Order Numbers:

EVAC-105-4 : EVERVOLT STANDARD 11 KWH AC-COUPLED SYSTEM
EVAC-105-6 : EVERVOLT PLUS 17 KWH AC-COUPLED SYSTEM
EVDC-105-4 : EVERVOLT STANDARD 11 KWH DC-COUPLED SYSTEM
EVDC-105-6 : EVERVOLT PLUS 17 KWH DC-COUPLED SYSTEM
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 panasonicevervoltsupport@us.panasonic.com

Check the resources page at na.panasonic.com/us/energy-solutions/battery-storage for the latest specifications and manuals.

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

Fronius, SolarEdge, ABB, Enphase Energy, SMA

EverVolt has successfully performed Frequency Control with:

Fronius, Enphase Energy, SolarEdge HD Wave

Please contact your Panasonic sales representative for a complete list of compatible models.
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INTRODUCTION (DC-Coupled)

The EverVolt provides power to the essential load by utilizing power from PV panels, the utility and batteries. When the PV panels (two string input) generate enough power, the inverter can support the essential load, charge the batteries and feed back to the grid all at the same time. When the energy generated by the PV panels is not sufficient to support the essential load, the inverter takes power from either the batteries or the utility depending on the mode the homeowner has selected.

To accommodate various power situations, the EverVolt is designed to handle continuous power from PV panels, batteries and the utility. When the MPPT input voltage from the PV panels is within the acceptable range, between 250 and 430VDC, the inverter is able to feed the grid and charge the batteries. The EverVolt inverter is compatible with monocrystalline, polycrystalline and Panasonic HIT PV panels.

Note:
- Positively grounded PV modules are not compatible with the DC-coupled EverVolt system.
- When PV input voltage is lower than 250V, the power of the inverter will de-rate.

Basic EverVolt Configuration (DC-Coupled)
INTRODUCTION (AC-Coupled)

With the AC Coupled EverVolt, energy storage can be added to homes and small commercial buildings, with or without a PV system. The AC Coupled EverVolt can be AC-coupled with existing PV systems, either with string or micro inverters, to allow continuous use during utility outage. To facilitate easy installation, the AC Coupled EverVolt’s distribution box includes quick disconnect terminals, DC and battery disconnects, AC breakers, battery connectors and optional generator contactor. The AC Coupled EverVolt supports a wide range of applications, including peak shaving, backup, TOU with or without feed-in, and remote control.

Basic EverVolt Configuration (AC-Coupled)
IMPORTANT SAFETY WARNINGS

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

WARNING: Users and homeowners should not attempt to service Evervolt. Only an authorized Panasonic technician should attempt to service EverVolt.

Safety Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨</td>
<td>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.</td>
</tr>
<tr>
<td>⚠️</td>
<td>CAUTION: This indicates important information where failure to comply may result in safety hazards or cause damage to this product.</td>
</tr>
<tr>
<td>⚠️</td>
<td>CAUTION: This indicates the risk of a hot surface. The surface may reach a temperature high enough to cause serious burn injuries.</td>
</tr>
</tbody>
</table>

General 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.

⚠️ 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.
**Important Safety Warnings**

**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 Panasonic.

**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.

**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:** 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 from Panasonic.

**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, call for an RMA [Return Material Authorization].

**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.
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.

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 EverVolt if it has been damaged in any way.
**WARNING:** Only charge the EverVolt within the specified conditions. Failure to do so may result in damages, heat generation, smoke, fire, or explosion.

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.

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.

**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:** 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 Customer Support for assistance at panasonicevervoltsupport@us.panasonic.com.

**WARNING:** Proper disposal of lithium-ion batteries is required. Follow all local codes and regulations for proper disposal and recycling of lithium-ion batteries. Contact your Panasonic representative with any questions or concerns. The customer cannot keep the old lithium-ion batteries because they are dangerous and considered hazardous waste.

**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.
In the event that Inverter, one or more batteries or 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 Customer Support at panasonicevervoltsupport@us.panasonic.com

**MULTIPLE 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 (2.5mm² to 4mm²) 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:** Users should not attempt to service the EverVolt.

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 (protective eyewear and gloves) while working on the energized equipment. Voltages up to 400 VDC and 240 VAC Present. Arc Flash Approach Boundary 1.0 m. Arc Flash Prohibited Approach Boundary 24 mm.
INVERTER WARNINGS: The inverter is intended to operate with an internet connection. Failure to maintain an internet connection may have an impact on the warranty.

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 3,000m (9843ft) 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 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:
- 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 Customer Support at panasonicevervoltsupport@us.panasonic.com

In case of fire or smoke:
- Fire involving Lithium-ion batteries can be extremely dangerous. Lithium-ion batteries can flash fire or explode.
- Close doors as you leave to confine fire as much as possible. If the alarm is not already sounding, pull the fire alarm on your way out of the building. If there is no alarm to activate, yell “fire” as you leave. Move quickly to an open area, away from buildings, trees, power lines, and roadways.
- When in safe location call fire department and report a possible Lithium-ion battery fire.

In all other 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.
Part I: Planning for Installation, Assembly, Testing, & Commissioning

Pre-Commissioning Checklist (Customer Information & Part Scanning)
Planning for Installation
What’s in the Box
Assembly
Installing the Battery Enclosure, Battery & Wires
Mounting the Inverter
PV Module Connection (DC-Coupled)
Connections, General
Grid (Utility) Connection
Battery Connection and Charging Requirements
Installing the PowerHub
Connecting the PowerHub to the Internet
Waking Up the Batteries
Operational Testing (Upload photos, Verify system & Create user account)
Finishing Touches
Pre-Commissioning Checklist

1. Download the commissioning EverVolt app. The EverVolt app can be downloaded from Google Play Store or Apple App Store.

2. Log in to your account using your certified installer credentials.

3. Follow the steps within the EverVolt app to scan system hardware.
Planning for Installation

1. Essential Load Sizing: Assure there are enough batteries so that the essential load doesn’t exceed 1100W continuous per battery module.

2. Internet Connectivity: The most reliable connection is a CAT5/6 hardcable to the router. The next most reliable connections are PLC (included) and cellular.

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.

4. Outlet Placement: 120V AC outlet needs to be within 4 ft of the inverter to plug in the power supply to power the PowerHub.

System Layout & Dimensions

66” x 24” x 10.5” (battery) & 17.5” x 39” x 6” (inverter). The minimum spacing between the inverter and battery enclosure is 4”. 
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).

