Panasonic

EverVolt™

Installation Manual

FOR EVERVOLT™ AC-COUPLED SYSTEMS

Models:
EVAC-105-2, EverVolt Mini, 5.7 kWh AC Coupled System
EVAC-105-4, EverVolt Standard, 11.4 kWh AC Coupled System
EVAC-105-6, EverVolt Plus, 17.1 kWh AC Coupled System

V. 110519

Panasonic

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

panasonicbatterystorage@us.panasonic.com

Check the resources page at na.panasonic.com/us/solar for the latest specifications and manuals.

As of September 1, 2019 EverVolt™ AC-Coupled has been successfully tested and operated using frequency control with the following solar inverters:

Fronius, Enphase Energy, SolarEdge HD Wave

Please contact your Panasonic sales representative for the complete list of inverter models tested and approved with EverVolt.

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IMPORTANT SAFETY WARNINGS

PLEASE READ ALL INSTRUCTIONS AND CAUTIONARY MARKINGS ON THE UNIT AND THIS MANUAL BEFORE USING THE INVERTER. STORE THIS USER MANUAL WHERE IT CAN BE ACCESSED EASILY.

WARNING: Only an authorized EverVolt technician with appropriate contracting license(s) should attempt to service the EverVolt. Please consult your local codes and standards for required qualifications to install and service an energy storage system.

Safety Symbols

	WARNING. This indicates the risk of electric shock. The presence of high voltage levels may constitute a risk of injury or death to users and/or installers.
	CAUTION. This indicates important information where failure to comply may result in safety hazards or cause damage to this product.
	CAUTION. This indicates the risk of a hot surface. The surface may reach a temperature high enough to cause serious burn injuries.

General Inverter Precautions

CAUTION. Before installing and using this inverter, read all instructions and cautionary markings on the inverter and all appropriate sections of this guide. This inverter must be installed by licensed electricians only.

CAUTION. Normally grounded conductors may be ungrounded and energized when a ground fault is indicated.

CAUTION. This inverter is heavy. It should be lifted by at least two persons for safety.

CAUTION. To reduce risk of fire hazard, do not cover or obstruct the cooling fan.

CAUTION. Do not operate the Inverter if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the Inverter is damaged, contact Panasonic for an RMA (Return Material Authorization).

CAUTION. Under high temperature environment, the cover of this inverter could be hot enough to cause skin burns if accidentally touched. Ensure that this inverter is away from normal traffic areas.

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. Authorized service personnel should reduce the risk of electrical shock by disconnecting AC, DC and battery power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors can remain charged for five (5) minutes after disconnecting all sources of power.

WARNING. Do not disassemble this inverter yourself. It contains no user-serviceable parts. Attempting to service this inverter yourself may cause a risk of electrical shock or fire and will void the warranty from the manufacturer.

WARNING. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that the wire is not undersized. Do not operate the Inverter with damaged or substandard wiring.

WARNING. During the installation process, drilling, punching, and screwing the bolts can cause metal burrs, which must be cleaned up to prevent them from falling into the electronics.

WARNING. Use only recommended accessories.

WARNING. Exposed hazardous voltage, during servicing or for emergency procedures use a lockable manual breaker lockout on the main service panel disconnects to enable Lock-Out-Tag-Out per the Standard for Electrical Safety in the Workplace, NFPA 70E, and the Standard for Workplace Electrical Safety, CSA Z462, and any other local codes and standards relevant to your jurisdiction.

BATTERY PACK WARNINGS:

There is danger of generating heat / smoke / rupture flames.

Do not disassemble battery pack.

Do not touch disassembled battery pack.

Do not reassemble battery pack.

Do not immerse the battery pack in any liquids or get it wet.

Do not short circuit battery pack.

Do not incinerate or heat the battery pack.

Do not use or leave the battery near a fire, stove, or heated place.

Do not impact the battery pack or throw it.

Do not use a damaged and/or deformed battery pack.

Do not drive sharp objects into the battery pack, strike it with any object, or stand on it.

Do not place the battery pack on materials such as tools, electric wire, screws, etc.

Do not touch a leaked battery pack.

In case of a leak in the battery pack, avoid contact.

Do not touch your eyes if accidental contact with leaky battery.

Do not expose to corrosive substances such as sea breeze, steam, or chemicals.

Do not install in humid places or places with condensation.

Do not install or use the EverVolt if it has been damaged in any way.

CAUTION. Do not expose the EverVolt to liquids or flooding.

Do not expose of equipment or batteries with household waste.

Do not dispose of batteries in a fire or by burning. The batteries can explode.

WARNING. Charge EverVolt only within the specified conditions (e.g. temperature range, voltage, current, etc.) Failure to do so may result in damages, heat generation, smoke, fire, or explosion.

Check the positive (+) and negative (-) terminals. If EverVolt is connected with reversed polarity, unexpected reactions may occur such as damages, heat generation, smoke, fire, or explosion.

Do not connect between the positive (+) and negative (-) terminals with a conductive material (e.g. wire, a cable, etc.). This may result in damages, heat generation, smoke, fire, or explosion.

Do not directly solder the EverVolt. This may result in damages, heat generation, smoke, fire, or explosion.

WARNING: Risk of electric shock. Risk of fire. Do not attempt to repair the battery(ies); it contains no user-serviceable parts. Tampering with or opening the battery(ies) will void the warranty. If the battery(ies) fails, contact Panasonic at panasonicbatterystorage@us.panasonic.com

WARNING: Proper disposal of lithium-ion batteries is required. Please contact your Panasonic representative for disposal and recycling measures.

WARNING: Take care when lifting the Battery. The Battery is heavy and may require a lifting tool to initially lift the battery high enough to get a good hold on it.

Hazardous Waste:

In the event that the Inverter or one or more batteries of EverVolt is defective and needs to be removed, replaced, temporarily uninstalled, disposed of, decommissioned or if Panasonic Customer Support authorizes a replacement (RMA), perform the following steps:

1. Follow installation and service shut down.
2. Contact Panasonic at panasonicbatterystorage@us.panasonic.com

INVERTER WARNINGS: Method of active anti-islanding protection: The Inverter monitors for sudden changes in the impedance of the grid by looking for changes in the second to the eighth harmonic.

Perform installation and wiring in accordance with all applicable local electrical codes and standards.

Protection against lightning and resulting voltage surge must be in accordance with local standards.

Using unapproved attachments or accessories could result in damage or injury.

Use Class 1 wiring methods for field wiring connections to terminals of a Class 2 circuit. Use only 6-8 AWG (2.5mm^2 to 4mm^2) and 1/0 wire in the junction box terminal block. Select the wire size based on the protection provided by the circuit breakers / fuses. Install properly rated over-current protection as part of the system installation.

To ensure optimal reliability and to meet warranty requirements, the Inverter must be installed and/or stored according to the instructions in this guide.

WARNING: Only an authorized technician should attempt to service the EverVolt.

WARNING: Risk of injury and equipment damage. Protect the EverVolt from damage and improper use.

WARNING - ARC FLASH AND SHOCK HAZARD: Appropriate PPE and Tools Required while working on this energized equipment.

WARNING: The Inverter is intended to operate with an internet connection. Failure to maintain an internet connection may have an impact on the warranty. See na.panasonic.com/us/EverVoltsupport for full terms and services.

When replacing an Inverter, it must be replaced with the same type of Inverter.

Properly mount the Inverter or place it on a flat, plain surface that can bear heavy weights. Ensure that the mounting location is structurally suited to bearing the weight of the Inverter.

During use, storage, and transport, keep the Inverter:

- Properly ventilated
- Away from water, other liquids, heat, sparks, and direct sunlight
- Away from excessive dust, corrosive and explosive gases, and oil smoke
- Away from direct exposure to gas exhaust, such as from motor vehicles
- Free of vibrations
- Away from falling or moving objects, including motor vehicles
- At an elevation of less than 3,000 m above sea-level
- In a location compliant with fire safety regulations (has a smoke alarm)
- In a location compliant with local building codes and standards
- Conditions for the Inverter installation site apply also to storage conditions

In Case of Fire or Other Emergency

In all cases:

- If safe to do so,
    1. Initiate Rapid Shutdown and allow the DC voltage to drop to a safe level
    2. Power down inverter, and
    3. Disconnect wiring sources of AC and DC power
- Contact the fire department or other required emergency response team.
- Evacuate the area.

In case of fire:

- When safe, use a fire extinguisher. Suitable types are A, B, and C dry chemical fire extinguishers. Additional extinguishing media include water, carbon dioxide, or alcohol-resistant foams.

In case of flooding:

- Stay out of water if any part of the system or wiring is submerged.
- If possible, protect the system by finding and stopping the source of the water, and pumping it away.
- If submerged, the whole system may need to be replaced.
- Let the area dry completely before use.

In case of unusual noise, smell or smoke:

- Ensure nothing is in contact with the system or in the venting area on top of the Inverter or Battery enclosures.
- Ventilate the room.
- Contact Panasonic at panasonicbatterystorage@us.panasonic.com

About EverVolt Certifications

Below are descriptions of some relevant certifications that the EverVolt conforms to:

- UL 1973: These requirements cover electric energy storage systems as defined by this standard for use as energy storage for stationary applications such as for PV, wind turbine storage or for UPS, etc. applications. These systems are to be installed in accordance with the National Electric Code, ANSI/NFPA 70 or other applicable installation codes.

- UL 1741 SA: A product safety standard that lays out the manufacturing (including software) and product testing requirements with the goal of producing inverters more capable of riding through grid excursions or even actively managing grid reliability functions.

- UL 1642: These requirements cover primary (non-rechargeable) and secondary (rechargeable) lithium batteries for use as power sources in products. These batteries contain metallic lithium, or a lithium alloy, or a lithium ion, and may consist of a single electrochemical cell or two or more cells connected in series, parallel, or both, that convert chemical energy into electrical energy by an irreversible or reversible chemical reaction.

- UL9540: 1.1 These requirements cover energy storage systems that are intended to receive electric energy and then to store the energy in some form so that the energy storage system can provide electrical energy to loads or to the local/area electric power system (EPS) up to the utility grid when needed. The types of energy storage covered under this standard include electrochemical, chemical, mechanical and thermal. The energy storage systems equipment (constructed either as one unitary complete system or as matched assemblies that when connected are the system) may include equipment for charging, discharging, control, protection, power conversion, communication, controlling the system environment, air, fire detection and suppression system, fuel or other fluid movement and containment, etc. The system may contain other ancillary equipment related to the functioning of the energy storage system. 1.2 The systems covered by this standard include those intended to be used in a standalone mode (e.g. islanded) including "self-supply" systems to provide electric energy and those used in parallel with an electric power system or electric utility grid such as "grid-supply" systems, or applications that perform multiple operational modes. 1.3 Requirements for installation, with the exception of installation

manuals and documents for installation provided with the system that are integral to the tested system are outside the scope of this standard. The installation instructions indicate that the energy storage systems are to be installed in accordance with the national and local electrical codes and other applicable codes. This standard assumes that the final installation of the energy storage system will be performed by qualified service personnel in accordance with the applicable installation instructions, installation practices and national installation codes. Energy storage systems are intended for installation subject to approval by the Authority Having Jurisdiction.

- CSA 22.2.107.1: This Standard applies to AC and DC type power conversion equipment (PCE) that
  a) is of dry or liquid-filled construction
  b) has a rated voltage not exceeding 1500 V
  c) is for commercial, industrial, and residential indoor and outdoor use in nonhazardous locations in accordance with the Rules of the Canadian Electrical Code, Part I.

- IEE 1547: Standard for Interconnecting Distributed Resources with Electric Power Systems was approved by the IEEE Standards Board in June 2003. It was approved as an American National Standard in October 2003. The published standard is available from the IEEE Std 1547-2003.

- NEMA 1: Intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment or locations where unusual service conditions do not exist.

Required Tools

Below is a list of recommended tools you will need to install the EverVolt:

PARTS NAME	DESCRIPTION	QTY.
Gloves	Cotton glove with urethane coating	1 Pair
Automatic Screwdriver (+)	Automatic driver with torque setting	1
Wrench	M6/M8/M12	1
Wire Cutters	Standard wire cutters	1
Crimping Tool	Used for making power cables	1
Socket Wrench	Battery terminals are 10mm	1
Screwdriver	Standard screw driver	1
Allen Wrench	4mm allen wrench needed for enclosure	1

Planning for Installation

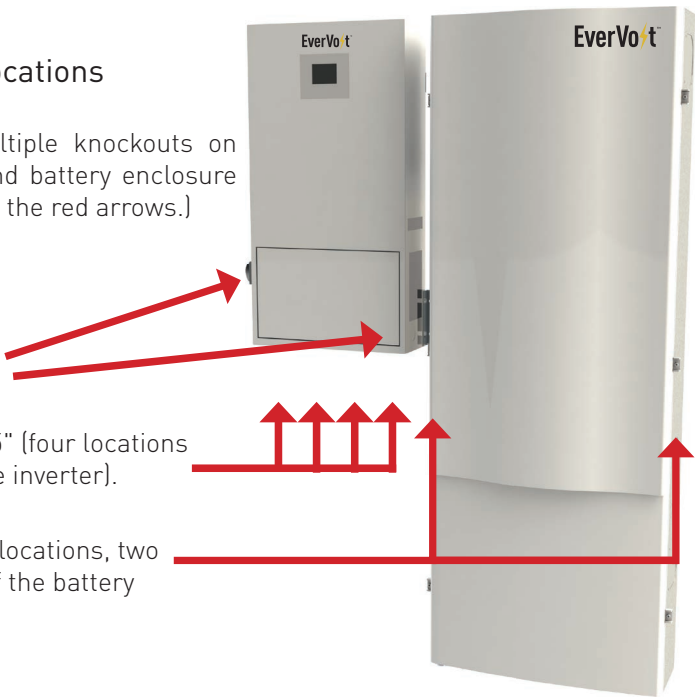
1. Essential Load Sizing: Please ensure that the battery power per the EverVolt spec sheet is capable of running the essential load circuits during backup.
2. Internet Connectivity: All EverVolt systems ship with a PLC communications kit for simple installation. EverVolt also works with a CAT5/6 hardwired cable to the customer's internet router. Cellular modem connectivity is an option that will be available in the future. If interested please contact your sales representative for more information.
3. System Placement: (a) Placement of the physical system so that the batteries rest on the feet of the battery enclosure (b) a conduit between the battery and inverter be placed for easy routing of the 1/0 or 2/0 wire. The clearance spacing needs to be observed to allow for adequate cooling and servicing of the equipment as shown below.
4. Outlet Placement: 120V AC outlet needs to be within 4 ft of the inverter to plug in the power supply to the PowerHub.

System Layout & Dimensions

66" x 24" x 10.5" (Battery) & 17.5" x 39" x 6" (Inverter)

Knockout Locations

There are multiple knockouts on the inverter and battery enclosure (as shown with the red arrows.)



1", 1.5", 1.75"

.5", .75", 1", 1.5" (four locations underneath the inverter).

1.5" & 2" (four locations, two on each side of the battery enclosure).

To Install, Service or Shutdown Equipment (Overview):

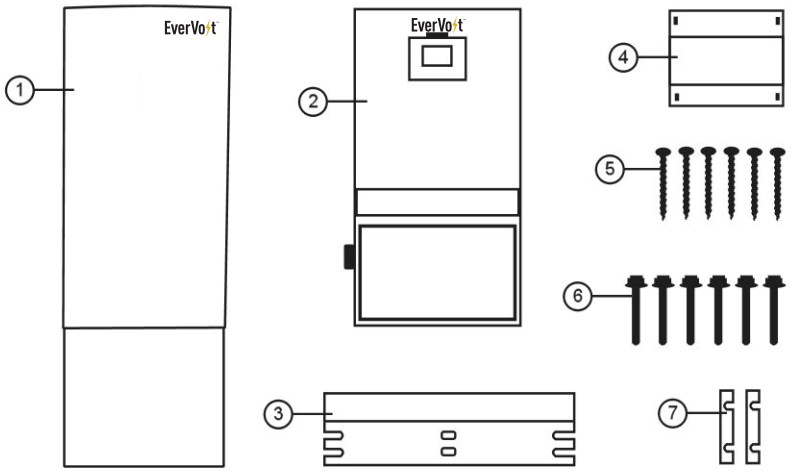
Installation and service of this equipment includes risk of electric shock.

