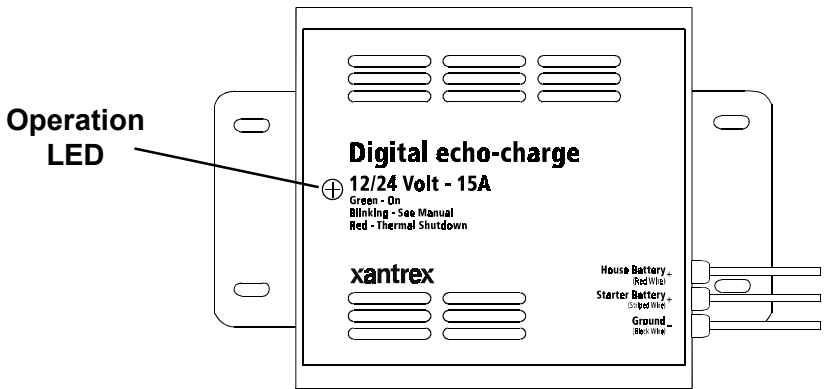
The graph shows the relationship between the voltage difference over the echo-charge (voltage difference between house (+) and starter (+) battery) and the charge current.



# OPERATION

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It is important to install the Digital echo-charge in a well-ventilated location. An elevated temperature may cause the Operation LED to glow red and turn the echo-charge OFF. When the temperature cools down, the LED will return to green and the Digital echo-charge will resume normal operation.



# TROUBLESHOOTING

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PROBLEM	THINGS TO CHECK
LED is red. Thermal shutdown	1. Check to see that the Digital echo-charge has sufficient air flow and ventilation around it. 2. Check the battery connections.
Starter battery is not charging	1. Check the difference in voltage between the house battery and the starter battery. If the difference is greater than 2 volts, the Digital echo-charge will reduce the charge current. If the difference is greater than 10 volts, the Digital echo-charge will shut off and the green LED will blink. 2. Check the connections to house battery bank and starter battery. Check the fuses. Check the ground connection.
LED is off	Check fuse in the red wire. Check the ground connection.
LED is flashing green	1) House battery voltage below 13.0 volts DC or above 17 volts DC. 2) The difference between the house battery and the starter battery is greater than 10 volts DC.

# GLOSSARY

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**AGM (Absorbed Glass Mat) Battery** A lead acid, maintenance-free battery.

**Ah Capacity** The ability of a fully charged battery to deliver a specified quantity of electricity (Amp-Hr., Ah) at a given rate (Amp, A) over a definite period of time (Hr.). The capacity of a battery depends on a number of factors: active material, weight, density, adhesion to grid, number, design and dimensions of plates, plate spacing design of separators, specific gravity and quantity of available electrolyte, grid alloys, final limiting voltage, discharge rate, temperature, internal and external resistance, age and life of the battery (bank).

**Alternating Current (AC)** An electric current that reverses direction at regular intervals. Sources of alternating current are shorepower, generator power, inverter power or household current.

**Ampere (Amp, A)** The unit of measure of electron flow rate of current through a circuit.

**Ampere-hour (Amp-Hr., Ah)** A unit of measure for a battery's electrical storage capacity, obtained by multiplying the current in amperes by the time in hours of discharge (Example: a battery that delivers 5 amperes for 20 hours delivers 5 amperes times 20 hours, or 100 Amp-Hr. of capacity.)

**AWG (American Wire Gauge)** A standard used to measure the size of wire.

**Current** The rate of flow of electricity or the movement rate of electrons along a conductor. It is comparable to the flow of a stream of water. The unit of measure for current is ampere.

**Cycle** In a battery, one discharge plus one recharge equals one cycle.

**Direct Current (DC)** Current that flows continuously in one direction such as that from batteries, photovoltaics, alternators, chargers and DC generators.

# GLOSSARY

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**Gel Cell Battery** A type of battery that uses a gelled electrolyte solution. These batteries are sealed and are virtually maintenance-free. Not all sealed batteries are the gel cell type.

**Ground** The reference potential of a circuit. In automotive use, the result of attaching one battery cable to the body or frame which is used as a path for completing a circuit in lieu of a direct wire from a component. This method is not suitable for connecting the negative cable of the inverter to ground. Instead, route the cable directly to the negative terminal of the battery.

**LED (Light Emitting Diode)** Indicator light.

**NEC** National Electric Code

**Negative** Designating or pertaining to electrical potential. The negative terminal is the point from which electrons flow during discharge.

**Positive** Designating or pertaining to electrical potential; opposite of negative. The positive battery terminal is the point where electrons return to the battery during discharge.

**Volt** The unit of measure for electric potential.

**Watt** The unit for measuring electrical power, i.e., the rate of doing work, in moving electrons by or against an electric potential.

**Wet Cell Battery** A type of battery that uses liquid as an electrolyte. The wet cell battery requires periodic maintenance; cleaning the connections, checking the electrolyte level and performing an equalization cycle.

# WARRANTY

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**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 echo-charge. 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.

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

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**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.

# WARRANTY

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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.

## **Warning: Limitations On Use**

Please refer to your product user manual for limitations on uses of the product. Specifically, please note that the Xantrex Digital echo-charge 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.
3. 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

MODEL	echo-charge 12V	echo-charge 24V
Input (House Battery)		
Output ON	13.0 to 17.0 Volts	26.0 to 33.0 Volts
Output OFF	<12.9V >17.0V	<25.5V >34.0V
Output		
Charge Current	15.0 Amps Maximum	15.0 Amps Maximum
Reverse Current	0.0005 Amps	0.0015 Amps
Voltage Limiting	14.4 Volts	28.8 Volts

## PROTECTION

- Input and output are reverse polarity protected.
- Input is not protected against a voltage that is greater than 36 Volts DC.
- Thermal protection automatically shuts down the Digital echo-charge. When the condition is corrected, the unit will automatically reset.