RaVolt Installation Guidelines

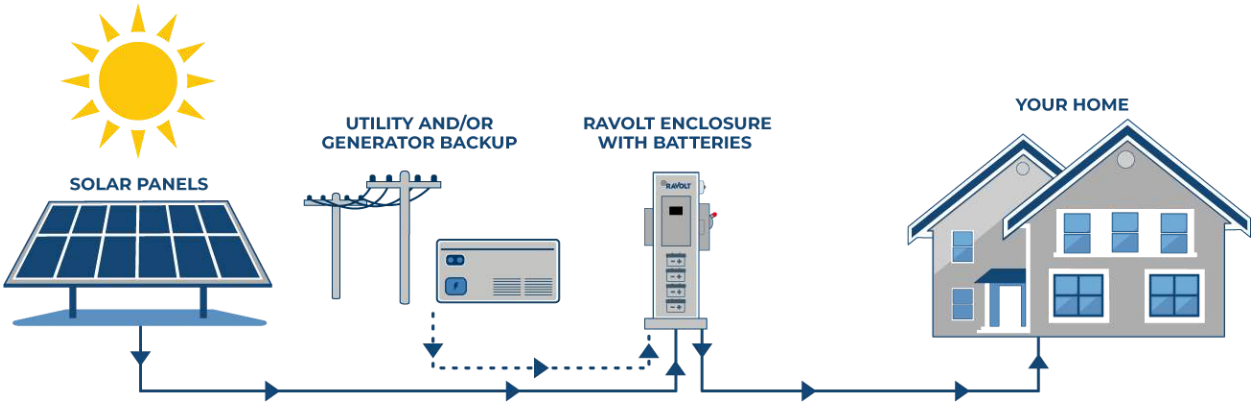
Generation 2

Version 3.0 Dated 03/05/2024

Table of Contents

All information contained within this document shall be used as a guide and not intended as complete instructions.
All installation activities shall be carried out by qualified and properly trained electricians and all personnel must wear appropriate PPE.
All installation means and methods shall be per Scope of Work (SOW), stamped Design Documents, and manufacturer installation guides.

HOW RAVOLT WORKS



For further support, please contact the RaVolt team.

Service Line: 1 (844) RAVSERV/ 1 (844) 728-7378

Email: service@ravolt.com

1. Recommended Tools & Materials

The following list of tools and materials are recommended, but not required. Installations may require additional materials based on design.

Tools

1. Hand Tools

- Torque Wrench
- Phillips head screwdriver
- Flat head screwdriver
- Small precision screwdriver
- 5/16” nut driver
- Wire strippers
- Cable cutters
- Linesman pliers
- Crimpers
- Shovel
- Tamper
- Level
- Hammer
- 6-foot ladder
- AC/DC Volt Meter with amp clamp
- Cat 6 cable tester

2. Power Tools

- Knockout set or hole-saw set
- Cordless hammer drill
- Bandsaw or Sawzall
- Impact gun

3. Rigging

- 6-foot rigging straps
- Shackle
- Refer to *Ravolt Lifting Diagram*
- Refer to *RaVolt Anchoring Diagram*

Materials:

1. Conduit

- PV Input to DC Disconnects (1 list per string)
- (1) 1” rain hood
- (1) 1” sch. 40 cut to length (roughly 12-18”)
- (1) 1” TA/MA
- (1) 1” bushing
- (1) 1” locknut

2. Generator Circuit

- (1) 2” non-metallic flexible conduit cut to length (roughly 6’)
- (1) 2” sch. 40 cut to length (roughly 4’)
- (1) 2” sch. 40 to be placed in trench
- (2) 2” 90° sch. 40 fittings
- (2) 2” flexible straight fittings
- (2) 2” flexible 90° fittings
- (2) 2” locknuts
- (2) 2” bushings

3. AC Output Circuit

- (1) 2” MA/TA
- (1) 2” expansion joint
- (1) 2” locknut
- (1) 2” bushing
- (1) 2” 90° sch. 40 fitting
- 2” sch. 40 to be placed in trench to AC disconnect according to design

4. Miscellaneous Materials

- Unistrut hardware
- Unistrut straps
- Colored electrical tape
- All weather code-compliant conduit glue

2. Installation Overview

The RaVolt installation follows a standard process consisting of the following steps:

- **Unloading Equipment** -Trucks will arrive with a palleted enclosure and batteries. It may also include a palleted generator and concrete pads, set pads first, then set the enclosure and generators directly off the truck.
- **Placing the Enclosure & Generator Pads** -Choosing a desired location for both pads, typically on the northern side of the array, about 6 feet apart (Minimum gap for generator exhaust is 4-foot 6-inch). This step also consists of leveling and compacting the designated pad locations.
- **Placing the Enclosure & Generator** - Using slings and shackles on a capable machine (skid steer, mini excavator, or tractor), rig and place the equipment on their dedicated concrete pads.
- **Trenching & Conduit** - There will be 2 main trenches, the AC Out trench and the generator circuit. The AC Out trench will be from the load center on the side of the unit to the AC disconnect on the side of the home. The generator circuit will be from the generator to the enclosure.
- **Terminations** - The RaVolt unit arrives with pre-installed and pre-configured equipment. There are roughly 10 additional terminations to make on a standard project.
- **QA/QC, Commissioning, Photos** - Installers will inspect the work using the QA/QC guidelines. There is a short commissioning process to ensure process functionality, followed by some photos for product warranties.
- **Installation Checklists** - Pre-Site installer and On-Site installer checklists to assist in aiding the commissioning process.
- **Troubleshooting** - General Troubleshooting Methods for residential RaVolt units.
- **One-Line Diagrams** - Both installer and customer forward one-line diagrams provided for confirmation of correct installation. These will be general one-line diagrams to explain the basic exterior connections.

3. Unloading Equipment

Recommended Tools & Materials: Weight-rated slings, weight-rated shackles, and weight-rated ratchet straps.

- Determine a safe, flat location for the truck to park for unloading.
- The delivery truck will arrive with the RaVolt enclosure banded to a pallet.
- Depending on unit type, additional batteries will be in crates.

Estimated equipment weights are below:

NOTE: VERIFY TOTAL LIFTING HEIGHT OF EQUIPMENT BEFORE MOVING UNIT.

- Estimated weight without batteries- 600 lbs
- Estimated weight with batteries - 1100 lbs
- Single Cabinet Weight – approx. 1100 lbs
- Paralleled Cabinet Weight – approx. 2300 lbs
- Estimated delivery weight Single Cabinet - 800 lbs
- Estimated delivery weight Paralleled Cabinet - 1500 lbs

NOTE: Operators must ensure sufficient lifting capacity of the machine to be used.

- If using a mini excavator for unloading the equipment, utilize properly weight-rated slings and properly weight-rated shackles. The unit will arrive with 4 lifting points present on the top of the enclosure. The operator must use extreme caution to not bend or break these lifting points, which may interfere with the enclosure's NEMA 3R rating. Straps with too severe of an angle will lead to bends on the lifting points. Ensure lifting force is as vertical as possible at all times. If using a forklift or skid steer for unloading the equipment, utilize properly rated 4-foot forks for lifting pallets.

- If using a forklift or skid steer for unloading the equipment, utilize a ratchet strap to secure the equipment to the mast of the unloading machine when transporting.

- Place equipment in a flat, secure, and safe location until the installation team is ready to progress.
- Ensure the rain hoods that are included in the enclosure are installed on top of the unit upon arrival.
    - Unscrew the corner screws on the enclosure.
    - Place the rain hoods on top, aligning them with the corresponding holes.
    - Tighten the screws back on to secure the rain hoods in place.
    - This prevents rain from getting into the unit.

- If additional batteries arrive on a pallet and installation won't be done on the same day, cover them with a tarp or weather-resistant material to protect them from rain or other weather conditions.

4. Placement of Enclosure Pad

NOTE: Additional information in Section 10 “Commissioning & Photos”

RaVolt Enclosure Pad Dimensions:

Single Enclosure 4-Feet L x 3-Feet W x (Depth Dependent on Hurricane Zone)

Dual Enclosure 4-Feet L x 6-Feet W x (Depth Dependent on Hurricane Zone)

Recommended Tools & Materials: Shovel, rake, hand tamper, crushed gravel, 4-foot level.

When choosing the location for the RaVolt enclosure, consider the following steps to ensure a successful installation:

1. Review Project Design Documents: Before determining the precise location, refer to the project-specific design documents. These documents will give you a general idea of where the enclosure should be placed.

