xantrex
Smart Choice for Power

Installation & Operator's Guide

Remote Monitor

Sun Tie XR Series

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Xantrex Technology Inc., is a world-leading supplier of advanced power electronics and controls with products from 50-watt mobile units to 1 MW utility-scale systems for wind, solar, batteries, fuel cells, microturbines, and backup power applications in both grid-connected and stand-alone systems. Xantrex products include inverters, battery chargers, programmable power supplies, and variable speed drives that convert, supply, control, clean, and distribute electrical power.

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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.

Date and Revision

February 2002, Revision A

Part Number

975-0032-01-02

Contact Information

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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.

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

NOTE - This statement is important. Follow instructions closely.

- 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 (or on) the manual, the inverter, the PV array, etc.
- 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 when installing or working with this product or system, use insulated tools.
- Remove all jewelry while installing this system. This will greatly reduce the chance of accidental exposure to live circuits.
- The inverter contains more than one live circuit (PV array, and AC). Power may be present at more than one source.

SAVE THESE INSTRUCTIONS

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1.0 INTRODUCTION

The remote monitor is an add-on accessory for the Sun Tie XR (STXR) Series product line. The remote monitor adds additional functions for the user which are not directly available on the Sun Tie XR display. All display features are accessible with the remote's two front-panel push buttons.

FEATURES

- 16 character, dual-line, alphanumeric LCD featuring 4 informative data screens:
  - System status and daily energy status monitor
  - Energy produced since reset and total energy since installed
  - Technical operator meters
  - Troubleshooting log
- Easy mounting to interior wall
- Simple two button operation (SCROLL/RESET and POWER)
- Built in scroll feature to move through menu items
- Dual color (red/green) LED status indicator
- Battery backup for night time illuminated display
- Operates with all Sun Tie XR models

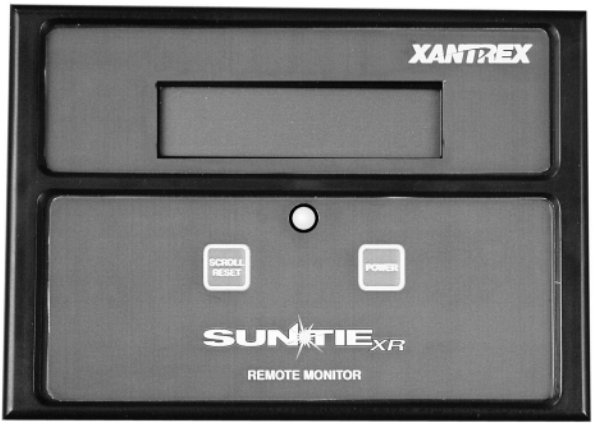

Figure 1-1
Sun Tie XR Remote Monitor

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1.0 INTRODUCTION

UNPACKING AND INSPECTION

Upon receiving the Sun Tie XR remote monitor, check that the following items are included:

- Sun Tie XR remote monitor (front panel, adaptor and mounting bracket)
- 9-volt battery (installed)
- Wood screws
- Manual
- 50-foot communications cable

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REQUIRED TOOLS

- Phillips screw driver
- 3/32 and 3/16 inch drill bits
- Hole saw

PRE-INSTALLATION

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

Determine the cable route to the Sun Tie XR.

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

Before mounting the Sun Tie XR remote monitor:

- Using a pair of cutters, clip and remove the nylon tie down strap holding the battery in place. If this is not done, the unit will not sit flush against the wall when surface mounted.

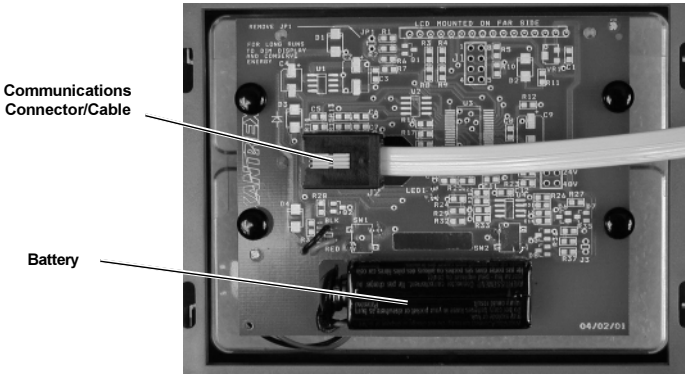

Figure 2-1
Battery Location/Cable Installation

2.0 INSTALLATION

Mounting

The unit can be surface mounted (using the bezel supplied) or flush mounted into a rectangular opening. Provide at least one-inch clearance behind the meter circuit board for the cabling when flush mounting.

