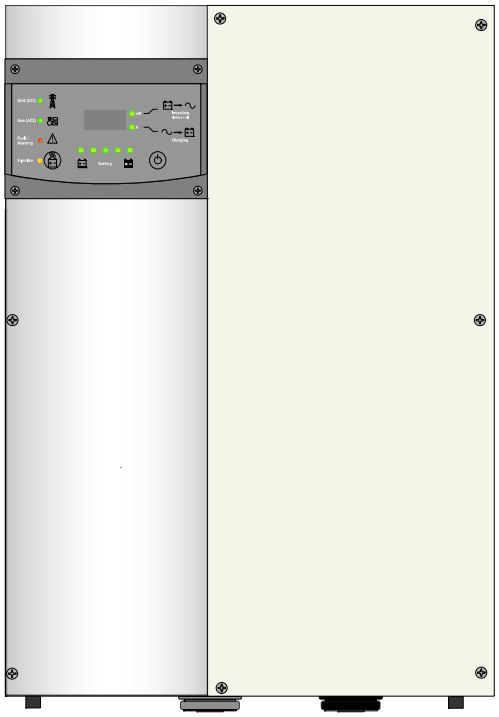
Xantrex™ XW Series Hybrid Inverter/Charger

Xantrex XW4024 120/240 60
Xantrex XW4548 120/240 60
Xantrex XW6048 120/240 60

Operation Guide



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Contact Information

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Information About Your System

As soon as you open your product, record the following information and be sure to keep your proof of purchase.

Serial Number _____

Product Number _____

Purchased From _____

Purchase Date _____

About This Guide

Purpose

The purpose of this Operation Guide is to provide explanations and procedures for configuring, operating, maintaining, and troubleshooting the Schneider Electric Xantrex XW Series Hybrid Inverter/Charger.

Scope

This Guide includes information about monitoring and configuring the Xantrex XW Series Inverter/Charger.

The Guide provides safety guidelines, detailed setup information, and information about operating and troubleshooting the unit. It does not provide installation procedures or details about particular brands of batteries, photoelectric cells, or generators. Consult the equipment manufacturers for this information.

Audience

The Guide is intended for anyone who needs to operate, configure, and troubleshoot the Xantrex XW Series Hybrid Inverter/Charger. Certain configuration tasks should only be performed in consultation with your local utility and/or an authorized dealer.

Organization

This Guide is organized into four chapters and three appendices.

Chapter 1, “Introduction”, describes the operational features of the Xantrex XW Series Hybrid Inverter/Charger.

Chapter 2, “Monitoring Operation”, contains information about monitoring Xantrex XW Series Hybrid Inverter/Charger operation using the inverter information panel or the Xantrex XW System Control Panel.

Chapter 3, “Configuration” explains how to navigate through the Xantrex XW System Control Panel menus and configure the Xantrex XW Series Hybrid Inverter/Charger.,

Chapter 4, “Troubleshooting”, contains information and procedures for identifying and solving possible problems with the Xantrex XW Series Hybrid Inverter/Charger.

Appendix A, “Specifications” provides the electrical and mechanical specifications for the Xantrex XW Series Hybrid Inverter/Charger.

Appendix B contains the default configuration settings and ranges for the Xantrex XW Series Hybrid Inverter/Charger. Configuration settings can be viewed and changed using the Xantrex XW System Control Panel.

Appendix C provides information on Boost Charging for flooded lead-acid batteries in off-grid and grid support applications.

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Conventions Used

The following conventions are used in this guide.

WARNING

Warnings identify conditions or practices that could result in personal injury or loss of life

CAUTION

Cautions identify conditions or practices that could result in damage to the unit or other equipment.

Important: These notes describe things which are important for you to know, but not as serious as a caution or warning.

Abbreviations and Acronyms

CEC	California Energy Commission
CSA	Canadian Standards Association
GT	Grid Tie
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MPPT	Maximum Power Point Tracking
NEC	US National Electrical Code NFPA-70
PV	Photovoltaic
PVGFP	PV Ground Fault Protection
UL	Underwriters Laboratories
VAC	Volts AC
VDC	Volts DC

Related Information

Xantrex XW Power System Installation Overview (975-0238-01-01)

Xantrex XW Power System Installation Guide (975-0239-01-01)

You can find more information about Schneider Electric as well as its products and services at www.schneider-electric.com.

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Important Safety Instructions

READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

WARNING

This chapter contains important safety and operating instructions. Read and keep this Operation Guide for future reference.

WARNING: Limitations on use

The Xantrex XW Series Hybrid Inverter/Charger is not intended for use in connection with life support systems or other medical equipment or devices.

1. Before using the Xantrex XW Series Inverter/Charger, read all instructions and cautionary markings on the Xantrex XW Series Inverter/Charger, the batteries, and all appropriate sections of this guide.
2. Ensure the Xantrex XW Series Inverter/Charger is installed according to the guidelines and procedures in the *Xantrex XW Power System Installation Guide*.
3. Do not expose the Xantrex XW Series Inverter/Charger to rain, snow, or spray. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings.
4. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.
5. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the Xantrex XW Series Inverter/Charger with damaged or substandard wiring.
6. Do not operate the Xantrex XW Series Inverter/Charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the unit is damaged, see your warranty.
7. Do not disassemble the Xantrex XW Series Inverter/Charger. It contains no user-serviceable parts. See your warranty for instructions on obtaining service. Attempting to service the Xantrex XW Series Inverter/Charger yourself may result in a risk of electrical shock or fire and will void your warranty. Internal capacitors remain charged after all power is disconnected.
8. To reduce the risk of electrical shock, authorized service personnel must disconnect both AC and DC power from the Xantrex XW Series Inverter/Charger before attempting any maintenance or cleaning or working on any circuits connected to the Xantrex XW Series Inverter/Charger. Putting the unit in Standby mode will not reduce this risk.
9. To reduce the chance of short-circuits, authorized service personnel must use insulated tools when installing or working with this equipment.

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FCC Information to the User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to a different circuit from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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1 Introduction

Chapter 1, “Introduction”, describes the operational features of the Xantrex XW Series Hybrid Inverter/Charger.

Topics in this chapter include:

- “Basic Features” on page 1–2
- “Basic Operation” on page 1–3
- “Monitoring the Xantrex XW Series Inverter/Charger” on page 1–6

Basic Features

The Xantrex XW Series Hybrid Inverter/Charger is a true sine wave inverter/charger that can be used for residential and commercial applications: stand-alone, grid-backup, and grid-tie with battery energy storage. Capable of being grid-interactive or grid-independent, the Xantrex XW Series Inverter/Charger will operate with generators and renewable energy sources to provide full-time or backup power.

Other Xantrex XW Series Inverter/Charger features include:

- Building block power levels—units can be installed in parallel to produce up to 24 kilowatts in single phase and split phase configuration. Units can be installed in parallel to produce up to 36 kilowatts in a three phase configuration. See the *Xantrex XW Power System Installation Guide* (Document Part Number 975-0239-01-01) and the *Addendum to the Xantrex XW Power System Installation Guide* (Document Part Number 976-0222-01-01) both available at www.schneider-electric.com for more information on single-phase (120 V) and three-phase (120:208 V) configuration.
- High efficiency true sine wave output
- Single-phase, three-wire output to simplify system configuration by eliminating the need for an autotransformer or stacking multiple inverters
- Surge capacity to start difficult loads like well pumps, refrigerators, or A/C compressors
- Power factor-corrected (PFC) input minimizes AC input current required for charging, increasing AC pass-through capacity
- High output, multi-stage charger minimizes charging time
- Optional Xantrex XW Automatic Generator Start allows operation with a wide range of generators, supported through a dedicated generator input
- Multi-mode grid-tie operation supported
- Integrated transfer switch
- Temperature-controlled, variable-speed internal cooling fan. The fan turns on when the internal temperature reaches 45 °C (113 °F) and reaches maximum speed at 70 °C (158 °F). The fan turns off when the internal temperature falls to 40 °C (104 °F).
- Housing design promotes vertical air flow through the Xantrex XW Series Inverter/Charger. This natural “chimney effect” provides convection cooling at lower power levels and reduces fan run time.
- Designed for reliability and field serviceability.

System component

The Xantrex XW Series Inverter/Charger uses Xantrex Xanbus™, a network communications protocol developed by the manufacturer, to communicate its settings and activity to other Xantrex Xanbus-enabled devices. You can configure and monitor the Xantrex XW Series Inverter/Charger and every Xantrex Xanbus-enabled device in the system using an optional Xantrex XW System Control Panel (part number 865-1050).

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Basic Operation

The Xantrex XW Series Hybrid Inverter/Charger is a modular building block sine-wave inverter/charger that can be used for both residential and commercial stand-alone, grid-backup, and grid-tie applications with battery energy storage. The Xantrex XW Series Inverter/Charger is a self-contained DC to AC inverter, battery charger, and integrated AC transfer switch. Up to four Xantrex XW Series Inverter/Chargers can be installed together in a 120/240 V single-phase, three-wire configuration. However, the Xantrex XW Power Distribution Panel is only rated for up to three Xantrex XW Series Inverter/Chargers.

Multi-unit operation

Inverting For multiple Xantrex XW Series Inverter/Chargers, the master Xantrex XW Series Inverter/Charger broadcasts pulses on the Xantrex Xanbus network to synchronize operation between the other paralleled units. When AC loads are present, all units produce power, effectively sharing the load. Multiple Xantrex XW Series Inverter/Chargers do not produce power together when Search mode is enabled. See “Using Search Mode” on page 3–8.

Parallel charging Multiple Xantrex XW Series Inverter/Chargers synchronize charging stages to ensure efficient charging of the battery bank. When a single unit transitions from bulk to absorption so do all other units. In absorption, all units must complete the absorption stage before transitioning to the next stage. Note that units do not load share when charging except during the bulk stage. The Xantrex XW Series Inverter/Chargers stop sharing charge current just before completing the bulk stage. The units do not share charge current during the absorption and float stages.

Each unit charges batteries based on the Max Charge Rate setting and active internal (temperature-based) deratings.

If equalization is enabled on one or more devices capable of equalization charging (such as Xantrex XW Series Inverter/Chargers or Xantrex XW Solar Charge Controllers), only those devices perform an equalize cycle after absorption. Other devices transition to float (if three-stage charging is selected) or transition to AC pass-through (if two-stage charging is selected).

When one or more Xantrex XW Solar Charge Controllers are installed and operating in the system, the Xantrex XW Series Inverter/Chargers synchronize only the bulk charging stage with the charge controllers.

AC Transfer Xantrex XW Series Inverter/Chargers monitor each other using a peer-to-peer monitoring technique to determine the quality of AC input. If AC input is deemed to be bad by any of the paralleled units, no transfer to AC occurs and the AC LED may continually flash on each unit’s information panel. If the system was in pass-through and AC fails on any unit, all units transfer to invert simultaneously.

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Faults When a Xantrex XW Series Inverter/Charger in a multi-unit system has a fault, only the affected device shuts down, except in the following cases:

- When a master unit has an invert mode fault that causes it to stop inverting, a system-wide fault occurs. Invert mode faults on a slave unit only shut down the affected slave unit.
- When there is a battery-related fault such as battery over-temperature or over-voltage.

Other modes of operation Xantrex XW Series Inverter/Chargers operate independently when in grid support mode (including sell mode), load shave, generator support, and charger block modes. This enables units to be configured to perform multiple functions independently and allows greater flexibility in operating the system.

Auxiliary output Each Xantrex XW Series Inverter/Charger has one programmable auxiliary output that is able to run a small 12 V fan or operate an external relay to perform other functions, such as remotely starting a generator (if the Xantrex Xanbus-enabled Xantrex XW AGS is not used), to disconnect external non-critical loads, or to turn on a diversion load for battery voltage regulation.

Transfer relay The built-in transfer relay is rated for 60 amps. When an external AC source is detected on either of the AC inputs, the relay transfers loads from the Xantrex XW Series Inverter/Charger to the external power source, and then activates the battery charger.

AC1 and AC2 relay The Xantrex XW Series Inverter/Charger design does not allow the AC1 and AC2 inputs to feed into each other. The relays controlling AC1 and AC2 input can never close simultaneously. This design prevents generator input from backfeeding to the utility grid.

Surge Performance

Unlike many other inverters, the Xantrex XW Series Inverter/Charger prevents voltage from sagging dramatically during surge conditions. The Xantrex XW Series Inverter/Charger handles surges of over twice its rated output power with only a minimal drop in output voltage.

Islanding Protection

Islanding protection is an essential safety feature that makes sure no one working on the utility grid is harmed by a distributed energy source, such as the Xantrex XW Series Inverter/Charger. Islanding protection also prevents loads connected to the Xantrex XW Series Inverter/Charger from being damaged by fluctuating utility grid input.

The Xantrex XW Series Inverter/Charger uses a proprietary positive feedback control to achieve reliable anti-islanding while maintaining low total harmonic distortion. Default software settings are programmed into each Xantrex XW Series Inverter/Charger at the factory to make sure it does not island according to applicable safety regulations (such as IEEE 1547 and UL 1741 in North America).

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In some instances it may be desirable from both a utility and a customer point of view to adjust default anti-islanding settings. For example, the Xantrex XW Series Inverter/Charger may experience “nuisance trips” if the grid is weak and the voltage falls outside the allowable range specified in the regulations. It may be difficult for a utility to upgrade the grid to eliminate this problem. With permission from the utility, the factory settings may be changed to allow the Xantrex XW Series Inverter/Charger to operate over a wider grid voltage range. These settings must only be changed by qualified service personnel using a special software application provided by the manufacturer.

While selling power, the Xantrex XW Series Inverter/Charger continuously monitors utility grid voltage and frequency. If the grid voltage and frequency move beyond the Xantrex XW Series Inverter/Charger default ranges[1]—during a power surge or outage, for example—the Xantrex XW Series Inverter/Charger stops selling power to AC1 and disconnects from the utility grid for five minutes. (Five minutes is the minimum reconnect time, and it is not adjustable.) If the utility grid voltage and frequency have returned to their nominal values when the reconnect time has expired, the Xantrex XW Series Inverter/Charger begins selling power again.

The Fault light on the Xantrex XW Series Inverter/Charger information panel indicates a utility fault. No fault code appears on the three-character display because the fault is with the utility grid, not the Xantrex XW Series Inverter/Charger.

The Xantrex XW System Control Panel (Xantrex XW SCP) indicates a utility fault with the Fault light and a fault message on its screen (faults F23 to F40 are utility faults—see Table 4-5 on page 4–19). The fault cannot be manually cleared. Utility faults clear automatically when the utility grid voltage and frequency return to within the ranges programmed into the Xantrex XW Series Inverter/Charger. If grid support is enabled and the utility voltage and frequency come back within tolerance, the Xantrex XW Series Inverter/Charger information panel displays a countdown timer for the five minutes that it takes until the Xantrex XW Series Inverter/Charger can start interacting with the grid again.

1.See “Electrical Specifications” on page A–2.

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Monitoring the Xantrex XW Series Inverter/Charger

You can monitor Xantrex XW Series Inverter/Charger operation using either the factory-installed inverter information panel or an optional Xantrex XW System Control Panel. You can configure the Xantrex XW Series Inverter/Charger only with the Xantrex XW System Control Panel.

Inverter Information Panel

The inverter information panel features:

- Buttons for Xantrex XW Series Inverter/Charger on and off control, clearing faults and warnings, and battery equalization
- Three-character display to indicate power output, charge current, or troubleshooting information
- LEDs to indicate input status, output status, battery condition, and system warnings or faults.

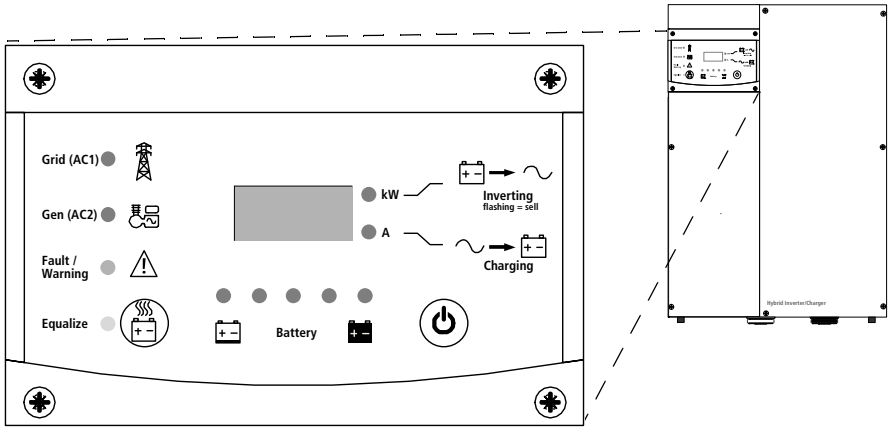

Figure 1-1 Inverter Information Panel

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Xantrex XW System Control Panel

A Xantrex XW System Control Panel (Xantrex XW SCP) is required for configuring the Xantrex XW Series Inverter/Charger and other Xantrex Xanbus-enabled system components.

The Xantrex XW SCP features:

- Liquid crystal display that provides graphics and text describing operation and status information in real time
- LED fault and warning indicator
- Internal clock to control time-dependent Xantrex XW Series Inverter/Charger settings
- Buttons to select configuration menus, customize Xantrex XW Series Inverter/Charger settings, and clear faults and warnings.

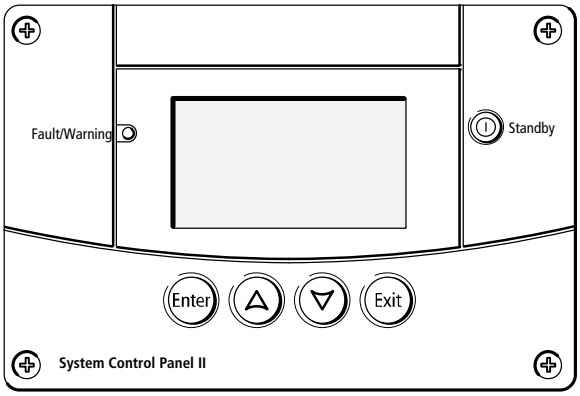

Figure 1-2 Xantrex XW System Control Panel

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2 Monitoring Operation

Chapter 2, “Monitoring Operation”, contains information about monitoring Xantrex XW Series Hybrid Inverter/Charger operation using the inverter information panel or the Xantrex XW System Control Panel.

The topics in this chapter include:

- “Monitoring Operation with the Inverter Information Panel” on page 2–2
- “Monitoring Operation with the Xantrex XW SCP” on page 2–7

Monitoring Operation with the Inverter Information Panel

The inverter information panel monitors a single Xantrex XW Series Inverter/Charger. The inverter information panel displays basic information, allows you to turn the Xantrex XW Series Inverter/Charger on and off, and allows you to start battery equalization. LEDs on the information panel indicate AC input status, Xantrex XW Series Inverter/Charger status, battery condition, and charging and equalization status. The LEDs and three-character display screen also alert you to Xantrex XW Series Inverter/Charger warning and fault conditions.

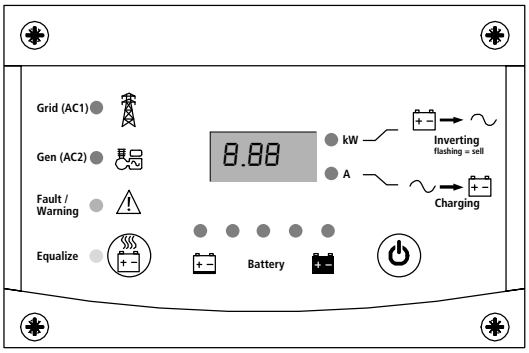

Figure 2-1 Inverter Information Panel

Monitoring AC Input Status

Grid (AC1) The green Grid (AC1) LED indicates the presence and status of an AC source connected to the AC1 input.

Symbol	LED On	LED Flashing	LED Off
	AC input is present and qualified. The Xantrex XW Series Inverter/Charger is ready to charge batteries, sell power to the grid, or pass AC through to the loads.	AC input is present, within nominal range and is being qualified.	The Xantrex XW Series Inverter/Charger is not connected to the grid. AC input is not present, or AC input is present but not within nominal range.

Gen (AC2) The green Gen (AC2) LED indicates the presence and status of a generator or other auxiliary AC source on the AC2 input.

Symbol	LED On	LED Flashing	LED Off
	The AC source is present and AC input is qualified. The Xantrex XW Series Inverter/Charger is ready to charge batteries and pass power through to the loads.	AC input is present, within nominal range, and is being qualified.	AC input is not present, or AC input is present but not within nominal range.

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When one AC input LED is on and the other AC input LED is flashing, AC input is present on both AC1 and AC2. However, the Xantrex XW Series Inverter/Charger can qualify and receive AC input from only one source at a time. The qualified source is represented by the steadily lit LED. When two sources of AC input are present, the Xantrex XW Series Inverter/Charger uses the source selected under `AC Priority` on the Xantrex XW System Control Panel's `AC Settings` menu.

Monitoring Xantrex XW Series Inverter/Charger Status

The green kW LED indicates the Xantrex XW Series Inverter/Charger is inverting DC input to AC output. When this LED is on or flashing, the display screen shows Xantrex XW Series Inverter/Charger output power in kilowatts.

Symbol	LED On	LED Flashing	LED Off
	The Xantrex XW Series Inverter/ Charger is inverting and producing power for connected loads.	The Xantrex XW Series Inverter/ Charger is selling power to the grid.	The Xantrex XW Series Inverter/ Charger is not inverting.

Monitoring Charger Status

The green A LED indicates the Xantrex XW Series Inverter/Charger is charging the battery bank. When this LED is on, the display screen shows battery charging current in amps.

Note: When a charge cycle ends or charging is manually disabled, the Xantrex XW Series Inverter/Charger does not leave charge mode immediately, and the charging LED remains on for 60 seconds.

Symbol	LED On	LED Flashing	LED Off
	The Xantrex XW Series Inverter/ Charger is charging the batteries.	The AC is coupling[a].	The Xantrex XW Series Inverter/ Charger is not charging.

a.See the application note, "AC Coupling of Inverters" (Document Part Number 976-0240-01-01) available on www.schneider-electric.com for more information about AC coupling.

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Monitoring Faults and Warnings

The red Fault/Warning LED indicates the presence of a fault or warning in the system. To clear active faults, press the ON/OFF button momentarily.

Symbol	LED On	LED Flashing
⚠	The Xantrex XW Series Inverter/ Charger has a fault and has stopped charging or inverting. The LED also turns on steadily if the unit has both a fault and a warning.	The Xantrex XW Series Inverter/ Charger has a warning. A warning may escalate to a fault if the warning condition does not go away.

Equalizing Batteries

Button

Pressing the Equalize button (symbol) for five seconds turns battery equalization on and off. After the button is pressed, the Xantrex XW Series Inverter/Charger begins the equalization charge after the next charge cycle is complete. Equalization functions only if AC is present and qualified and the charger is enabled. Otherwise the Xantrex XW Series Inverter/Charger generates a `cannot equalize` warning (W96).

CAUTION: Battery damage

If improperly performed, equalization can damage your battery. Consult your battery supplier for details on equalizing the battery type in your system.

Important: In a system where more than one device is capable of equalizing batteries (such as a system including multiple Xantrex XW Series Inverter/ Chargers and Xantrex XW Solar Charge Controllers), there is no system-wide equalization command for all devices. To equalize with multiple devices, each would have to be enabled individually. Alternatively, equalization can be performed using only one device. During the equalization process, one device applies the equalization charge while the other devices continue to operate in synchronized charge mode, typically in float (three-stage charging) or no-float (two-stage charging).

For more information, see “Equalize Charging” on page 3–15.

LED

The yellow Equalize LED indicates that the Xantrex XW Series Inverter/Charger is equalizing batteries.

Symbol	LED On	LED Flashing
	The Xantrex XW Series Inverter/ Charger has begun equalizing the batteries.	Equalization has been enabled but has not begun. The Xantrex XW Series Inverter/ Charger must complete a charge cycle before applying the equalization charge.

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Turning the Xantrex XW Series Inverter/Charger On and Off

ON/OFF control

When the Xantrex XW Series Inverter/Charger is operating, pressing and holding the ON/OFF button for five seconds turns the unit off. To return the Xantrex XW Series Inverter/Charger to its previous operating state, press the ON/OFF button momentarily.

While the Xantrex XW Series Inverter/Charger is turning off, the other inverter information panel buttons stop working. The shutdown process cannot be cancelled. The Xantrex XW Series Inverter/Charger can only be turned on again once the display is blank.

Standby mode

In Standby mode, the Xantrex XW Series Inverter/Charger stops charging, inverting, and passing through AC input. However, the unit remains powered up and present on the Xanbus network.

To put the Xantrex XW Series Inverter/Charger into Standby mode, press and hold the ON/OFF button and the Equalize button simultaneously for about five seconds. The display shows StB. To return the Xantrex XW Series Inverter/Charger to operating mode, press the ON/OFF button momentarily.

Pressing the ON/OFF button momentarily while the Xantrex XW Series Inverter/Charger is operating clears active faults and warnings.

