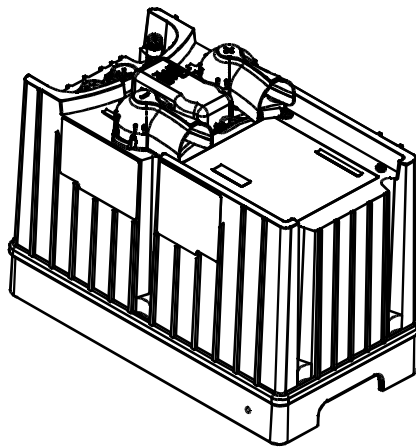


# Heavy Duty Inverter/Charger 1000 Watt Weatherproof



## Owner's Guide

Model RM1012  
For Volvo Trucks

## **About Xantrex**

Xantrex Technology develops, manufactures, and markets advanced power electronic products. The company's products convert raw electrical power from any source into high-quality power required by electronic and electrical equipment.

## **Trademarks**

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# Important Safety Information



## WARNING

Before using your Inverter/Charger, read and save these safety instructions.

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## General precautions

1. Before using the inverter/charger, read all appropriate sections of this guide and any cautionary markings on the inverter and the batteries.
2. Use only a grounded AC extension cord when connecting to AC input power (shorepower). Do not remove or attempt to defeat the ground connection to any shorepower source in any way.
3. If possible, plug the inverter/charger into an AC source outlet that is protected by a Ground Fault Circuit Interrupting (GFCI) device; either a breaker or outlet.
4. Do not operate the inverter/charger if it has received a sharp blow, been dropped, or otherwise damaged. If the unit is damaged, return it to your authorized Volvo dealer.
5. Do not dismantle the inverter/charger; it contains no user-serviceable parts. Attempting to service the unit yourself could cause electrical shock or fire. **Internal capacitors remain charged after all power is disconnected.**
6. To reduce the risk of electrical shock, turn off the inverter/charger from the remote switch, then disconnect both AC (shorepower) and DC (battery) power from the unit before working on any circuits connected to it. Turning off the remote On/Off switch alone will not reduce this risk.

## Precautions when working with batteries

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 battery.
4. Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and cause an explosion.
5. Remove metal items like rings, bracelets, and watches when working with lead-acid batteries. These batteries produce a short-circuit current high enough to weld a ring, other metal jewellery or tools, thus causing severe burns.
6. If you need to remove a battery, always remove the negative terminal from the battery first. Make sure all accessories are off so you don't cause an arc.
7. Before making the final connection to a battery, be sure the polarity is correct; negative-to-negative, and positive-to-positive.
8. When you are making the final connection to a battery, you will see a spark and hear a loud pop. This is normal.

## Precautions for using appliances

Most battery-operated equipment uses a separate charger or transformer that is plugged into an AC receptacle and produces a low voltage output. If the label on the AC adapter or charger states that the adapter or charger produces a low voltage AC or DC output (less than 30 volts), the inverter/charger can power this charger or adapter safely.

Some rechargers for small nickel-cadmium batteries can be damaged if connected to the inverter/charger. Do not use the following loads and appliances:

- Small battery-operated appliances like flashlights, razors, and night lights that can be plugged directly into an AC receptacle to recharge.
- Chargers for battery packs used in hand power tools. These types of chargers display a warning label stating that dangerous voltages are present at the battery terminals.

# 1

## Introduction

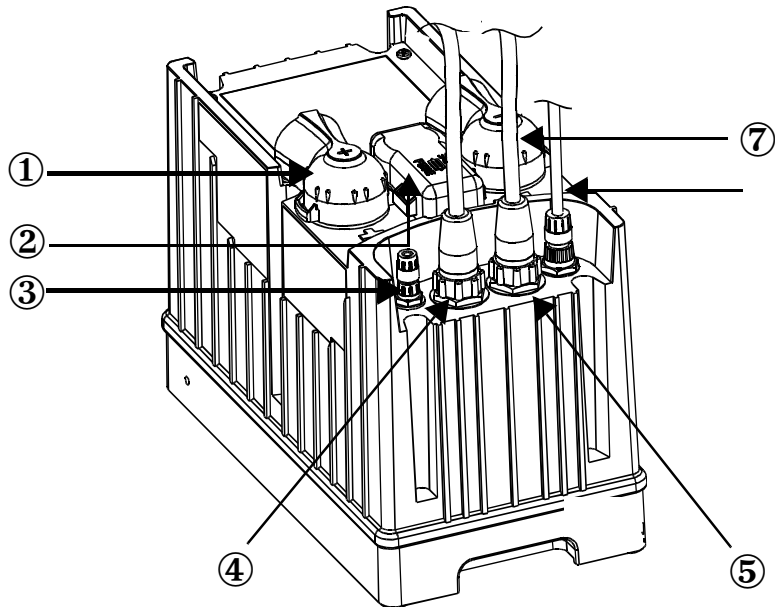
Chapter 1, “[Introduction](#)” describes the main performance and protection features of the inverter/charger.

# Introduction to the Xantrex HD

## Features

The Xantrex HD inverter/charger is a weatherproof, modified sine wave inverter/charger designed to be mounted on main frame rail of the truck. It is a sealed, dust and water resistant unit weighing approximately 30 pounds (13.6 kg). [Figure 1-1](#) shows its main features.

Consult [Appendix A, “Specifications”](#) for more detailed information about the unit.