The Sun Tie XR remote monitor (STRM) ships (pre-assembled) in three sections:

- Monitor panel
- Bezel for surface mounting
- Mounting bracket

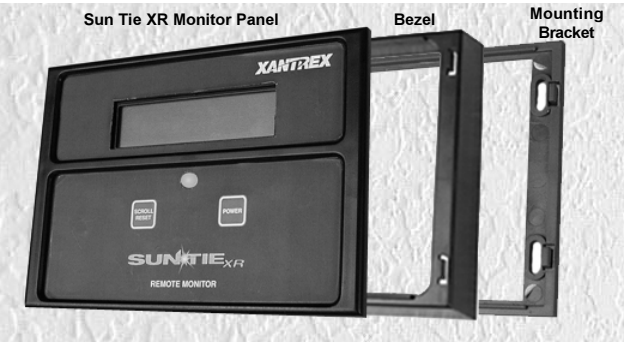

Figure 2-2
STRM and Mounting Components

Surface Mounting

- Use the mounting bracket as a template and mark the positions for the screw holes, as well as an area where the cable(s) will feed through.
- Drill out the four screw holes (if required) and wire access opening. Use a 3/16" bit if the supplied plastic anchors are used. If placing the screws directly into the backing material, use a 3/32" bit. The wire access hole should be at least 1/2" diameter to allow the connector to pass through.
- Mount the bracket using the screws (and anchors if necessary) supplied (Figure 2-3). Do not overtighten the screws.
- Install the bezel onto the bracket by snapping it tightly into place.
- Connect the communications cable (from the Sun Tie XR) to the port on the remote monitor's printed circuit board (Figure 2-1).
- Install the remote monitor's panel onto the bezel by pressing it tightly into place.
- Run the cable to the Sun Tie XR unit and connect it to the REMOTE PORT connector. Refer to the Sun Tie XR manual for location of the jack.

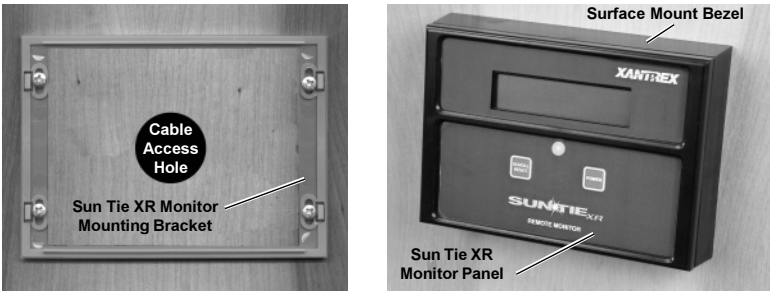

Figure 2-3
Surface Mounting the STRM Using the Bezel

2.0 INSTALLATION

Flush Mounting

To flush mount the remote monitor, an opening must be cut in the backing material to provide room for the circuit board, cable, and connectors. Allow at least one-inch depth behind the circuit board for the connectors and cable.

- Use the bracket as a template and mark the positions for the screw holes. Mark the open area to be cut out for the circuit board.

> *NOTE: **Carefully** cut out the circuit board area from the backing material (i.e., wallboard). Cut **inside** the lines so there is enough area left to securely hold the screws.*

- Drill out the four screws holes (if required) and wire access opening. Use a 3/16" bit if the supplied plastic anchors are used. If placing the screws directly into the backing material, use a 3/32" bit.
- Mount the bracket using the screws (and anchors if necessary) supplied (Figure 2-4). Do not overtighten the screws.
- Connect the communications cable jack (from the Sun Tie XR) to the port on the remote monitor's printed circuit board (Figure 2-1).
- Install the remote monitor panel onto the bracket by snapping it tightly into place.
- Run the cable to the Sun Tie XR unit and connect it to the REMOTE PORT connector. Refer to the Sun Tie XR manual for location of the jack.
- It is recommended that the cable is not placed in a metallic conduit to minimize noise on the data line. Metallic conduits can capture noise emissions and may interfere with the data line. A PVC conduit is recommended.