Required Tools

Below are list of recommended tools you will need to install EverVolt:

<table>
<thead>
<tr>
<th>PARTS NAME</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Cotton glove with urethane coating</td>
<td>1 Pair</td>
</tr>
<tr>
<td>Automatic Screwdriver (+)</td>
<td>Driver with torque setting</td>
<td>1</td>
</tr>
<tr>
<td>Wrench</td>
<td>M6/M8/M12</td>
<td>1</td>
</tr>
<tr>
<td>Wire Cutters</td>
<td>Standard wire cutters</td>
<td>1</td>
</tr>
<tr>
<td>Crimping Tool</td>
<td>Used for making power cables</td>
<td>1</td>
</tr>
<tr>
<td>Socket Wrench</td>
<td>Battery terminals are 10mm</td>
<td>1</td>
</tr>
<tr>
<td>Screwdriver</td>
<td>Standard screwdriver</td>
<td>1</td>
</tr>
<tr>
<td>Allen Wrench</td>
<td>4mm Allen wrench needed for enclosure</td>
<td>1</td>
</tr>
</tbody>
</table>
What's in the Box

1. Battery Enclosure | Qty | 1
2. Inverter | Qty | 1
3. Enclosure Mounting Bracket | Qty | 1
4. PowerHub | Qty | 1
5. Wood Screws | Qty | 6
6. Inverter Mounting Bracket Screws | Qty | 6
7. Inverter Mounting Bracket | Qty | 2
Assembly

1. INSTALLING THE BATTERY ENCLOSURE, BATTERY & WIRES

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, 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 (8IN) OF CLEARANCE TO THE SIDES AND 50CM (20IN) TO THE TOP of the unit for proper air circulation to dissipate heat.
- The ambient temperature (charging) must be between 5°C and 50°C and discharging -10°C and 50°C; 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.
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 batteries 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 bottom right side.*
10. Locate your wiring harness kit. Grab the negative and positive wires. Use 6 AWG (top batteries) and 8 AWG (bottom batteries). Refer to the table below for more sizing information.

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Number of Wires</th>
<th>Black Length</th>
<th>Red Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 AWG</td>
<td>(2) Red, (2) Black</td>
<td>69.25&quot;</td>
<td>56.75&quot;</td>
</tr>
<tr>
<td>8 AWG</td>
<td>(4) Red, (4) Black</td>
<td>42.25&quot;</td>
<td>37&quot;</td>
</tr>
</tbody>
</table>
Note, for the terminal block four bottom connections, check that the minimum DC wire is stripped 23mm (0.9in). Wire lengths for the four bottom connections can be check by removing set screw before tightening and checking that the stripped wire completely protrudes past the set screw hole. Secure to the screw to the torque value listed below.

### Marathon Terminal Block Torque Specifications

<table>
<thead>
<tr>
<th>LINE</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/0 - 6 cual</td>
<td>120 lbf.in.</td>
</tr>
<tr>
<td>8 cu</td>
<td>40 lbf.in.</td>
</tr>
<tr>
<td>10 - 14 cu</td>
<td>35 lbf.in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOAD</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 6 cual</td>
<td>35 lbf.in.</td>
</tr>
<tr>
<td>8 - 14 cu</td>
<td>35 lbf.in.</td>
</tr>
</tbody>
</table>
11. Feed the positive wiring through the enclosure as shown in the picture below.

12. Use 6 AWG for top row/bank. Use 8 AWG for middle and bottom row/banks.
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. Once complete, place the cover back onto the battery enclosure.
2. MOUNTING THE INVERTER

Before installation, make sure nothing inside the package is damaged. You should have received the following items in the package: hybrid 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 (8IN) OF CLEARANCE TO THE SIDES AND 50CM (20IN) 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 0°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 -- AC-Coupled, 88lb/40kg -- DC-Coupled). 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.

**NOTE:** The DC-coupled inverter bracket dimensions are all the same as the AC-coupled inverter brackets except for the distance between the top and bottom mounting brackets, which is 604mm/23.8in.
2. Install the brackets on the inverter.

3. Hang the inverter onto the backplate and secure the brackets to the wall using at least two screws; one on each side of the inverter.
Access Cover to Terminal Block Connectors

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

1. Remove the screws from the cover.
2. Pull off the cover.
ASSEMBLY (Continued)

3. PV MODULE CONNECTION (DC-Coupled Only)

There is a DC (PV) circuit breaker in the distribution box when using the DC coupled version of EverVolt (black). This system can connect to two strings of PV modules with MPPT control. Configure each PV input as recommended in the table below. Vmp is a PV panel’s max power point voltage. The PV charging efficiency is maximized when the PV system’s voltage is close to Best Vmp. **Note: Do not operate a single MPPT channel higher than 3250 W. If more than 3250 W is required, use the AP Tool to parallel the MPPT Inputs to allow single arrays to produce greater than 3250 W.**

<table>
<thead>
<tr>
<th>TERMINAL MARK</th>
<th>MAXIMUM PV INPUT POWER</th>
<th>TYPICAL AMPERAGE</th>
<th>CABLE SIZE (MIN)</th>
<th>Torque</th>
<th>Best Vmp</th>
<th>VMP Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Input 1</td>
<td>3.25 kW</td>
<td>13A</td>
<td>12 AWG</td>
<td>1.4 - 1.6 Nm</td>
<td>360V</td>
<td>250V - 430V</td>
</tr>
<tr>
<td>PV Input 2</td>
<td>3.25 kW</td>
<td>13A</td>
<td>12 AWG</td>
<td>1.4 - 1.6 Nm</td>
<td>360V</td>
<td>250V - 430V</td>
</tr>
</tbody>
</table>

**Note on DC Wiring and NEC**

Some electricians or installers may be unfamiliar with DC wiring in a residential setting. Make note of all relevant codes, which may include: 1. NEC 690.31(G) for DC PV circuits in buildings. 2. NEC 215.12(C)(2) for correct DC wiring coloring. 3. NEC 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).

**Rapid Shutdown**

Evervolt is compatible with NEP and Tigo MLPE devices to comply to NEC 690.12. For more information on specific models, please contact your Panasonic representative.
Connecting the PV Arrays (DC coupled only)

Step 1. For each PV input string, make sure the input voltage is between 250VDC and 430VDC, and the maximum current is 13A.

*Note:* The inverter can still be installed if you are only using one PV input string.

Step 2. Make sure the PV Switch and inverter Main Switch located on the side of the inverter are OFF.

Step 3. Strip 15mm (0.6in) of insulation from each PV cable (PV1+, PV1-, PV2+, and PV2-).

Step 4. Insert the PV cables into the PV quick connect terminals. Make sure the polarity for each connection is correct; positive to positive and negative to negative.

