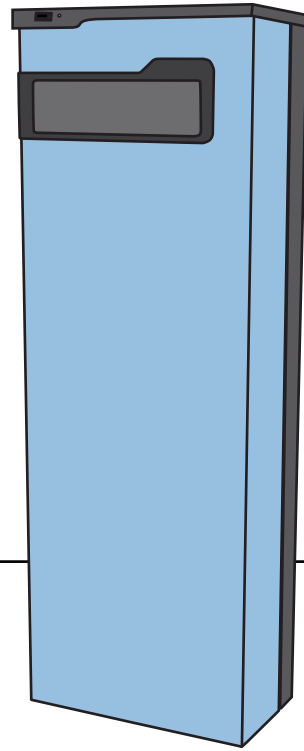


# Installation Manual

## Pika Harbor Smart Battery

### Harbor Flex / Harbor Plus

Part of the Pika Energy Island™

Pika ENERGY

M00016-04

Pika ENERGY

**Harbor Smart Battery**

Serial Number:

RCP Number:

We are committed to quality and constant improvement. All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, we reserve the right to make modifications at any time that may result in a change of specification without notice in our pursuit of quality. If you find any inconsistencies or errors in this document, please notify us at sales@pika-energy.com

Check the Installer Resources page at www.pika-energy.com for the latest specifications and manuals.

# Table of Contents

# Section 1: Introduction

## About this manual

This Installation Manual provides instructions and recommendations for installing and commissioning the Pika Harbor Series of smart batteries for simple, reliable energy storage with optional solar charging. The Harbor Smart Battery is designed to house compatible lithium ion battery modules, and connects directly to the Pika Islanding Inverter™ and other REbus™-compatible components of the Pika Energy Island™ system from Pika Energy.

This Installation Manual includes full details on installation, wiring, safety, inverter integration, and other key aspects of installing The Harbor Smart Battery. The companion document to this Installation Manual is the Harbor 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.

## 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 the Harbor Smart Battery

The Harbor Smart Battery  is an easy-to-install energy storage device for efficient DC-coupled performance. As a storage component of the Pika Energy Island, Harbor Smart Battery models can be used for grid-connected solar applications such as self-supply, rate arbitrage and clean backup power.  Both the Harbor Flex™ and Harbor Plus™ models are designed to work seamlessly with Pika Energy's S2500 Series PV Link optimizers, and X7600 and X11400 Series Islanding Inverters to form the Pika Energy Island system for grid-tie solar-plus-storage.

All Pika Energy products use the REbus™ 380VDC 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, a REbus compatible Pika Islanding Inverter is directly connected to PV Link optimizers and high voltage energy storage on the DC (REbus) line, shown to the the left of the inverter. To the right of the inverter are AC lines: 240VAC or 208VAC for grid and home loads, and protected load support up to 50A.

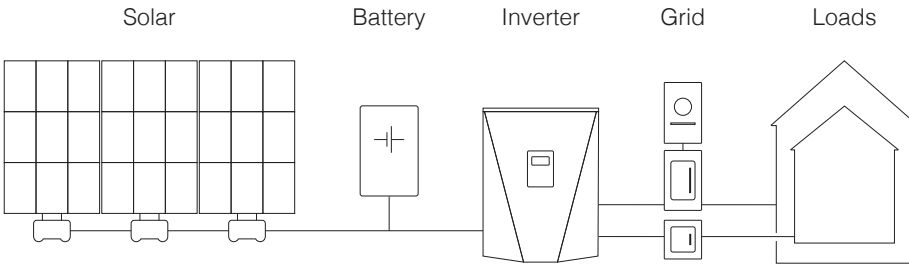



*Fig 1. Example Energy Island*

# Section 2: Safety instructions

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS!

## General Warnings

**SHOCK RISK**: HIGH VOLTAGE ELECTRICITY

**WARNING:** To reduce the risk of injury, read all instructions and caution markings before installing Harbor. Consult installation documentation for all other REbus devices on the system.

**WARNING:** Harbor must be installed by trained and qualified technicians, and in accordance with all instructions.

**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:** Protection against lightning surges in accordance with local electric codes are the responsibility of the installer.

**WARNING:** Connect only to REbus-compatible devices. Never connect to ANY other power source, including raw PV output, AC power, or any non-REbus-compatible battery.

**WARNING:** POWER SEARCH. TURN BATTERY DISCONNECT “OFF” AND DE-ENERGIZE REBUS BEFORE TOUCHING TERMINALS.

# 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 the Islanding Inverter Installation 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.

# Battery Module Safety

Harbor is designed to be used with Panasonic DCB-105 lithium ion battery modules. Do not attempt to connect batteries of any other make or model to your Harbor Smart Battery, including any other lithium ion battery, or any other type of battery.

**WARNING:** Use ONLY Panasonic DCB-105 lithium ion battery modules. DO NOT CONNECT ANY OTHER BATTERY MODULES. DOING SO WILL VOID THE WARRANTY AND MAY DAMAGE THE HARBOR SMART BATTERY.

Refer to the manufacturer's documentation for information on the correct handling, storage, and use of your battery modules.

# Section 3: Location and Compliance

## Location and clearances

The Harbor Smart Battery is designed to be installed in protected indoor locations only. Do not install where it will be subject to rain, ice, dripping or pooling water, condensation, or other environmental factors.