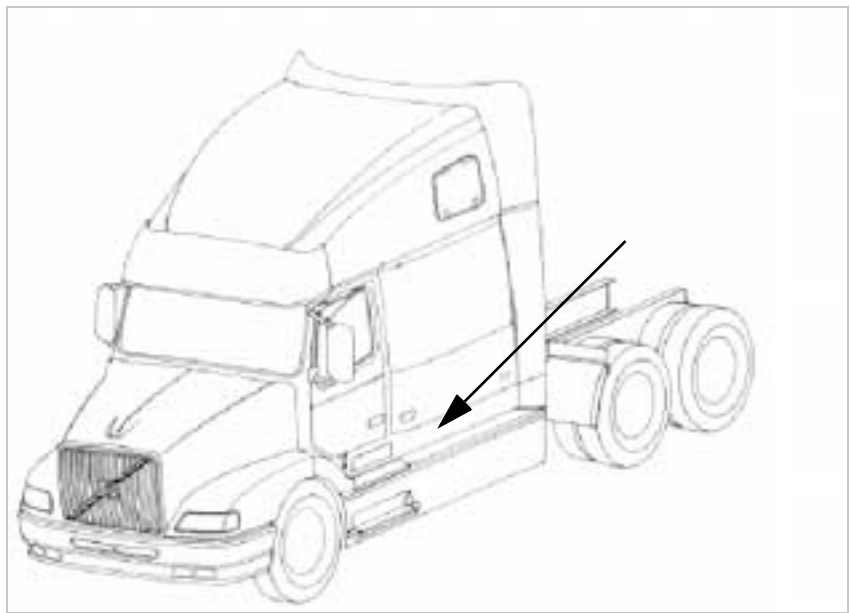
**Figure 1-1** Features of the inverter/charger



Feature	Description
①	Positive terminal connecting to positive terminal of battery
②	Over-current protection fuse which blows in case of a fault within the unit or if it is connected to the battery with reverse polarity.
③	Battery temperature sensor
④	AC output to vehicle
⑤	AC input from shorepower
	Remote toggle switch connection. The connection must be secure for the inverter to work
⑦	Negative terminal connecting to negative terminal of battery

#### Location

The inverter/charger is mounted on the main rail of the truck adjacent to the battery compartment as shown in [Figure 1-2](#).



**Figure 1-2** Location of the inverter/charger

## Operating features

**Inverter/charger**     The inverter/charger operates as an inverter and as a charger depending upon the operational conditions. When the unit is inverting, it is said to be in invert mode and is referred to as an inverter. When the unit is charging, it is in charge mode and is referred to as a charger.

The unit can only operate in charge mode when external AC power referred to as “shorepower” is connected.

**Inverter features**

Xantrex HD offers the following inverter features:

- **Ability to run many of the same appliances that you use at home**  
You can operate TVs, VCRs, satellite receivers, computers, hair dryers, and small power tools for example. You can also run multiple loads up to 1000 watts in total.
- **Surge capability**  
Xantrex HD will manage loads up to 3000 watts for short periods of time as long as the peak current is less than 36 A peak.
- **Low voltage shutdown**  
The inverter shuts off when your batteries reach a predetermined voltage set in the microprocessor to ensure you will always have enough engine starting power. Low voltage shutdown also monitors frequency and voltage, and protects against overload, short circuits and over-temperature.
- **Automatic shutdown when the unit does not detect a load greater than 20 watts for 24 hours**  
This feature prevents the inverter from draining the batteries if it is left on without a load.

Charger  
features

Xantrex HD offers the following charger features:

- 50 amp charging, when shorepower is connected, to ensure your truck batteries are always charged
- Automatic transfer to invert mode  
When your truck's AC shorepower cord is disconnected, the unit automatically switches to invert mode. When AC shorepower is available again, the inverter automatically switches to charging/pass-through mode.
- Load management capability which temporarily reduces charging current to the batteries when a large AC load is applied to the inverter output. This capability helps reduce the chance of tripping the shorepower breaker.



# 2

## Operation

[Chapter 2, “Operation”](#) explains how to calculate the size of the loads you can run from the Xantrex HD Inverter/Charger. It also provides guidelines to help you run loads safely and efficiently.

## Planning for AC loads

AC load	AC load refers to an AC product you want to operate from the inverter/charger. Loads include most products that you can plug into a standard 120 volt household electrical outlet.
Variables affecting AC loads	<p>The Xantrex HD inverter/charger inverter can power a wide range of loads. The size of the load and the length of time you can operate it depends on variables such as</p> <ul style="list-style-type: none"><li>• type of load</li><li>• ambient temperature</li><li>• size, state of charge, temperature, and condition of batteries.</li></ul> <p>The larger your battery capacity and the higher the state of charge, the longer the inverter/charger can run your AC loads. Battery capacity is reduced as battery temperature lowers.</p>

### Type of loads

#### AC loads

The way in which an AC load draws power may determine how effectively it can be powered from the inverter/charger.

Resistive loads	Toasters, coffee pots and incandescent lights are examples of loads which do not need a high start-up current to start running. They use a resistive heater element to generate heat or light. They are the simplest and most efficient for an inverter/charger to run. Large resistive loads, such as electric stoves and water heaters, are impractical since their high current demands quickly drain the batteries.
Inductive loads	TVs, VCRs, stereos, computers, and electric motors (power tools, vacuum cleaners, for example) are examples of AC loads which surge on start up, that is, they require a high startup current compared to a resistive load such as toasters or coffee pots. These loads are known as inductive or electronic loads. Depending upon the size of the motor, it can take as much as six times its running current to start it than it does to keep it running once it has started. This surge can sometimes exceed the inverter/charger's maximum output rating and the inverter will shut down.

---

## DC loads

DC loads are those that run off the 12 V electrical system on the truck. A few examples of DC loads are:

- marker lights, headlights, cab lighting, other lights using DC power
- DC refrigerators
- CBs
- factory-installed radios or sound systems

DC loads and the inverter/charger both rely on the batteries for power. Many DC loads running at one time will shorten the operating times of AC loads.

