

Installation Manual

Pika Islanding Inverter

X7602/X11402

Part of the Pika Energy Island™





Islanding Inverter

Serial Number:

RCP Number:

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Section 1: Introduction




About This Manual

This Installation Manual provides instructions and recommendations for installing and commissioning Pika Grid Supporting Utility Interactive Islanding Inverters (X7602/X11402) for simplified solar-plus-storage. Pika Islanding Inverters are storage-ready inverters that connect to Pika PV Link™ DC optimizers and smart batteries to form a Pika Energy Island™ system.

This Installation Manual includes full details on mounting, wiring, safety, battery integration, and other key aspects of installing Islanding Inverters. The companion document to this Installation Manual is the Pika Islanding Inverter Operation Manual. Please reference the Operation Manual for complete information on user-configurable features including Device Settings and Operational Modes. Some information on user-configurable features is included here, but is comprehensively detailed in the Operation Manual.

Use This Document for the Following Serial Numbers	
X7602-1164	and higher
X11402-2057	and higher

Symbols used in this Manual

	WARNING: This indicates a fact or feature very important for the safety of the user to prevent injury or death and/or which can cause serious hardware damage if not applied appropriately.
	CAUTION: Presents information to prevent damage to this product
	EARTH GROUND SYMBOL

About Pika Islanding Inverters: X7602/X11402

Islanding Inverters connect to the Pika PV Link optimizers to form the Pika Energy Island system for grid-tie solar-plus-storage. Upon the loss of grid power, Islanding Inverters disconnect from the grid and provide AC power to support protected loads. The inverter provides islanding power without an external autotransformer. High voltage smart batteries connect to Islanding Inverters with no additional storage interface.

All Pika Energy products use the REbus™ 380 VDC nanogrid to connect energy sources, storage, loads and the grid. The REbus nanogrid automates the flow of power to enable plug-and-play setup and operation of Pika Energy equipment. For more information about REbus, visit pika-energy.com.

In the diagram below, an Islanding Inverter is directly connected to PV Link optimizers and high voltage lithium ion storage on the DC (REbus) line, shown the the left of the inverter. To the right of the inverter are AC lines: 240 VAC for grid and home loads, and Protected load support up to 50 A.

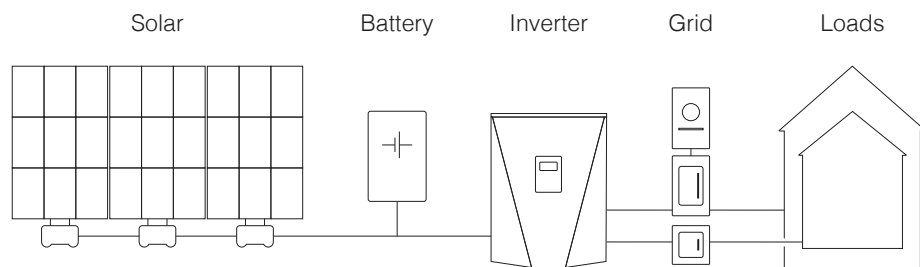


Fig 1. Example Energy Island

For project-specific one-line diagrams, contact Pika Energy.

Section 2: Safety Specifications

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS!

General Warnings



WARNING: DO NOT ATTEMPT TO SELF-INSTALL INVERTER. A QUALIFIED SOLAR INSTALLATION PROFESSIONAL OR ELECTRICIAN MUST INSTALL AND COMMISSION PIKA ENERGY EQUIPMENT. CONTACT PIKA ENERGY FOR A LIST OF AUTHORIZED INSTALLERS IN YOUR REGION.

SHOCK RISK: HIGH VOLTAGE ELECTRICITY

WARNING: Before installing the Pika Energy Island, read all instructions and caution markings in this guide and installation manual. Consult installation documentation for all other REbus devices on the system.

WARNING: Electrical installation in the United States shall be done in accordance with all local electrical codes and/or the National Electrical Code (NEC), ANSI/NFPA 70.

WARNING: Electrical installation in Canada shall be done in accordance with all local electrical codes and/or the Canadian Electrical Code.

WARNING: Connecting the Pika Energy Island to the electric utility grid must only be done after receiving prior approval from the utility company and installation completed only by qualified personnel/licensed electrician(s).

WARNING: This equipment is NOT intended for use with life support equipment or other medical equipment or devices.

WARNING: Disconnect all smart batteries and turn their Battery Disconnect switches to OFF before servicing the inverter or touching electrical terminals. Refer to smart battery documentation for complete safety instructions.

Safety Shutdown

The Pika Energy Island system can signal to connected devices on REbus to shut down and limit output voltage to a safe level. The red Safety Shutdown button on the front of the Pika Islanding Inverter activates a Safety Shutdown. An external shutdown button may also be installed, given appropriate labeling. See the section titled “External Safety Shutdown Switch” in this manual for more information.

To enter a Safety Shutdown, press and hold the red button on the front of the inverter. The Safety Shutdown LED will illuminate and the LCD screen will indicate a Safety Shutdown has been initiated.

In a system configured to provide backup power, the DC bus will remain energized on loss of AC grid power. Upon entering a Safety Shutdown, a shutdown signal will be transmitted to all devices connected to REbus. In Safety Shutdown, the Islanding Inverter will disconnect from the grid, stop sourcing power to REbus, and immediately disable all sources on REbus by sending a global shutdown signal. All PV Link optimizers will disconnect their output. The Safety Shutdown LED will be illuminated to show that the inverter has entered a Safety Shutdown. DC bus voltage will be displayed on the inverter screen.



WARNING: BEFORE PERFORMING SERVICE, ALWAYS INITIATE A SYSTEM-WIDE SAFETY SHUTDOWN AND TURN THE FRONT PANEL BATTERY DISCONNECT SWITCH TO “OFF” ON ALL CONNECTED SMART BATTERIES. UNLESS THE BATTERY SWITCH IS “OFF”, THE BATTERY MAY PERFORM A POWER SEARCH AT ANY TIME WHICH WILL CREATE DANGEROUS VOLTAGE AT THE REBUS TERMINALS.

Section 3: Mounting the Inverter

The Islanding Inverter weighs 31.6 kg (70 lbs). Use appropriate fasteners to hold the mounting bracket to a strong surface. Engage screws with at least two studs or other structural members. The mounting bracket has clearance holes for 0.25" fasteners with slots to accommodate different stud spacings.



CAUTION: Mount the inverter to a strong, stable surface. Never mount to drywall, plaster, or other non-structural wall treatments. Always engage fasteners with at least two studs or other structural members.

With an assistant, lift the inverter, center it over the bracket, and lower gently. Align the tabs on the wall bracket with the slots on the back of X7602/X11402. Secure the inverter to the wall with two fasteners through the back wall of the wiring compartment.

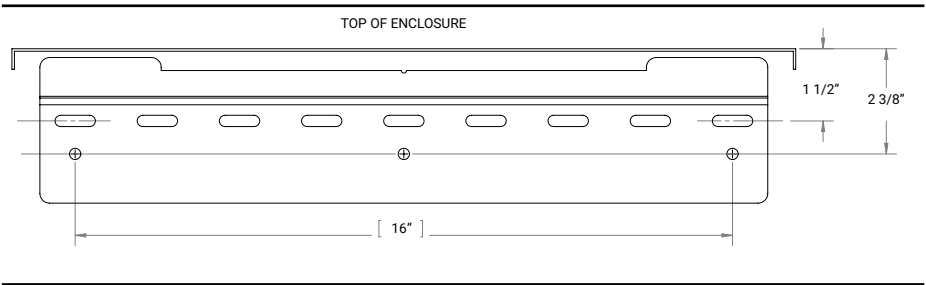


Fig 6. X7602/X11402 Mounting Bracket

Pika Islanding Inverters are designed to be mounted upright on a vertical wall only. Observe all minimum airspace clearances as shown. Never obstruct the inverter exhaust louvers. Do not allow splashing water to enter through the louvers.