Install only in a clean, dry, well-ventilated location. Ensure that the minimum clearances of the table below are met. Do not allow bottom or front vents to become blocked.

| Minimum Airspace Clearances | | |
|---|---|---|
| **Sides** | 0” | Recommend at least 2” on each side to operate cover |
| **Top** | 3” | |
| **Front** | 36” | |

Do not expose the Harbor Smart Battery to extreme temperatures. Refer to the specification table at the end of this manual for Recommended and Acceptable operating temperatures. Operating the Smart Battery outside of the Recommended range may degrade performance.

*Note: Consider year-round temperature extremes when deciding on a location for Harbor. In extreme climates, always install Harbor in a conditioned space. Pika recommends installing Harbor in a conditioned space regardless of climate.*

# Compliance

Install Harbor in compliance with all applicable local codes. Only qualified persons should attempt to install Harbor. Follow all instructions included in this manual and use appropriate practices for all product wiring and installation.

*Note: It is the responsibility of the installer to ensure conformance with NFPA70E, Article 120, lockout/tagout procedures. If the Pika Inverter is installed out of sight of the AC distribution panel, a correctly rated disconnect switch must be installed within sight of the Pika Inverter. In the situation where the Pika Inverter is installed out of sight of the Harbor Smart Battery product, a correctly rated DC disconnect switch must be installed within sight of the Harbor Smart Battery.*

## Note on DC Wiring and the NEC

Some electricians or installers may be unfamiliar with DC wiring in a residential setting. Please note the following:

1. NEC 215.12(C)(2) for correct DC wiring coloring.
2. NEC 210.5(C)(2) for identification of DC conductors carrying more than 50V.

Always adhere to applicable codes when marking and installing DC conductors.

For all REbus DC wiring please observe the following coloring convention. Mark or flag all conductors as appropriate.

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

# Section 4: Installing the Harbor Smart Battery

**Contents of Shipping Box**

- Wall bracket
- Body (including pre-installed electronics package and battery jumpers)
- Cover
- Hardware kit
- Installation and Operation Manuals

The Panasonic DCB-105 lithium ion battery modules are shipped separately from your equipment distributor. Keep the battery modules in their original packaging until they are ready for installation, observing their storing and stacking requirements.

## Unboxing and Mounting

### Prepare location

- Sweep away any debris or dust that might get pulled into the Harbor Smart Battery's bottom intake vent.
- Remove debris and ensure the grade is smooth. A sharply sloping or irregular floor surface may hinder installation of the front cover.

### Unbox Harbor enclosure

- Lay the package on one of the long edges. Remove the top cardboard cap. Remove the Documentation and Hardware box and set aside in a safe place.
- Lift the cardboard sleeve from around the Harbor. Carefully lay the unit onto its back and remove the bottom cardboard cap.
- Remove the front cover from Harbor. Slide the cover straight towards the top of the unit, swing the bottom out, and pull slightly down to remove it. Set the cover aside in a safe place.

***Pro Tip: Don't adjust the feet yet! The feet are shipped pre-positioned to ensure sufficient clearance for the front cover.***

## Install and level wall bracket

*Note: Use screws appropriate to the mounting surface. The total weight of the unit is 411 lbs (311 lbs for the Harbor Flex). Though the weight of the unit rests on the feet, make sure that the mounting bracket fasteners are adequate to hold the unit against the wall.*

- Mount the bracket so the bottom edge is 29-5/8” inches (751 mm) off the floor.
- Level the bracket.
- Use a minimum of two fasteners into each horizontal brace. All fasteners must engage with a structural member.

***Pro Tip: You may wish to rough in the field wiring at this time. See illustration for knockout locations and dimensions.***

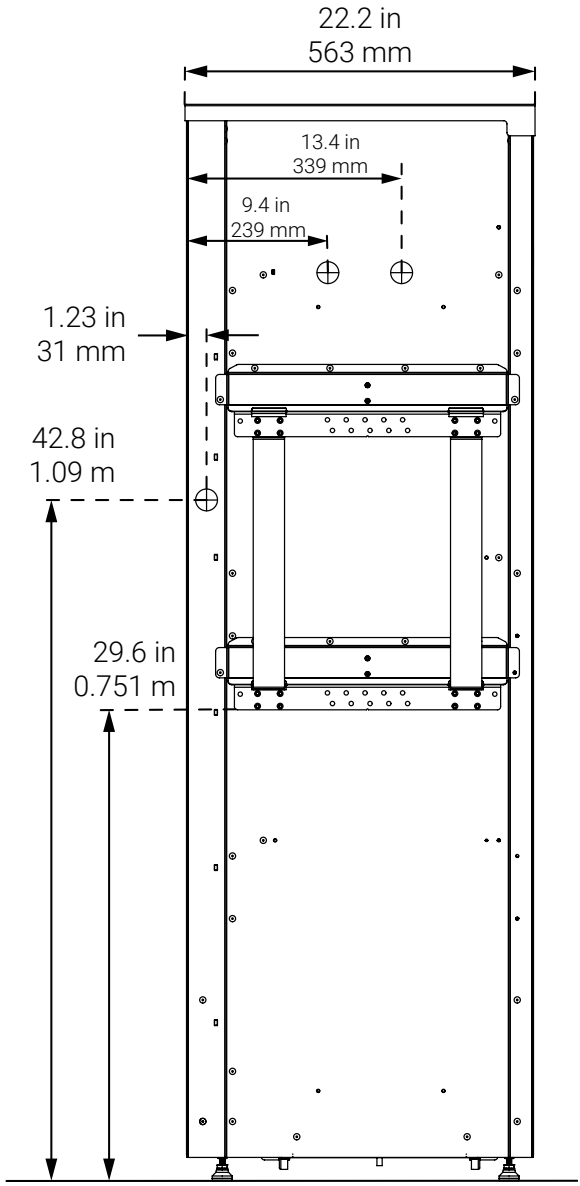
**CAUTION:** The Harbor Smart Battery is designed to be installable by one or two people without the use of heavy equipment. However, use caution when handling heavy parts and battery modules. Lift heavy parts in teams if necessary to prevent injury.