Single-unit installations

In a single-unit installation, when the Xantrex XW Series Inverter/Charger is turned off using the ON/OFF button, Xantrex Xanbus network power is lost. When Xantrex Xanbus network power is lost, network-connected accessories such as the Automatic Generator Start (Xantrex XW AGS) and Xantrex XW SCP lose power and stop operating. Xantrex XW Solar Charge Controllers continue to operate if Xantrex Xanbus network power is removed, but they do not continue to communicate with each other.

If the ON/OFF power button is pressed and held on a Xantrex XW Series Inverter/Charger and a Xantrex XW AGS is installed in the system, the unit stops inverting or charging immediately and turns off completely in 120 seconds. During this time, the display shows OFF. This interval allows the Xantrex XW AGS to stop the generator after a cool down period. During the 120-second shutdown time, all network communication is blocked and the unit sends a shutdown command to all other devices in the system. As well, the inverter information panel buttons stop working and the shutdown process cannot be cancelled. The Xantrex XW Series Inverter/Charger can only be turned on again once the display is blank.

Multiple-unit installations

If the ON/OFF power button is pressed and held on a master Xantrex XW Series Inverter/Charger (see “Inverter Mode” on the “Multi-Unit Config Menu” on page 3–30) and a Xantrex XW AGS is installed in the system, the unit stops inverting/charging immediately and turns off completely in 120 seconds. During this time, the display shows OFF. This interval allows the Xantrex XW AGS to stop the generator after a cool down period. During the 120-second shutdown time, the master unit stops all network communication, and then all the slave units issue an external sync fault (F69) or a system configuration fault (F66). As well, the inverter information panel buttons stop working, and the shutdown process cannot be cancelled. The Xantrex XW Series Inverter/Charger can only be turned on again once the display is blank.

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In a multiple-unit installation, when a slave Xantrex XW Series Inverter/Charger is turned off, other Xantrex XW Series Inverter/Chargers continue to supply Xantrex Xanbus network power and the Xantrex XW AGS and Xantrex XW SCP continue to operate.Monitoring Battery Level

The row of five LEDs indicates the approximate available capacity of the batteries connected to the system. The capacity reading is based on current-compensated battery voltage.

There are four battery states: empty, low, medium, and full. When the available battery capacity is empty, no LEDs are lit. The battery is considered empty when its depth of discharge exceeds approximately 50 per cent. When the battery capacity is low, the two leftmost LEDs are lit. When the battery is at medium capacity, the four leftmost LEDs are lit. When the battery capacity is full, all five LEDs are lit.

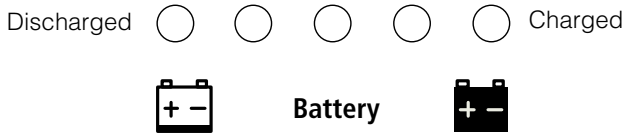

Figure 2-2 Battery Level LEDs

Reading the Display Screen

The three-character display screen shows the following information about the operational state of the Xantrex XW Series Inverter/Charger:

- Output power in kilowatts when the Xantrex XW Series Inverter/Charger is inverting and the kW LED is lit.
- Battery charger current when the Xantrex XW Series Inverter/Charger is charging and the A LED is lit.
- Stb when the Xantrex XW Series Inverter/Charger is in Standby mode.
- Sch when the Xantrex XW Series Inverter/Charger is in Search mode. See “Using Search Mode” on page 3–8.
- OFF when the ON/OFF button is pressed and held for five seconds. OFF is displayed briefly before the unit turns off.
- “---” appears briefly when the Xantrex XW Series Inverter/Charger is in transition between modes, for example, qualifying AC input. The display also shows “---” when the Xantrex XW Series Inverter/Charger is operating in AC passthrough mode.
- En momentarily when the Xantrex XW Series Inverter/Charger is enabled.
- dis momentarily when the Xantrex XW Series Inverter/Charger is disabled.

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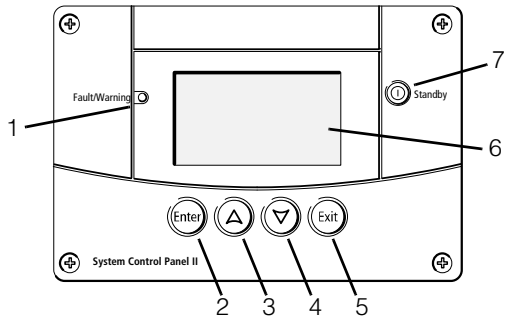
Monitoring Operation with the Xantrex XW SCP

The Xantrex XW System Control Panel (Xantrex XW SCP) provides remote configuration and monitoring capability for the Xantrex XW Series Inverter/Charger and other Xanbus-enabled devices in the power system.

You can monitor Xantrex XW Series Inverter/Charger operation on the Xantrex XW SCP using the:

- System Status screen (see page 2–11)
- Xantrex XW Series Inverter/Charger Home screen (see page 2–12)
- Xantrex XW Series Inverter/Charger Meters Menu (see page 2–15).

Xantrex XW System Control Panel Features



Feature	Description
1	**Fault/Warning light** indicates a device has a fault or warning condition and requires attention. The light flashes when a warning occurs and turns on steadily when a fault occurs.
2	**Enter button** confirms selection of a menu item or displays the next screen.
3	**Up arrow button** scrolls upwards through screen text or increases a selected value.
4	**Down arrow button** scrolls downwards through screen text or decreases a selected value.
5	**Exit button** cancels selection of a menu item or displays the previous screen.
6	**Screen** shows menus, settings, and system information.
7	**Standby button** disables inverting and charging on all Xantrex XW Series Inverter/Chargers in the system when pressed for one to two seconds. To enable inverting and charging, press the Standby button again.

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Using the Standby Button

The Standby button has two functions. The Standby button can disable inverting and charging for all Xantrex XW Series Inverter/Chargers in the system, or, when pressed simultaneously with the Exit button, can put the entire system into Standby mode.

Pressing the Standby button produces the same result as disabling `Invert` and `AC Charge` from the System Settings menu on the Xantrex XW SCP. Pressing the Standby button momentarily affects only Xantrex XW Series Inverter/Chargers; it does not affect Xantrex XW Solar Charge Controller operation. After disabling inverting and charging with the Standby button, the system continues to pass AC input through to the loads, and "`---`" is displayed on the inverter information panel.

Pressing the Exit and Standby buttons at the same time puts the entire Xantrex XW power system (including Xantrex XW Solar Charge Controllers) into Standby mode. In Standby mode, the Xantrex XW Series Inverter/Chargers stop passing AC input through to the loads, and `StB` is displayed on inverter information panel.

After the keypress command to enter Standby mode, the Xantrex XW AGS (if installed) shuts down the generator (if it is running) after a cool-down cycle.

Xantrex XW System Control Panel Navigation

This section describes the different types of screens and menus on the Xantrex XW SCP that are useful for monitoring Xantrex XW Series Inverter/Charger operation.

Viewing the Xantrex XW System Control Panel Home Screens

The top level screens on the Xantrex XW SCP are the startup screen, the `System Status` screen and the device `Home` screen. After power is applied and the startup screen appears, the Xantrex XW SCP displays the `System Status` screen. You can view the device `Home` screen for the Xantrex XW Series Inverter/Charger and other devices in the system by pressing the up and down arrows, as shown in Figure 2-3.

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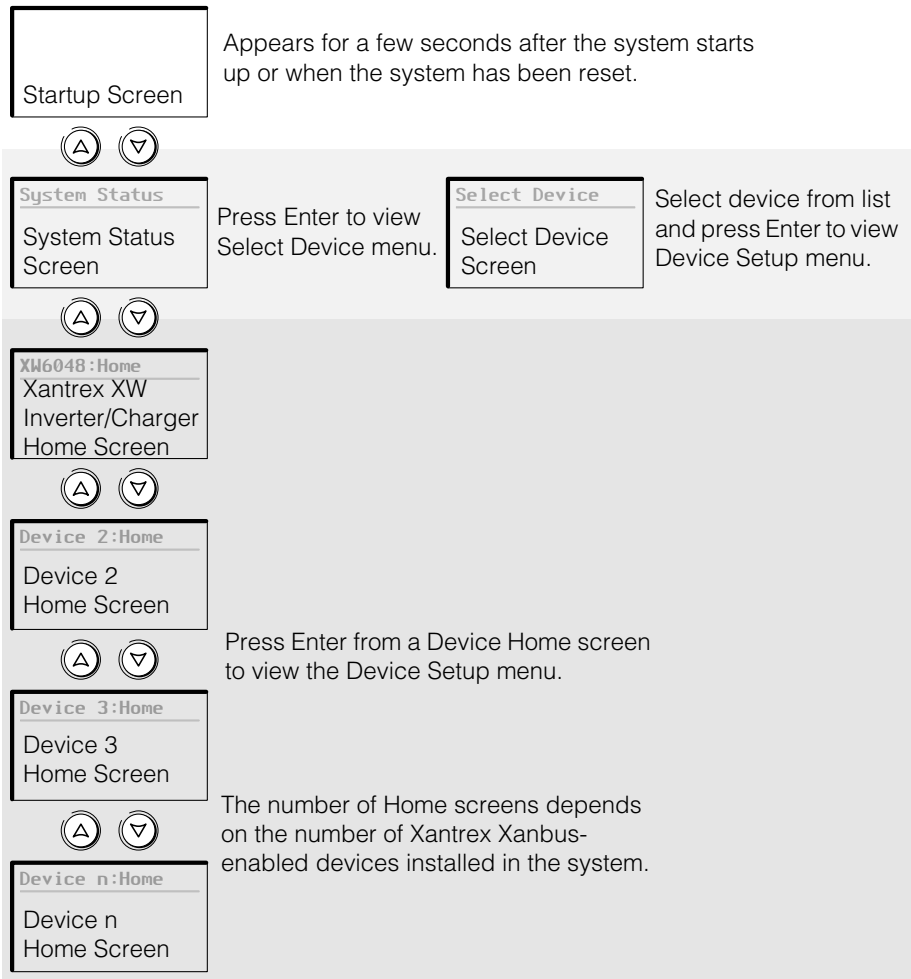

Figure 2-3 Xantrex XW System Control Panel Top Level Screens

System Status Screen The `System Status` screen appears after the startup screen. It displays aggregated status information for the entire power system. For example, a single system might have three Xanbus network-connected Xantrex XW Series Inverter/Chargers, two Xantrex XW Solar Charge Controllers, one Xantrex XW AGS module, and one Xantrex XW SCP all connected to a single battery bank, a single generator, and a common utility grid.

The `System Status` screen always features a `Menu` arrow pointing to the Enter button. Pressing Enter takes you to the `Select Device` menu. For more information, see “Reading the System Status Screen” on page 2–11.

Important: If you are uncertain which Xantrex XW SCP screen or menu you are viewing, you can return to the starting point—the `System Status` screen—by pressing Exit repeatedly until the screens stop changing.

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Xantrex XW Series Inverter/Charger Home Screen The Xantrex XW Series Inverter/Charger `Home` screen is the first of the device `Home` screens. Each Xantrex XW Series Inverter/Charger installed in the system has its own `Home` screen.

The Xantrex XW Series Inverter/Charger `Home` screen displays status information for the Xantrex XW Series Inverter/Charger. The screen appearance varies with the status of the Xantrex XW Series Inverter/Charger (standby, inverting, and so on). For more information, see "Reading the Xantrex XW Series Inverter/Charger Home Screen" on page 2–12.

To display the Xantrex XW Series Inverter/Charger Home screen:

◆ While viewing the `System Status` screen, press the down arrow key.

Viewing Other Screens

This section describes the next level of screens and menus on the Xantrex XW SCP.

Select Device Menu The `Select Device` menu displays a list of Xantrex Xanbus-enabled devices in the system, including the Xantrex XW Series Inverter/Charger and the Xantrex XW SCP. From this menu you can access the `Setup` menus for each device in the system.

The `Select Device` menu also contains the `Clock` menu (where the time and date are set) and the `System Settings` menu (where system-level settings can be configured). These menus and the Xantrex XW SCP menu are always available from the `Select Device` menu, regardless of the number of Xantrex Xanbus-enabled devices installed.

To display the Select Device menu:

◆ While viewing the `System Status` screen, press Enter.

Device Setup Menus `Device Setup` menus display status information (on the `Meters` screen) and changeable settings. Changeable settings are identified by the square brackets [ ] around values in the right-hand column.

To display the Setup menu for a device:

◆ Highlight the device name on the `Select Device` menu and press Enter.
-Or-
From the device `Home` screen, press Enter.

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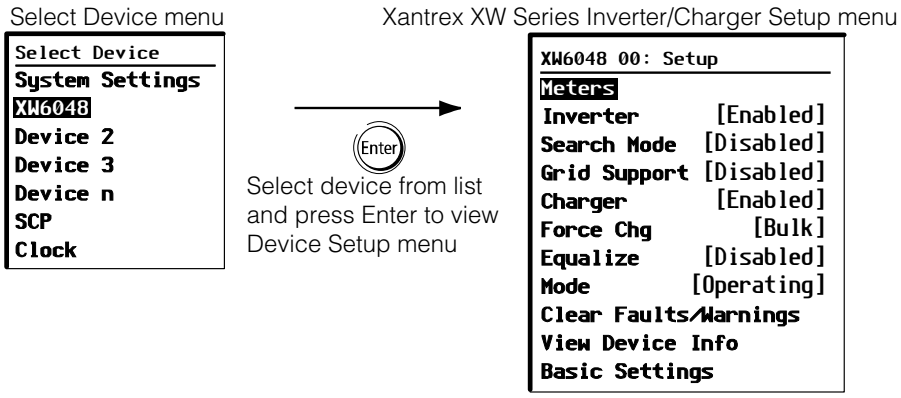

Figure 2-4 Selecting a Device Setup Menu

Reading the System Status Screen

The `System Status` screen displays:

- Qualified AC source (if applicable) and total power to and from the source
- Battery voltage and capacity level
- Net battery input or output current
- Total inverter loading

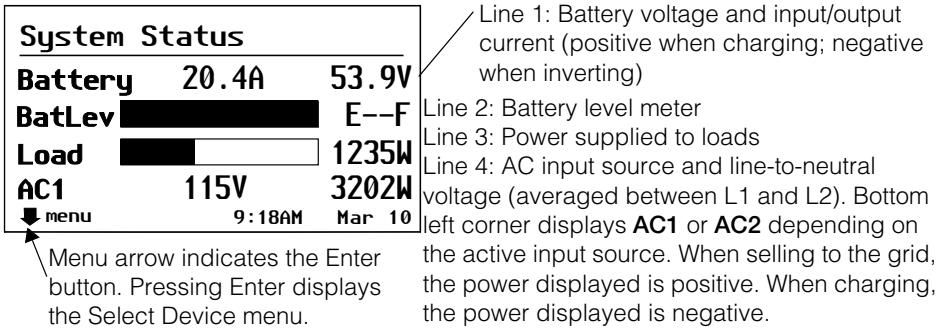

Figure 2-5 System Status Screen

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Reading the Xantrex XW Series Inverter/Charger Home Screen

The Xantrex XW Series Inverter/Charger `Home` screen displays real-time operational data specific to the Xantrex XW Series Inverter/Charger. The Xantrex XW Series Inverter/Charger status changes according to the states described in Table 2-1 on page 2–12.

To view the Xantrex XW Series Inverter/Charger Home screen:

◆ On the system `Home` screen, press the down arrow button until the Xantrex XW Series Inverter/Charger `Home` screen appears.

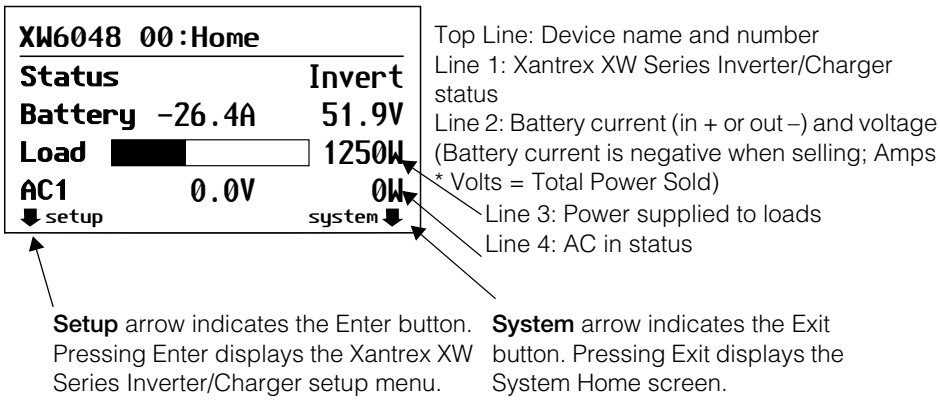

Figure 2-6 Xantrex XW Series Inverter/Charger Home Screen

Press the down arrow button from the Xantrex XW Series Inverter/Charger `Home` screen to display the `Home` screens for other Xantrex XW Series Inverter/Chargers and other Xanbus-enabled devices in the system.

Table 2-1 Xantrex XW Series Inverter/Charger Home Screen States

Xantrex XW Series Inverter/ Charger Status	Displayed When...
Invert	The Xantrex XW Series Inverter/Charger is supplying power to loads by inverting power from the batteries. AC input from the utility or generator is absent or out of nominal range.
Qualifying AC	The Xantrex XW Series Inverter/Charger is determining if AC input is within a usable voltage and frequency range. `Qualifying AC` is also displayed when the Xantrex XW Series Inverter/Charger is awaiting application of AC power or a command to enable invert mode.
Charging	The Xantrex XW Series Inverter/Charger is charging the batteries from qualified AC input from the utility grid or a generator. The charge state is in transition to either bulk, absorption, float, or equalize. AC input is also passed through to the load while charging.
Bulk	The Xantrex XW Series Inverter/Charger is bulk charging the batteries from qualified AC input from the utility grid or a generator. AC input is also passed through to the load while bulk charging.

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Table 2-1 Xantrex XW Series Inverter/Charger Home Screen States

Xantrex XW Series Inverter/ Charger Status	Displayed When...
Absorption	The Xantrex XW Series Inverter/Charger is absorption charging the batteries from qualified AC input from the utility grid or a generator. AC input is also passed through to the load while absorption charging.
ABS Finish	The Xantrex XW Series Inverter/Charger has completed the absorption stage and is waiting for other Xantrex XW Series Inverter/Chargers in the system to complete absorption. This status can occur only when there is another Xantrex XW Series Inverter/Charger also charging the battery.
Float	The Xantrex XW Series Inverter/Charger is float charging the batteries from qualified AC input from the utility grid or a generator. The Xantrex XW Series Inverter/Charger is set for three-stage charging. AC input is also passed through to the load while float charging.
CHG Finish	The Xantrex XW Series Inverter/Charger has completed charging or the charge cycle has been interrupted and is transitioning to the next state. This stage lasts about one minute, while the battery is allowed to settle and battery voltage to drop back to normal. The delay keeps the Xantrex XW Series Inverter/Charger from unnecessarily transitioning to grid support (if enabled) due to the high battery voltage after a charge cycle.
Fault	The Xantrex XW Series Inverter/Charger has an active fault. The Fault/Warning light on the Xantrex XW SCP is on.
Gen Support	There is AC input from the generator, and the Xantrex XW Series Inverter/Charger is supporting the generator by supplying additional power to the critical loads. The Xantrex XW Series Inverter/Charger supports the generator (or other power source connected to the generator [default AC2] input) when the AC load current drawn from the generator exceeds the `GenSup Amps` setting for 1 to 2 seconds. The Xantrex XW Series Inverter/Charger uses stored DC capacity to load share with the generator until the total AC load current (generator plus Xantrex XW Series Inverter/ Charger output) drops by 2 amps plus 10 per cent of the `GenSup Amps` setting for 0.5 seconds. For example, if `GenSup Amps` is set to 10 amps, the Xantrex XW Series Inverter/ Charger starts to support when the load exceeds 10 amps for 2 seconds and stops when it drops more than 3 amps below the `GenSup Amps` setting, or 7 amps (2 amps plus 10 per cent of 10 amps = 3 amps). The system can enter this state if the battery voltage is above `Low Batt Cut Out` (LBCO) and generator support is enabled. See “Generator Support Settings” on page 3–27.

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Table 2-1 Xantrex XW Series Inverter/Charger Home Screen States

Xantrex XW Series Inverter/ Charger Status	Displayed When...
Grid Support	There is AC input from the utility and the Xantrex XW Series Inverter/Charger is supporting the utility grid by supplying additional power to the critical loads. The Xantrex XW Series Inverter/Charger supports the utility grid by limiting the power drawn from the utility to close to zero. This mode is desirable for using excess energy from auxiliary DC sources like PV, while still maintaining a charged battery bank. No power is sold to the utility in this mode. The Xantrex XW Series Inverter/Charger enters this state only when `Grid Support` is set to ON and battery voltage is above the `Grid Supp Volts` setting. See "Grid Support Settings" on page 3–20.
Load Shaving	The Xantrex XW Series Inverter/Charger supports the utility grid when there is AC input from the utility and the current required to power the loads rises above the `Load Shave Amps` setting between the `Load Shave Start` and `Load Shave Stop` times set on the `Grid Support` menu. Many utilities impose a surcharge on their customers based on the peak load used by a facility. When load shaving, the Xantrex XW Series Inverter/Charger uses stored DC capacity to reduce the peak load on the utility grid by providing the difference between the actual load current and the `Load Shave Amps` setting. The Xantrex XW Series Inverter/Charger enters this state only when `Grid Support` is enabled, the load shave time window is valid and the load draw exceeds the `Load Shave Amps` setting, and the battery voltage is between LBCO + 2 VDC and the Grid Support Volts setting. See "Grid Support Settings" on page 3–20.
Search	Search mode is enabled and the Xantrex XW Series Inverter/Charger is standing by, waiting to begin inverting. See "Using Search Mode" on page 3–8.
SellToGrid	The Xantrex XW Series Inverter/Charger is grid-tied and is selling power to the utility grid. Both `Grid Support` and `Sell` must be enabled in order to sell power back to the utility. See Table 3-1 on page 3–2 and "Grid Support Settings" on page 3–20.
Standby	The unit has been placed in standby mode using the `Mode` setting on the Xantrex XW SCP `Setup` menu, the Standby button on the Xantrex XW SCP, or the Standby key press (ON/OFF and Equalization) on the inverter information panel.
Passthru	The AC connected to the AC1 or AC2 input is passing directly through the Xantrex XW Series Inverter/Charger to the loads. The batteries are not being charged in this state.
Equalize	Equalization has been turned on and the Xantrex XW Series Inverter/Charger is equalizing the batteries after completing a full charge cycle.

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Reading the Meters Screen

The `Meters` screen displays total system power production, grid voltage and current status, and load voltage and current status.

To view the Meters screen:

- On the Xantrex XW Series Inverter/Charger setup menu, highlight `Meters` and press Enter.

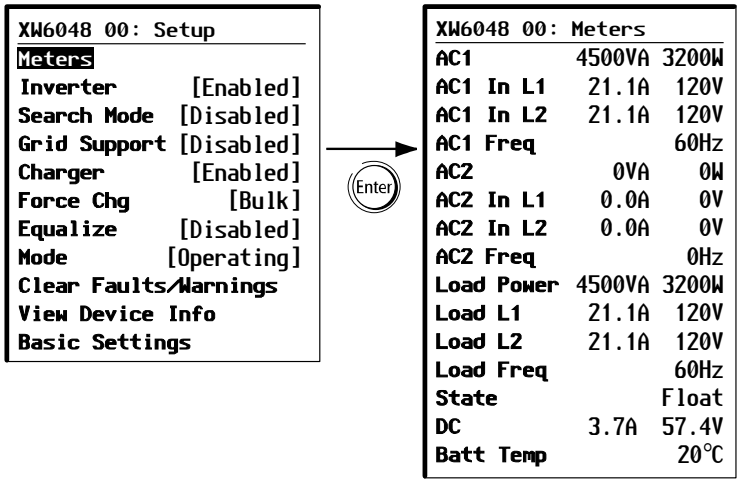

Figure 2-7 Viewing the Meters Screen

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Table 2-2 Meters Screen

Screen Item	Description
AC1	AC input power connected to the Xantrex XW Series Inverter/Charger's AC1 terminals, in volt-amps and watts. AC1 is assumed to be connected to the utility grid, but can be connected to any other AC source.
AC1 in L1	AC input voltage and current connected to the Xantrex XW Series Inverter/Charger's AC1 L1 terminals. This input voltage display may drift slightly before the Xantrex XW Series Inverter/Charger has synchronized to the grid.
AC1 in L2	AC input voltage and current connected to the Xantrex XW Series Inverter/Charger's AC1 L2 terminals. This input voltage display may drift slightly before the Xantrex XW Series Inverter/Charger has synchronized to the grid.
AC1 Freq	AC frequency connected to the Xantrex XW Series Inverter/Charger's AC1 terminals.
AC2	AC input power connected to the Xantrex XW Series Inverter/Charger's AC2 terminals, in volt-amps and watts. AC2 is assumed to be connected to a generator, but can be connected to any other AC source.
AC2 in L1	AC input voltage and current supplied to the Xantrex XW Series Inverter/Charger from the AC2 L1 input. This meter indicates the Xantrex XW Series Inverter/Charger is drawing power from the generator to charge the battery or power the AC loads.
AC2 in L2	AC input voltage and current supplied to the Xantrex XW Series Inverter/Charger from the AC2 L2 input. This meter indicates the Xantrex XW Series Inverter/Charger is drawing power from the generator to charge the battery or power the AC loads.
AC2 Freq	AC frequency connected to the Xantrex XW Series Inverter/Charger's AC2 terminals.
Load Power	Power consumed by the AC loads, in volt-amps and watts.
Load L1	AC voltage and current supplied from L1 to the AC loads.
Load L2	AC voltage and current supplied from L2 to the AC loads.
Load Freq	AC frequency supplied to the AC loads.
State	Operating state of the Xantrex XW Series Inverter/Charger. For more information, see Table 2-1 on page 2–12.
DC	Charging current and battery voltage.
Batt Temp	Battery temperature, as read by the BTS connected to this Xantrex XW Series Inverter/Charger. If the BTS is not installed, it shows `NotAvailable`.

