

Trace™ GSM

Generator Start Module



Installation and Operation Guide

XANTREX
Smart Choice For Power

GSM—Generator Start Module

Table of Contents

1.0 INTRODUCTION	1
Unpacking and Inspection	1
Controls and Indicators	2
Indicator LEDs	2
GENERATOR RUN/GLOWSTOP RELAY 7 LED	2
GENERATOR START RELAY 8 LED	2
INVERTER OPERATIONAL LED	2
Switches	3
GENERATOR START Switch	3
INVERTER ERROR Switch	3
Internal Components	4
Relays	4
Relay Terminal Block	4
Ground Stud	4
Fuses	4
2.0 INSTALLATION	6
Tools Required	6
Pre-Installation	6
Mounting Procedure	6
Generator Wiring	9
To connect the generator wires to the terminal block	9
Two-Wire Start Circuits	10
Wiring Honda-Type Generators	11
Wiring Onan-Type Generators	12
Error Indicator Wiring	13
Communication Cable	14
3.0 OPERATION	15
Operation and Test	15
Internal Sticker	16
Danger Label	16
4.0 TROUBLESHOOTING	17
5.0 SERVICE INFORMATION	18
6.0 WARRANTY	19
7.0 SPECIFICATIONS	20

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety instructions that should be followed during the installation and maintenance of this product.

To reduce the risk of electrical shock, and to ensure the safe installation and operation of this product, the following safety symbols have been placed throughout this manual to indicate dangerous conditions and important safety instructions.



WARNING - A dangerous voltage or condition exists in this area. Use extreme caution when performing these tasks.

AVERTISSEMENT - Une tension ou condition dangereuse existe dans cette zone. Faire preuve d'extrême prudence lors de la réalisation de ces tâches.



CAUTION - This procedure is critical to the safe installation or operation of the unit. Follow these instructions closely.

ATTENTION - Cette procédure est essentielle à l'installation ou l'utilisation de l'unité en toute sécurité. Suivre ces instructions de près.



NOTE - *This statement is important. Follow instructions closely.*

NOTE - *Cette déclaration est importante. Suivre les instructions de près.*

- All electrical work must be done in accordance with local, national, and/or international electrical codes.
- Before installing or using this device, read all instructions and cautionary markings located in the manual and on the generator.
- Do not expose this unit to rain, snow or liquids of any type. This product is designed only for indoor mounting.
- To reduce the chance of short-circuits, use insulated tools when installing or working with this product, the inverter, the batteries or generator.
- Remove all jewelry such as rings, bracelets, necklaces, etc., while installing the GSM. This will greatly reduce the chance of accidental exposure to live circuits.
- The inverter contains more than one live circuit (batteries, PV array, AC line, etc.). Power may be present at more than one source.
- To reduce risk of electric shock, disconnect all wiring before attempting any maintenance or cleaning. Turning off the device may not reduce this risk.
- Disable the generator's starting circuit by disconnecting the starter battery, spark plug, etc., before wiring this device.

SAVE THESE INSTRUCTIONS

Disclaimer of Liability

Since the use of this manual and the conditions or methods of installation, operation, use and maintenance of the unit are beyond the control of Xantrex Technology Inc., the company does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or any way connected with such installation, operation, use, or maintenance.



NOTE: Due to continual improvement through product updates, photographs and/or illustrations used in this manual may not exactly match your unit. Xantrex Technology Inc., reserves the right to update this product without notice or releasing an updated manual when fit, form or function are not affected.

The GSM (Generator Start Module) is an accessory for selected Trace™ inverter/charger models allowing automatic generator control and inverter error indication when using the optional SWRC remote control. The unit contains three relays providing normally open (N.O.), normally closed (N.C.) and common (COM) contacts. Relays RY7 and RY8 are used for generator control. Relay RY11 is used to indicate an error condition (via an external indicator) whenever the inverter's output is shutdown. This could be a bell, buzzer, light, etc.

The unit interfaces the inverter (via a phone type cable) to an auto-start/stop generator. Commands from the inverter control the generator when defined parameters (programmed via the SWRC or SWCA for PS Series models) are met. Refer to the inverter operator's manual for setting the various parameters for generator operation.

Front panel LEDs provide a visual display of relay activity whenever a relay contact receives an engage command from the inverter. A highly visible blue LED indicates the inverter is operational.

Unpacking and Inspection

Carefully inspect the contents of the shipping carton for damages. Report any damages to the carrier immediately.