## Place body onto bracket and level feet

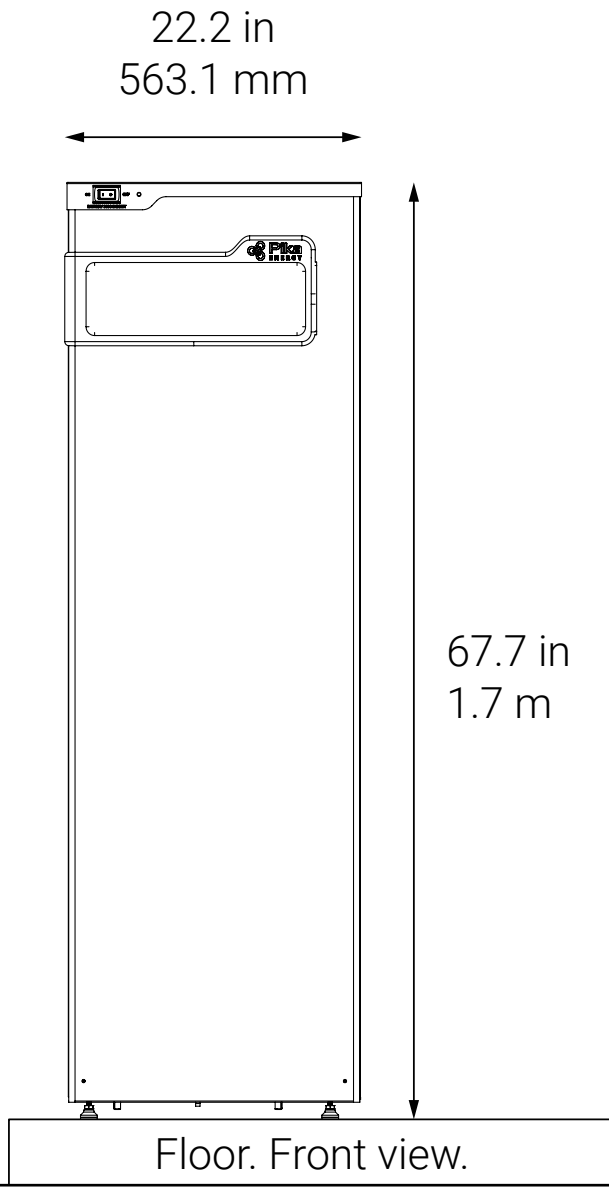
- Lift the body onto the bracket. Keep the body tight to the wall as you lower it. Make sure both recessed pockets engage with the wall bracket.
- Secure the body to the bracket using four stainless steel M4x8 machine screws, two in each horizontal brace. Start the machine screws in their holes, but do not tighten yet.
- Check unit for plumb side to side and adjust feet as necessary. Keep the body plumb side to side and tight to the wall.
- The feet should be just snug against the floor and the body should rest on the wall bracket. Do not lift the body off the bracket by over-lengthening the feet.

***Pro Tip: The feet have been pre-adjusted at the factory to ensure adequate clearance between the cover and floor. Make sure there is at least 1 ⅜” from the bottom of the body to the floor.***

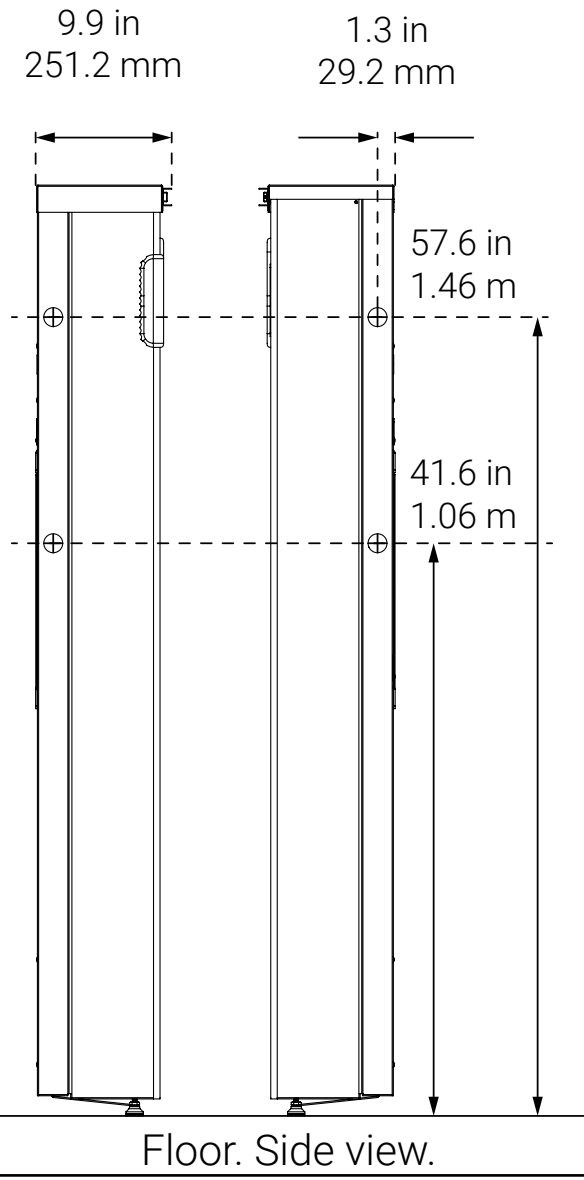
- Tighten the machine screws to the bracket and torque to 13 in-lbs.
- Double check that the feet are still snug to floor and tighten their jam nuts to lock them in place.




