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Owner's Manual

GT100E Ground Fault Protection System

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Owner's Manual

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Date and Revision

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About This Manual

Purpose

The purpose of this Owner's Manual is to provide explanations and procedures for installing and configuring the GT100E Ground Fault Protection System.

Scope

The Manual provides safety guidelines, procedures for installing the GT100E Ground Fault Protection System, 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 and GT100E Grid Tie Inverter Operation and Installation Manual for this information.

Audience

The Manual is intended for anyone who needs to install and operate the GT100E Ground Fault Protection System. 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 Ground Fault Protection System, read all instructions and cautionary markings on the GT100E Ground Fault Protection System, 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 Ground Fault Protection System with damaged or substandard wiring.
4. Do not operate the GT100E Ground Fault Protection System if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the GT100E Ground Fault Protection System is damaged, see the Warranty section.
5. Do not disassemble the GT100E Ground Fault Protection System. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the GT100E Ground Fault Protection System 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 Ground Fault Protection System. 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 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 for the location of these terminals.
 - b) PV Terminals: (PV+ and PV-)
See GT100E Grid Tie Inverter Installation Manual for the location of these terminals.

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Installation and Configuration

Description of the GFP

The GT100E Ground Fault Protection System (GFP) is an option for the GT100E Grid Tie Inverter. The GFP monitors the insulation resistance levels of the PV array's cabling to the GT100E. If the insulation resistance levels fall below the relay's set points, it will generate a ground fault alarm and shutdown the GT100E unit.

GFP Specifications

Application of the GT100E Ground fault protection system in a manner inconsistent with these specifications may cause the protection system to have improper functionality.

Software Requirements

Xantrex PV View	Software Revision: 2.0.0 or higher
System Software, GT100E	Software Revision: 3.0.0 or higher
Front Panel Software	Software Revision: 4.0.0 or higher

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 0-50 Nm minimum range
- Philips Screwdriver

Installing the GFP

To install the GFP:



1. Install the DIN rail onto the Ground Fault Monitor bracket using the two M5 hardware, see Figure 1.
2. Mount the Ground Fault Bracket onto the Customer Interface rail.

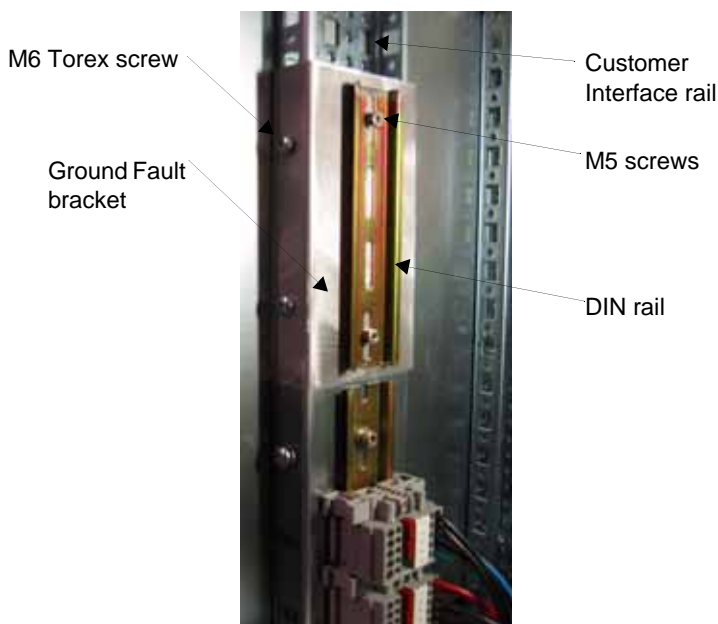


Figure 1 GFP Installation Layout

3. Connect the Ground Fault Harness (1-152539-01) to the Bender Relay, see Figure 2.

Ground Fault Harness (colour)	Bender Relay
GFM-L1 (yellow)	L1
GFM-L2 (brown)	L2
GFM-KE (green/yellow)	KE
GFM-GND (green/yellow)	GND
GFM-11 (red)	11

Ground Fault Harness (colour)	Bender Relay
GFM-14 (red)	14
GFM-A1/+ (black)	A1/+
GFM-A1/- (black)	A1/-

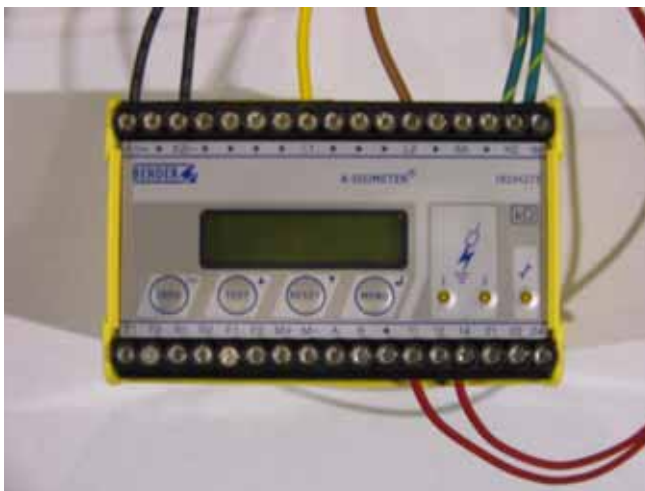


Figure 2 Ground Fault Harness to Bender Relay Connection

4. Mount the Bender Relay on to the Ground Fault Monitoring bracket.
5. Mount the Terminal Stops on each side of the Bender relay.