The following items are packed with the GSM:

- Generator Start Module unit (GSM)
- 25-foot cable
- Operator's manual
- Generator Danger Label

Report any missing items to Xantrex Technology Inc., immediately.



Figure 1
Generator Start Module (GSM)

1.0 INTRODUCTION

Controls and Indicators

Indicator LEDs

Three LEDs located on the front panel of the GSM indicate the relay control signal status from the inverter.



NOTE: The LEDs are unaffected by the GSM's switch positions or fuse condition.

GENERATOR RUN/GLOWSTOP RELAY 7 LED

The yellow LED indicates relay RY7 is receiving a control signal to engage the relay and RUN the generator or provide a GLOWSTOP signal (for diesel generators). The LED turns ON when the relay's COM and N.O. contacts engage. The function of this relay is dependent on the selection made (using the SWRC) as to whether it is used to RUN the generator or provide GLOWSTOP control.

GENERATOR START RELAY 8 LED

The green LED indicates relay RY8 is receiving a START signal from the inverter. The LED turns ON when the relay's COM and N.O. contacts engage.

INVERTER OPERATIONAL LED

The blue LED indicates the inverter's operational status. If the inverter is powered and ready for operation, the blue SYSTEM OPERATIONAL LED turns ON as soon as the phone-type cable is plugged into the inverter. If the blue LED does not turn ON, the inverter is either not powered, is set to the CHG only mode without any utility pass-through, or has no AC output which may be caused by an error condition.

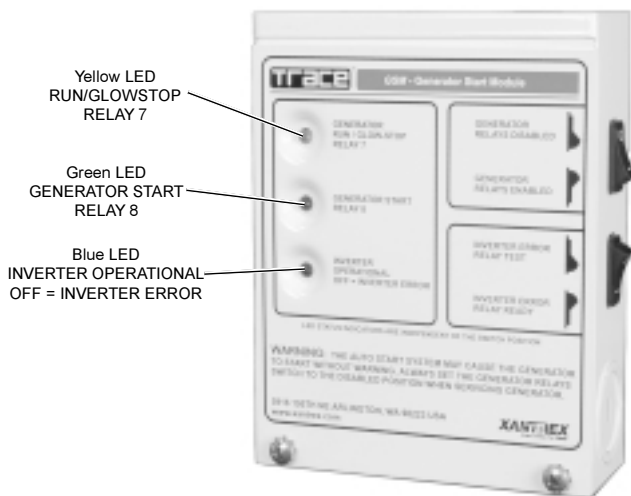


Figure 2
Indicator LEDs

Controls and Indicators (continued)

Switches

Two switches are provided on the right side of the GSM to effectively disconnect the relay coils from the inverter's supply voltage (11 VDC), thus preventing the relays from engaging if a control signal is sent out from the inverter. This is a safety feature which allows the generator to be serviced without it unexpectedly starting due to an inverter GEN-START command.

GENERATOR START Switch

The GENERATOR START switch enables the relays by providing the operating voltage to the relay coils RY7 and RY8. When the relays are enabled, they will respond to the control signals provided by the inverter. When the switch is in the RELAYS DISABLED position, the inverter control signals have no effect on relay operation (i.e., the COM and N.C. contacts engage). This switch does not affect the operation of the LEDs which continue to light whenever the inverter sends a CLOSE CONTACT command to the relays.

INVERTER ERROR Switch

The INVERTER ERROR switch provides a simple way to test an externally connected alarm. Once the alarm is tested, this switch should be switched to the RELAY READY position.

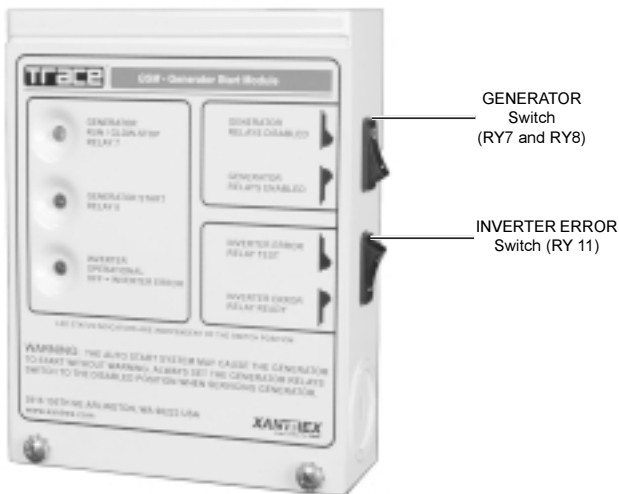


Figure 3
Switches

1.0 INTRODUCTION

Internal Components

The Generator Start Module (GSM) is designed to control generators equipped with two- or three-wire, electronic, automatic start operation (not all generators are supported) and provides the following features.