*Harbor rear view*




*Harbor front view*




*Harbor side views*

# Installing REbus Wiring

**WARNING:** Put the Islanding Inverter into a Safety Shutdown before installing any wiring. If there are any other Smart Batteries connected to REbus, toggle their front Battery Disconnect switches to OFF. Ensure the voltage has dropped to a safe level before touching terminals.

The Harbor Smart Battery must be grounded according to local codes. When required, grounding is the responsibility of the installer. For proper REbus communication, ensure the enclosure is securely bonded to the Islanding Inverter via the grounding bar in the Islanding Inverter wiring compartment.

**CAUTION:** Never connect REbus conductors to ground.

- Harbor has a field wiring terminal block located in the wiring compartment. Install the REbus conductors to their terminal blocks: RE+ to red, RE- to blue.
- Install the equipment grounding conductor to the green terminal block.
- If necessary, route the field wiring conductors through the grommet in the wiring chase baffle. Do not route the wires around the baffle.
- Use a suitable wiring method in compliance with local electrical codes. Protect wiring from exposed metal edges by using appropriate bushings, fittings, and restraints.

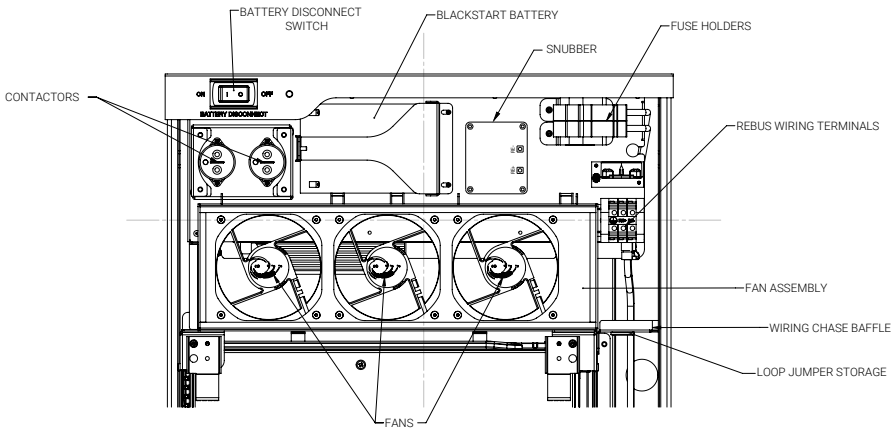
**WARNING:** Connect only REbus-compatible devices. Do not connect any other DC source, including raw PV string output, raw battery output, or any non-REbus compatible converter or charge controller.

- At the Islanding Inverter, install the RE+ and RE- conductors to any unused 30A REbus breaker. Secure the equipment grounding conductor to the Islanding Inverter ground bar.

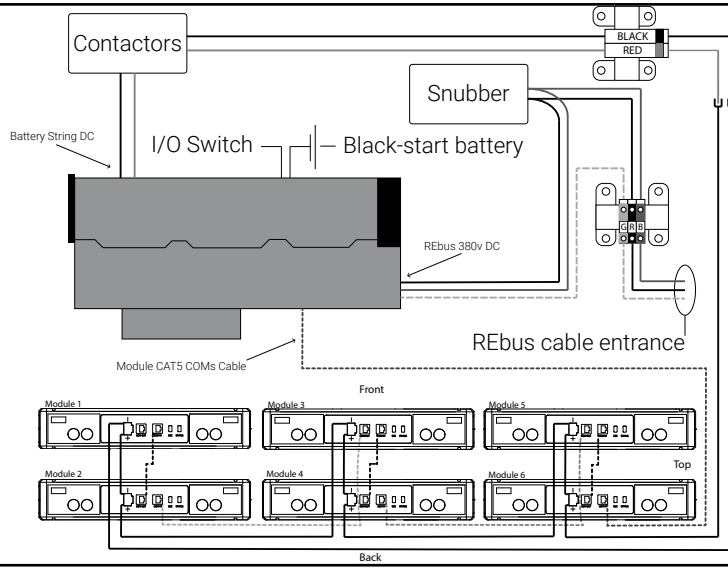
| Spefication | Min | Max | Units |
|---|---|---|---|
| Allowable wire size | 10 | 6 | AWG |
| Torque | 13.3 (1.5) | 15.9 (1.8) | lb-in (N-m) |
| Strip length | 3/8 (10) | | in (mm) |
| Temperature rating | 90 | | C |

## Connect Blackstart battery

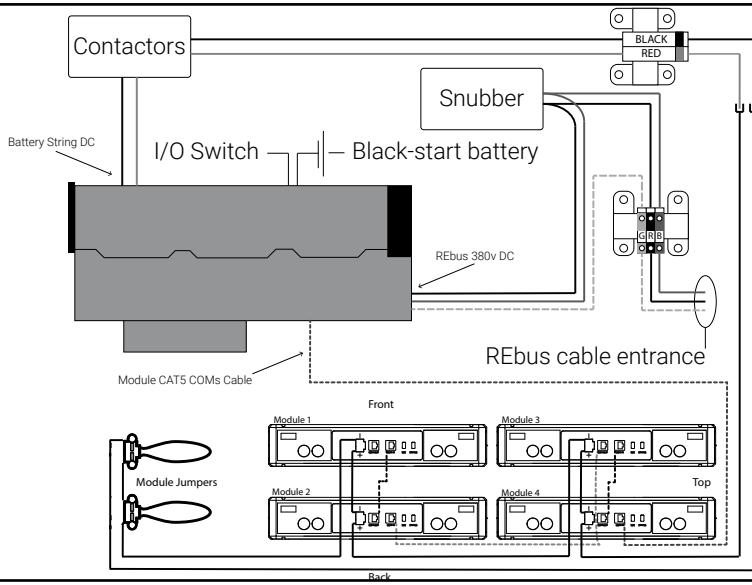
- The Blackstart battery is located in the wiring compartment. Refer to the Wiring Compartment Layout to locate it.
- One lead is already connected to the Blackstart battery. Connect the other lead to the free battery terminal.