## Problem loads

These are loads you should not operate from inverter/charger because they may be damaged or may not operate properly:

- dimmer switches
- some small rechargeable hand power tool chargers
- small battery-operated appliances such as flashlights, razors, night lights
- variable speed motors

## Ambient temperature

Ambient temperature

The ambient temperature, that is, the air temperature around the inverter/charger will affect its output power.

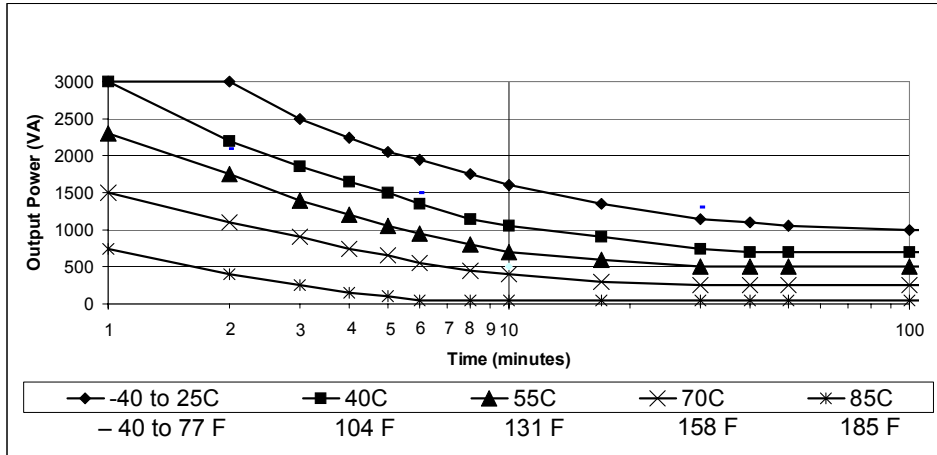
The air temperature around the inverter may be much hotter than away from the vehicle. If your truck is standing on hot pavement, the temperature may be quite high near the inverter.

Temperature and power

Generally, the output power decreases as the temperature increases. For example, at 77 °F (25 °C) the unit delivers 1000 watts for as long as you have sufficient battery power. At 104 °F (40 °C) it delivers 1000 watts for up to 10 minutes before shutting down or 750 watts continuous, or 2000 watts for 2 1/2 minutes.

[Figure 2-1](#) shows the relationship between ambient temperature and the length of time the unit will supply an output power level. Choose the curve with temperature range most closely approximating that of the inverter/charger location, then look for the time in minutes. The

intersection of the time and temperature will indicate approximately the output power of the unit. For example, between  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ ) and  $77^{\circ}\text{F}$  ( $25^{\circ}\text{C}$ ), you will get 3000 watts for approximately two minutes or 2500 watts for 3 minutes.



**Figure 2-1 Output power versus time and temperature**

## Calculating size of an AC load

Operating time

To determine how long you can run your appliances:

1. List all the AC loads you think you will use and determine their power requirement. You can usually find this information on a label near the power cord on the appliance.
2. Look in [Table 2-1](#) to find its operating time or the operating time of a similarly sized appliance. The operating times shown in the table are the maximum time the appliance will operate. The unit will shut down after that time so the battery is not drained past a safe level.
3. To find the running time for several appliances running simultaneously add the total watts of the appliances and look for an appliance with similar power requirement in [Table 2-1](#).

Battery condition

The information in [Table 2-1](#) assumes:

- there is a properly maintained 400 amp-hour battery bank
- the batteries have not been damaged by deep discharge and are relatively new



Factors  
affecting load

Consider these factors when you are calculating loads:

- Loads that exceed 1000 watts may be run for a short time (less than five minutes)
- Loads which run continuously, (reading light, TV, computer) should not exceed more than 1000 watts in total
- Poor battery condition, low battery capacity, low battery temperature, and high ambient temperature will shorten the operating times listed in the table
- The presence of DC loads will reduce the operating times

**Table 2-1 Typical operating time with fully-charged 400 amp-hour batteries †**

Appliance	Watts	Minutes					Hours									
		10	20	30	40	50	1	2	3	4	5	6	9	18	24	
Electric shaver	15															
Table fan	15															
Video game	25															
Reading Lamp	40															
Notebook computer	75															
Computer printer	100															
Hand-held vacuum cleaner	100															
19 in TV/VCR combo	100															
3 cu. ft. refrigerator *	180															
Electric blanket	200															
Electric buffer	400															
Electric drill 1/2"	500															
Halogen work light	750															
Coffee maker	800															
Toaster	1000															
Microwave oven	1200															
Hair dryer	1500															

\* Average

The inverter/charger shuts down after 24 hours if it does not detect a load (or loads less than 20 W).

† Based on four minute operation timeout and shutdown at 11.8 V for loads more than 150 W and 12.3 V timeout and shutdown for loads less than 150 W at 77 °F (25 °C).