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3 Configuration

Chapter 3, “Configuration” explains how to navigate through the Xantrex XW System Control Panel menus and configure the Xantrex XW Series Hybrid Inverter/Charger.

Topics in this chapter include:

- “Using the Xantrex XW System Control Panel” on page 3–2
- “Using the Setup Menus” on page 3–4
- “Inverter Settings Menu” on page 3–7
- “Charger Settings Menu” on page 3–10
- “AC Settings” on page 3–19
- “Grid Support Settings” on page 3–20
- “Generator Support Settings” on page 3–27
- “Auxiliary Output Settings” on page 3–28
- “Multi-Unit Config Menu” on page 3–30
- “Connections Menu” on page 3–34
- “Copying Settings From Another Unit” on page 3–36
- “Resetting the Xantrex XW Series Inverter/Charger to Default Settings” on page 3–37
- “Using the Advanced Features” on page 3–38

Using the Xantrex XW System Control Panel

The Xantrex XW Series Inverter/Charger is configured using the Xantrex XW System Control Panel (Xantrex XW SCP). The Xantrex XW SCP provides access to settings relating to AC input and output, battery charging, and grid-tie operation.

Xantrex XW Series Inverter/Charger Setup Menu

The Xantrex XW Series Inverter/Charger `Setup` menu is accessible either from the system `Home` screen or from the Xantrex XW Series Inverter/Charger `Home` screen.

To navigate to the Xantrex XW Series Inverter/Charger Setup menu:

1. From the system `Home` screen, press Enter to view the `Select Device` menu. Go to step 2.
   -Or-
   From the Xantrex XW Series Inverter/Charger `Home` screen, press Enter. The Xantrex XW Series Inverter/Charger `Setup` menu appears.
2. Highlight the Xantrex XW Series Inverter/Charger device name, and then press Enter.

```
XW6048 00: Setup
Meters
Inverter        [Enabled]
Search Mode    [Disabled]
Grid Support   [Disabled]
Charger         [Enabled]
Force Chg          [None]
Equalize       [Disabled]
Mode          [Operating]
Clear Faults/Warnings
View Device Info
Basic Settings
```

Note: The Xantrex XW SCP only displays four lines of the Setup menu at once. To view additional settings, press the Down arrow button.

Figure 3-1 Xantrex XW Series Inverter/Charger Setup Menu

Table 3-1 Xantrex XW Series Inverter/Charger Setup Menu

Menu Item	Description
Meters	Displays the `Meters` screen.
Inverter	Enables or disables the inverter.
Search Mode	Turns `Search Mode` on and off. See “Using Search Mode” on page 3–8.
Grid Support	Enables or disables grid-interactive Xantrex XW Series Inverter/Charger features, such as grid support and grid sell mode. See “Grid Support Settings” on page 3–20. To allow grid support to function after battery charging has completed, it is recommended to set the Charge Cycle to 2-Stage. See “Charger Settings Menu” on page 3–10.

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Table 3-1 Xantrex XW Series Inverter/Charger Setup Menu

Menu Item	Description
Charger	Enables or disables the charger.
Force Chg	Manually changes the charge stage to either bulk or float (when 3-Stage cycle is selected) or bulk or no float (when 2-Stage cycle is selected).
Equalize	Enables or disables battery equalization. This option is only available if the battery type is set to `Flooded` or is set to `Custom` with `Equalize Support` enabled.
Mode	Selects the Xantrex XW Series Inverter/Charger operating mode: `Operating` or `Standby`. The red Standby button on the Xantrex XW SCP has similar functionality (see “Xantrex XW System Control Panel Features” on page 2–7).
Clear Faults/ Warnings	Clears any active faults or warnings. If the fault or warning condition is still present, the fault or warning message may reappear.
View Device Info	Displays the `Device Info` screen where you can view the warning, fault, and event logs.
Basic Settings	Select to display and/or adjust the basic Xantrex XW Series Inverter/Charger settings. See “Using the Setup Menus” on page 3–4.

Setting the Time and Date

Xantrex XW Series Inverter/Charger advanced features such as peak load shaving, charger block, and time-stamped events (faults, warnings, and logged historical data) require that the system be set to the correct time. The Xantrex XW SCP has an internal clock that controls the time for all Xanbus-enabled devices in the system. You can set the time, time format, and date on the `Clock` menu. The `Clock` menu is accessible on the `Select Device` menu.

For more information, see “Setting the Time” and “Setting the Date” in the *Xantrex XW System Control Panel Owner’s Guide*.

Important: Network time configured on the Communications Gateway overrides time configured on any individual device in the network-enabled power system. However, Xantrex XW Series Inverter/Chargers (240 V/60 Hz models manufactured before April 2008) and Xantrex XW Solar Charge Controllers (firmware versions prior to 1.03) may not be compatible with network time protocol (NTP).

If your device is not compatible with NTP, Xantrex XW Series Inverter/Charger features such as peak load shaving and charger block may not work correctly, and charge controller daily power production values may reset at an unexpected time. If your device is working incorrectly, configure the Gateway to use the local time and date. See the *Communications Gateway Installation Guide*, Document Part Number 975-0330-01-01 for more information.

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Using the Setup Menus

Basic menu

The Xantrex XW Series Inverter/Charger configuration settings can be viewed in basic and advanced formats (see Figure 3-3, “Basic and Advanced Settings” on page 3–6). The basic settings include configuration items you may have to adjust routinely, or as part of initial setup.

Advanced menu

The advanced settings option gives you access to the full range of Xantrex XW Series Inverter/Charger settings, including everything displayed on the basic menu. As a safeguard against unintended advanced configuration, the Xantrex XW SCP displays the basic settings by default. To view the advanced settings, you must perform a special keypress.

WARNING: Risk of fire and shock hazard

The advanced settings are intended for qualified installation/service personnel only. Before changing advanced settings, you must be familiar with the settings and the system-wide impact of changing those settings. Setting parameters incorrectly could damage connected equipment (such as batteries) or could severely affect the performance of your system. Incorrect charging configuration can lead to battery damage and risk of fire. Consult the local utility before enabling sell mode or changing grid support settings.

To select the Advanced settings:

1. On the `Select Device` menu, select a Xantrex XW Series Inverter/Charger.
2. Press and release Enter + up arrow + down arrow at the same time.

Notes:

- This keypress enables the advanced settings for every device in the system.
- After performing the keypress, `Advanced Settings` appears at the top of the Setup menu. When the keypress is performed again, the Setup menu displays `Basic Settings` as the last item on the menu.

The Xantrex XW Series Inverter/Charger advanced settings include menus for configuring:

- Inverter settings (see page 3–7)
- Charger settings (see page 3–10)
- AC transfer limit settings (see page 3–19)
- Grid support and peak load shaving settings (see page 3–20)
- Generator support settings (see page 3–27)
- Auxiliary output settings (see page 3–28).
- Multi-unit operation, including customizing the default model name of the Xantrex XW Series Inverter/Charger, and setting its network device number. Setting the device number is important when multiple Xantrex XW Series Inverter/Chargers are on the Xanbus network and sharing connections such as AC loads, utility grid, and generator. The device number is also used when configuring paralleled Xantrex XW Series Inverter/Chargers for master-slave operation (see page 3–7).

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In the advanced settings you can also copy another unit's settings using the `Copy from` command.

To view the advanced or basic settings:

- From the `Setup` menu, with `Basic Settings` or `Advanced Settings` highlighted, press Enter. See Figure 3-2.

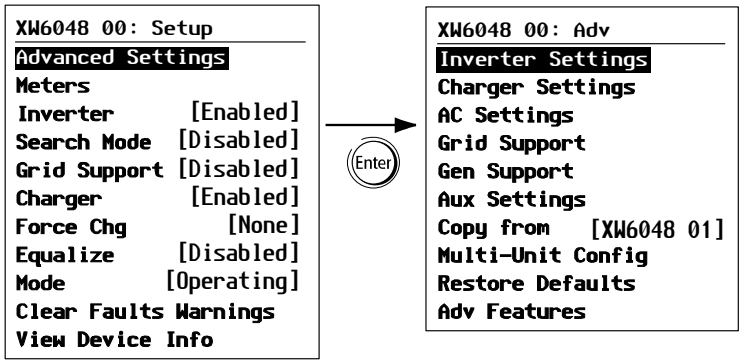

Figure 3-2 Selecting Advanced Settings

To select and change a configurable setting:

1. On the desired configuration menu, press the up arrow or down arrow button to highlight the setting you want to change.
2. Press Enter to highlight the current value of the setting.
3. Press the up arrow or the down arrow button to change the value. Hold down the button to scroll through a large range of values quickly.

   The previously set value appears with an asterisk (*) beside it.
4. Press Enter to select the value.
5. If you have another setting to change, return to step 1.

   -Or-

   If you have no more settings to change, press Exit until the Xantrex XW SCP displays the desired screen or menu.

Important: If you have no more settings to change, it is recommended to leave the `Setup` menu in the basic settings format to help prevent unintended configuration. If the `Setup` menu displays `Advanced Settings`, press Enter + up arrow + down arrow at the same time. The Setup menu should then display `Basic Settings` as the last item on the menu.

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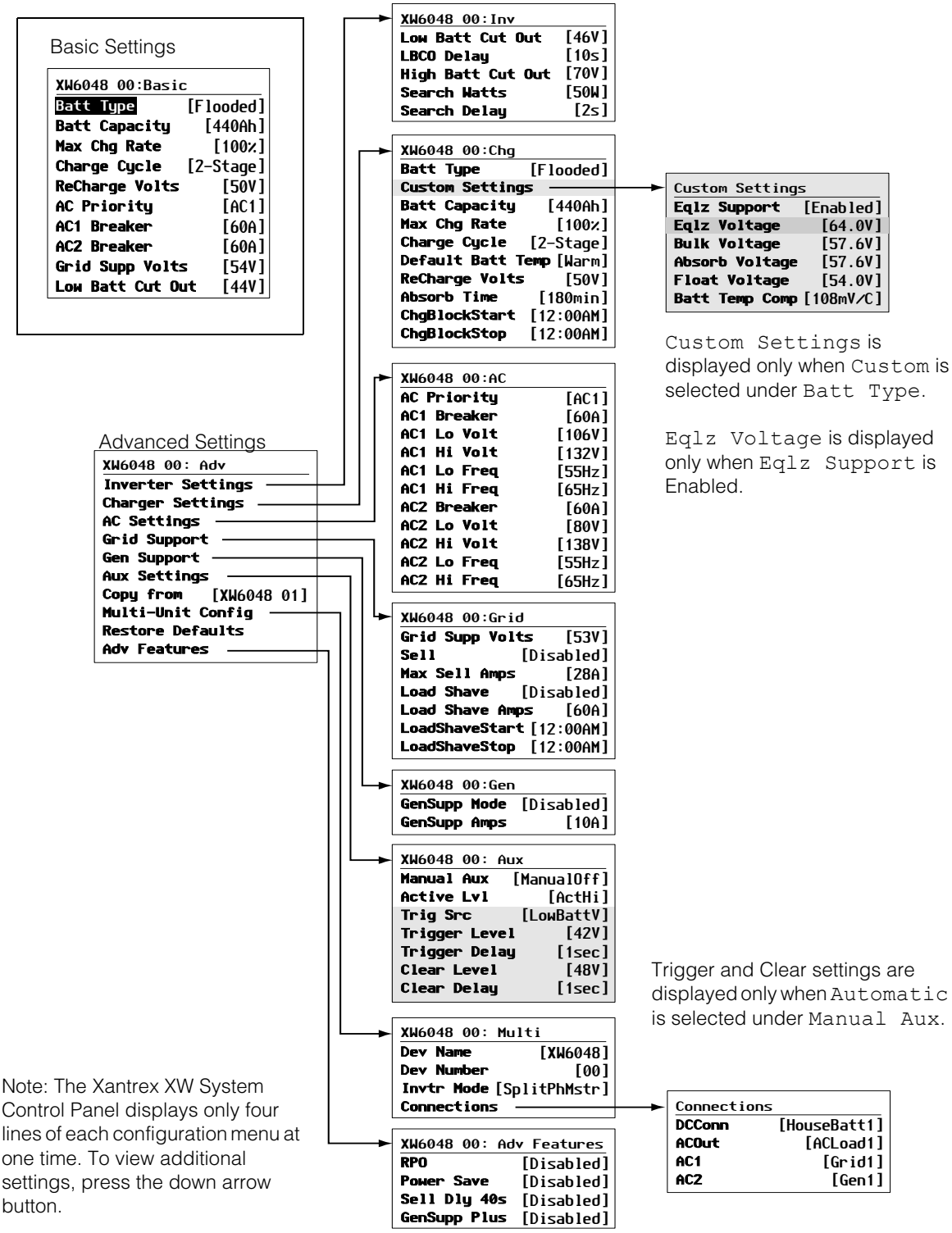

Figure 3-3 Basic and Advanced Settings

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Inverter Settings Menu

The `Inverter Settings` menu contains settings that control when the Xantrex XW Series Inverter/Charger starts and stops producing AC output.

Table 3-2 Inverter Settings Menu

Item	Description
Low Batt Cut Out	Low Batt Cut Out controls when the inverter stops producing AC output due to a low battery voltage condition. The inverter will stop producing AC output only after this level has been reached for the period of time set by the `LBCO Delay`. This setting is not temperature compensated.
LBCO Delay	LBCO Delay controls how long the inverter is allowed to operate at or below the `Low Batt Cut Out` level before turning off due to a low battery voltage condition. The inverter will stop producing AC output only after the `Low Batt Cut Out` level has been reached for this uninterrupted period of time. Once the inverter has shut off, the battery voltage must rise 4 volts above the `Low Batt Cut Out` setting (2 volts for 24 V systems) for inverter operation to resume.
High Batt Cut Out	High Batt Cut Out sets the maximum battery voltage at which the inverter will operate. If the battery voltage exceeds this limit for more than 1 minute, the Xantrex XW Series Inverter/Charger displays a fault message (F49) and shuts down. The inverter will not support AC loads when in this condition. If a qualified AC source is present, the unit passes AC through to the loads. The inverter automatically restarts when the voltage drops to 3 volts (24 volt system) or 6 volts (48 volt system) below the `High Batt Cut Out` setting. If battery voltage continues to rise after shutdown, an external charger may still be charging the batteries. The Xantrex XW Series Inverter/Charger cannot control how external chargers operate.
Search Watts	Search Watts sets the Xantrex XW Series Inverter/Charger's search sensitivity when search mode is enabled. When a load larger than this setting is present, the inverter starts producing AC output. Enabling search mode from the `Setup` menu (see page 3–2) can minimize power draw from the battery during periods of low demand from loads. Also see "Using Search Mode" on page 3–8.
Search Delay	Search Delay sets the time between search pulses. When searching for loads, the Xantrex XW Series Inverter/Charger sends out search pulses to determine if a load is present. If the Xantrex XW Series Inverter/Charger finds a load above the `Search Watts` setting, the inverter turns on. Xantrex XW Series Inverter/Charger power draw while in search mode decreases when `Search Delay` is increased, but the Xantrex XW Series Inverter/Charger's response time to active loads is slower.

For default settings, see "Inverter Menu" on page B–3.

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Using the Low Battery Cut Out and LBCO Delay Settings

The `Low Batt Cut Out` setting is the lowest battery voltage level acceptable for use by the inverter. When the batteries discharge to the `Low Batt Cut Out` setting, and are held at or below this level for the `LBCO Delay` time, the inverter output shuts down and transfers any available AC source (generator or grid) to the charger to bring the battery level back above the `Low Batt Cut Out` setting. After shutdown, the inverter does not support any AC loads, and AC loads must be powered by either a generator or grid power. If the battery voltage stays below the LBCO voltage for more than 24 hours, the Xantrex XW Series Inverter/Charger turns off.

- If using an automatic generator starting system, it is recommended to set the Xantrex XW AGS voltage trigger setting higher than the Xantrex XW Series Inverter/Charger `Low Batt Cut Out` voltage.
- Although not recommended, if using an automatic generator starting system with the start trigger set to the same voltage as the LBCO voltage, do not set the `LBCO Delay` for less than the amount of time it takes the generator to start and connect.

Otherwise – in both of the scenarios above – inverter output turns off before the generator automatically starts, causing the battery voltage to recover slightly. This may then stop the Xantrex XW AGS from starting the generator or result in the Xantrex XW Series Inverter/Charger cycling on and off multiple times before the generator automatically starts.

Using Search Mode

Why use Search mode?

Search mode allows the inverter to selectively power only items that draw more than a certain amount of power, which can result in power savings. The Xantrex XW Series Inverter/Charger has a no-load power draw of about 28 watts. Enabling search mode reduces this power draw to less than 8 watts.
Search mode operates differently in single-unit and multi-unit installations.

Single units

When a single Xantrex XW Series Inverter/Charger has search mode enabled, the inverter sends electrical search pulses through its AC output. These search pulses look for connected AC loads. The delay between search pulses is set using the `Search Delay` setting. After a load larger than the `Search Watts` setting is detected, the inverter starts producing AC output.

Multiple units

To use search mode in multiple-unit installations with paralleled Xantrex XW Series Inverter/Chargers, the master unit must have search mode disabled. Slave units must have search mode enabled.

When search mode is disabled on the master unit and enabled on slave units, only the master Xantrex XW Series Inverter/Charger operates, and the slave units start to support the load only when the load exceeds approximately 60 per cent of the rated output power of the master unit. In a three-unit system, the third slave unit starts to support the load if the load on the master is above 60 per cent of its rated power for about 3 to 5 seconds. When the load drops below 20 per cent of the master's rated output power, the slave units stop producing AC output in reverse order; that is, the last slave unit to start is the first to stop.

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When to set up Search mode

The search mode feature is only valuable if the inverter can spend a fair amount of time “sleeping” each day. Therefore, if search mode is to be used it must be adjusted properly. The initial adjustment should be made so that the inverter comes on only when needed.

Certain types of loads can cause search mode to work unexpectedly. These types of loads are described on page 4–3. If these kinds of loads are in the system, follow the suggestions given to eliminate the problem.

If the problem loads cannot be eliminated, there are two work-around solutions:

1. Disable search mode from the main Xantrex XW Series Inverter/Charger Setup menu, causing the inverter to always remain at full output voltage.
2. Use a search-friendly companion load whose only purpose is to be switched on to wake up the inverter to power the load that is unable to bring the inverter out of search mode.

Notes:

- Search mode, by function, cannot work with clocks and timers or devices that need power 24 hours a day. Examples of devices with timers include video recorders, coffee makers with brew timers, refrigerators, and freezers with defrost timers. Examples of devices that need power 24 hours a day include telephone answering machines, alarm systems, motion detection lights, and some thermostats.
- When the inverter is searching the output for loads, lights that have a wattage lower than this setting may flash momentarily.

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Charger Settings Menu

The `Charger Settings` menu provides options for configuring the Xantrex XW Series Inverter/Charger to operate from your battery bank.

Table 3-3 Charger Menu

Item	Description
Batt Type	Sets the system battery chemistry and type: `Flooded` (default), `AGM`, `Gel`, and `Custom`. Selecting `Custom` displays the `Custom Settings` item, which allows you to adjust the settings for each charging stage.
Custom Settings	Displays the `Custom Battery Settings` menu, where you can adjust settings specific to your battery type and installation. It is only displayed if `Custom` is selected as the `Batt Type`.
Batt Capacity	Selects the system battery capacity in amp hours. Setting the battery capacity to 0 resets the charging current to its default values. Zero Ah battery capacity implies there is no absorption exit current criteria and absorption only exits when the absorption timer (default 3hrs, range 1min-8hr) expires.
Max Chg Rate	Sets the percentage of the maximum DC output current that is available to the charger. The maximum DC output current for different models is: • Xantrex XW4024 120/240 60—150 ADC • Xantrex XW4548 120/240 60—85 ADC • Xantrex XW6048 120/240 60—100 ADC If multiple Xantrex XW Series Inverter/Chargers are charging the same battery bank, set each inverter's `Max Chg Rate` to 1/n of the desired charge rate (where n is the number of inverter/chargers).
Charge Cycle	Sets the charging method: `3-Stage` (bulk, absorption, float) or `2-Stage` (bulk, absorption, no float).
Default Batt Temp	Selects the battery temperature charging compensation if a battery temperature sensor is not installed. In the absence of a battery temperature sensor, the charger uses one of three settings: `Cool` (5 °C/41 °F), `Warm` (25 °C/77 °F), or `Hot` (40 °C/104 °F).
ReCharge Volts	Sets the battery voltage level at which a new charge cycle begins. `Recharge Volts` is automatically temperature compensated to be consistent with the charge voltage which is also temperature compensated.
Absorb Time	Sets the maximum time spent in the absorption stage, before transitioning to float or no float.
Chg Block Start	Sets the time to halt charging on AC1 (Grid). The AC2 (Gen) port is unaffected by the charger block settings. The charger block start and stop settings allow you to select when the charger stops charging on AC1. To disable the charger block function, set `Chg Block Start` and `Chg Block Stop` to the same time. See “The Xantrex XW system will still allow manual equalize charging when the boost absorption voltage is implemented.” on page 3–17.
Chg Block Stop	Sets the time that charging on AC1 can resume. At the `Chg Block Stop` time, charging on AC1 is enabled again.

For default settings, see “Charger Menu” on page B–3.

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Battery Charger Functions

When AC power is available, the Xantrex XW Series Inverter/Charger can operate as a battery charger. Different battery types and chemistries require different charging voltage levels. Not charging batteries at the required levels can shorten battery life or damage the batteries. The Xantrex XW Series Inverter/Charger is configured at the factory to work with the battery types recommended for inverter applications. If the default settings do not work for your specific installation, you can adjust the charge stage settings (as recommended by the battery manufacturer) on the `Custom Battery Settings` menu (see page 3–18).

Note: This information is provided for guidance only. Variations in battery chemistry and site-specific environmental considerations mean that you should consult your system designer or battery manufacturer for specific recommendations for appropriate battery voltage and current settings.

Multi-Stage Charging Process

The charging cycle is a multi-stage process. Whenever qualified AC power is present at the inverter's input, it passes power through to the connected load and begins charging the batteries.

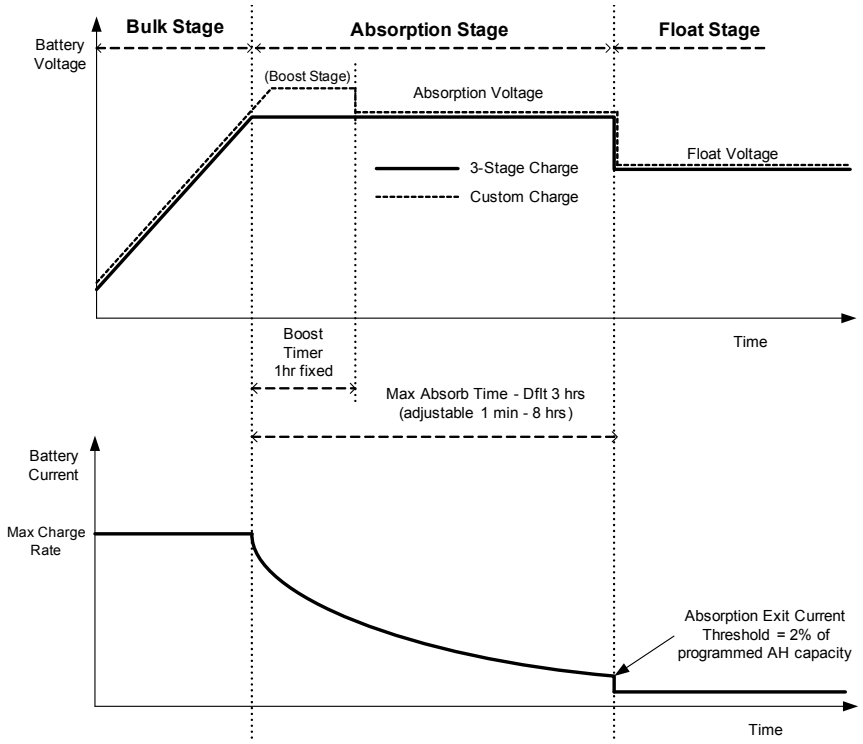

Figure 3-4 Three-Stage Battery Charging Cycle

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Note:

When the charge cycle is interrupted, the charger will restart charging at the beginning of the multi-stage algorithm.