*Wiring compartment layout*




*Harbor Plus Wiring Diagram*




*Harbor Flex Wiring Diagram*

# Installing Battery Modules

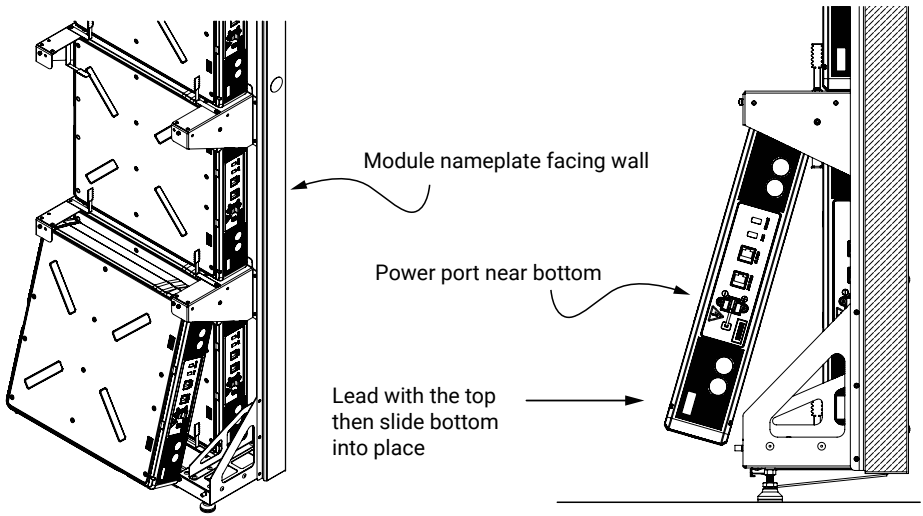
## Install Rear Modules

- Check that the bottom intake filter is in place.
- If installing Harbor Plus, install the first module in lowest rear position. If installing Harbor Flex, install the first module in the middle rear position.

***Pro Tip: In a Harbor Flex, use only the top two shelves to hold the four battery modules. Leave the bottom shelf empty.***

- Hold the module vertically with the ports on the right hand side and the module nameplate label facing away from you.
- Angle the top of the module away from you, lead with the top, and then slide the bottom in.
- Push the module all the way against the grounding clips in the back of the body.

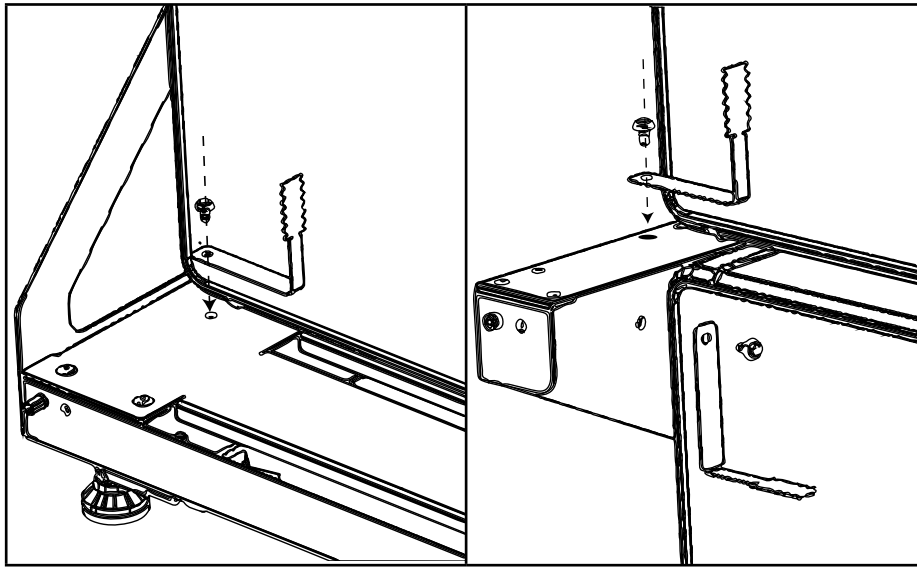
***Pro Tip: The toothed grounding clips are intended to contact and bite into the metal case of the battery modules to provide an equipment grounding connection.***




*How to install battery modules*

## Install Grounding Tabs

- Install two L-shaped grounding tabs at the bottom of the module on the floor of the body as shown. Fasten each with an M4x8 machine screw.
- Install two more grounding tabs at the top of the module as shown.
- Install the other rear modules in the same way. Hold each module in place with four grounding tabs.