## Driving the truck while operating AC and DC loads

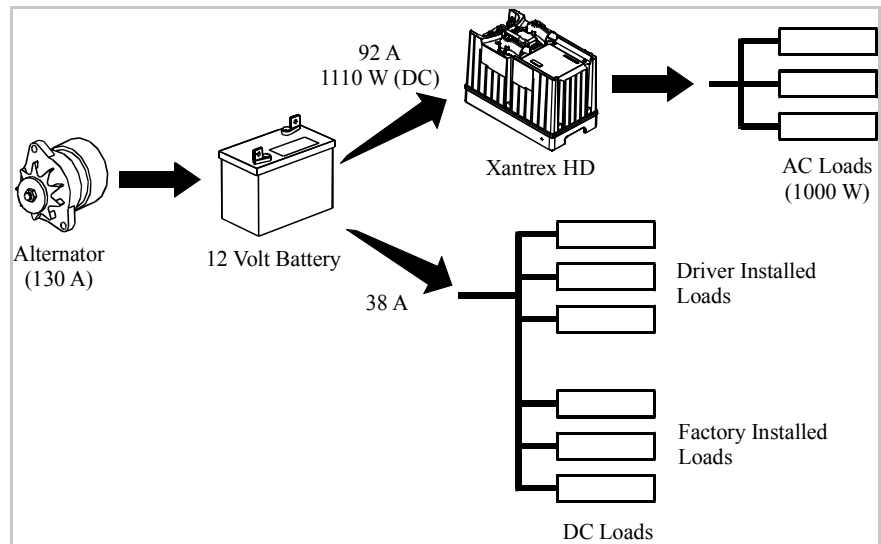
Recharging

Driving your truck does not guarantee that the battery is being fully recharged by the alternator if you are running a combination of large AC and DC loads.

The alternator must provide more power than the combined DC and AC loads draw for your battery to fully recharge.

Example

This example shows what happens if the alternator is overloaded.



**Figure 2-2 AC and DC loads powered by the alternator**

The alternator is charging at 130 amps while the truck is being driven at highway speeds and there is a 1000 W (AC) load.

## Operation

---

The efficiency of the inverter/charger is approximately 90%, which means it is drawing about 1100 W (DC) from the battery or 92 amps. This leaves 38 amps for all DC loads. If the DC loads require more than 38 amps, the battery will actually discharge even though the alternator is running.

## Indication

If the alternator is overloaded the:

- battery voltage gauge on the dashboard begins dropping from approximately 14 V towards 12 V
- inverter LED signals a low battery with a slow blink
- inverter shuts down at 11.8 V and AC loads will stop operating
- battery voltage gauge will climb again as the alternator now has enough power to charge the battery

## Solutions

You can reduce the AC or DC load on the battery or, for continuous operation of large AC and DC loads you can consider installing a larger alternator.

## Comment

Small alternator overloads may not be immediately noticeable and can take several hours to discharge the batteries. Large overloads will discharge the battery in a shorter time.

At low engine RPMs the alternator current will drop significantly causing alternator overload to occur even with reduced AC and DC loads.

## Using the toggle switch

**Location** The inverter/charger is controlled from the remote toggle switch on the control panel in the cabin as shown in [Figure 2-3](#).



**Figure 2-3 Remote switch**

**Switch settings** The switch is used to disable the inverter. The charger is always on as long as shorepower is connected.

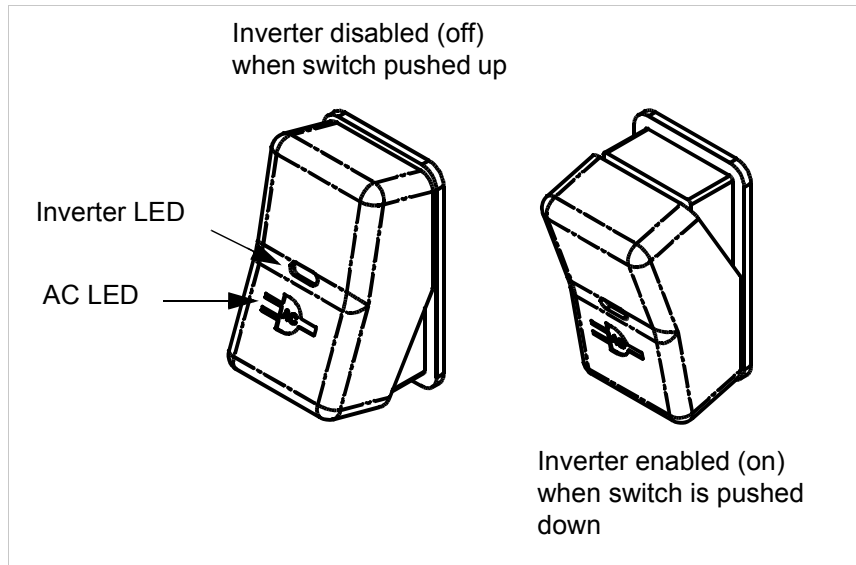
<b>If the switch is ...</b>	<b>The inverter is ...</b>
On	Providing AC to the vehicle when there is no shorepower and the battery voltage is acceptable.
Off	Providing pass-through AC to the vehicle only if there is shorepower. The inverter is disabled and will not provide AC power in the absence of shorepower.

Switch LEDs

The LEDs provide information about the operating state of the inverter/charger. Under normal operating conditions the lights will behave like this:

- AC LED: Illuminated when there is shorepower.  
Blinks slowly (once per second) when first connecting to shorepower then lights steadily or it will continue to blink if the AC voltage is not within range (100 V to 130 V).
- Inverter LED: Illuminated when the unit is inverting and there is no shorepower.  
If the LED is blinking once every two seconds (very slow blink), it means the unit has shut down to avoid draining the batteries.  
A fast-blinking Inverter LED light indicates a unit fault. Refer to [Chapter 4, “Troubleshooting”](#) for more information.

**Note:** Some switches may also have a center position. The center position also enables the inverter.



**Figure 2-4** Inverter/charger switch positions

---

# Operating the Inverter/Charger

This section provides guidelines for operating the Xantrex HD.

## Turning the inverter on and running loads

### To run loads:

- Put the switch in the On position by pressing down.
- Check that the inverter LED is illuminated and AC LED is off if you are not connected to shorepower.
- Connect appliances one at a time to the inverter. Don't connect too many high-surge appliances at once. You may notice some appliances halt or dim momentarily while another is starting up.

## Running in extremes of hot or cold temperatures

**Hot** In extremely hot conditions, the inverter may shut down sooner than it would in normal or cold temperatures. The unit may be hotter than the outside air temperature when parked on hot pavement, for example.