**WARNING:** Never touch the terminals of the inverter directly. It will cause lethal electric shock.

**WARNING:** The final connection for DC strings should be done at the array not at the inverter.

**WARNING:** Because this inverter is non-isolated, only two types of PV modules are acceptable: monocrystalline (including Panasonic HIT) and poly crystalline with only Class A-rated. To avoid any malfunction, do not connect any PV modules with possibility of leakage current to the inverter. For example, non-grounded PV modules will cause leakage current to the inverter.

**CAUTION:** To reduce the risk of injury, use the proper cable size for PV module connection.

**CAUTION:** To reduce the risk of damage due to surge, Panasonic recommends surge protection between the modules and the inverter.

**CAUTION:** Exceeding the maximum input voltage can destroy the unit. Check the PV string voltage before wiring the connection.
ASSEMBLY (Continued)

4. General Connections

- 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.

**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 where are made.

**Wire/Cable Requirements**

<table>
<thead>
<tr>
<th></th>
<th>GRID</th>
<th>LOAD</th>
<th>BATTERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE</td>
<td>Rated for 40 AAC</td>
<td>Rated for 30 AAC</td>
<td>Rated for 150 ADC</td>
</tr>
<tr>
<td>LENGTH</td>
<td>--</td>
<td>--</td>
<td>Use supplied 6 ft cable. If cable over 16 ft. is needed, increase wire by one AWG size or more.</td>
</tr>
</tbody>
</table>

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

5. GRID (UTILITY) CONNECTION

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.

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.

<table>
<thead>
<tr>
<th>ESSENTIAL LOAD MAX POWER</th>
<th>NOMINAL VOLTAGE</th>
<th>WIRE SIZE</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 kW</td>
<td>240 VAC</td>
<td>Rated for 30 AAC</td>
<td>N/A, Spring Connectors</td>
</tr>
<tr>
<td>2.75 kW</td>
<td>120 VAC</td>
<td>Rated for 30 AAC</td>
<td>N/A, Spring Connectors</td>
</tr>
</tbody>
</table>

⚠️ **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.
**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!

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

### Connecting to the Essential Load

1. Make sure the circuit breaker is off.
2. For each AC wire, strip 15mm (0.6in) of isolation.
3. Be sure to connect PE protective conductor first (GND).
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: DO NOT USE PV INPUT TERMINALS ON AC COUPLED SYSTEMS. Plug (cap) all PV Input terminals for AC-Coupled installations. Under no circumstances will the PV Input terminals be used for AC-COUPLED.

1. Put a screwdriver into the terminal, insert the wire into the terminal and then remove the screwdriver. **Do not install wires into PV Inputs for AC-Coupled installations.**
Connecting to the Grid/Utility Continued

Step 1. Check the grid voltage and frequency with an AC voltmeter. 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.
Next, make sure inverter is disconnected. Follow the below instructions to completely isolate the equipment.

Step 1. Turn off the 40 A “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.
ASSEMBLY (CONTINUED)

6. BATTERY CONNECTION AND CHARGING INFORMATION

Note on DC Wiring and NEC

The maximum EverVolt DC charging current is 60 A for DC Coupled and 100 A for AC Coupled systems.

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 reduce the risk of injury, use proper cable size for battery’s 150 A maximum current. It is very important for system safety and efficient operation to use the appropriate cable for battery connection.
Connect DC Power

Step 1. Make sure the inverter battery circuit breaker is OFF (100 A, 2 pole tied together).

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

*Note* Press Rocker Switch here to turn 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

15 mm (0.6 in)
Connecting to Battery Terminals

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

![Battery Connection Diagram](image)

Step 2. Check that every battery has a red wire to the battery positive binding posts and to the positive terminal block. Check that every battery has a black wire to the battery negative binding posts and to the negative terminal block. Note, The larger/longer wires go to the top batteries. The smaller/shorter wires go to the middle and bottom batteries.
Connect Communication

1. Connect the supplied battery communication cable to the inverter master RS485 M connector.

2. Route the other end of the communication cable from the inverter into battery enclosure per AHJ requirements.
3. Connect the other end of the supplied battery communication cable to upper/outer battery RJ-45 connector labeled “UP”.

![Diagram showing the connection process]
4. Position all the four sliders to the 'OFF' position for setting the battery as the primary battery.

5. Connect up to eleven other communication cables starting with the “M” (primary) module, from the “LOW” to “UP” with the Ethernet RJ-45 cables. Up to 12 total modules may be string together (one - primary and one to eleven - secondary).
6. On the one to eleven secondary modules connected, confirm that the slides are positioned to all ‘ON’ for non-terminating batteries. For the terminating battery, ensure that the first three sliders are set to ‘ON’ position and the fourth slider is set to ‘OFF’ position as shown below.

**Configuration**

**Master**

![Master Configuration Diagram]

**Slave (not termination)**

![Slave (not termination) Diagram]

**Slave (termination)**

![Slave (termination) Diagram]
7. 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. Ensure that the PowerHub power supply and the internet connection’s power supply is fed from the essential loads panel.

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 USB/(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.
ASSEMBLY (Continued)

8. CONNECTING THE POWERHUB TO THE INTERNET

In order of preference:

1. Hardwire LAN Ethernet cable, CAT 5 or 6. (Installer supplies RJ45 CAT 5 or 6 Cable)
2. Ethernet Powerline Adapter, or Power Line Connector (PLC). (PLC included and installer supplies two RJ45 CAT 5 or 6 Cable) For more information, see below.
3. Cellular (monthly fees may apply). (Installer supplies Cellular device and RJ45 CAT 5 or 6 Cable)
4. WiFi. (Installer supplies WiFi device and RJ45 CAT 5 or 6 Cable)

Connecting the Internet - Hardwire LAN

Run a CAT5/6 cable from the RJ45 router to the RJ45 PowerHub connector.

Connecting the Internet - Ethernet Powerline Adapter (PLC)

1. Unbox the Powerline Connector (PLC).
2. Plug the first PLC into an outlet1 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.

1Ensure PLC power supply and the internet connection’s is fed from essential loads panel.
9. WAKING UP THE BATTERIES

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

1. Check that cables are properly connected
2. Make sure Inverter Main Switch is off.
3. Turn on main panel 240 VAC, 40 AAC breaker
4. Check grid voltage is between 211.2Vac and 264Vac
5. Turn on Inverter “Main AC Grid” 40 A Breaker
6. Turn on Inverter “Battery Disconnect” 200 A Breaker
7. Turn on all the battery pack ON/OFF switches.

8. Check that all battery pack “Status” indicators blink orange, on for three second and off for one second.
9. Turn on Inverter Main Switch.
10. After three minutes, check that all battery packs “Status” indicators are solid or blinking green
11. If the inverter displays error 27, turn off the Main Switch and back on again to clear error. See image below.
12. Check the inverter main screen reads battery SOC, Test Limit 10% to 100%. See image below.