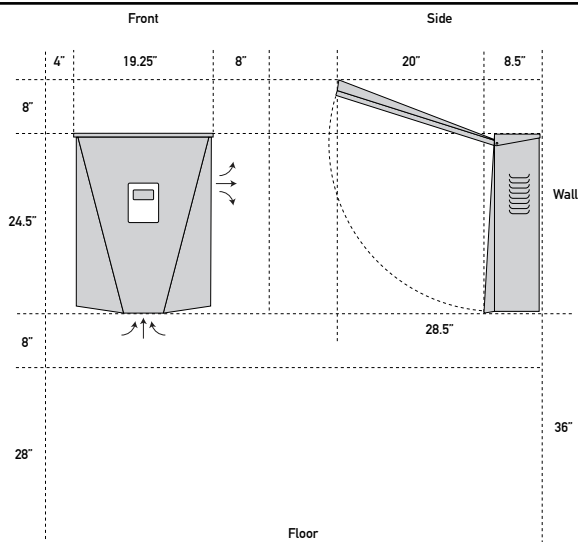
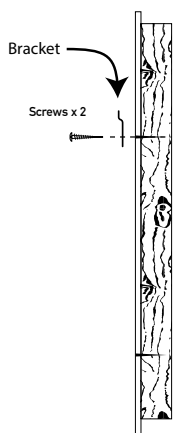
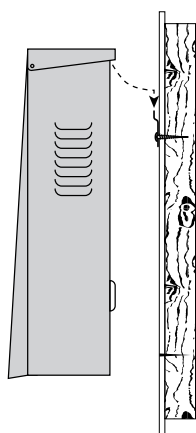


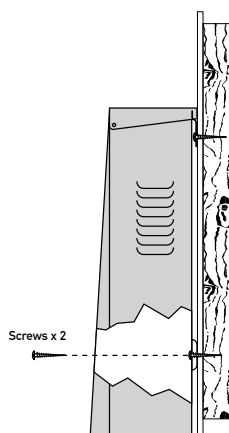
Fig 5. X7602/X11402 Mounting Clearances



1. Install Bracket



2. Hang Inverter on Bracket



3. Install Internal Mounting Screws

Fig 7. X7602/X11402 Hanging Bracket

Section 4: Electrical Connections



WARNING: Verify all system voltages are safe before wiring. Always disconnect all AC and DC sources of power before touching terminals. Ensure no dangerous voltages are present on conductors and terminals before wiring.

WARNING: Disconnect all smart batteries and turn their Battery Disconnect switches to OFF before servicing the inverter or touching electrical terminals. Refer to smart battery documentation for complete safety instructions.

The Islanding Inverter wiring compartment is located in the bottom of the enclosure. To access the compartment, remove the wiring compartment cover. Make all electrical connections inside the wiring compartment. Use the provided screws to install the cover once all wiring connections are complete.

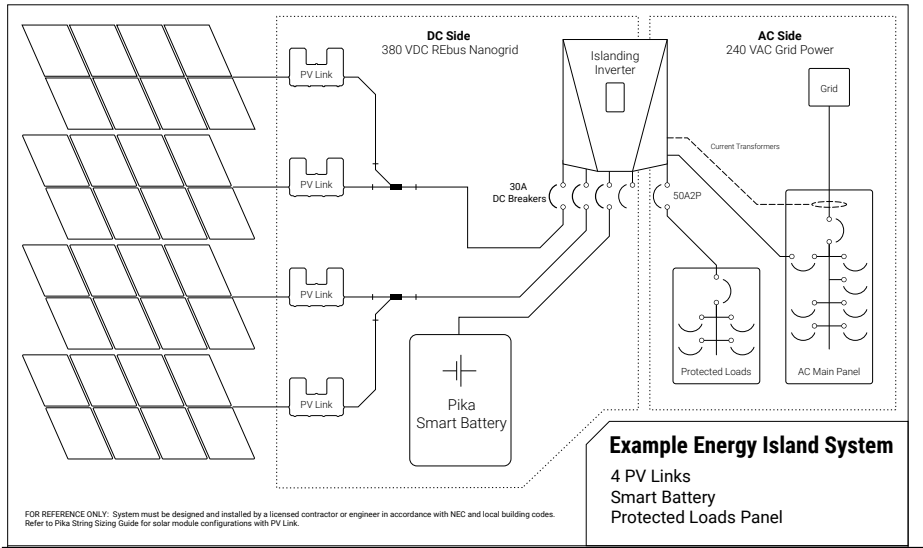


Fig 8. Example of 10kW Energy Island with Smart Battery and Protected Loads

Wiring Guidelines

X7602/X11402 includes an integrated AC and DC wiring compartment. As such, proper installation techniques should be employed to restrain service loops and to separate AC, DC and isolated circuits. All installed conductors must be rated for at least 420 V.

Always use wiring methods in accordance with National Electrical Code (ANSI/NFPA 70) or other applicable codes. Field terminals are intended for copper conductors only. Do not use field wiring leads smaller than 18 AWG. Torque all terminals as specified in "Section 11: Technical Reference" on page 45.

All permanently-installed conductors within the X7602/X11402 are sized in compliance with NEC Table 310.15(B)(16) (formerly Table 310.16). All pressure terminals are factory-installed and securely fastened.

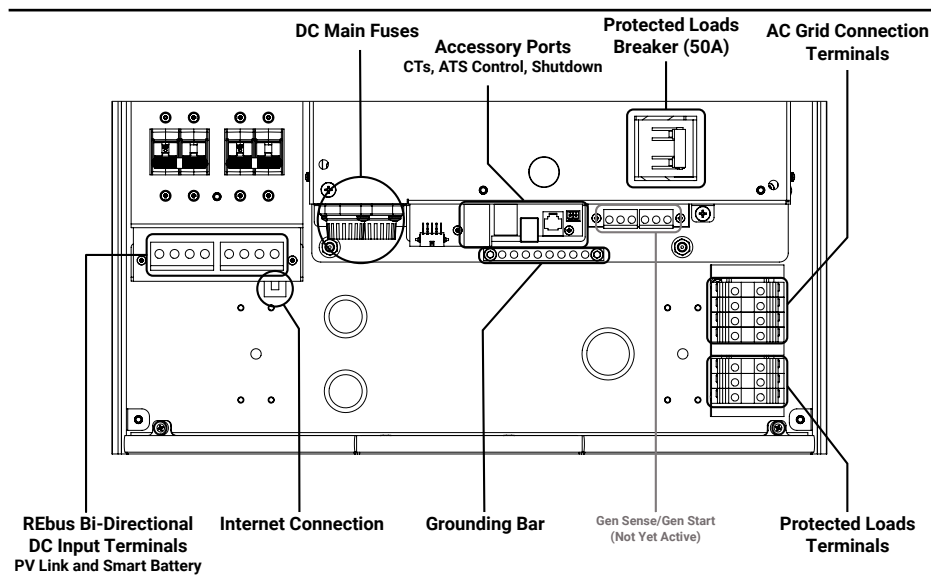


Fig 9. X7602/X11402 Islanding Inverter wiring compartment

Knockout Dimensions and Locations

There are nine knockouts located on the bottom of the enclosure, three in the back, and one on the left hand (DC) side of the wiring compartment. Use reducing washers to accommodate smaller conduit sizes.

To maintain the integrity of X7602/X11402's NEMA 3R enclosure, use raintight or wet locations hubs in compliance with UL514B, the standard for conduit, tubing, and cable fittings.

Reference the table below and the accompanying diagram for available knockout sizes and quantities. All knockouts are combination knockouts.

Combination Knockout Size	Quantity
$\frac{3}{4}$ " X 1"	6
$\frac{1}{2}$ " X $\frac{3}{4}$ "	7

