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Owner's Manual

GT100E MS Combiner Box for Master/Slave Configuration

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Contact Information

GERMANY

Telephone: 49 0180 2240400

Fax: 49 (0) 7531 8199868

Email GTsupport.Germany@xantrex.com

SPAIN

Telephone: 34 935 560 976

Fax: 34 934 736 093

Email GTsupport.Spain@xantrex.com

About This Manual

Purpose

The purpose of this Owner's Manual is to provide explanations and procedures for installing and configuring the GT100E MS Combiner Box for Master/Slave Configuration.

Scope

The Manual provides safety guidelines, procedures for installing the GT100E MS Combiner Box for Master/Slave Configuration, as well as information about configuring the modem. It does not provide details about the GT100E Grid Tie Inverter. You need to consult the GT100E Grid Tie Inverter Installation Manual (P/N 152364) and GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365) for this information.

Audience

The Manual is intended for anyone who needs to install and operate the GT100E MS Combiner Box for Master/Slave Configuration. Installers should be certified technicians or electricians.

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

PBX - Private Branch Exchange

Related Information

You can find more information about Xantrex Technology Inc. as well as products and services at **www.xantrex.com**

Important Safety Instructions



WARNING

This chapter contains important safety and operating instructions. Read and keep this Owner's Manual for future reference.

1. Before installing and using the GT100E MS Combiner Box for Master/Slave Configuration, read all instructions and cautionary markings on the GT100E MS Combiner Box for Master/Slave Configuration, GT100E Grid Tie Inverter, and all appropriate sections of this manual.
2. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.
3. 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 GT100E MS Combiner Box for Master/Slave Configuration with damaged or substandard wiring.
4. Do not operate the GT100E MS Combiner Box for Master/Slave Configuration if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the GT100E MS Combiner Box for Master/Slave Configuration is damaged, see the Warranty section.
5. Do not disassemble the GT100E MS Combiner Box for Master/Slave Configuration. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the GT100E MS Combiner Box for Master/Slave Configuration yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
6. To reduce the risk of electrical shock, disconnect both AC and DC power from the GT100E Grid Tie Inverter before attempting any maintenance or cleaning or working on any circuits connected to the GT100E MS Combiner Box for Master/Slave Configuration. Turning off controls will not reduce this risk.

Lockout and Tag



WARNING: Shock hazard

Review the system schematic for the installation to verify that all available energy sources are de-energized. DC bus voltage may also be present. Be sure to wait the full 20 minutes to allow the capacitors to discharge completely. Schematics are located inside the front door of the unit.

Safety requirements mandate that this equipment not be serviced while energized. Power sources for the GT100E must be locked-out and tagged prior to servicing. A padlock and tag should be installed on each energy source prior to servicing.

The GT100E can be energized from both the AC source and the DC source. To ensure that the inverter is de-energized prior to servicing, lockout and tag the GT100E.

To lockout and tag the GT100E:



1. Open, lockout, and tag the incoming power at the utility disconnect.
2. Open, lockout, and tag the AC disconnect switch on the enclosure. See GT100E Grid Tie Inverter Installation Manual (P/N 152364) for the location of the AC disconnect switch.
3. Using appropriate means, open, lockout, and tag incoming PV circuits.
4. Using a confirmed, accurate meter, verify all power to the inverter is de-energized. A confirmed, accurate meter must be verified on a known voltage before use. Ensure that all incoming energy sources are de-energized by checking the following locations.
 - a) AC Utility Terminals: (Bottom of A, B, C, and N)
See GT100E Grid Tie Inverter Installation Manual (P/N 152364) for the location of these terminals.
 - b) PV Terminals: (PV+ and PV-)
See GT100E Grid Tie Inverter Installation Manual (P/N 152364) for the location of these terminals.

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Installation and Configuration

GT100E MS Combiner Box

The GT100E MS combiner box, when installed with dual GT100Es, allows the GT100E Master/Slave configuration to maximize energy production during periods of low irradiance. A system would consist of two - 100kW inverters, one as the master and the other as a slave, and as a result, the GT100E system will run at greater than 94% efficiency above 20kW.