13. Turn off Inverter Main Switch.
14. Turn off “Main AC Grid.”
10. OPERATIONAL TESTING

To Startup Equipment:

1) Check that cables are properly connected,
2) DC Coupled EverVolt only: Turn on Solar by commissioning Solar PV Rapid Shutdown
3) Turn on:
   a. “Main” Electrical Panel ESS breaker
   b. Inverter PV Solar Switch
   c. Inverter “Main AC Grid” Breaker
   d. Battery Breaker (if not already on)
   e. “LOAD INPUT” “FROM GRID” (connects Essential Loads directly to Grid)
4) Turn ON the Main Switch (located on the left side of the inverter)
5) If the inverter has PV (DC Coupled EverVolt Only) or GRID input, then the system will automatically start. If only battery starts the inverter, press the Enter button for seven seconds until two beeps are heard. The system will boot up in under sixty seconds.
6) After three minutes, check Load Output Voltage on the inverter POWER INFORMATION PAGE. See image below:
   Test Limit L1-L2 232.8 - 247.2 VAC.

7) Turn on LOAD Breaker
8) Check PV, Battery and Load values from Power Information Page.
   See Section 12, OPERATION AND DISPLAY PANEL for details on system operation.
OPERATIONAL TESTING (Continued)

PowerHub Activation:

Step 1: Verify system is turned on from the previous section "To Startup Equipment."

Step 2: make sure the PowerHub has three connections:
   a. Power, 5 VDC plug into the essential loads
   b. Communication cable, PowerHub USB to Inverter RS-485 S
   c. Ethernet cable from your internet source to the PowerHub

Step 3: Confirm indicators are blinking on PowerHub USB connector.

Step 4: Confirm Inverter Main Screen shows connection to PowerHub. See images below.

Commissioning App (Continued)

1. Start the Commissioning App (pick up where you left off)
2. Follow instructions to:
   a. Upload photos
   b. Verify system
   c. Create user [customer] account.
11. FINISHING THE INSTALLATION

Battery Enclosure Cover

Install the battery enclosure cover by bolting the six mounting points down. Make sure each bolt has a star washer.

Inverter Access Door

Secure inverter access door using the thumb screw that is attached to the inverter door.

Part II: User Guide

Operation and Display Panel
To Install, Service or Disconnect (Shutdown) Equipment
Configuring the Hardware

Part III: References, Maintenance, Cleaning, Troubleshooting, & Warranty

Grid and Load Terminals
Generator (Optional)
Internet Connectivity Options
Maintenance & Cleaning
Service
Troubleshooting
Installing and Replacing Additional Batteries
Specifications
Grid Support Parameters (UL1741SA)
EverVolt Limited Warranty
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.

<table>
<thead>
<tr>
<th>ICON</th>
<th>FUNCTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Enter" /></td>
<td>Enter</td>
<td>Confirm the selection in setting mode or enter setting mode.</td>
</tr>
<tr>
<td><img src="image" alt="ESC" /></td>
<td>Exit</td>
<td>Exits setting mode.</td>
</tr>
<tr>
<td><img src="image" alt="Left" /></td>
<td>Left</td>
<td>Go to previous page, move or decreasing all Number.</td>
</tr>
<tr>
<td><img src="image" alt="Right" /></td>
<td>Right</td>
<td>Go to next page; move; to increase all Number.</td>
</tr>
</tbody>
</table>
To Start Up Equipment (Overview):
How to Turn the System On - Grid-tied

Step 1. Check that the cables are properly connected,
Step 2. Turn ON External Solar by disabling Solar PV Rapid Shutdown (if installed).
Step 3. Turn ON: (a) AC Grid Breaker, (b) Battery Breaker, (c) [DC Coupled only] PV Solar Switch.
Note: AC grid switch needs to be switched swiftly. If it does not catch, try again with greater speed.

Step 4. Turn on the Main switch (located on the left side of the inverter).

Step 5. 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 7 seconds until two beeps are heard to start the inverter.

Step 6. Check Load AC output voltage: L-L 240 VAC / L-N 120 VAC.

Step 7. Turn on Load Breaker in the distribution box.
Starting the System -- Off-Grid (Black Start)

**Note:** 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% state of charge (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:** the system will black start from PV automatically once there is enough solar power and battery SoC.

**Note:** 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. 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, (c) [DC Coupled only] PV Solar Switch
4. Turn ON the Main Switch (located on the left side of the inverter).
5. If the inverter has PV or 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.
To Install, Service or Disconnect (Shutdown) Equipment (Overview): How to Turn the System Off

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. (DC Coupled only) Turn off the PV Switch located outside the inverter enclosure on the left side
5. Turn off all AC breakers located inside the Distribution Box behind the thumb screw latched access door
6. **Allow five minutes for all sources of supply to discharge**
7. Check that AC and DC voltages are at a safe level.
8. Access to the wiring requires opening the access door using the thumb screw and removing the four screws on the Inverter wire compartment cover.

---

**Diagram:**

- **Main Switch**
- **PV Switch**
- **Battery Breaker**
- **AC Breakers**
- **Access Door**
- **Electronic Control Panel**
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**
<table>
<thead>
<tr>
<th>ICON</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="PV ARRAY" /></td>
<td>Represents the PV Array</td>
</tr>
<tr>
<td><img src="image" alt="BATTERY" /></td>
<td>Represents the Battery Pack</td>
</tr>
<tr>
<td><img src="image" alt="UTILITY" /></td>
<td>Represents the Utility</td>
</tr>
<tr>
<td><img src="image" alt="LOAD" /></td>
<td>Represents the Load</td>
</tr>
<tr>
<td><img src="image" alt="INV" /></td>
<td>Represents the Hybrid Inverter</td>
</tr>
<tr>
<td><img src="image" alt="ERROR" /></td>
<td>Indicates the Connection to a PowerHub</td>
</tr>
<tr>
<td><img src="image" alt="ERROR" /></td>
<td>Indicates the Error and error codes</td>
</tr>
<tr>
<td><img src="image" alt="OVERLOAD" /></td>
<td>Indicates an overload has occurred</td>
</tr>
<tr>
<td><img src="image" alt="SYSTEM MODE" /></td>
<td>Represents the System Mode Setting</td>
</tr>
<tr>
<td><img src="image" alt="SYSTEM TIME" /></td>
<td>Represents the System Time Setting</td>
</tr>
<tr>
<td><img src="image" alt="SYSTEM INFORMATION" /></td>
<td>Represents the System Information</td>
</tr>
</tbody>
</table>
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.