1. Initiate External Solar PV Rapid Shutdown (If installed)
2. Turn OFF the Main Switch located outside the inverter enclosure on the left side
3. Turn off the battery breaker located inside the Distribution Box behind the thumb screw latched access door
4. Turn off all AC breakers located inside the Distribution Box behind the thumb screw latched access door
5. Allow two minutes for all sources of supply to discharge
6. Check that AC and DC voltages are at a safe level
7. Access to the wiring requires opening the access door using the thumb screw and removing the four screws on the Inverter wire compartment cover

To Start Up Equipment (Overview):

1. Check that cables are properly connected
2. Turn ON External Solar by disabling Solar PV Rapid Shutdown (If installed)
3. Turn ON: (a) AC Grid Breaker, (b) Battery Breaker
4. Turn ON the Main Switch (located on the left side of the inverter)
5. If the inverter has GRID input, then the system will automatically start. If only battery starts the inverter, press the Enter button for five seconds until two beeps are heard. The system will boot up in under sixty seconds
6. Check output voltage: L1-L2 240 VAC; L1-N 120 VAC and L2-N 120 VAC
7. Turn ON Load Breaker

1. WHAT'S IN THE BOX



Parts Description	Qty
1. EverVolt	1
2. Inverter	1
3. Enclosure Mounting Bracket	1
4. PowerHub	1
5. Wood Screws	6
6. Self-drilling Screws	6
7. Inverter Mounting Bracket	2

2. INSTALLING THE BATTERY ENCLOSURE

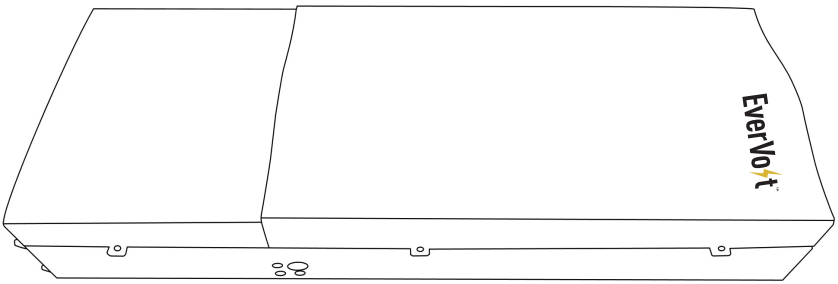
Before installing the battery enclosures, make sure nothing inside the package is damaged. You should have received the following items in the package: The EverVolt inverter, backplate, brackets, screws and this installation manual.

The following considerations must be taken into account before selecting where to install.

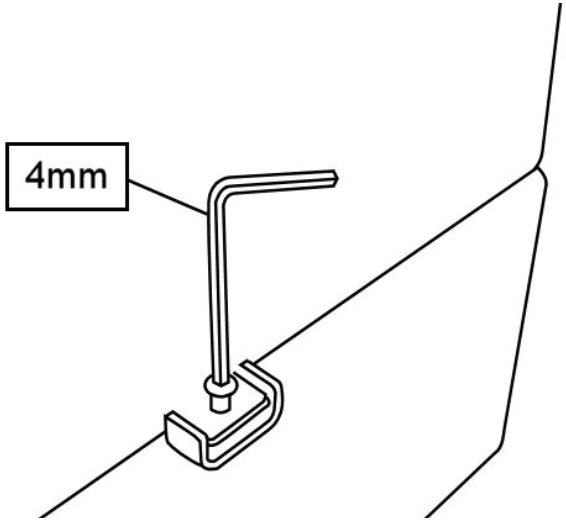
- The unit cannot be mounted on flammable construction materials.
- The unit must be mounted to a solid surface.
- ALLOW 20CM (8 INCHES) OF CLEARANCE TO THE SIDES AND 50CM (20 INCHES) TO THE TOP AND BOTTOM of the unit for proper air circulation to dissipate heat.
- The ambient temperature (charging) must be between 41°F and 122°F and discharging 14°F and 122°F. Relative humidity must be between 5% and 85% to ensure optimal operation. Do not operate where the temperature and humidity are beyond the specified limits.
- The unit has a Pollution Degree rating of PD2. The unit must be mounted in a protected area that is dry, free of excessive dust and has adequate air flow.
- The unit was designed with an IP20 protection rating and is for indoor applications only.

To begin installing the battery enclosures, please follow the steps below:

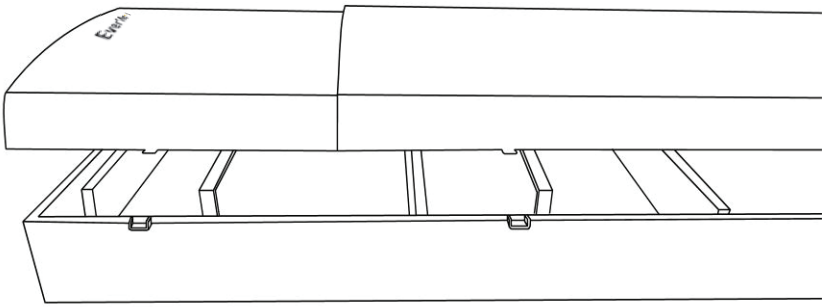
1. Take the enclosure out of the box and move to a stable surface.



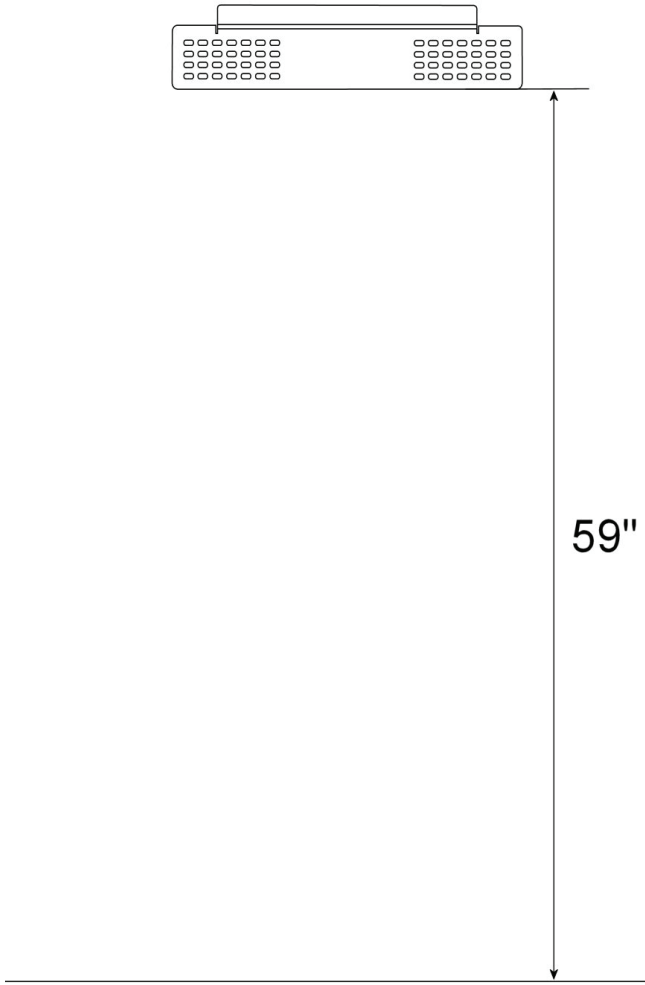
2. Remove the 6 screws from the front portion of the enclosure with a 4mm allen wrench.



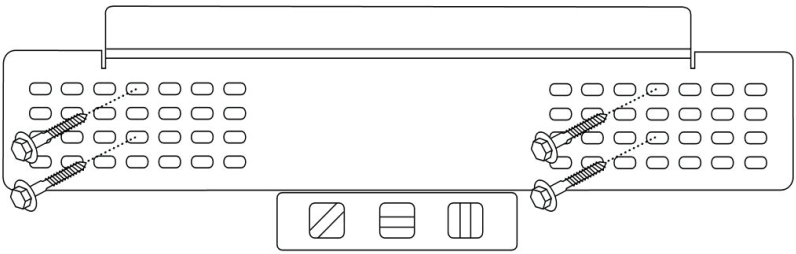
3. With two people, remove front cover and set aside.



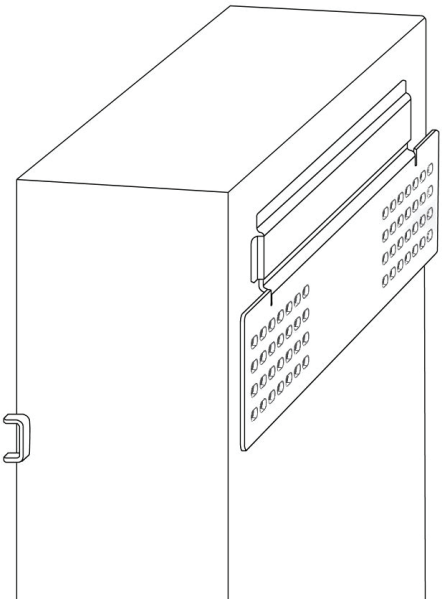
4. Place mounting bracket onto predetermined wall for installation and ensure that the bracket is 59" above the ground.



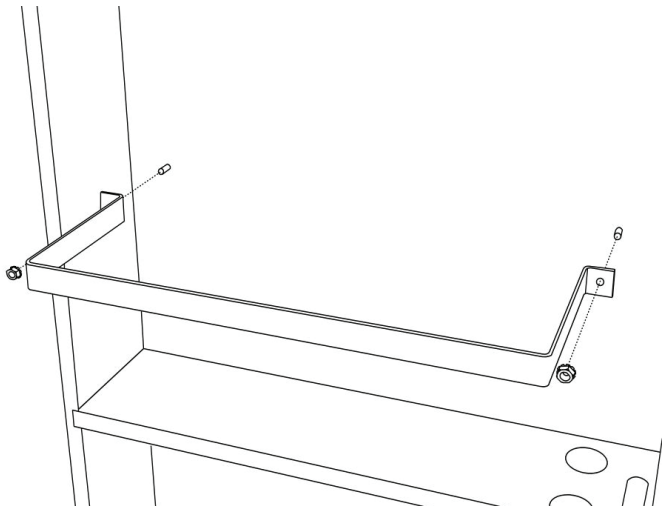
5. Determine what type of wall you're working with to use the appropriate amount of lag bolts. Always consult with your local jurisdiction on specific building code requirements for mounting energy storage systems.



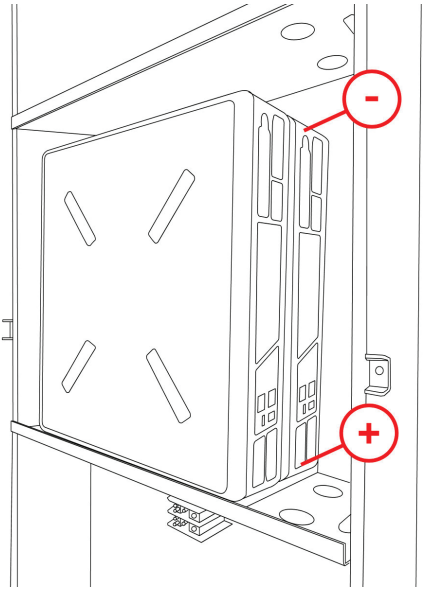
6. Hang the enclosure on the bracket and ensure that the slots line up correctly. To assure that the weight of the battery rests firmly on the floor, leave a 1/4" gap between the enclosure and the wall mounting bracket.



7. Unscrew the battery hold downs within the enclosure and place to the side.



8. Place each battery in the enclosure and repeat 4 times or the appropriate amount that lines up with the amount of batteries you have. Note that the batteries must be placed on their side with the Positive side *DOWN* and the Negative side *UP*.



9. Place battery hold-downs over battery and screw them down.

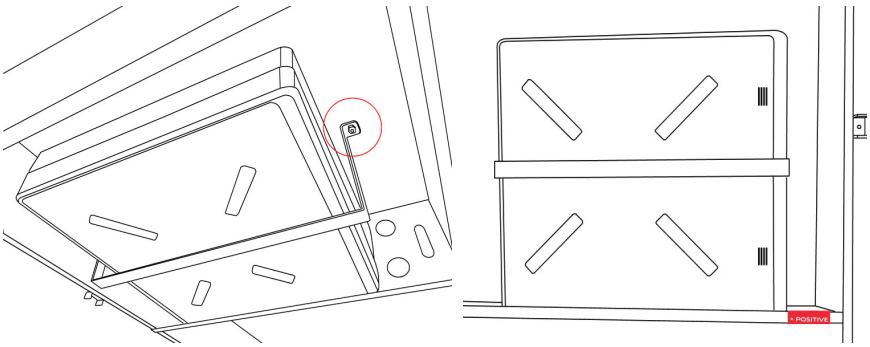
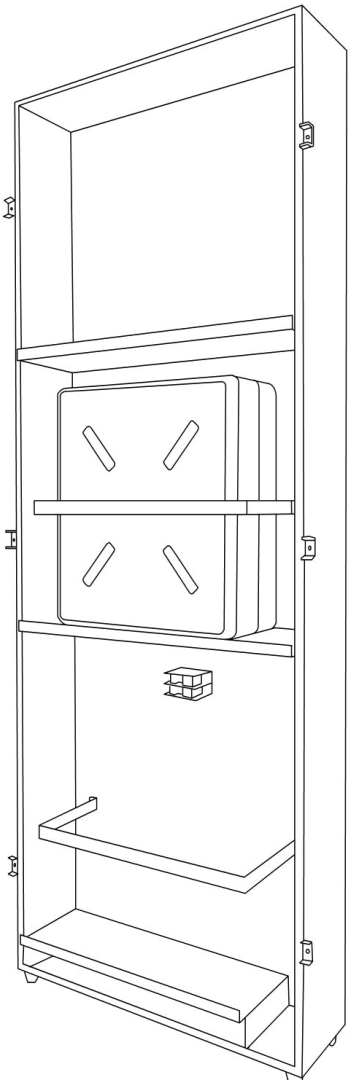


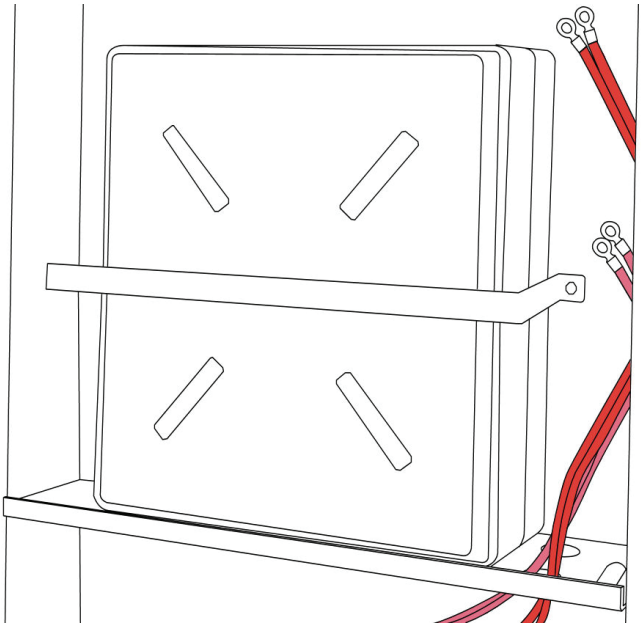
Image Above: Battery orientation labels. The batteries are installed on their side so the positive connection is on the right side.



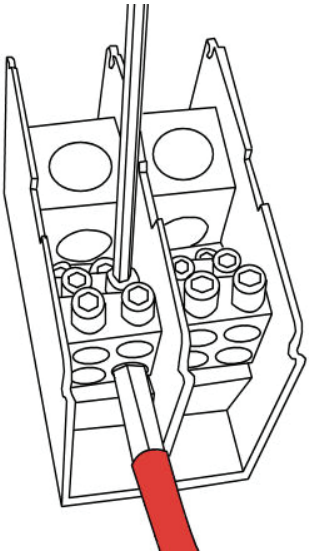
10. Locate your wiring harness kit. Grab the negative and positive wires. If the wires are too short, please use 6 AWG (top batteries), 8 AWG (bottom batteries), 18 Sq", 36". Please refer to the table below for more sizing information.