Exit Current Threshold can be effectively disabled by programming the amp-hour capacity to 0. In this case, absorption will only exit once the Max Absorption timer expires.

Charge current during equalize state (optional state not shown here) is normally limited to 10% of the programmed amp-hour capacity setting. If this setting is programmed to 0 Ah, the charge current during equalize is instead limited to whatever is programmed for the maximum current limit of the unit (default is 60A).

Synchronized charge states are active when more than one charging device (Xantrex XW Series Inverter/Charger or Xantrex XW Solar Charge Controller) is connected in the system via the Xantrex Xanbus network.

- The first unit (Xantrex XW Series Inverter/Charger or Xantrex XW Solar Charge Controller) to enter bulk, causes all other chargers to enter bulk.
- The first Xantrex XW Series Inverter/Charger to enter absorption causes all other Xantrex XW Series Inverter/Chargers to enter absorption.
- The last Xantrex XW Series Inverter/Charger ready to exit absorption triggers all Xantrex XW Series Inverter/Chargers to exit absorption and exit charge. The Xantrex XW Series Inverter/Chargers will not wait for any connected Xantrex XW Solar Charge Controllers to transition to absorption or float.

Bulk Stage

Bulk charge is the first stage in the charging process and provides the batteries with a controlled, constant current. Once the battery voltage rises to the absorption voltage threshold, the charger switches to the absorption stage.

Absorption Stage

During the absorption stage, the Xantrex XW Series Inverter/Charger begins operating in constant voltage mode and the current falls gradually as the amp hours are returned to the battery. For the first 60 minutes of the absorption stage, the Xantrex XW Series Inverter/Charger regulates the battery voltage at the `Bulk Voltage` setting. The voltage limit used for the remaining time in this stage is the `Absorption Voltage` setting. By default, the bulk and absorption voltage settings are the same for all battery types. The voltage limit settings for bulk and absorption can be adjusted independently if the battery type is set to `Custom`.

For flooded lead acid batteries only, a custom charging scheme can be used which sets the bulk voltage higher than the absorption voltage. This will result in the batteries being charged at a boost voltage charge level, which has been found beneficial for making sure enough amp hours are returned to the battery bank for off grid and grid support installations.

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Once the Xantrex XW Series Inverter/Charger reaches the `Bulk` (`Absorption`, after the first 60 minutes) `Voltage` setting, the Xantrex XW Series Inverter/Charger will operate in constant voltage mode, providing only the necessary current to maintain the voltage setting. As the amp hours are returned to the battery, the current required to maintain the voltage setting falls gradually.

For detailed information on how boost charging works and when it is recommended, refer to Appendix C, “Boost Charging”. The Xantrex XW Series Inverter/Charger transitions to the float stage if either one of the following two conditions are met:

1. The charge current allowed by the batteries falls below the exit current threshold, which is equal to 2% of the programmed battery capacity (for a 500 amp-hour battery bank, this would be 10 amps), for three minutes.
2. The Xantrex XW Series Inverter/Charger has been in absorption for the programmed maximum absorption time limit. The default is 3 hours, but the time limit is programmable from 1 minute to 8 hours.

Note: If there are DC loads on the batteries, the charger’s current may never decrease to a level to initiate the next stage of charging. In this case, the charger would stay in absorption until the `Absorb Time` setting is reached.

To make sure the charger does not remain in absorption for too long, adjust `Absorb Time` on the `Charger Settings` menu. The timer begins at the start of the absorption stage and terminates absorption charging if the charge current does not decrease to below 2 per cent of the battery capacity before the `Absorb Time` setting expires. The `Absorb Time` setting may be increased if the charge cycle continually runs the full `Absorb Time` in the absence of DC loads. This is an indication of too large a battery bank for the selected `Absorb Time` setting.

Float Stage

Float charge maintains the batteries slightly above the self discharge voltage of the batteries. The charge current in float is the current necessary to maintain the batteries at the `Float Voltage` setting, limited only by the inverter's capability or other settings that limit the inverter's maximum charge rate. Float charging reduces battery gassing, minimizes watering requirements (for flooded batteries), and makes sure the batteries are in a constant state of readiness. When three-stage charging is selected, the charger automatically switches to the float stage after the batteries have received a bulk and absorption charge (see Figure 3-4 on page 3–11). The batteries are maintained at the default float voltage level for the selected battery type or the voltage selected under `Float Voltage` on the `Custom Battery Settings` menu.

Note: The battery voltage can increase above the float voltage when using an external charging device such as PV arrays, wind turbines, and micro-hydro generators. Be sure to include appropriate charge management equipment with all external DC sources.

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Two-Stage

Two-stage (or no float) mode differs from an ordinary three-stage charge mode in that it does not continuously maintain the battery at float voltage. Instead, the Xantrex XW Series Inverter/Charger begins charging the battery in bulk mode whenever the battery voltage drops below the recharge level. While the battery voltage is above the recharge level the inverter's AC transfer switch continues to pass power through from the utility grid to the loads, but does not actively charge the batteries.

Two-stage mode increases efficiency of utility connected systems by reducing the amount of power consumed by the inverter and batteries compared to when the battery is continuously maintained at `Float Voltage`. This feature can extend the life of most batteries.

To allow grid support and sell mode to function after battery charging has completed, it is recommended to set `Charge Cycle` to `2-stage`.

Note: If the AC input fails or drops below the lower VAC limit (as set in `AC Settings`), the complete multi-stage charge cycle (bulk, absorption, float/no float) restarts once the source AC recovers to within the acceptable range. If the batteries are already nearly full, the charge cycle will take little time to complete.

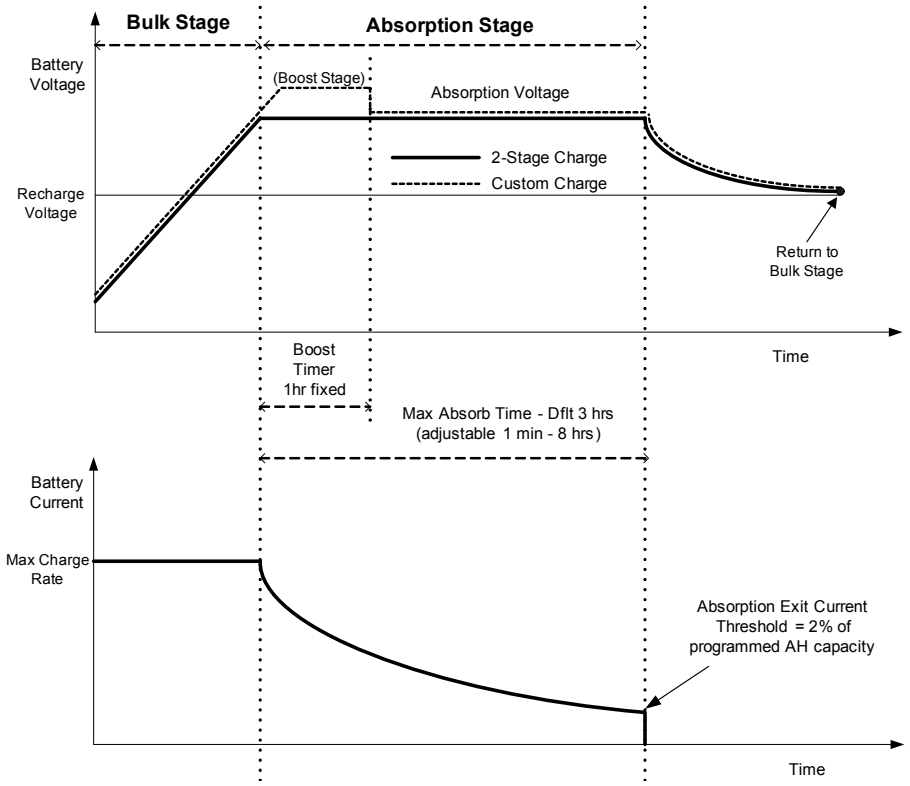

Figure 3-5 Two-Stage Charging Cycle

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Note:

When the charge cycle is interrupted, the charger will restart charging at the beginning of the multi-stage algorithm.

Exit Current Threshold can be effectively disabled by programming the amp-hour capacity to 0. In this case, absorption will only exit once the `Max Absorption` timer expires.

Charge current during equalize state (optional state not shown here) is normally limited to 10% of the programmed amp-hour capacity setting. If this setting is programmed to 0Ah, the charge current during equalize is instead limited to whatever is programmed for the max current limit of the unit (default is 60A).

Synchronized charge states are active when more than one charging device (Xantrex XW Series Inverter/Charger or Xantrex XW Solar Charge Controller) is connected in the system via the Xanbus network.

- The first unit (Xantrex XW Series Inverter/Charger or Xantrex XW Solar Charge Controller) to enter bulk, causes all other chargers to enter bulk.
- The first Xantrex XW Series Inverter/Charger to enter absorption causes all other Xantrex XW Series Inverter/Chargers to enter absorption.
- The last Xantrex XW Series Inverter/Charger ready to exit absorption triggers all Xantrex XW Series Inverter/Chargers to exit absorption and exit charge. The Xantrex XW Series Inverter/Chargers will not wait for any connected Xantrex XW Solar Charge Controllers to transition to absorption or float.

Equalize Charging

Many battery manufacturers recommend periodic equalize charging to counter cell charge imbalance and capacity-robbing electrolyte stratification. Equalizing helps to improve battery performance and lifespan by encouraging more of the battery material to become active.

Battery equalization is a controlled overcharging method that mixes up stratified electrolyte and reactivates unused areas of the plate material. Periodic equalizing can help to regularly restore batteries to a full and healthy state of charge.

Consult the battery manufacturer's recommendation for equalize charging settings. Sealed batteries should not be equalized. Consult the battery manufacturer for optimal charging procedures when using sealed batteries.

When `Equalize` mode is enabled, the battery is charged from bulk to absorption, and then to the equalize phase. The Xantrex XW Series Inverter/Charger will transition from the absorption phase to equalize if:

- the DC charge current is below 2% of the configured battery capacity (for example, 8.8A for 440Ah).
- the absorption time is exceeded (for example, 180 min).

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After absorption, the maximum charge DC current is set to 10% of battery capacity (for example, 44A for 440Ah). See Figure 3-6. This constant current charge will continue until the voltage has increased to the equalize voltage at which point the battery will be regulated at the temperature-compensated equalize voltage.

If the battery capacity is set to zero (Ah=0 effectively disables the exit current criteria for the absorption charge stage making the absorption stage defined by time only), the equalize charge current is fixed at maximum 44A.

Equalization duration is fixed at one hour.

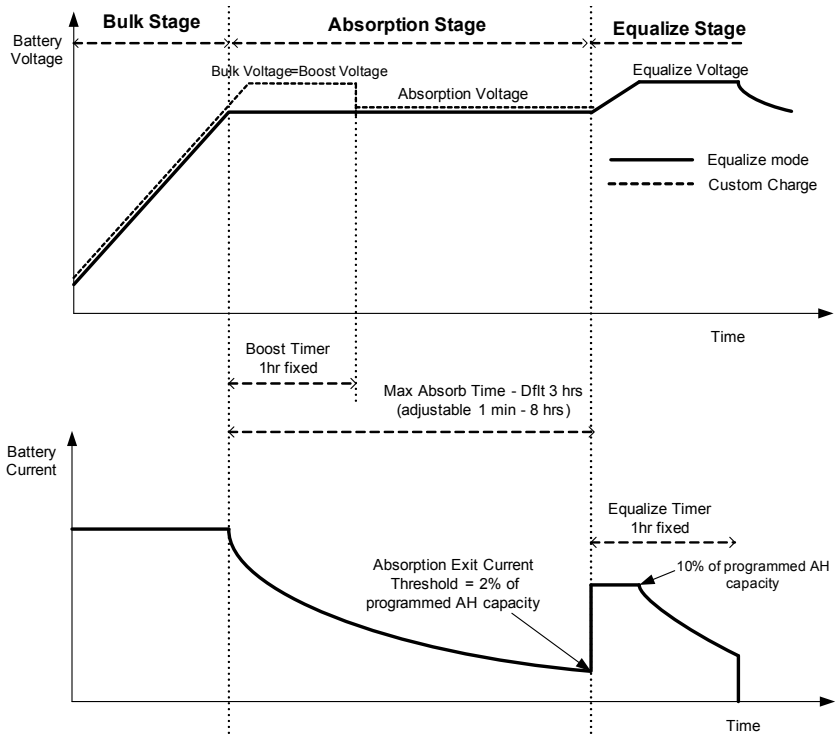

Figure 3-6 Equalize Charging

Equalization Procedure

To start equalizing the batteries, do one of the following:

- On the Xantrex XW Setup menu, highlight `Equalize` and select `Enable`.
- Press the Equalize button on the inverter information panel for five seconds.

If the Xantrex XW Series Inverter/Charger will not perform the equalization, see Warning W96 “Cannot Equalize” in Table 4-2 on page 4–12.

WARNING: Explosion Hazard

Only flooded or vented batteries should be equalize charged. Hydrogen and oxygen gases are produced when batteries are equalize charged. Provide adequate ventilation and remove all sources of ignition to prevent explosion.

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Important: In a system where more than one device is capable of equalizing batteries (such as a system including multiple Xantrex XW Series Inverter/Chargers and Xantrex XW Solar Charge Controllers), there is no system-wide equalization command for all devices. To equalize with multiple devices, each would have to be enabled individually. Alternatively, equalization can be performed using only one device. During the equalization process, one device applies the equalization charge while the other devices continue to operate in synchronized charge mode, typically in float (three-stage charging) or no-float (two-stage charging).

A custom Boost charge profile can be configured if the equalize method is not periodically used. Boost charging is part of the absorption stage and allows the absorption voltage to be set slightly higher than the absorption voltage for the first hour of the absorption charge stage thus encouraging a “mini-equalize” each time the battery is charged.

The boost voltage is defined by the `Bulk Voltage` setting. This is for advanced users only who pay strict attention to battery maintenance and have an appropriately vented and protected battery installation. Consult your battery manufacturer for appropriate voltages.

The Xantrex XW system will still allow manual equalize charging when the boost absorption voltage is implemented.

Using Charger Block

The charger block feature halts charging on AC1 (Grid) for a period of time each day. This period of time is defined by the `Chg Block Start` and `Chg Block Stop` settings. In areas where the utility charges variable rates for electricity, it is preferable to use utility power for charging only during non-peak hours. Charger block can prevent utility power from being used for battery charging during peak billing periods.

During the time period set between `Chg Block Start` and `Chg Block Stop`, AC1 (Grid) input continues to be passed through to the loads. Inverter operation remains unaffected during the charger block period.

During the charger block period, no charging on AC1 occurs even if the batteries discharge below `ReCharge Volts` setting. However, a generator connected to AC2 (in the absence of utility/AC1 power) or a Xantrex XW Solar Charge Controller may charge batteries during the charger block period. AC priority must be set to AC2 to charge batteries with a generator connected to AC2 during the charger block period.

If the charger is operating (that is, in float, absorption, bulk, or equalize stage) at the `Chg Block Start` time, charging on AC1 stops immediately and the charger enters an idle state identical to no float (see “Two-Stage” on page 3–14). When the charger block period is over, the charger does not resume the charge stage that was interrupted. Instead, if the batteries are above the `ReCharge Volts` setting, the charger remains idle.

If the battery voltage falls below the `ReCharge Volts` setting during the charger block period, the Xantrex XW Series Inverter/Charger begins a new charge cycle with the bulk stage after the charger block period has expired (at the `Chg Block Stop` time).

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For example, charger block is set to start at 5:00 PM and end at 8:00 PM. If the Xantrex XW Series Inverter/Charger is charging from AC1, charging stops at 5:00. When charger block ends at 8:00, the Xantrex XW Series Inverter/Charger does not automatically resume charging. The unit first measures the battery voltage. If the voltage is below the `ReCharge Volts` setting, then the Xantrex XW Series Inverter/Charger starts a new charge cycle from bulk. If the battery voltage is above the `ReCharge Volts` setting, the Xantrex XW Series Inverter/Charger remains idle and continues passing through AC to the loads.
The Xantrex XW Series Inverter/Charger also keeps measuring the battery voltage as before to determine whether to start a new charge cycle.

Custom Battery Settings Menu

CAUTION: Equipment damage

To avoid damaging your batteries during charging or equalization, consult your battery manufacturer and associated documentation before setting a custom battery type.

The `Custom Battery Settings` menu can be viewed if `Custom` is selected as the `Batt Type`. This menu allows you to adjust charging and equalization voltage for batteries with specifications that fall outside the default settings for the battery types the Xantrex XW Series Inverter/Charger offers. You can also adjust the temperature compensation constant for the battery temperature sensor on this menu.

Important: All settings for configuring a custom battery type are based on the default settings for a flooded battery type.

Table 3-4 describes the items on the `Custom Battery Settings` menu.

Table 3-4 Custom Battery Settings Menu

Item	Description
Eqlz Support	Enables or disables the ability to enter an equalization cycle. Refer to the battery manufacturer's specifications to determine whether equalization is recommended.
Eqlz Voltage[a]	Selects the equalization voltage. Consult your battery manufacturer for equalization voltage setting.
Bulk Voltage	Sets the bulk voltage for a custom battery type.
Absorb Voltage	Sets the absorption voltage for a custom battery type.
Float Voltage	Sets the float voltage for a custom battery type.
Batt Temp Comp	Battery temperature compensation for a custom battery type. This setting is the reference that the BTS uses to adjust the charging voltage when the temperature is above or below 25 °C (77 °F).

a.The `Eqlz Voltage` setting is displayed when `Eqlz Support` is set to `On`.

For default settings, see "Custom Battery Menu" on page B–4.

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AC Settings

The `AC Settings` menu configures the voltage and frequency limits for AC port 1 (Grid) and AC port 2 (Gen). These are the limits at which the Xantrex XW Series Inverter/Charger considers input voltage qualified—that is, suitable for charging batteries or powering loads. If the input voltage is not qualified according to these settings, the Xantrex XW Series Inverter/Charger transfers from using AC input to inverting.

Important: The Xantrex XW Series Inverter/Charger is configured from the factory as a split-phase inverter. In order to qualify the input, the AC input to the inverter must be split phase: $V_{Line1–Neutral} + V_{Line2–Neutral} = V_{Line1–Line2}$. The Xantrex XW Series Inverter/Charger can be configured for single-phase operation (120 V only). A split-phase Xantrex XW Series Inverter/Charger cannot accept input from a three-phase source unless the inverter is converted to single-phase operation and connected to a 120 V leg. See Appendix D, “Split-Phase to Single-Phase Conversion Instructions” in the *Xantrex XW Power System Installation Guide* for more information about three-phase operation.

Table 3-5 AC Settings Menu

Item	Description
AC Priority	Sets the priority for the AC source (AC1 or AC2) for qualification and transfer. For example, if you set this to AC2, the Xantrex XW Series Inverter/Charger will use a renewable energy source (such as an AC hydro generator) connected to AC2. It will use utility power only when renewable energy is insufficient or unavailable to power loads. In systems that use both utility grid (AC1) and generator (AC2) input, it is recommended that you set `AC Priority` to AC1. Assuming the generator is intended for occasional use only, the Xantrex XW Series Inverter/Charger will use utility power. It will use the generator only if AC1 is unavailable, and if the generator is running.
AC1 Breaker	Sets the AC1 (Grid) breaker size, based on the size of the breaker installed on AC1. The installed breaker size must not exceed the capacity of the upstream distribution panel. The Xantrex XW Series Inverter/Charger limits the maximum input current to this setting by derating its charging current to an equivalent of 80% of the AC breaker size. If the connected loads exceed the AC1 breaker setting, the AC breaker trips. The breaker may not trip if grid support is enabled and battery voltage is above the `Grid Supp Volts` setting, or if peak load shave is enabled and the load shave time window is active.
AC1 Lo Volt	Minimum acceptable input voltage level from the utility grid.
AC1 Hi Volt	Maximum acceptable input voltage level from the utility grid.
AC1 Lo Freq	Minimum acceptable utility grid input frequency.
AC1 Hi Freq	Maximum acceptable utility grid input frequency.

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Table 3-5 AC Settings Menu

Item	Description
AC2 Breaker	Sets the AC2 (Gen) breaker size, based on the size of the installed AC breaker. The breaker size must not exceed the capacity of the generator. The Xantrex XW Series Inverter/Charger limits the maximum input current to this setting by derating its charging current to an equivalent of 80% of the AC breaker size. If the connected loads exceed the AC2 breaker setting, the AC breaker trips. The breaker may not trip if `Gen Support` is enabled and `Gen Amps` is configured not to exceed the generator's rated output current.
AC2 Lo Volt	Minimum acceptable input voltage level from the generator.
AC2 Hi Volt	Maximum acceptable input voltage level from the generator.
AC2 Lo Freq	Minimum acceptable generator input frequency.
AC2 Hi Freq	Maximum acceptable generator input frequency.

For default settings, see "AC Menu" on page B–4.

Grid Support Settings

The `Grid Support Settings` menu contains configuration options for grid-tie operation. To enable all these settings, `Grid Support` must be enabled in the `Setup` menu (see "Xantrex XW Series Inverter/Charger Setup Menu" on page 3–2).

Important: Grid support and sell functions are modes of operation that are subject to local and/or national grid interconnection requirements in most jurisdictions. It is the responsibility of the installer and system operator to ensure that all applicable procedures and technical requirements are complied with before turning on either of these modes.

Note: Upon startup, the Xantrex XW Series Inverter/Charger does not enable grid support functions for five minutes (300 seconds). During this period the Xantrex XW Series Inverter/Charger connects to AC input and determines whether the utility grid voltage and frequency are stable and within nominal range. If `Grid Support` is enabled, the inverter information panel also displays a 300-second countdown during this period. For more information, see "Islanding Protection" on page 1–4.

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Table 3-6 Grid Support Settings Menu

Item	Description
Grid Supp Volts	Sets the level to which the batteries will be discharged when the inverter is selling power to the grid or supporting the power grid by providing additional power to the loads. This setting is not adjusted for the battery temperature even if the temperature sensor is installed.
Sell	Turns sell mode on and off. When `Sell` is set to enabled, the Xantrex XW Series Inverter/Charger AC output is divided between powering loads and delivering power to the utility grid. Sell mode requires the battery voltage to be above `Grid Supp Volts`. All configurations must comply with local and national electrical codes. The renewable energy from the battery is exported to the grid as long as the battery voltage is greater than or equal to `Grid Supp Volts`. See Figure 3-8 on page 3–25. • Grid-tie entry condition: battery voltage is greater than `Grid Supp Volts`. • Grid-tie exit condition: battery voltage is lower than `Grid Supp Volts` less 0.5 V. There is a time delay associated with the entry and exit conditions. The default is 20 seconds. The delay can be extended to 40 seconds if the battery voltage is not very stable (Figure 3-3, “Basic and Advanced Settings” on page 3–6 and Table 3-12, “Advanced Features Menu” on page 3–38). This delay helps to avoid sell power fluctuations when the battery voltage fluctuates. There is an exception. The delay is zero when the battery voltage suddenly changes to 2 V above `Grid Supp Volts`. For example, when a wind turbine or micro-hydro is connected to a small battery bank which may create a sudden change on the battery voltage. In this case the system will immediately respond by converting the energy from the battery to grid.
Max Sell Amps	Sets the maximum AC amps allowed to be delivered to the utility grid from a solar array and/or the batteries during grid-tie operation. This setting is only used if `Sell` is set to enabled. `Max Sell Amps` must be less than 80 per cent of the selected AC1 breaker setting. If set higher, the breaker setting will override the `Max Sell Amps` setting to avoid tripping the breaker.

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Table 3-6 Grid Support Settings Menu

Item	Description
Load Shave	Enables or disables the load shave feature. Load shave allows the Xantrex XW Series Inverter/Charger to support the grid in powering local loads during a defined window of time (set using `Load Shave Start` and `Load Shave Stop`). If `Load Shave` is set to enabled: • If the battery voltage is above `Grid Supp Volts`, then the current taken from the grid is reduced to zero (see Figure 3-7, "Peak Load Shaving Mode" on page 3–23). This maximizes the renewable energy for AC load usage. • If battery voltage is below `Low Batt Cut Out` +2 V, then it will exit load shave mode and enter AC pass through mode. • If battery voltage is reduced further to below `Low Batt Cut Out` +1 V, then it will exit AC pass through mode and enter charge mode to fully recharge the battery. Note that the Xantrex XW Series Inverter/Charger will only enter charge mode during the load shave period if the battery voltage drops to `Low Batt Cut Out` +1 VDC.
Load Shave Amps	Sets the maximum amount of current that can be drawn from the AC1 (grid) input by the loads and battery charger combined. This setting determines the amperage level at which the inverter starts drawing power from the batteries to add to the utility power to meet the demand of the loads. Typically, this value is set to the size of the AC circuit breakers feeding the inverter's AC input or the peak usage surcharge threshold imposed by the utility, if applicable.
Load Shave Start	Sets the time of day that the load shave feature operates. This feature is suited for regions where local utilities impose peak usage surcharges. The inverter provides load shaving power as long as battery voltage is 2 V or more above `Low Batt Cut Out`. See Figure 3-7, "Peak Load Shaving Mode" on page 3–23.
Load Shave Stop	Sets the time of day that the load shave feature stops operating. If `Load Shave` is set to enabled and `Load Shave Start` and `Load Shave Stop` are set to the same time, the Xantrex XW Series Inverter/Charger load shaves continuously.