2. Ideal Location Criteria: Look for a flat area that offers protection from erosion and other weather elements. This will safeguard the RaVolt unit and ensure its longevity and efficiency.

3. Preparing the Pad: Once you've identified the ideal location, prepare the concrete pad by leveling and compacting the area. To create a sturdy base, we recommend using gravel or crushed stone for compaction. (Check the provided photos for reference.)

4. Pouring the Pad: If you need to pour the pad, refer to the provided diagram for guidance. Follow the diagram's specifications to create a suitable foundation for the RaVolt enclosure.

NOTE:

When installing RaVolt units, Consider the following guidelines to ensure optimal performance and compliance with local and national codes:

1. Orientation Flexibility: RaVolt pads can be placed in any orientation preferred by the homeowner. For ground mount applications, units are typically installed on the north side of the solar array. For rooftop applications, placement near the meter is common.

2. Code Compliance: As the installer, you must ensure the enclosure placement adheres to all relevant local and national codes. Consider gas line setbacks, utility easements, and other applicable regulations.

3. Serviceable Radius: Make sure that there is a minimum 3-foot serviceable radius in front, back, and on the sides of the RaVolt enclosure. This ensures adequate access for maintenance and servicing tasks.

4. Generator Considerations: If a generator is present near the RaVolt enclosure, ensure a distance of 4 feet 6 inches between the enclosure and the generator exhaust. On the non-exhaust side of the generator, a 4-foot gap is acceptable.

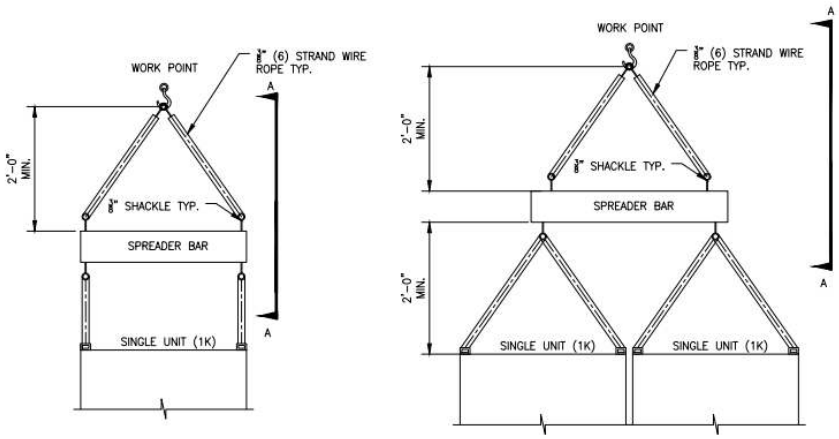
5. Placement and lifting of Enclosure

Recommended Tools & Materials: Slings, shackles, straps, snips

Once the designated pad has been positioned, the installation technician will proceed to rig and elevate the enclosure for its final placement. To ensure a smooth process, it is advised to use the pallet to transport the unit to the designated spot before removing the lifting bands.

For lifting instructions, please consult the provided lifting diagram.
In the case of a Single Cabinet Installation, use all four lifting eyes on the RaVolt unit, along with the suitable rigging equipment, to safely lift the RaVolt enclosure from the shipping pallet and position it onto the prepared pad.

For a Paralleled Cabinet Installation, Strapping must run through all 8 lifting eyes, 4 in front and 4 in back.



LIFT DIAGRAM:
SINGLE UNIT CONFIGURATION
SCALE: ½"=1'-0"

LIFT DIAGRAM:
DOUBLE UNIT CONFIGURATION
SCALE: ½"=1'-0"

SECTION AA
SCALE: ½"=1'-0"

To secure the unit effectively, utilize the provided anchoring hardware to fasten it securely to the pad.

After setting up the enclosure, proceed to install the supplied rain hood to maintain the NEMA 3R rating. The rain hood should be placed in the three holes located on the top of the enclosure, both on the front and back sides.

For this task, you will find T30 bolts already installed on the enclosure. Simply remove these bolts, align the rain hood holes with those on the enclosure, and then replace the bolts to complete the installation.

6. Trenching & Conduit

It is a requirement to contact the “Diggers Hotline” before any excavations and confirm the location of any unmarked utility or privately owned utilities.

1. Before excavations, contact the diggers hotline (DigSafe) to confirm the location of any unmarked utility or privately owned utilities.

2. Use a trencher or mini excavator to create three main trenches in the following locations:

   a) From the RaVolt Enclosure to the Generator or Service Disconnect for the Generator/Grid Input. If using generator Signal wire to the generator is required to be enclosed in a separate conduit from the AC wiring.

   b) From the RaVolt Enclosure to the AC Disconnect at the home for the AC Output.

   c) From the RaVolt Enclosure to the Solar Array (if necessary) for the PV Input.

3. Within each trench, install a 2-inch sch. 40 conduit. Use a 90° fitting to extend the conduit upwards at the specified locations before backfilling. Make sure to use all-weather code-compliant conduit glue for making connections.

NOTES:

1. You can use either flexible conduit or sch. 40 for all incoming conduit connections; the material lists may differ slightly based on your choice.

2. Trenches should be dug to a depth of 18-inch to 24-inch, as per code requirements.

3. Before backfilling, ensure that warning tape is placed above the conduit or direct burial cable for added safety.

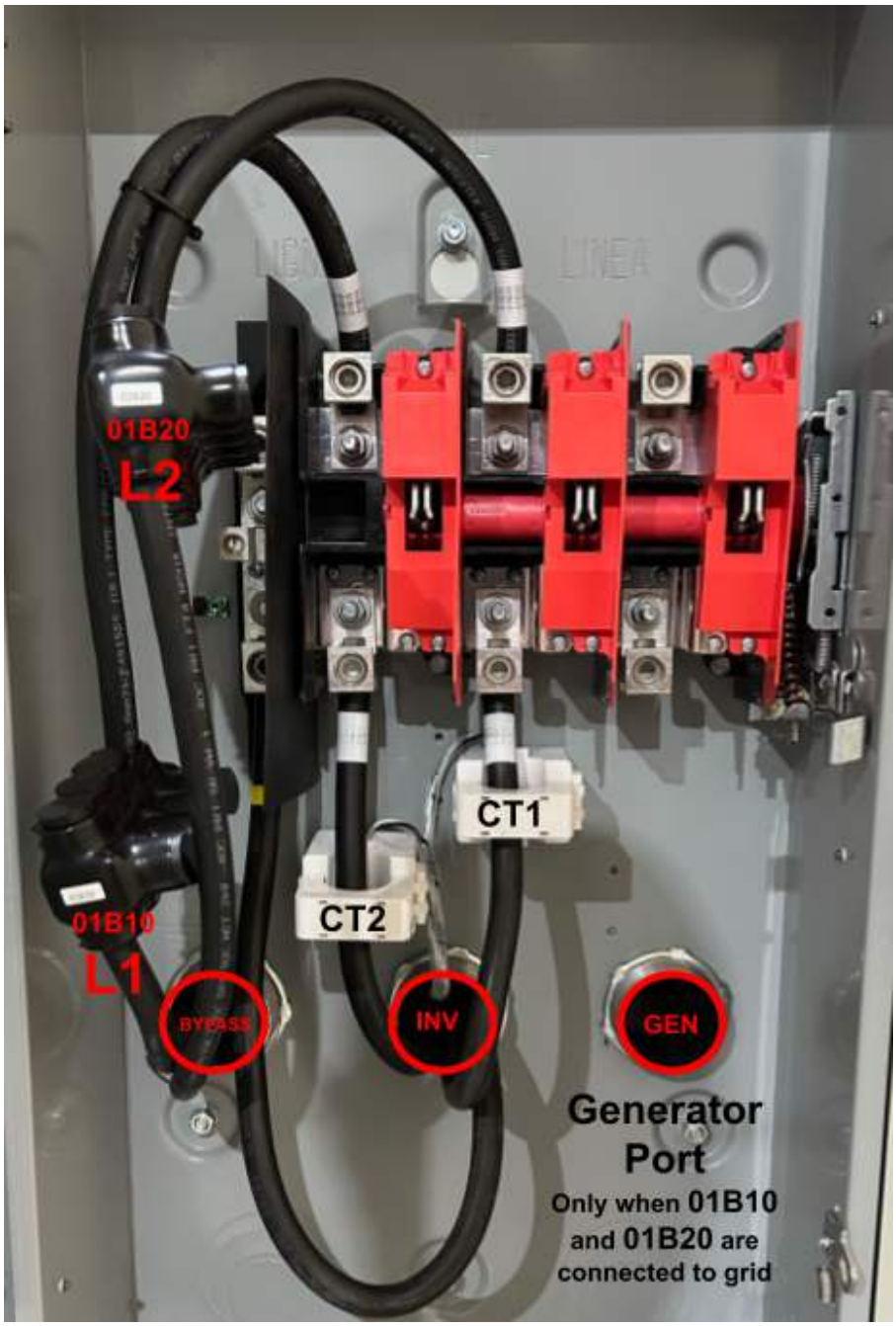
4. When backfilling trenches, use clean fill that is free of large rocks or sharp objects.