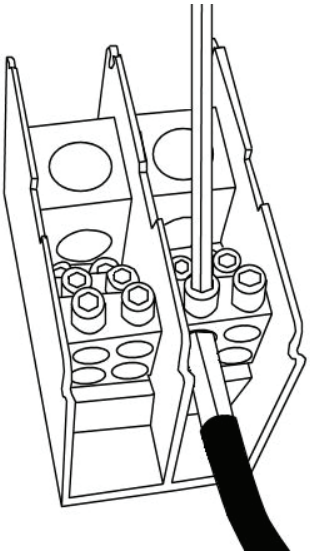
6 AWG -- (2) Red, (2) Black	Black 69.25"	Red 56.75"
8 AWG -- (4) Red, (4) Black	Black 42.25"	Red 37"

11. Feed the positive wiring through the enclosure as shown in the picture below.

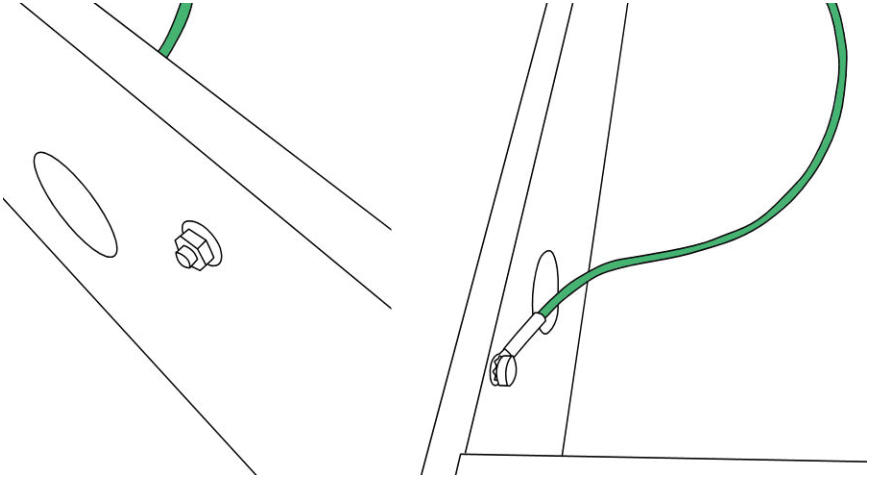


12. 6 AWG, middle row/bank, 8 on the first row.

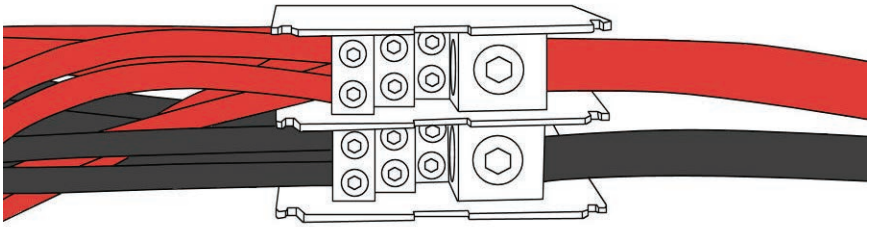




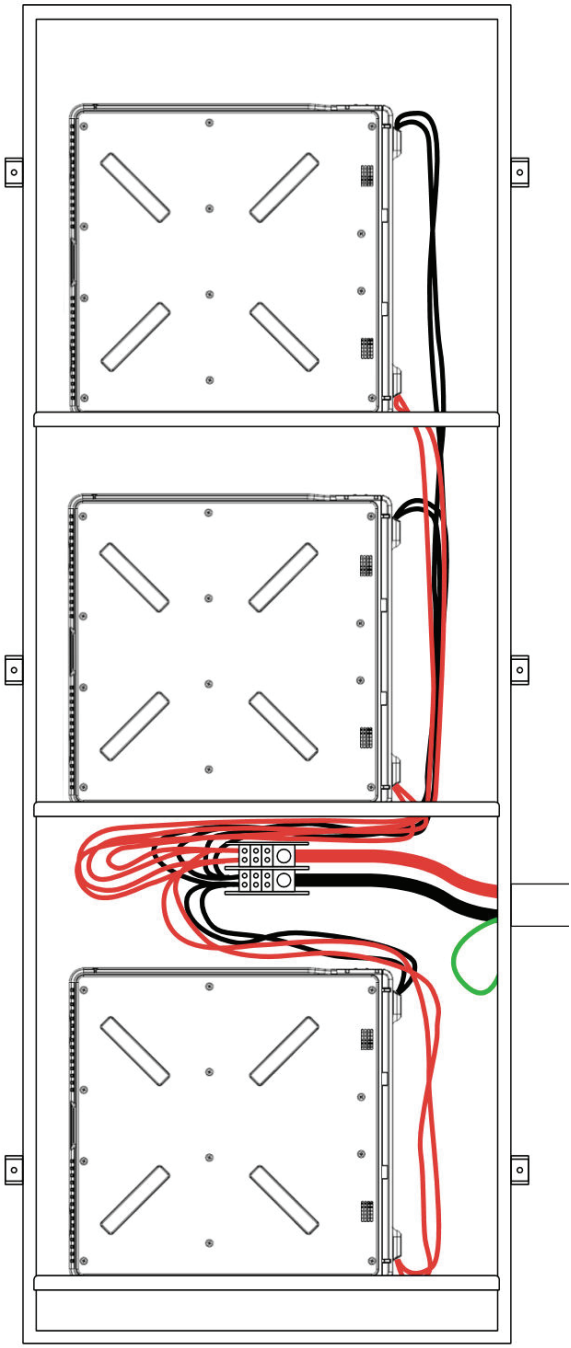
13. Mount the ground wire on either the upper or lower vent screws. The ground cable connects to the inverter. Ensure there is a star washer in between the ground cable and screw.



14. Connect the appropriate sized wire between the Terminal Block and the battery lugs within the inverter to handle 150 ADC. Please see the image below of the completed Terminal Block.



15. The finished installation will resemble the image below.



3. MOUNTING THE INVERTER

Before installation, make sure nothing inside the package is damaged. You should have received the following items in the package: The EverVolt inverter, backplate, brackets, screws and this installation manual.

The following considerations must be taken into account before selecting where to install:

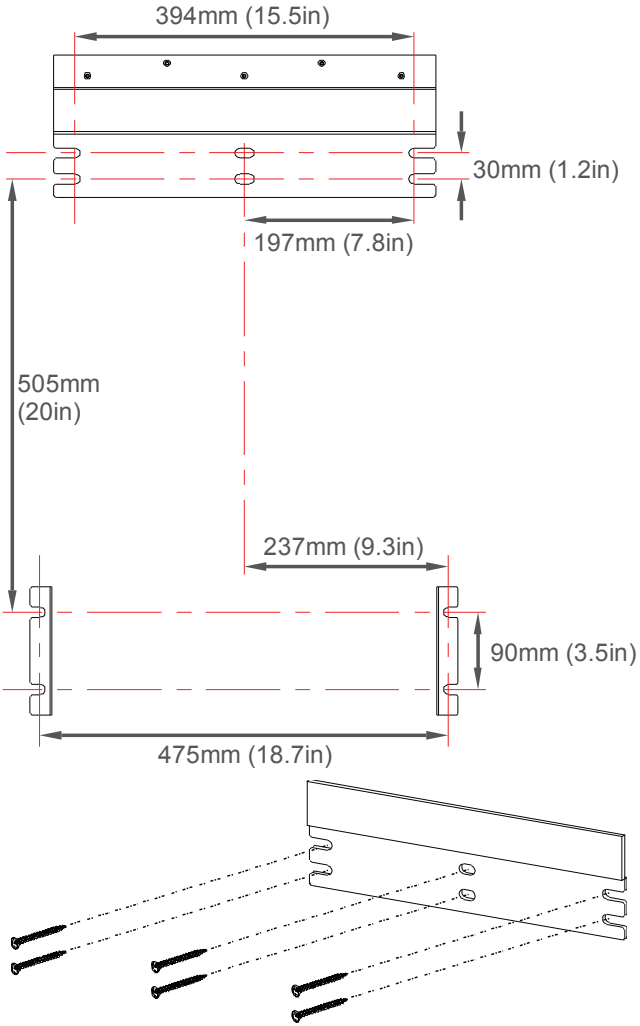
- The unit cannot be mounted on flammable construction materials.
- The unit must be mounted to a solid surface.
- ALLOW 20CM (8 INCHES) OF CLEARANCE TO THE SIDES AND 50CM (20 INCHES) TO THE TOP AND BOTTOM OF THE UNIT for proper air circulation to dissipate heat.
- Before inverter placement, see battery operating temperature requirements.
- The ambient temperature must be between -20°C and 50°C and relative humidity must be between 5 and 85% to ensure optimal operation. Do not operate where the temperature and humidity are beyond the specified limits.
- The unit has a Pollution Degree rating of PD2. The unit must be mounted in a protected area that is dry, free of excessive dust and has adequate air flow.
- The unit was designed with an IP20 protection rating and is for indoor applications only.

⚠ CAUTION: This inverter is heavy (74lb/33.6kg). For safety, mounting should be handled by two people.

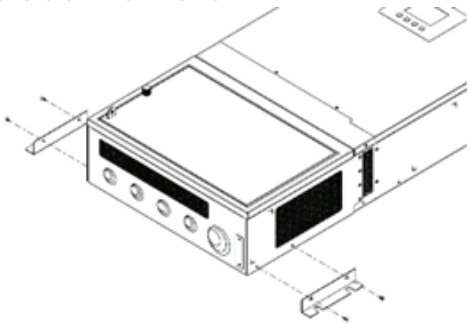
Wall Types

- Stud: The inverter will need to be mounted to the wall using Unistrut. The Unistrut must be secured to two studs in the wall. There should be two rows of Unistrut installed: one for the backplate and the other for the side brackets.
- Solid: Use the backplate and mounting dimensions to mark for screw locations.

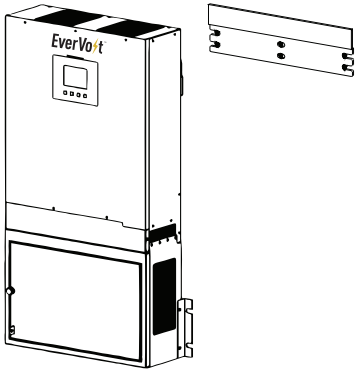
1. Mount the backplate onto the wall using at least two screws; one on each side of the backplate.



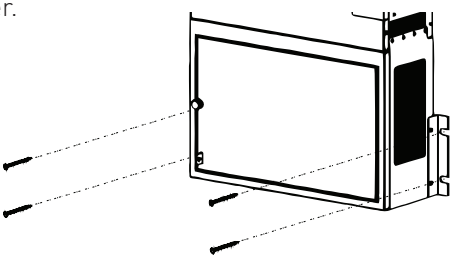
2. Install the brackets on the inverter.



3. Hang the inverter onto the backplate.



4. Secure the brackets to the wall using at least two screws; one on each side of the inverter.

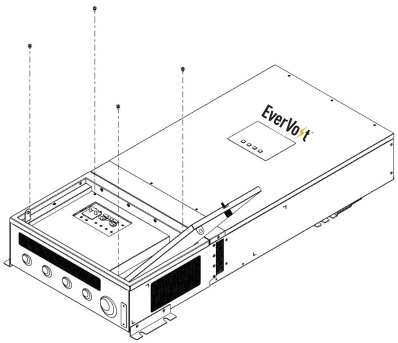


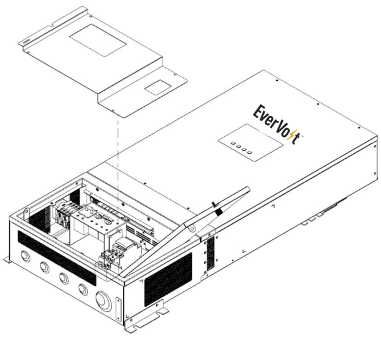
Dead-Front Cover

- The dead-front cover must be removed when making or modifying connections in the distribution box, and reinstalled when connections have been completed.
- To remove the dead-front cover, use the following steps.
- Reverse the steps to reinstall the dead-front cover.

1. Remove the screws from the dead-front cover.

2. Pull off the dead-front cover.





4. CONNECTIONS

WARNINGS

- Make sure the circuit breaker is off before making or modifying any connections.
- To prevent the risk of electric shock, make sure the ground wire is properly earthed before operating this unit whether the grid is connected or not.
- To reduce the risk of injury, use the recommended wire/cable size.
- Do not apply anti-oxidant substance on battery terminals connections are made.

Notes

- Order of connections should be Grid, Load, then Battery.
- Order of wire connections should be Ground, N, L1, L2.
- Connect AC wires according to the labels on the terminal block or your system

Wire/Cable Requirements

	GRID	LOAD	BATTERY
SIZE	8 AWG	8 AWG	2 AWG
LENGTH	--	--	Use 6ft cable. If longer cable is needed, make sure it is less than 16 ft.

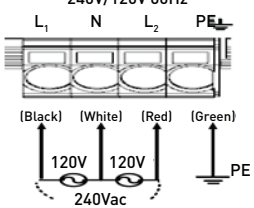
Strip 15mm(0.6in) off the AC wires and battery cables.

5. GRID (UTILITY) CONNECTION

WARNING: To reduce the risk of injury, use the recommended wire size above. It is very important for system safety and efficient operation to use the appropriate wire for grid (utility) connection.

WARNING: To prevent the risk of electric shock, make sure the ground wire is properly earthed before operating this unit whether the grid is connected or not.

There is an AC (Grid) circuit breaker in the distribution box. This will ensure the inverter can be safely disconnected during maintenance and is fully protected from overcurrent of AC input.Use the recommended wire size below.

	USA: 240V/120V SPLIT-PHASE SYSTEM
AC GRID UTILITY TYPE	

GRID CONNECTION WIRING REQUIREMENTS	GRID RATED POWER	NOMINAL VOLTAGE	WIRE SIZE	Torque
	5 kW	240 VAC	8 AWG	0.82 Nm

Connecting to the Grid/Utility

Step 1. Check the grid voltage and frequency with an AC multimeter. It should be within the operation AC voltage range of the product's specifications.

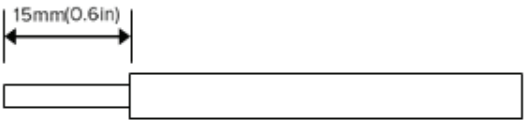
Step 2. Make sure the circuit breaker is off.

Step 3. For each AC wire, strip 15mm(0.6in) of insulation.

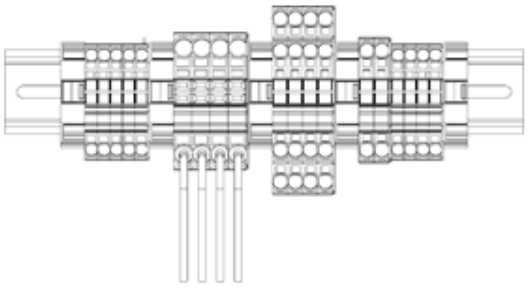
Step 4. Connect the AC wires to the inverter according to the labels indicated on the terminal block or your grid utility type.

Note: The PE protective conductor (Ground) should be the first to be connected.

AC WIRE FOR GRID CONNECTION



CONNECTING TO AC UTILITY TERMINAL



6. BATTERY CONNECTION AND CHARGING REQUIREMENTS

There is a DC (Battery) circuit breaker in the distribution box. Before connecting the batteries, please have the battery specifications on hand.

Note on DC Wiring and NEC

The maximum EverVolt Battery DC charging current is 60A for DC Coupled and 100A AC Coupled systems. Under fault circumstances, a flashing error 06 will show on the inverter display. See fault table in this manual.

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.

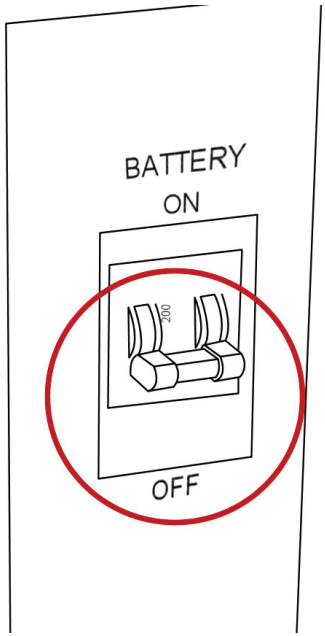
3. NEC TABLE 310.15(B)(16) for Allowable Ampacities of Insulated Conductors for Not More Than Three Current-Carrying Conductors in Raceway (conduit wiring over 12").