Relays

There are three 12 VDC relays, rated at 10 amps/250 VAC; 8 amps/30 VDC (for resistive loads), with gold contacts increasing the low-end signal range.

- Relay RY7 is used for generator RUN/GLOWSTOP functions.
- Relay RY8 is used for the generator START function.
- Relay RY11 can be connected to an external indicator device to display or sound an alarm whenever the inverter AC output is lost.
- The normally open (N.O.) and normally closed (N.C.) contacts are available to accommodate the various generator auto-start circuits.

Relay Terminal Block

Connections to the GSM are accomplished by the nine position, spring clamp, terminal block with quick connect levers. All relay contacts (N.O., COM and N.C.) are available at this connector, which accepts wire sizes from #28 AWG to #14 AWG. No tools are required to secure the wires as the spring clamp holds the wires securely in place.

Ground Stud

A ground screw is provided in the GSM to provide a safety ground path when hazardous voltages are connected to the relays. Connect this screw to a grounded conductor whenever high voltages (i.e., above 90 volts) are connected to the relays.



NOTE: No hazardous voltages are supplied from the inverter to power or control the relays; however, some generator control circuits may use a high voltage in their starting/control circuits or 120 V could be used for an external error indicator.

Fuses

Each relay's common (COM) contact is protected with a 6.3 amp (5 mm x 20 mm) 250 VAC fuse which will open if excess current is drawn through the relay contacts. Always replace this fuse with the same type and rating. Type GDC (Bussman) or 218 (Littlefuse) is recommended.



NOTE: These fuses can be replaced with lower amperage fuses to also protect the connected circuitry, if desired. Refer to the generator's specifications for the correct size fuse. In no case, should this fuse be replaced with one of a higher amperage.

Internal Components (continued)

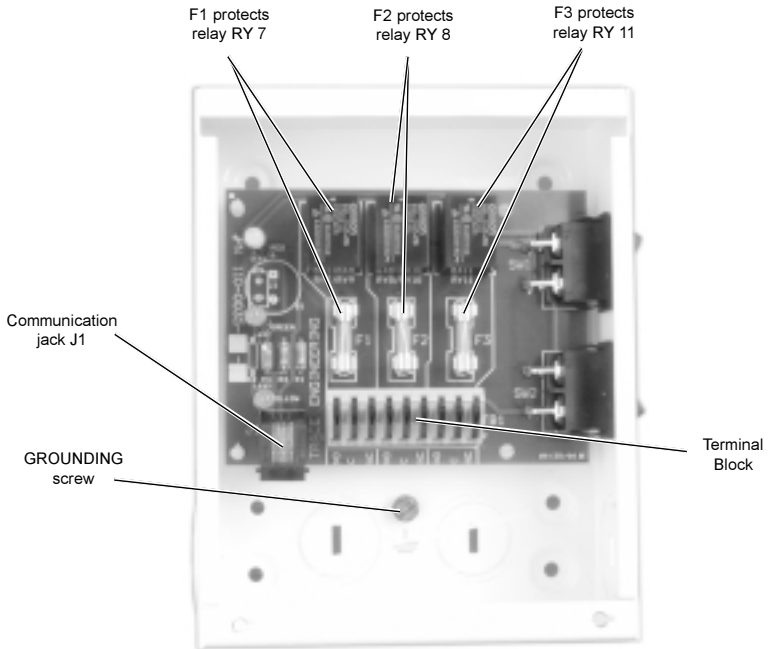


Figure 4
Internal Components

2.0 INSTALLATION

The GSM should be mounted close to the generator in a location where it is easily accessible. Knockouts, 3/4 and 1 inch, are provided for cable routing and conduit connections. Mount the GSM to a flat, vertical surface, such as a wall.

Tools Required

screwdrivers (Phillips and flat blade)
wood screws (#10)
anchors (if required)
drill and assorted bits
wire strippers



WARNING: before making any connections to the generator or inverter, ensure that all inverter power is disconnected and the generator starter is disabled.

Pre-Installation

Before installing the GSM, read all instructions and cautionary markings located in this manual. The unit should be mounted in a clean, dry, protected environment.

Determine the wire route (or conduit runs) to the GSM, generator, inverter and error indicator (if used).



NOTE: Check for existing electrical, plumbing, or other potential areas of accidental damage prior to making cuts in structural surfaces.