5. Conduit must be secured according to the NEC (National Electrical Code) guidelines to maintain proper installation standards.

7. Terminations

1. Install ground rod(s) at the enclosure. Properly ground and bond according to NEC code at the disconnect.
2. Once all trenching and conduit work is finished, pull wire to all specified locations as per the design. Make sure the wire sizing adheres to NEC code guidelines based on the system sizing.
3. **IMPORTANT: Ensure that the power output from the RaVolt enclosure to the load is protected either at the home service entrance or before connecting to any load using a circuit breaker with a maximum rating of 200AMPS. Failure to comply with this safety measure could result in serious consequences such as fire, damage, injury, or even death**

Generator/Grid Input:



1. Before proceeding, ensure there is no power on the grid/generator cables using a voltmeter.
2. Remove the screws and front plate from the disconnect.
3. All external AC power sources, whether from the grid, a generator, or a combination of both, will be terminated within the disconnect located on the side of the RaVolt enclosure.

4. After pulling the cable from the service disconnect or the generator to the RaVolt enclosure's side disconnect, begin making terminations according to NEC code guidelines.

5. If the system is exclusively **Grid-Tied**, run the utility lines to the Polaris lugs (sized for 4/0 DLO or 500mm THHN) on the service entrance of the unit. This will connect to the Grid Breaker.

6. If the system is exclusively **Off-Grid**, run generator lines to the Polaris lugs (sized for 4/0 DLO or 500mm THHN) on the service entrance of the unit. This will connect to the Grid Breakers.

7. If both a **grid and generator are present**, connect the grid input to the line side of the disconnect. The generator input should be terminated on the "GEN" breaker on the inverter.

8. Label the incoming cable and ensure the two hot legs are correctly terminated in the designated lugs. Make sure to torque the lugs to the manufacturer's specifications.

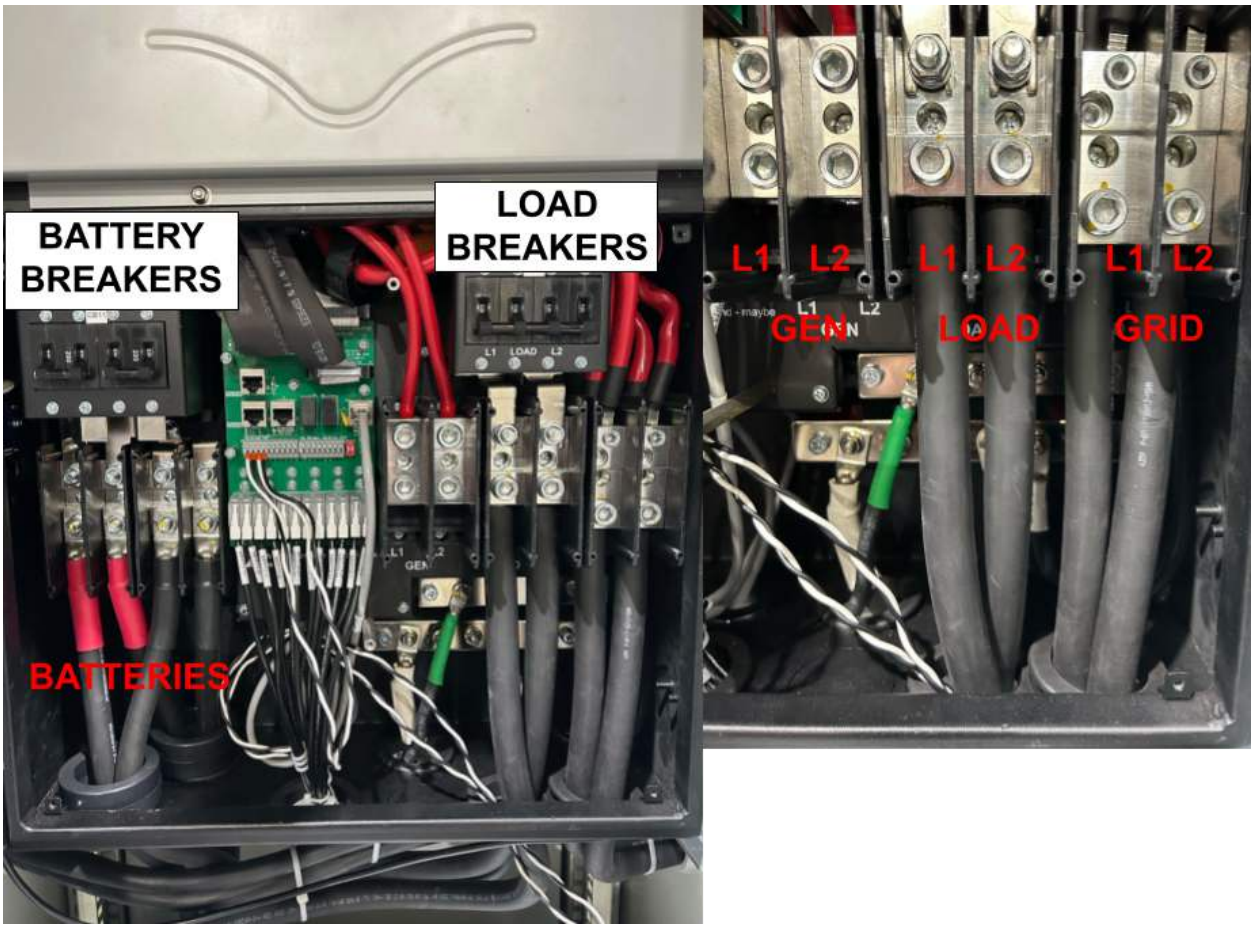
UL LISTED TORQUE VALUES PER CONDUCTOR SIZE (IN/LBS)

	CONDUCTOR SIZE													
CONNECTOR WIRESIZE/PORT SIZE	#10 - #14 AWG	#8 AWG	#4 - #6 AWG	#3 - #1 AWG	1/0 AWG	2/0 AWG	3/0 AWG	4/0 AWG	250 MCM	350 MCM	400 MCM	500 MCM	750-600 MCM	800-1000 MCM
#4 AWG - #14 AWG	35	40	45											
1/0 AWG - #14 AWG	35	75	110	150	180									
3/0 AWG - #6 AWG			110	150	180	180	250							
250 MCM - 6 AWG			110	150	180	180	250	250	360					
350 MCM - 6 AWG			110	150	180	180	250	250	360	400				
500 MCM - 4 AWG			110	150	180	180	250	250	360	400	425	450		
600 MCM - 6 AWG			110	150	180	180	250	250	360	400	425	450	550	
750 MCM - 1/0 AWG					550	550	550	550	550	550	550	550	550	550