4. NEC TABLE 310.15(B)(17) for Allowable Ampacities of Insulated Conductors in Free Air (chassis wiring).

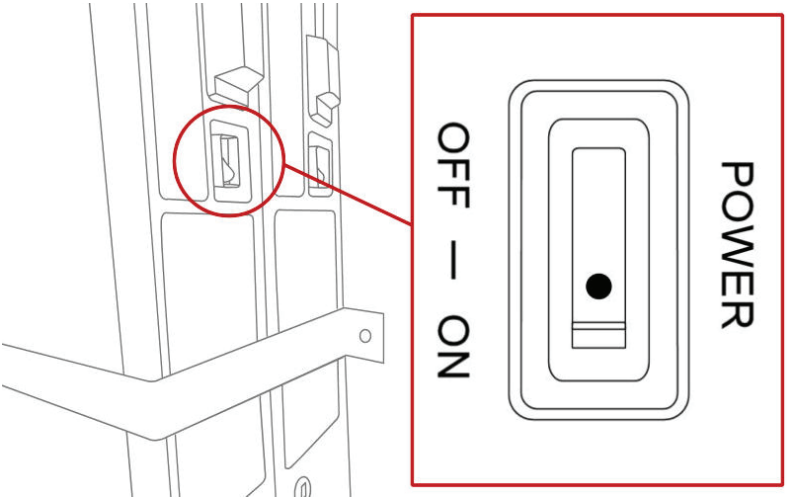
WARNING: To maximize battery capacity, it is important to keep the voltage drop from the 150A current as low as possible.

Connecting the Batteries

Step 1. Make sure the inverter battery circuit breaker is OFF.



Step 2. Make sure the battery pack ON/OFF switch is OFF.



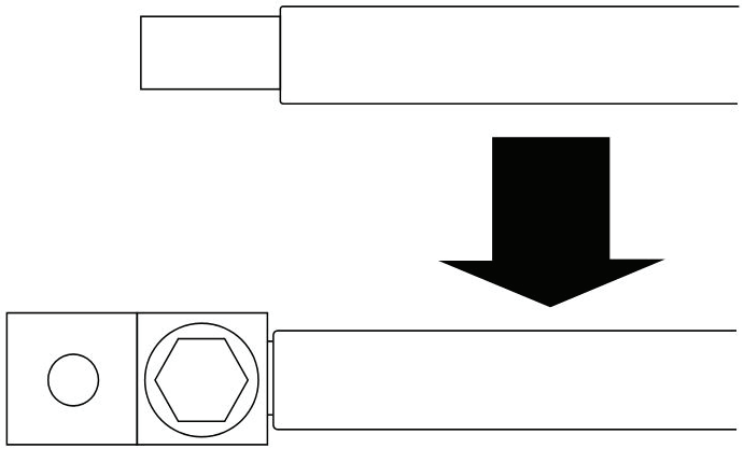
WARNING: Shock Hazard. Installation must be performed with care due to high battery current.

Inverter Battery Connection

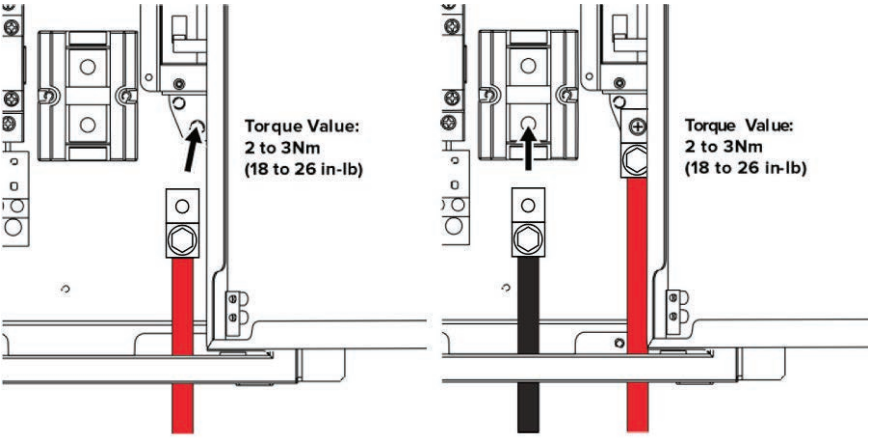
Step 3. Strip 15mm(0.6in) of insulation from each battery cable and insert it into a ring lug. See Cable Length table above for connecting four batteries in one enclosure.

Crimp or bolt ring lugs to the battery cables.

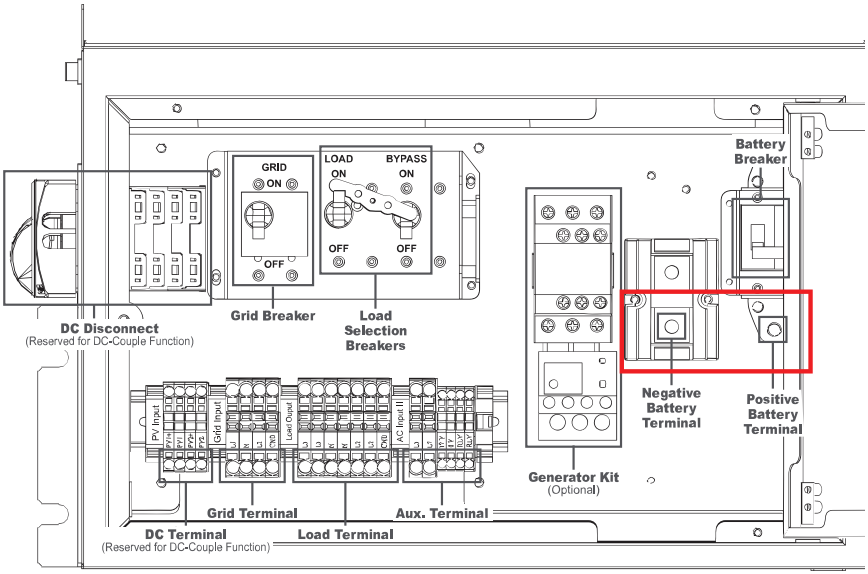
CABLES FOR BATTERY CONNECTION



Connect the red cable to the positive (+) battery terminal and the black cable to the negative (-) battery terminal.



Connecting to Battery Terminals



CAUTION: Before making the final connection or closing the breaker, make sure the connections have the correct polarity. Check polarity labels above.

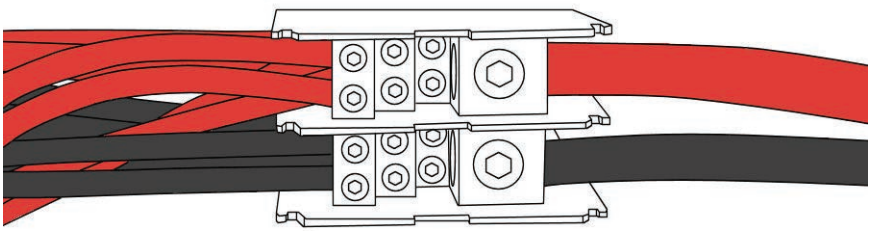
CAUTION: Do NOT apply anti-oxidant substance on the terminals before terminals are connected tightly.

CAUTION: Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

WARNING: Check positive (+) and the negative (-) terminals. If the EverVolt is connected with reversed polarity, unexpected reactions may occur such as damages, heat generation, smoke, fire, or explosion.

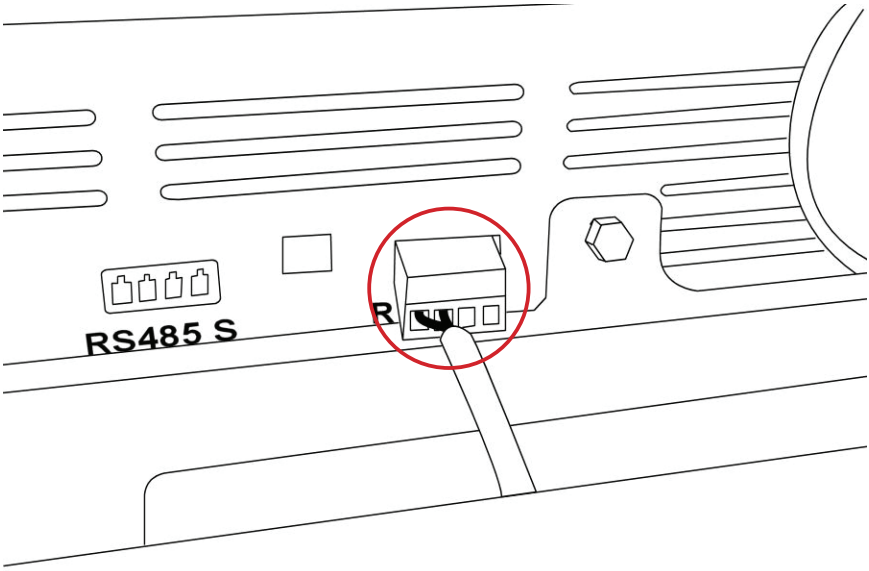
WARNING: Do not connect between the positive (+) and negative (-) terminals with a conductive material (e.g. wire, a cable, etc.). This may result in damages, heat generation, smoke, fire, or explosion.

Step 1. If not completed already from earlier, connect the other end of the battery connection cable to the large terminal block located in the battery enclosure. See image below.

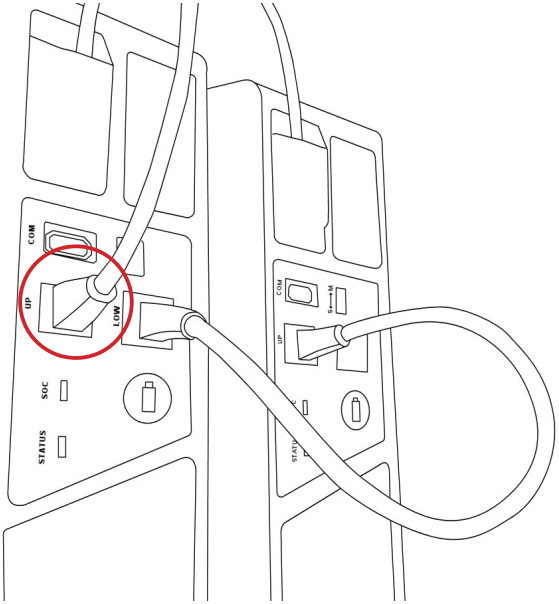


Step 2. Connect the four red wires to the battery positive binding post. Connect the four black wires to the battery negative binding post. The smaller/shorter wires go to the top batteries. The longer/larger wires go to the bottom batteries.

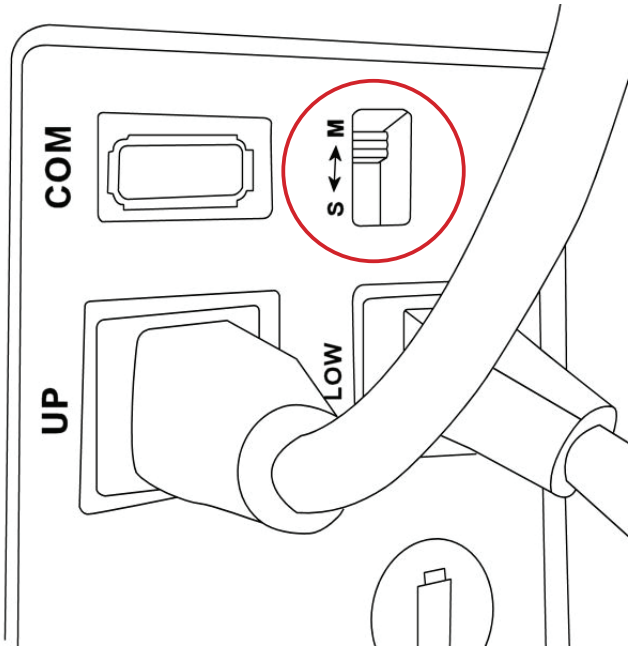
Step 3. Connect the supplied battery communication cable to the inverter primary RS485 M connector.



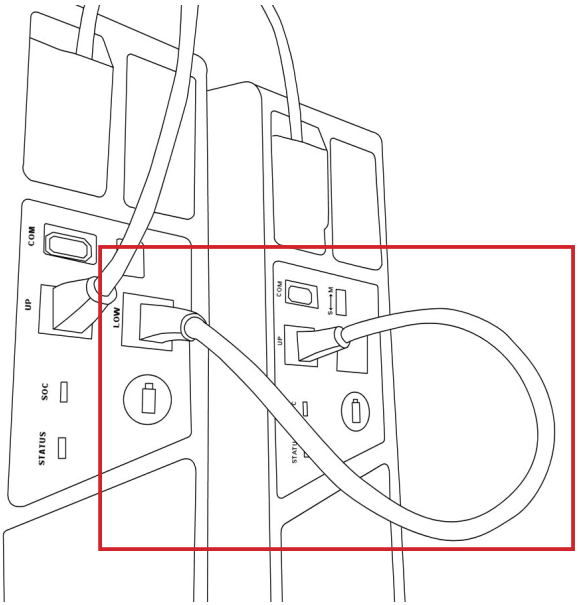
Step 4. Connect the other end of the supplied battery communication cable to upper/outer battery RJ-45 connector labeled "UP."



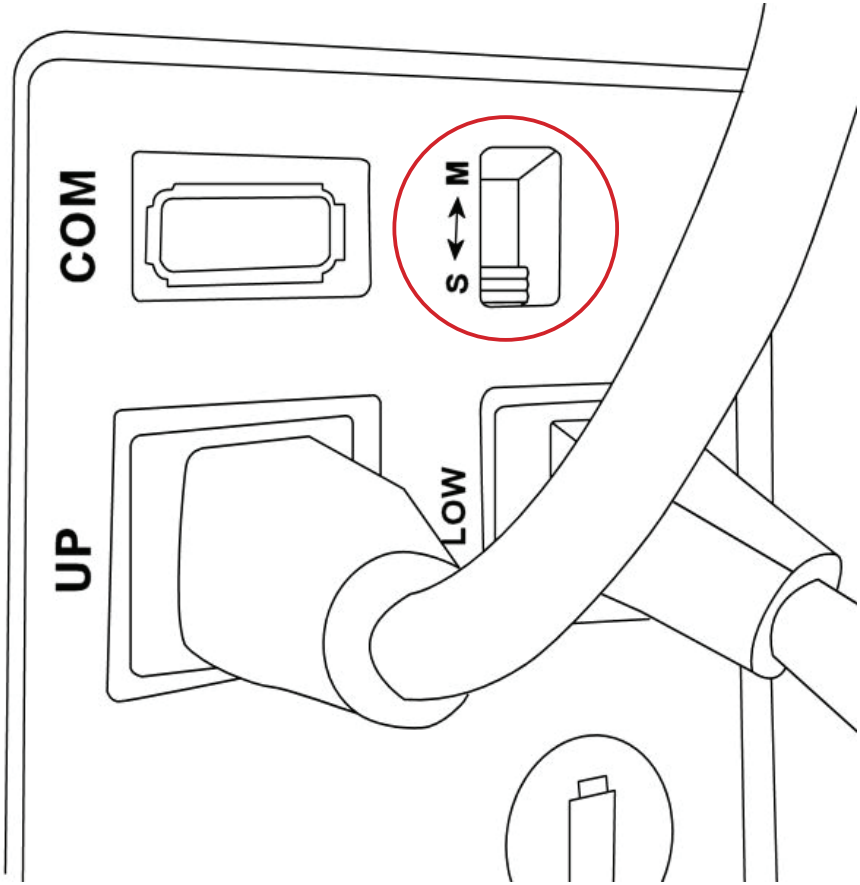
Step 5. Switch the "S <-> M" slider switch to "M" position.



Step 6. Connect up to eleven other communication cables starting with the "M" (primary) module, from the "LOW" to "HIGH" with the Ethernet RJ-45 cables. Up to 10 total modules may be string together (one – Primary and one to eleven – Secondary).



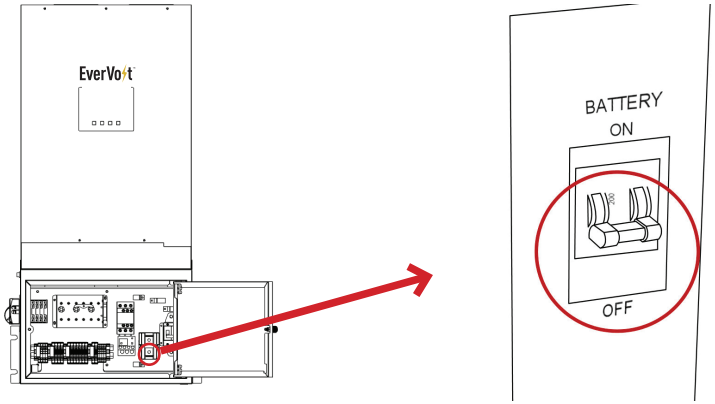
Step 7. On the one to eleven Secondary modules just connected, confirm that the "S <-> M" slider is in the "S" position.