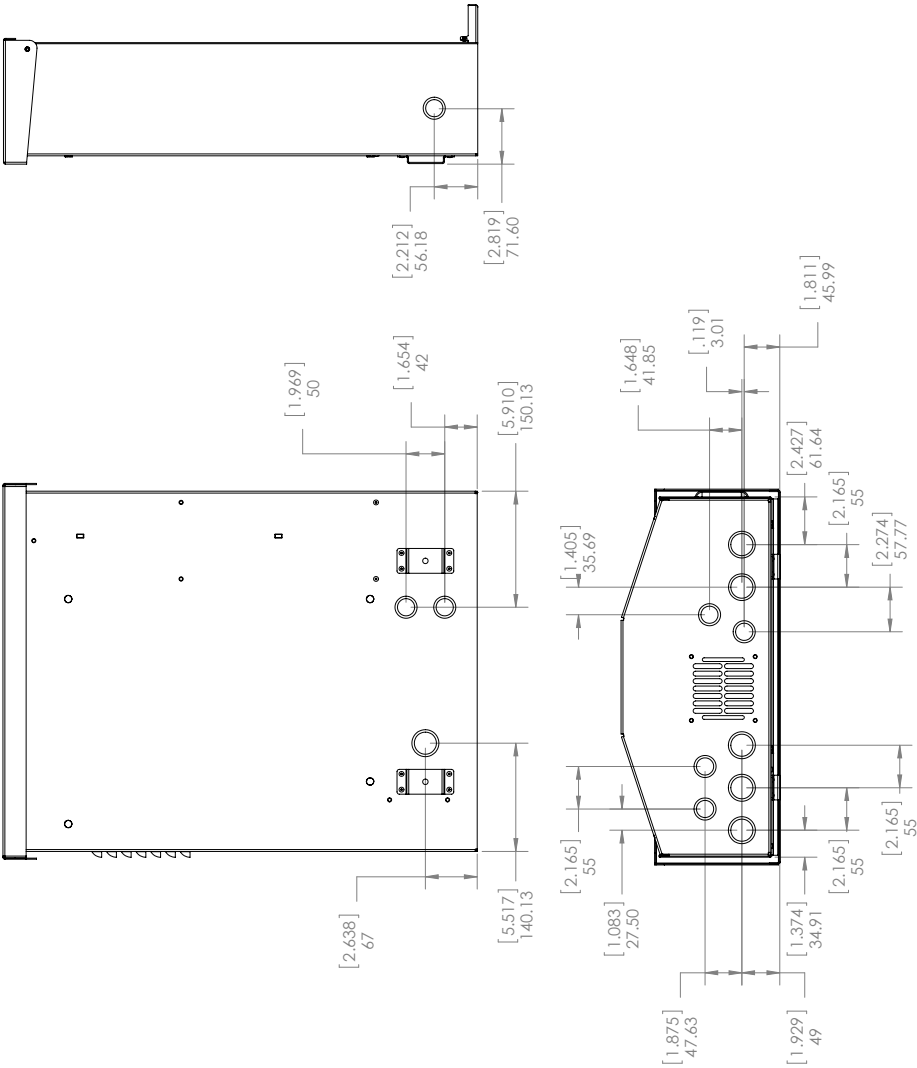


Fig 10. X7602/X11402 knockout configuration

Grounding

Grounding means are provided by a grounding bar located in the back of the wiring compartment for up to 8 conductors. Connect the equipment grounding conductors for all REbus devices to the ground bar. Ensure a good connection for proper REbus communication.

Input and output circuits from X7602/X11402 are isolated from the enclosure. The neutral line is not bonded to ground within the enclosure. When required, system grounding is the responsibility of the installer.

Grounding Bar Wiring Terminals		
Wire Size (AWG)	Torque (Nm)	Torque (lb-in)
4 - 6	5	45
8	4.5	40
10	4	35



WARNING: Never connect REbus conductors to ground.



FOR proper REbus communication, bond the Islanding Inverter enclosure to ground and bond all PV Link and REbus device enclosures to the Islanding Inverter ground bar.

DC Wiring



WARNING: Connect only REbus-compatible devices. Do not connect PV string output directly to the inverter. PV must be connected via PV Link.

WARNING: Do not connect raw, unregulated battery output to the inverter. Connect only REbus-compatible smart batteries. Contact Pika Energy for a list of compatible smart batteries.

Connect all REbus devices to the DC wiring terminals inside the Islanding Inverter, including REbus-compatible batteries and PV Links.

There are four bi-directional REbus inputs available, labeled RE1 through RE4. Each input is protected by a 30A two-pole circuit breaker. These breakers indicate state and may be used as a means of disconnect for the DC circuits. The breakers disconnect both ungrounded DC conductors simultaneously.

DC Wiring Terminals			
Wire Size	Terminal Temp range	Wire Min Temp Rating	Torque
18 to 6 AWG (0.75 mm to 10 mm)	-40 to 130°C	90°C	1.35 Nm (12 lb-in)

Pro Tip: You may connect any REbus device to any one of the bidirectional inputs, or up to 30A of parallel devices. In practice, this means you can connect one REbus compatible smart battery to each input, or up to three PV Links. Always follow applicable codes when calculating ampacities and selecting and installing wiring and overcurrent protection.



CAUTION: Obey polarity markings when connecting REbus devices. Do not reverse-polarize any DC circuits.

CAUTION: Connect only one wire to each DC wiring terminal. Do not double up wires in the terminals.

AC Wiring

The AC wiring terminal block is located on the right side of the wiring compartment. Seven AC terminals are provided. Use the top four terminals for connection to the utility grid. Use the blue “L3” terminal only with X11402. The bottom three terminals provide the Protected Loads output.

AC Wiring Terminals			
Wire Size	Terminal Temp Range	Wire Min Temp Rating	Torque
14 to 6 AWG (2.08 mm ² to 16 mm ²)	Up to 120°C	90°C	1.5 Nm to 1.8 Nm (13.3 lb-in to 15.9 lb-in)

It is the responsibility of the installer to provide sufficient overcurrent protection for the AC grid wiring terminals. Breaker size is not to exceed ampacity of installed conductors. Refer to all applicable codes and regulations when connecting the AC output of X7602/X11402 to AC distribution equipment.

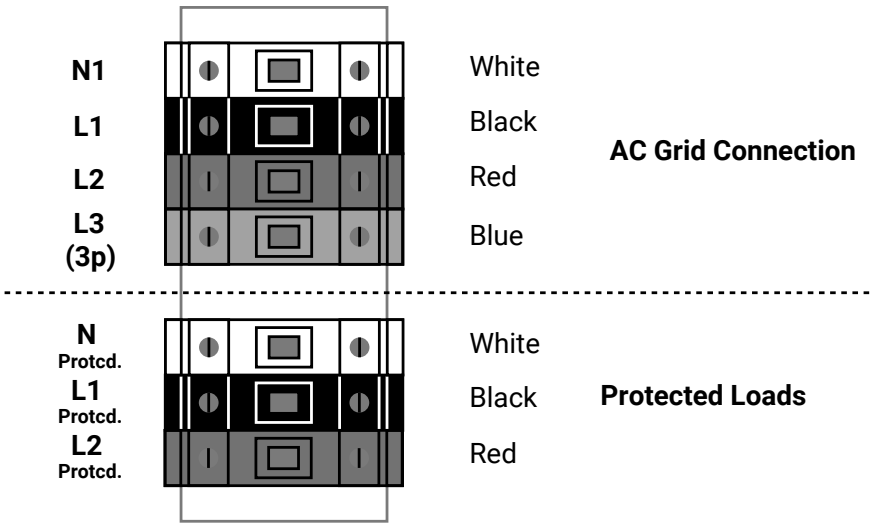


Fig 11. AC Terminal Block. Use the blue L3 terminal only with X11402.

Protected Loads



CAUTION: Never connect the Protected Loads terminals to the grid. This will bypass the anti-islanding protection of the inverter and may cause damage.

For systems equipped with energy storage, the Protected Loads terminals provide power during a grid outage.

By default, the Protected Loads output is connected by internal relays to the AC grid terminals of the inverter. In this state, the Protected Loads output is powered by the grid. In the event of a grid outage, the internal relays isolate the Protected Loads output from the AC grid connection and the inverter provides power only to the Protected Loads. This transition takes place in a fraction of a second.

Note: The Islanding Inverter cannot provide full three-phase power at the Protected Loads terminals. Contact Pika Energy for design assistance when using the X11400-series to provide backup power.

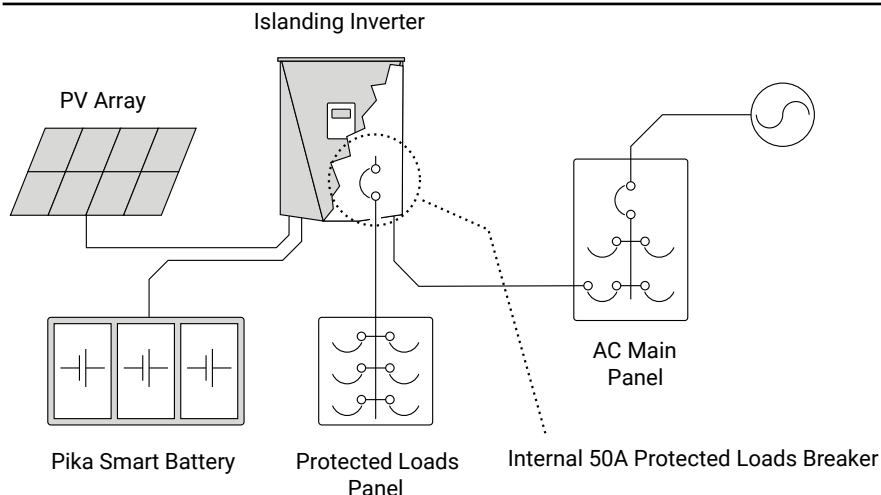


Fig 20. Single Inverter Backup Installation with Protected Loads Panel

To create a Protected Loads panel, select the circuits you wish to back up during an outage and connect them to a subpanel that is fed by the Protected Loads terminals. An integrated 50A breaker is incorporated into X7602/X11402 to support the Protected loads panel. If you wish to back up an entire main service panel, you must use an external transfer switch. See “Section 5: External Transfer Switches” on page 25 for more information.

Pro Tip: If your system does not include battery storage but you expect to add batteries in the future, you can install a Protected Loads panel at the same time you install the inverter. The Protected Loads panel will be fed by the grid through the inverter while the system operates in Grid Tie mode.