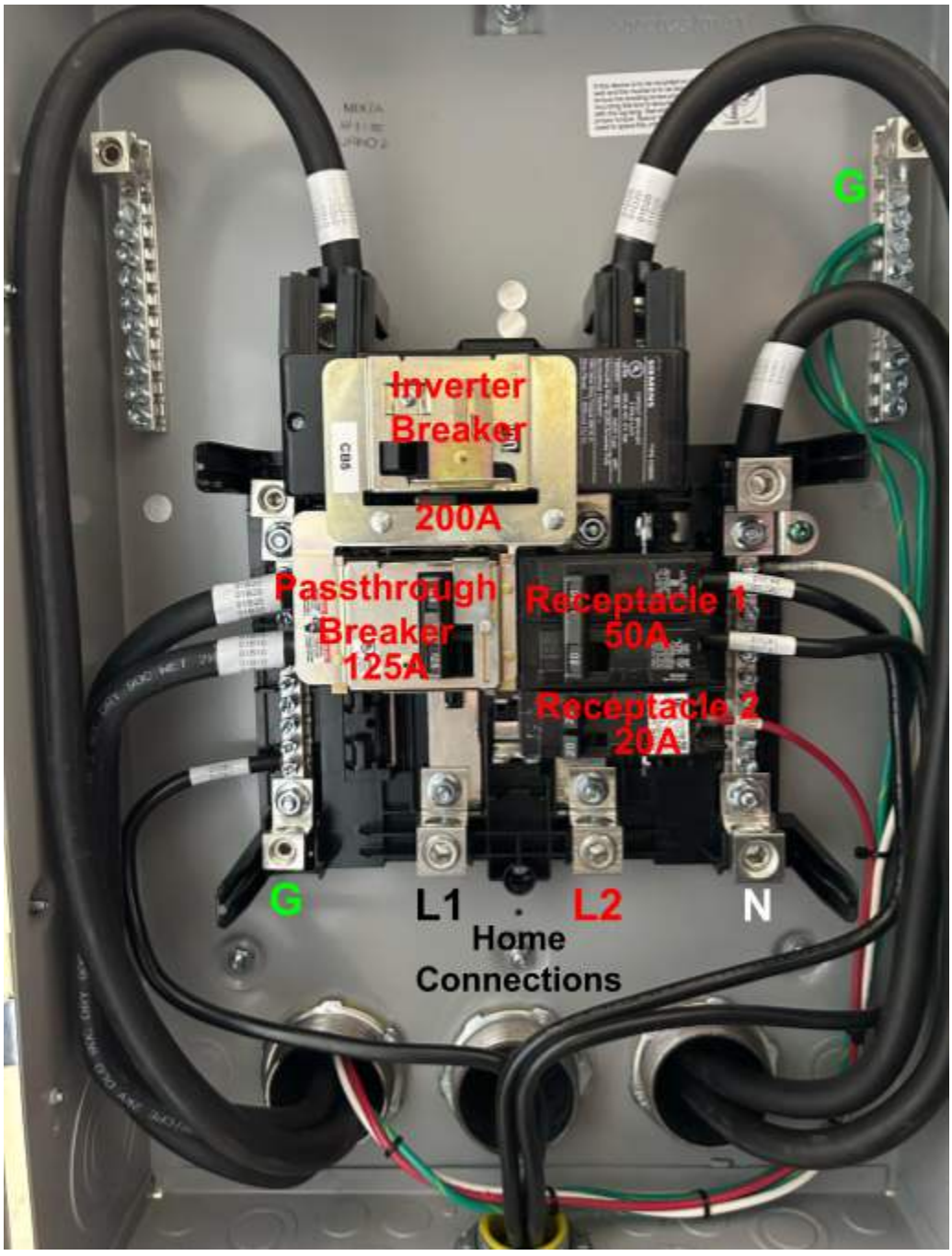
9. Properly terminate both the neutral and ground in their designated locations and torque them to the manufacturer's specifications.

10. The RaVolt enclosure comes pre-wired and pre-configured to allow the load side of this disconnect to flow through the inverter, into the load center, and into the home. Once you've landed the grid and/or generator inputs, this disconnect is complete.

Inverter Internal Pre-Installed Terminations:



Load Center Output: flip passthrough and inverter breaker



1. Before proceeding, ensure there is no power to the load center using a voltmeter.
2. Remove the screws and front plate from the load center.

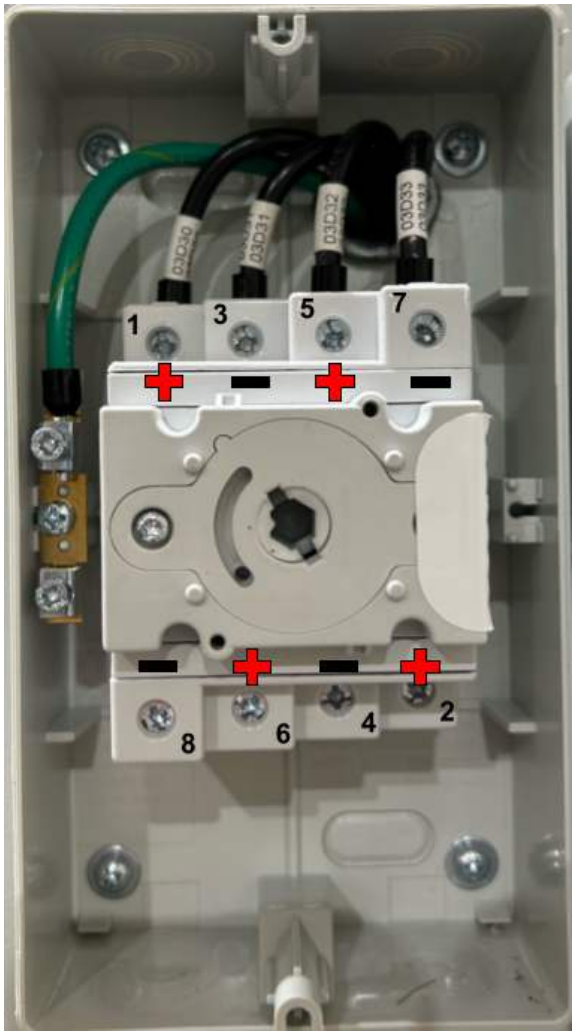
3. After pulling the cable from the load center on the RaVolt enclosure to the AC disconnect on the side of the home or dwelling, proceed to make terminations in the appropriate locations within the load center, utilizing the 200A feed-thru lugs.

4. Label the cables and terminate them on the load side of the 200A breaker, following the manufacturer's specifications and adhering to NEC code guidelines.

5. Ensure both the neutral and ground are correctly terminated in their designated locations within the load center.

6. The RaVolt enclosure arrives pre-wired and pre-configured to connect the load center to the inverter. Once you have terminated this AC out cable, the load center is complete and ready to function.

PV Input:



1. Ensure that there is no power on the incoming PV cable. DO NOT MAKE MC4 HOME RUN CONNECTIONS UNTIL AFTER TERMINATING THIS DC DISCONNECT.
2. Label the cables correctly, clearly indicating different strings, positive, and negative.
3. Place the switch in the "off" position, and then remove the screws from the DC disconnect cover to access the interior.
4. Run the PV cables directly into the DC disconnects on the side of the enclosure.
5. After making and verifying the terminations, replace the screws and DC disconnect cover.
6. The RaVolt enclosure comes pre-wired and pre-configured to connect the DC disconnects to the MPPTs on the inverter. Once the incoming wires are properly terminated, these disconnects are complete.

Two-Wire Start:

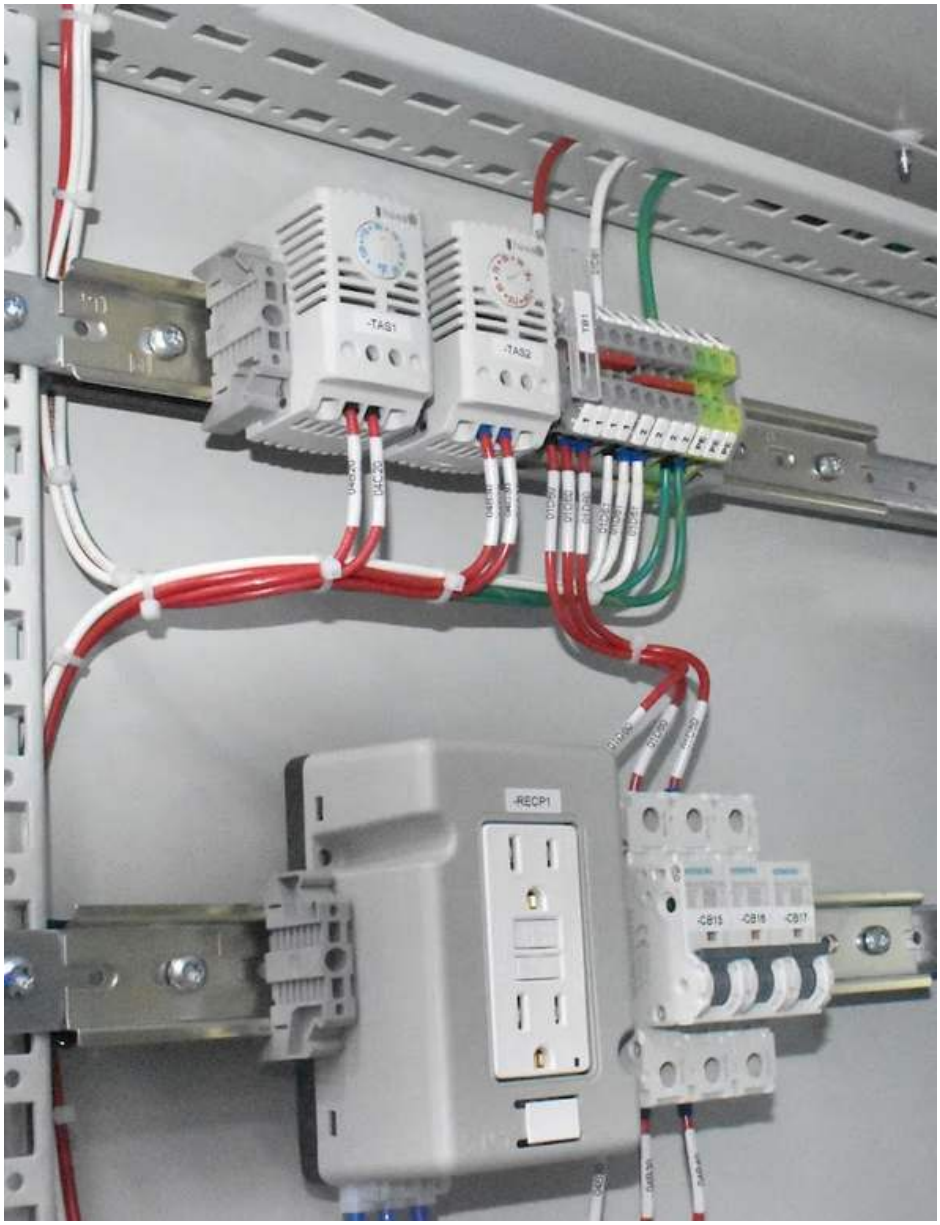
1. Typically, a two-wire start circuit is required for the generator, the wire must be a **Belden 8450** or equivalent. It must be run in its conduit **separate** from the AC conductors.
2. Run these two wires from the generator, through the disconnect, and into the RaVolt enclosure.
3. Before proceeding, ensure there is no power to the inverter.
4. Terminate these wires on the inverter using pin terminals at terminal blocks 7 + 8 (Sol-Ark). For more detailed instructions, refer to the generator manual if necessary.
5. For the generator side of the two-wire start circuit, terminate it at the designated two-wire start terminals. Refer to the generator's manufacturer manual and specifications for specific instructions.

Trickle Charge Circuit:

1. If a generator is present, it will likely need a trickle charge circuit to continuously charge the battery of the generator. This circuit typically consists of three #10 AWG THHN/THWN wires.
2. Run these wires from the generator, through the disconnect, and into the RaVolt enclosure.

3. Ensure there is no power to the terminal blocks specified in step 4 within the RaVolt enclosure.

4. Label these wires and terminate at the terminal blocks at the top right corner of the RaVolt enclosure. The hot wire will be terminated at block 1, neutral at block 2, and ground at block 3. Terminate the generator side of the trickle charge circuit at the designated 120 VAC input location. Refer to the generator's manufacturer manual and specifications for specific instructions.



NOTE: If (2) Paralleled cabinets are on site you will have received the cabinet and a second pallet with additional batteries. Only the bottom battery in each cabinet has been Installed.

PowerSync

Ensure to identify which battery serves as the head battery, leading to the last one in the chain. The head battery may differ depending on the configuration. In the example given below the head battery is circled in red.

NOTE: ALL DIP SWITCHES ARE PRE-CONFIGURED. IF RECEIVE PARALLEL BOX, ENSURE BATTERY 4 IS IN BT4 SLOT AND SO FORTH.

It may be beneficial to prepare for installing the battery addition by referring to the PowerSync Battery Manual. This manual contains information regarding information for the Powersync Batteries. However, the required dip switch configuration when adding batteries is depicted in the following images.

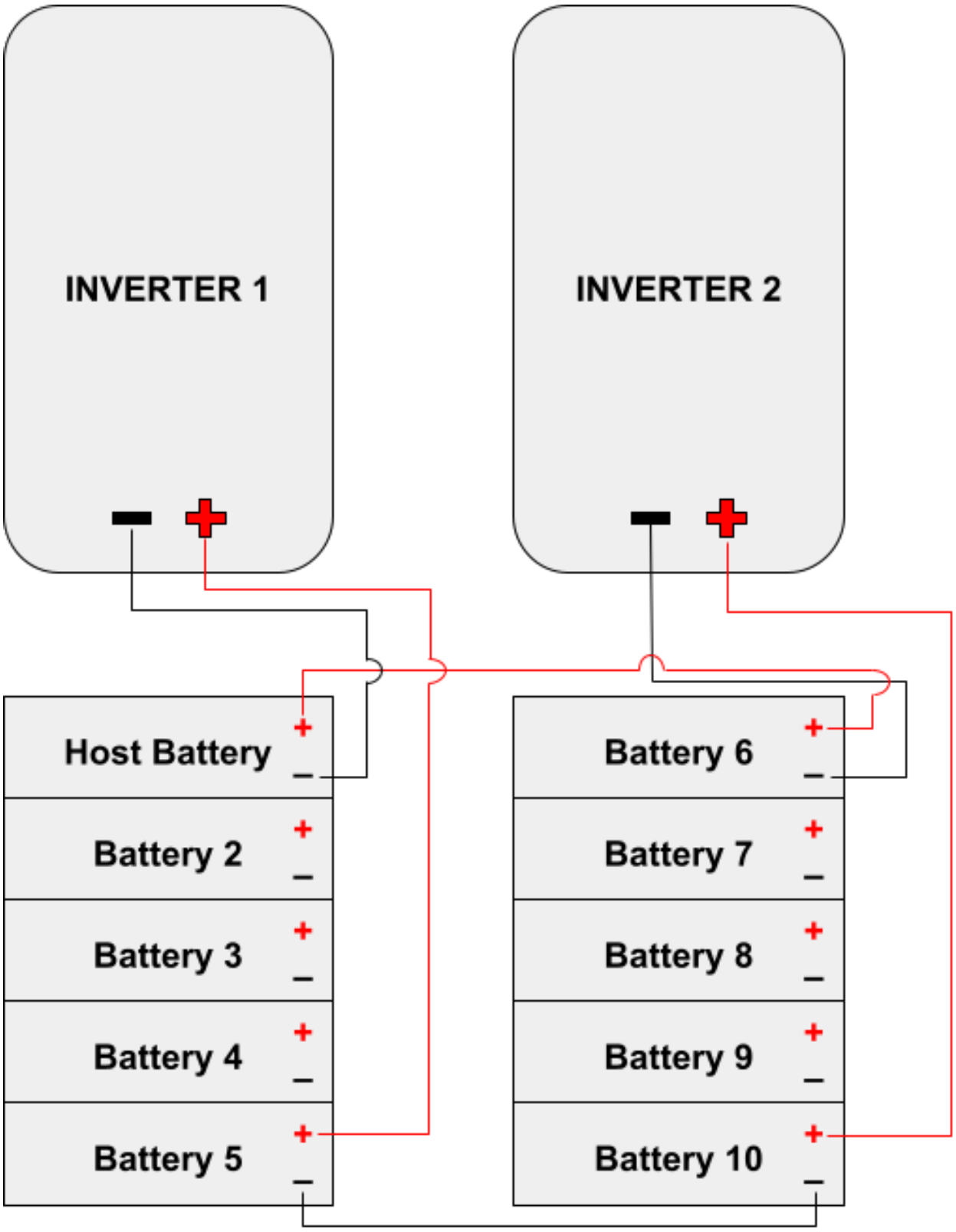
HOST MODULE TOGGLE SWITCH SETTINGS

	#1	#2	#3	#4	#5	#6	Inverter
Host Option 1	OFF	OFF	OFF	OFF	OFF	ON	Sol-Ark, Pylon, Goodwe

SUB-MODULE TOGGLE SWITCH SETTINGS (1-29 MODULES)

Module	#1	#2	#3	#4	#5	#6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF

Batteries are paralleled on the front using provided busbars. Make sure to switch off all power before removing or adding busbars.



MultiStack Wiring Detail for Parallel Inverters

For adding **additional** batteries, that were not part of the original order, please follow the steps below:

1. Remove the wire connecting the Inverter from the previous "last" battery.
2. Connect this wire to the corresponding polarity terminal of the newest battery addition.
3. Once all batteries are connected, attach the Inverter cable connection to the newest battery addition.