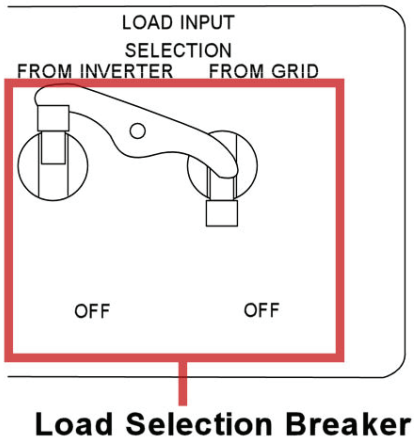
Disconnecting Equipment

Follow the below instructions to completely isolate the equipment.

Step 1. Turn off the 40A "marked" main grid breakers located in the main service panel.
Step 2. Turn off the battery breaker located in the inverter distribution box.



Step 3. Turn off both (interlocked) Load Input Selection breakers located on the left side, outside of the distribution box.

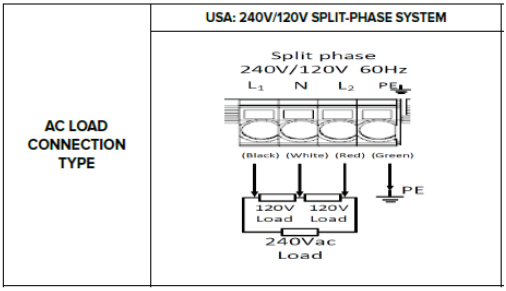


WARNING: Internal capacitors can remain charged for 5 minutes after disconnecting all above sources of power.

7. ESSENTIAL LOAD CONNECTION

Installing an essential load panel provides backup power to connected circuits. There are two interlocked AC breakers to the essential loads inside the distribution box. One AC breaker labeled "FROM INVERTER" is for normal inverter operation. The other breaker labeled "FROM GRID" bypasses the "AC GRID" breaker and connects the essentials loads directly to the "Grid Input" terminals.

Note: If the inverter needs to be repaired this breaker can be used to supply the essential load when the inverter has been taken off-line. This bypass can also be used while a customer waits for Permission to Operate from their utility or local Authority Having Jurisdiction.



ESSENTIAL LOAD MAX POWER	NOMINAL VOLTAGE	WIRE SIZE	Torque
5.5 kW 2.75 kW	240 VAC 120 VAC	10 AWG 10 AWG	0.6 ft-lb 0.6 ft-lb

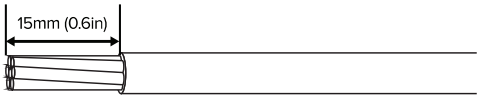
WARNING: To reduce the risk of injury, use the recommended cable size above. It is very important for system safety and efficient operation to use the appropriate cable for AC connection.

WARNING: Essential load terminals are to be wired to a separate subpanel. Never connect essential load lines directly to the main service panel without use of an external automatic transfer switch. Direct connection of essential loads output to the grid will result in damage to the inverter.

WARNING: Do not connect essential loads output in parallel with the grid!

Connecting to the Essential Load

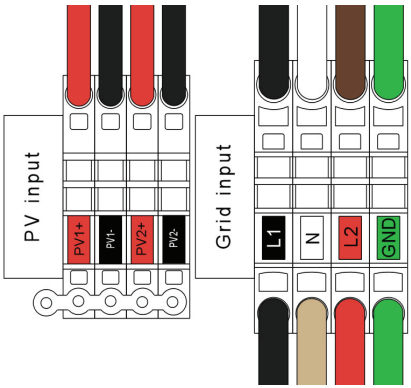
Step 1. Make sure the circuit breaker is off.
Step 2. For each AC wire, strip 15mm(0.6in) of isolation.



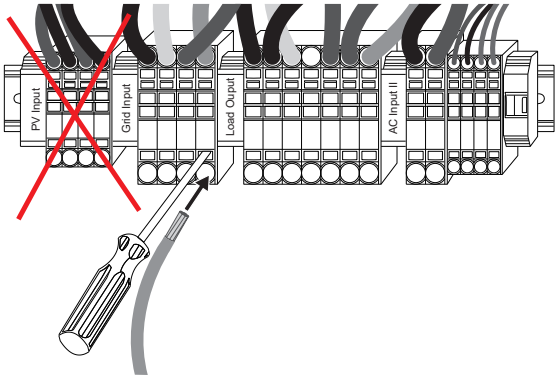
Step 3. Be sure to connect PE protective conductor first (GND).
Step 4. Connect the wires according to the labels indicated on the terminal block or your grid utility type.

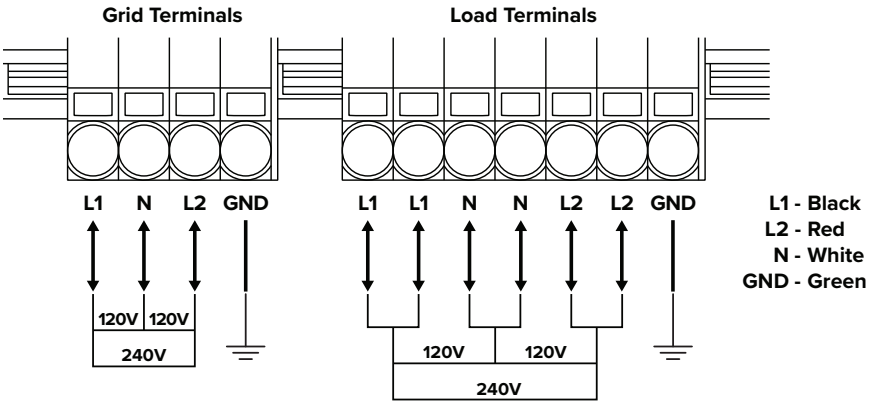
How to Install Conductors into the Terminal Blocks (Installation below shows the grid connection for reference. Make sure to use proper terminal block, connect grid to grid, PV to PV and Load to Load.)

⚠ CAUTION: Plug all PV Input terminals for all AC-Coupled installations. Under no circumstances will the PV Input terminals be used.

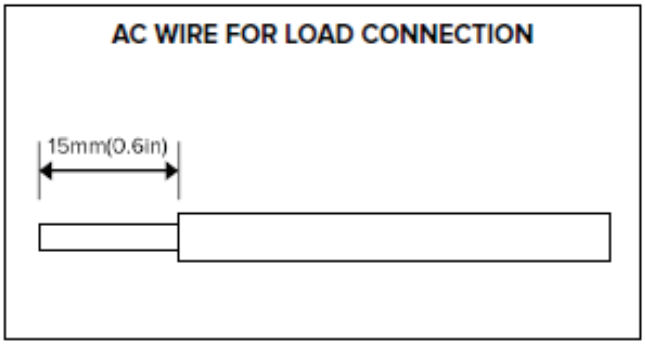


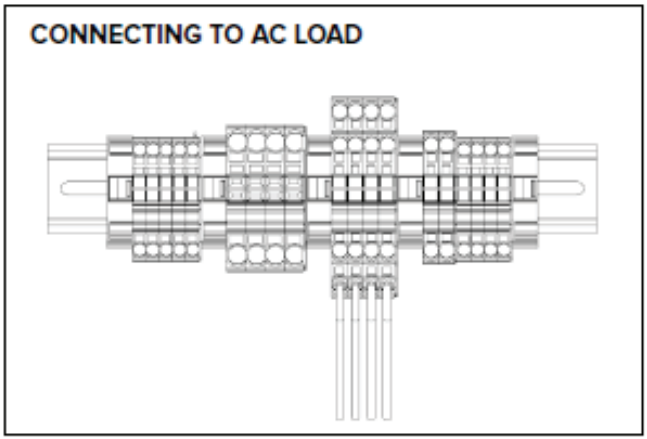
1. Put a screwdriver into the terminal, insert the wire into the terminal and then remove the screwdriver. PV Input terminals not used in AC Coupled EverVolt.





CAUTION: Make sure the AC Load and AC Grid are properly connected. Misconnecting them will damage to this product.

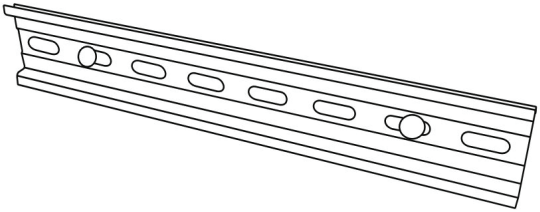




8. INSTALLING THE POWERHUB

1. Begin by locating the PowerHub box that was shipped with the system.

2. Locate the DIN rail and two bolts within the box.

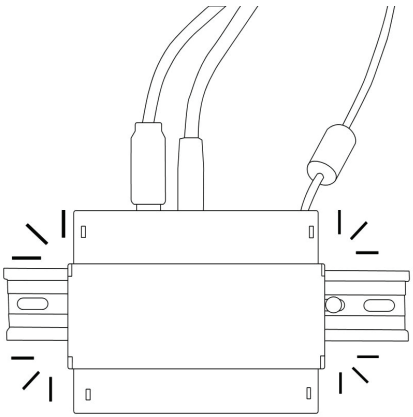


3. Mount the DIN rail on an open wall space within close proximity from the inverter.

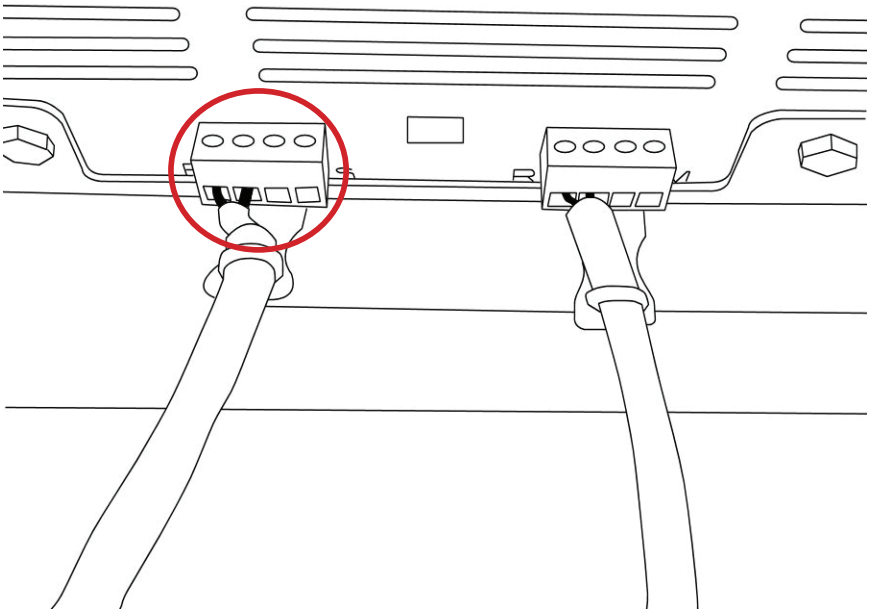
Note* For ease of installation, install 15A / 120V outlet next to PowerHub if one isn't within 4 ft away.

4. Mount the PowerHub on the DIN rail until there is an audible click.

5. Plug the power supply cable (120 VAC to 5 VDC), ethernet cable (RS485) and communications cable into the PowerHub.



6. Plug the RS-485 cable into any of the 4 USB outlets on the PowerHub, and plug the other end into the RS-485S input in the inverter.



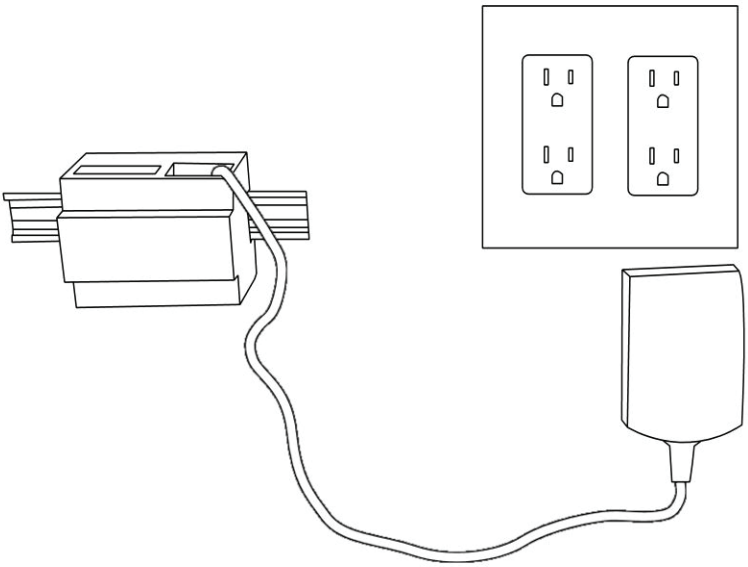
7. Plug a working RJ-45 Ethernet cable into the PowerHub Ethernet connector to give the PowerHub Internet access. See section "Internet Connectivity Options" for more information on connecting the PowerHub to the Internet.

Connecting the PowerHub to the Internet

All EverVolt systems ship with a PLC communications kit for simple installation. EverVolt also works with a CAT5/6 hardwired cable to the customer's internet router.

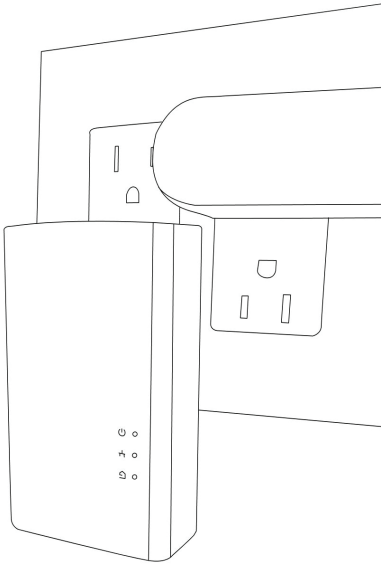
Disconnecting Remote Control of the PowerHub

1. Unplug the PowerHub's 120 VAC to 5 VDC power supply.

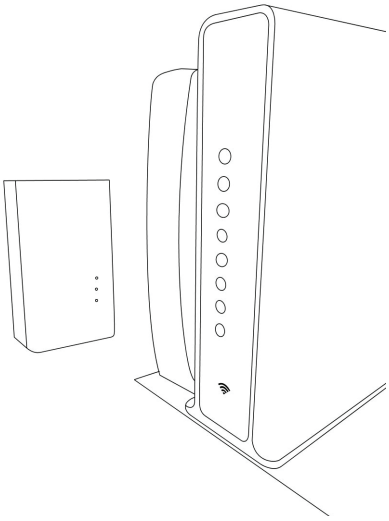


9. CONNECTING THE INTERNET-OVER-POWER (PLC)

1. Unbox the Powerline Connector (PLC).
2. Plug the first PLC into an outlet near the installed EverVolt.
3. Run a CAT5/6 cable from the PowerHub to the PLC.

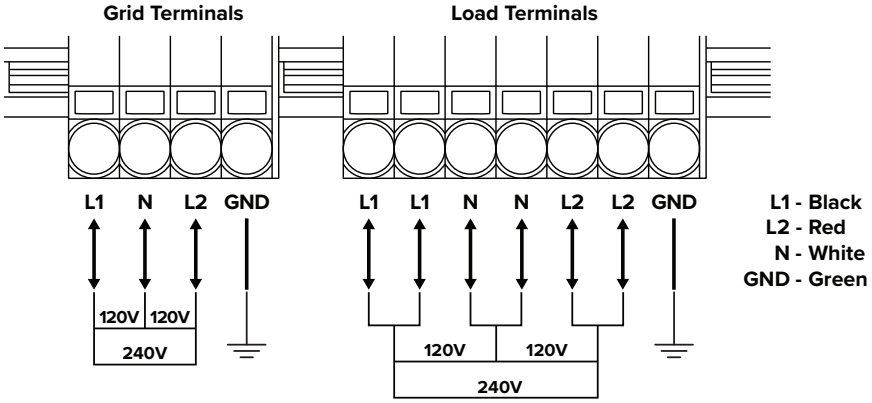


4. Place the second PLC next to the customer's router.
5. Run a CAT5/6 from the PLC to the customer's router.
6. For full installation instructions, refer to 'Quick Start' booklet located in the PLC box.