### DC Operation Mode: Backup (default)

<table>
<thead>
<tr>
<th>PRESET MODES</th>
<th>PV USE PRIORITY</th>
<th>LOAD PRIORITY</th>
<th>CHARGE FROM</th>
<th>FEED GRID FROM</th>
<th>BATTERY RESERVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-Up (default)</td>
<td>2 1 3</td>
<td>1 2 3</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Residential</td>
<td>1 2 3</td>
<td>1 3 2</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Residential Zero Grid Export</td>
<td>1 2 3</td>
<td>1 3 2</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TOU w/o Batt. Feed-In</td>
<td>Low E. Cost</td>
<td>1 2 3</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>TOU w/ Batt. Feed-In</td>
<td>Low E. Cost</td>
<td>1 3 2</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>String Inverter</td>
<td>Remote controlled</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Grid Export “Feed-In Power” until “Battery Reserve Percent.” is reached. PV is never curtailed.
1. Grid export can be greater than “Feed-In Power” if there is enough PV production and battery and Essential Load cannot absorb it.
2. If PV is low the battery will discharge to raise the Grid export to “Feed-In Power.”

### AC Operation Mode: Backup (default)

<table>
<thead>
<tr>
<th>PRESET MODES</th>
<th>EXCESS PV**</th>
<th>LOAD PRIORITY</th>
<th>CHARGE FROM</th>
<th>FEED GRID FROM</th>
<th>BATTERY RESERVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-Up (default)</td>
<td>1 2 3</td>
<td>1 1</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Residential</td>
<td>1 2 3</td>
<td>1 3 2</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3. TOU w/o Batt. Feed-In</td>
<td>Low E. Cost</td>
<td>1 2 3</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. TOU w/ Batt. Feed-In</td>
<td>High E. Cost</td>
<td>1 1 3</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5. Remote Control</td>
<td>Remote controlled</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Peak Shave</td>
<td>Peak Shave</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

** Grid Export “Feed-In Power” until “Battery Reserve Percent.” is reached. PV is never curtailed.

* Excess PVs when PV production is greater than Essential Load.

### Operation and Display Panel

1. Back-Up (default) - Keep the battery full and discharge only in cases of power outages
2. Residential - Self-consume from PV and battery first before the Grid
3. Back-Up Zero Grid Export - Same as back-up mode except power will not export back to the Grid
4. Residential Zero Grid Export - Same as Residential mode except power will not export back to the Grid
5. TOU w/o Batt. Feed-In - Operate as back-up mode
6. TOU w/ Batt. Feed-In - Operate as back-up mode
7. String Inverter - Operate as Residential mode and Grid export constant power back to the Grid. PV is not curtailed to Grid.
8. Remote Control - Output and input power can be controlled through communication.
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.

Please Enter The Password:

0000

Setting Fail!!
Password Incorrect
Step 2. Use the `<--` or `-->` keys to toggle between modes and `OK` 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 `OK` to set it. Once the value for the last time field is set, press the `OK` 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.

<table>
<thead>
<tr>
<th>YEAR RANGE</th>
<th>MONTH RANGE</th>
<th>DAY RANGE</th>
<th>HOUR RANGE</th>
<th>MINUTE RANGE</th>
<th>SECOND RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 to 2100</td>
<td>1 to 12</td>
<td>1 to 31</td>
<td>0 to 23</td>
<td>0 to 59</td>
<td>0 to 59</td>
</tr>
</tbody>
</table>

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.

Change battery type to Panasonic
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.

<table>
<thead>
<tr>
<th>CODE</th>
<th>FAULT EVENT</th>
<th>ALARM</th>
<th>ICON</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>DC bus voltage exceeds the upper threshold</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure PV voltage is below 500Vdc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. When the Grid is absent, disconnect any grid-tied inverter from the load</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>02</td>
<td>Arc occurs on PV</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>03</td>
<td>DC bus voltage falls below the lower threshold</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>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 58/9Vdc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. If the voltages are in range, check if the battery went into protection mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>04</td>
<td>Parallel setting is not correct</td>
<td>None</td>
<td>⚠️</td>
<td>1. Check the parallel setting and mode setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Check the communication cable between stacking system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>05</td>
<td>Battery discharging current exceeds the upper threshold</td>
<td>On: 1s Off: 1s</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure the Grid and Load terminals are wired properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>06</td>
<td>Battery charging current exceeds the upper threshold</td>
<td>On: 1s Off: 1s</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure the Grid and Load terminals are wired properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>07</td>
<td>Short circuit on PV1 input</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, have your installer check the PV array for short circuits.</td>
</tr>
<tr>
<td>08</td>
<td>Short circuit on PV2 input</td>
<td>None</td>
<td>⚠️</td>
<td>5. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Turn off the load breaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Make sure L1, L2 and N on the load circuit are not shorted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>09</td>
<td>Short circuit on AC output</td>
<td>Continuous</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, contact your installer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Make sure the fans are running.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter off, then back on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>10</td>
<td>Leakage current CT fault</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Turn the load breaker off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. On the essential loads, check all appliances are not leaking current. If so, unplug the appliance safely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter on. If the error remains, turn the Grid and PV breakers off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1) 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2) 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Turn the inverter off, then back on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>11</td>
<td>DC/DC Current Sensor fault</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>12</td>
<td>PV Current Sensor fault</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td>13</td>
<td>EEPROM read failure</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off, then back on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>14</td>
<td>Communication with main &amp; secondary controllers are interrupted</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>15</td>
<td>Over temperature fault</td>
<td>On: 1s Off: 1s</td>
<td>⚠️</td>
<td>1. The internal temperature is too high.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure the inverter is properly ventilated by removing any obstruction around the vents.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Make sure the fans are working.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn off the inverter using the main switch and let it cool down for 10 minutes before turning it back on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>17</td>
<td>PV input voltage exceeds the upper threshold</td>
<td>None</td>
<td>⚠️</td>
<td>1. If the PV Voc is higher than 500VDC, contact your installer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. If the PV Voc is less than 500VDC, turn off the inverter and restart it after 5 seconds. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>18</td>
<td>Over power protection</td>
<td>On: 0.25s Off: 0.75s</td>
<td>⚠️</td>
<td>1. The Grid Load power has been over 7.5kW for 30s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Make sure the load is lower than 5kW.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>19</td>
<td>PV insulation resistance is too low</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn off the PV breaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Check if the impedance between positive and negative poles to the ground is greater than 1MΩ.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. If the impedance is lower than 1MΩ, contact your installer.</td>
</tr>
<tr>
<td>20</td>
<td>Battery charging voltage is too high</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn off the inverter using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure the connection between battery and inverter has firm and solid contact.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Make sure the battery voltage is within manufacturer’s specifications.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Turn the inverter on. If the error remains, contact your installer.</td>
</tr>
<tr>
<td>21</td>
<td>Fan fault</td>
<td>None</td>
<td>⚠️</td>
<td>1. Turn the inverter off and then back on using the main switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Make sure the fans are working.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. If the error remains, contact your installer.</td>
</tr>
</tbody>
</table>
### Error and Warning Definition