Begin connecting the ethernet cables from one battery to the next following the same pattern the previous batteries have. Going from the left RS45 jack to the right RS45 jack on the next battery.

NOTE: The first battery will have a connection from the inverter to the CANBus port. Do not remove this connection.

Pytes V4

1. Install the remaining batteries in the racks that are provided.
2. Connect the batteries per polarity to a respective positive or negative busbar.
3. Use the provided interconnecting wires to connect the two battery banks together. Connect the positive terminals to each other and the negative terminals to each other.
4. Use the provided Bus bars to connect all the battery terminals together.
5. Connect an Ethernet cable from the Master inverter to the CANbus port of the Host Battery.
6. Connect the remaining batteries using the standard Ethernet cables provided.

Pytes V5

1. Install the remaining batteries in the racks that are provided.
2. Use the provided interconnecting wires to connect the two battery banks together. Connect the positive terminals to each other and the negative terminals to each other.
3. Use the provided Bus bars to connect all the battery terminals together.
4. Install the battery terminal touch-safe covers as provided.
5. Connect an Ethernet cable from the Master inverter to the CANbus port of the Host Battery.
6. Connect the remaining batteries using the standard Ethernet cables provided.

8. Enclosure Labeling

When you receive the RaVolt enclosure, it will come with a packet of labels that are required for the properly identifying components of the system. These labels must be present and in good condition.

Once you have the labels, carefully place each label at its appropriate location on the RaVolt enclosure. To help you with this, refer to the photo below, which provides references for the correct placement of the labels.

Please confirm with the NEC code, local AHJ, and local utility for all labeling requirements and protocol.

9. Commissioning & Photos

Take photos of the following items for documentation:

1. RaVolt Enclosure and Pad Placement: Take clear photos of the RaVolt enclosure's precise placement on the pad, showcasing its proper alignment and positioning.
2. Installed Anchoring Hardware: Capture images of the anchoring hardware, ensuring it is securely fastened to maintain stability.
3. Rain Hood Installation: Photograph the Rain Hood installed on top of the enclosure, ensuring proper installation to protect against water ingress.
4. Conduit Connections: Document all conduit connections, both at the entry and exit points, to verify correct installations.
5. Grounding & Neutral-to-Ground Bond: Take photos of the grounding and neutral-to-ground bond connections to ensure proper electrical grounding.
6. Load Center Terminations: Capture images of the AC output terminations, showing the connection of 2 hot wires, 1 neutral wire, and 1 ground wire.
7. Disconnect Terminations: Photograph the grid/gen input disconnect terminations, showing the connection of 2 or 4 hot wires, 1 or 2 neutral wires, and 1 or 2 ground wires.
8. DC Disconnect Terminations: Document each PV string's termination within the DC disconnect, verifying proper connections.
9. Two-Wire Start Termination: Capture the termination of the two-wire start at the inverter to ensure proper setup.
10. Trickle Charge Termination: Photograph the trickle charge termination at the terminal blocks within the RaVolt enclosure, verifying the connection.
11. Battery Communication Cables: Document the battery communication cables, ensuring they are appropriately connected.
12. Dip Switches: Document the dip switch orientation for all batteries, and include a photo for confirmation.
13. Heater and Fan Settings: Capture images of the heater and fan settings, confirming proper configurations.
14. Notable Issues or Blemishes: Take photos of any notable issues or blemishes on the equipment for reference and further assessment.

15. Placed Labels: Ensure all labels are photographed, providing a comprehensive record of their correct placement.
16. Communication Connections: Document all communication connections to verify proper setup.
17. Functioning Wi-Fi Dongle: Confirm that the Wi-Fi dongle is functional and properly connected.
18. Cellular Modem: Confirm the modem is powered on and functioning properly, include photos of the modem itself with illuminated status LEDs and connections to antennae.
19. Additional RaVolt Options: If applicable, capture images of any additional RaVolt options specific to the project.

Commissioning

1. Once all terminations are completed, and a successful QA/QC walkthrough has been conducted, the RaVolt system is prepared for activation. Follow the steps below to ensure the equipment's safety and functionality.
2. Before powering up any aspect of the system, ensure that ALL breakers and disconnects are set to the OFF position. This precaution is essential for a safe and controlled start-up process.
3. Begin turning on the system by powering on the batteries via the switch on the front. Be sure to wait a moment as they each turn on then, press the reset button on each battery.
4. Go to the inverter and turn on the battery breakers, this will allow the inverter to utilize battery power.
5. Turn the inverter on, if using Sol-Ark a button on the left side of the unit must be depressed.
6. Wait for the inverter to completely turn on, this may take 1-3 minutes. Once the inverter is on, turn on the remaining breakers in the inverter.
7. Go to the right side of the RaVolt unit and turn on the main disconnect switch if utilizing anything connected to the Grid connection.
8. Go to the left side of the RaVolt unit and open the Load Panel. Turn on all breakers located in this panel.
9. If an RV panel is connected to the RaVolt unit, you can turn these breakers on at this time.

10. On the Right side of the unit, turn the PV disconnect switches to the **ON** position. These are rotary switches.

11. Utilize the Gen force option either on the inverter menu, or through PowerView Pro to ensure generator is properly connected to the two wire start.

Grid-Connected Generator Function

In a Grid-connected scenario, the generator serves as a backup solely for charging the batteries in situations when the grid becomes unavailable. During regular operation with the grid present, the grid acts as the primary power source for recharging the batteries as needed. The generator will only provide power to the RaVolt system/home when the batteries are at a low charge during a grid outage scenario. It is important to note that, with this setup, the generator cannot directly power the house without passing through the inverters. This ensures that the RaVolt system operates efficiently and safely, relying on the grid and batteries as the main power sources while utilizing the generator as a reliable backup only for battery charging during grid outages

Generator/Grid Battery Charging

1. Go to the Battery settings' charge tab and set the Start % value to 90%.
2. If the batteries are already below 90% State of Charge (SOC), set the Start % value to a percentage 1%-3% below the current battery SOC.
3. Adjust the inverter settings for grid start and generator start values slightly below the current battery charge.
4. Go into the Grid setup/Limiter tab and deactivate the Time of Use function by unchecking the box.
5. Set the PV disconnects to "OFF."
6. Confirm that the system is running solely on battery power.
7. Run loads at the house or the enclosure until the state of charge drops to the grid/gen start values.
8. Once the grid/gen start value is reached, the generator should automatically turn on (if off-grid), or power should be supplied from the grid to charge the batteries (if grid-connected).
9. Once it is verified that the generator or grid has been called for, and the batteries are charging, the battery charging commissioning is complete.

IMPORTANT: After completing the commissioning process, make sure to reset the Start % to the value indicated in the original settings (likely 10% for off-grid installations). Also, remember to re-enable the Time of Use function by re-checking the box indicated in Step 4 above.

Modem & Wi-Fi Set-Up

RaVolt will utilize the IR300 Series to provide WiFi connectivity to the Sol-Ark system. This cellular modem generates a WiFi signal, allowing the Sol-Ark dongle to connect and enabling system monitoring. It's crucial to keep this modem powered on while the system is operational for troubleshooting purposes.

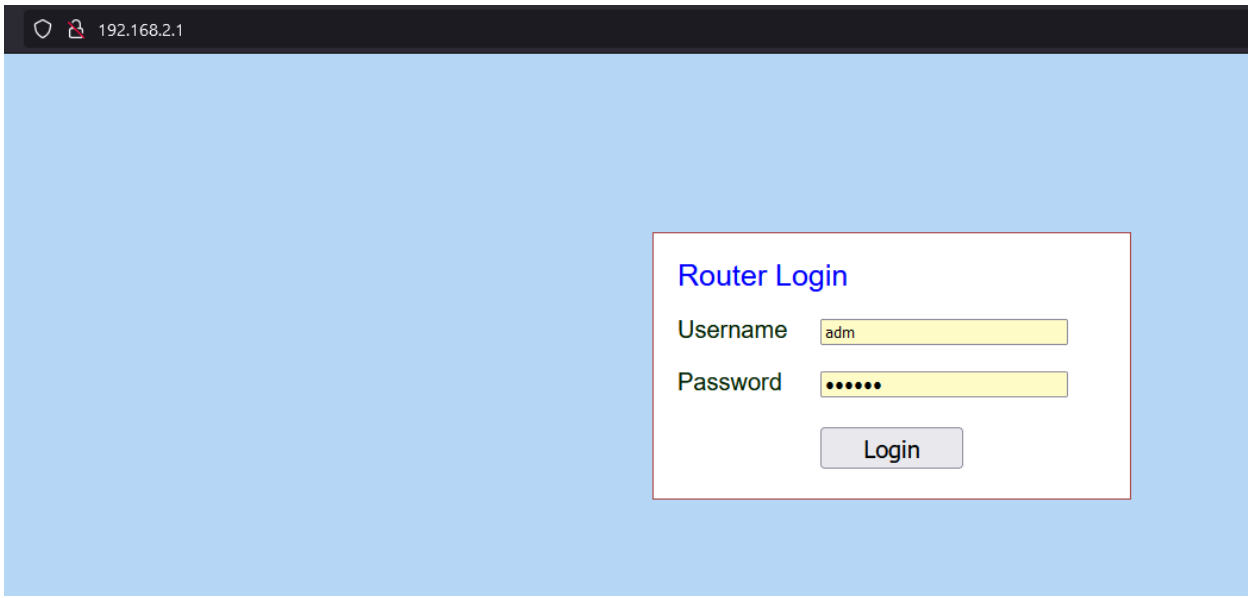
NOTE: If the customer chooses to use their home network Wi-Fi instead of the cell modem provided, they are to IMMEDIATELY contact RaVolt. Providing this information allows RaVolt to offer the best form of assistance regardless of Wi-Fi choice