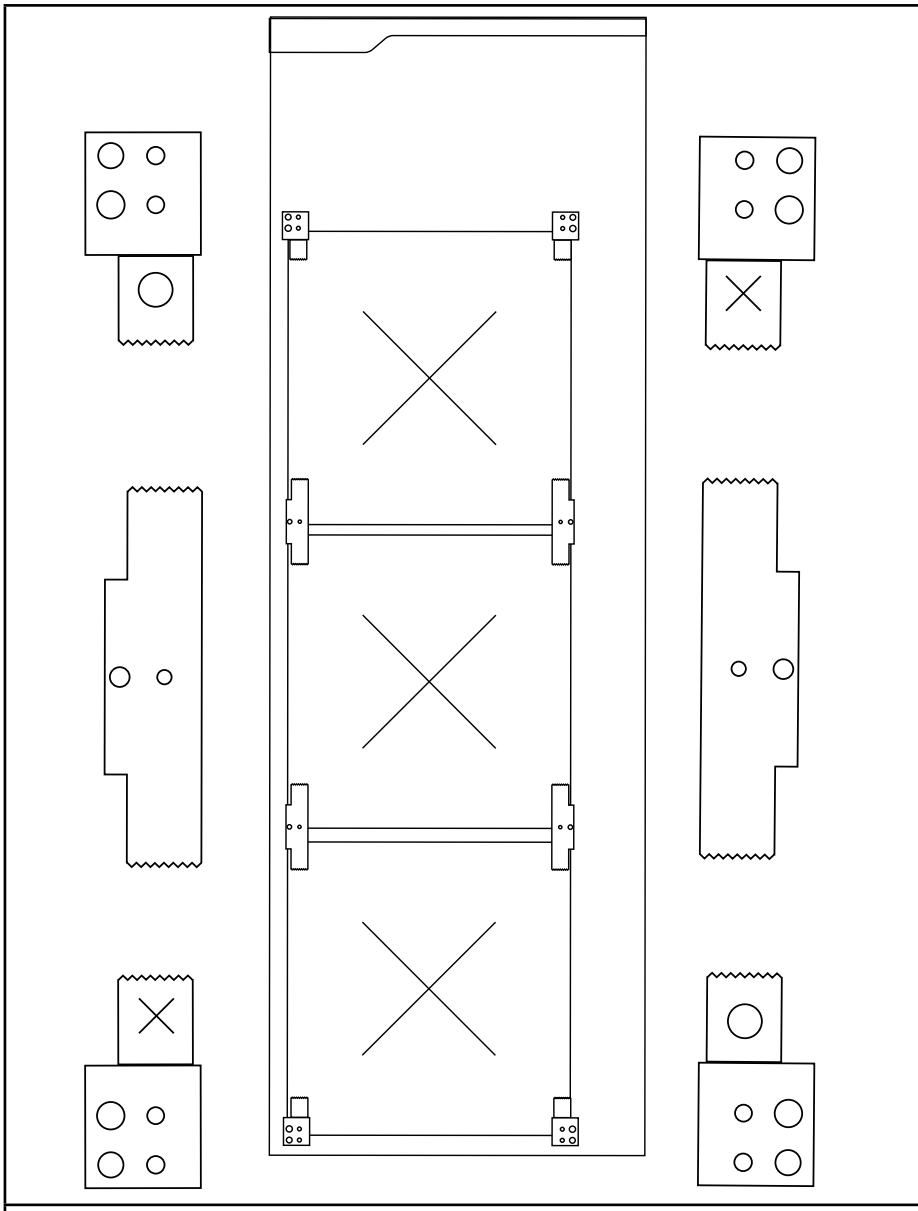
*Install grounding tabs as shown*

## Install Front Modules and Retention Clips

- Install the front modules similarly, working bottom to top.
- Install retention clips to hold the modules in place. Refer to the drawing for correct placement.
  - Install single retention clips at the top and bottom of the stack.
  - Install double retention clips to span between rows of modules.

***Pro Tip: Not all clips are the same! Check the drawing carefully for placement.***

- Apply gentle pressure to the module when installing the retention clips to ensure that all grounding tabs and clips make firm contact with the case.



*How to install retention clips*

## Connect COM cables

- Connect the pre-installed, colored COM cables to the COM IN and COM OUT ports. Refer to the diagram for the correct connections.
- Connect the short black COM cables between the remaining COM ports. Use the diagram to guide you.

## Connect battery power cable

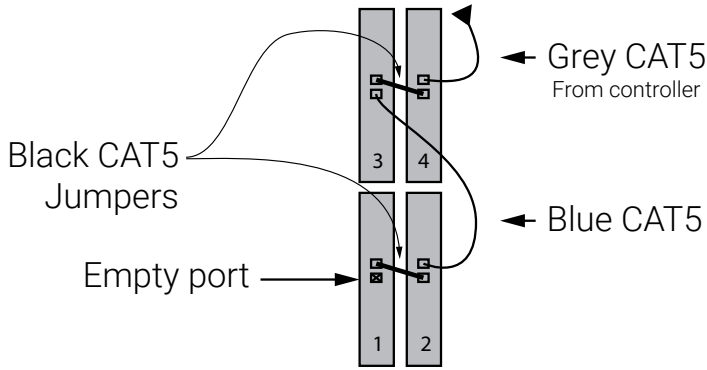
- If installing a Harbor Plus, remove the black loop jumpers from the last two connectors in the battery power cable. If installing a Harbor Flex, leave the two loop jumpers in place.