<table>
<thead>
<tr>
<th>Code</th>
<th>Event Description</th>
<th>Icon</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 22   | Overload          | ☢️   | 1. The load exceeds available output power. This error will disappear once load is in an 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 | ☢️   | 1. Make sure your PV arrays do 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 | ☢️   | 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 | ☢️   | 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 | ☢️   | 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 | ☢️   | 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Warning Description</th>
<th>Icon</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 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 | ⚠️   | 1. The grid voltage is less than 47.1V (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%.  
3. If the error remains, contact your installer. |
| 56   | Grid voltage exceeds the upper threshold | ⚠️   | 1. The grid voltage is less than 44V (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%.  
3. If the error remains, contact your installer. |
| 57   | Grid voltage falls below the lower threshold | ⚠️   | 1. Inverter output current exceeds the upper threshold.  
2. Turn the inverter off using the main switch.  
3. Make sure the connection between battery and inverter has firm and solid connection.  
4. Make sure the fans are working. If the error remains, contact your installer. |
| 58   | Grid frequency exceeds the upper threshold | ⚠️   | 1. The grid frequency falls below the lower threshold.  
2. Inverter output over power.  
3. Turn the inverter off using the main switch.  
4. If error remains, contact your installer. |
| 59   | Grid frequency falls below the lower threshold | ⚠️   | 1. The grid frequency falls below the lower threshold.  
2. Inverter output current exceeds the upper threshold.  
3. Turn the inverter off using the main switch.  
4. If error remains, contact your installer. |
| 60   | 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%.  
3. If the error remains, contact your installer. |
| 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%.  
3. If the error remains, contact your installer. |
| 63   | Battery not detected | ⚠️   | 1. Inverter output current exceeds the upper threshold.  
2. Turn the inverter off using the main switch.  
3. If error remains, contact your installer. |
| 64   | Inverter output OCP | ⚠️   | 1. The battery voltage is too low.  
2. Check battery connection for any loose wiring.  
3. Turn the inverter off using the main switch.  
4. If error remains, contact your installer. |
| 65   | RS485 communication error | ⚠️   | 1. Turn the inverter off using the main switch and check all communication wires.  
2. The inverter will wait for 5 minutes before attempting to connect to the Grid.  
3. If the error remains, contact your installer. |
| 66   | Output derated | ⚠️   | 1. The output derated.  
2. Turn the inverter off using the main switch.  
3. If error remains, contact your installer.  
4. The Grid/Load power supply will be turned off.  
5. Connect the appliance safely.  
6. If error remains, contact your installer. |

---

Notes:
- System output lowered to 60% when the system temperature is higher than 40°C.
- System output lowered to 44V when the system temperature is higher than 85°C.
- System output restored to 100% when the system temperature is lower than 70°C.
13. 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).
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.

<table>
<thead>
<tr>
<th>FUNCTION DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AUX. PORT</td>
<td>FOR generation function</td>
</tr>
<tr>
<td>2. EXTERNAL DISPLAY PORT</td>
<td>FOR H100/H200 CABINET USE</td>
</tr>
<tr>
<td>3. PARALLELED COMMUNICATION PORT</td>
<td>FOR INVERTER PARALLELED FUNCTION</td>
</tr>
<tr>
<td>4. BOOT-LOAD AND COMMUNICATION JUMPER</td>
<td>FIRMWARE UPDATE ONLY</td>
</tr>
<tr>
<td>5. USB PORT</td>
<td>INSTALLER USE PARAMETER CHANGES</td>
</tr>
<tr>
<td>6. RS-485 SECONDARY</td>
<td>FOR DATA LOGGER USE/REMOTE CONTROL USE</td>
</tr>
<tr>
<td>7. RS-485 PRIMARY</td>
<td>FOR BMS USE</td>
</tr>
</tbody>
</table>
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 IS ONLY USED FOR EVERVOLT DC COUPLED SYSTEM
14. GRID AND LOAD TERMINALS

240V/120V 60HZ SPLIT-PHASE SYSTEM (USA)
15. 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.

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.
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. It could be used to remote control for external generator.
Approved cell modem options -- Any LTE Broadband Router with Ethernet ports.
Typical PLC Options:
PLC INCLUDED WITH EVERY EVERVOLT SYSTEM

Powerline network expansion makes the wiring in your home act like an Ethernet cable, sending the Internet signal from your router to any active power outlet.

Typical WiFi Options:

Wireless Router

GWU627 Ethernet-2-WiFi adapter

PowerHub
17. MAINTENANCE & CLEANING

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

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

18. SERVICE

⚠️ 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 to avoid hazardous voltage, turn off the "BATTERY DISCONNECT" and all AC breakers located inside the Distribution Box behind the thumb screw latched access door. 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 put a lock on the lockable access door.

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.
19. TROUBLESHOOTING

Waking Up the Batteries (Optional)

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

Disconnecting Remote Control of the PowerHub

1. Unplug the PowerHub’s 120 VAC to 5 VDC power supply.
20. INSTALLING AND REPLACING ADDITIONAL BATTERIES

Decommissioning at End of Life (EOL)

Battery SOH is reported in the EverVolt dashboard monitoring software. When the SOH is below the level listed in Detail Battery Module Specification the batteries are at EOL and should be replaced.

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, contact Panasonic Customer Support for assistance at panasonicevervoltsupport@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 initiating 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 the battery manufacturer 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.
To make the battery parallel connection, use either:

Polaris Connectors from your local electrical store or Bay Marine BusBar - Dual 4-Post Power Distribution Block - 3/8" & 3/8" (available on Amazon).