Before arriving on-site, ensure the IR300 Series is set up and the Sol-Ark dongle is connected via Wi-Fi. The login credentials are standardized but can be changed by directly connecting the modem to a computer via Ethernet and accessing 192.168.2.1 to log in and make adjustments.

The default login credentials are Username/Password: adm/123456.

If the user or installer encounters difficulties with the modem, follow these steps to set up the IR300 series cellular modem:

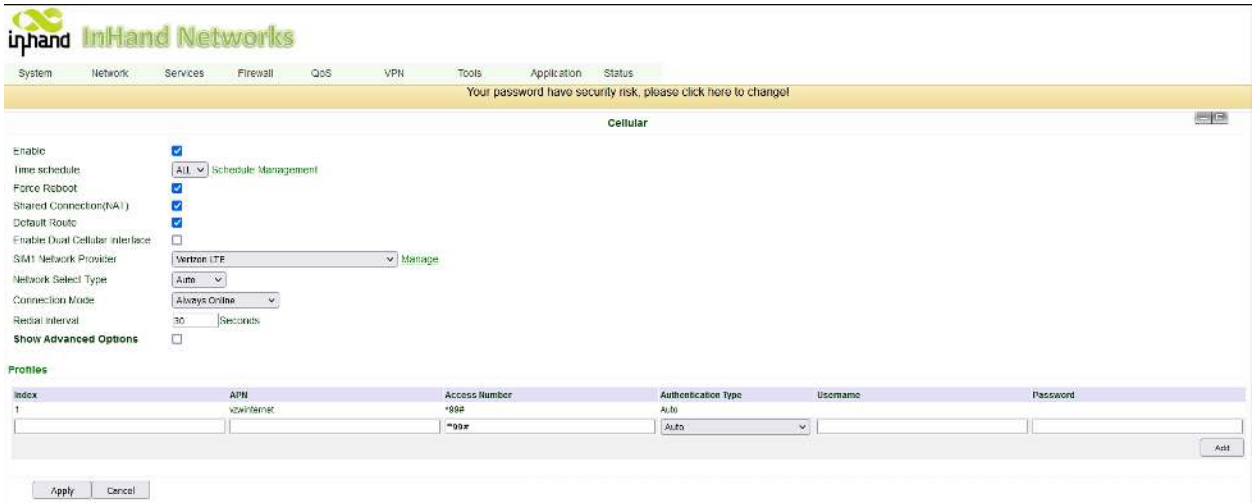
1. Install the SIM card into the modem.
2. Connect the Wi-Fi and cellular antennas to the modem.
3. Use an Ethernet cable to connect the modem to a laptop or PC.
4. Connect the DC power cable to the modem.
5. Access 192.168.2.1 on the laptop/PC to log in to the modem's server.



6. On the InHand Networks main page, navigate to the Network option and then to Cellular.

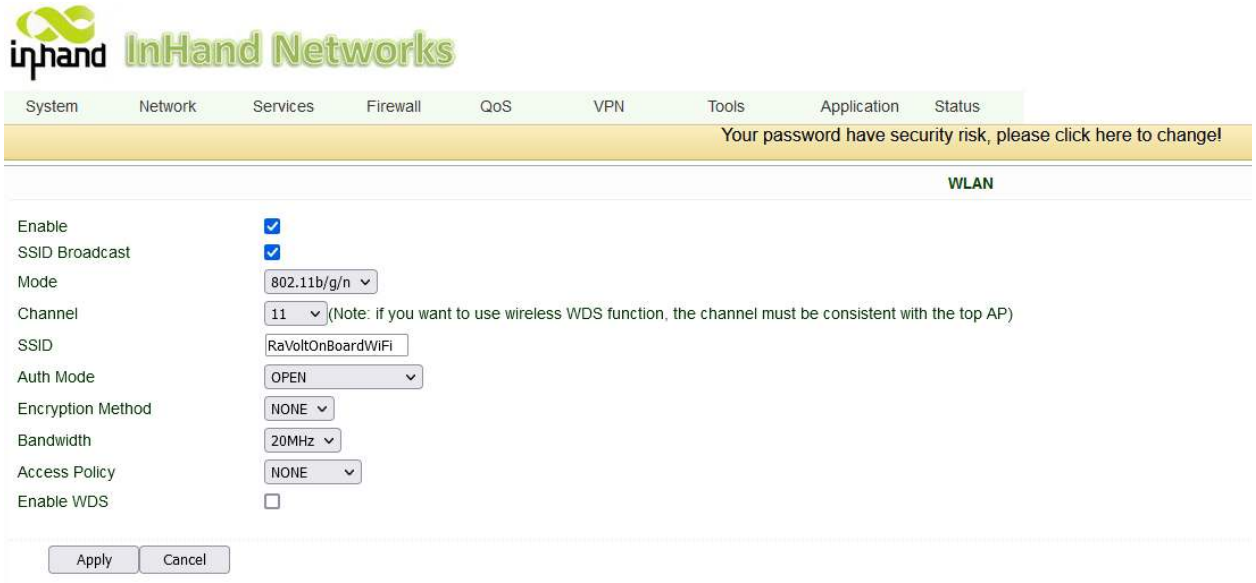
7. Select the appropriate network provider (e.g., Verizon LTE) under SIM1 Network Provider and click Apply.

8. In the profiles section, input "vzwinternet" as the APN for the Verizon network and click Apply.



9. This will connect the modem to the selected service provider.

10. Go back to the Network menu, click on WLAN, and enable the WiFi signal by checking the enable option.



11. Optionally, edit the SSID to customize the WiFi network name (e.g., RaVoltOnBoardWiFi####).

12. Once these steps are completed, disconnect the Ethernet cable from the computer, and the modem is ready for use.

Home Network Set-Up

NOTE: Home Wifi Network must have a 2.4 GHz band available. If you intend to use your home wifi connection please confirm this with RaVolt prior to connecting.

1. Check Wi-Fi Compatibility: Before beginning the set-up process, ensure that your Home Wi-Fi Network has the 2.4 GHz band available. The inverter requires this frequency band to establish a connection with the Wi-Fi dongle.

2. Refer to the Manual: To gain a comprehensive understanding of the Wi-Fi dongle set-up, consult the inverter manual. The manual provides detailed step-by-step instructions, diagrams, and additional information to facilitate a smooth installation.

3. Verify Wi-Fi Dongle Power: Once the Wi-Fi dongle is connected to the inverter, verify its power status. A visible red light on the dongle indicates that it is receiving power from the inverter. This step ensures that the dongle is functioning correctly and ready for the set-up process

4. Connecting to EAP Wi-Fi Network: Using your phone or computer, navigate to the Wi-Fi settings section. Locate the network named "EAP-####" and connect to it. When connecting, you may encounter a pop-up message stating that the network has no internet access. Ignore this message, as it is normal during the set-up process.

5. Password Entry: During the connection process, you will be prompted to enter a password to connect to the EAP Wi-Fi network. Use the password "12345678" as provided in the set-up instructions. This password ensures the secure connection of the Wi-Fi dongle to your network.