Mounting Procedure

- Remove the two Phillips screws from the unit's front panel and remove the cover.
- Open the inverter's access panel and locate the GEN connector if necessary. Refer to the inverter operator's manual for the location of the connector.
- Hold the GSM against the surface to be mounted and use the unit as a template to mark the four hole locations.



NOTE: Six holes are provided in the back panel of the GSM. Use the two top and two bottom screw holes.

- Drill holes for mounting and insert appropriate anchors if necessary.
- Use four #10 wood screws to mount the unit to the wall or other vertical surface.
- Install conduit runs if necessary for the generator control wires, error indicator (if used), and communication cable (between the inverter and GSM).

Mounting Procedure (continued)

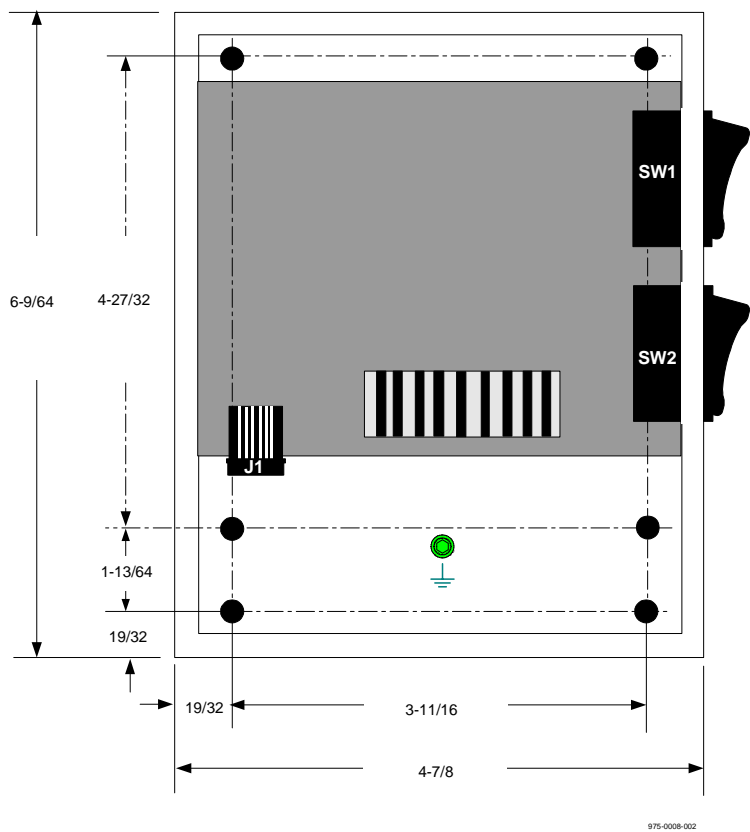


Figure 5
Dimensional Drawing

2.0 INSTALLATION

Mounting Procedure (continued)

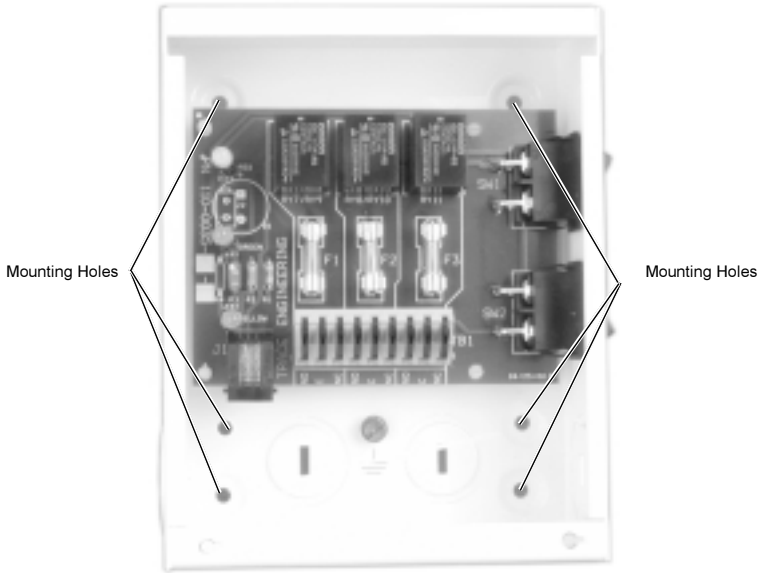


Figure 6
Mounting Holes

Generator Wiring

Connect the generator auto-start wires to RY7 for the RUN/GLOWSTOP functions and RY8 (if used) for the START circuit.

