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Installation Guide

GT Series Three Phase Ethernet Communications Kit

www.xantrex.com

This guide for use by qualified personnel only

GT Series Three Phase Ethernet Communications Kit

Installation Guide

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Contact Information

Telephone: 1 800 670 0707 (toll free North America)
1 408 987 6030 (direct)

Fax: 1 800 994 7828 (toll free North America)

Email: customerservice@xantrex.com

Web: www.xantrex.com

About This Guide

Purpose

The purpose of this Installation Guide is to provide explanations and procedures for installing and configuring the GT Series Three Phase Ethernet Communications Kit.

Scope

The Guide provides safety guidelines, procedures for installing the GT Series Three Phase Ethernet Communications Kit, as well as information about configuring the Ethernet Communications Kit protocol for proper operation. It does not provide details about the GT Three Phase Grid Tie Inverters. You need to consult the Operation manual and/or Installation manual for this information.

Audience

The Guide is intended for anyone who needs to install and operate the GT Series Three Phase Ethernet Communications Kit. ***Installers should be certified technicians or electricians.***

Organization

This Guide is organized into three chapters:

Chapter 1, “Introduction”, contains a description of the Ethernet Communications Kit and lists the specifications and requirements needed for use.

Chapter 2, “Installation”, contains procedures on how to de-energize the Inverter, install the new Ethernet Communications Kit, and re-energize the Inverter.

Chapter 3, “Configuration”, describes how to configure and activate the Ethernet Communications Kit to establish communication with the Inverter.

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.

Related Information

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

Important Safety Instructions

SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This manual contains important safety instructions for the GT Series Three Phase Ethernet Communications Kit that must be followed during installation and maintenance procedures.



WARNING: Shock Hazard

Read and keep this Installation Guide for future reference.

Before operating and maintaining the Ethernet Communications Kit, read all instructions, cautionary markings, and all other appropriate sections of this manual. Failure to adhere to these warnings could result in severe shock or possible death. Exercise extreme caution at all times to prevent accidents.



WARNING: Shock Hazard

The Inverter Enclosures contain exposed high voltage conductors. The Inverter enclosure doors should remain closed with the latches tightened, except during maintenance or testing. These servicing instructions are for use by qualified personnel who meet all local and governmental code requirements for licensing and training for the installation of Electrical Power Systems with AC and DC voltage to 600 volts. To reduce the risk of electric shock, do not perform any servicing other than that specified in the installation instructions unless you are qualified to do so. Do not open the cabinet doors if extreme moisture is present (rain or heavy dew).



WARNING: Lethal Voltage

In order to remove all sources of voltage from the Inverter, the incoming power must be de-energized at the source. This may be done at the main utility circuit breaker and by opening the AC Disconnect and the DC Disconnect Switch on the Ethernet Communications Kit. Review the system configuration to determine all of the possible sources of energy. In addition, allow five minutes for the DC bus capacitors to discharge after removing power. Follow the “Lockout and Tag” procedure on page viii to de-energize the Ethernet Communications Kit.



WARNING: Shock hazard

If a ground fault has occurred, there may be potential between TB4 and GND. The normally grounded pole may be energized and ungrounded.

Risks



WARNING: Shock hazard

Parts of the capacitor charge will still be energized for a maximum of five minutes after being disconnected.

Open doors only after the device is disconnected and discharged. Check whether the device is no longer live (DC voltage) including terminals TB3 and TB4.



WARNING: Amputation hazard

The inverters contain integrated ventilators including rotating ventilator wheels. Do not place fingers in ventilator.



WARNING: Burn hazard

Inverters contain components that become hot during normal operation. Do not touch.



CAUTION: Equipment Damage

Sensitive electronics inside the Inverter can be destroyed when touched and when electrostatically charged. Discharge via earth potential before touching and wear appropriate protective gear.



CAUTION: Equipment Damage

No connections or disconnections are to be made at the terminal strips or internal connectors during operation.

Turn unit off before performing terminal work; wait five minutes (capacitor charge) and recheck to ensure internal components are no longer live.