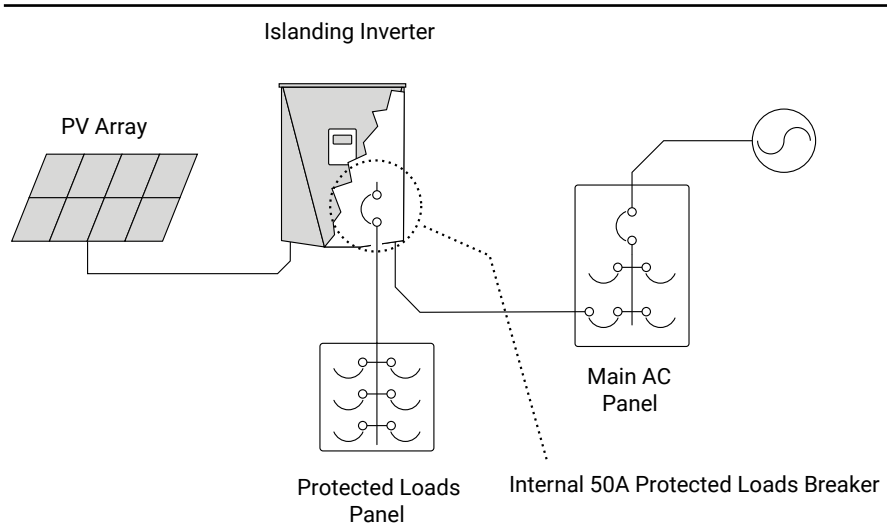


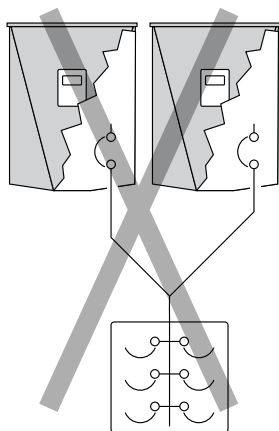
Fig 19. Protected Loads Panel Installed -- Add Batteries Later



CAUTION: Do not connect the Protected Loads terminals to any other source of power, including another Islanding Inverter, any other inverter, the utility grid, or a generator.

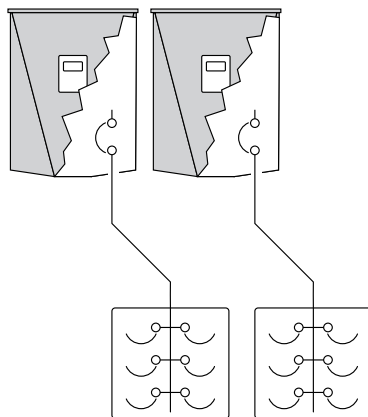
CAUTION: Do not connect the Protected loads output from multiple inverters in parallel. Damage to X7602/X11402 will result!

INCORRECT



Shared Protected Loads Panel

CORRECT



Seperate Protected Loads Panels

Fig 23. Do not parallel Protected Loads output

Connecting Ethernet

Note: If installing a REbus Beacon, refer to the Beacon documentation for instructions on installing Beacon and connecting to the internet.

Connect the inverter to the internet to enable online system monitoring. An internet connection also allows Pika Energy to perform remote service, troubleshooting, and software updates. No data is logged onboard Islanding Inverters when internet connectivity is unavailable.

The inverter's RJ45 ethernet jack is located inside the wiring compartment. When running ethernet cable without a conduit, use an appropriate cord grip or strain-relief connector.

The inverter should usually be connected to a router and settings will be automatically detected (for networks using DHCP). For manual IP setup, refer to the Operation Manual.

Note: It is the installer's responsibility to make sure the internet connection is reliable and secure. Pika Energy recommends always using a hardwired connection to provide internet connectivity. We do not recommend or support using any wireless or powerline carrier network devices. Use these devices at your own discretion.

Connecting Current Transformers (CTs)

Current transformers (CTs) are required to use the Self Supply operational mode and to enable Zero Export capability. They also allow the inverter to provide information on utility consumption through the front panel LCD screen.

CTs are optional for Grid Tie, Clean Backup, and Priority Backup modes. However, Pika recommends including CTs at all installations.

Install CTs around the main service conductors between the inverter point of interconnection and the grid. If using an external transfer switch for main panel backup, install CTs on the Grid side of the transfer switch.

Install one current transformer per phase: use two CTs for split phase grids, use three CTs for three-phase grids. For installations with multiple inverters, contact Pika Energy for guidance on installing CTs.

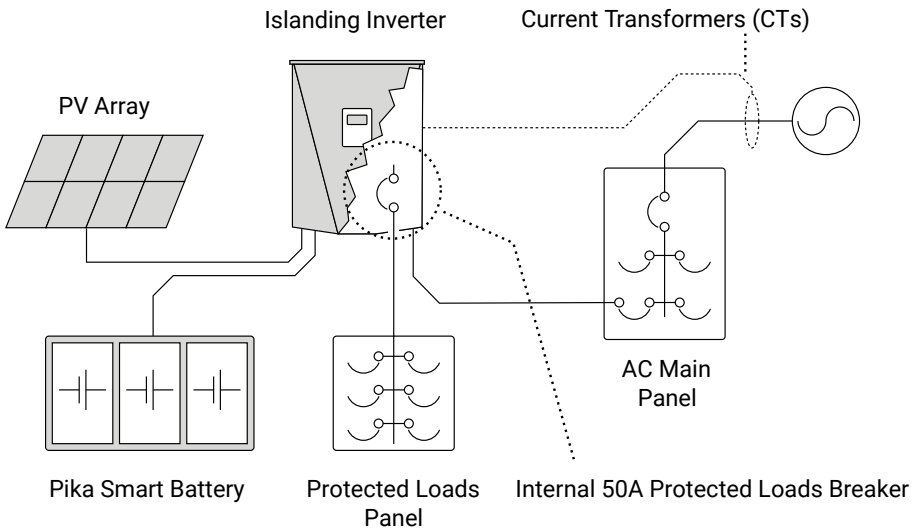


Fig 21. Single-Inverter Self Supply Installation with CTs Installed

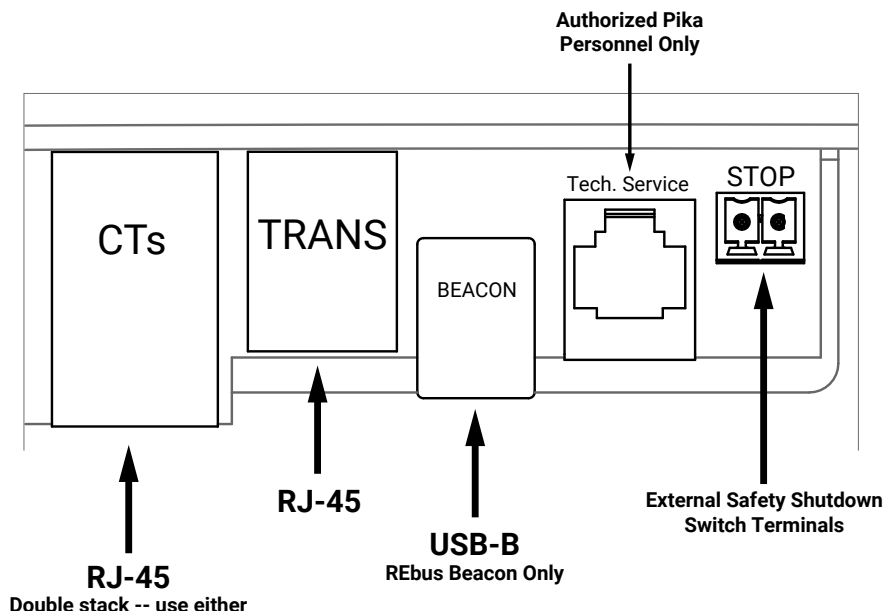


Fig 12. Accessory Ports

Connecting CTs to the Inverter

Connect CTs to the inverter using a RJ-45 connector and Category 5 (Cat 5) ethernet cable. The CT input jack is a double-stacked RJ-45 jack. You may use either the top or the bottom jack.

Note: Connect CTs to the CT input jack in the middle of the wiring compartment. Do not connect CTs to the ethernet jack. Do not attempt to connect the internet to the CT input jack

Fan out the wires from the Cat 5 cable and connect the CT leads to the appropriate colored wires. Use a RJ-45 breakout adapter (included with the Pika CT Kit), or use wire nuts or crimped splices to make the connections. Use the following pinout table.

Pin	Wire Color (T-568A)	Wire Color (T-568B)	Value
1	White/Green	White/Orange	CT3+
2	Green	Orange	CT3-
3	White/Orange	White/Green	CT2+
4	Blue	Blue	CT1+
5	White/Blue	White/Blue	CT1-
6	Orange	Green	CT2-
7	White/Brown	White/Brown	Not Used
8	Brown	Brown	Not Used

CT Calibration

The inverter will automatically detect and calibrate CTs, including detecting polarity. Once CTs are detected and calibrated, you will see a utility pole symbol on the lower right corner of the Home Screen power flow diagram.

Install CTs before powering on the inverter. After CTs are installed, the inverter must be power cycled completely to detect and calibrate CTs. To completely power cycle the inverter, turn off all sources of power, wait for the LCD screen to turn off, then power on the inverter.