To connect the generator wires to the terminal block

- Lift the appropriate lever for the relay contact.
- Insert the wire (stripped back 1/4 inch) into the terminal block.
- Snap the lever down to secure the wire.

Please refer to the generator section of the inverter's operation manual for additional information.



NOTE: Due to the various wiring schemes used by different manufacturers, detailed wiring instructions can not be given in this manual. Please refer to the generator manufacturer's documentation for wiring details.



CAUTION: DO NOT WIRE THE RELAYS DIRECTLY TO A HIGH-AMPERAGE DEVICE, SUCH AS A STARTER MOTOR. THESE RELAYS ARE DESIGNED TO INTERFACE WITH THE GENERATOR'S AUTO-START CIRCUIT (LOW-CURRENT SIGNALS) ONLY. CONNECTION TO A HIGH-CURRENT DEVICE WILL OPEN THE FUSE IN THE COMMON LINE AND Possibly DAMAGE THE RELAY.



NOTE: All wiring described in this manual must be performed by a qualified, licensed electrician and meet local and national codes, such as NEC.

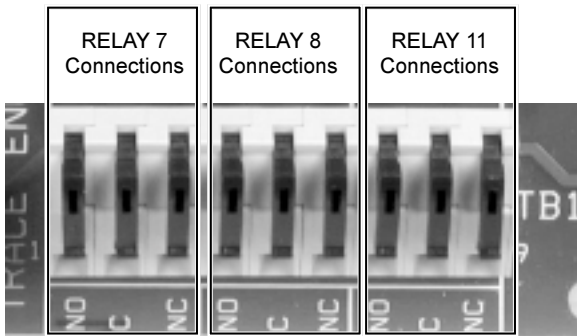


Figure 7
Terminal Block Connections

2.0 INSTALLATION

Generator Wiring (continued)

Two-Wire Start Circuits

Two-wire starting generators are the easiest to control and are highly recommended for this type of application. A contact closure starts the generator, while an open contact stops the generator.

- Connect the two wires from the generator's remote, auto-start, control circuit to the RY7, N.O. and COM terminals.
- Select *RUN* from the SWRC's *SET RY7 FUNCTION* menu item (found under the *GEN STARTING DETAILS (13)* menu heading).

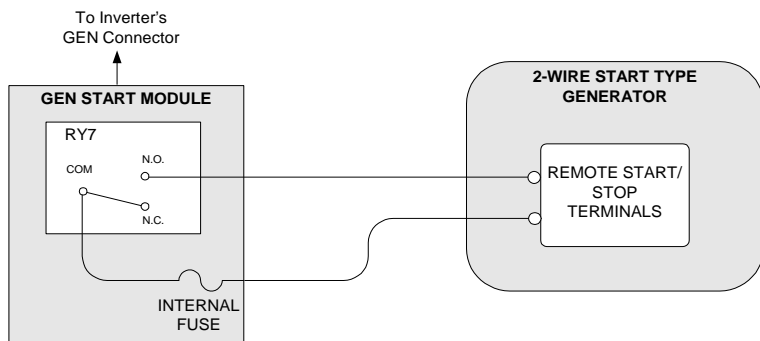


Figure 8
2-Wire Start Connections

Generator Wiring (continued)

Wiring Honda-Type Generators

In this starting configuration, relay RY7 duplicates the "RUN" position and RY8 duplicates the "START" position, cranking the starter motor.

- Connect the COM contact of RY7 to one of the RUN/STOP switch contacts of the generator.
- Connect the N.O. contact of RY7 to the other RUN/STOP switch contact of the generator.
- Connect the COM contact of RY8 to one of the START switch contacts of the generator.
- Connect the N.O. contact of RY8 to the other START switch contact of the generator.
- Select *RUN* from the SWRC's *SET RY7 FUNCTION* menu item (found under the *GEN STARTING DETAILS (13)* menu heading).

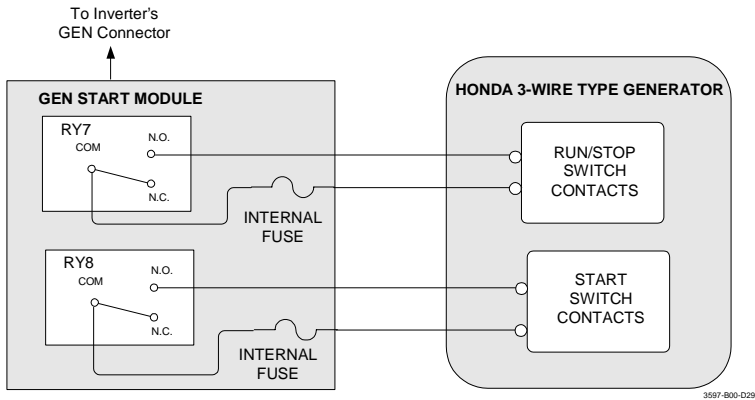


Figure 9
Honda-Type Connections

2.0 INSTALLATION

Generator Wiring (continued)

Wiring Onan-Type Generators

In this system, RY8 duplicates the "START" position and relay RY7 duplicates the "STOP" position. Some generators use a similar system with two push-button switches, one to start and one to stop the generator.