General Safety Precautions

1. When installing the Ethernet Communications Kit in GT Series Three Phase Grid Tie Inverters use only components recommended or sold by Xantrex. Doing otherwise may result in a risk of fire, electric shock, injury to persons, and will void the warranty.
2. Do not attempt to operate the Ethernet Communications Kit if it has been dropped, or received more than cosmetic damage during transport or shipping. If the Ethernet Communications Kit is damaged, or suspected to be damaged, see the Warranty section of this manual.
3. To reduce the risk of electrical shock, lock-out and tag the inverters before attempting any maintenance, service, or cleaning.

Personal Safety

Follow these instructions to ensure your safety while installing the Ethernet Communications Kit in Inverter Grid Tie Inverters.

Qualified Personnel

Only qualified personnel should perform the transportation, installation and initial operation and maintenance of the GT Series Three Phase Grid Tie Inverters in accordance with National Electrical Code ANSI/NFPA 70, as well as all state and local code requirements. Follow all national accident prevention regulations.

Qualified personnel, within the meaning of these basic safety regulations, will be people who are familiar with the installation, assembly, start-up and operation of the GT Series Three Phase Grid Tie Inverters and have the appropriate qualifications with respect to their functions.

Safety Equipment

Authorized service personnel must be equipped with standard safety equipment including the following:

- Safety glasses and ear protection
- Steel-toed safety boots and safety hard hats
- Padlocks and tags
- Appropriate meter to verify that the circuits are de-energized (1000 Vac and DC rated, minimum)

Check local safety regulations for other requirements.

Operational Safety Procedures

Never work alone when servicing this equipment. A team of two is required until the equipment is properly de-energized, locked-out and tagged, and verified de-energized with a meter.

Thoroughly inspect the equipment prior to energizing. Verify that no tools or equipment have inadvertently been left behind.

Lockout and Tag

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



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 five minutes to allow the capacitors to discharge completely

The Inverter 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 Inverter using the following procedure.

1. Turn the Inverter main ON/OFF switch (S3) to the OFF position. This stops the inverter from exporting power to the AC utility grid.
2. Open, lockout, and tag the incoming power at the utility main circuit breaker.
3. Open, lockout, and tag the AC Disconnect (CB1) on the left door of the Inverter enclosure. See your GT100 or GT250 Grid Tie Inverter manual for the location of the AC Disconnect.

4. Open, lockout, and tag the DC Disconnect Switch (S1) on the right door of the Inverter enclosure. See GT100 or GT250 Grid Tie Inverter manual for the location of the DC Disconnect Switch.



CAUTION

Once the DC Disconnect Switch is open, there will be DC voltage on the PV Array side of the switch where TB3, TB4, and TB5(PV GND) are located. This voltage may be as high as the Open-Circuit Voltage of the PV Array and is limited to 600VDC per NEC 690.

5. 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 at all line-to-line and all line-to-ground configurations.
 - **AC Utility Terminals: [TB1-A, TB1-B, TB1-C, TB1-N, and TB2(GND BUS)]**
See GT100 or GT250 Grid Tie Inverter manual for the location of these terminals.
 - **PV Terminals: [TB3, TB4, and TB5 (PV GND)]**
See GT100 or GT250 Grid Tie Inverter manual for the location of these terminals.

De-Energize/Isolation Procedure

The following procedure should be followed to de-energize the Inverter for maintenance.



WARNING

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

To isolate the Inverter:

1. Turn the main ON/OFF switch (S3) to the OFF position.
2. Open the utility connection circuit breaker.
3. Open the AC Disconnect.
4. Open the DC Disconnect Switch.
5. Install lockout devices on the utility connection circuit breaker, AC and DC disconnect switch.

Interconnection Standards Compliance

The Ethernet Communications Kit complies with IEEE C37.90.1 requirements.

The Inverter complies with FCC Part 15 Class A requirements.

The Inverter is designed to meet NEC Article 690 and UL1741-2005 *Static Inverters And Charge Controllers For Use In Photovoltaic Power Systems*, which includes testing for IEEE 1547.1-2005, IEEE 929-2000 and IEEE 519-2000.

Intended Use

The Ethernet Communications Kit may only be used in GT Series Three Phase Grid Tie Inverters. It is not suitable for any other application areas.

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Installation and Configuration

Description of the GT Series Three Phase Ethernet Communications Kit

The GT Series Three Phase Ethernet Communications Kit is an option for the GT Series Three Phase Grid Tie Inverters.