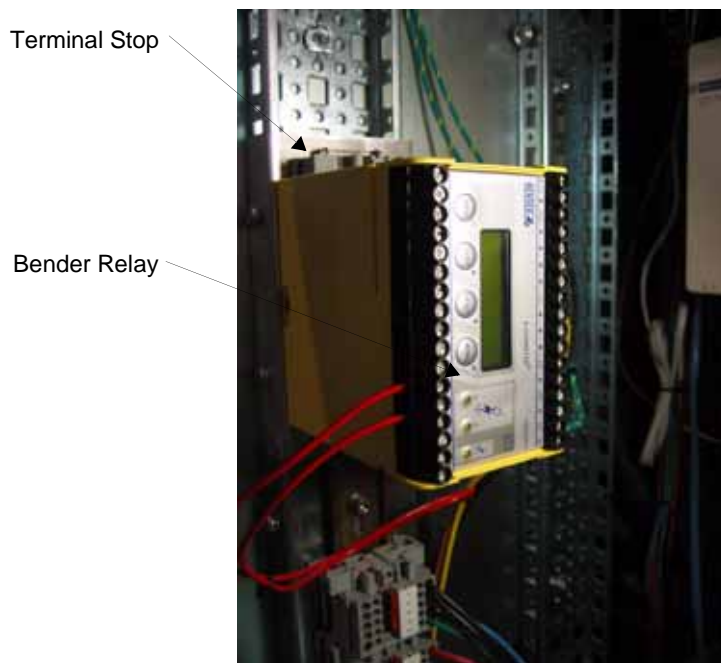


Figure 3 Bender Relay to GT100E Mounting

6. Connect the Ground Fault Harness (1-152539-01) to the GT100E Ground TB1, see Figure 4.



Figure 4 Ground Fault Harness to GT100E Ground Connection

7. Remove the DC Access Panel from the GT100E.
8. Connect the Ground Fault Harness (1-152539-01) to the GT100E PV Array input cables at the DC contactor K2, see Figure 5.

Ground Fault Harness (colour)	DC Contactor - K2
PV(+) (yellow)	PV(+) K2-6T3
PV(-) (brown)	PV(-) K2-2T1

Note: Torque the M10 Bolts to 40.0Nm



Figure 5 Ground Fault Harness to GT100E PV Array Connection

9. Connect the Ground Fault Harness (1-152539-01) J23 to the GT100E Option Panel P23, located at the bottom/rear of the cabinet.
10. Reinstall the DC Access Panel to the GT100E.

Turn-On Procedure

To turn on the GT100E:



1. Remove any lockout devices from the PV and utility grid circuit breakers.
2. Close the PV and utility grid circuit breakers.
3. Close the AC disconnect switch.
4. Turn the on/off switch to the on position.
5. Disengage (pull out) the Emergency Stop switch.
After a 15 second initialization period and a 5 minute wake up period, the GT100E will automatically begin power tracking, given the PV voltage is greater than the PV start voltage setpoint.

Configuring the GFP

The Ground Fault monitor can be configured for monitoring the PV arrays cable resistance levels.

Read the PV Array Resistance level on the Ground Fault Monitor, see Figure 6.

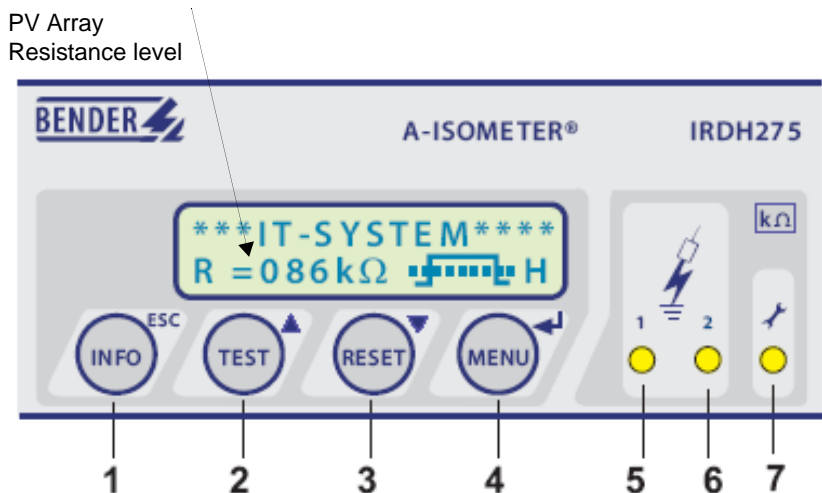


Figure 6 Ground Fault Monitor

1	INFO key: to query standard information / ESC function: back to the menu function
2	TEST key: to call up self test / Arrow key UP: parameter change, scrolling
3	RESET key: to delete insulation and fault messages (only A-ISOMETER®) / Arrow key DOWN: parameter change, scrolling
4	MENU key: to activate the menu system / ENTER function: confirm parameter change
5	Alarm LED 1 lights up: insulation fault, first warning level reached
6	Alarm LED 2 lights up: insulation fault, second warning level reached
7	LED lights up: system fault