Master/Slave Configuration

The Master/Slave configuration would be implemented on the DC side of the inverter. The configuration would feed multiple PV arrays into the Master inverter until the irradiance increases and the power reaches the high power threshold of the Master inverter. Once the power reaches the Master inverter's high power threshold, the inverter would shutdown and disconnect from the additional arrays. The Slave inverter would then be enabled and both the Master and the Slave inverter would power up and come on-line. See Figure 1 on page <\$pagenum>.

The GT100E inverters will have the ability to run in the master/slave configuration or the ability to run independently (stand-alone mode). The inverters will also have the ability to be configured as either the master (configured master) or the slave inverter (configured slave). The inverters also can be set to switch from operational master to operational slave daily.

Difference between Configured Master/Slave and Operational Master/Slave

Through the front panel or the Xantrex PV View GUI Software, the user configures an inverter to be either configured master or configured slave. Next, the user sets daily role reversal on or off.

If daily role reversal is off, then the configured master is the operational master (operates as master) and the configured slave is the operational slave (operates as slave).

If daily role reversal is on, then the configured master is operational master on odd days (January 1,3,5,...) and operational slave on even days (January 2,4,6,...).

If daily role reversal is on, then the configured slave is operational slave on odd days (January 1,3,5,...) and operational master on even days (January 2,4,6,...).

Master Unit

The GT100E Master inverter will control the GT100E MS Combiner Box via a control cable. The Master inverter will enable and disable the Slave inverter, and monitor the status of the Slave inverter through an interconnect cable. If the interconnect cable is disconnected, the master will open the combiner box and go online.

Slave Unit

The GT100E Slave inverter will monitor the status of the Master inverter through the interconnect cable. The inverter will be enabled from the Master inverter. If the interconnect cable is disconnected then the slave will go online.

Master/Slave Operation States

The Master/Slave operation states will follow the standard states specified by the GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365) with the following Master/Slave configuration state.

1. At Power up, the Master inverter will disable the Slave inverter, and close the contactor in the GT100E MS Combiner Box.
2. The Master inverter will go online through the normal operating States. The Slave inverter will remain disabled.
3. When the Master inverter's power level increases, and reaches the High Power Threshold (configurable parameter). The Master inverter will shutdown, open the contactor in the GT100E MSCombiner Box, and the Master will also enable the Slave inverter.
4. Both the Master and Slave Inverters will go to an online state.
5. End of the Day or Cloud Interaction - When the Master inverter's power level decreases, and reaches the Low Power Threshold and has maintained the power level for the Minimum Transition Seconds

(configurable parameter). The Master and the Slave inverters will shutdown. The Master inverter will disable the Slave inverter and close the contactor in the GT100E MS Combiner Box. The Master inverter will go online.

Fault Condition

If the Master or Slave Inverter gets a fault or the status signal from either inverter is lost, the inverters will shutdown and restart as stand alone inverters.

Mis-configuration of Units

If the Master or Slave Inverter are miss-configured by the operator, the inverters run as stand alone inverters.