The Ethernet Communications Kit is an option that is available for remote plant monitoring. This enables users to monitor and control the inverter from a dedicated plant wide monitoring system.

Interface Requirements

The Ethernet interface requires a connection to a computer network system. External software will be used to retrieve data from the inverter.

Installation



WARNING: Shock hazard

Safety requirements mandate that this equipment not be serviced while energized. Power sources for the inverter must be locked-out and tagged (see “De-Energize/Isolation Procedure (Shutdown)”) prior to servicing. A padlock and tag should be installed on each energy source prior to servicing.

Equipment Required

- Inverter Enclosure Key (7mm triangle key)
- Small flathead screwdriver
- Wire cutter or scissors to trim cable ties
- Ratchet with 10mm socket or 10mm nutdriver

De-Energize/Isolation Procedure (Shutdown)



WARNING: Shock hazard

The terminals of the PV input may be energized if the arrays are energized. In addition, allow 5 minutes for all capacitors within the enclosure to discharge after disconnecting the Grid Tie Inverter from AC and DC sources.

Use the following procedure to isolate and de-energize the Inverter for maintenance:

1. Turn the main ON/OFF switch (S3) to the OFF position.
2. Open the utility connection circuit breaker.
3. Open the AC disconnect.
4. Open the DC disconnect switch.
5. Install lockout devices on the utility connection circuit breaker, AC and DC disconnect switch.

Installing the Ethernet Communications Kit

You will have to make connections to the CCU control board inside of the enclosure. Use caution not to discharge any static electricity onto the control board.

Use the following procedure to install the new Ethernet Communications Kit:

1. Install the panel with the four M6 nuts.



Figure 1 Panel with Four M6 Nuts

2. Connect the fiber optic cable to the RS232/Fiber adapter.
3. Connect the orange cable to the TX connector on the RS232/Fiber adapter.
4. Connect the blue cable to the RX connector on the RS232/Fiber adapter. See Figure 2.

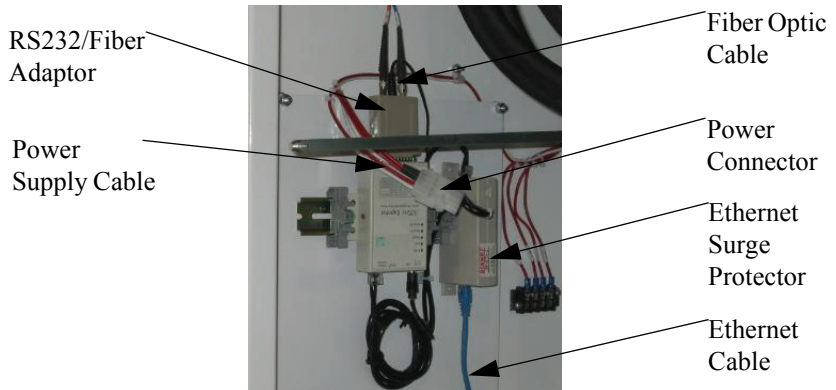


Figure 2 Ethernet Kit Cable Connections

5. Connect the Ethernet cable from the computer network to the unprotected connection on the Ethernet surge protector.
6. Connect the orange cable (U1002) to the U1002 connector on the CCU board.
7. Connect the blue cable (U1001) to the U1001 connector on the CCU board. See Figure 3.

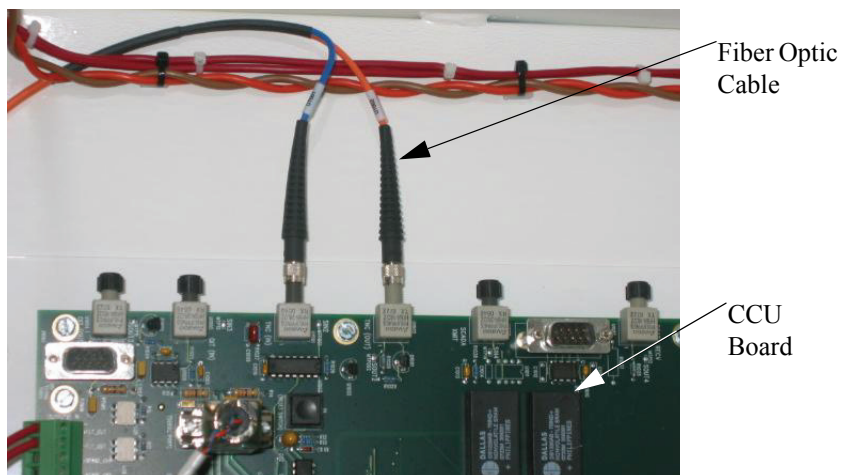


Figure 3 CCU Board Cable Connections

8. Secure the cable with plastic tie wraps.
9. Connect the power connector to the power supply cable.

Energize Procedure (Startup)