For default settings, see "Grid Support Menu" on page B–5.

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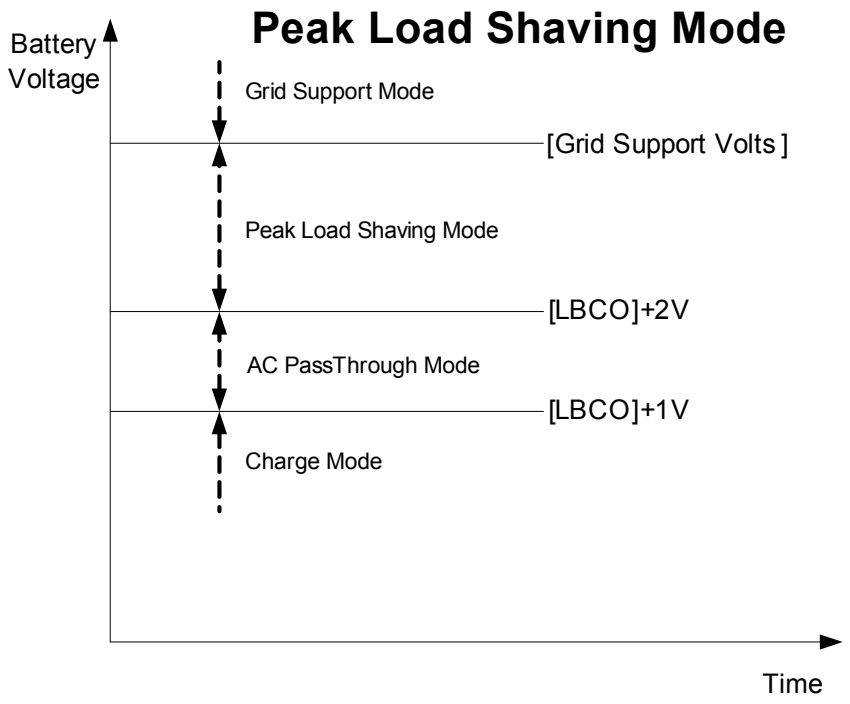

Figure 3-7 Peak Load Shaving Mode

Energy Management

The Xantrex XW Series Inverter/Charger can be programmed to control how and when to use utility power. Advanced features allow management of peak loads and time-of-use billing.

Charger Block

See “The Xantrex XW system will still allow manual equalize charging when the boost absorption voltage is implemented.” on page 3–17.

Grid Support

Important: Grid support and sell functions are modes of operation that are subject to local and/or national grid interconnection requirements in most jurisdictions. It is the responsibility of the installer and system operator to ensure that all applicable procedures and technical requirements are complied with before turning on either of these modes. The interconnect codes and standards with which the Xantrex XW Series Inverter/Charger complies are listed in the Specifications section.

The grid support feature allows the Xantrex XW Series Inverter/Charger to support local loads by converting excess capacity from external DC sources connected to its battery bank. Examples of external DC sources are charge controllers, micro-hydro, and wind turbines.

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For grid support to function, `Grid Support` must be enabled on the `Setup` menu and the battery voltage must be above the `Grid Supp Volts` setting.

There are two modes of operation within grid support.

Grid Support enabled, Sell disabled In this mode, available excess DC power is converted and used to power local loads. No power is exported to the utility. If the local load demand exceeds the available power from the external DC sources, power is then drawn from the utility to support the load. However, if the local load demand is less than the power available from external DC sources, the net excess power from the external DC sources is not converted and hence not used.

Grid Support enabled, Sell enabled In this mode, all available excess DC power is first used to power local loads. Any remaining power is exported to the utility grid.

Grid Support and Battery Charging

Charge Cycle settings

With the charger enabled, the Xantrex XW Series Inverter/Charger enters grid support mode only after completing a charge cycle when it is first powered up or reconnected to the grid. Set `Charge Cycle` to 2-stage (default) to allow grid support to function immediately after the absorption charge stage. See “Charger Settings Menu” on page 3–10.

Grid Support modes

Grid support can be configured to operate in one of two modes.

Fixed battery voltage This mode is suitable for systems with DC sources (such as wind turbines, DC generator sets, fuel cells, and so on) that are not connected to the Xantrex XW Series Inverter/Charger through Xanbus or for mixed systems which have both Xanbus-connected Xantrex XW Solar Charge Controllers and other DC sources (such as those listed above). In this mode, `Grid Supp Volts` is set about 0.5 volts below the voltage provided by the DC source (typically the float voltage setting of the DC source or charge controller). See Figure 3-8, “Grid-tie Sell Mode” on page 3–25.

In fixed battery voltage mode the Xantrex XW Series Inverter/Charger tries to regulate the battery voltage to the `Grid Supp Volts` setting by converting the available DC power to AC power to support the loads or export to the utility grid. Because the battery bank voltage may not reach bulk/absorption voltages in this mode, it is recommended to occasionally force a full charge cycle by either temporarily disabling grid support or forcing a bulk charge cycle from the grid (see “Force Chg” on the “Xantrex XW Series Inverter/Charger Setup Menu” on page 3–2).

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Enhanced interactive mode This mode is suitable for Xantrex XW Systems with only Xantrex XW Solar Charge Controller(s) networked to Xantrex XW Series Inverter/Charger(s) through Xanbus. In this mode, `Grid Supp Volts` is set as the charge controller's `Bulk` and `Absorb` voltages (for example, 32 volts on a 24 volt system and 64 volts on a 48 volt system).

In enhanced interactive mode the Xantrex XW Series Inverter/Charger automatically tracks the Xantrex XW Solar Charge Controller voltage as it transitions through all charge states (from bulk to absorption to float). This allows the Xantrex XW System to execute a full battery charge cycle while still converting excess DC power to AC power to support the loads or export to the utility grid. In doing so, the Xantrex XW Series Inverter/Charger only uses what is not accepted by the battery to support local loads and sell to the grid, thereby maximizing the use of the array. Since this mode allows the battery bank voltage to reach absorption levels (when PV harvest is adequate), the state of health of the battery is improved. The sell entry and regulation voltage level is 1 V below absorption and float of Xantrex XW Solar Charge Controller set points. The sell exit from sell is 1.5 V below absorption and float of Xantrex XW Solar Charge Controller set points.

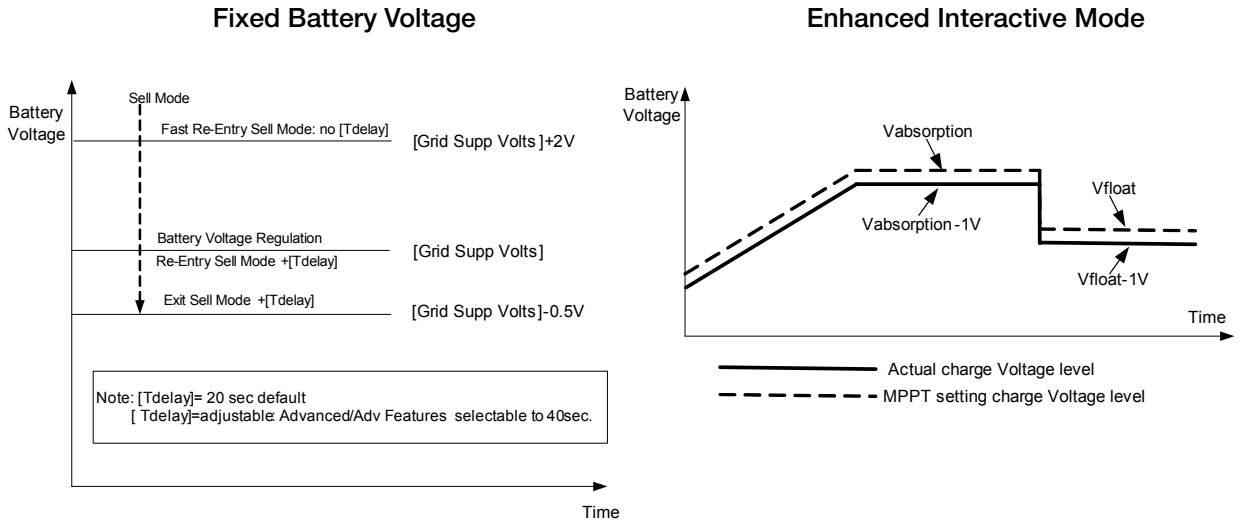

Figure 3-8 Grid-tie Sell Mode

Note:

[Tdelay] is an entry/exit transition time delay to/from grid support and sell mode.

If the battery voltage has higher fluctuations due to DC renewable sources (e.g. charge controllers, wind turbines, and so on), then the time delay can be increased by setting `Sell Dly 40s` to enabled (Table 3-12, "Advanced Features Menu" on page 3–38).

If the battery voltage has a sudden increase change greater than `Grid Support Volts` + 2 V, then the Xantrex XW Series Inverter/Charger will override the delay and enter grid support or sell mode immediately.

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Peak Load Shaving

Many utilities impose a surcharge on their customers based on the peak load used by a facility. To reduce utility peak demand charges, the inverter can be configured (using the `Load Shave Amps` setting) to limit the maximum draw the AC loads place on the utility. The inverter can be programmed to provide power above a specified level, eliminating the surcharge. When the utility current draw reaches the maximum level, the inverter assists by providing power from the batteries to the loads.

For peak load shaving to be effective, all loads must be connected to the inverter. For large loads, multiple (or stacked) inverters may be required.

To further make sure the batteries are able to supplement the power requirements of the connected load, an additional source of power (solar, wind, or hydroelectric) is recommended.

Peak load shaving can also be used in addition to the time-of-use metering.

Time-of-Use Metering

Utilities use time-of-use metering to determine utility charges during peak usage hours and to impose a surcharge. The Xantrex XW Series Inverter/Charger can be configured (using the `Load Shave Start`, `Load Shave Stop` and `Charger Block` settings) to overcome these peak charges by using utility power to charge the battery bank during the inexpensive energy hours and consuming the battery energy during expensive energy hours.

For example, if `Charger Block` is set between 9:00 AM and 10:00 PM and `Load Shave` is set between 6:00 PM and 9:00 PM, charging on AC1 stops at 9:00 AM and continues to pass utility AC through to the loads. If charging is required during the charger block period, and `AC Priority` is set to AC2, the Xantrex XW Series Inverter/Charger can use any AC source connected to AC2. Loads will transfer to the AC source on AC2 as well. The inverter connects to the utility grid at 6:00 PM and supports loads using the batteries. The inverter continues to run until 9:00 PM. The Xantrex XW Series Inverter/Charger then stops supporting the utility grid and passes utility AC through to the loads. At 10:00 PM utility AC begins maintaining the batteries based on the battery charger settings.

The above example allows an external renewable energy source to be utilized as a primary charging source during a desired time window. The charger (using utility AC connected to AC1) can then be used to supplement the battery charging when the utility rates are low.

When using the system for time-of-use metering, the system should be designed with a battery capacity large enough to support loads during the entire peak rate period without reaching the `Low Batt Cut Out` setting.

To further make sure the batteries are able to support the loads, an additional source of power (solar, wind, or hydroelectric) is recommended. Depending upon the capacity of the system, certain heavy loads should only be run during non-peak periods.

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Generator Support Settings

Generator support allows power to be automatically drawn from the batteries to assist an AC generator to support heavy loads (loads that exceed the available current from the generator).

Generators have a limited output current and it is possible to reach this limit when operating heavy loads. The Xantrex XW Series Inverter/Charger is designed to assist the generator when heavy current demands load down the generator by supplying additional power from the batteries.

In addition, the battery charger can reduce its charging current to the batteries so the combined charge AC current and total load current does not exceed the capacity of the generator or trip its output breakers or fuses.

For imbalanced loads and small generators, the generator support feature may be used. When `GenSupp Plus` is enabled, the Xantrex XW Series Inverter/Charger will connect the center of its transformer to the AC2 input neutral to act as a load balancing transformer. This feature will attempt to balance the load between L1 and L2. Generator support is most effective for generators under 5 kW. If used with larger generators, the potential for recirculating current exists and if so, the efficiency losses would outweigh the benefit of generator support. See Table 3-12, “Advanced Features Menu” on page 3–38.

Note: Running and start-up (peak) currents are limited to the maximum current limits of the inverter.

Table 3-7 Gen Support Menu Values

Setting	Description
GenSupp Mode	Turns the generator support feature on and off.
GenSupp Amps	Sets the generator load level at which the Xantrex XW Series Inverter/Charger supplies power from the batteries to support the generator.

For default settings, see “Gen Support Menu” on page B–6.

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Auxiliary Output Settings

The `Aux` menu allows you to enable and configure the auxiliary output. The auxiliary output provides 12 volts DC at 250 milliamps to power a relay, indicator light, or alarm.

Table 3-8 Aux Menu Values

Setting	Description
Manual Aux	Sets the state of the auxiliary output. `ManualOn` or `ManualOff` allow manual control of the auxiliary output. When set to `Automatic`, a trigger source can then be selected.
Active Lvl	Sets the mode (polarity) of the auxiliary output. When triggered, the output can be active high (12 VDC output turns on) or active low (output is high until the trigger turns it off).
Trigger Src	Selects the desired condition (trigger source) to activate the auxiliary output. The trigger source options are `LowBattV`, `HighBattV`, `LowBattTemp`, `HighBattTemp`, and `Fault`.
Trigger Level	Sets the voltage or temperature level (depending on the selected trigger source) at which the auxiliary output is activated. If the selected `Trigger Src` is a battery voltage, the range also varies according to the nominal battery voltage of your system.
Trigger Delay	Sets a delay period between when the trigger occurs and when the auxiliary output is activated.
Clear Level	Sets the voltage or temperature level (depending on the selected trigger source) at which the auxiliary output becomes inactive.
Clear Delay	Sets a delay period between when the `Clear Level` setting occurs and when the auxiliary output becomes inactive.

For default settings, see “Aux Menu” on page B–6.

Important: Changing `Trigger Level` resets the auxiliary output. If an auxiliary output trigger is active, changing the trigger level will clear the trigger.

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Trigger Source Descriptions

Low Batt Voltage Activates the auxiliary output when the battery voltage falls below `Low Batt Voltage` for the trigger delay time. The auxiliary output turns off when the battery voltage rises above the clear setting for the `Clear Delay` time. Use this setting if you want the auxiliary output to control a relay to disconnect loads from a battery that is nearly discharged, or to activate a low battery voltage alarm such as a buzzer or light.

High Batt Voltage Activates the auxiliary output when the battery voltage rises above `Hi Batt Voltage` for the trigger delay time. The auxiliary output turns off when the battery voltage falls below the clear setting for the `Clear Delay` time. This setting is useful for:

- Installations that have another external charging source such as a wind generator or hydro generator connected directly to the batteries. The Xantrex XW Series Inverter/Charger auxiliary output can control a relay to disconnect the external charging source from the battery when the battery is in danger of being overcharged, or control a relay to turn on a diversion load.
- Activating a high battery voltage alarm such as a buzzer or light.
- Activating a vent fan to disperse hydrogen from the battery compartment when the batteries reach their gassing voltage.

Low Batt Temp Activates the auxiliary output when the battery temperature falls below `Low Batt Temp` for the trigger delay time. The auxiliary output turns off when the battery temperature rises above the clear setting for the `Clear Delay` time. Battery temperature is measured with a battery temperature sensor. Do not use this setting if a battery temperature sensor is not installed. With this setting, the auxiliary output can turn on an indicator alarm if the batteries are too cold. A battery with frozen electrolyte will not accept a charge.

High Batt Temp Activates the auxiliary output when the battery temperature rises above `Hi Batt Temp` for the trigger delay time. The auxiliary output turns off when the battery temperature falls below the clear setting for the `Clear Delay` time. Battery temperature is measured with a battery temperature sensor. Do not use this setting if a battery temperature sensor is not installed. With this setting, the auxiliary output can turn on a fan to cool the battery compartment.

Fault Activates the auxiliary output when a fault occurs. The auxiliary output clears when the fault is cleared.

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Multi-Unit Config Menu

The `Multi-Unit Config` menu configures the Xantrex XW Series Inverter/Charger to operate as a part of a multi-unit installation.

Important: Accessing this menu automatically places the Xantrex XW Series Inverter/Charger in standby mode. When entering the `Multi-Unit Config` menu, the unit identifies itself by flashing all front panel lights. After exiting the `Multi-Unit Config` menu, the Xantrex XW Series Inverter/Charger returns to operating mode and the front panel lights stop flashing.

Table 3-9 Multi-Unit Config Menu

Item	Description	Default	Range
Dev Name	Allows customization of the default device name. This setting is optional and does not affect operation. See “Setting the Device Name” on page 3–31.	n/a	n/a
Dev Number	Allows setting of a unique unit number in a multiple-unit system. See “Setting the Device Number” on page 3–32.	00	00–31
Inverter Mode	**For a split-phase system:** For a multi-unit system to operate, one Xantrex XW Series Inverter/Charger must be configured to `SplitPhMaster` and the rest as `SplitPhSlave`, otherwise a system-wide fault is asserted.	SplitPhMaster	For single-phase, three-wire models: SplitPhMaster, SplitPhSlave
	For a single-phase system: For a multi-unit system to operate, one Xantrex XW Series Inverter/Charger must be configured to `1PhMaster` and the rest as `1PhSlave`, otherwise a system-wide fault is asserted. Before setting up a single-phase system, perform the steps in “Converting 120 V/240 V Split-Phase to 120 V Single-Phase” in the *Xantrex XW Power System Installation Guide* (Document Part Number 975-0239-01-01) to convert up to four Xantrex XW 120 V/240 V split-phase models to 120 V single-phase models. A maximum of four inverters can be installed in parallel for a single-phase system. (In a four-inverter system, a second Xantrex XW PDP is required.)	1PhMaster	n/a
	For a three-phase system: See “Setting Up a Three-Phase System” on page 3–33.		
Connections	Select to display the Connections menu. See “Connections Menu” on page 3–34.	n/a	n/a

When installing a multi-unit system, each setting on the `Multi-Unit Config` menu (except for `Dev Name`) must be configured for each Xantrex XW Series Inverter/Charger in the system. The settings should be configured in the following order:

- Dev Number
- Inverter Mode
- Connections

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Setting the Device Name

The `Dev Name` setting allows you to customize the name of the Xantrex XW Series Inverter/Charger as it is displayed on other screens and menus.

The characters available are:

- A to Z
- a to z
- 0 to 9
- space

Note: Increasing the number of characters in a device name may cause other text on the same line to run off the edge of the screen. Device names should be limited to 10 characters or less.

To customize the Xantrex XW Series Inverter/Charger name:

1. On the device setup menu, select `Advanced Settings`.

   If `Basic Settings` appears instead of `Advanced Settings` on the device setup menu, display `Advanced Settings` by pressing Enter + Up arrow + Down arrow at the same time.
2. Select the `Multi-Unit Config` menu.
3. Select `Dev Name`.
4. Press Enter.

   The last letter of the Xantrex XW Series Inverter/Charger name is highlighted.
5. Begin customizing the device name.
   - To change the character, press the up or down arrow button. Holding down the button causes the characters to scroll more quickly.
   - To delete the character, press Exit.
   - To add characters, press Enter.
6. When the correct character is shown, press Enter to select it.
7. After pressing Enter to select the last character of your customized device name, press Enter again to return to the menu.

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Setting the Device Number

Setting the device number gives a Xantrex Xanbus-enabled device a unique identity when several devices of the same type are installed in the networked power system. When each identical device has a unique number, the Xantrex XW SCP can correctly identify and display status information for each device.
A device number consists of two digits ranging from 00 (default) to 31.

If only one of each type of device is installed in the networked power system, you do not need to set the device number. However, setting the device number to a value other than 00 is recommended in case you need to use the `Restore Defaults` command (which resets the device number to 00). After performing the command, checking that the device number has returned to 00 indicates that the command was successfully completed.

To set the Xantrex XW Series Inverter/Charger device number:

1. On the Xantrex XW Series Inverter/Charger Setup menu, select `Advanced Settings`.

   If `Basic Settings` appears instead of `Advanced Settings` on the `Setup` menu, display `Advanced Settings` by pressing Enter + Up arrow + Down arrow simultaneously.

   On the `Advanced Settings` menu, select `Multi-Unit Config` and press Enter.
2. On the `Multi-Unit Config` menu, select `Dev Number`. See Figure 3-9.
3. Press Enter to highlight the instance number.
4. Use the up and down arrow buttons to adjust the two-digit identifier number.
5. Press Enter.

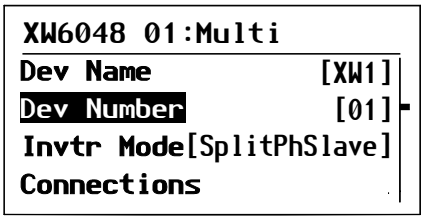

Figure 3-9 Setting a Device Number

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Setting Up a Three-Phase System

Before setting up a three-phase system, perform the steps in “Converting 120 V/240 V Split-Phase to 120 V Single-Phase” in the *Xantrex XW Power System Installation Guide* (Document Part Number 975-0239-01-01) to convert three Xantrex XW 120 V/240 V split-phase models to 120 V single-phase models.

To set up a three-phase system:

1. Daisy chain XW-phA, XW-phB, and XW-phC at each unit’s AC sync port. To do this, connect an AC sync cable between unit 1 and unit 2. Next, connect an AC sync cable between the second AC sync port in unit 2 and an AC sync port in unit 3. Network terminators are not required for AC Sync connections.
2. On the Xantrex XW System Control Panel (Xantrex XW SCP), select XWabcd 00 > `Advanced Settings` > `Multi-Unit Config` (where abcd is the model number 6048, 4548, or 4024).
3. Change the device name or device number in the proper sequence.
4. Under `Invtr Mode`, select:
   - 3Ph L1Master for unit 1 or Phase A
   - 3Ph L2Master for unit 2 or Phase B
   - 3Ph L3Master for unit 3 or Phase C
5. Optionally, up to one additional unit may be installed in parallel on each phase. This allows for a maximum of 6 Xantrex XW Series Inverter/Charger units in a three-phase system. Additional units are commonly called “slave units”. The slave unit on each phase (parallel) must be configured as 3PhL1Slave, 3PhL2Slave, and 3PhL3Slave respectively. A maximum of two units per phase is allowed.

Important: In a six-inverter system, a second Xantrex XW PDP is required.

CAUTION

Maximum power of 36 kW is permitted in a standalone system where no grid is available. If the system is tied to the grid, then total power during sell mode must be adjusted so that it does not exceed 30 kW. The power adjustment on each phase must be made at time of commissioning and under supervision of a utility representative.

6. Make sure the Grid or Gen wiring has the correct A, B, C phase sequence with the three Xantrex XW Series Inverter/Chargers. If the phase sequence is incorrect, the Xantrex XW system will not qualify the input AC voltage.
7. Put the wiring compartment cover back in place, and then power up the converted units. Perform an AC voltage measurement in invert mode. Make sure the output voltage is within 115 – 120 VAC.

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When installed in a three-phase system, the Xantrex XW Series Inverter/Charger checks for the existence of a master on each phase. If there is not a master unit on each phase, a system-wide fault (F66) is asserted. Each Xantrex XW Series Inverter/Charger has to be associated with a phase or line. To associate a Xantrex XW Series Inverter/Charger with a phase or line, select one of six available three-phase inverter modes shown in Table 3-10.

Table 3-10 Three-phase Inverter Modes

Line or Phase	Inverter Mode	Role Assignment[a]	Suggested Device Number
Line-1 or Phase-A	3Ph L1 Master[b]	Phase-A or Line-1 Master	10
	3Ph L1 Slave[c]	Phase-A or Line-1 Slave	11
Line-2 or Phase-B	3Ph L2 Master	Phase-B or Line-2 Master	20
	3Ph L2 Slave	Phase-B or Line-2 Slave	21
Line-3 or Phase-C	3Ph L3 Master	Phase-C or Line-3 Master	30
	3Ph L3 Slave	Phase-C or Line-3 Slave	31

a.Each phase can support one master unit and one slave unit.
b.The L1 Master is also the master Xantrex XW Series Inverter/Charger for the entire system. The system master broadcasts phase synchronizing pulses through its sync port, and each phase master controls the slave units on its respective phase.
c.The slave unit in each phase is optional.

Important: Device numbers are only suggested to facilitate identifying devices on the system as well as phase association from a device's name and number. Customize the naming as desired. Conflicting device names are allowed and will not cause faults in the system.

Connections Menu

The `Connections` menu contains additional settings to allow the Xantrex XW Series Inverter/Charger to function as part of a multi-unit networked system. Setting the connections for a Xantrex Xanbus-enabled device provides a way of identifying non-network connections for Xantrex Xanbus-enabled devices (see Figure 3-10) and enhancing networked power system management. When connections are set, devices of different types can detect that they share, for example, a common DC input source, or a common grid or generator source.