- Connect the COM contact of RY7 to one of the STOP switch contacts of the generator.
- Connect the COM contact of RY7 to the COM contact of RY8.
- Connect the N.O. contact of RY7 to the other STOP switch contact of the generator.
- Connect the N.O. terminal of RY8 to the START switch contact.
- Select *GLOWSTOP* from the SWRC's *SET RY7 FUNCTION* menu item (found under the *GEN STARTING DETAILS (13)* menu heading).

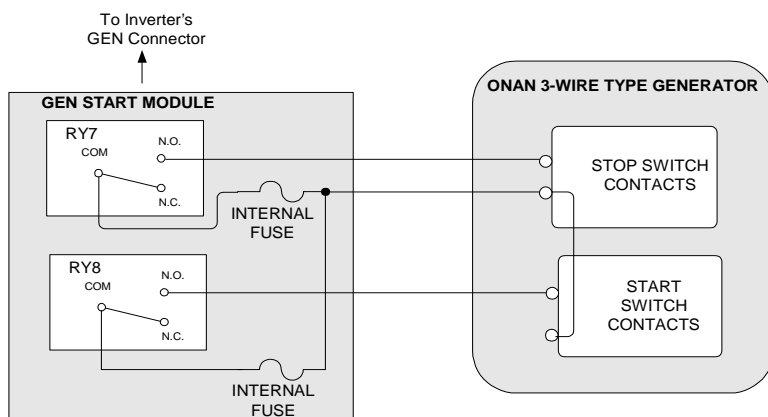


Figure 10
Onan-Type Start Connections

Error Indicator Wiring

If an error indicator is used (light, buzzer, bell, etc.), connect the wires to the RY11 relay contacts. Depending on the error indicator used, either the N.O. or N.C. contacts can be used. Typically, the N.C. and COM contacts are used to complete a circuit, turning on a light, buzzer, etc. The N.C. contacts are held "open" until an error condition is detected (or the AC output is OFF); at which time the N.C. contact will "close" completing the circuit and activating the external device.

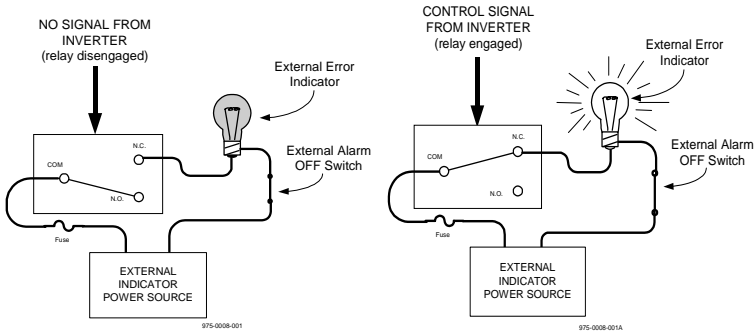


Figure 11
External Error Indicator Connections

For convenience, add an external OFF switch in line with the alarm device. This allows turning off the alarm until the inverter's output is restored.



NOTE: The diagrams shown here are intended as an example of how the relays operate an external alarm device. Actual alarm types may operate differently from these diagrams. Refer to the owner's manual for specific alarm wiring. Do not exceed the voltage or amperage ratings of the relay and fuse.

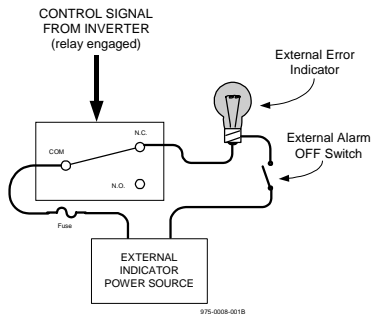


Figure 12
External Alarm OFF Switch

2.0 INSTALLATION

Communication Cable

The GSM is supplied with a 25-foot, telephone-type, cable with RJ11 connectors on each end.



NOTE: Longer cable lengths are available from Xantrex: part Numbers TC/50 for 50 feet (15.24 m) and TC/100 for 100 feet (30.48 m).