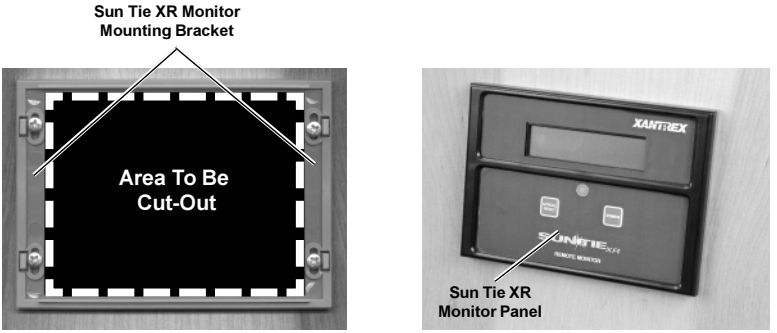

Figure 2-4
Flush Mounting the STRM

INDICATORS AND CONTROLS

The Sun Tie XR remote monitor contains the following controls and indicators:

1. Sixteen character, two-line, alphanumeric Liquid Crystal Dispaly (LCD)
2. Dual color (red/green) LED Status indicator
3. SCROLL/RESET push button
4. POWER push button

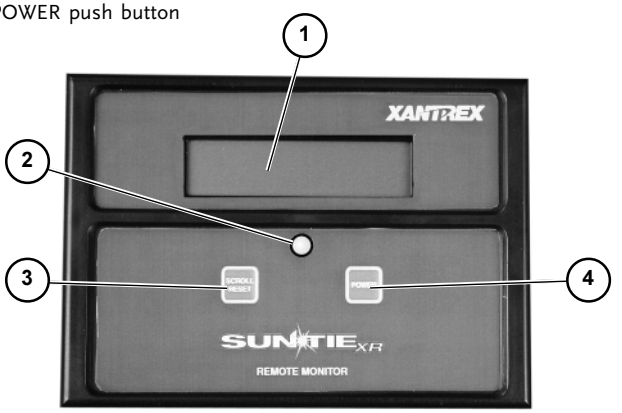

Figure 3-1
Front Panel Controls and Indicators

OPERATION

Power Up

Upon the Sun Tie XR startup, three identification screens will momentarily be displayed:

Startup Screen 1

SUNTIE XR
WITH SUNSWEEP

Start-up Screen 2

TRACE
A XANTREX BRAND

Start-up Screen 3

REV X.X

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3.0 OPERATION

Indicators and Controls (continued)

User Displays

Two user displays are always available whenever the inverter is producing power. These displays restart every day (or when the available sunlight is sufficient to allow the Sun Tie XR to start producing power).

User Display 1

User Display 1 displays inverter status and daily energy produced.

When the inverter starts, the Sun Tie XR Remote Monitor (STRM) will display *"RECONNECTING"* during the Sun Tie XR's 5-minute initialization period. The green LED will also flash during this period. Upon completion of the timer and with satisfactory operating conditions, the inverter will begin producing power. The status LED will turn to a steady green. At this point, the remote meter will display *"PRODUCING ENERGY"* and the total Wh produced since the inverter was last started (or reset) will begin to accumulate.

Upon Startup, the initial User Display 1 screen and status LED appears as follows:

After the five-minute timer elapses the display and LED changes to:

User Display 2

User Display 2 displays resettable and totalizing energy meters.

Pressing the SCROLL/RESET push button once, advances the remote to User Screen 2.

User Screen 2 allows monitoring the total energy harvested by the Sun Tie XR since it was last reset (on the first line) and the total energy harvested since the STRM was installed (on the second line).

User Display 2 appears as follows:

NOTE: The first line in the display, RESET 0 Wh, can be reset to zero by pressing and holding the RESET/ SCROLL push button for 5 seconds.

NOTE: The STRM will store the accumulated Wh readings to non-volatile memory every 15 minutes.

Indicators and Controls (continued)

POWER Push Button

When the STXR is online, it powers the remote monitor and display circuits. When the STXR is off-line, the battery in the remote provides power to the display for 15 seconds after the POWER push button is pressed for viewing User Display 1 and User Display 2.

To view the display while the STXR is off-line, press the POWER push button once. This will power the remote monitor and allow viewing the user display screens for *15 seconds* .

During the 15 second power-up period, it is possible to scroll through the two screens as described previously and reset the *"RESET 0 Wh"* display to zero.