Approved CTs

Contact your distributor for information on purchasing the Pika CT Kit. Most current transformers with a 1:3000 turns ratio will work, but accuracy may vary.

Approved Current Transformers (CTs)
LEM 100A 50-60Hz TT 100-SD
TDK CCT354571-300-24-02
TDK CCT406393-600-36-02

Section 5: External Transfer Switches

In situations where an entire main panel requires backup power, you may install an external transfer switch. This allows the Protected Loads output to power the entire main panel.

During a grid outage, the system enters Islanding Mode and signals the transfer switch to change state. The Protected Loads output on the X7602/X11402 will supply power to the main panel. When grid service returns, the inverter will toggle the transfer switch and resume grid-tied operation.

You may use either a manual transfer switch or an automatic transfer switch (ATS) to provide main panel backup. Islanding Inverters are compatible with most manual transfer switches. However, many automatic switches are not compatible. Use only an ATS that has been approved by Pika Energy. Pika cannot support the use of any non-approved ATS.

Approved Automatic Transfer Swtiches (ATS)
Generac RTS series
Generac RXS series



CAUTION: Never connect the Protected Loads terminals directly to the main service panel without use of an external transfer switch. Never connect the Protected Loads terminals to the grid. This will bypass the anti-islanding protection of the inverter and may cause damage.

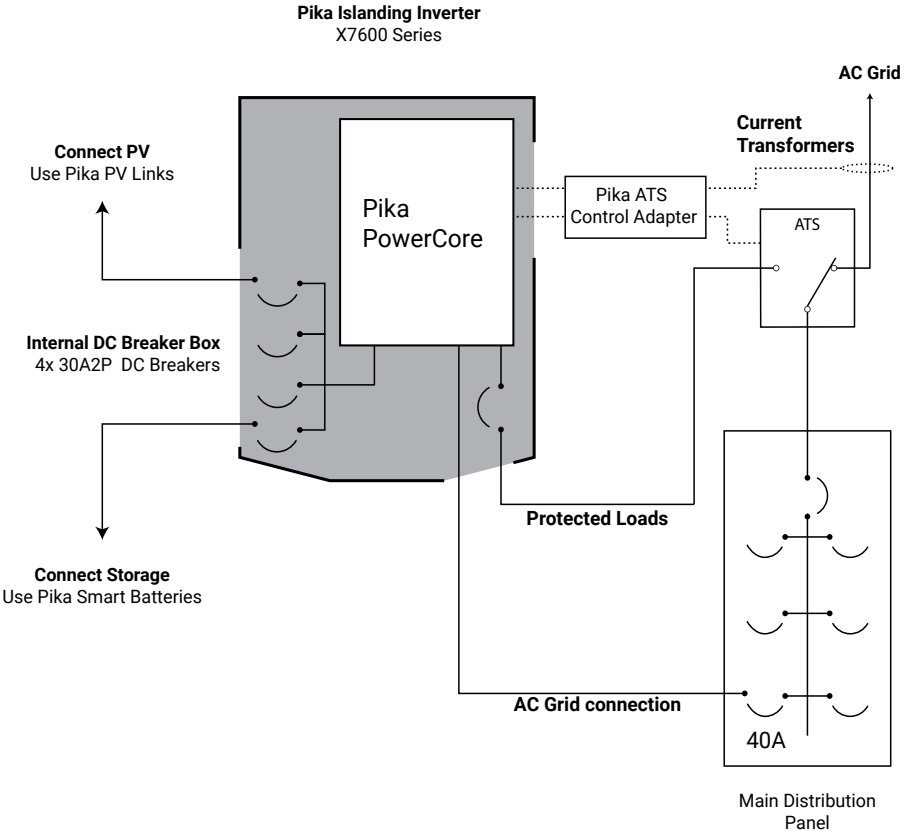


Fig 55. Main panel backup configuration using external transfer switch

Controlling an Automatic Transfer Switch (ATS)

To control an automatic transfer switch (ATS), use the Pika ATS Control Adapter. The ATS Control Adapter is sold separately as part of the ATS Control Adapter Kit.



CAUTION: Always use the Pika ATS Control Adapter to connect grid sense and transfer switch control wires. Connecting grid sense wires without the ATS Control Adapter will damage the Islanding Inverter.

To use the ATS Control Adapter, connect the transfer switch control lines and grid sense lines as shown. Then use a Category 5 (Cat 5) ethernet cable to connect the “ATS” port on the ATS Control Adapter to the “TRANS” port in the inverter wiring compartment. Use a “straight through” or “patch” type cable, not a “crossover” cable.

Attach the ATS Control Adapter to a convenient surface inside the transfer switch housing using the baseplate magnets or the included adhesive strips.

If using CTs, install the CTs around the service conductors on the Grid side of the transfer switch. Connect CTS to the ATS Control Adapter at the CT terminals, then use a Cat 5 cable to connect the CT port on the ATS Control Adapter to the CT port inside the inverter wiring compartment.

To allow the inverter to control the ATS, enable the transfer switch using the EnaExtTransfer setpoint. See “ATS Behavior and Setpoints” on page 28. Refer to the Islanding Inverter Operation Manual for complete instructions on adjusting setpoints and using the inverter control panel.

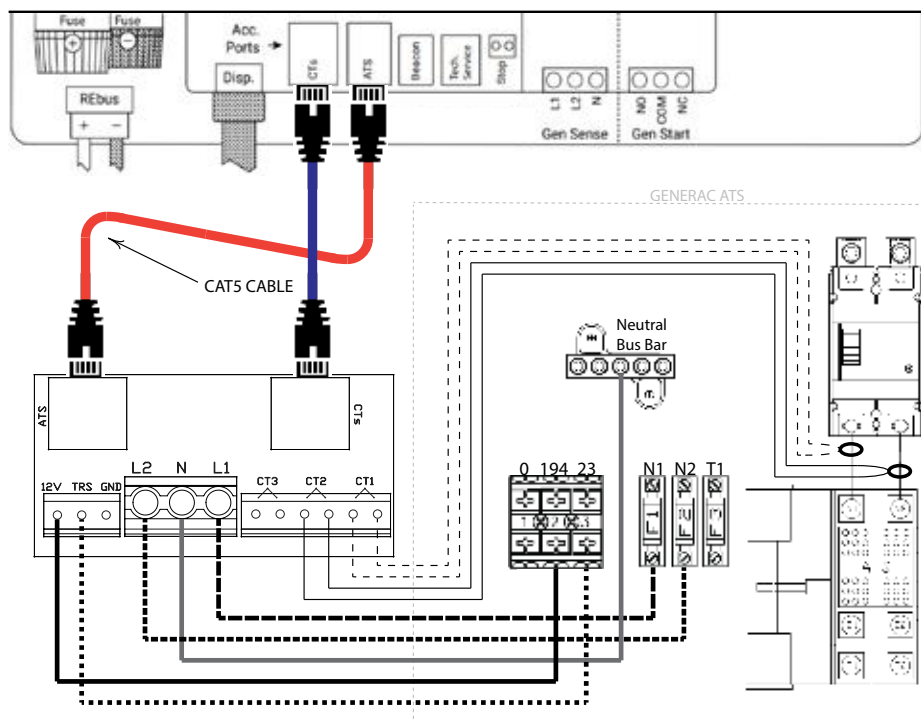


Fig 13: ATS control wiring using the ATS Control Adapter

ATS Behavior and Setpoints

In the event of a grid outage, the Islanding Inverter will immediately toggle the transfer switch to provide power to the main panel from the Protected Loads output. The switchover time is typically less than one second.

Note: The Protected Loads breaker must be ON in order for the switch to toggle. If the Protected Loads breaker is OFF, then the switch will not change positions.

Setpoint	Description	Default	Units
EnaExtTransfer	Enable use of external ATS. Set to 1 to enable use of ATS.	0	-
ExtTransTime	<p>Minium length of time that the grid must be stable before the inverter will toggle the ATS back to grid mode after an outage.</p> <p>This time results in a short delay before the inverter commands the ATS to toggle back to the grid. The inverter will continue to provide battery power to the Protected Loads during this time.</p> <p><i>Note: The inverter also has a five minute delay before exporting power to the grid, even after the transfer switch reconnects.</i></p>	60	s
ExtTransVolt	<p>Minimum single-line grid voltage below which the inverter will toggle the ATS.</p> <p>If either line of the grid drops below this setpoint and there is a grid fault as defined by the UL1741SA trip settings, then the inverter will toggle the ATS to backup mode.</p>	95.0	V

Section 6: Other Accessories

External Safety Shutdown Switch

Use the STOP terminals to connect an external Safety Shutdown switch. Use a normally closed (NC) type switch or button. The STOP terminals ship with a jumper installed. Remove this jumper before installing an external switch. If not using an external switch, leave this jumper in place.