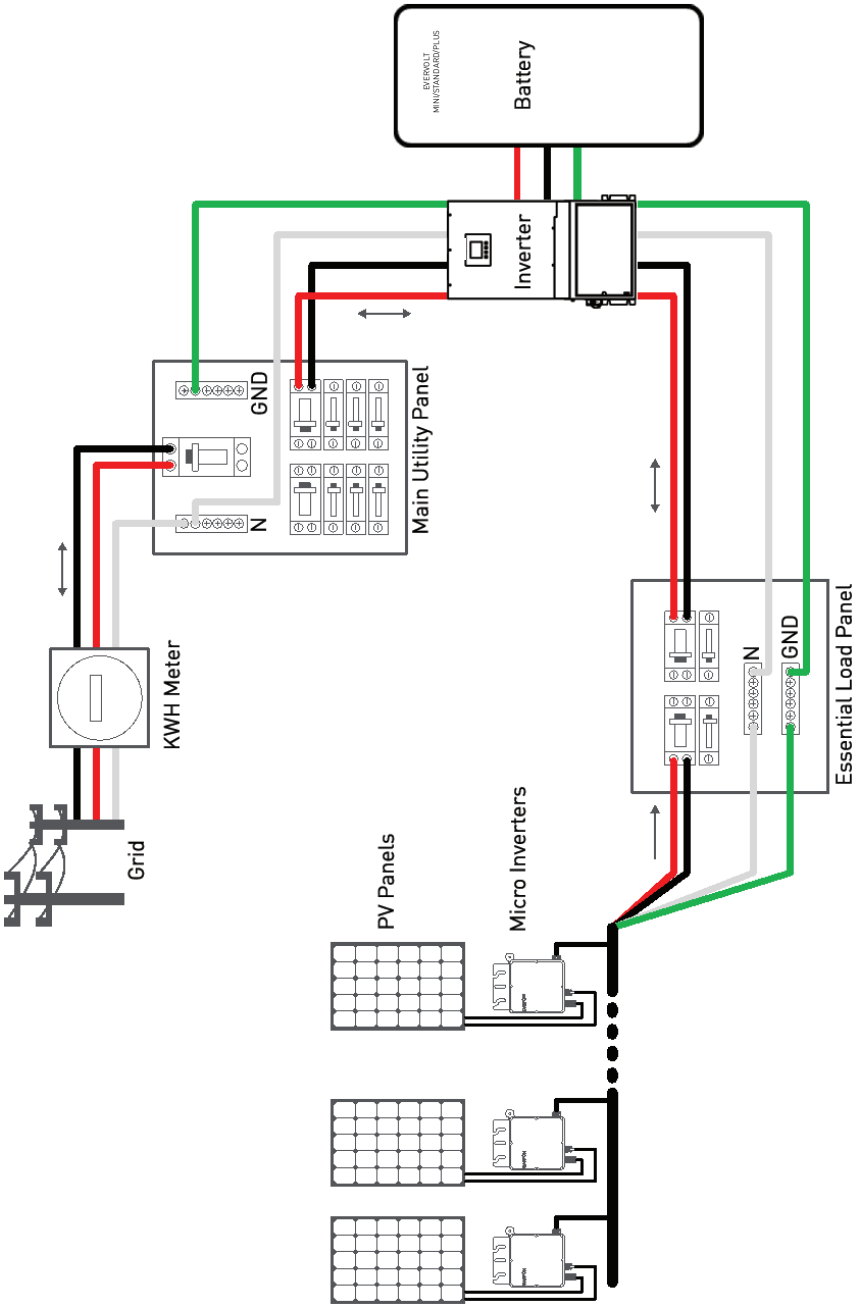


10. SYSTEM TYPES: QUICK DISCONNECT TERMINALS

240V/120V 60HZ SPLIT-PHASE SYSTEM (USA)



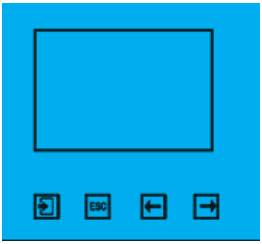
11. SAMPLE WIRING DIAGRAM



12. OPERATION AND DISPLAY PANEL

Display Panel Overview

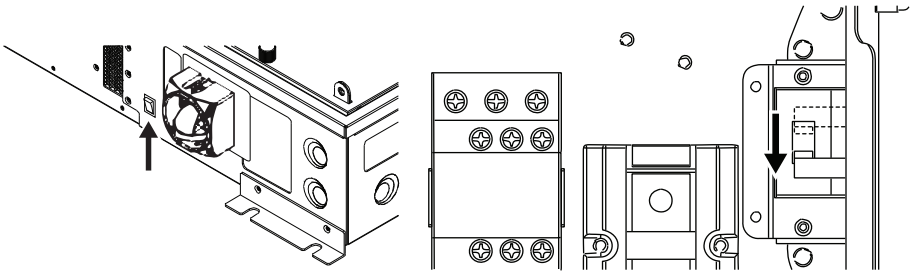
The display panel consists of four function keys and an LCD screen. The display panel will be used to manage and monitor the system.



ICON	FUNCTION	DESCRIPTION
	Enter	Confirm the selection in setting mode or enter setting mode.
ESC	Exit	Exits setting mode.
	Left	Go to previous page, move or decreasing all Number.
	Right	Go to next page; move; to increase all Number.

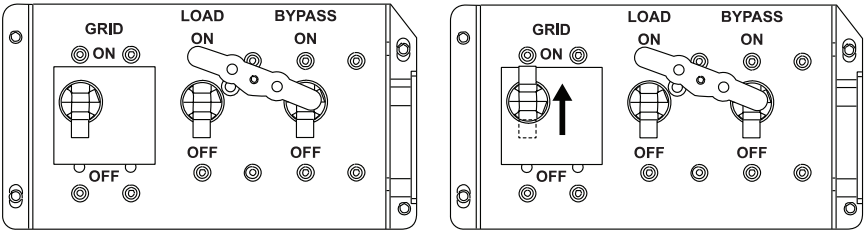
How to Turn the System On -- Grid-tied

1. Turn/set the Grid Breaker and Battery Breaker to the on position. *Note:* AC grid switch needs to be switched swiftly. IF it does not catch, try again with greater speed.



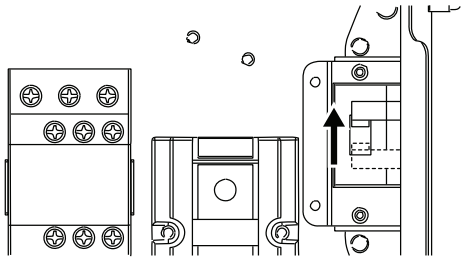
2. Turn on the Main Switch (located on the left side of the inverter).

3. If the inverter has multiple sources of power, the inverter will start automatically. If the battery is the only power source, then press the enter key for 3 seconds until two beeps are heard to start the inverter.



5. Check Load AC output voltage: L-L 240 VAC / L-N 120 VAC.

6. Turn on Load Breaker in the distribution box.



Starting the System -- Off-Grid (Black Start)

Note 1, the batteries will always start. The status indicator must be pressed to determine whether or not the batteries are in a state to be charged. Batteries must be above 0-10% SoC (blinking red) to be charged. If the batteries are blinking red, they may not charge on the inverter, you will then need an external power supply.

Note 2, the system will black start from PV automatically once there is enough solar power and battery SoC.

Note 3, the system will almost always manually "black start" the system from batteries but may not maintain (system shutdown right away) if the batteries SoC is not high enough. In that case, 1) reduce the essential load or 2) wait for either the grid voltage to return or for enough solar power and battery SoC to operate the essential loads again.

1. Make sure all the connections have been completed and properly installed.

2. Turn/set the PV Switch, Grid Breaker and Battery Breaker to the on position.

3. Turn on the Main Switch (located on the left side of the inverter).

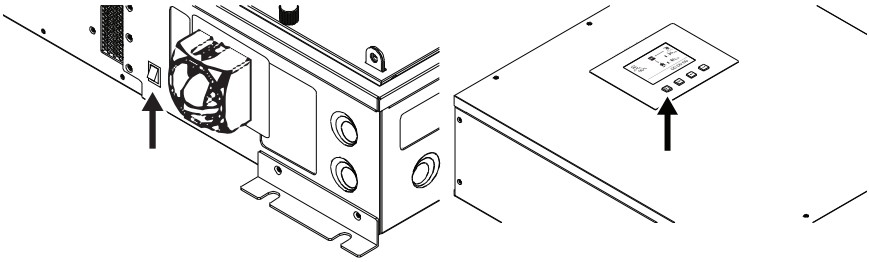
4. Press the Enter Key for 3 seconds.

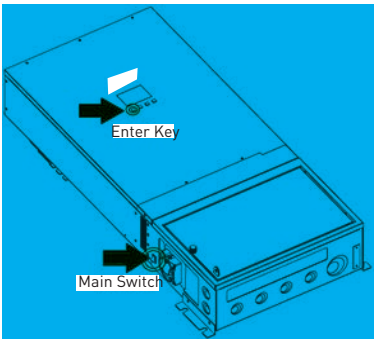
5. Check Load AC output voltage: L-L 240 VAC / L-N 120 VAC.

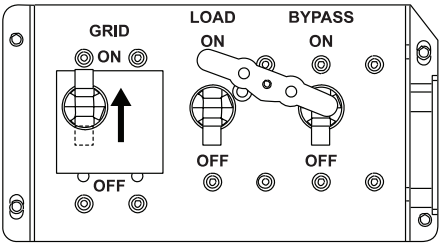
6. Turn on Load Breaker in the distribution box.

How to Turn the System Off

1. Turn off the Main Switch (located on the left side of the inverter).
2. Turn off the battery breaker.
3. Turn off all AC breakers.

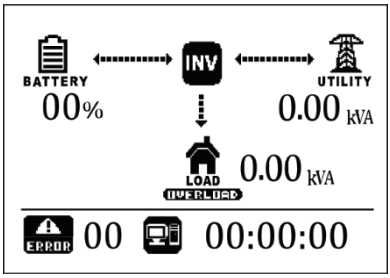




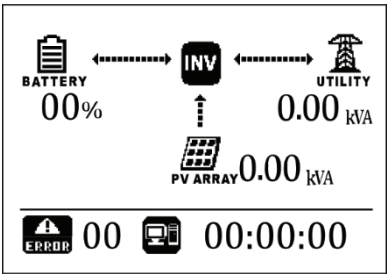


LCD Screen – Icons and Pages

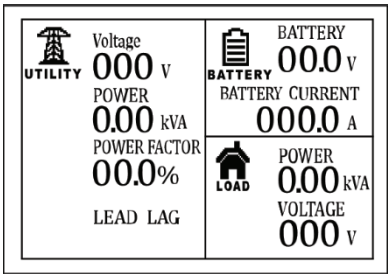
The LCD screen will display three different pages: "Power Flows", "Power Information" and "System Settings". Use the <-- or --> keys to toggle between the various pages. The screen will default to the "Power Flows" page.



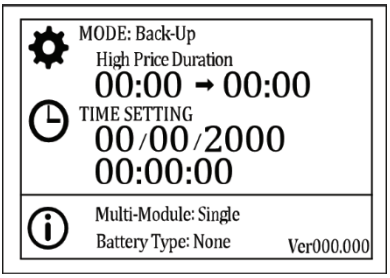
Power Flow Page w/Load Output



Power Flow Page w/AC-Couple Input



Power Information Page



System Settings Page

ICON	DESCRIPTION
	Represents the PV Array
	Represents the Battery Pack
	Represents the Utility
	Represents the Load
	Represents the Hybrid Inverter
	Indicates the Connection to a PowerHub
	Indicates the Error and error codes
	Indicates an overload has occurred
	Represents the System Mode Setting
	Represents the System Time Setting
	Represents the System Information

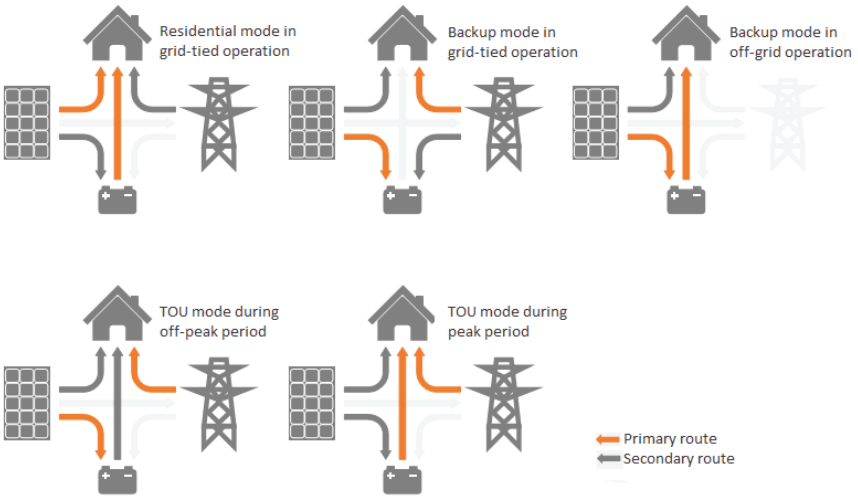
Operating Modes

The inverter has six modes of operation for backup, residential and time of use. Each mode assumes a set of conditions and prioritizes the consumption of PV, Grid or batteries accordingly to optimize energy flow.

PRESET MODES		DESCRIPTION
1. Back-up (default)		Keep the battery full and discharge the battery only if power outage happens.
2. Residential		Reduce power consumption from the Grid. Use the power from PV and battery first.
3. Back-up without Feed-in		Operate as Back-up mode but will not feed-in power back to the Grid.
4. Residential without Feed-in		Operate as Residential mode but will not feed-in power back to the Grid.
5. TOU without **Batt.** Feed-in	Low electricity cost	Operate as Back-up mode.
	High electricity cost	Operate as Residential mode.
6. TOU with **Batt.** Feed-in	Low electricity cost	Operate as Back-up mode.
	High electricity cost	*Operate as residential mode and will feed-in constant power back to the Grid.

*The default feed-in power is 3000W.

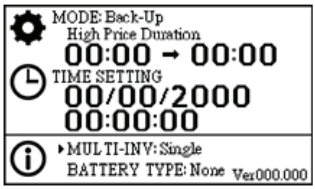
PRESET MODES		PV USE PRIORITY			LOAD PRIORITY			CHARGE FROM		FEED GRID FROM		BATTERY DOD	
1. Back-up (default)		Load	Batt.	Grid	PV	Grid	Batt.	PV	Grid	PV	Batt. (No PV)	On-Grid	Off-Grid
1. Back-up (default)		2	1	3	1	2	3	Yes	Yes	Yes	No	40%	0%
2. Residential		1	2	3	1	3	2	Yes	No	Yes	No	40%	0%
3. Back-up without Feed-in		2	1	X	1	2	3	Yes	Yes	No	No	40%	0%
4. Residential without Feed-in		1	2	X	1	3	2	Yes	No	No	No	40%	0%
5. TOU without **Batt.** Feed-in	Low electricity cost	2	1	3	1	2	3	Yes	Yes	Yes	No	40%	0%
	High electricity cost	1	2	3	1	3	2	Yes	No	Yes	No	40%	0%
6. TOU with **Batt.** Feed-in	Low electricity cost	2	1	3	1	2	3	Yes	Yes	Yes	Yes	40%	0%
	High electricity cost	1	3	2	1	3	2	Yes	No	Yes	Yes	40%	0%

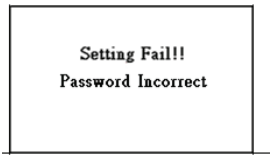


System Settings

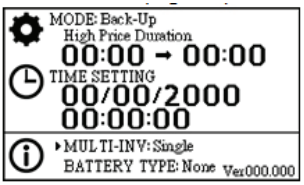
In the display panel, use <-- or --> keys to get to the System Setting Page. System settings are divided into two parts, "Mode" and "Time Setting." Click ↵ to enter the System Setting Page and click ESC to exit

Step 1. In the System Setting Page, press ↵ twice to enter the page to select Mode.

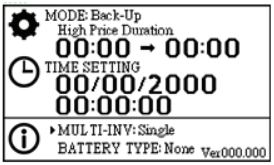


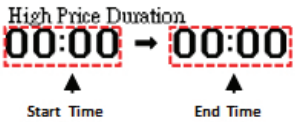


Step 2. Use the <-- or --> keys to toggle between modes and ↵ to select it.

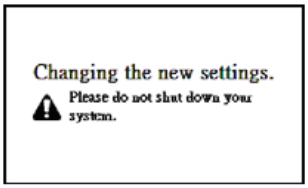


Step 3. For modes "Time of Use" or "Time of Use with Battery Feed-in (Grid Export)", enter the start/end times for "High Price Duration" in 24-hour notation. Use the <-- or --> keys to change the number, and then ↵ to set it. Once the value for the last time field is set, press the ↵ key.