Use the following procedure to turn on the Inverter:

1. Remove any lockout devices from the utility connection circuit breaker and PV disconnect switch.
2. Close the utility connection circuit breaker.
3. Close the AC disconnect.
4. Close the DC disconnect switch.
5. Turn the ON/OFF switch (S3) to the ON position.

After a short initialization period, the Inverter will automatically transition to 'Waking Up', given the PV voltage is greater than the PV V Start set point.

Configuring

The Ethernet Communications Kit IP address and configuration are required before installing into the inverter.

The configuration can be performed from any desktop or laptop computer.

Hardware

DB25 Male to DB9 Female modem cable.

Software

NPORT Management Suite (supplied on the NPort Installation CD)
MOXA PComm Program (<http://web4.moxa.com/support/download.asp>)

LAN Interface Set-up

To set-up the Ethernet Communications Kit:

1. Plug the power adapter's DC plug into Ethernet Communications Kit's DC-IN jack.
2. Plug the power adapter into an electrical outlet.
3. Connect the DB25 male connector of the modem cable to the Ethernet Communications Kit's serial connector.
4. Connect the DB9 female connector of the modem cable to a PC RS232 port (COMM port).
5. Connect the ethernet cable from the Ethernet Communications Kit's 10BaseT Ethernet connector to the LAN network

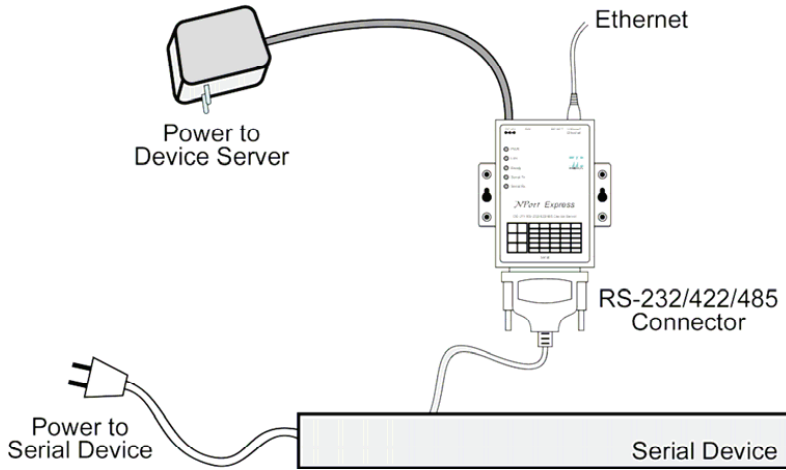


Figure 4 Ethernet Communications Kit Configuration Diagram

Configuring the LAN Interface

To configure the Ethernet Communications Kit (NPort Express) follow the instructions provided on the NPort Installation CD.

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 GT Series Three Phase Ethernet Communications Kit. This Warranty Period lasts for five (5) 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:

Telephone: 1 800 670 0707 (toll free North America)
1 408 987 6030 (direct)

Fax: 1 800 994 7828 (toll free North America)
1 360 925 5143 (direct)

Email: customerservice@xantrex.com

Website: www.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, but not limited to, 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) component parts or monitoring systems supplied by you or purchased by Xantrex at your direction for incorporation into the product;
- f) the product if its original identification (trade-mark, serial number) markings have been defaced, altered, or removed;
- g) the product if it is located outside of the country where it was purchased; and
- h) 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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Exclusions

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

Return Material Authorization Policy

For those products that are not being repaired in the field and are being returned to Xantrex, 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.

Xantrex Technology Inc.

1 800 670 0707 Tel toll free NA
1 408 987 6030 (direct)
1 800 994 7828 Fax toll free NA
customerservice@xantrex.com
www.xantrex.com