When the ambient temperature is high, reduce the number of loads.

**Cold** In extreme cold temperatures, your batteries may have less stored energy. At 0 °F (– 18 °C) your battery has only half the standby power than it has at 77 °F (25 °C).

## Restarting after a shutdown

If the appliances stop operating suddenly, it usually means that the battery voltage is too low or you have drawn too much power for too long. Try restarting the inverter by turning the switch off, then on again. If you are running several loads, try disconnecting one or two of them. If it doesn't start right away, let the inverter rest a few minutes, then try again. The batteries should be recharged as soon as possible. If it still refuses to power your loads, start the vehicle to charge the batteries.

---

**Note:** Turning the switch off, then on again to restart after a shutdown should only be considered a temporary measure. The batteries likely need to be recharged.

---

## Battery charging

When you are connected to shorepower, the AC LED is illuminated and the unit is both passing power through to the appliances and charging the batteries. To avoid low voltage problems, make sure your connection cord to shorepower is not too long and that it is heavy enough to support the loads you are running. A 14 or 12 gauge extension cord is recommended.

If the AC LED flashes slowly (about twice per second), this means the AC voltage is out of range and your batteries are not charging.

## Using shorepower

If you are running too many appliances you may either trip the 15 amp truck breaker or the shorepower breaker. Reduce the load and reset the affected breaker.

Note that the charger will automatically reduce battery charging if other AC loads are connected. This helps to prevent nuisance tripping of the shorepower breaker.

## Miscellaneous hints

**Automatic shutdown**      The inverter automatically turns off if it has not detected any AC loads for 24 hours or the loads are so small the inverter cannot detect them, such as an alarm clock or very small television (less than 10-20 watts).

**Output power**      Remember that the total output of the inverter/charger is 1000 watts and not 1000 watts per outlet (if there is more than one).

---

**Note:** The Xantrex HD does not provide any warning before it shuts down. If you need to operate a critical AC load, be sure there are no heavy loads connected and that the batteries have been recently charged.

---

**Connect delay to AC power**      If you are connected to shorepower, the AC LED should be on and the inverter LED off. The AC LED may blink slowly when you first apply shorepower because of a connect delay (about 30 seconds), but then will illuminate steadily.

**Load failure**      If any loads fail to operate, or the inverter shuts down, refer to [Chapter 4, “Troubleshooting”](#) for suggestions.



# 3

## Maintenance

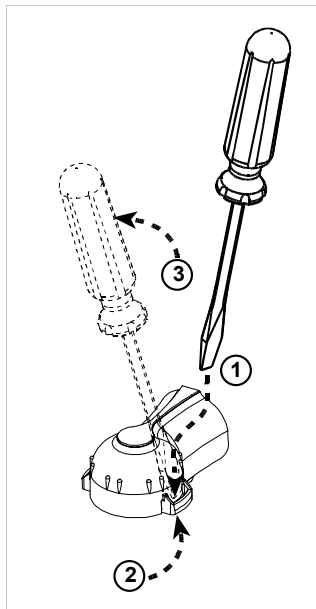
Chapter 3, “Maintenance” provides procedures for checking the terminal connections on the inverter/charger, disconnecting Xantrex HD from the batteries, changing the overcurrent protection fuse, and removing or connecting the AC input and output cables.

## Checking terminals

To check that the battery cables are firmly connected, you will need to remove the terminal caps.

### To remove the terminal cap:

1. Using a flathead screwdriver as shown in [Figure 3-1](#), place the blade in the lip of the cap and push it gently against the cap until it lifts off.
2. To replace the cap, place it over the terminal and push down until it snaps into place.



**Figure 3-1** Lifting the terminal cap

# Disconnecting and connecting Xantrex HD from the batteries

Before doing any work with your batteries or with the inverter/charger, review [“Important Safety Information”](#) on [page v](#).

## Disconnecting



### **WARNING: Explosion or Fire**

Make sure the battery compartment is well ventilated. Flammable fumes are often present when working with batteries.

---

#### **To disconnect from the battery:**

1. Disconnect the shorepower cable and turn the inverter/charger off.
2. Remove the inverter/charger cables from the battery.  
Disconnect the negative connection first at the inverter/charger terminal and then disconnect the positive at the battery terminal.
3. If you are replacing batteries, make sure they are the same kind and capacity as you are currently using.
4. Disconnect the ground wire if the unit must be removed from its mounting bracket.

## Connecting

#### **To connect to the batteries:**

1. Ensure shorepower is disconnected and the inverter/charger is off.
2. Connect the ground wire if it was previously removed



### **CAUTION: Reverse Polarity**

Do not connect cables in reverse polarity. If you do, the fuse will blow the fuse and the unit could be damaged.

---



**WARNING: Explosion or Fire**

Do not complete the next step if flammable fumes are present. Explosion or fire may result. Thoroughly ventilate the battery compartment before making this connection.

---

3. Connect the positive battery cable from the inverter/charger to the positive terminal on the battery; then the negative to the negative with the last connection made at the Xantrex HD terminal to prevent sparks. You may hear an audible “pop” and see a spark when you make the last connection.
4. Tighten to a torque of 14.5 ft-lbs (+/-10%).
5. Check that the inverter is operating by enabling it from the toggle switch as explained in [“Using the toggle switch” on page 2–9](#).

## Replacing the fuse

---



**WARNING: Correct fuse type**

To reduce the risk of fire and electrical hazards, replace the fuse with a fuse of the same type and rating.

Using the wrong fuse type can damage the unit and void your warranty.

---

The inverter/charger over-current protection fuse, shown in [Figure 1-1](#), protects the unit from internal failure or reverse polarity when connecting it to the battery. If it blows for any reason, replace it with *only* the fuse types listed below.