In multi-unit networked systems, Xantrex XW Series Inverter/Chargers can be stacked to produce increased charge current. To achieve this functionality, the devices must be configured to the same DC connection, such as House Battery Bank 1. The Xantrex XW Series Inverter/Chargers will collaborate on battery charging by listening to other units on this shared DC connection.

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Important: When configuring multiple networked Xantrex XW Series Inverter/Chargers with the Xantrex XW SCP, DC connections must be set to the same battery bank. If one of the units is set with a different DC connection, a system configuration fault (F66) occurs.

If separate battery banks are used in the system, all charging sources still synchronize their charge cycles. Transition from one stage of the charge cycle to another will occur simultaneously when all charging sources have reached the criteria for transition.

Table 3-11 Connections Menu

Item	Description
DCConn	DC input and output connection. This is the common DC connection between Xantrex XW Series Inverter/Chargers, charge controllers, and Automatic Generator Start.
ACOut	AC output connection. This connection specifies a common AC output connection between Xantrex XW Series Inverter/Chargers. The AC output connection has to be configured so that the Xantrex XW Series Inverter/Chargers know if they are connected to the same load or not. If connected to the same load, select the same name on all units; for example, “ACLoad1.” If connected to separate load banks, use different names for the AC output connection on each unit; for example, “ACLoad1” on one unit and “ACLoad2” on the other.
AC1	AC1 input connection. This connection specifies a common AC port 1 input for multiple Xantrex XW Series Inverter/Chargers.
AC2	AC2 input connection. This connection specifies a common AC port 2 input for multiple Xantrex XW Series Inverter/Chargers.

For default settings, see “Connections Menu” on page B–6.

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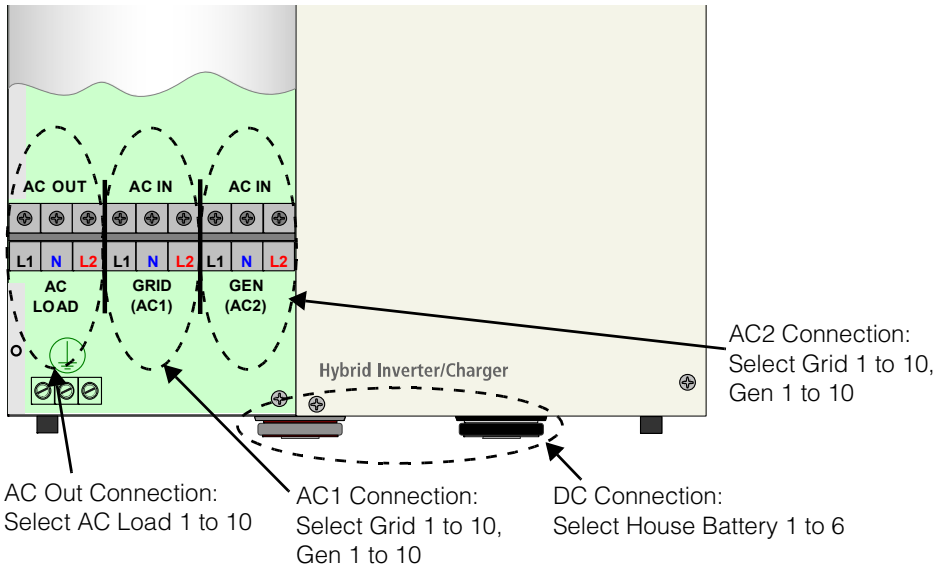

Figure 3-10 Xantrex XW Series Inverter/Charger Connections Representation

Operating without connections

AC1 and AC2 connections can be set to `None` if operating without a connection to a specific power source. Only stand-alone devices (in a system that includes only the device and a Xantrex XW SCP) may be configured this way. Note that this is not a necessary configuration step as the system will still operate with the default settings. Using `None` where no AC source is used only serves as a label in this case and does not modify the behavior of a unit.

Copying Settings From Another Unit

The `Copy from` command allows quick configuration of a Xantrex XW Series Inverter/Charger. After selecting another Xantrex XW Series Inverter/Charger in the system to copy settings from, common parameters are copied from the selected Xantrex XW Series Inverter/Charger to the Xantrex XW Series Inverter/Charger being configured.

The following settings are copied from the selected unit:

- Inverter settings
- Charger settings
- AC settings
- Grid support settings (except the sell setting)
- Gen support settings.

The following settings are not copied between units:

- Inverter mode
- Device number
- Device name
- Auxiliary output settings.

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Resetting the Xantrex XW Series Inverter/Charger to Default Settings

The `Restore Defaults` command returns the Xantrex XW Series Inverter/Charger to factory default settings. After using the `Restore Defaults` command, the Xantrex XW Series Inverter/Charger is no longer configured for the power system.

To restore Xantrex XW Series Inverter/Charger default settings:

1. On the `Advanced Setup` menu, select `Restore Defaults`.

   Warning W252 appears, asking to confirm the command.
2. To cancel the command, press Exit. To continue with the `Restore Defaults` command, press Enter.

Important: If a warning is already active in the system, selecting `Restore Defaults` brings up the `Warnings` list, with warning W252 at the top. Press Enter to view W252 and continue with the restore defaults process.

CAUTION: Equipment damage

Do not restore defaults while the Xantrex XW Series Inverter/Charger is operating. De-energize the power system and disconnect the Xantrex XW Series Inverter/Charger AC input before restoring defaults. Reconfigure the Xantrex XW Series Inverter/Charger before reconnecting the AC input and re-energizing the power system.

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Using the Advanced Features

Table 3-12 Advanced Features Menu

Item	Description
RPO	Enables or disables the remote power off function. Enable this setting if an external shut-off switch has been connected to the Xantrex XW Series Inverter/Charger auxiliary port. See the *Xantrex XW Power System Installation Guide* for more information about the auxiliary port.
Power Save	When enabled, power save mode can reduce tare loss from the battery by reducing output from 240 volts to 220 volts when the loads are less than 100 watts. When the Xantrex XW Series Inverter/Charger detects loads higher than 100 watts, it produces the full 240 volts. Power save mode is disabled by default.
Sell Dly 40s	When enabled—and other conditions are satisfied—there will be a 40 second delay before the system starts selling power to the grid. When disabled, the default value of 20 seconds is used. This feature is useful when the battery voltage is not constant. It also helps avoid power fluctuations during sell. As an exception, there will be zero time delay when the battery voltage suddenly rises to 2 V above `Grid Supp Volts`. For example, a wind turbine or micro-hydro connected to a small battery bank may create a sudden change on the battery voltage. In this case the system will immediately respond to convert the energy from the battery to grid.
GenSupp Plus[a]	When enabled, this feature helps to balance the generator input L1 and L2 phases under severe imbalanced loads on L1 and L2. This should only be enabled for generators below 5 kW. The default setting is Disabled.

a. Applicable to split-phase models only.

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4 Troubleshooting

Chapter 4, “Troubleshooting”, contains information and procedures for identifying and solving possible problems with the Xantrex XW Series Hybrid Inverter/Charger.

Topics in this chapter include:

- “General Troubleshooting Guidelines” on page 4–2
- “Inverter Applications” on page 4–3
- “Inverter Troubleshooting” on page 4–4
- “Battery Charger Troubleshooting” on page 4–8
- “Faults and Warnings” on page 4–11

General Troubleshooting Guidelines

This section will help you narrow down the source of any problem you may encounter. Please read the following troubleshooting steps:

1. Check for a warning or fault message on the Xantrex XW System Control Panel (Xantrex XW SCP) or a fault code on the inverter information panel. If a message is displayed, record it immediately.
2. As soon as possible, create a detailed record of the conditions at the time the problem occurred. These details should include, but not be limited to, the following:
   - loads the Xantrex XW Series Inverter/Charger was running or attempting to run
   - battery condition at the time of failure (battery voltage or temperature, for example), if known
   - recent sequence of events (for example, charging had just finished, utility grid had failed but the inverter did not come on)
   - any known unusual AC input factors such as low voltage or unstable generator output
   - extreme conditions which may have existed at the time (temperature or moisture, for example).
3. Attempt the solution indicated in Table 4-2 on page 4–12 or Table 4-5 on page 4–19.
4. If your inverter information panel or Xantrex XW SCP is not displaying a Fault light, check the following list to make sure that the present state of the installation allows proper operation of the unit. See also “Inverter Troubleshooting” on page 4–4 and “Battery Charger Troubleshooting” on page 4–8.

❒ Is the Xantrex XW Series Inverter/Charger located in a clean, dry, adequately ventilated area?

❒ Have the AC input breakers opened? If so, your pass-through load may have exceeded the rating of one or more of the input breakers.

❒ Are the battery cables adequately sized and short enough? See the *Xantrex XW Power System Installation Guide* for more information.

❒ Is the battery in good condition and are all DC connections tight?

❒ Are the AC input and output connections and wiring in good condition?

❒ Are the configuration settings correct for your particular installation?

❒ Are the display panel and the communications cable properly connected and undamaged?

❒ Is the battery temperature sensor and its cable properly connected and undamaged?

5. Contact Customer Service for further assistance. Please be prepared to describe details of your system installation and provide the model and serial number of the unit. See page ii for contact information.

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Inverter Applications

The Xantrex XW Series Inverter/Charger performs differently depending on the AC loads connected to it. If you are having problems with any of your loads, read this section.

Resistive Loads

Resistive loads are the easiest and most efficient to drive. Voltage and current are in phase, which means they are in step with one another. Resistive loads generate heat in order to accomplish their tasks. Toasters, coffee pots, and incandescent lights are typical resistive loads. It is usually impractical to run larger resistive loads—such as electric stoves and water heaters—from an inverter due to their high current requirements. Even though the inverter may be able to accommodate the load, the size of battery bank will limit inverter run time.

Motor Loads

Induction motors (AC motors without brushes) require up to six times their running current on startup. The most demanding are those that start under load (for example, compressors and pumps). Of the capacitor start motors (typical in drill presses and band saws, for example), the largest you can expect to run is 1 horsepower. Universal motors are generally easier to start. Check that the Locked Rotor Amps (LRA) rating of the motor load does not exceed the maximum surge current rating of the inverter. Since motor characteristics vary, only testing will determine whether a specific load can be started and how long it can be run.

If a motor fails to start within a few seconds or loses power after running for a time, it should be turned off. When the inverter attempts to start a load that is greater than it can handle, the inverter may shut down from an AC overload fault.

Problem Loads

Very Small Loads

If the power consumed by a device is less than the threshold of the search mode circuitry, and search mode is enabled, the inverter will not run. Most likely the solution will be to disable `Search` mode or lower the sense threshold. Refer to *Technical Note TN 003 Making Sense of Search Mode* (available at **www.schneider-electric.com**) for more information.

Fluorescent Lights and Power Supplies

Some devices cannot be detected when scanned by search mode circuitry. Small fluorescent lights are the most common example. Some computers and sophisticated electronics have power supplies that do not present a load until line voltage is available. When this occurs, each unit waits for the other to begin. To drive these loads, either a small companion load like a light bulb rated for more than the `Search Watts` setting must be used to bring the inverter out of search mode, or the inverter may be programmed to remain on by disabling `Search` mode. (See “Using Search Mode” on page 3–8.)

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Clocks

You may notice that your clocks are not accurate. Some of the clocks on your appliances may reset when the Xantrex XW Series Inverter/Charger is in search mode.

Searching

When the inverter is in search mode, it may fail to start some loads even though the rated wattage on the load is more than the `Search Watts` setting. Disable `Search` or apply an additional load (companion load) to make the inverter exit search mode.

Inverter Troubleshooting

To determine the cause of an inverter error condition, refer to the troubleshooting solutions below to resolve the situation.

Problem	Possible cause	Solution
Unit will not come on (no LEDs are on) and the inverter information panel is blank or off.	Unit was turned off using ON/OFF button on front panel.	Turn the unit on again.
	DC voltage on the inverter's DC terminals is incorrect.	Check the battery voltage, fuses or breakers and DC cable connections to the inverter. If the DC voltage on the inverter's DC terminals is correct, have unit serviced.
Unit goes into invert mode and starts producing AC output, but stops quickly (several attempts made).	Excessive load on output.	Reduce loads.
	Unit is in over-temperature protection and needs to cool down.	Stop inverting by putting the inverter into Standby mode, and then allow the unit to cool and increase ventilation. If necessary, replace the foam air filter on the bottom of the unit.
	Remote Power Off signal is present.	Release or reset the Remote Power Off switch.

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Problem	Possible cause	Solution
No AC power output. The inverter information panel displays `Sch`.	Open AC output breakers or fuses and bad output wire connections.	Check the Load AC Voltage status on the SCP `Meters` screen and check AC voltage on the inverter AC Out terminal block. If the `Meters` screen shows correct AC voltage but there is no AC voltage on the inverter AC Out terminal block, check for loose connections on the inverter terminal block. If connections are not loose, the inverter may need to be serviced. If there is correct AC voltage on the `Meters` screen and on the inverter AC terminal block, check for open AC output breakers or fuses and bad output wire connections. If AC voltage on the `Meters` screen or inverter AC terminal block is incorrect, have unit serviced.
No AC power output. INVERT LED is flashing.	AC load too small for search mode circuit to detect.	Reduce `Search Watts` setting, increase load above `Search Watts` setting, or disable `Search` on the `Setup` menu. If the AC1 LED is on, check inverter output connections and voltage.

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Problem	Possible cause	Solution
Low AC power output or low surge power. INVERT LED is on. AC inductive loads are not running at full speed.	Insufficient DC current being provided to the inverter to operate the AC loads.	Check the battery voltage, fuses or breakers and cable connections. Make sure the battery bank is sufficient (check for low DC voltage while running the load). Make sure the cable length and size is correct (see the *Installation Guide* for correct cable). Tie the battery cables together to reduce inductance. Apply a load greater than 100W or disable `Power Save` (see Table 3-12, "Advanced Features Menu" on page 3–38).
Inverter goes into invert mode and starts producing AC output and then stops or does not start at all.	`Search Watts` setting is too low or high. Potential problem loads for search mode: • **Incandescent lights** have a higher starting wattage when the filament is cold than the continuous rating of the bulb. • **Fluorescent bulbs** draw little power until the mercury vapor begins to conduct enough current to light the tube. • **Other loads:** Some appliances draw power even when turned off: TVs with instant-on circuits and VCRs, for example.	If the search sensitivity is set higher than the combined loads, then connect an auxiliary load to bring the inverter out of search mode before the appliances can be turned on. If the sensitivity is set lower than the combination of the loads, the loads will remain on and excess battery drain will occur since the inverter won't ever idle. One solution is to turn the item off at the wall, use an extension cord with a rocker switch, a switch at the outlet, or an appropriate circuit breaker.
Load Shaving does not start and stop at the desired times.	A Communications Gateway is installed in the power system. Firmware versions for Xantrex XW Series Inverter/Chargers manufactured prior to April 2008 have an incompatibility with how the Gateway broadcasts the system time when it is configured to use the Network Time Protocol (NTP).	Configure the Communications Gateway to use `Local Settings` for time and date, or consult your dealer to upgrade the Xantrex XW Series Inverter/Charger firmware with the latest available version.

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Problem	Possible cause	Solution
The utility grid is not dropping out, but the unit is disconnecting from the grid.	The AC voltage or frequency provided to the inverter input is outside the AC Setting voltage or frequency range.	Adjust the AC1 voltage and frequency settings (see “AC Settings” on page 3–19). Raise the high voltage and frequency settings, and lower the low voltage and frequency settings.
The inverter connects to the grid and can charge normally. In a grid interactive mode (`Grid Support` enabled), the unit is experiencing excessive anti-islanding faults during periods of high sell amperage.	The impedance of the AC connection to the inverter is too high for the power being sold to the grid. The impedance may be on the high end if the installation is too far from the utility point of common connection or if the wires are too small between the Xantrex XW Series Inverter/Charger and the main service panel.	Measure the grid voltage at the service panel (meter base). It is important to measure L1-N, L2-N, L1-L2, and N-Ground. If these measurements are not within the voltage range for sell mode (see Table A-1 on page A–2), contact your utility for resolution. If these measurements are within the voltage range for sell mode (see Table A-1 on page A–2), the most likely event is that the AC wiring between the inverter and the meter base is not sized appropriately. It should be sized for a 1 to 1.5% voltage drop. Alternately, the `Max Sell Amps` can be reduced until the unit stops disconnecting.

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Battery Charger Troubleshooting

To determine the cause of a charger error condition, refer to the troubleshooting solutions below to resolve the situation.

Problem	Possible Cause	Solution
AC1/AC2 LED is on, but will not start charging	1) Charger is disabled on the `Setup` menu.	1) Enable the charger.
(allow 40 seconds to synchronize).	2) `Charger Block` is enabled and the Xantrex XW Series Inverter/ Charger is inside of the charger block time window.	2) Disable `Charger Block` if you need to override this feature.
	3) The Xantrex XW Series Inverter/ Charger is load shaving.	3) Check the load shave settings. If the load draw from the grid exceeds `Load Shave Amps`, the charger will not operate.
	4) Charger is set for 2-stage charging and has completed a full charge cycle.	4) No action required. The charger comes on when the battery reaches the `ReCharge Volts` setting. Otherwise use the `Force Chg` setting on the device setup menu to force a bulk or float charge.
	5) Battery voltage is below 40 V and AC source could not be qualified.	5) Recharge the batteries with an external battery charger or replace the batteries.

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Problem	Possible Cause	Solution
AC1 or AC2 LED is flashing, but will not start charging (allow 40 seconds to synchronize).	AC voltage and frequency at the AC input terminal are within nominal range, but the inverter output is not yet synchronized to the AC source. There are four possible causes:	
	1) The inverter may already be synchronized to another AC source.	1) The inverter is operating normally.
	2) The AC voltage or frequency applied to the input is outside of the acceptable range of the inverter.	2) Adjust the AC acceptance settings (see “AC Settings” on page 3–19) or possibly service an unstable generator.
	3) AC voltage and frequency at the AC input terminals are within acceptable range, but the inverter is not yet synchronized to the AC source.	3) For 120 V/240 V units, measure voltage in four places on the input of the inverter: L1-N, L2-N, L1-L2, and N-Ground. These readings must be approximately 120, 120, 240, and 0 respectively. Make sure these readings are within the tolerance for AC acceptance and are stable for at least 60 seconds. See Table 3-5 on page 3–19.
	4) A split phase unit may be connected to two legs of three-phase service.	4) Connect the split phase unit to split phase power; use an isolation transformer to create a separately derived neutral; or acquire three or six units, convert them to single phase, and then connect a three-phase system to the three-phase source.
Charger Block does not start and stop at the desired times.	A Communications Gateway is installed in the power system. Firmware versions for Xantrex XW Series Inverter/Chargers manufactured prior to April 2008 have an incompatibility with how the Gateway broadcasts the system time when it is configured to use the Network Time Protocol (NTP).	Configure the Communications Gateway to use `Local Settings` for time and date, or consult your dealer to upgrade the Xantrex XW Series Inverter/Charger firmware with the latest available version.

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Problem	Possible Cause	Solution
Charger amperage drops off before full charging has finished (no Fault LED).	AC frequency at the AC input terminal may be out-of-tolerance (too high or low) or the AC voltage may be outside the `Hi AC Volt` or `Lo AC Volt` settings. AC input voltage approaching the low disconnect level.	Check the settings on the `AC Settings` menu. Check for the correct AC voltage or frequency at the AC input terminal. If the AC source is a generator, adjust the AC voltage or frequency accordingly. Increase the difference between the `Hi AC Volt` (AC1) and `Lo AC Volt` (AC1) settings to allow synchronization.
	The charge settings are incorrectly configured for your battery type.	Select the correct battery type or configure a `Custom` battery type.
	Ambient temperature may be high, causing unit to overheat and ramp down the charging.	Cool the unit down or check for anything preventing air flow around the unit.
Charger stops before full charging (or equalization) has finished. Fault LED flashes and AC output drops momentarily.	Cold temperature around batteries with battery temperature sensor (BTS) installed may be causing unit to reach `High Batt Cut Out` setting.	Disconnect BTS during charging or increase `High Batt Cut Out` setting.
Charger output is low.	Loose or corroded battery connections.	Check and clean all connections.
	Loose AC input connections.	Check and tighten AC wiring connections.
	Worn-out batteries.	Replace batteries.
	Battery cables too small or too long.	Refer to cable and battery recommendations in the *Installation Guide*.

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Problem	Possible Cause	Solution
Batteries being charged above the bulk/float settings.	If BTS is installed, it may be in a cold area or have fallen off the batteries.	Inspect the BTS. Reduce `Batt Temp Comp` on `Custom Battery Settings` menu.
	Another DC charging source may be on the batteries.	NOTE: To bring batteries that are cold to the correct state of charge may require charging at a higher voltage. This may be normal BTS operation. Unplug the BTS and determine if your voltage returns to the bulk/float voltage.

Faults and Warnings

When a fault or warning message appears on the Xantrex XW SCP, you can acknowledge the message to clear the screen. To acknowledge a fault or warning message, press the Enter button. This action does not clear the fault or warning condition, so you should consult Table 4-2 and Table 4-5 for suggested actions after you have acknowledged the message. Refer to the *Xantrex XW System Control Panel Owner's Guide* for more information on faults and warnings.

Warning Messages

Warning messages appear on the Xantrex XW SCP to alert you to an impending system change. You can view 20 most recent warning messages using the Xantrex XW SCP's warning log, accessible from the `View Device Info` menu. Each warning has a time stamp to let you know the date and time that the warning appeared.

If several warning messages occur before you can acknowledge or clear them, they are displayed together on a warning list. This list contains messages from every Xantrex Xanbus-enabled device, not just the Xantrex XW Series Inverter/Charger. You can select a message and view its details from warning list.

To view a message from a warning list:

1. On the list, use the up arrow or down arrow button to highlight the message you want to view.
2. Press Enter.

   The complete message appears.

After viewing the message, you can return to the warning list by pressing Exit or continue to the menu for the device that caused the warning by pressing Enter. Each time you return to the list after viewing a complete message, the viewed message is removed from the list.

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If you have left the warning list, you can view warnings at any time from the `System Settings` menu.

To view a warning list:

1. On the `Select Device` menu, highlight `System` and press Enter.
2. On the `System Settings` menu, highlight `View Warning List`.
3. Press Enter.

Warning Types

There are two types of warnings: automatic and manual. When the Xantrex XW Series Inverter/Charger detects a warning condition, it displays a warning message on the Xantrex XW SCP. Table 4-1 describes how their behavior differs and how you can respond to them when they appear on the Xantrex XW SCP.

Table 4-1 Warning Types and Behavior

Warning type	Behavior
Automatic warning	Clear automatically if the fault condition that generated the message goes away. You can also acknowledge automatic warnings without waiting for them to clear automatically.
Manual warning	Require you to acknowledge them before you can proceed with configuring or operating the Xantrex XW Series Inverter/Charger. Manual warnings are usually in the form of a Yes/No question that you may acknowledge by pressing the Enter button on the Xantrex XW SCP for Yes and the Exit button for No. Refer to the *Xantrex XW System Control Panel Owner's Guide* for more information.

Table 4-2 provides descriptions of the warning messages and solutions.

Table 4-2 Warning Messages

Warning Number	Xantrex XW System Control Panel Message	Warning Type	Cause	Solution
W44	Battery Over Temperature	Automatic	Battery Over Temperature Warning. Battery temperature is over 50 °C (122 °F).	Check battery voltage and battery cable connections. Stop charging, if necessary. Check for excessive ambient temperature and adequate ventilation in the battery compartment
W45	Capacitor over temperature	Automatic	DC Bulk Capacitor over temperature (100 °C/ 212 °F)	Ensure adequate ventilation around the Xantrex XW Series Inverter/Charger. Reduce the AC loads.

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Table 4-2 Warning Messages

Warning Number	Xantrex XW System Control Panel Message	Warning Type	Cause	Solution
W48	DC Under Voltage	Automatic	Battery voltage is below 47 V (48 V systems) or 23.5 V (24 V systems).	Check for the correct battery voltage at the inverter's DC input terminals. Check for an external DC load on the batteries. Check condition of batteries and recharge if possible or reduce your Low Batt Cut Out setting.
W49	DC Over Voltage	Automatic	Battery voltage is above 68 V (48 V systems).	Turn off or check additional charging sources to batteries. Check battery cables. Check for the correct battery voltage at the inverter's DC input terminals. Ensure your DC source is regulated below your high battery cut out or increase your High Batt Cut Out setting.

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Table 4-2 Warning Messages

Warning Number	Xantrex XW System Control Panel Message	Warning Type	Cause	Solution
W57	FET1 Over Temperature	Automatic	Internal temperature is over 85 °C (185 °F).	
			AC input voltage may be too high while charging.	Check for high input AC voltage.
			Operating too large of a load for too long while inverting.	Remove excessive loads.
			Ambient temperature may be high.	Let inverter cool down and try restarting.
			Inverter cooling fan may have failed.	Hold a piece of paper to inverter vents to check the fan. If the fan has failed, have the inverter serviced.
			Inverter airflow intake may be blocked.	Increase clearance around the inverter or unclog the fan air intake.
			Charging setting is too high based on ambient temperature around inverter.	Lower the Max Charge Rate setting.
W58	FET2 Over Temperature	Automatic	See W57.	See W57.
W63	AC Overload	Automatic	Excessive load on the AC output.	Check for loads above the inverter's capacity. Turn off some loads if necessary.
W64	AC Overload	Automatic	See W63.	See W63.
W68	Transformer Over Temperature	Automatic	See W57.	See W57.