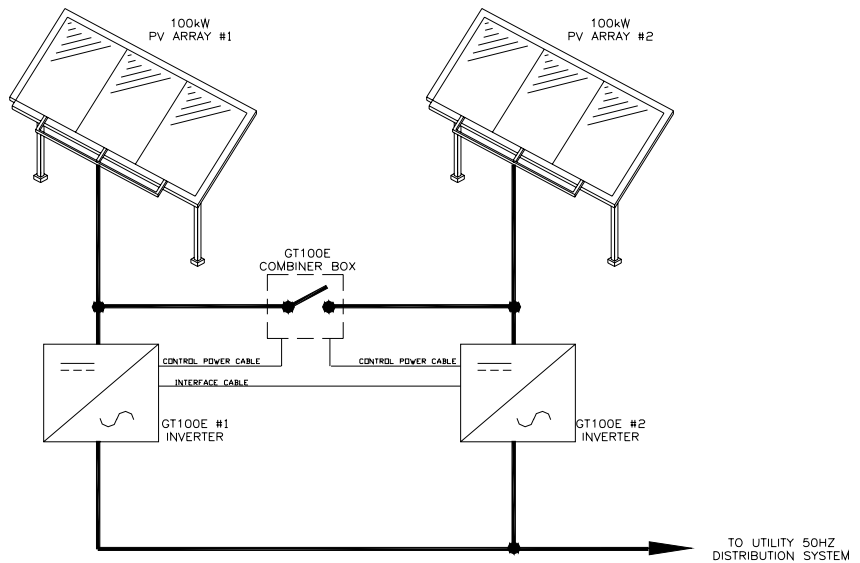


Figure 1 Configuration Diagram

Installing



WARNING: Shock hazard

Safety requirements mandate that this equipment not be serviced while energized. Power sources for the GT100E must be locked-out and tagged (see “Lockout and Tag” on page vi) prior to servicing. A padlock and tag should be installed on each energy source prior to servicing.



WARNING: Shock hazard

The terminals of the PV input may be energized if the arrays are energized. In addition, allow 20 minutes for all capacitors within the enclosure to discharge after disconnecting the GT100E Grid Tie Inverter from AC and DC sources.

Equipment Required

- Ratchet Handle
- Extension
- Metric socket set
- Metric wrench set
- Metric hex wrench set
- Torque wrench with 0-150Nm minimum range
- Phillips Screwdriver

Unpacking the GT100E MS



WARNING: Equipment is Heavy

The GT100E MS combiner box weighs 82 Kg.



To unpack the GT100E MS from the shipping pallet:

1. Remove the packing material from the MS100E.
2. Open the GT100E MS Combiner Box.
3. Remove the 8 M6 screws holding the safety cover from the box.
4. Remove the box containing GT100E MS interface assemblies.
5. Remove the manual.

6. Remove the GT100E MS combiner box power cable assembly P/N 1-152492-01
7. Remove the GT100E MS combiner box interface cable assembly P/N 1-152493-01
8. Remove all mounting hardware from the box.
9. Remove the GT100E MS Combiner Box from the pallet.



Figure 2 GT100E MS Components

Mounting Instructions

To mount the MS100E combiner box onto a wall:



1. Install the 4 wall mounting brackets P/N 062-2000-02 to the rear of the MS100E Combiner box, see Figure 3.

Important: The GT100E MS Combiner box needs to be mounted with in 8 meters of the GT100E units.



Figure 3 Wall Mounting Bracket Locations

2. Anchor the GT100E MS combiner box to the wall using anchor bolts.

Cable Installation



CAUTION

All wiring methods and wire gauges shall be in accordance with Local Electrical Code. Take care to keep the wire bundles away from any sharp edges which may damage wire insulation over time.

Wire Gauge and Torque Specifications

The following torque specifications are to be used on all electrical interfaces made during installation of the GT100E MS Combiner Box.

Wire Gauge Requirements for the GT100E MS Combiner Box

One or multiple wires up to 300 mm² can be connected to the GT100E MS Combiner box. Follow local Electrical codes to determine the correct wire gauge.

Torque Specifications for the GT100E MS Combiner Box

M10 Bolt 40.0Nm

M12 Bolt 54.0Nm

M16 Bolt 132.0Nm

MS100E Connections

Use the following descriptions and figures to correctly identify access panels and route wiring.

Input/Output Access Panels

Install all the cable strain reliefs, customer supplied, needed for cable entry in both Access Panels, see Figure 4.