- Littelfuse Mega® Fast Blow, 250 A, 32 V; part number 298250
- Bussmann® 250 A 48 V; part number AMG-250

**To replace the fuse:**

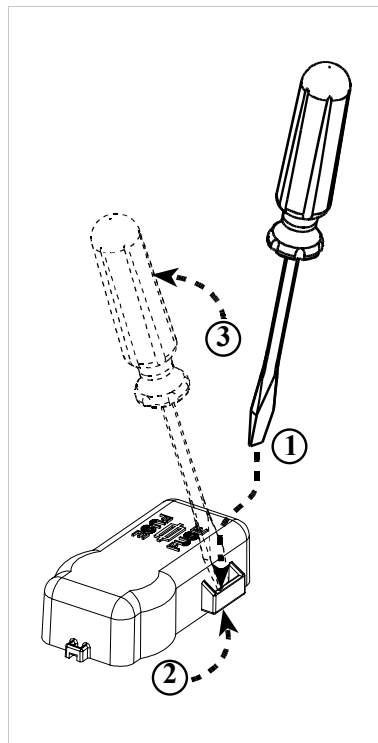
1. Lift the fuse cover off as shown in [Figure 3-2](#).
2. Remove the spent fuse and install the new fuse.

Be sure to use a lock washer when replacing the nuts. Tighten to a torque of 4-5.5 ft-lb (5.5-7.5 Nm).

**CAUTION: Do not overtighten fuse nuts!**

3. Replace the fuse cover by placing it over the fuse and pressing down until it snaps into place.

If the fuse blows a second time without being able to operate the unit, do not change the fuse again. Call your authorized Volvo dealer.



**Figure 3-2** Removing the fuse cover

## Removing and reconnecting AC cables

### To remove the AC cables:

- Grasp the knurled surface of the connector housing as shown in [Figure 3-3](#) and turn counter clockwise approximately one-half turn. Gently pull the cable out by grasping the connector.

### To reconnect:

- Insert the plug firmly. Turn the connector housing clockwise 1/2 turn until you feel resistance, then another 1/8 turn until it locks into place.

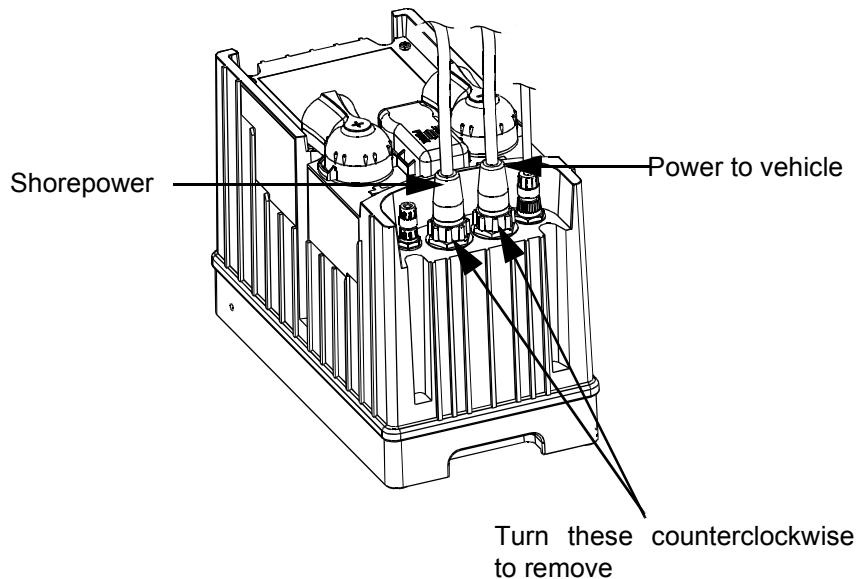


Figure 3-3 AC input and output cables

# 4

## Troubleshooting

Chapter 4, “Troubleshooting” provides information to help you identify common problems which may occur. Read this chapter before calling your authorized Volvo dealer. If you cannot solve the problem, record the details as suggested on [page 4–5](#), then call your dealer.

# Troubleshooting

## Common problems

The unit shuts down during operation for four main reasons:

- low battery—when the battery reaches approximately 11.8 Vdc (for loads greater than 150 watts) for more than four minutes, or 12.3 Vdc for loads less than 150 watts.
- high battery—when the battery voltage exceeds 16 Vdc
- overload—when the AC load connected to the inverter exceeds the rated load
- over temperature—when the internal temperature thresholds are reached

This table lists problems you may encounter and offers suggestions to fix them. Refer to [Table 4-2](#) and [Table 4-3](#) for explanation of the blinking LEDs.

**Table 4-1 Troubleshooting reference**

Symptom	Possible Problem	Remedy
Loads will not start when there is no shorepower	Inverter not turned on	Turn the inverter on
	Batteries at low voltage	Recharge batteries by running the engine or connect to shorepower
	Inverter too hot	Wait until inverter has cooled down
Loads stop running almost as soon as they start	Load is too heavy	Reduce the load
	Batteries at low voltage level	Recharge batteries by running the engine or plug into shorepower
	Bad battery cable or corroded battery terminals	Check cable and connectors
	Batteries in poor condition	Test and replace, if necessary



**Table 4-1 Troubleshooting reference (Continued)**

Symptom	Possible Problem	Remedy
Loads stop operating without warning after they have been running for awhile Shorepower not connected	Too many appliances have reduced battery voltage to shutdown level	Reduce number of loads. Allow inverter to cool and restart. Start the truck to recharge the batteries.
	Ambient temperature is too high	Disconnect appliances and let the unit cool down
Inverter will not work even after toggling switch and batteries are charged and the inverter is cold	Remote switch may be disconnected at the unit (not likely)	Check that the remote switch is firmly connected
	Fuse on the unit (shown in <a href="#">Figure 1-1</a> ) may have blown (not likely)	Replace fuse or return unit to an authorized Volvo dealer
AC voltage at receptacles reads low	Wrong type of volt meter being used	Use a true RMS meter
In inverter mode, times to shutdown are getting shorter for the same kind of AC load	Bad battery cable or corroded battery terminals	Check cables and connectors
	Batteries too old or damaged	Replace batteries