***Pro Tip: Tie your unused loop jumpers to the hook on the wiring chase baffle. In the event that a battery module needs to be replaced some time in the future, you can use the loop jumpers to keep Harbor up and running until the new module arrives.***

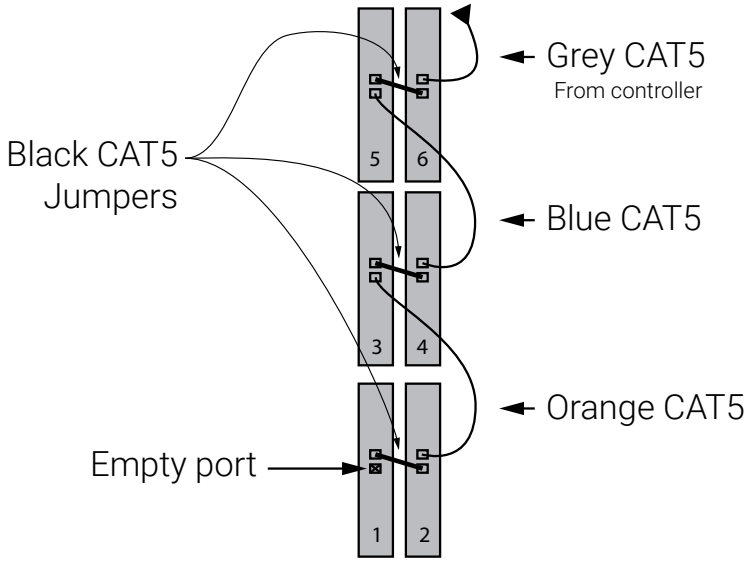
- Plug the black power cable connectors into the battery module power ports. Remove the gray rubber cap from each module power port as you plug in each connector.

**WARNING:** The battery module power terminals are energized. Do not reach into the port or touch the battery terminals with hands or tools.

## Harbor Flex




## Harbor Plus




*Module COM Cabling*

# Installing the Cover

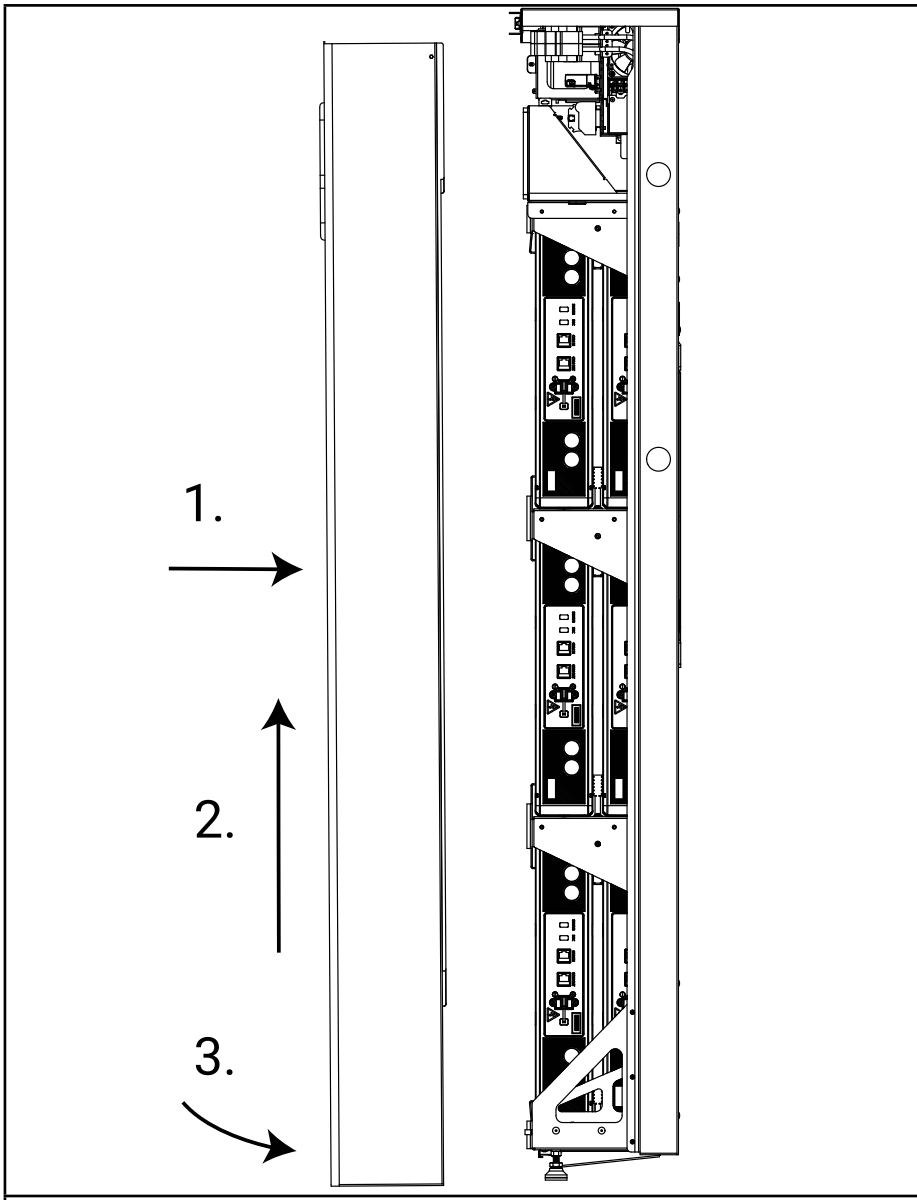
- Place the cover upright in front of the unit as shown. Slide the cover straight back until it engages with the body.
- Make sure all the angled guides are tucked inside the body. The back edges of the cover should be against the rubber gasket along their entire length. Do not force the cover into place.
- Lift straight up. Pins on the cover will automatically engage and hold the top of the cover in place.