Figure 4 Input/Output Access Panel Location

PV Array and GT100E Connections

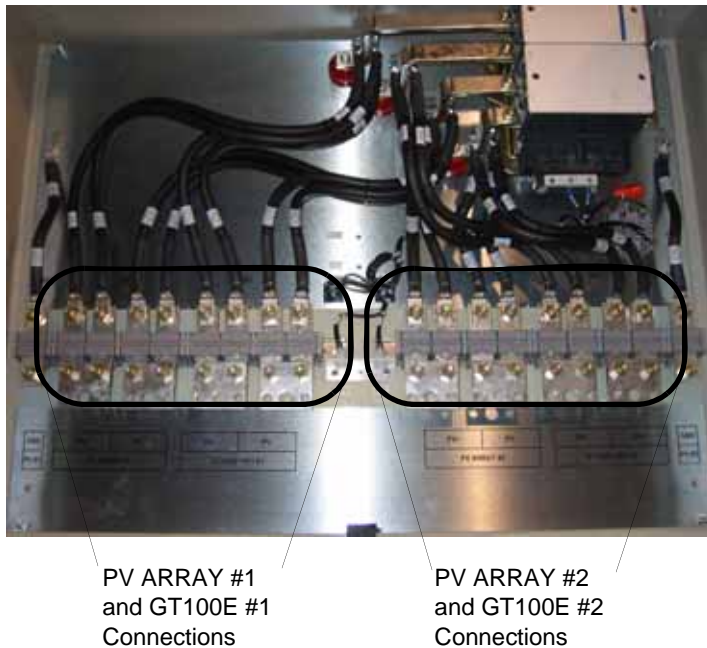
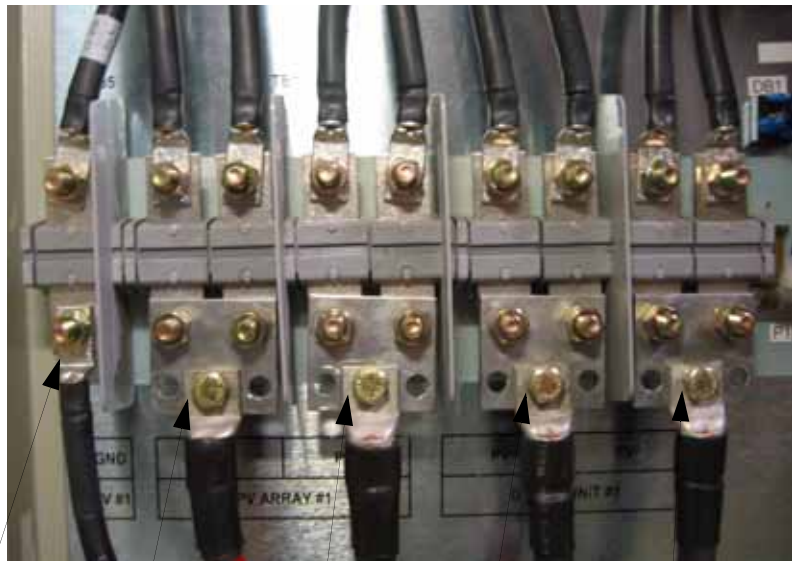


Figure 5 PV Array and GT100E Connections

To make PV Array #1 and GT100E #1 connections:



1. Route the PV Array #1 cables through the access panel and connect the cables to PV ARRAY #1 PV(+) and PV(-) terminals, see Figure 6.
2. Route the GT100E #1 cables through the access panel and connect the cables to GT100E #1 PV(+) UNIT and PV(-) terminals, see Figure 6.
3. Route the PV Array #1 ground cable through the access panel and connect the cable to PV ARRAY #1 GND terminal, see Figure 6.



Combiner Box	Combiner Box	Combiner Box	Combiner Box	Combiner Box
PV ARRAY #1	PV ARRAY #1	PV ARRAY #1	GT100E #1	GT100E #1
GND Terminal	PV (+) Terminal	PV (-) Terminal	PV (+) Terminal	PV (-) Terminal

Figure 6 PV Array #1 and GT100E #1 Connections

To make PV Array #2 and GT100E #2 connections:



1. Route the GT100E #2 cables through the access panel and connect the cables to GT100E UNIT #2 PV(+) and PV(-) terminals, see Figure 7.
2. Route the PV Array #2 cables through the access panel and connect the cables to PV ARRAY #2 PV(+) and PV(-) terminals, see Figure 7.
3. Route the PV Array #2 ground cable through the access panel and connect the cable to PV ARRAY #2 GND terminal see Figure 7.