NOTE:
* Maximum PV input: 6.5 kW DC per EverVolt™ Inverter
** Not required if using a generator only to power essential loads
## 21. SPECIFICATIONS

### DC-Coupled System

<table>
<thead>
<tr>
<th>SOLAR DC INPUT</th>
<th>3250 W per MPPT channel / 6500 W total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Power</td>
<td>3250 W per MPPT channel / 6500 W total</td>
</tr>
<tr>
<td>Operation / MPPT Voltage Range</td>
<td>120 to 500VDC / 250 to 430VDC</td>
</tr>
<tr>
<td>Minimum Start Voltage</td>
<td>150VDC</td>
</tr>
<tr>
<td>Maximum Input Current</td>
<td>13A / 13A (two string input)</td>
</tr>
</tbody>
</table>

### AC OUTPUT TO LOAD

<table>
<thead>
<tr>
<th>Output Power (Continuous) @ 25°C</th>
<th>5500W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload 40/5/1sec @ 25°C</td>
<td>5500/6500/7500W</td>
</tr>
<tr>
<td>Rated Output Current</td>
<td>23 A (@120V and 240 V)</td>
</tr>
<tr>
<td>Output Frequency (Selectable)</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>L-N: 120V ± 3%; L-L: 240V ± 3%</td>
</tr>
<tr>
<td>Total harmonic distortion (THD) at rated power</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>Power Factor</td>
<td>&gt;99%</td>
</tr>
</tbody>
</table>

### AC INPUT FROM GRID (GRID SUPPORT)

<table>
<thead>
<tr>
<th>AC Input Voltage Limits (Bypass)</th>
<th>L-L: 180 to 280V (240 V nominal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Transfer Relay Rating / Typical Transfer Time</td>
<td>48A / 20ms</td>
</tr>
<tr>
<td>AC Input Frequency Range (Bypass)</td>
<td>55 to 65 Hz</td>
</tr>
</tbody>
</table>

### AC OUTPUT TO GRID

<table>
<thead>
<tr>
<th>Output Power (Continuous) @ 25°C</th>
<th>5000W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Sell Current Range (Depending On Operation Mode)</td>
<td>0 to 24A (@Low Grid, 211V)</td>
</tr>
<tr>
<td>Grid Sell Voltage Range</td>
<td>L-L: 211 to 264V ± 3.0V</td>
</tr>
<tr>
<td>Grid Sell Frequency Range</td>
<td>59.4 to 60.4Hz ± 0.05Hz</td>
</tr>
</tbody>
</table>

### EFFICIENCY

| Peak PV to Grid                                                               | 96%                                     |
| CEC weighted PV to Grid                                                      | 95.5%                                   |
### DC Battery Charger

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Charge Current</td>
<td>60A</td>
</tr>
<tr>
<td>Output Voltage Range</td>
<td>43 to 58V (48V Nominal)</td>
</tr>
<tr>
<td>Compatible Battery Types</td>
<td>Li-ion</td>
</tr>
<tr>
<td>Battery Bank Range</td>
<td>10 to 33 kWh</td>
</tr>
</tbody>
</table>

### General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product weight</td>
<td>335 to 1000 lbs</td>
</tr>
<tr>
<td>Product dimensions (H x W x D)</td>
<td>24.2” x 42.5” x 10” (Per enclosure)</td>
</tr>
<tr>
<td>IP degree of protection</td>
<td>NEMA Type 1/IP20</td>
</tr>
<tr>
<td>Temperature</td>
<td>Operating: -20 to 55°C (0°C Min Startup Temp. &amp; power derated above 40°C ) Storage: -25 to 70°C (-13 to 158°F)</td>
</tr>
<tr>
<td>Compliances</td>
<td>STANDARD COMPLIANCE</td>
</tr>
<tr>
<td></td>
<td>Safety UL9540, UL1973, UL1741SA, CSA 22.2</td>
</tr>
<tr>
<td></td>
<td>Grid Connection Standards IEEE 1547A, IEEE 1547.1</td>
</tr>
<tr>
<td></td>
<td>Emissions FCC part15 class B</td>
</tr>
<tr>
<td></td>
<td>Standards Rule 21, HECO</td>
</tr>
</tbody>
</table>

### AC-Coupled System

<table>
<thead>
<tr>
<th>AC Output to Load</th>
<th>With Grid Absent</th>
<th>With Grid Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power (Continuous) @ 25°C</td>
<td>5500W</td>
<td>7000W</td>
</tr>
<tr>
<td>Overload 40/20/5/1sec @ 25°C &amp; 240V</td>
<td>5500/…/6500/7500W</td>
<td>--/9600/…/--W</td>
</tr>
<tr>
<td>Overload 40/5/1sec @ 25°C &amp; 120V</td>
<td>2750/3250/3750W</td>
<td>--</td>
</tr>
<tr>
<td>Rated Output Current (RMS)</td>
<td>23A (120V and 240V)</td>
<td>29A (@120V and 240V)</td>
</tr>
<tr>
<td>Output Frequency (Selectable)</td>
<td>50/60Hz</td>
<td></td>
</tr>
<tr>
<td>Output Voltage and Accuracy</td>
<td>L-N: 120V ± 3%; L-L: 240V ± 3%</td>
<td></td>
</tr>
<tr>
<td>Output Voltage Limits</td>
<td>L-L: 180 to 280V (240V Nominal)</td>
<td></td>
</tr>
<tr>
<td>Total harmonic distortion (THD) at rated power</td>
<td>&lt; 5%</td>
<td></td>
</tr>
<tr>
<td>Power Factor</td>
<td>&gt;99%</td>
<td></td>
</tr>
</tbody>
</table>
## Specifications

### 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. & power derated above 40°C)
  - Storage: -25 to 70°C (-13 to 158°F)

### AC INPUT FROM GRID (GRID SUPPORT)

<table>
<thead>
<tr>
<th>Automatic Transfer Power Rating / Typical Transfer Time</th>
<th>7000W / 20ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td>L-L: 180 to 280V (240V nominal)</td>
</tr>
<tr>
<td>Input Frequency Range</td>
<td>45 to 54.9Hz / 55 to 65Hz</td>
</tr>
</tbody>
</table>

### AC OUTPUT TO GRID (GRID SUPPORT)

<table>
<thead>
<tr>
<th>Output Power (Continuous) @ 25°C</th>
<th>5000W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Feed-In Current Range</td>
<td>0 to 24A (@240V)</td>
</tr>
<tr>
<td>Grid Feed-In Voltage Range</td>
<td>L-L: 211 to 264V ± 3.0V</td>
</tr>
<tr>
<td>Grid Feed-In Frequency Range</td>
<td>49.3 to 50.5Hz / 59.3 to 60.5Hz ± 0.05Hz</td>
</tr>
</tbody>
</table>

### DC BATTERY Charger

- **Max Charge/Discharge Current**: 100A/150A
- **Output Voltage Range**: 44 to 58V (48V Nominal)
- **Compatible Battery Types**: Li-Ion

### EFFICIENCY

- **Peak Battery to Grid**: 92%
- **System Standby Power**: 20W
- **System Idle Power**: < 8W

### STANDARDS COMPLIANCE

- **Safety**: UL9540, UL1973, UL1741SA, CSA 22.2
- **Grid Connection Standards**: IEEE 1547A, IEEE 1547.1
- **Emissions**: FCC part15 class B
- **Standards**: Rule 21, HECO
22. GRID SUPPORT PARAMETERS (UL1741SA)