Pro Tip: Make sure to select an appropriately rated, code compliant switch. Your local codes may require special labeling, indicators, or other features. Requirements can vary by region, so consult your local code enforcement officer for guidance.

Installation of an external switch does not disable the switch mounted on the front control panel. Either the front panel button or the external switch may be used to initiate a Safety Shutdown. However, once a Shutdown has been initiated, you must use the front control panel to exit the Shutdown. If a locking-type switch is installed, the system cannot exit the Safety Shutdown until the switch has been released.

See “Safety Shutdown” on page 9 for more information on Safety Shutdown functionality, including how to initiate and exit a shutdown.

Beacon

A USB type B jack is provided for use with the REbus Beacon, an accessory control module for use in certain regions. A USB cable is pre-installed for use with Beacon. Do not connect any other device to the USB port. No data logging or other software is accessible by the user through this port. For instructions on installing and using the Beacon, refer to the Beacon documentation.

Tech. Service Connection

The Tech. Service RJ-11 jack is for use by Pika Energy service personnel only. Do not attempt to connect any device to this jack without direct instructions from Pika Energy Technical Service.

Gen Sense and Gen Start Terminals

As of this writing, the Gen Sense and Gen Start terminal blocks are not active. Do not attempt to use these terminals. Generator integration is in active development, but at this time the Islanding Inverter cannot be connected to a generator. If a generator is present at the site, use transfer switches, interlocks, or other means to keep the generator isolated from the inverter at all times.

Section 7: Compliance

Note on DC Wiring and NEC

Some electricians or installers may be unfamiliar with DC wiring in a residential setting. Make note of all relevant codes, which may include:

1. NEC 690.31(G) for DC PV circuits in buildings.
2. NEC 215.12(C)(2) for correct DC wiring coloring.
3. NEC 210.5(C)(2) for identification of DC conductors more than 50V.

REbus wiring conventions.

For all REbus DC wiring please observe the following coloring convention. Mark or flag all conductors as appropriate. It is recommended that REbus (+) conductors NOT be green, white, gray, blue, or black. It is recommended REbus (-) conductors NOT be green, white, gray, or red.

Wire	Color
REbus + (RE+)	Red
REbus - (RE-)	Black or Blue
Ground (GND)	Green or bare wire

Safety Shutdown

X7602/X11402 is equipped with a Safety Shutdown function to help installers comply with the Rapid Shutdown requirements given in Article 690.12 of the National Electrical Code.

See "Safety Shutdown" on page 9 for more information on Safety Shutdown functionality, including how to initiate and exit a shutdown. See "External Safety Shutdown Switch" on page 29 for information on installing and using an external switch to initiate a Safety Shutdown.

Voltage and Frequency Trip Thresholds

This unit or system is provided with fixed trip limits and shall not be aggregated above 30 kW on a single Point of Common Connection.

All Islanding Inverters are shipped from the factory in compliance with all UL1741 requirements, including IEEE1547. If your installation requires compliance to a different standard, such as UL1741SA, contact Pika Energy for more information.

Voltage Trip Thresholds

The following is a table of the default "As Shipped" fixed voltage trip setpoints. All over voltage and under voltage trip conditions result in a 300-second restart delay time after the trip threshold has been exceeded for the listed number of cycles.

Frequency Trip Thresholds

The following is a table of the default "As Shipped" fixed frequency trip setpoints. All over frequency and under frequency trip conditions result in a 300-second restart delay time after the trip threshold has been exceeded for the listed number of cycles.

Voltage Trip Thresholds			Frequency Trip Thresholds		
Threshold	Threshold (% of nominal)	No. of Cycles	Threshold	Hz Over/ Under Nominal	No. of Cycles
OV1	110	120	OF1	0.5	120
OV2	120	10	OF2	2	6
OV3	130	1	OF3	1.3	0
OV4	999*	1	OF4	0 [†]	1
UV1	88	120	UF1	0.5	120
UV2	50	10	UF2	2	10
UV3	0	1	UF3	0 [†]	1
UV4	0	1	UF4	0 [†]	1

*Value of 999 indicates a disabled threshold for voltage trips

[†]Value of zero indicates a disabled threshold for frequency trips

Section 8: System Configurations

The Pika Energy Island is a flexible, highly customizable system which may be configured in a number of ways to meet your needs. Correct system configuration requires selecting the right equipment and also selecting the correct Operational Mode for the system. Refer to the Islanding Inverter Operation Manual for information on Operational Modes and other user-configurable settings.

Required Equipment

Each operational mode requires different configurations of batteries, CTs, and other equipment to operate properly. Use the table below to help you determine what equipment you need for your installation.

Mode	Batteries	Current transformers	Protected Loads Panel
Grid Tie	Not Required	Optional	Optional
Clean Backup	Required	Optional	Required
Priority Backup	Required	Optional	Required
Self Supply	Required	Required	Optional

Enabling Islanding

If your system includes battery storage, you must enable Islanding to allow the inverter to provide power during grid outages. **If this setpoint is not enabled, then the inverter will not provide power during grid outages.**

Setpoint	Description	Default	Units
NoIslanding	Enable Islanding mode. Set to 0 to allow inverter to enter Islanding Mode and provide backup power during grid outages.	0	-

This setpoint is accessible through the Mod. Settings menu via the inverter device page. Refer to “Mod. Settings Menu” on page 18 of the Islanding Inverter Operation Manual for instructions on changing setpoints using this menu.

Section 9: Commissioning and Setup

After successful installation and wiring of X7602/X11402 and other REbus devices, the Pika Energy Island system is ready to be commissioned.

All REbus devices are configured and controlled through the X7602/X11402. Connected devices will appear on the LCD display.

Commissioning the System

Note: If your installation includes more than one inverter at the same site, read and follow the instructions in "REbus Cross Talk Between Multiple Inverters" on page 38 before you continue.

Commissioning consists of four steps:

1. Inverter Power-Up
2. Select an Operational Mode
3. Optional: Configure Custom Grid Settings
4. Enable REbus Devices
5. Enable Ethernet

Before powering up your system for the first time, complete the following system checks:

1. AC voltage within specified range for system configuration (240V split-phase or 208V 3-phase)
2. All wiring terminations are tight and secure.
3. DC wiring field terminations are secure and polarity is correct.
4. DC breakers for all connected devices are turned on.

Step 1: Inverter Power-Up

Power on the inverter by turning on the main AC breaker. The inverter screen will light up. You will see the home screen. The Operational Mode is listed at the top of the home screen above a power flow diagram. Once the home screen appears, you are ready to continue.

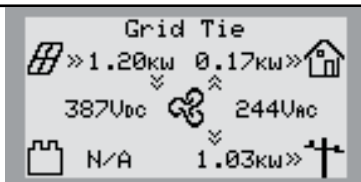


Fig 39. The inverter home screen with the Power Flow Diagram

Note: If there is no grid power at the site and the system includes a REbus-compatible smart battery, you may also “blackstart” the system from the smart battery. Refer to your battery documentation for information on blackstarting your system.

Step 2: Select an Operational Mode

Consult the Islanding Inverter Operation Manual for guidance on selecting the correct operational mode.

To select an operational mode:

1. While viewing the home screen, press the center button.
2. The screen will display a list of operational modes. The current operational mode will have an asterisk (*) next to it. (The list of modes may not include all those shown here. Not all modes are available for all situations.)
3. Use the up and down arrows to highlight the desired operational mode. Press the center button to select it.
4. Arrow right and press the center button to select “Confirm.”
5. The X7602/X11402 will now be in the new operational mode. Confirm that the mode listed at the top of the ICM screen is the desired mode.

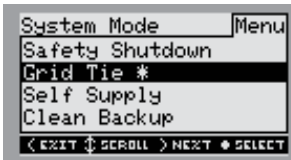


Fig. 40

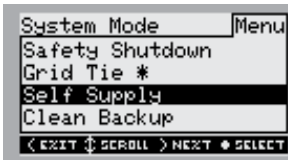


Fig. 41



Fig. 43

Step 3: Optional: Configure Custom Grid Settings

By default, all Islanding Inverters ship in compliance with UL1741, including IEEE1547. If the system needs to be configured to comply with a different grid interconnection standard, activate the new configuration before proceeding.

Note: Changing grid interconnection trip points requires the use of the REbus Beacon, an accessory communications module. Contact Pika Energy for more information on Beacon. Refer to the Beacon documentation for instructions on how to use Beacon to select the correct configuration.

Step 4: Enable Devices



WARNING: Once the inverter is enabled, it will create high voltage at the DC terminals.

All Pika Energy Island devices are enabled and configured individually through the inverter control panel. First, enable the inverter. Then follow the same steps to enable your other REbus devices, such as PV Links and smart batteries. Make sure to enable each REbus device.