***Pro Tip: Don't lean against the cover as you try to lift it; the friction with the gasket will work against you. Instead, stand close to the unit, grasp it between your palms. and lift straight up. Hook your toe under the cover to help you lift.***

- Gently push in on the bottom of the cover with your knee or toe. This will lock the bottom of the cover in place.
- Peel off the protective plastic sheet from the cover.
- Install two M4x16 machine screws at the bottom.

**To remove the cover:**

- Lift straight up.
- Pull the bottom out slightly and lower to the floor.




*How to install the front cover*

# Section 5: Commissioning

Before commissioning the Harbor ensure that all wiring is correct and secure and that the front cover is securely in place.

*Note: Refer to the Pika Islanding Inverter Operation Manual for complete information on enabling the inverter and using the display and keypad, as well as information on the different Operational Modes and their uses.*

1. **Select System Operational Mode and Enable Inverter**
   i. Turn the Harbor REbus breaker to the ON position.
   ii. Power on the Islanding Inverter.
   iii. From the home screen, press the center button to bring up the list of available Operational Modes. Use the keypad to select and confirm the desired mode.
   iv. Enable the Inverter to energize the REbus nanogrid.
2. **Configure Harbor**
   i. Press the right arrow key on the inverter keypad until you see the Harbor device page. Press the center button to bring up the menu and select “Mod. Settings.”
   ii. Configure any setpoints as desired. Refer to the Harbor Operation Manual for descriptions of user-configurable setpoints.
   iii. At sites with multiple inverters, set Harbor to the appropriate PLM channel. The default channel is Channel 1. Refer to the Islanding Inverter Installation Manual for more information.

*Note: Harbor will auto-detect the number of lithim-ion modules.*

3. **Enable Harbor**
   i. Toggle the front panel Battery Disconnect switch to the “ON” position.
   ii. From the Harbor device page, press the center button to bring up the menu, select “Enable”, and confirm.
4. **Enable Islanding and Configure Inverter for Backup**
   i. From the Inverter device page, press the center button to bring up the menu and select “Mod. Settings.”
   ii. Select “NoIslanding” and set it to “0”. Commit the new settings.
   iii. If using an external automatic transfer switch, refer to the Islanding Inverter Installation Manual for switch wiring and configuration.

***Pro Tip: Don’t forget to enable Islanding! You must enable Islanding to allow the inverter to provide power during outages.***

The battery will automatically begin charging or discharging depending on its state of charge, the availability of energy on REbus, and the selected Operational Mode.

## Operating Modes, Charging Parameters, and Setpoints

Harbor's internal control electronics come pre-programmed for the safe and effective charge and discharge of the battery modules.

The Pika Energy Island supports multiple Storage Interactive system modes. For complete information on the different system modes and how to select them, consult the Islanding Inverter Operation Manual.

For full operation and maintenance instructions, including information on setpoints, consult the Harbor Operation Manual.

# Section 6: Troubleshooting

**Smart battery not recognized by inverter**
Check that inverter is enabled and REbus is operating. Make sure that the correct DC breaker is on and that all connections are secure. Measure voltage at the REbus terminals; there should be at least 360V between RE+ and RE-. Make sure Inverter and Harbor are using the same PLM channel.

**Battery remains in state "Waiting"**
Check that the Battery Disconnect switch is ON.

**Smart battery stays in disabled or sleep state (intermittent red LED strobe)**
Check the battery main fuses.

To check the fuses, follow these steps:

1. Disable smart battery from inverter console.
2. Shut off DC breaker to battery.
3. Toggle power switch on front of battery to off position.
4. Remove front cover from Harbor.
5. Measure voltage at input terminals and output terminals of fuse block. If the voltage is different between the input and output terminals, one or more fuses has blown.
6. Replace fuses if necessary. Information on replacement fuses may be found in the Technical Reference section, below.

# Section 7: Technical Reference

Replaceable fuses are as follows:

| Fuse | Manufacturer Part number | Ratings |
|---|---|---|
| Main battery string fuses | Ferraz A60Q40-2 | 40A, 600Vdc |
| Main battery string fuses (alternate) | Ferraz A60Q35-2 | 35A, 600V |
| Main battery string fuses (alternate) | Cooper Bussmann / Eaton KTK-40 | 40A, 600Vdc |
| Blackstart Battery Fuse | Littelfuse 0235005 HXP | 5A, 125Vac |

## 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 8: Product Specifications

| Specification | Harbor Plus | Harbor Flex | Units | Notes |
|---|---|---|---|---|
| Usable capacity | 17.1 | 11.4 | kWh | Expandable up to 60kW with up to four units per inverter |
| Power (Continuous) | 6.7 | 4.5 | kW | - |
| Power (Surge) | 10 | 6.7 | kW | - |
| Battery Modules | 6 | 4 | - | Lithium ion (NMC): Panasonic DCB-105 |
| Weight | 411 (186) | 311 (141) | lb (kg) | - |
| DC Voltage (per module) | 52 | | Vdc | - |
| DC Current (Continuous) | 24 | | A | - |
| Round Trip Efficiency | >90 | | % | - |
| Recommended Operating Temperature | 13-30 (55-86) | | C (F) | - |
| Acceptable Operating Temperature | 0-50 (32-122) | | C (F) | - |
| Dimensions | 68.375 (1737) x 22 (558) x 9.87 (251) | | in (mm) | - |
| Weight (Battery Module) | 55 (25) | | lb (kg) | - |
| Communication Protocol | REbus DC Nanogrid | | - | Powerline carrier |
| Compliance | UL 9540 | | - | - |
| Warranty | 10 | | years | - |

# Section 9: 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.


Pika
ENERGY


www.pika-energy.com

35 Bradley Drive #1
Westbrook Maine
04092