> *NOTE: Resetting this value also resets the troubleshooting log (which is only available when the STXR is ON).*

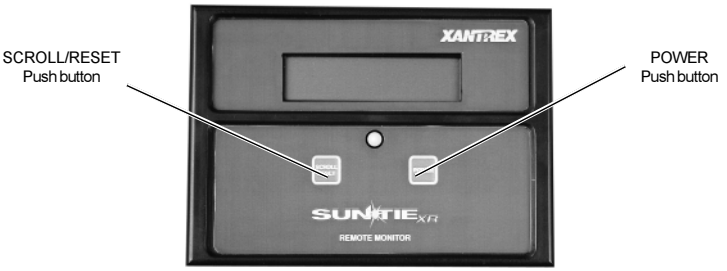

Figure 3-2
SCROLL/RESET and POWER Push buttons

When the STXR is OFF, press the POWER button once to allow viewing the display for 15 seconds.

To access the USER displays while in battery power mode:

- Press the POWER push button until USER DISPLAY 1 is displayed.

  DISCONNECTED
  561 Wh

- Press the SCROLL/RESET push button to access USER DISPLAY 2.

  RESET 337 Wh
  TOTAL 7777 Wh

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Resetting the Wh Display

USER DISPLAY 2 contains two lines of data. The first line, *RESET 0 Wh,* can be reset to zero. This is useful for keeping tabs on the daily power harvested (after the inverter is OFF).

- While in battery power mode (and USER DISPLAY 2), press and hold the SCROLL/RESET push button (for approximately 5 seconds) until the display resets to zero.

The remote monitor is now reset and will display the daily Wh's produced the following day (starting from zero).

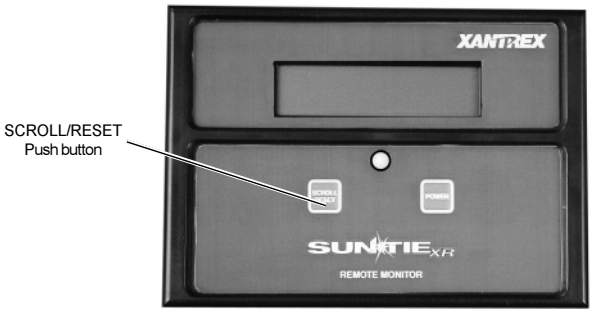

Figure 3-3
Resetting the Wh Display

Technical Display Screens

When the inverter is online, two additional information screens are available, providing technical information for dealers, installers and technical support personnel. This information can be used to check the inverter's instantaneous parameters or for troubleshooting.

To access the technical display screens:

- Press the RESET/SCROLL and POWER buttons simultaneously.

The first screen displays: AC voltage (V), line frequency (Hz), DC voltage from PV array (V), instantaneous power produced in watts (W), and daily cumulative energy in watt hours (Wh).

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Tech Display 1

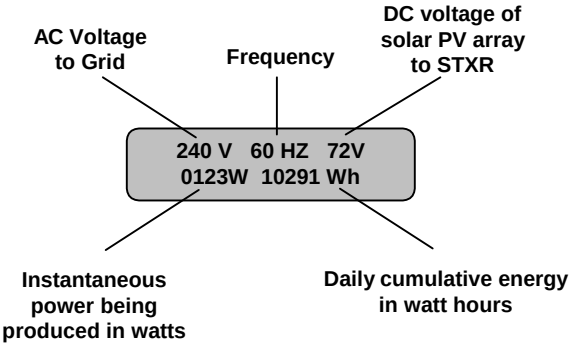

Figure 3-4
Technical Display 1

The second screen displays an inverter fault log of events that occurred since the remote monitor was last reset by the user. The faults displayed include: AC voltage fault (V), frequency fault (H) and over-temperature (OT). The display also includes a 5-minute, inverter countdown timer (300 sec). To access the Tech Display 2 screen, press the SCROLL/RESET push button once.

Tech Display 2

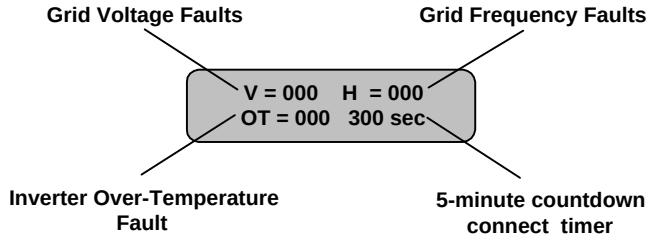

Figure 3-5
Technical Display 2

Fault Log Description:

- "V" represents any AC over/under voltage fault detected on the grid.
- "H" represents any over/under frequency fault detected on the grid.
- "OT" represents a self-protection, over-temperature shutdown.