To enable the inverter:

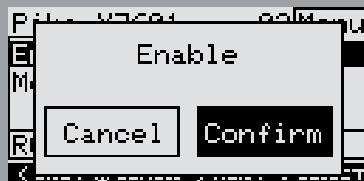
1. Press the right arrow button on the inverter LCD until the inverter device page is displayed. The inverter device page display will read "Disabled."
2. Press the center button.
3. Use the up and down arrows to highlight "Enable" [Fig. 32] and press the center button. Arrow sideways and press the center button to select "Confirm" [Fig. 33].



```

Pika X7601 -02 Menu
Enable
Mod. Settings
RCPn: 000100070011
< EXIT ↵ SCROLL > NEXT * SELECT
  
```

Fig 32. Enabling the inverter

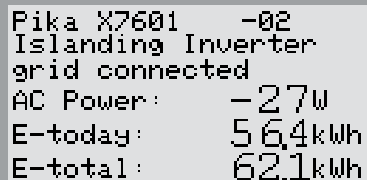


```

Pika X7601 -02 Menu
Enable
Cancel Confirm
< EXIT ↵ SCROLL > NEXT * SELECT
  
```

Fig 33. Enabling the inverter - confirm

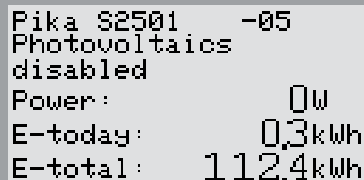
The inverter is now enabled. It will now create voltage at the DC terminals and begin communicating over REbus to other REbus devices.



```

Pika X7601 -02
Islanding Inverter
grid connected
AC Power: -27W
E-today: 56.4kWh
E-total: 62.1kWh
  
```

Fig 34. Inverter device page when enabled



```

Pika S2501 -05
Photovoltaics
disabled
Power: 0W
E-today: 0.3kWh
E-total: 112.4kWh
  
```

Fig 35. PV Link device page when disabled

Use the left and right arrow buttons to scroll through the device pages. Repeat steps 2 and 3 to enable each device.



Fig. 36



Fig. 37

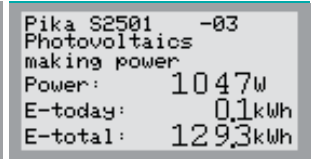


Fig. 38

*Note: If your system includes battery storage, **you must enable Islanding to allow the inverter to provide power during grid outages.** Refer to “Enabling Islanding” on page 32 for more information.*

Step 5: Enable Ethernet

Press the left arrow button on X7602/X11402 until the Ethernet Status page appears. The MAC address is listed at the top of the screen. If the screen reads “Ethernet Disabled”, follow steps 2 through 4 to Enable ethernet capability.

1. Press the center button to open the settings menu.
2. Use the up and down arrows and the center button to select “Enable Ethernet” [Fig. 45]. For advanced settings select “IP Settings” from Ethernet setting main menu.
3. Press the right arrow, then the center button to select “Confirm” [Fig. 46].
4. The Pika Energy Island system is now Ethernet-enabled and can send and receive data. The blue Internet LED should now be illuminated [Fig. 56].



Fig. 45



Fig. 46



Fig. 56

Note: If using the REbus Beacon, an accessory communications module, refer to the Beacon Installation and Operation Manuals for information on connecting Beacon to the internet.

Registering Your System on RReview

Don't forget to log on to **profiles.pika-energy.com** to sign up and register your REbus devices.

All Pika Energy products use RReview, a performance monitoring program developed by Pika Energy and embedded in all REbus nanogrid systems. Each Pika Energy Island has its own RReview dashboard that collects and reports system performance data at 20-second intervals.

Any combination of REbus devices may be registered to a single online RReview profile. This may include multiple Energy Island systems at a single site, or devices from several locations.

Follow the instructions on the Registration sticker on the front of the Islanding Inverter to register your system. Keep all device serial number stickers and save them for future reference by attaching them to a single piece of paper or keeping them in a folder. This will accelerate any troubleshooting needed in the event of a call to the technical service team. Refer to the RReview setup guide for complete instructions.

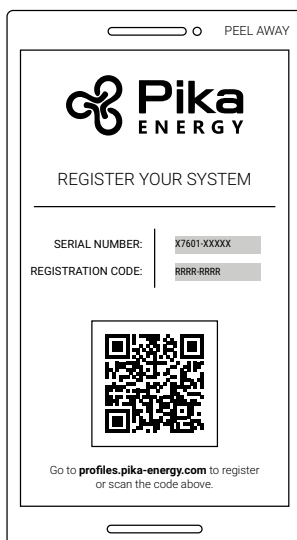


Fig 47. Example Pika Device Serial Number Sticker included with inverter

REbus Cross Talk Between Multiple Inverters

When more than one Energy Island system is installed in the same building, the systems must be configured to prevent cross talk. Cross talk is a phenomenon where separate REbus systems pick up and receive REbus data from each other without being physically connected. Cross talk is not harmful and will not effect system performance, but it can cause an inverter to display information for devices that are not connected to it.

PLM Channels

To prevent cross talk, you must assign each system in the building a different PLM channel. There are twelve channels available. All devices ship pre-programmed to Channel 1.

Channel 0 is a "catch-all" channel; devices on channel 0 will broadcast their data to all other channels, and will receive data from all other channels. Use channel 0 to communicate with a device when you don't know what PLM channel it is using, but don't set a system to use channel 0 permanently. Use channels other than channel 0 to prevent cross talk.

For each system, set the same channel on each device, including all PV Links, smart batteries, and the inverter. Assign a different channel to each system. For example, at a site with two systems, you can assign all the devices on one system to channel 2, and all the devices on the other system to channel 3.

To change the PLM channel on a system, the following steps must be followed explicitly in order. If the steps are not followed in order, devices will not communicate with the inverter, and their device pages may display "device offline" despite being connected and operational.


The PLM channel can be adjusted for each device through the inverter front control panel. For more information on using the inverter control panel and changing settings, see the *Islanding Inverter Operation Manual*.

To set PLM channels and prevent REbus cross talk:

1. Commission each system separately. Shut down all equipment in every system, including inverters and smart batteries. Power on only one system at a time.
2. Power on the first system and follow the commissioning procedure given in "Section 9: Commissioning and Setup" on page 33.
3. Set the inverter PLM channel to 0. This will allow you to communicate with all connected devices, even if some of them have been set to a different channel.

- i. Use the left and right arrow buttons to navigate to the correct device screen and press the center button to bring up the menu.
 - ii. Highlight 'Mod. Settings' and press the center button to select.
 - iii. Highlight 'PLM Channel' and press the center button to select.
 - iv. Use the up and down arrows to change the channel number to 0. Press the center button to confirm your choice.
 - v. Arrow down to highlight 'Commit'. Press the center button, then confirm your selection.
4. Follow the same steps to set the PLM channel for each connected device (PV Link and smart battery) to any channel other than channel 0. Set all devices to the same channel. For each device:
 - i. Navigate to the correct device page.
 - ii. Enter the 'Mod. Settings' menu.
 - iii. Change the PLM Channel, commit and confirm your changes.
5. Once all connected devices are set to the new channel number, follow the same steps to change the inverter PLM channel to the new channel number.
 - i. Navigate to the inverter device page.
 - ii. Enter the 'Mod. Settings' menu.
 - iii. Change the PLM Channel, commit and confirm your changes.
6. The first system now has a new PLM Channel. Power this system down, then power up and commission the next system. Follow this procedure again to change the PLM channel to a different number. Repeat for every system at the site.
7. Once every system has its own channel, you can power on all systems without cross talk.
 - i. At this point, some inverters may show extra device pages for devices that are not connected to it. These pages will read "Device offline". Remove the "Offline" devices by pressing the center button and selecting "Remove Device".

Section 10: Service and Maintenance

	WARNING: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions unless you are qualified to do so.
	WARNING: UNLESS THE SYSTEM IS IN A SAFETY SHUTDOWN, LIVE VOLTAGE MAY BE PRESENT, EVEN WHEN THE POWER GRID HAS FAILED AND THERE IS NO SOURCE OF POWER FROM THE SOLAR PANELS. TO ENSURE THE DC BUS IS NOT POWERED, ALWAYS ACTIVATE SAFETY SHUTDOWN BEFORE PERFORMING EMERGENCY OR SERVICE WORK.
	WARNING: Verify all system voltages are safe before performing service. Always disconnect all AC and DC sources of power before touching terminals. Ensure no dangerous voltages are present on conductors and terminals before wiring.
	WARNING: Disconnect all smart batteries and turn their Battery Disconnect switches to OFF before servicing the inverter or touching electrical terminals. Refer to smart battery documentation for complete safety instructions.

The main fuses in the Islanding Inverter are field replacable by a qualified technician. Additionally, the Power Core may be removed and replaced. No other parts of X7602/X11402 are intended for technician replacement. Contact Pika Energy for instructions on replacing the Power Core.