Combiner Box PV ARRAY #2 PV (+) Terminal
Combiner Box PV ARRAY #2 PV (-) Terminal
Combiner Box GT100E #2 PV (+) Terminal
Combiner Box GT100E #2 PV (-) Terminal
Combiner Box PV ARRAY #2 GND Terminal

Figure 7 PV Array #2 and GT100E #2 Connections

GT100E MS Control Power Cable

To make GT100E MS Control Power Cable connections:



1. Connect the GT100E MS combiner box power cable assembly P/N 1-152492-01 from the GT100E #1 through the access panel and connect it to P1, see Figure 8.
2. Connect the GT100E MS combiner box power cable assembly P/N 1-152492-01 from the GT100E #2 through the access panel and connect it to P2, see Figure 8.
3. Connect the Cables ground wires to the ground terminal using a M5 nut.

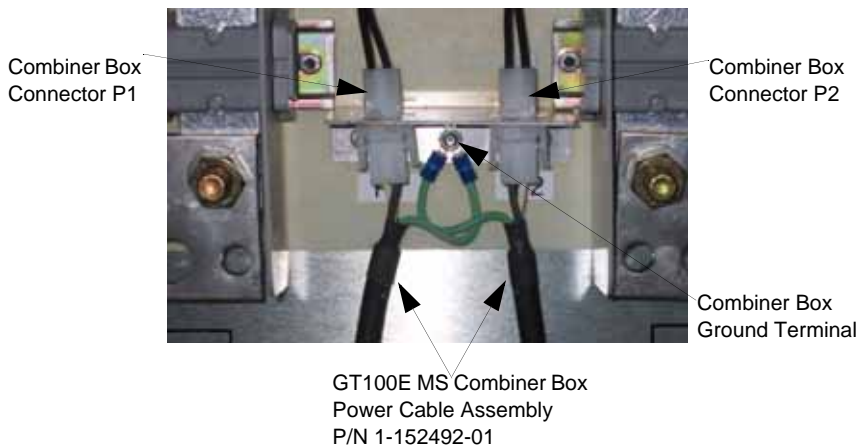


Figure 8 GT100E MS Power Control Cable Connections

4. Reinstall the safety cover into the GT100E MS Combiner box using 8 M6 screws.

MS100E Interface Assembly Installation for GT100E #1 Mounting Instructions

The GT100E MS Interface is located in the bottom right compartment of the GT100E. See Figure 9.

n



Figure 9 Location of GT100E MS in the GT100E

To install the GT100E MS Interface Assembly:



1. Mount the MS100E Interface Assembly to the Customer Interface Rail using the 4 supplied Torx screws P/N 1-152173-01. See Figure 10.