**Manufacturer Stated Tolerances**

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>CURRENT</th>
<th>FREQUENCY</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%</td>
<td>5%</td>
<td>2%</td>
<td>0.1 Sec</td>
</tr>
</tbody>
</table>

**Solar DC Input**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDC(_{\text{op}})</td>
<td>120-500V</td>
<td>Max input voltage</td>
</tr>
<tr>
<td>VDC(_{\text{mppt}})</td>
<td>250-430V</td>
<td>Maximum power point track range</td>
</tr>
<tr>
<td>VDC(_{\text{start}})</td>
<td>150V</td>
<td>Min start voltage</td>
</tr>
<tr>
<td>IDC(_{\text{max}})</td>
<td>13A/13A</td>
<td>DC input current rating for each string</td>
</tr>
</tbody>
</table>

**Inverter AC Output**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>V(_{\text{nom,L-N}})</td>
<td>120V</td>
<td>Nominal Voltage L-N (if neutral available)</td>
</tr>
<tr>
<td>V(_{\text{nom,L-L}})</td>
<td>240V</td>
<td>Nominal Voltage L-L</td>
</tr>
<tr>
<td>P(_{\text{nom}})</td>
<td>5kW</td>
<td>Active Power Output</td>
</tr>
<tr>
<td>IAC(_{\text{nom}})</td>
<td>21A</td>
<td>Nominal current per phase</td>
</tr>
<tr>
<td>IAC(_{\text{max}})</td>
<td>21A</td>
<td>Max current at lowest operating voltage</td>
</tr>
</tbody>
</table>

**Voltage Ride-Through**

<table>
<thead>
<tr>
<th>VOLTAGE ZONE</th>
<th>ZONE LIMITS</th>
<th>TRIP TIME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV2</td>
<td>V ≥ 120%</td>
<td>0.166 sec</td>
<td>Trip time when the voltage is above 288Vac</td>
</tr>
<tr>
<td>HV1</td>
<td>110% &lt; V &lt; 120%</td>
<td>13 sec</td>
<td>Trip time when the voltage range is between 264Vac and 288Vac</td>
</tr>
<tr>
<td>Nominal</td>
<td>88% ≤ V ≤ 110%</td>
<td>-</td>
<td>No applicable when the voltage range is between 211.2Vac and 264Vac</td>
</tr>
<tr>
<td>LV1</td>
<td>70% ≤ V &lt; 88%</td>
<td>21 sec</td>
<td>Trip time when the voltage range is between 168Vac and 211.2Vac</td>
</tr>
<tr>
<td>LV2</td>
<td>50% ≤ V &lt; 70%</td>
<td>11 sec</td>
<td>Trip time when the voltage range is between 120Vac and 168Vac</td>
</tr>
<tr>
<td>LV3</td>
<td>V &lt; 50%</td>
<td>1.5 sec</td>
<td>Trip time when the voltage is below 120Vac</td>
</tr>
</tbody>
</table>
### Frequency Ride-Through

<table>
<thead>
<tr>
<th>FREQUENCY ZONE</th>
<th>ZONE LIMITS (Hz)</th>
<th>TRIP TIME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF2</td>
<td>F ≥ 62</td>
<td>0.166 sec</td>
<td>Trip time when the frequency is above 62Hz</td>
</tr>
<tr>
<td>HF1</td>
<td>60.5 &lt; F &lt; 62</td>
<td>300 sec</td>
<td>Trip time when the frequency range is between 60.5Hz and 62Hz</td>
</tr>
<tr>
<td></td>
<td>58.5 ≤ F ≤ 60.5</td>
<td>-</td>
<td>Not applicable when the frequency range is between 58.5Hz and 60.5Hz</td>
</tr>
<tr>
<td>Nominal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LF1</td>
<td>57 ≤ F &lt; 58.5</td>
<td>300 sec</td>
<td>Trip time when the frequency range is between 57Hz and 58Hz</td>
</tr>
<tr>
<td>LF2</td>
<td>F &lt; 57</td>
<td>0.166 sec</td>
<td>Trip time when the frequency is below 57Hz</td>
</tr>
</tbody>
</table>

### Power Factor

<table>
<thead>
<tr>
<th>POWER</th>
<th>MIN INDUCTIVE, PF_{MIN,IND}</th>
<th>MIN CAPACITIVE, PF_{MIN,CAP}</th>
<th>SETTLING TIME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5kW</td>
<td>70%</td>
<td>70%</td>
<td>3 Sec</td>
<td>Capacitive (Var production) and Inductive (Var absorption) minimum power factor. Default PF = 1.0</td>
</tr>
</tbody>
</table>

### Volt-Var Q(V)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S_{rated}</td>
<td>5 KVA</td>
<td>Apparent Power Rating (VA)</td>
</tr>
<tr>
<td>P_{rated}</td>
<td>3.5 KW</td>
<td>Output Power Rating (W)</td>
</tr>
<tr>
<td>V_{nom}</td>
<td>240V</td>
<td>Nominal AC EPS voltage (V)</td>
</tr>
<tr>
<td>V_{min} - V_{max}</td>
<td>211 - 264V</td>
<td>AC EPS voltage range with function enabled (V)</td>
</tr>
<tr>
<td>V_{A percent}</td>
<td>5%</td>
<td>Reactive Power Accuracy</td>
</tr>
<tr>
<td>V_{A ramp}</td>
<td>500 VA/sec</td>
<td>Maximum ramp rate</td>
</tr>
<tr>
<td>Q_{over-cap,max}</td>
<td>3.57 VA</td>
<td>Maximum Rated Reactive Power Production (Capacitive, Overexcited)</td>
</tr>
<tr>
<td>Q_{under-ind,max}</td>
<td>3.57 VA</td>
<td>Maximum Rated Reactive Power Absorption (Inductive, Underexcited)</td>
</tr>
<tr>
<td>V_{A slope,max}</td>
<td>148 VA/V</td>
<td>Maximum slope of power over voltage</td>
</tr>
<tr>
<td>D_{min} - D_{max}</td>
<td>235 - 240V</td>
<td>Deadband range (V)</td>
</tr>
</tbody>
</table>
## Power Ramp Rate

<table>
<thead>
<tr>
<th>Normal Operating Soft Start</th>
<th>RRNORM_UP_MIN</th>
<th>RRNORM_UP_MAX</th>
<th>ACCURACY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1% (Irate/sec)</td>
<td>50% (Irate/sec)</td>
<td>3%</td>
<td>Percentage of nominal generated power per second for the first time startup.</td>
</tr>
<tr>
<td></td>
<td>1% (Irate/sec)</td>
<td>50% (Irate/sec)</td>
<td>3%</td>
<td>Percentage of nominal generated power per second for the first time startup.</td>
</tr>
</tbody>
</table>