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These values will count up to 255 log events and then reset to zero (0). The log can manually be reset to zero (0) also when User Display 2 is reset, as previously described.

NOTE: Always refer to the inverter specifications for voltage, frequency and over-temperature values.

NOTE: Faults are only added to the fault log if the value detected is outside of the specified tolerance range.

The 5-minute countdown timer (in seconds) allows the operator or technician to view the reconnecting of the STXR when it restarts. The STXR will not start until the counter reaches 000 sec and all conditions for producing power are satisfied.

This counter resets to 300 sec each time the STXR is powered down, reset, or disconnected from the grid. The countdown timer is useful for monitoring the time duration until the inverter will attempt to reconnect to the grid and begin operation. In addition, the timer can be used to gauge the amount of time between utility voltage or frequency occurrences.

Exiting the Technical Display Screens

- Press the RESET/SCROLL button until the User menu is displayed.

Status LED

The Status LED is a bi-color LED (green/red) which can indicate the status of the STXR or can be used for troubleshooting purposes.

- When the STXR is performing its 5-minute countdown, the LED flashes green.
- Once the STXR is connected to the grid and providing power, the LED turns to a solid green.
- A slowly flashing red LED (1-2 flashes/second) indicates the DC voltage is out of the inverter's DC input requirements.
- A solid red LED indicates the DC voltage is correct, but the AC voltage from the grid is not available.

Refer to the troubleshooting section of this manual for additional information regarding the Status LED.

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BASIC TROUBLESHOOTING

Problem	Cause	Remedy
The remote monitor's LED does not illuminate red or green and the STXR does not operate in sufficient sunlight.	PVGFP, AC or DC breakers are switched OFF.	Turn ON breakers in the sequence described in the operating section.
	No AC grid or DC array voltage is present.	Check AC connections and ensure 240 VAC is present at the inverter's AC disconnect. Check DC connections and ensure 50-125 VDC is present on the inverter's DC disconnect.
	20 amp fuses on the inverter's combiner board are missing or open.	Install combiner board fuses. Check PV array for short circuits or improper sizing for the 20 amp fuses.
The red LED on the remote monitor is illuminated. The green LED never illuminates in a flashing or solid mode.	The inverter does not recognize any AC input signal.	Ensure the inverter's AC disconnect is switched ON. Check the AC voltage at the inverter and ensure AC voltage is present. Check source of the AC voltage.
The red LED is flashing.	Inverter does not recognize the appropriate DC signal.	Check the DC voltage on the positive and negative input terminals. The DC voltage must be 50 volts open circuit or greater to initiate inverter operation. Check for incorrectly wired PV arrays or try again on a day with greater sunlight intensity.
Upon startup, the red LED illuminates and goes into a flashing green mode. The flashing green LED continues for over 5 minutes and never illuminates solid.	The inverter recognizes the AC grid is present, but grid voltage or frequency are not within the appropriate tolerances. Grid voltage must be between 211 and 264 VAC.	Check the AC voltage and frequency with a multimeter/frequency meter. Wait for grid power to return to acceptable voltage and/or frequency. Notify the utility company that the voltage of frequency is outside of the appropriate boundries.
The remote monitor's LED illuminates a solid green but does not produce any power as indicated by the LCD watt and watt-hour meters.	The inverter recognizes the appropriate AC grid and DC array voltages are present.	Check the input voltage on the STXR's DC disconnect. The STXR may not produce power due to insufficient sunlight or the DC voltage is on the lower threshold of the maximum peak power tracking window. Wait for sunlight intensity to increase and ensure solar PV array panels produce sufficient voltage for inverter initialization.
100 amp DC breaker trips.	Current from the array exceeds the DC input breaker rating.	Check array size and ensure the DC input does not exceed the breaker rating.
	A lightning strike hit near the PV array.	Check lightning arrestor, breakers, panels, diodes, DC wire insulation and other components for damage. Replace any damaged components and reset the breaker.
Open 20 amp combiner board fuse(s).	A short to ground exists in the DC array wiring.	Check all DC array wiring for improper wiring or exposed wires.
	Array is producing current in excess of the fuse rating.	Check array size and ensure the DC input current does not exceed the fuse rating.
PVGFP breaker trips.	A ground fault exists in the DC array wiring.	Check all PV array wiring for improper wiring, exposed wires, or short circuits by removing all fuses or disconnecting all PV array strings. Reconnect all circuits until the PVGFP trips. The short will be in the last circuit connected.
Voltage on the combiner board is near zero volts with the fuses installed. With fuses removed, the voltage returns to normal.	One or more inputs to the combiner board may have been installed with reversed polarity.	Recheck the polarity of each input to the combiner board and correct if necessary.
The remote monitor's display is ON, but it is unreadable.	Either the signal or display circuitry is faulty.	1) Check connections from the inverter to the remote monitor. 2) Reset inverter (disconnect DC power). 3) Shield remote wiring. If none of the above remedies work, have the remote monitor (or inverter) serviced.
Tech Display 2 shows numerous voltage/frequency line faults and the inverter produces less power than expected.	The utility company is operating the grid outside of the specified boundries.	Notify your utility company.
The remote monitor will not display when the inverter is off and the power mode is initiated, as described on page 9.	The 9-volt battery is disconnected or drained.	Replace the 9-volt battery as described on page 14.