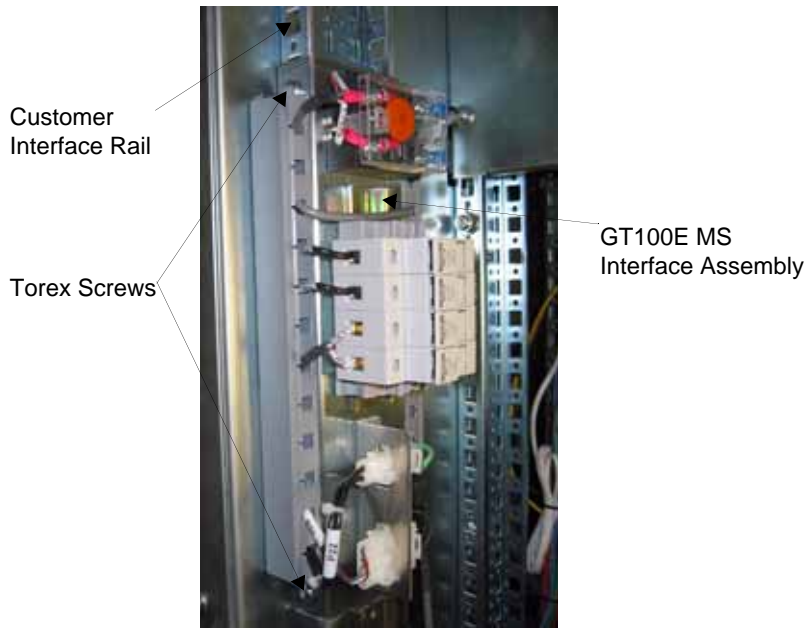


Figure 10 GT100E MS Interface Assembly Installation

To install the MS100E Interface Assembly Cable:

1. Connect the MS100E Interface Assembly cable J20 to the GT100E Option Panel P20, located at the bottom/rear of the cabinet, see Figure 11.



Option Panel
P20

Figure 11 GT100E MS Interface Assembly Cable Connection

To install the MS100E Control Power and Interface Cable:

1. Route the MS100E Power Cable assembly P/N 1-152492-01 and MS100E Interface cable assembly P/N 1-152493-01 through the Input/Output Access Base Panel on the GT100E unit. Reference the GT100E Planning and Installation Manual P/N 152364
2. Connect the MS100E Power cable assembly to the MS100E Interface Assembly connector P22, see Figure 12.
3. Connect the MS100E Interface cable assembly to the MS100E Interface Assembly connector P21, see Figure 12.
4. Connect both of the cable ground wires to the ground terminal using a M5 nut, see Figure 12.

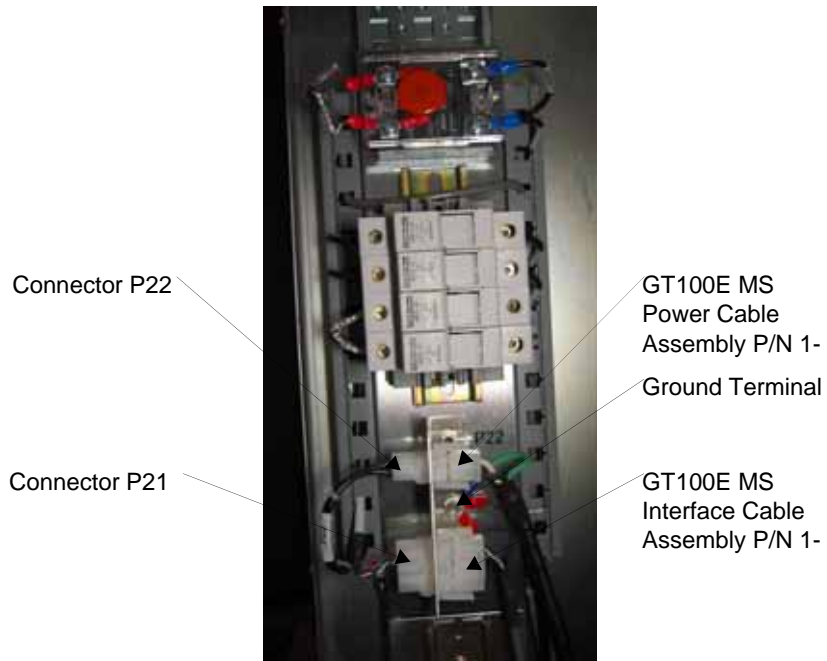


Figure 12 GT100E MS Control Power and Interface Cable Connection

To install the MS100E Interface Assembly for GT100E #2:



1. Repeat the MS100E Interface Assembly Instructions for GT100E for the second GT100E unit - GT100E #2.

GT100E Unit Installation

To install the GT100E refer to the GT100E Grid Tie Inverter Installation Manual (P/N 152364).