To configure the GFP to the PV array:

1. Press the MENU \downarrow key on the relay.
2. Scroll down the menu to item 3. ISO SETUP, using the arrow keys.
3. Select item 3. ISO SETUP, using the MENU \downarrow key.
4. Scroll down the menu to item 2. Alarm1: 40K Ω , using the arrow keys.
5. Select item 2.Alarm1:, using the MENU \downarrow key.
6. Set the Alarm1 resistance level ~60% below PV Array Resistance level. Adjust the resistance level by using the arrow keys.
7. Press the MENU \downarrow key to set the value.
8. Scroll down the menu to item 3. Alarm2: 10K Ω , using the arrow keys.
9. Select item 3.Alarm2:, using the MENU \downarrow key.
10. Set the Alarm2 resistance level ~80% below PV Array Resistance level. Adjust the resistance level by using the arrow keys.
11. Press the MENU \downarrow key to set the value.
12. Scroll up the menu to item 1. EXIT, using the arrow keys.
13. Press the MENU \downarrow key to exit the set up menu.
14. Scroll up the menu to item 1. EXIT, using the arrow keys
15. Press the MENU \downarrow key to exit the set up menu.

Troubleshooting

In the event of a PV Ground Insulation fault, the GT100E will annunciate the condition at the operator interface. The GT100E will execute an orderly shutdown and remain faulted until the fault is manually cleared.

Respond to any GT100E fault as follows:

1. The source of the fault should be sought by referring to the following section.
2. Rectify the fault condition and attempt to clear the fault by pressing <F1> on the operator interface panel.
3. If the problem cannot be corrected, note and write down the fault code and description, then contact your Xantrex Service Center for assistance or service.

Alarm and Fault Conditions



WARNING: Shock hazard

Lethal energy may be stored within each matrix assembly. Use extreme caution when troubleshooting. After disconnecting all sources of power, wait at least five minutes for internal capacitors to discharge.

0035 - PV Ground Insulation

This fault indicates that the Bender Relay has indicated an insulation failure in the PV arrays cables, resulting in a low resistance from the PV+ or PV- to ground.

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 Ground Fault Protection System. 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

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY PROVIDED BY XANTREX IN CONNECTION WITH YOUR XANTREX PRODUCT AND IS, WHERE PERMITTED BY LAW, IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, GUARANTEES, REPRESENTATIONS, OBLIGATIONS AND LIABILITIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE IN CONNECTION WITH THE PRODUCT, HOWEVER ARISING (WHETHER BY CONTRACT, TORT, NEGLIGENCE, PRINCIPLES OF MANUFACTURER'S LIABILITY, OPERATION OF LAW, CONDUCT, STATEMENT OR OTHERWISE), INCLUDING WITHOUT RESTRICTION ANY IMPLIED WARRANTY OR CONDITION OF QUALITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE TO THE EXTENT REQUIRED UNDER APPLICABLE LAW TO APPLY TO THE PRODUCT SHALL BE LIMITED IN DURATION TO THE PERIOD STIPULATED UNDER THIS LIMITED WARRANTY.

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IF YOU ARE A CONSUMER (RATHER THAN A PURCHASER OF THE PRODUCT IN THE COURSE OF A BUSINESS) AND PURCHASED THE PRODUCT IN A MEMBER STATE OF THE EUROPEAN UNION, THIS LIMITED WARRANTY SHALL BE SUBJECT TO YOUR STATUTORY RIGHTS AS A CONSUMER UNDER THE EUROPEAN UNION PRODUCT WARRANTY DIRECTIVE 1999/44/EC AND AS SUCH DIRECTIVE HAS BEEN IMPLEMENTED IN THE EUROPEAN UNION MEMBER STATE WHERE YOU PURCHASED THE PRODUCT. FURTHER, WHILE THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, YOU MAY HAVE OTHER RIGHTS WHICH MAY VARY FROM EU MEMBER STATE TO EU MEMBER STATE OR, IF YOU DID NOT PURCHASE THE PRODUCT IN AN EU MEMBER STATE, IN THE COUNTRY YOU PURCHASED THE PRODUCT WHICH MAY VARY FROM COUNTRY TO COUNTRY AND JURISDICTION TO JURISDICTION.

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 Ground Fault Protection System package, record the following information and be sure to keep your proof of purchase.

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

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