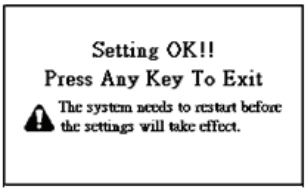


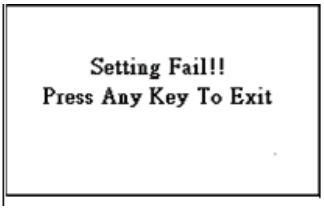


Step 4. Settings are being updated. Please wait for next message.



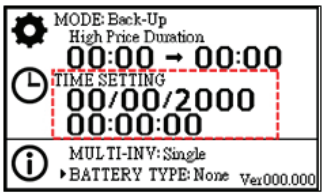
Step 5. Press any key and manually restart with the main switch located on the left side of the inverter. If you get a setting fail message, press any key. Please re-turn on the main switch and re-setting the mode again. If still get a setting fail message, please contact Panasonic.





B. Setting System Time

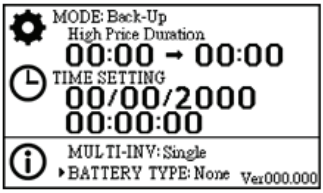
In the System Setting Page, press --> to select "Time Setting", and then press . The date format is DD/MM/YYYY, and the time format is hh:mm:ss. Use the key to toggle between the date fields and the <-- or --> keys to select the values. Once the value for the last date field is set, press the key. You will then be prompted to enter the password.



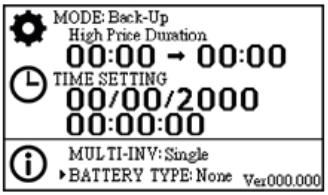
YEAR RANGE	MONTH RANGE	DAY RANGE	HOUR RANGE	MINUTE RANGE	SECOND RANGE
2010 to 2100	1 to 12	1 to 31	0 to 23	0 to 59	0 to 59

C. Setting Battery Type

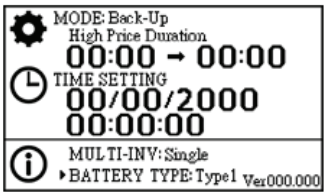
Step 1. In the System Setting Page, press ↵ to enter the page and select ⓘ to select Battery Type.

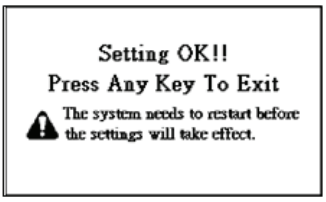


Step 2. Use the <-- or --> keys to select Battery Type and ↵ to select it.



Step 3. Use the <-- or --> keys to toggle between battery types and select Panasonic and press ↵ to select it. Press any key and manually restart with the main switch located on the left side of the inverter.





Warning and Fault Definition

On the Power Flows Page, the ERROR icon will flash when an error has occurred. Listed below are the error codes and their solutions.

Code	Fault Event	Alarm	ICON	Solution
01	DC bus voltage exceeds the upper threshold	None	ERROR	1. Turn off the inverter using the main switch. 2. Make sure PV voltage is below 500Vdc. 3. When the Grid is absent, disconnect any grid-tied inverter from to the load terminal. 4. Turn the inverter on. If the error remains, contact your installer.
02	Arc occurs on PV	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. If the error remains, contact your installer.
03	DC bus voltage falls below the lower threshold	None	ERROR	1. Turn off the inverter using the main switch. 2. Measure the voltage at the battery and at the cabling above and below the battery disconnect to make sure voltage is within 44 to 58Vdc. 3. If the voltages are in range, check if the battery went into protection mode. 4. Turn the inverter on. If the error remains, contact your installer.
04	Parallel setting is not correct	None	ERROR	1. Check the parallel setting and mode setting. 2. Check the communication cable between stacking system. 3. Turn the inverter off and then back on using the main switch. 4. If the error remains, contact your installer.
05	Battery discharging current exceeds the upper threshold	On: 1s Off: 1s	ERROR	1. Turn off the inverter using the main switch. 2. Make sure the Grid and Load terminals are wired properly. 3. Turn the inverter on. If the error remains, contact your installer.
06	Battery charging current exceeds the upper threshold	On: 1s Off: 1s	ERROR	
07	Short circuit on PV1 input	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. If the error remains, have your installer check the PV array for short circuits.
08	Short circuit on PV2 input	None	ERROR	
09	Short circuit on AC output	Continuous	ERROR	5. Turn off the inverter using the main switch. 6. Turn off the load breaker. 7. Make sure L1, L2 and N on the load circuit are not shorted. 8. Turn the inverter on. If the error remains, contact your installer.
10	Leakage current CT fault	None	ERROR	1. Turn off the inverter using the main switch. 2. Turn the load breaker off. 3. On the essential loads, check all appliances are not leaking current. If so, unplug the appliance safely. 4. Turn the inverter on. If the error remains, turn the Grid and PV breakers off. • On the PV side, measure and make sure the impedance of PV1+, PV1-, PV2+ and PV2- to ground and to each other should be an open circuit. • On the Grid side, measure and make sure the impedance of L1, L2 and N relative to ground and to each other should be an open circuit. 5. Turn the inverter off, then back on. If the error remains, contact your installer.
11	DC/DC Current Sensor fault	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. If the error remains, contact your installer.
13	PV Current Sensor fault	None	ERROR	
14	EEPROM read failure	None	ERROR	
15	Communication with main & secondary controllers are interrupted	None	ERROR	
16	Over temperature fault	On: 1s Off: 1s	ERROR	1. The internal temperature is too high. 2. Make sure the inverter is properly ventilated by removing any obstruction around the vents. 3. Make sure the fans are working. 4. Turn off the inverter using the main switch and let it cool down for 10 minutes before turning it back on. 5. If the error remains, contact your installer.
17	PV input voltage exceeds the upper threshold	None	ERROR	1. If the PV V_{OC} is higher than 500VDC, contact your installer. 2. If the PV V_{OC} is less than 500VDC, turn off the inverter and restart it after 5 seconds. If the error remains, contact your installer.
18	Over power protection	On: 0.25s Off: 0.75s	ERROR	1. The Grid/ Load power has been over 7.5kW for 30s. 2. Turn off the inverter using the main switch. 3. Make sure the load is lower than 5kW 4. Turn the inverter on using the main switch. 5. If the error remains, contact your installer.
19	PV insulation resistance is too low	None	ERROR	1. Turn off the PV breaker. 2. Check if the impedance between positive and negative poles to the ground is greater than 1MΩ. 3. If the impedance is lower than 1MΩ, contact your installer.
20	Battery charging voltage is too high	None	ERROR	1. Turn off the inverter using the main switch. 2. Make sure the connection between battery and inverter has firm and solid contact. 3. Make sure the battery voltage is within manufacturer's specifications. 4. Turn the inverter on. If the error remains, contact your installer.
21	Fan fault	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. Make sure the fans are working. If the error remains, contact your installer.

Code	Fault Event	Alarm	ICON	Solution
22	Overload	On: 0.25s Off: 0.75s	ERROR OVERLOAD	1. The load exceeds available output power. This error will disappear once load is in a acceptable range. 2. If the overload occurs for more than 40 seconds, the inverter will automatically restart. The inverter only allows 3 overload restarts within 5-minute intervals. 3. If the inverter is constantly restarting due to overload, you should decrease your load.
23	PV input over power	None	ERROR	1. Make sure your PV arrays does not exceed 6.5kW. 2. Turn the inverter off and then back on using the main switch. 3. If the error remains, contact your installer.
24	Battery type is wrong	None	ERROR	1. Set the correct battery type according to the battery installed to the system. 2. Turn the inverter off and then back on using the main switch. 3. If the error remains, contact your installer.

25	RCMU test fault	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. If the error remains, contact your installer.
26	Model setting fault	None	ERROR	1. Turn the inverter off and then back on using the main switch. 2. If the error remains, contact your installer.
27	Battery Voltage Drop	None	ERROR	1. Battery voltage drop below 30V. 2. Check the battery BMS errors and the wiring. 3. Turn the inverter off and then back on using the main switch. 4. If the error remains, contact your installer.

On the Power Flows Page, the ⚠ icon will flash when there is a warning. Listed below are the warning codes and their solutions.

Code	Warning	ICON	Solution
53	Stacking Canbus communication error	⚠	1. Turn the inverter off using the main switch and check the canbus communication cables. 2. Turn the inverter on. If error remains, contact your installer.
54	Power island	⚠	1. Turn the inverter off and then back on using the main switch. 2. The inverter will wait for 5 minutes before attempting to connect to the Grid. 3. If the error remains, contact your installer.
55	Grid is disconnected	⚠	
56	Grid voltage exceeds the upper threshold	⚠	
57	Grid voltage falls below the lower threshold	⚠	
58	Grid frequency exceeds the upper threshold	⚠	
59	Grid frequency falls below the lower threshold	⚠	
61	Battery voltage is too low	⚠	1. The battery voltage is less than 44V (lead-acid) or the SOC is lower than 10% (Lithium). Battery backup function will be turned off and the system output can only work with the Grid. 2. Wait for the PV or Grid to charge up the battery. The error code will change to 62 once the battery voltage is above 44V or the SOC is above 10%.
62	Low battery SOC level	⚠	1. The battery voltage is less than 47.1V (lead-acid) or the SOC is less than 40% (Lithium). 2. Wait for the PV or Grid to charge up the battery. The error code will clear and battery backup function will be enabled once the SOC is above 60%.
63	Battery is not detected	⚠	1. Turn the inverter off using the main switch. 2. Check battery connection for any loose wiring. 3. Turn the inverter on. If error message remains, contact your installer.
64	Inverter output OCP	⚠	1. Inverter output current exceeds the upper threshold. 2. Turn the inverter off and then back on using the main switch. 3. If error remains, contact your installer. Alarm – On: 1s, Off: 1s
65	RS485 communication error	⚠	1. Turn the inverter off using the main switch and check all communication wires. 2. Turn the inverter on. If error remains, contact your installer.
66	Output derated	⚠	1. When system temperature is too high, the output power has been derated. 2. Lower the load or lower the environmental temperature. Notes: System output lowered to 80% when the system temperature is higher than 80°C. System output lowered to 60% when the system temperature is higher than 85°C. System output restored to 100% when the system temperature is lower than 70°C.

13. GENERATOR [OPTIONAL]

The inverter can only work with "split-phase" generators that delivers clean 120/240 VAC at 60Hz. Single-phase and three-phase generators are not compatible with this inverter.

Note: Generators installed in a building should not have a bond between the neutral and ground connections. Installations in North America are expected to bond the neutral and ground at the main electrical panel.

Generator Sizing

• Available generator power may be limited by ratings for circuit breakers and/or generator connectors. The maximum allowed AC circuit breaker size is 40A.

• The generator should be sized to provide enough power and current for all loads. The minimum recommended generator wattage is 6.25kW because many generators may not be able to maintain AC voltage or frequency for long periods of time if they are loaded more than 80% of rated capacity. Please consult your Panasonic sales representative if you wish to charge your batteries with a generator.

Automatic Start Generator

The inverter can provide a start signal to control an automatic start generator. The generator must be an electric-start model with two-wire start capability. For other start-up methods, additional equipment may be required.

The 12V and Relay AUX terminals are used to start an automatic generator.

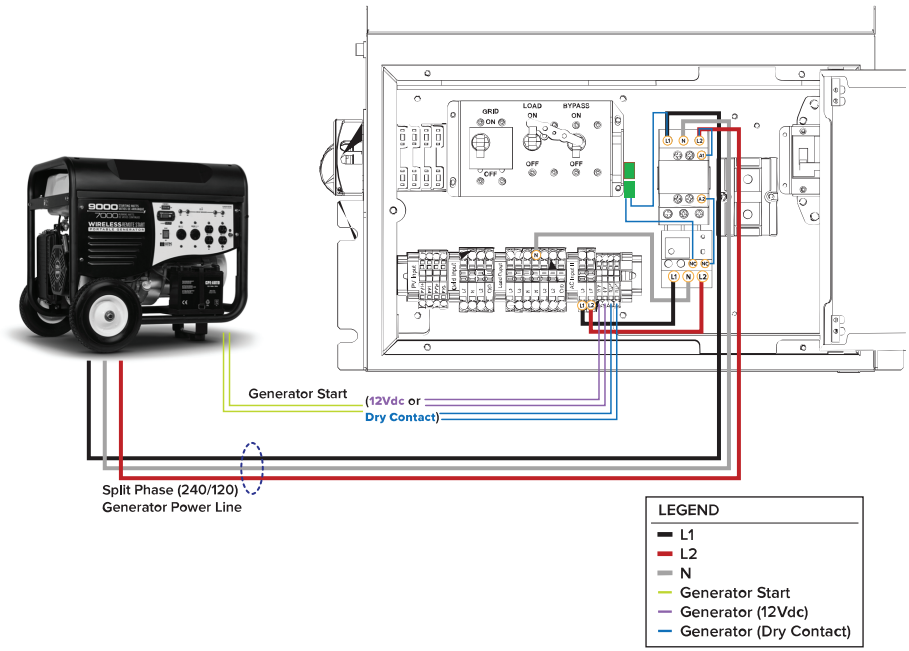
• The 12V AUX terminals are a switched 12 VDC power supply and can supply up to 0.25A.

• The Relay AUX terminals are "dry" contacts with no voltage and can conduct up to 7A and up to 250 VAC.

UNIT	CONDITION	12 VDC SOURCE	DRY CONTACT
Power Off	Unit is off and no output is powered.	0 VDC	Open
Power On	Grid Available	0 VDC	Open
		0 VDC	Open
	Grid Unavailable	12 VDC	Open
		0 VDC	Open

Generator Application Schematic

On AC input II Terminal, there are 6 pin for control Generator. Control port have defined as 1) Generator Power Line, 2) dry contact and 3) 12VDC source and. It could be used to remote control for external generator.



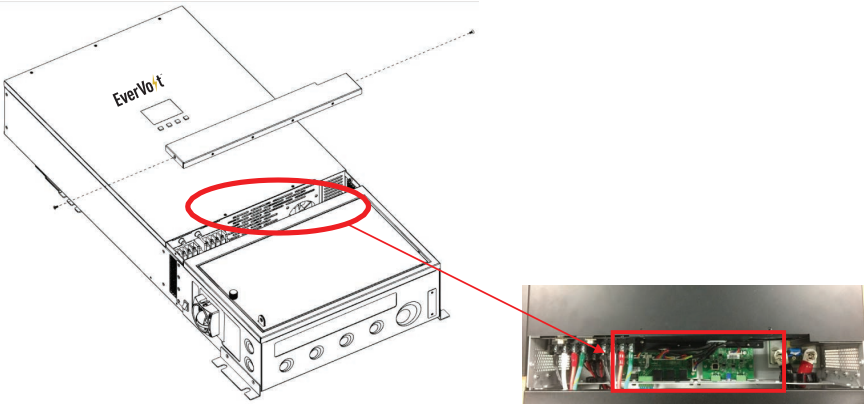
14. CONFIGURING THE HARDWARE

Connecting to the Hardware

Step 1: Remove the eleven screws on the bottom sides of the inverter. There are two PCB boards,

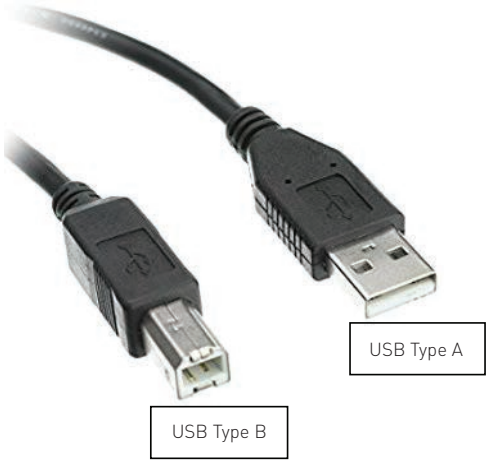
1. Left side: Communication board is used for parallel and display communication.