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Table 4-2 Warning Messages

Warning Number	Xantrex XW System Control Panel Message	Warning Type	Cause	Solution
W94	Remote Power Off	Automatic	The unit has been turned off with a Remote Power Off switch.	No action required. The unit stops inverting or charging immediately, and shuts down after five seconds. If the unit is configured as a master, it signals other network devices to also shut down.
W95	Equalize Abort	Manual	Equalization terminated abnormally because of interrupted AC input.	Wait until AC input (utility grid) returns to in-tolerance condition.
W96	Cannot Equalize	Manual	The selected battery type should not be equalized.	Change battery type if your batteries should be equalized. Gel or AGM batteries should not be equalized.
			AC input is not qualified or the charge setting is not adequate.	Check for presence of AC. Make sure `Charge` and `Equalize` are enabled. Verify the Xantrex XW AGS trigger is set to `Stop Float`. If `Stop V` is enabled, then the voltage level should be above the `Eqlz Voltage` level.
W97	Battery temp sensor failure.	Automatic	Battery Temperature Sensor Shorted	Replace battery temperature sensor.
W500	Lost network connection	Automatic	Lost network connection	Check network cables.
W501	Inv/Chg is trying to fix a memory problem	Manual	Non-volatile memory warning	Normal operation may return or may go to fault. Turn Xantrex XW Series Inverter/Charger off and on to resume normal operation.

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Fault Messages

When the Xantrex XW Series Inverter/Charger detects a fault condition, the fault is displayed on the Xantrex XW System Control Panel. The Xantrex XW Series Inverter/Charger also illuminates the Fault light on the Xantrex XW System Control Panel and inverter information panel. A fault affects the operation of the unit. See “Fault Types” on page 4–17 for an explanation of the different fault types.

You can view the 20 most recent fault messages on the Xantrex XW System Control Panel by selecting Fault Log from the Device Info menu in the Xantrex XW Series Inverter/Charger Setup Menu.

If several faults occur before you can acknowledge or clear them, they are displayed together on a fault list. This list contains messages from every Xanbus-enabled device, not just the Xantrex XW Series Inverter/Charger. You can select a message and view its details from the fault list.

To view a message from a fault list:

1. On the list, use the up arrow or down arrow button to highlight the message you want to view.
2. Press Enter.

   The complete message appears.

After viewing the message, you can return to the fault list by pressing Exit or continue to the menu for the device that caused the fault by pressing Enter. Each time you return to the list after viewing a complete message, the viewed message is removed from the list.

If you have left the fault list, you can view faults at any time from the System Settings menu.

To view a fault list:

1. On the Select Device menu, highlight System Settings and press Enter.
2. On the System Settings menu, highlight View Fault List.
3. Press Enter.

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Fault Types

There are three types of fault messages: automatic faults, manual faults, and escalating automatic faults. Table 4-3 describes how they differ in their behavior and how you can respond to them when they appear on the Xantrex XW System Control Panel.

Table 4-3 Fault Types and Behaviors

Fault type	Behavior
Automatic faults	Clear automatically if the fault condition that generated the message goes away. You can also acknowledge automatic faults without waiting for them to clear automatically.
Manual faults	Require you to clear them by: • selecting Clear Faults on the Main Xantrex XW Series Inverter/Charger menu or on the menu for the Xantrex Xanbus-enabled device that generated the fault (if the fault condition still exists, the fault message reappears) • correcting the condition that caused the fault.
Escalating automatic faults	Clear automatically if the fault condition goes away, just like an automatic fault. However, if an escalating automatic fault occurs several times within a defined time period, the escalating automatic fault becomes a manual fault, requiring user intervention. For example, if an AC Overload fault occurs three times in five minutes, it will no longer clear itself and become a manual fault. Then you must identify the problem, correct the fault condition, and clear the fault.

Inverter Operation After Faults

Xantrex XW Series Inverter/Charger operation changes when a fault occurs. How the operation changes depends on the operating state of the unit when the fault occurred—inverting, charging, grid or generator support, AC bypass, and so on—and on which fault has occurred.

Table 4-4 Inverter Operation After Faults

Faults	State when Faults Occur	Action After Faults
F1, F2: AC Output	Inverting	Unit stops inverting and waits for nominal AC output voltage level, or a manual clear from user.
F17 to F22: Relay Welded	Inverting	Unit stops inverting and waits for user to clear fault.

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Table 4-4 Inverter Operation After Faults

Faults	State when Faults Occur	Action After Faults
F23 to F40: Anti-Islanding	Grid Support (Peak Load Shaving or Selling)	Moves to AC bypass and waits for nominal grid conditions to return for a minimum of five minutes.
F41, F42: Aux power supply voltage	Unit has qualified AC input.	Unit shuts down and waits for nominal AC output voltage level, or a manual clear from user.
F44: Battery Over Temp F45: Capacitor Over Temp	Any state.	If inverting, the unit shuts down and waits for the temperature to return to nominal value. If in any of the AC-interactive states (charging, peak load shaving, sell, gen support), the unit goes into AC bypass mode until the temperature returns to the nominal value. If the unit is not in AC bypass, it shuts down until the temperature returns to nominal value. After these faults clear, the unit returns to its previous operating state.
F47 to F49: DC Under Voltage and Over Voltage	Unit is inverting or has qualified AC input and is preparing to charge.	If inverting, the unit shuts down and waits for nominal voltage. If operating with a qualified AC source, the unit charges if charging is enabled, or remains in AC bypass if charging is disabled.
F63 to F65: AC Overload	Inverting or Grid Support	Unit stops inverting and waits to qualify AC. Unit waits for user to manually clear fault.

Table 4-5 provides descriptions of the fault messages and solutions. If you are unable to resolve the problem after referring to this table, contact your dealer or Customer Service.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F1	AC Output Under Voltage	Escalating Auto Fault. Must occur 3 times in 2 minutes before becoming a manual fault.	AC under-voltage shutdown at 108 V. The inverter has shut down to protect the loads.	Clear the fault and attempt restart. If problem persists, call customer service.
F2	AC Output Over Voltage	Escalating Auto Fault. Must occur 3 times in 30 seconds before becoming a manual fault.	AC over-voltage shutdown at 135 V. The inverter has shut down to protect the loads.	Clear the fault and attempt restart. If problem persists, call customer service.
F17	Relay(s) Welded	Manual	The AC1 L1 transfer relay is bad or an AC source was wired directly to the AC output.	Disconnect the inverter's output wiring. If error continues, have unit serviced.
F18	Relay(s) Welded	Manual	AC1 L2 transfer relay is bad or an AC source was wired directly to the AC output.	See F17.
F19	Relay(s) Welded	Manual	AC2 L1 transfer relay is bad or an AC source was wired directly to the AC output.	See F17.
F20	Relay(s) Welded	Manual	AC2 L2 transfer relay is bad or an AC source was wired directly to the AC output.	See F17.
F21	Relay(s) Welded	Manual	An unidentified transfer relay is bad or an AC source was wired directly to the AC output.	See F17.
F22	Relay(s) Welded	Manual	An unidentified L1 transfer relay is bad or an AC source was wired directly to the AC output.	See F17.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F23	AI Over Frequency	Automatic	Over-frequency anti-islanding, caught by the AC qualification limit.	No action required. The inverter stops selling and disconnects from the grid. When the fault clears, a five-minute timer begins counting down. The inverter does not sell again until grid voltage and frequency are within range for five minutes.
F24	AI Under Frequency	Automatic	Under-frequency anti-islanding, caught by the AC qualification limit.	See F23.
F25	AI Over Frequency	Automatic	Over-frequency anti-islanding.	See F23.
F26	AI Under Frequency	Automatic	Under-frequency anti-islanding.	See F23.
F27	AI L1 Over Voltage	Automatic	Over-voltage anti-islanding, fast disconnect, 135 VAC.	See F23.
F28	AI L2 Over Voltage	Automatic	See F27.	See F23.
F29	AI L1L2 Over Voltage	Automatic	Over-voltage anti-islanding fault, caught by the qualification limit, voltage difference between L1 and L2.	See F23.
F30	AI L1L2 Over Voltage	Automatic	Over-voltage anti-islanding, fast disconnect, 270 V.	See F23.
F31	AI L1 Over Voltage	Automatic	Over-voltage anti-islanding, slow disconnect, 130 V.	See F23.
F32	AI L2 Over Voltage	Automatic	Over-voltage anti-islanding, slow disconnect, 130 V.	See F23.
F33	AI L1L2 Over Voltage	Automatic	Over-voltage anti-islanding, slow disconnect, 260 V.	See F23.
F34	AI L1 Under Voltage	Automatic	Under-voltage anti-islanding, slow disconnect, 108 V.	See F23.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F35	AI L2 Under Voltage	Automatic	See F34.	See F23.
F36	AI L1L2 Under Voltage	Automatic	See F34.	See F23.
F37	AI L1 Under Voltage	Automatic	Under-voltage anti-islanding, fast disconnect, 66 VAC.	See F23.
F38	AI L2 Under Voltage	Automatic	See F37.	See F23.
F39	AI L1L2 Under Voltage	Automatic	Under-voltage anti-islanding fault, caught by the qualification limit, voltage difference between L1 and L2.	See F23.
F40	AI L1L2 Under Voltage	Automatic	Under-voltage anti-islanding, fast disconnect, 132 V.	See F23.
F41	APS Under Voltage	Escalating Auto Fault. Must occur 3 times in 30 seconds before becoming a manual fault.	Auxiliary power supply under-voltage shutdown	Clear the fault and attempt restart. If problem persists, call customer service.
F42	APS Over Voltage	Escalating Auto Fault. Must occur 3 times in 30 seconds before becoming a manual fault.	Auxiliary power supply over-voltage shutdown	Clear the fault and attempt restart. If problem persists, call customer service.
F44	Battery Over Temperature	Automatic	Battery over- temperature shutdown at 60 °C.	Clear the fault and attempt restart. Stop charging, check battery voltage and temperature. Check for excessive ambient temperature and adequate ventilation in the battery compartment.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F45	Capacitor Over Temperature	Automatic	Capacitor over-temperature shutdown at 105 °C.	Clear the fault and attempt restart. Ensure adequate ventilation around the Xantrex XW Series Inverter/Charger. Reduce AC loads.
F46	Controller fault	Manual	Controller fault	Service required.
F47	DC Under Voltage	Automatic	DC under-voltage shutdown (immediate) occurs if DC voltage is below 16 VDC (24 V system) or 32 VDC (48 V system). The fault clears and the inverter restarts when DC voltage reaches V_{LBCO}+2 V (24 V system) and V_{LBCO}+4 V (48 V system).	Check for the correct battery voltage at the inverter's DC input terminals. Check for an external DC load on the batteries. Check condition of batteries and recharge if possible.
F48	DC Under Voltage	Automatic	DC under-voltage shutdown occurs if DC voltage is below LBCO voltage level.	See F47.
F49	DC Over Voltage	Escalating Auto Fault.	DC over-voltage shutdown. Occurs if DC voltage is above 35 VDC (24 V) or 70 VDC (48 V). The fault can occur when batteries are disconnected at the DC breaker while the Xantrex XW Series Inverter/ Charger is operating.	Clear the fault and attempt restart. Ensure battery voltage is below 29 VDC (24 V) or 58 VDC (48 V) at Xantrex XW Series Inverter/ Charger terminals. Check all other charging source outputs, battery cables. Ensure that batteries are connected, or that your DC source is regulated below your high battery cut out or increase your `Hi Batt Cut Out` setting.
F52	EEPROM Error	Manual		No action. Clear fault and resume operating or configuring the unit. If the fault persists, have the unit serviced.
F53	EEPROM Error	Manual		See F52.
F54	EEPROM Error	Manual		See F52.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F55	EEPROM Error	Manual		See F52.
F56	EEPROM Error	Manual		See F52.
F57	FET1 Over Temperature Shutdown	Automatic	Internal temperature is over 105 °C.	Fault clears when temperature drops to 75 °C.
			AC input voltage may be too high while charging.	Check for high input AC voltage.
			Operating too large of a load for too long while inverting.	Remove excessive loads.
			Ambient temperature may be high.	Let inverter cool down and try restarting.
			Inverter cooling fan may have failed.	Hold a piece of paper to inverter vents to check the fan. If the fan has failed, have the inverter serviced.
			Inverter airflow intake may be blocked.	Increase clearance around the inverter or unclog the fan air intake.
			Charging setting is too high based on ambient temperature around inverter.	Lower the Max Charge Rate setting.
F58	FET2 Over Temperature Shutdown	Automatic	See F57.	See F57.
F59	GOCFG process failed	Manual	Auto-configuration process failed.	Retry the Copy From? procedure, or configure the unit manually.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F63	AC Overload	Escalating Auto Fault. Must occur 3 times in 5 minutes before becoming a manual fault.	Excessive load on the AC output.	Check for loads above the inverter's capacity. Turn off some loads if necessary.
F64	AC Overload L1	Escalating Auto Fault. Must occur 3 times in 5 minutes before becoming a manual fault.	Excessive load on the AC output.	See F63
F65	AC Overload L2	Escalating Auto Fault. Must occur 3 times in 5 minutes before becoming a manual fault.	Excessive load on the AC output.	See F63.
F66	System Configuration Fault	Automatic	Multi-Unit Configuration settings are incorrect.	Ensure only one unit is configured as the master. Ensure each unit has a unique Device Number, and that Connections have been configured correctly. See "Connections Menu" on page 3–34.
F67	Watchdog Error	Manual		Service required.
F68	Transformer Over Temperature	Automatic	The transformer temperature is over 140 °C.	The fault clears when the transformer temperature falls to 125 °C. Ensure adequate ventilation around the Xantrex XW Series Inverter/Charger. Reduce AC loads.

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Table 4-5 Fault Messages

Fault Number	Message	Fault Type	Cause	Solution
F69	External Sync Failed	Manual		Check connections and cable on external AC sync port. In a single-inverter system, nothing must be plugged into the AC sync port. Clear fault and try again. If these steps fail, the unit requires service.
F70	Synchronization Fault	Manual, AC input is not qualified	1. An AC input voltage phase is lost or out of the AC range in the three-phase. 2. AC input voltage phases are not synchronized with Xantrex XW 3-phase system.	1. Check the AC voltage presence of each phase at the AC input terminals for each Xantrex XW Series Inverter/Charger. 2. Inspect the three-phase wiring to have the correct phase sequence: XW-Phase-A., XW-Phase-B, XW-Phase-C with the same AC input sequence to each unit.
F500	Silicon Serial ID Failure	Manual	Silicon Serial ID Failure	Service required.

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A Specifications

Appendix A, “Specifications” provides the electrical and mechanical specifications for the Xantrex XW Series Hybrid Inverter/Charger.

Electrical Specifications

Table A-1 Xantrex XW Series Hybrid Inverter/Charger Electrical Specifications

	Xantrex XW6048 120/240 60	**Xantrex XW4548 120/240 60**	**Xantrex XW4024 120/240 60**
Continuous Output Power	6,000 W	4,500 W	4,000 W
Surge Rating	12,000 W (15 s)	9,000 W (20 s)	8,000 W (20 s)
Surge Current	L-N: 105 A_{rms} (15 s) L-L: 52.5 A_{rms} (15 s)	L-N: 75 A_{rms} (20 s) L-L: 40 A_{rms} (20 s)	L-N: 70 A_{rms} (20 s) L-L: 35 A_{rms} (20 s)
Waveform	True Sine Wave		
Idle Consumption—invert mode, no load	28 W	26 W	24 W
Idle Consumption—search mode	< 8 W		
AC Output Voltage	L-N: 120 VAC ±3% L-L: 240 VAC ±3%		
AC Input voltage range (Bypass/Charge Mode)	L-N: 78–140 VAC (120 V nominal) L-L: 160–270 VAC (240 V nominal)		
AC Input Breaker	60 A double-pole		
AC Input Frequency Range (Bypass/Charge Mode)	55–65 Hz (default) 44–70 Hz (allowable)		
AC1 voltage range–Sell Mode[a] (automatically adjusts when entering Sell Mode)	L-N: 105.6–132 ±1.5 VAC L-L: 211.6–264 ±3.0 VAC		
AC1 frequency range–Sell Mode[a] (automatically adjusts when entering Sell Mode)	59.4–60.4 ±0.05 Hz		
AC Output Current (maximum 75% imbalance between L1-N, L2-N) in Inverter Mode	L-N: 37.5 A L-L: 25.0 A	L-N: 28.1 A L-L: 18.8 A	L-N: 25.0 A L-L: 16.7 A
AC Output Breaker	60 A double-pole		
AC Output Frequency	60.0 ±0.1 Hz		
Total Harmonic Distortion	< 5% at rated power		
Automatic Transfer Relay	60 A		
Auxiliary Relay Output	0–12 VDC, maximum 250 mA DC		
Peak Efficiency	95.4%	95.6%	94.0%
CEC Weighted Efficiency	92.5%	93.0%	91.0%
CEC Power Rating	6,000 W[b] 5,760 W[c]	4,400 W	4,000 W
DC Input Voltage (Nominal)	50.4 VDC	50.4 VDC	25.2 VDC
DC Input Voltage Range	40–64 VDC	40–64 VDC	20–32 VDC
DC Current at Rated Power	130 A	96 A	178 A
Continuous Charge Rate at L-L voltage	100 A	85 A	150 A
Power Factor Corrected Charging	PF (0.98)		

a.This unit or system is provided with fixed trip limits and shall not be aggregated above 30 kW on a single Point of Common Connection
b.Xantrex XW6048-120/240-60 (Part Number 865-1000)
c.Xantrex XW6048-120/240-60 (Part Number 865-1000-01)

Xantrex XW Series Inverter/Charger Overload Capability

Loads connected to the inverter are seldom constant, and large loads are often operated for short periods. To accommodate larger loads, the Xantrex XW Series Inverter/Charger can temporarily exceed its continuous output power rating. The graphs below illustrate approximate operation time versus load.

Inverter operation time during overload is limited by both inverter internal temperature protection and by the product of AC output current and elapsed time.

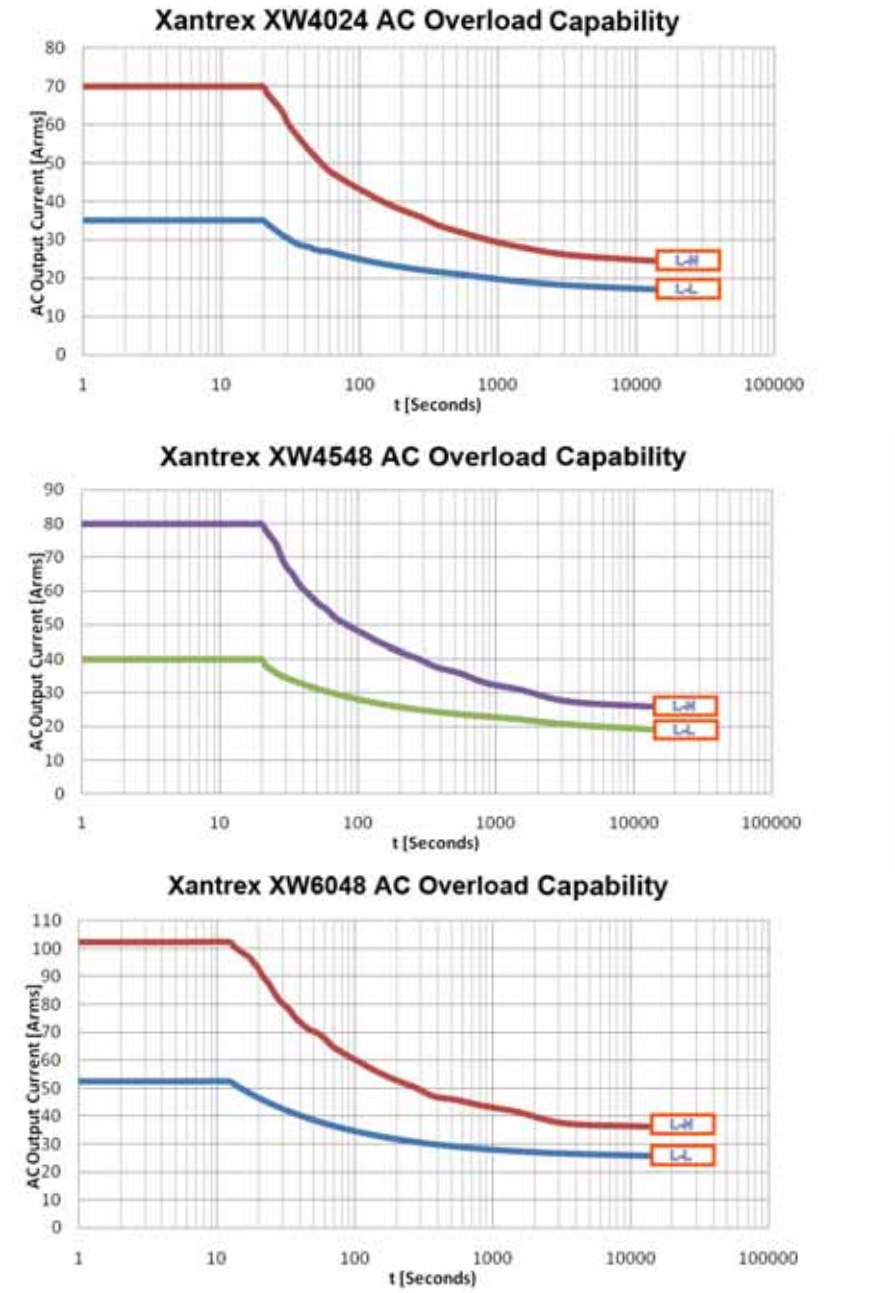

Figure A-1 Xantrex XW Series Inverter/Charger AC Overload Capability

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Output Power Versus Ambient Temperature

When the internal temperature of the Xantrex XW Series Inverter/Charger exceeds a preset limit, it begins to limit output power automatically to ensure maximum internal temperatures are not exceeded.