### Blinking lights on the remote switch

This table describes the different sequences of blinking lights you may encounter when the inverter is enabled (switch is on) or the unit is charging (switch is off). Light sequences are described as follows:

- Fast blink                      Light is on for 1/4 second and off for 1/4 second
- Slow blink                      Light is on for 1/2 second and off for 1/2 second
- Very slow blink                Light is on for one second and off for one second

Table 4-2 explains the blinking pattern of the AC input LED when the inverter is connected to shorepower.

**Table 4-2 Interpreting AC input LED blink patterns**

Inverter LED	AC input LED	Condition
Off	ON	Connected to shorepower within 100 to 130 Vac range and battery charger is operational
Off	Very slow blink	<ul style="list-style-type: none"> <li>• Delay on transfer from the inverter to shorepower</li> <li>• AC power is not in range (outside 100 to 130 Vac range)</li> <li>• Battery is not being charged. AC output load may be too great</li> <li>• Extension cord to shorepower may be too long or not of sufficient conductor size, resulting in voltage drop</li> </ul>

Table 4-3 explains the inverter LED flashing pattern when the unit is in invert mode or in charge mode.

**Table 4-3 Inverter LED blink patterns**

Unit in invert mode	Unit in charge mode	Condition
Slow blink	N/A	Low battery
Fast blink	Fast blink	High battery
Fast blink	Slow blink	Unit over temperature and has shut down
Fast blink	Slow blink	Ambient temperature too high and unit has shut down
Slow blink	N/A	Over current
Very slow blink	N/A	Auto shutdown. Inverter has shut down because no load has been detected in 24 hours or the load is too small to detect

## Calling your authorized Volvo dealer

If none of the troubleshooting suggestions work, you will need to call your authorized Volvo dealer. If possible, note the circumstances surrounding the failure. They may help the service technician diagnose the problem quickly.

How long have you had the inverter?

Serial number

Battery types and sizes

Appliances running at shutdown

Were the LEDs flashing and if so, what pattern (slow blinks? fast blinks?)

Was the ambient temperature extremely hot or cold?

Were any DC appliances affected?

Has this happened before?

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# A

## Specifications

[Appendix A “Specifications”](#) contains the Xantrex HD product specifications, which include the inverter, charger, and transfer specifications. It shows derating curves for output surge, current versus temperature, and pass-through current. It also illustrates the three-stage charging profile used by the unit.

Note that all specifications are subject to change without notice.

# Physical specifications

Physical specifications	
Enclosure	Sealed; dust and water-resistant
Dimensions	Approximately. 8.5" (21.8 cm)H x 7" (17.7 cm)W x 13.0"(33.0 cm)D, excluding DC ground connector (similar to Group 31 battery dimensions)
Net weight	30 lbs. maximum without mounting brackets or external cables
External finish	Base - Clear anodized aluminium. Cover -Black polycarbonate/ABS plastic
Mounting Orientation	Upright only
Mounting method	Four M8x1.25 threaded holes accessible from bottom only, one in each corner, and /or battery hold-down bar over center top of cover. Recommended torque: 5-6 ft-lb (7-8 Nm)
Battery cable	#2/0 AWG Minimum, maximum 6 feet long, each way
Battery size	300 Ah acceptable; 400 Ah recommended

## Inverter specifications

All inverter specifications are at nominal conditions; 77 °F (25 °C,) 1000 W resistive load, 12 Vdc inverting, 120 Vac, unless otherwise specified.

Inverter specifications	
Output wave form	Modified sine wave
Output power continuous	1000 VA continuous at 77 °F (25 °C)
Surge rating	3000 VA for 2 min at -40 °F to 77 °F (-40 °C to 25 °C) See Figure A-1 for output at different temperatures.
Operating voltage range	10.5 Vdc-16.0 Vdc
Input DC voltage rating	12 Vdc
Output voltage	120 Vac RMS
Output voltage regulation	108 to 125 Vac under steady state 0 to 1000 W load with 11.8 to 14.5 Vdc input at 25 °C  108 to 132 Vac up to 1000 W, 10.5to 16 Vdc input at - 40 to 185 °F (-40 °C -85 °C)
Output frequency	60.0 ± 0.1 Hz - 40 °F to 185 °F (- 40 °C to 85 °C ambient temperature)
Power factor allowed	All (0 to 1, leading or lagging)
Peak efficiency	Greater than 93% at 12.6 Vdc input at 77 °F (25 °C)
Idle power consumption	Less than 15 W (inverting with 120 Vac output and no load)
Auto-shutdown mode	Inverter output is less than 15 ±5 W and battery is less than 13 Vdc for 24 hours

Inverter specifications (continued)	
Shutdowns and Restarts	
DC low voltage shutdown	<ol style="list-style-type: none"> <li>1. Battery voltage drops below <math>11.8 \pm 0.15</math> Vdc at heavy loads (more than 150 W) or 12.3 Vdc at light loads (less than 150 W) for more than 4 min and 10 sec (<math>\pm 30</math> s)</li> <li>2. Battery voltage is below <math>10.5 \pm 0.2</math> Vdc for 3 seconds</li> </ol>
DC low voltage restart	$12.5 \pm 0.15$ Vdc
DC high voltage shutdown	$16.0 \pm 0.2$ Vdc
DC high voltage restart	Less than 16.0 Vdc, same as DC high voltage shutdown; there is no hysteresis

## Charger specifications

All charging specifications are at nominal conditions, 77 °F (25 °C), 14.0 Vdc at 50 A charging, 120 Vac, 60 Hz unless otherwise specified.