- Route the telephone-type cable through one of the knockouts fitted with a strain relief (or conduit).
- Connect one end of the cable to the jack labeled J1 on the GSM circuit board.
- Connect the other end of the cable to the jack labeled GEN inside the inverter (refer to the inverter/charger's operator's manual for location).
- Reinstall the cover on the GSM using the two Phillips screws.
- Reinstall the inverter's cover.



NOTE: Recheck all wiring before proceeding to the OPERATION section.

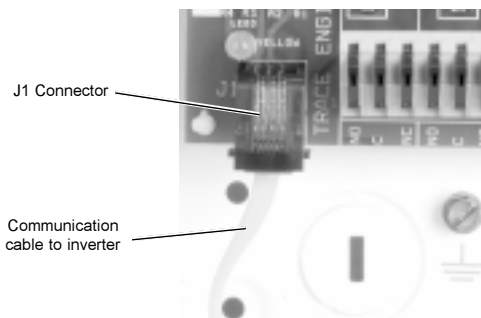


Figure 13
J1 Control Signal Connection

Operation and Test



NOTE: Refer to the inverter's operator's manual for setting the RY7 relay for either RUN or GLOWSTOP (whichever is appropriate for the generator).



NOTE: Ensure the inverter's MAXIMUM AC AMPS IN switch is in the AC2 position otherwise generator auto-start will not operate properly.

Immediately after installation, the GSM should be tested for proper operation of the generator and error indicator.

- Ensure the GENERATOR RELAY switch on the GSM is in the ON (ENABLED) position and the INVERTER ERROR relay is in the RELAY READY position.
- Reconnect all power to the inverter and generator start circuits. Turn ON the inverter. The blue INVERTER OPERATIONAL LED should immediately turn ON.
- Using the SWRC remote, press the green GEN MENU button to access the generator menu. Select ON from the display. The generator should begin to operate and the appropriate relay LEDs should be illuminated on the GSM.



NOTE: The LEDs will turn ON differently, depending upon the function selected in the SWRC's RY7 menu. On two-wire configurations, the RY8 relay is not used.

- If the test passes, select OFF from the SWRC's GEN MENU display.
- When the generator stops, select AUTO from the GEN MENU display (if desired) for automatic generator operation.
- If an external alarm is connected to the GSM, turn the INVERTER ERROR switch to the RELAY TEST position. The external device should activate.
- Place the INVERTER ERROR switch in the RELAY READY position.



NOTE: If the tests did not pass (i.e., the generator did not start or stop), recheck the wiring to the generator auto-start circuits and GSM for proper relay contact selection (N.O. or N.C.). Also check the settings for the RY7 relay (using the SWRC) and ensure they are correct.

3.0 OPERATION

Internal Sticker

Please refer to the component layout sticker located inside the front cover. This label can be used as a quick reference for component location and fuse sizing information.

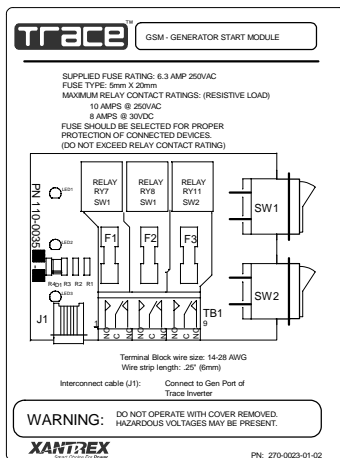


Figure 14
Internal Component Identification Sticker

Danger Label

A danger label is included with the GSM to warn service personnel that the generator may suddenly start without warning (due to an inverter command). Place this label close to the generator where it can easily be seen.

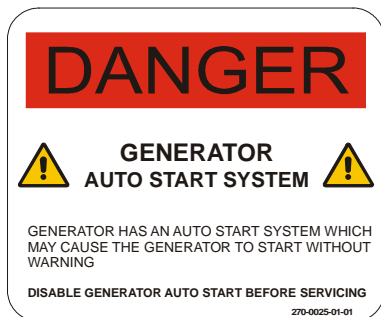


Figure 15
Danger Label

Troubleshooting

The GSM contains no serviceable parts other than the three fuses in the common contact circuit of the relays. If the module requires servicing, return it to Xantrex Technology Inc., or contact a Xantrex representative for assistance.