For GT100E commissioning or Turn-On Procedure refer to the GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365).

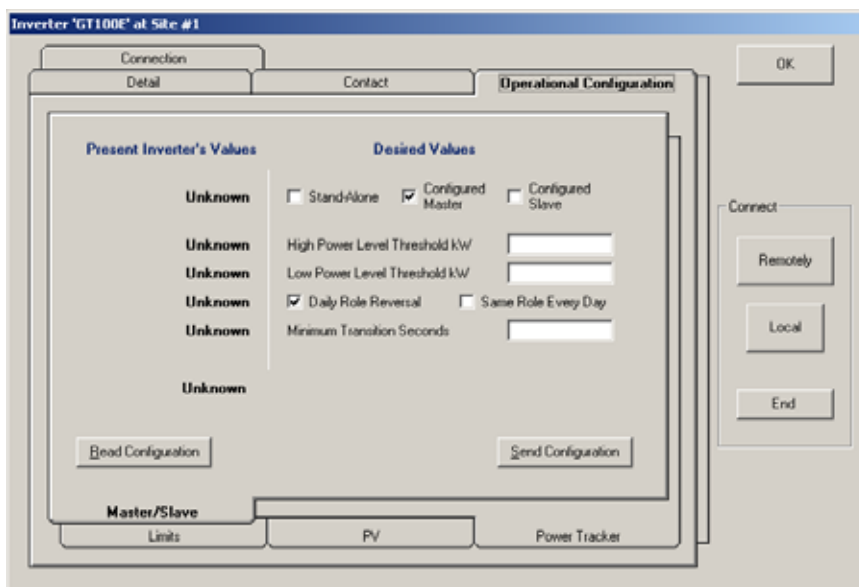
Master/Slave Configuration

The Master/Slave system can be configured through the Xantrex PV View GUI software, P/N 1-152577-01, or through the Operator Interface Panel. Establish remote or local communication with the GT100E, using the PV View.

To set a unit up as the Master Unit:



1. Click Tools > Inverter Data > Operational Configuration
2. Check the Configured Master check box



3. Click Send Configuration
4. Verify that the Present Inverter Data has the unit set as the Configured Master unit.

Important: If the inverter's date (not the workstation's!) is odd then the Inverter is OPERATIONAL MASTER until midnight; if the inverter's date is even, the Inverter is OPERATIONAL SLAVE until midnight.

To set a unit up as the Slave Unit:



1. Click Tools > Inverter Data > Operational Configuration
2. Check the Configured Master check box

3. Click Send Configuration
4. Verify that the Present Inverter Data has the unit set as the Configured Slave unit.

Important: If the inverter's date (not the workstation's!) is even then the Inverter is OPERATIONAL MASTER until midnight; if the date is odd, the Inverter is OPERATIONAL SLAVE until midnight.

The screenshot shows the 'Operational Configuration' window for Inverter 'GT100E' at Site #1. The window has tabs for 'Connection', 'Detail', 'Contact', and 'Operational Configuration'. The 'Operational Configuration' tab is active, showing 'Present Inverter's Values' and 'Desired Values'. Under 'Present Inverter's Values', 'Configured Slave' is set to 50, 'Daily Role Reversal' is set to 20, and 'Daily Role Reversal' is set to 30. Under 'Desired Values', 'Stand-Alone' is unchecked, 'Configured Master' is unchecked, 'Configured Slave' is checked, 'High Power Level Threshold kW' is empty, 'Low Power Level Threshold kW' is empty, 'Daily Role Reversal' is checked, 'Same Role Every Day' is unchecked, and 'Minimum Transition Seconds' is empty. A status message says 'Inverter is OPERATIONAL SLAVE until midnight.' There are 'Read Configuration' and 'Send Configuration' buttons. At the bottom, there are tabs for 'Master/Slave', 'Limits', 'PV', and 'Power Tracker'. On the right side, there are 'OK', 'Connect' (with 'Remotely' and 'Local' sub-buttons), and 'End' buttons.