If X7602/X11402 fails, first contact Pika customer service at (207) 808-0362 for troubleshooting help. Refer to your product warranty for complete warranty terms. You must obtain a Returned Merchandise Authorization (RMA) number prior to returning a unit.

Removing the Wiring Compartment Cover

The wiring box cover is attached by 5 screws. Initiate a Safety Shutdown and allow the DC voltage to drop to a safe level. Power down inverter and disconnect all sources of AC and DC power. Remove all 5 screws to release the cover.

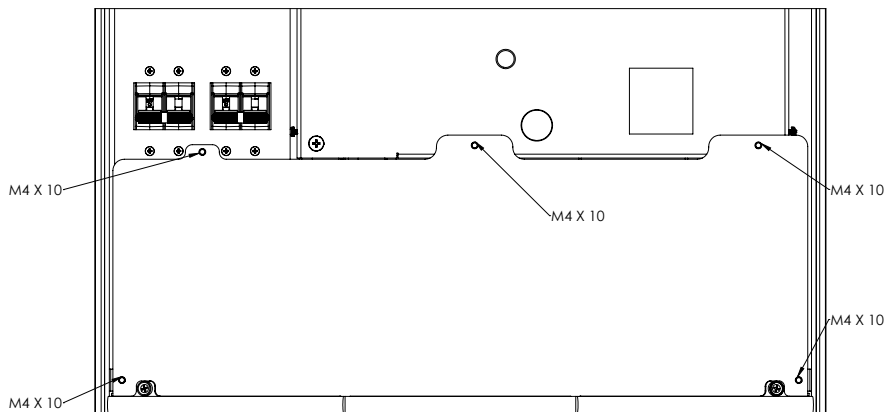


Fig 49. The Wiring Compartment Cover

Replacing Fuses



WARNING: DO NOT REMOVE DC FUSES UNDER LOAD!

Two main fuses are installed between the Power Core and the DC breakers. The fuses can be accessed behind the wiring compartment cover. If a main fuse has blown, contact Pika Technical Support to determine the root cause of the issue before replacing a fuse.

Pika Inverter Model	Fuse Rating	Fuse Model Number
X7601	30A 500V DC	Littelfuse: 0505030.MXP
X7602/X11402	40A 600V AC/DC	Ferraz: A60Q40-2

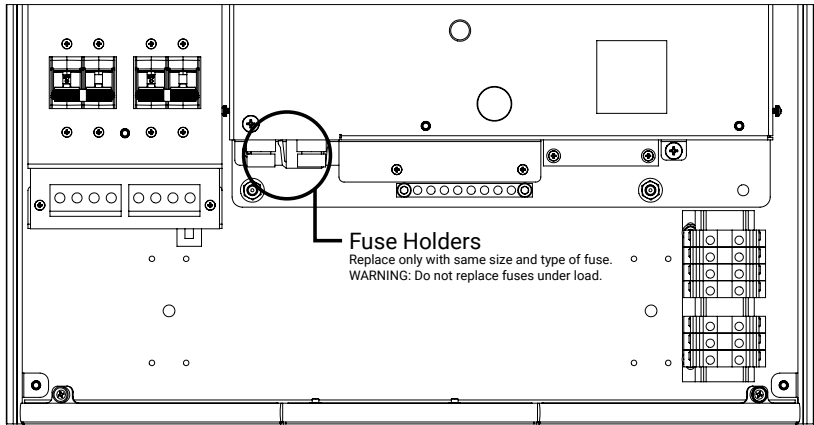


Fig 54. Main DC fuse locations

To replace a fuse:

1. Initiate a Safety Shutdown and disconnect all sources of DC and AC power.
2. Remove the wiring cover.
3. The DC fuses are located in the upper-left corner of the main compartment.
4. Press up and turn the fuse holder to remove the fuse. Insert a new fuse and press up on the fuse holder and screw in until it is firmly in place.



CAUTION: Never replace the fuse with a different size or style. Failure to follow these instructions could void X7602/X11402's warranty. See either the table on "Replacing Fuses" on page 41 or the fuse label on your inverter's Power Core cover for required fuse specifications

Section 11: Troubleshooting

Common Issues

Issue	Resolution	For More Info.
System will not exit Safety Shutdown	Make sure external shutdown button is not depressed. If no external button is present, make sure jumper is in place between STOP terminals.	Page 9 Page 29
CTs will not calibrate	Check CT wiring. If using field-made RJ-45 connector, check wiring or make new connector. Power down inverter, allow screen to go blank, then power back on.	Page 22
Device is in an error state	Disable device, then enable using front control panel	Page 35

Recovery From an Error State

Error events will force X7602/X11402 into a error state where no DC power is exported, though voltage may still be present on REbus from connected devices. To recover a device from an error state, use the front control panel to Disable and then Enable the device. If the system is unable to be accessed, but is connected to the internet, call Pika Technical support at (207) 808-0362 for assistance in resetting an error state.

Technical Support Information

Support department hours: 9AM to 5PM Eastern Standard Time Zone, Monday – Friday
(excluding holidays)

Phone: (207) 808-0362

Email: support@pika-energy.com



Section 11: Technical Reference

Terminal Torques

Torque specifications are derived from manufacturer recommendations.

Wiring Terminal	Torque
AC Terminals	1.5 to 1.8 Nm (13.3 to 15.9 lb-in)
DC Terminals	1.35 Nm (12 lb-In)
Ground Bar	4 to 6 AWG: 5 Nm (45 lb-in) 8 AWG: 4.5 Nm (40 lb-in) 10 to 14 AWG: 4 Nm (35 lb-in)
STOP Terminals	0.22 to 0.25 Nm (1.9 to 2.2 lb-In)
Gen Sense and Gen Start Terminals	0.4 to 0.6 Nm (3.5 to 5.3 lb-in)

Wire Sizing

Recommended maximum one-way wire lengths for REbus circuits:

AWG	@ 2kW	@ 4kW	@ 6kW	@ 8kW	@ 10kW	@ 12kW	@ 14kW
8	1512 ft	756 ft	504 ft	378 ft	302 ft	252 ft	216 ft
10	951 ft	476 ft	317 ft	238 ft	190 ft	-	-

Note: Installers are responsible for all final installation details, including correct wire sizing. Always follow all applicable codes when choosing wire sizes.

Section 12: Specifications

Quick Reference

Specification	X7600 Series	X11400 Series	Units
Max. cont. AC power @ 50°C	7.6	11.4	kW
Grid voltage	240 (1-ph)	120/208 (3-ph)	VAC
Max cont. REbus current (peak)	20	30	A
Max cont. grid output current	32		A
AC terminals wire size	14 to 6		AWG
DC terminals wire size	18 to 6		AWG
STOP terminals wire size	28 to 16		AWG
Gen Sense/Gen Start wire size	30 to 12		AWG
Weight	29 (64)		kg (lb)
Thermal Management	forced convection		-
Temperature Range	-20 to +50		°C
Weatherization rating	NEMA 3R		-
Enclosure Material	Powder-Coated Steel		-
Size (H x W x D)	622 x 489 x 203 (24.5 x 19.25 x 8)		mm (in)
Warranty	10 years standard		-

Detailed Ratings

Rating Type	Alt Rating Name	Min	Nominal	Max	Units
Maximum Input Voltage	Maximum nanogrid voltage			420	V
Range of Input Operating Voltage	Nanogrid operating voltage range	360		400	V
Maximum input current	Maximum nanogrid input current			20	A
Maximum input short circuit current	Maximum nanogrid short circuit current			30	A
Maximum input source backfeed current to input source	Maximum nanogrid output current			30	A
Output power factor rating	AC power factor rating			1	-
Operating Voltage range (ac) 2ph		108		130	V _{rms}
Operating Voltage range (ac) 3ph		106		132	V _{rms}
Operating frequency range or single frequency		59.6		60.4	Hz
Nominal output voltage (ac)	Nominal AC voltage		120/240 & 208V 3ph		V _{rms}
Normal output frequency	Nominal AC frequency		60		Hz
Maximum continuous output current (ac)	Maximum continuous AC current			32	A, rms
Maximum output overcurrent protection	Maximum AC overcurrent protection			50	A
Max output fault current and duration			50 / 17		A/ms
Utility interconnection voltage and frequency trip limits and trip times	See "Voltage and Frequency Trip Thresholds" on page 30 of this manual				
Trip voltage and frequency limits					
Trip Voltage Accuracy					
Trip Time Accuracy			2% +/-2 cycles		-
Normal operation temperature range		-20		+50	C
Output power temperature derating and maximum full power operating ambient		-20		+50	C
Peak Efficiency				97.5	%
CEC Weighted Efficiency				97	%



Notes

Use the following pages to record notes about your system or to document phone calls with our service department, available M-F 9AM-5PM ET at 207-808-0362.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page or a sheet of stationery.

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[illegible]





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Westbrook Maine
04092