Symptom	Possible Cause	Remedy
Blue LED does not light.	Inverter not turned ON. Communication cable not connected to inverter or is in the wrong jack. Inverter error detected. Inverter is in CHG (charge only) mode.	Turn ON inverter. Check connection. Ensure it is connected to the proper jack in the inverter. Check the inverter for proper operation. Troubleshoot the cause of the error using the SWRC as a guide. Change mode or apply AC utility (or generator) power to the inverter's input.
Blue LED lights, green and yellow LEDs do not light.	Inverter is not setup correctly.	Check the setup of the inverter using SWRC. Refer to inverter operator's manual.
Green and yellow LEDs light but the generator does not start.	Switch is in the OFF position. Fuse(s) open. Generator wired incorrectly.	Ensure the upper switch is in the ON position. Replace fuse, troubleshoot cause of overcurrent. Recheck generator auto-start wiring and correct.
NOTE: For additional information, refer to the the troubleshooting section in the inverter's operator's manual.		

975-0008-003

5.0 SERVICE INFORMATION

Xantrex Technology Inc., takes great pride in its products and makes every effort to ensure your unit fully meets your independent powering needs.

If your product needs repair, contact our Customer Service department at: (360) 435-8826 to obtain an RMA# and shipping information; or, fax this page with the following information to: (360) 474-0616.

Please provide:

Model Number: _____

Serial Number: _____

Purchase Date: _____

Problem: _____

Include a telephone number where you can be reached during business hours and a complete return shipping address (P.O. Box numbers are not acceptable).

Name: _____

Address: _____

City: _____

State / Province: _____

Zip / Postal Code: _____

Country: _____

Phone: (____) _____

FAX: (____) _____

E-mail Address: _____



visit our website at: www.traceengineering.com

or e-mail us at: traceengineering.com

Limited Warranty

Xantrex Technology Inc., warrants its power products against defects in materials and workmanship for a period of two (2) years from the date of purchase, established by proof of purchase or formal warranty registration, and extends this warranty to all purchasers or owners of the product during the warranty period. Xantrex Technology Inc., does not warrant its products from any and all defects:

- arising out of material or workmanship not provided by Xantrex or its Authorized Service Centers;
- when the product is installed or exposed to an unsuitable environment as evidenced by generalized corrosion or biological infestation;
- resulting from abnormal use of the product, alteration, or use in violation of the instructions;
- in components, parts, or products expressly warranted by another manufacturer.

Xantrex Technology Inc., agrees to supply all parts and labor to repair or replace defects covered by this warranty with parts or products of original or improved design, at the company's option. Xantrex Technology Inc., also reserves the right to improve the design of its products without obligation to modify or upgrade those previously manufactured. Defective products must be returned to Xantrex Technology Inc., or its Authorized Service Center in the original packaging or equivalent. The cost of transportation and insurance on items returned for service is the responsibility of the customer. Return transportation (UPS Ground or equivalent) as well as insurance on all repaired items is paid by Xantrex Technology Inc.

All remedies and the measure of damages are limited to the above. Xantrex Technology Inc., shall in no event be liable for consequential, incidental, contingent, or special damages, even if Xantrex Technology Inc., has been advised of the possibility of such damages. Any and all other warranties, expressed or implied, arising by law, course of dealing, course of performance, usage of trade or otherwise, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, are limited in duration for a period of two (2) years from the original date of purchase.

Some states or counties do not allow limitations on the term of an implied warranty, or the exclusion or limitation of incidental or consequential damage, which means the limitations and exclusions of this warranty may not apply to you. Even though this warranty gives you specific legal rights, you may also have other rights which vary from state to state.



5916 - 195th Street N.E., Arlington, WA 98223 Phone: (360) 435-8826 Fax: (360) 435-2229

visit our website at: www.traceengineering.com

7.0 SPECIFICATIONS

Specifications

ELECTRICAL:

Operating Voltage	11 VDC (provided by inverter)
Operating Current	< 10 ma
Relay Contact Rating	250 VAC, 10 amps max. (resistive load only) 30 VDC, 8 amps max. (resistive load only)
Wire Size Accepted	28 AWG to 14 AWG
Switches	2 DPDT switches
Protection	3—Fuses, 6.3 amps max. (5 mm x 20 mm), time delay Bussman—GDC, Littlefuse—218 series
Indicator LEDs	3—LEDs, green, yellow and blue
Interface Cable 25 ft.	Telephone-type cable with RJ11 plugs
Interface Connection	Telephone-type RJ11 jack
Terminal Block	Snap lock type connection

MECHANICAL:

Material	Powder coated, steel enclosure
Dimensions	6.8" H x 4.8" W x 2.0" D (15.6 cm H x 12.4 cm W x 5.0 cm D)