CAUTION

The Master/Slave configuration will only be activated after power is cycled on the unit.

Important: Verify that the date is the same on both the GT100E #1 and GT100E #2. This will allow the daily role reversal option to function correctly.

Refer to the GUI Help menu for complete configuration instructions.

Warranty and Return Information

Warranty

What does this warranty cover and how long does it last? This Limited Warranty is provided by Xantrex Technology Inc. ("Xantrex") and covers defects in workmanship and materials in your GT100E MS Combiner Box for Master/Slave Configuration. This Warranty Period lasts for 2 years from the date of purchase at the point of sale to you, the original end user customer, unless otherwise agreed in writing. You will be required to demonstrate proof of purchase to make warranty claims.

This Limited Warranty is transferable to subsequent owners but only for the unexpired portion of the Warranty Period. Subsequent owners also require original proof of purchase as described in "What proof of purchase is required?"

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

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

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

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

GERMANY

Telephone: 49 0180 2240400

Fax: 49 (0) 7531 8199868

Email GTsupport.Germany@xantrex.com

SPAIN

Telephone: 34 935 560 976

Fax: 34 934 736 093

Email GTsupport.Spain@xantrex.com

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

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

Warranty and Return

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

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

What does this warranty not cover? Claims are limited to repair and replacement, or if in Xantrex's discretion that is not possible, reimbursement up to the purchase price paid for the product. Xantrex will be liable to you only for direct damages suffered by you and only up to a maximum amount equal to the purchase price of the product.

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

- a) the product if it has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment;
- b) the product if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Xantrex product specifications including high input voltage from generators and lightning strikes;
- c) the product if repairs have been done to it other than by Xantrex or its authorized service centers (hereafter "ASCs");
- d) the product if it is used as a component part of a product expressly warranted by another manufacturer;
- e) the product if its original identification (trade-mark, serial number) markings have been defaced, altered, or removed;
- f) the product if it is located outside of the country where it was purchased; and
- g) any consequential losses that are attributable to the product losing power whether by product malfunction, installation error or misuse.

Disclaimer

Product

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Return Material Authorization Policy

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

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

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

Record these details on page WA-4.

Return Procedure

Package the unit safely, preferably using the original box and packing materials. Please ensure that your product is shipped fully insured in the original packaging or equivalent. This warranty will not apply where the product is damaged due to improper packaging.

Include the following:

- The RMA number supplied by Xantrex Technology Inc. clearly marked on the outside of the box.
- A return address where the unit can be shipped. Post office boxes are not acceptable.
- A contact telephone number where you can be reached during work hours.
- A brief description of the problem.

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

If you are returning a product from outside of the USA or Canada In addition to the above, you **MUST** include return freight funds and are fully responsible for all documents, duties, tariffs, and deposits.

If you are returning a product to a Xantrex Authorized Service Center (ASC) A Xantrex return material authorization (RMA) number is not required. However, you must contact the ASC prior to returning the product or presenting the unit to verify any return procedures that may apply to that particular facility and that the ASC repairs this particular Xantrex product.

Out of Warranty Service

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

To return your product for out of warranty service, contact Xantrex Customer Service for a Return Material Authorization (RMA) number and follow the other steps outlined in "Return Procedure" on page WA-3.

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

Information About Your System

As soon as you open your GT100E MS Combiner Box for Master/Slave Configuration package, record the following information and be sure to keep your proof of purchase.

- ☐ ModemSerial Number _____
- ☐ Purchased From _____
- ☐ Purchase Date _____

Xantrex Technology Inc.

Phone

+ 49 0180 2240400 (Germany)

+ 34 935 560 976 (Spain)

Fax

+ 49 (0) 7531 8199868 (Germany)

+ 34 934 736 093 (Spain)

Email

GTsupport.Germany@xantrex.com

GTsupport.Spain@xantrex.com

www.xantrex.com