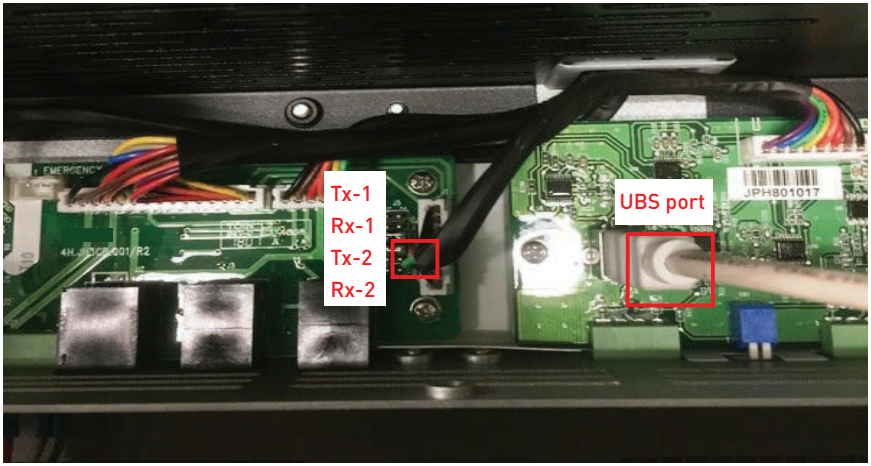
2. Right side: External RS485 board is used for primary RS485 (communicated with battery) and secondary RS485 (communicated with application software & HEMS unit).



	FUNCTION DESCRIPTION	REMARKS
1.	AUX. PORT	FOR GENERATION FUNCTION
2.	EXTERNAL DISPLAY PORT	FOR H100/H200 CABINET USE
3.	PARALLELED COMMUNICATION PORT	FOR INVERTER PARALLELED FUNCTION
4.	BOOT-LOAD AND COMMUNICATION JUMPER	FIRMWARE UPDATE ONLY
5.	USB PORT	INSTALLER USE PARAMETER CHANGES
6.	RS-485 Secondary	FOR DATA LOGGER USE/REMOTE CONTROL USE
7.	RS-485 Primary	FOR BMS USE

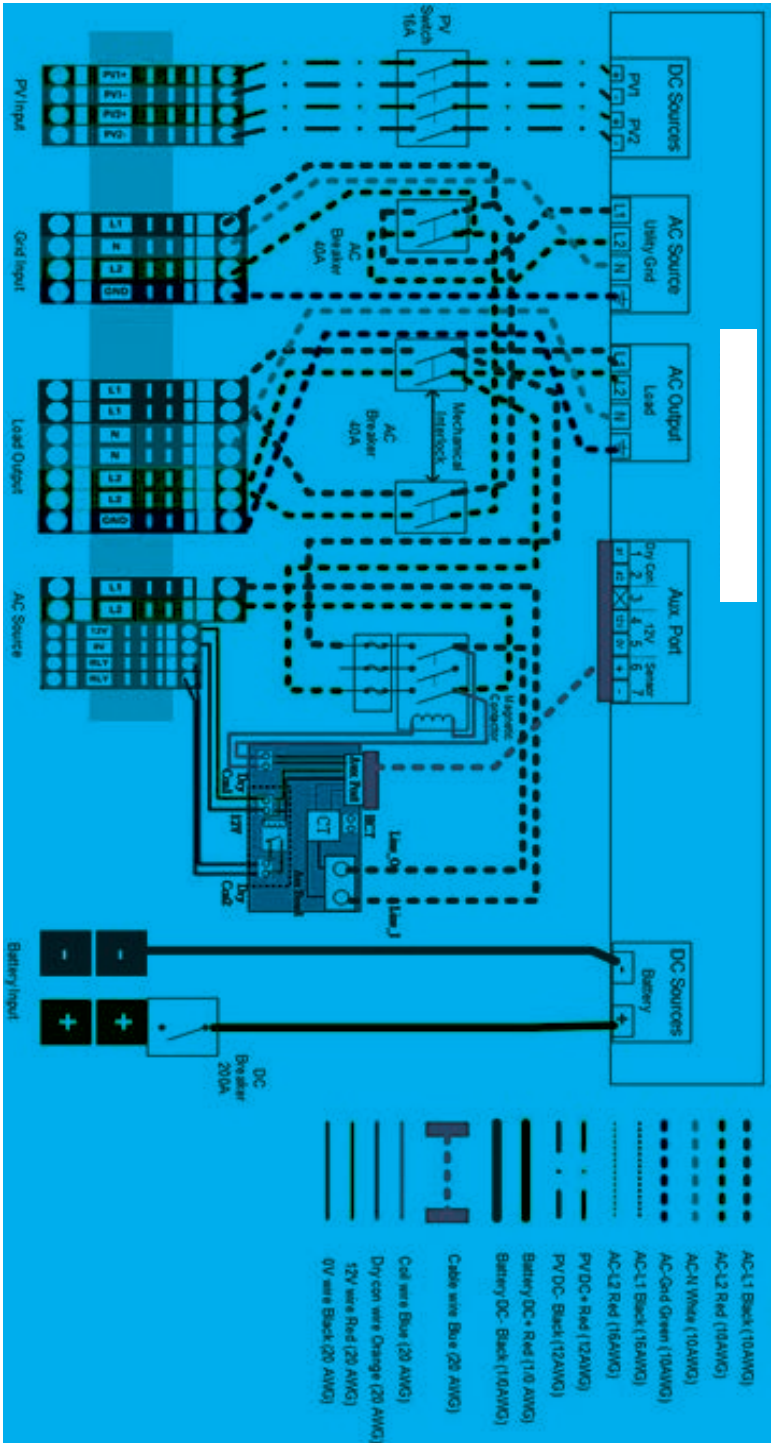
Step 2: Please use the USB wires (Type-A <->Type-B) and plug in the USB Type-B connector to the USB port, another side (Type A) connecting to the computer.





Step 3: Please make sure the jumper pins on Tx-2 and Rx-2.

Step 4: The inverter needs to connect the power, either choices PV, Battery or Grid. Then use the application software setting your parameters.


PV Input
Grid Input
Load Output
AC Source
Battery Input
PV Switch 16A
DC Sources
PV1 PV2
AC Source
Utility Grid
L1 L2 N
AC Output
Load
L1 L2 N
Aux. Port
Dry Con
12V
Sense
AC Breaker 40A
Mechanical Interlock
AC Breaker 40A
Magnetic Contactor
Aux Port
Dry Cont
CT
Aux Port
Dry Cont2
DC Sources
Battery
DC Breaker 200A
AC-L1 Black (10AWG)
AC-L2 Red (10AWG)
AC-N White (10AWG)
AC-Grid Green (10AWG)
AC-L1 Black (16AWG)
AC-L2 Red (16AWG)
PV DC+ Red (12AWG)
PV DC- Black (12AWG)
Battery DC+ Red (1/0 AWG)
Battery DC- Black (1/0 AWG)
Cable wire Blue (20 AWG)
Coil wire Blue (20 AWG)
Dry con wire Orange (20 AWG)
12V wire Red (20 AWG)
0V wire Black (20 AWG)

15. COMMISSIONING

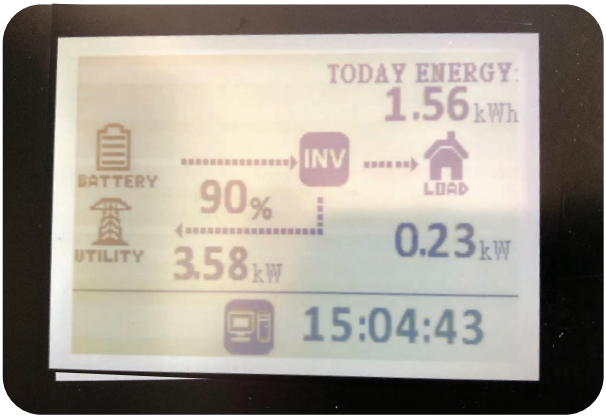
Commissioning the System

Step 1: Turn on the system and make sure the PowerHub has three connections:

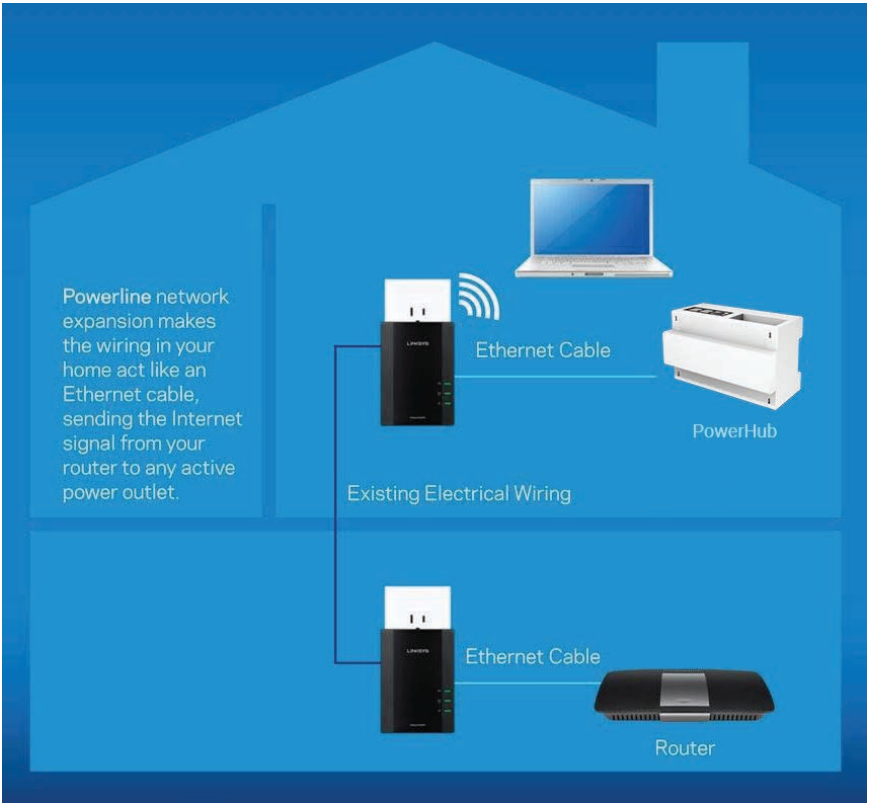
a. Power, 5 VDC plug into the essential loads
b. Communication cable, PowerHub USB to RS-485 S
c. working internet connection.

Step 2: Confirm lights are blinking on USB connection and Inverter Main Screen shows Connection to PowerHub

	Indicates the Connection to the Control Hub



Included PLC option:



17. MAINTENANCE & CLEANING

Perform the following maintenance annually or more often if the site requires it to ensure proper operation.

• Clean the inverter during the cool time of the day, whenever it is visibly dirty.
• Before cleaning the inverter, make sure to turn off all the breakers (AC, battery and PV).
• Ensure all connectors on the inverter are clean.
• Periodically inspect the system to ensure all wires and supports are securely fastened in place.

⚠ CAUTION: There are no user-replaceable parts inside the inverter. Do not attempt to service the unit yourself.

Wiring Diagram

The following diagram shows how the distribution box is electrically connected to the hybrid inverter. When replacing breakers or wires on the distribution box the following rules must be observed: (1) All AC breakers must be sized for 40A or less, and (2) All wiring must be sized for 40A or more.

NOTES: EverVolt has L1 and L2 connections for two AC input sources, although it can only accept one source at a time. The inverter has separate neutral connections for grid input, generator input and output. These are electrically common. The distribution box is both an input conduit box and an AC load center. The distribution box also contains maintenance transfer switches (load selection breaker). Maintenance transfer switching assemblies allows for the inverter to be taken offline if necessary without shutting the entire system down. These assemblies include an interlock mechanism that isolates the AC Lines from each other.

WARNING: Exposed hazardous voltage, during servicing or for emergency procedures use a lockable manual breaker lockout on the main serice panel disconnects to enable Lock-Out-Tag-Out per the Standard for Electical Safety in the Workplace, NFPA 70E, and the Standard for Workplace Electrical Safety, CA Z462.

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.

Accessing Wiring

Initiate a Rapid Shutdown and allow the DC voltage to drop to a safe level. Power down inverter and disconnect all wiring sources of AC and DC power.

18. TROUBLESHOOTING

Waking Up the Batteries (Optional)

When waking up the batteries for the first time, you may receive an Error 27 (battery voltage under 30V). To clear this error, turn of the inverter using the main switch and then turn it back on.

19. INSTALLING AND REPLACING ADDITIONAL BATTERIES

Decommissioning at End of Life (EOL)

Battery SOH is reported in the Panasonic View, Panasonic's monitoring software. When the SOH is below the level listed in Detail Battery Module Specification the batteries are at EOL and should be replaced. Contact Panasonic at panasonicbatterystorage@us.panasonic.com for details on a replacement battery.

WARNING: Risk of electrocution! Do not disconnect any battery leads while the system is energized.

WARNING: Risk of electric shock. Risk of fire. Do not attempt to repair the battery(ies); it contains no user-serviceable parts. Tampering with or opening the battery(ies) will void the warranty. If the battery(ies) fails, Panasonic at panasonicbatterystorage@us.panasonic.com

Adding and Replacing the Batteries

WARNING: Battery voltage heads to be within +/- 1V.

Prior to uninstalling a battery(ies), Customer Service must ensure that the state of charge (SoC) matches the SoC as given in Replacement Battery Information sheet in the box with the Replacement Battery(ies). This is accomplished by charging or discharging the battery until SoC on Dashboard matches the SoC on the Replacement Battery Information sheet.
The battery will continue to operate until it reaches the desired SoC. Since the rate at which the battery can charge or discharge is governed by the loads, it can take several hours for the desired SoC to be reached and for the Battery to be ready for replacement. Customer service will set the system to the backup power program at the desired SoC 24-48 hours in advance of the physical removal of the Battery. This is to ensure that sufficient time has passed to allow the Battery(ies) to be at the correct SoC when customer service personnel arrives to replace the battery(ies).

- Once the Battery(ies) SoC is confirmed to be at the same SoC as the Replacement Battery(ies).
- Verify that all power is removed from the system before attempting to remove the Battery(ies) by Initiate Rapid Shutdown and allow the DC voltage to drop to a safe level power down Inverter and disconnect wiring sources of AC and DC power.

⚠ WARNING: Take care when lifting the Battery. The Battery is heavy and may require a lifting tool to initially lift the battery high enough to get a good hold on it.

- Once the battery(ies) have been safely removed, please follow the steps listed in Section 5 to begin the installation process of the new battery(ies).

⚠ WARNING: Proper disposal of lithium-ion battery(ies) is required. Contact Panasonic for further instruction on how to dispose of batteries.

Within every city, the Authority Having Jurisdiction (AHJ) local ordinance that is responsible for the disposal of hazardous waste will need to be contacted. The customer cannot keep the old lithium-ion battery(ies) because they are dangerous and considered hazardous waste.

20. INVERTER SPECIFICATIONS

AC OUTPUT TO LOAD	WITH GRID ABSENT	WITH GRID PRESENT
Output Power (Continuous) @ 25°C	5500W	7000W
Overload 40/20/5/1sec @ 25°C & 240V	5500/--/6500/7500W	--/9600/--/--W
Overload 40/5/1sec @ 25°C & 120V	2750/3250/3750W	--
Rated Output Current (RMS)	23A (120V and 240V)	29A (@120V and 240V)
Output Frequency (Selectable)	50/60Hz	
Output Voltage and Accuracy	L-N: 120V ± 3%; L-L: 240V ± 3%	
Output Voltage Limits	L-L: 180 to 280V (240V Nominal)	
Total harmonic distortion (THD) at rated power	< 5%	
Power Factor	>99%	
AC INPUT FROM GRID (GRID SUPPORT)		
Automatic Transfer Power Rating / Typical Transfer Time	7000W / 20ms	
Input Voltage Range	L-L: 180 to 280V (240V nominal)	
Input Frequency Range	45 to 54.9Hz / 55 to 65Hz	
AC OUTPUT TO GRID (GRID SUPPORT)		
Output Power (Continuous) @ 25°C	5000W	
Grid Feed-In Current Range	0 to 24A (@240V)	
Grid Feed-In Voltage Range	L-L: 211 to 264V ± 3.0V	
Grid Feed-In Frequency Range	49.3 to 50.5Hz / 59.3 to 60.5Hz ± 0.05Hz	
DC BATTERY CHARGER		

Max Charge/ Discharge Current	100A/150A
Output Voltage Range	44 to 58V (48V Nominal)
GENERAL SPECIFICATIONS	
Product weight	265 to 750 lbs
Product dimensions (H x W x D)	24.2" x 42.5" x 10" (Per enclosure)
IP degree of protection	NEMA Type 1/IP20
Temperature	Operating: -20 to 55°C (0°C Min Startup Temp.) Storage: -25 to 70°C(-13 to 158°F)
Compliances	UL 9540, UL1741SA, CSA CS22.2, IEEE 1547A, IEEE 1547.1, FCC Class B, HECO
EFFICIENCY	
Peak Battery to Grid	92%
System Standby Power	20W
System Idle Power	< 8W

EverVolt™

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For more information
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