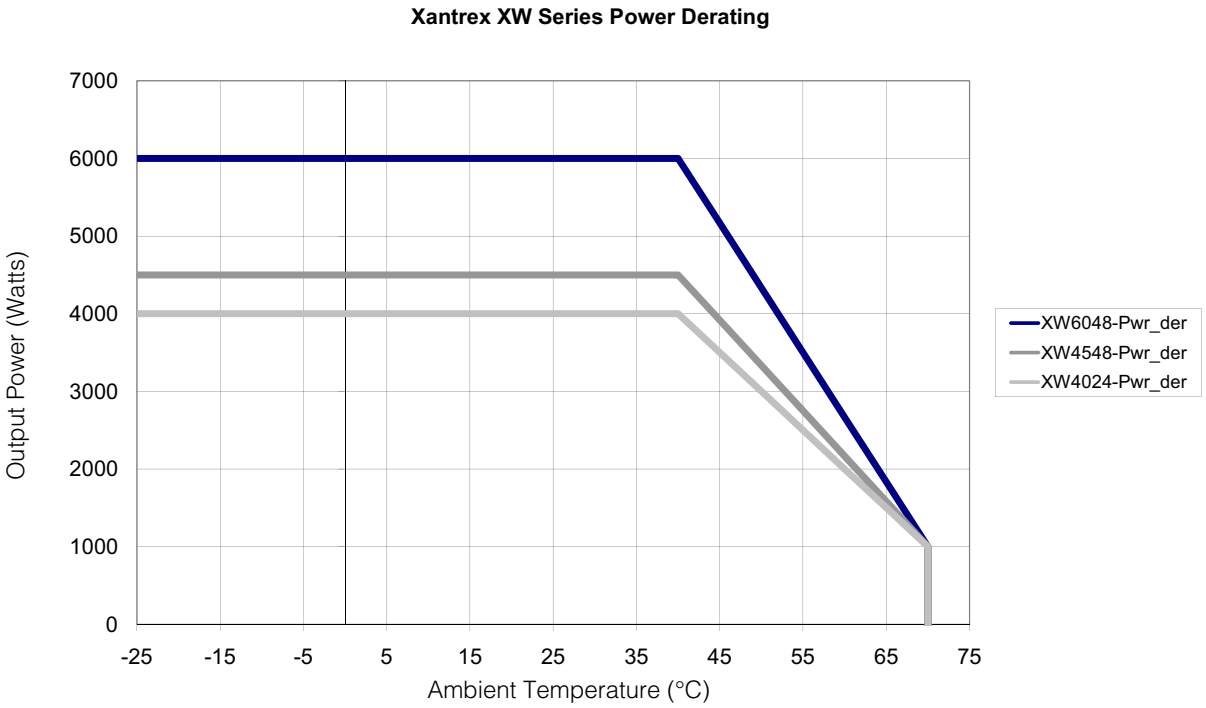

Figure A-2 Output Power Versus Ambient Temperature

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Xantrex XW Series Inverter/Charger Efficiency

Inverting Efficiency (Typical)

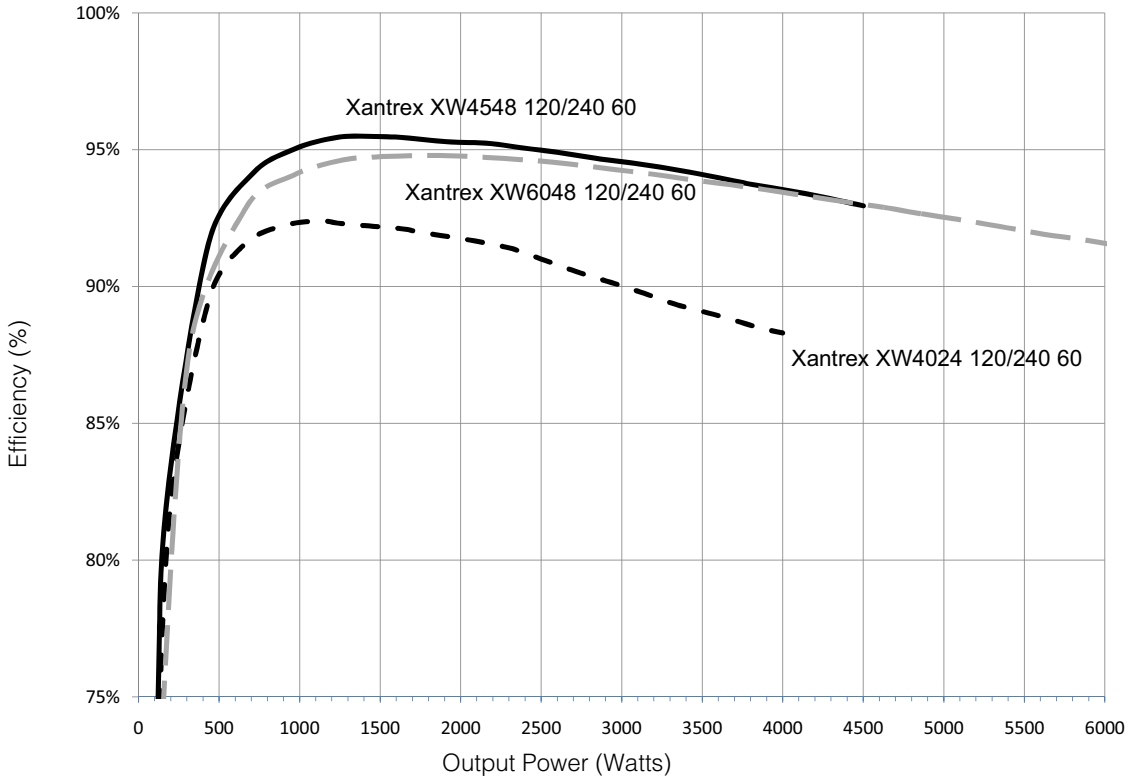

Figure A-3 Inverting Efficiency (Typical)

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Charging Efficiency (Typical)

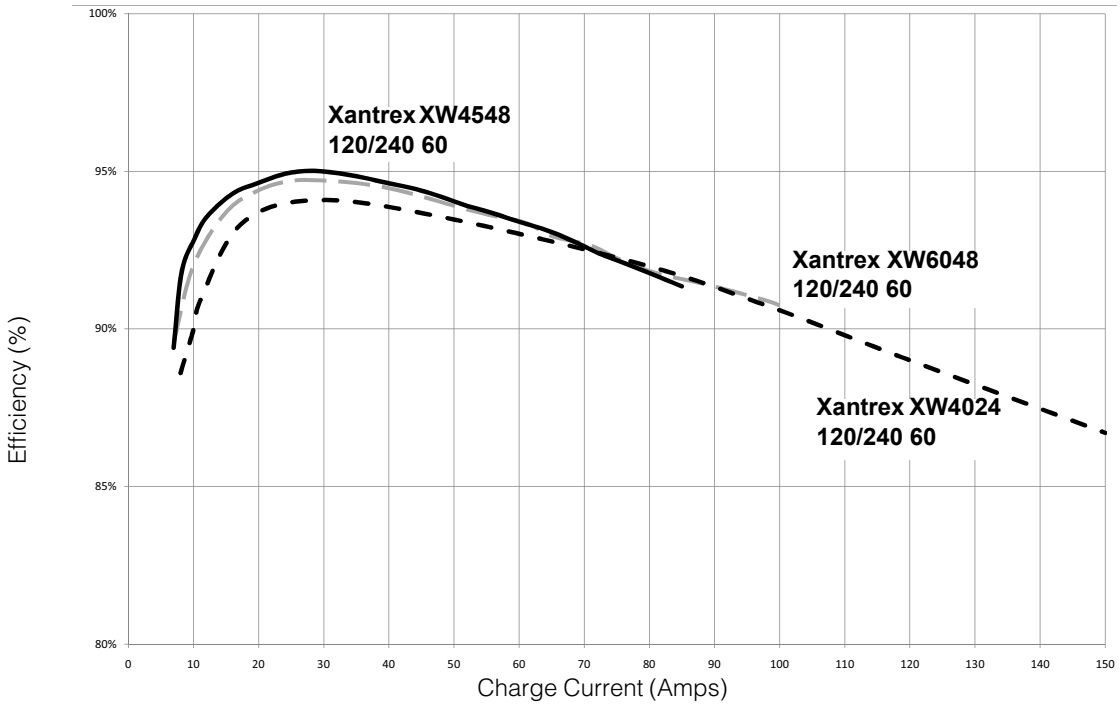

Figure A-4 Charging Efficiency (Typical)

Charging Efficiency (Power Factor)

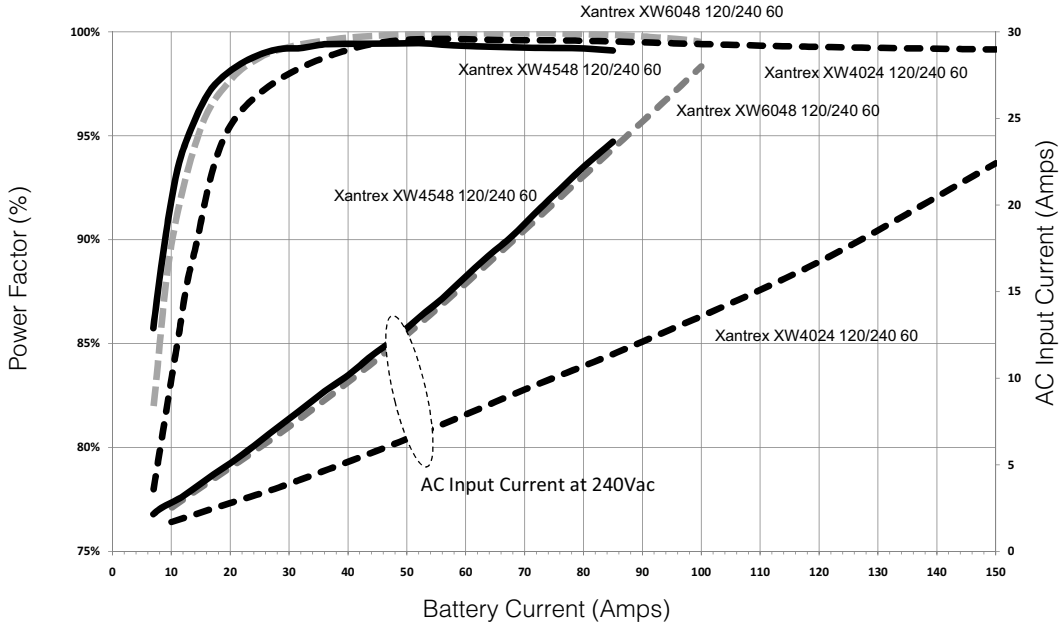

Figure A-5 Charging Efficiency (Power Factor)

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Grid-Tie Sell Mode Efficiency (Typical)

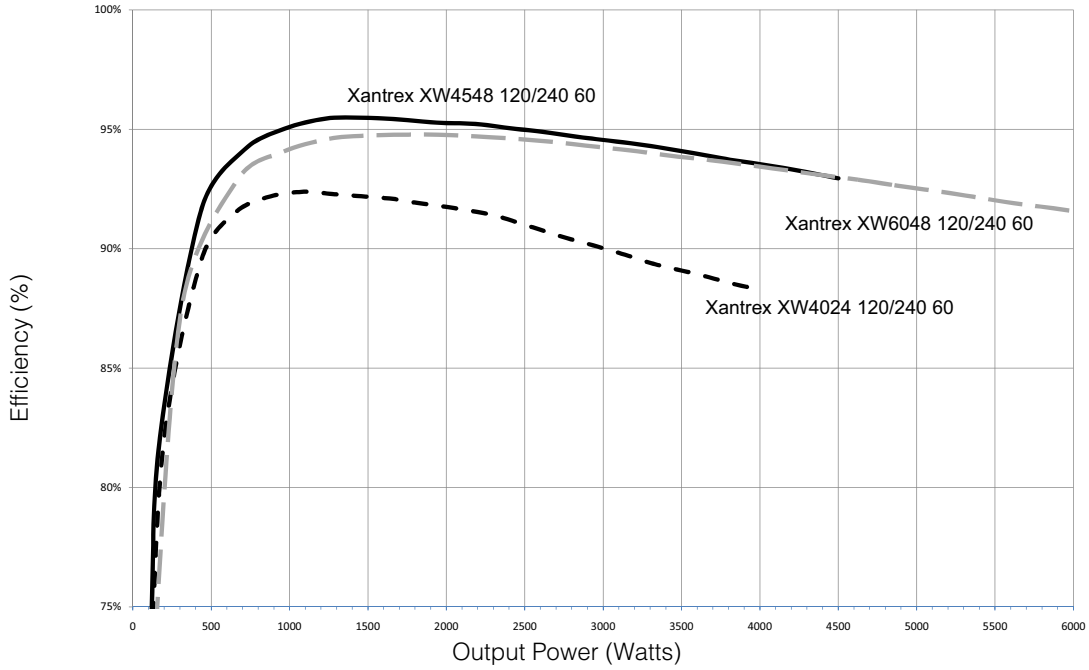

Figure A-6 Grid-Tie Sell Mode Efficiency (Typical)

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Mechanical Specifications

Table A-2 Xantrex XW Series Hybrid Inverter/Charger Mechanical Specifications

Model	**Xantrex XW6048 120/240 60**	**Xantrex XW4548 120/240 60**	**Xantrex XW4024 120/240 60**
Supported Battery Types	Flooded (default), Gel, AGM, Custom		
Battery bank size	0–10000 Ah		
Non-Volatile Memory	Yes		
Inverter Information Panel	Status LEDs indicate AC In status, faults/warnings, equalize mode, battery level. 3-character display indicates output power or charge current, fault/warning codes. ON/OFF and equalize button		
Multiple Unit Configurations	Up to 4 parallel units in 120/240 three-wire, single-phase configuration		
System Network	Xantrex Xanbus (publish-subscribe network, no need for hubs or special cards)		
Emissions	FCC Class B		
Regulatory approvals	UL 1741 1st Edition: 2005 Version, CSA 107.1-01		
Enclosure Type	NEMA Type 1—Indoor		
Rated Temperature Range (meets all specifications)	32–104 °F (0–40 °C)		
Operational Temperature Range	-13–158 °F (-25–70 °C)		
Storage Temperature Range	-40–185 °F (-40–85 °C)		
Inverter Dimensions (H × W × D)	23 × 16 × 9" (580 × 410 × 230 mm)		
Shipping Dimensions (H × W × D)	28 × 22 ½ × 15 ½" (711 × 572 × 394 mm)		
Inverter Weight	125 lb (57 kg)	115 lb (52 kg)	115 lb (52 kg)
Shipping Weight	132 lb (60 kg)	122 lb (55 kg)	122 lb (55 kg)

Accessories

Accessory	**Part Number**
Xantrex XW Power Distribution Panel	865-1015
Conduit Box	865-1025
Inverter #2 Connection Kit	865-1020
Xantrex XW Solar Charge Controller	865-1030-1
Xantrex XW System Control Panel	865-1050
Xantrex XW Automatic Generator Start	865-1060
Network cables	3 ft (0.9 m): 809-0935 25 ft (7.6 m): 809-0940 75 ft (22.9 m): 809-0942
Network terminators	Available on request

B Default Settings

Appendix B contains the default configuration settings and ranges for the Xantrex XW Series Hybrid Inverter/Charger. Configuration settings can be viewed and changed using the Xantrex XW System Control Panel.

Default Settings and Ranges

Figure B-1 shows how the Xantrex XW Series Inverter/Charger configuration menus are organized in the Xantrex XW System Control Panel.

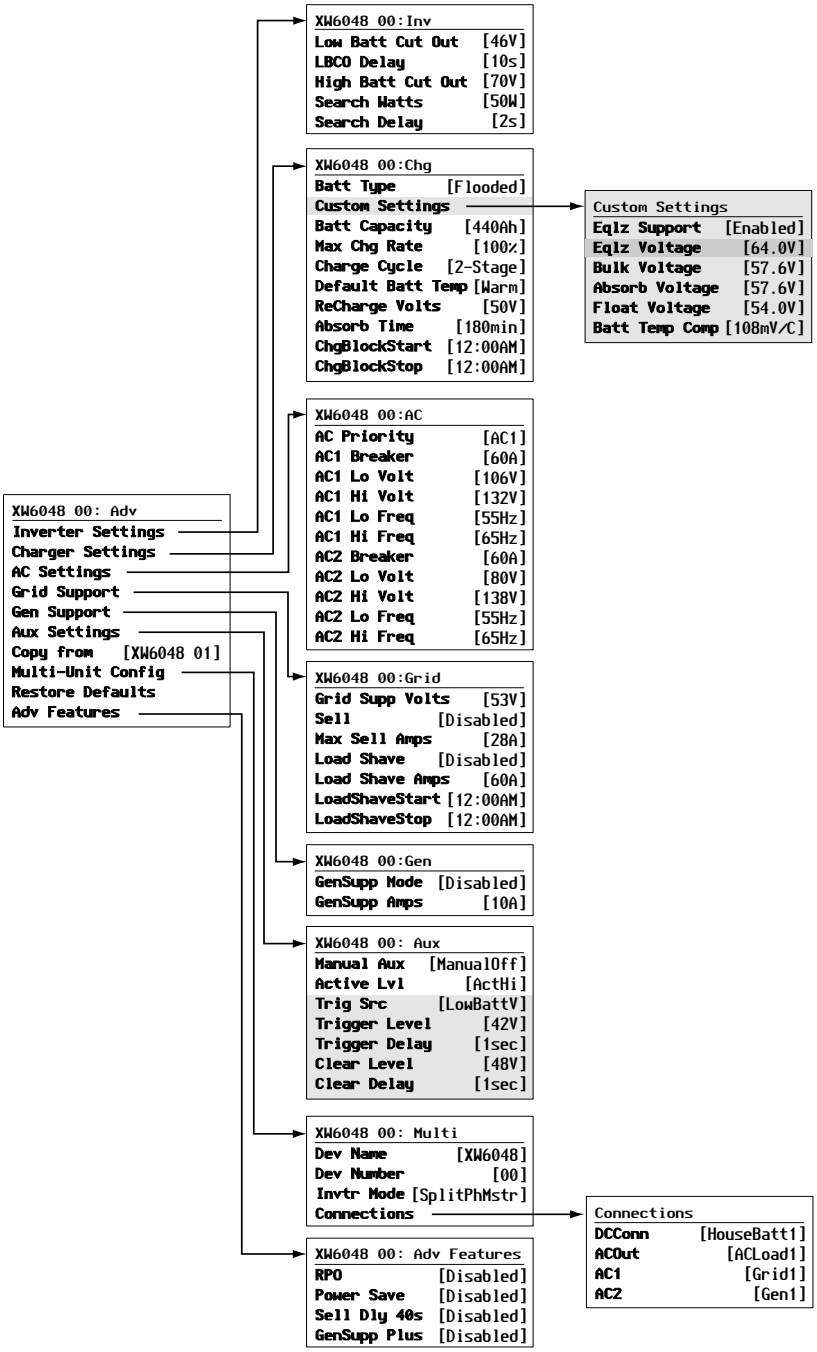

Figure B-1 Configuration Menu Map (Advanced)

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Inverter Menu

Item	Default Setting		Range		Step Size
	24 V	48 V	24 V	48 V	
Low Batt Cut Out	23V	46V	20–24V	40–48V	0.1
LBCO Delay	10s		0–600s		1
High Batt Cut Out	35V	70V	29–35V	58–70V	0.1
Search Watts	50W		25–255W		5
Search Delay	2s		1–25s		1

Charger Menu

Item	Default Setting		Range		Step Size
	24 V	48 V	24 V	48 V	
Batt Type	Flooded		Flooded, Gel, AGM, Custom		n/a
Batt Capacity	440Ah		0–10000Ah[a]		1
Max Chg Rate	100%		5–100%		1
Charge Cycle	2-Stage		2-Stage, 3-Stage		n/a
Default Batt Temp	Warm		Cold, Warm, Hot		n/a
ReCharge Volts	25.0V	50.0V	20.0–26.5V	40.0–53.0V	0.1
Absorb Time	180min		1–480min		1
Chg Block Start	12:00 AM		12:00 AM–11:59 PM, 00:00–23:59		1
Chg Block Stop	12:00 AM		12:00 AM–11:59 PM, 00:00–23:59		1

a.Setting the battery capacity to 0 will reset the charging current to its default values. Zero Ah battery capacity implies there is no absorption exit current criteria and absorption only exits when the absorption timer (default 3 hrs, range 1 min-8 hr) expires.

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Custom Battery Menu

Item	Default Setting[a]		Range		Step Size
	24 V	48 V	24 V	48 V	
Eqlz Support	Enabled	Enabled	Enabled, Disabled		n/a
Eqlz Voltage	32.0V	64.0V	27.0–32.0V	54.0–64.0V	0.1
Bulk Voltage	28.8V 28.4V (Gel) 28.6V (AGM)	57.6V 56.8V (Gel) 57.2V (AGM)	20.0–32.0V	40.0–64.0V	0.1
Absorb Voltage	28.8V 28.4V (Gel) 28.6V (AGM)	57.6V 56.8V (Gel) 57.2V (AGM)	20.0–32.0V	40.0–64.0V	0.1
Float Voltage	27V 27.6V (Gel) 26.8V (AGM)	54.0V 55.2V (Gel) 53.6V (AGM)	20.0–32.0V	40.0–64.0V	0.1
Batt Temp Comp	54mV/C (Flooded, Gel) 42mV/C (AGM)	108mV/C (Flooded, Gel) 84mV/C (AGM)	0–90mV/C	0–180mV/C	1

a.Custom battery default settings are based on the Flooded battery default settings. The Gel and AGM default settings are provided here for reference only.

AC Menu

Item	Default Setting		Range		Step Size
	120 VAC	240 VAC	120 VAC	240 VAC	
AC Priority	AC1		AC1, AC2		n/a
AC1 Breaker	60A		3–60A		1
AC1 Lo Volt	106V	212V	78–115V	156–230V	1
AC1 Hi Volt	132V	264V	125–140V	250–280V	1
AC1 Lo Freq	55Hz		44–59Hz		1
AC1 Hi Freq	65Hz		61–70Hz		1
AC2 Breaker	60A		3–60A		1
AC2 Lo Volt	80V	160V	78–115V	156–230V	1
AC2 Hi Volt	138V	276V	125–140V	250–280V	1
AC2 Lo Freq	55Hz		44–59Hz		1
AC2 Hi Freq	65Hz		61–70Hz		1

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Grid-tie Specifications

	120 V/240 V	120 V	Response Time
Anti-islanding reconnect	254.4 V (± 3 V)	127.2 V (± 3 V)	300 s (+1/–0 s)
Over frequency disconnect	60.5 Hz (± 0.05 Hz)	60.5 Hz (± 0.05 Hz)	60 ms (± 20 ms)
Under frequency disconnect	59.3 Hz (± 0.05 Hz)	59.3 V (± 0.05 Hz)	60 ms (± 20 ms)
Over voltage LN fast disconnect	135 V (± 1.5 V)	135 V (± 1.5 V)	60 ms (± 25 ms)
Over voltage LN slow disconnect	132 V (± 1.5 V)	132 V (± 1.5 V)	500 ms (± 25 ms)
Over voltage L1/L2 fast disconnect	270 V (± 3 V)	–	60 ms (± 25 ms)
Over voltage L1/L2 slow disconnect	264 V (± 3 V)	–	500 ms (± 25 ms)
Under voltage LN fast disconnect	75 V (± 5 V)	75 V (± 5 V)	100 ms (± 25 ms)
Under voltage LN slow disconnect	105.6 V (± 1.5 V)	105.6 V (± 1.5 V)	1000 ms (± 25 ms)
Under voltage L1/L2 slow disconnect	211.2 V (± 3 V)	–	100 ms (± 25 ms)
Under voltage L1/L2 fast disconnect	150 V (± 10 V)	–	60 ms (± 25 ms)

Grid Support Menu

	Default		Range		Step Size
Item	24 V	48 V	24 V	48 V	
Grid Supp Volts	26.5V	53.0V	23.0–35.0V	46.0–70.0V	0.1
Max Sell Amps[a]	18A (865-1010) 36A (865-1010-01)	27A (865-1000), 20A (865-1005) 48A (865-1000-01)	0–18A (865-1010) 0–36A (865-1010-01)	0–27A (865-1000), 0–20A (865-1005) 0–48A (865-1000-01)	1
Load Shave Amps	48A		5–48A		1
Load Shave Start[b]	12:00 AM		12:00 AM–11:59 PM, 00:00–23:59		1
Load Shave Stop	12:00 AM		12:00 AM–11:59 PM, 00:00–23:59		1

a.This setting is restricted to the selected AC1 breaker size.
b.When Load Shaving is enabled, if Load Shave Start and Load Shave Stop are set to the same time, the Xantrex XW Series Inverter/Charger load shaves continuously.

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Gen Support Menu

Setting	Default	Range	Step Size
GenSupp Mode	Disabled	Enabled, Disabled	n/a
GenSupp Amps	48A	0–48A	1

Aux Menu

Item	Default		Range		Step Size
	24 V	48 V	24 V	48 V	
Manual Aux	ManualOff		ManualOn, ManualOff, Automatic		n/a
Active Lvl	ActiveHigh		ActiveHigh, ActiveLow		n/a
Trigger Src[a]	LowBattV		LowBattV, HighBattV, LowBattTemp, HighBattTemp, Fault		n/a
Trigger Level—LowBattV[b]	23.0V	46.0V	10.0–26.0V	20.0–52.0V	0.1
Clear Level—LowBattV	24.0V	48.0V	10.0–26.0V	20.0–52.0V	0.1
Trigger Level—HighBattV	28.0V	56.0V	24.0–32.0V	48.0–64.0V	0.1
Clear Level—HighBattV	26.0V	52.0V	24.0–32.0V	48.0–64.0V	0.1
Trigger Level—HighBattTemp	45.0°C		30.0–60.0°C		1
Clear Level—HighBattTemp	35.0°C		30.0–60.0°C		1
Trigger Level—LowBattTemp	0.0°C		-30.0–10.0°C		1
Clear Level—LowBattTemp	5.0°C		-30.0–10.0°C		1
Trigger Delay	1s		0–600s		1
Clear Delay	1s		0–600s		1

a.The Trigger Src setting (and the settings below Trigger Src) appear only if Manual Aux setting has been set to Automatic.
b.Trigger Level, Trigger Delay, Clear Level and Clear Delay do not appear if Trigger Src is set to Fault.

Connections Menu

Item	Default	Range
DCConn	HouseBatt1	HouseBatt1–6, StartBatt1–6
ACOut	ACLoad1	ACLoad1–10
AC1	Grid 1	None, Grid1–10, Gen1–10
AC2	Gen 1	None, Grid1–10, Gen1–10

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C Boost Charging

Appendix C provides information on Boost Charging for flooded lead-acid batteries in off-grid and grid support applications.

Using Boost Charging

Boost charging allows for better utilization of flooded lead acid batteries under moderate cycling in off grid or grid support applications. Boost charging encourages a short duration charging voltage—above the gassing voltage—at the beginning of the absorption charge state. Testing has shown that boost charging improves battery performance by providing a regular mixing of the liquid electrolyte. Boost charging specifically discourages capacity-robbing acid stratification and plate sulfation.

Boost mode charging can be enabled by selecting the Custom battery type and by setting the bulk voltage higher than the absorption voltage. The multi-stage charge algorithm then attempts to use the higher for the first hour of the absorption stage, unless it is interrupted by the max absorption timer or exit current threshold.

- Boost charging encourages gassing of flooded Lead acid batteries.

WARNING: Explosive gases

Always ensure adequate battery ventilation.

- Boost charging is NOT recommended for AGM, GEL or any other electrolyte-limited and/or valve-regulated sealed battery application.
- Boost charging may result in higher than normal water consumption. However, the benefits of boost charging are likely to be greater than the extra watering effort. Check battery water levels at least once per month.
- Boost charging has maximum benefit when used on batteries that experience moderate cycling. An unoccupied cottage, for example, where batteries are full the majority of the time may not benefit from boost charging, especially if battery watering is difficult.

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