Charger specifications	
Charging method	<ul style="list-style-type: none"> <li>• Three-stage charging with battery temperature compensation. See <a href="#">Figure A-3</a>.</li> <li>• Algorithm for generic flooded batteries only</li> <li>• No equalization mode</li> </ul>
AC input voltage	100–130 Vac
AC input frequency	54–66 Hz
Minimum battery voltage	8 Vdc The charger does not operate below this level
Maximum charger input current	13.0 Aac <sub>rms</sub>
Maximum charge rate	$50 \pm 5$ Adc. See <a href="#">Figure A-2</a>
Charger efficiency	Greater than 80%
Absorption charge voltage	$14.3 \pm 0.3$ Vdc at 77 °F (25 °C)
Float charge voltage	$13.4 \pm 0.3$ Vdc at 77 °F (25 °C)



<b>Charger specifications (continued)</b>	
Temperature compensation	– 0.023 Vdc/ °C from -2 °C to 85 °C. Below -2 °C, the charger voltage defaults to the – 2 °C voltage
Overvoltage shutdown	Greater than or equal to 15.3 ± 0.3 Vdc

## Transfer and general specifications

<b>Transfer and general specifications</b>	
AC input/bypass current	20 Aac maximum continuous at 77 °F (25 °C) Derates after 30 °C to 5 Aac at 185 °F (85 °C)
Transfer speed	10–40 ms typical
AC low voltage transfer	90 ±5 Vac
AC low voltage restart	95 ±5 Vac, 30 second delay
AC high voltage transfer	None
Standby/off consumption	< 0.7 at 12.5 Vdc with charger and inverter both off
Operating temperature range	– 40 °F to +185 °F (– 40 °C to +85 °C)
Storage temperature range	– 40 °F to +185 °F (– 40 °C to +85 °C)
Altitude limit	15 000 feet (5000 metres)
AC neutral to ground bonding	Invert mode: AC output neutral is connected to AC ground (chassis) Charge mode: AC output neutral is connected to AC input neutral  AC input neutral is always isolated form AC ground

# Rating curves and charging profiles

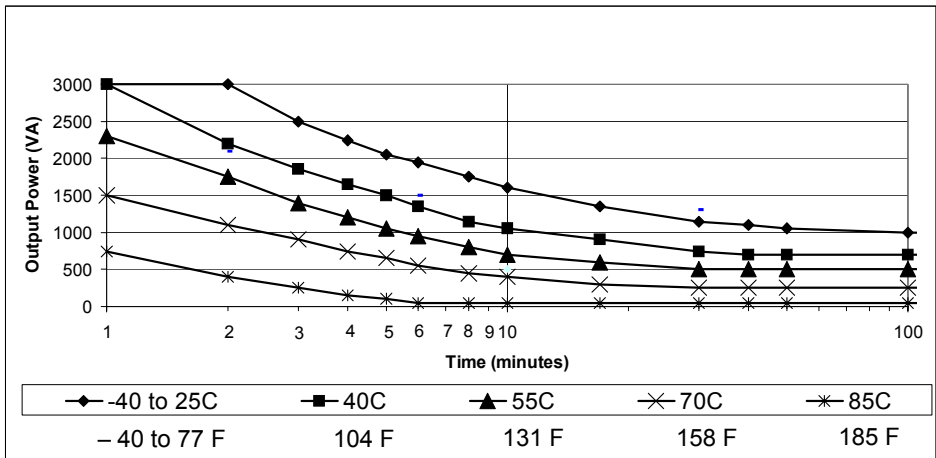


Figure A-1 Output surge rating

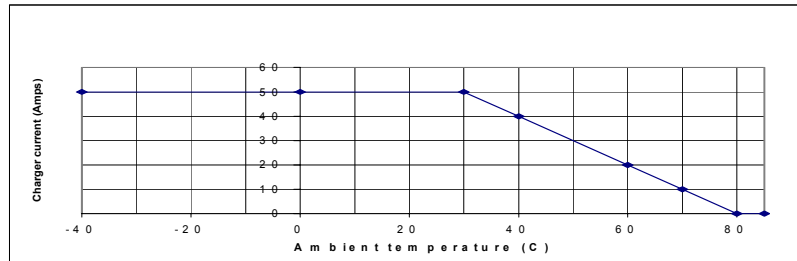


Figure A-2 Charging current versus temperature derating curve

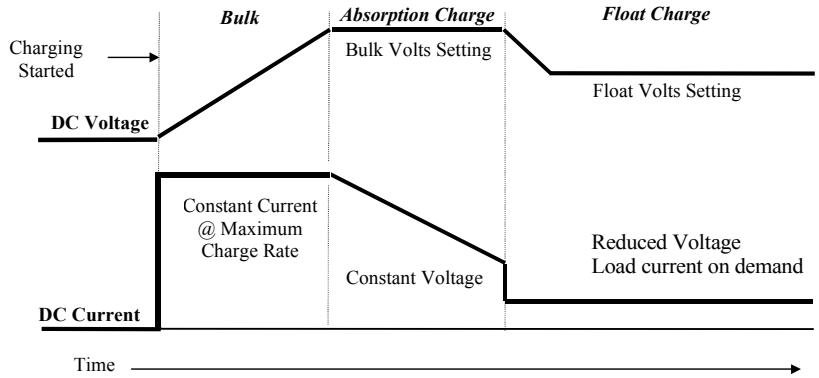


Figure A-3 Three-stage charging profile



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