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4.0 TROUBLESHOOTING

BATTERY REPLACEMENT

The 9-volt battery should be replaced on a yearly basis.

Removing the Battery

- Remove the monitor panel by gently pulling it away from the mounting bracket.
- Remove the battery from its slot in the back of the remote meter and carefully disconnect the connector.
- Dispose of the battery properly.

Installing a New Battery

- Connect a standard 9-volt battery to the battery connector. Verify the connections snap onto the battery securely.
- Fit the battery into the rectangular opening in the circuit board.
- Reinstall the STRM to the mounting bracket.

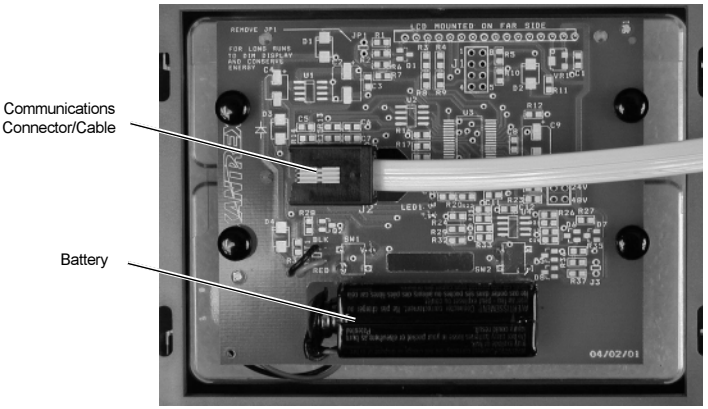

Figure 4-1
Battery/Cable Installation

NOTE: Replacing the battery will not zero out stored cumulative values.

APPENDIX A - SPECIFICATIONS

Function	Specification
LCD Display	16-character, dual line LCD
Features	• Daily energy production • Total energy production since installed • Resettable energy meter • Technical troubleshooting meters with data logging capability
LED Status Indicator	dual-color (green/red) LED
Power	9-volt battery backup (included) for night time monitoring (the STXR provides the power when it is ON)
Dimensions	3-7/8" H x 5-3/8" W x 1-1/4" D (14 cm H x 9.5 cm W x 3.2 cm D)
Weight	approximately 3 lb (1.36 kg)
Mounting	
Surface	using molded plastic adaptor
Flush	using plastic mounting bracket
Environment	indoor use only

Specifications @ 25 °C.
Specifications subject to change without notice.

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APPENDIX B – PRODUCT AND SYSTEM INFORMATION

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 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 countries 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.

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APPENDIX B - PRODUCT & SYSTEM INFORMATION

RETURN MATERIAL AUTHORIZATION POLICY

You must obtain a Return Material Authorization (RMA) number from Xantrex before returning a product directly to Xantrex. Products returned without an RMA number or shipped collect will be refused. When you contact Xantrex to obtain servcie, be prepared to supply the serial number of your product and its date of purchase as well as information about the installation and use of the unit. Record this information inthe SERVICE INFORMATION section on page B-3 of this guide.

RETURN MATERIAL PROCEDURE

If you are returning a product, follow this procedure:

1. Obtain an RMA number and a shipping address from Xantrex.
2. Package the unit safely, preferably using the original box and packing materials. Include the following:
   - The RMA number
   - A copy of your dated proof of purchase
   - A return address where the repaired unit can be shipped
   - A contact telephone number
   - A brief description of the problem
3. Ship the unit freight prepaid to the address provided in step 1.

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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. You can also contact us by email at tracewarranty@traceengineering.com.

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: _____

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