6. Accessing the Dongle's Setup Page: Open a web browser on your device and type "10.10.10.1" into the address bar. This specific IP address leads you to the dongle's setup page, where you can proceed with further configurations.

7. Scanning for Wi-Fi Networks: Once on the setup page, scroll down to locate the Wi-Fi list and press "Scan." This action will search for available Wi-Fi networks in your vicinity.

8. Connecting to Your Home Wi-Fi: Identify your home Wi-Fi network (or cell modem network if applicable) from the list and click on it. You will be prompted to enter your home Wi-Fi network's password. Once entered correctly, you should see a "Set Success!" message on the setup page, indicating that the dongle is now online and connected to your Wi-Fi network.

9. Verifying the Wi-Fi Connection: To confirm a successful Wi-Fi connection, check for a solid green light next to the red power light on the dongle. The solid green light indicates that the Wi-Fi connection is stable and functional. However, if the green light is blinking repeatedly, it may indicate a VPN or firewall issue that requires further attention.

Settings

1. The RaVolt unit will arrive on-site with pre-configured settings.
2. Verify that all settings match the specific needs of the customer.
3. Refer to the RaVolt Standard Settings Document to confirm the accuracy of factory settings.
4. If any adjustments or clarifications are required, contact the RaVolt team for further assistance.
5. Thoroughly review and verify the settings to ensure the RaVolt unit is tailored to meet the customer's requirements and operates optimally for their unique setup.

10. QA/QC Walkthrough

1. Commence Inspection: Thoroughly inspect all aspects of the completed work using the "RaVolt QA/QC Inspection Document." This document highlights all critical components that require inspection.
2. Inspection Coverage: The inspection must encompass all elements, including conduit installation, trenching, terminations, labeling, and any other relevant aspects. Pay close attention to the accuracy and completeness of each component.
3. Complete Inspection Document: Ensure that the "RaVolt QA/QC Inspection Document" is thoroughly filled out during the inspection. Every relevant detail should be documented.
4. Signature for Warranty Registration: A representative of the installation team must sign off on the completed "RaVolt QA/QC Inspection Document." This signature is necessary for warranty registration and ensures that the inspection has been diligently conducted.
5. Addressing Issues: If any issues or discrepancies are identified during the inspection, they must be corrected promptly. Document all corrections made on the "RaVolt QA/QC Inspection Document" to maintain a comprehensive record of the improvements.

Inspector Name:

Company Name:

Date of Final Inspection:

Send the completed form to service@ravolt.us

QA/QC DOCUMENT

Instructions: Before beginning any QA/QC inspection, please stay aware of any possible safety risks that may be present. Please complete the inspection form thoroughly, marking all necessary items throughout each section. If there are exceptions or an unsatisfactory item, please explain the issue in the "Notes" box of the section. This document is intended to be completed only by an authorized installer of RaVolt, LLC. Pictures are encouraged throughout the inspection.

Electrical:

Item:	Description:	Pass:	Fail:	Notes:
Enclosure Condition	The RaVolt enclosure has not been damaged during installation and all lifting points remain in shipped condition.			
PV Terminations	The PV wire has been terminated within the RaVolt enclosure, ensuring the **correct polarity** upon installation.			
Anchoring	The RaVolt enclosure has been anchored to the concrete pad, per the provided spec.			
Electrical Equipment	All switches, disconnects, batteries, and other electrical equipment has been installed to code.			
Labels	All necessary labels have been installed on the equipment.			
Terminations	All terminations have been made with proper terminals.			

Batteries	Ensure Dip Switches are in the correct formation related to the battery manufacturer (Powersync, Pytes, etc.)			
Solar String Voltage	Check voltage on the end of the solar string with multimeter to ensure proper connections			
Trickle Charge Connection	Check voltage on pins 7 and 8 of solar to show voltage for trickle charge connection and the corresponding points on the generator to confirm trickle charge is effective			
Generator Input	Check voltage on L1 and L2 of generator output leading to the Inverter to show appropriate voltage.			
Grid Input	Check voltage on L1 and L2 of generator output leading to the Inverter to show appropriate voltage.			

Grounding and Bonding:

Item:	Description:	Pass:	Fail:	Notes:
Enclosure Grounding	Enclosure is properly grounded using a lug and ground rod, per NEC code.			
Neutral to Ground Bond	Neutral to ground bond is present in *ONLY ONE* location. This neutral-to-ground bond includes the entire system, home service panel, and home load panels.			

Generator (if applicable):

Item:	Description:	Pass:	Fail:	Notes:
Conduit	Conduit is installed, strapped, and run from the generator to the RaVolt enclosure. Ensure the two-wire start is in a separate conduit.			
Electrical	Generator Two wire start and charging wires have been installed and terminated in the designed location.			

Inspector Name:

Inspector Signature:

Date:

11. Troubleshooting

In the case there are issues on-site at any point during the operation of the RaVolt unit, follow the troubleshooting methods provided below. In the event, assistance is required call **RaVolt Technical Support at 1 (844) 728-7378**

BATTERY TROUBLESHOOTING (Powersync)

1. Ensure that all battery switches are in the "OFF" position. Also, check to confirm that all communication cables are correctly connected.
2. Turn on one battery and use a voltmeter to verify the voltage. Check if the inverter is reading a similar voltage. In case the batteries are showing 0V, restart the battery unit and retake the voltage measurement.
3. Once the Battery Voltage is confirmed to be reading correctly, you may proceed to turn on the rest of the batteries in the system. If battery voltages differ across battery units, don't worry, as the system will automatically balance all battery cells during its initial 1-2 days of operation.
4. Verify that the battery Dip Switch settings match the diagram provided in the Powersync installation manual (also available in the "Dual Cabinet Terminations" section of this document).
5. Confirm that the "LI-Batt Info" tab is visible under the system setup options. Click on the Li-Batt Info tab to ensure that real data is being read, and not just displaying all zeros (take a photograph of this screen for confirmation).

BATTERY TROUBLESHOOTING (Pytes V4)

1. Ensure that all battery switches are in the "OFF" position. Also, check to confirm that all communication cables are correctly connected.
2. Turn on one battery and use a voltmeter to verify the voltage. Check if the inverter is reading a similar voltage. In case the batteries are showing 0V, restart the battery unit by pushing the SW button and retake the voltage measurement.
3. Once the Battery Voltage is confirmed to be reading correctly, you may proceed to turn on the rest of the batteries in the system. If battery voltages differ across battery units, don't worry, as the system will automatically balance all battery cells during its initial 1-2 days of operation.

4. Verify that the battery Dip Switches are all off, with the host battery being the only unit where the second position dip switch is in the up position.

5. Confirm that the "LI-Batt Info" tab is visible under the system setup options. Click on the Li-Batt Info tab to ensure that real data is being read, and not just displaying all zeros (take a photograph of this screen for confirmation).

PV TROUBLESHOOTING

1. Make the MC4 home run connections on string one at the array to provide DC power to the DC disconnect.

2. Use a voltmeter to measure the voltage on string one.

3. Repeat this process on all available PV strings coming to the DC disconnect.

4. Once all string voltages are verified and correct, replace the DC disconnect cover and make all MC4 home run connections at the array.

5. Turn the DC disconnect dial from the "OFF" position to "ON." This will send power to the inverter.

6. Turn the PV disconnect switch on the inverter (Located on the left side of the inverter, inside the RaVolt Enclosure) from the "OFF" position to "ON." (The disconnect switch is "ON" in the horizontal, depressed position. "OFF" is the vertical position.)

7. The inverter should recognize the incoming DC voltage and light up the screen. Verify that the voltage readings on the inverter match the voltages previously verified with the voltmeter. The PV voltages can be seen by pressing the battery icon on the inverter.

AC DISCONNECT TROUBLESHOOTING

1. Turn off all batteries and the inverter. Then, remove the cover from the disconnect.

2. With all disconnects, breakers, and equipment off, switch on the incoming power to the disconnect. If both grid and generator inputs are present, test them individually.

3. With the disconnect set to "OFF," use a voltmeter to check the incoming voltage on the line side of the disconnect. Verify both phase-to-ground and phase-to-phase voltages to ensure a balanced incoming voltage.

4. After verifying voltages from both the grid and generator inputs at the disconnect, turn off the power to the disconnect and replace the cover.

5. Turn the power on to the disconnect and, once it is on, throw the disconnect switch to allow power to flow to the Inverter.

6. Flip the "Grid" and "Gen" disconnects on the inverter to the "ON" position. The inverter should recognize the power and turn it on.
7. Verify voltage readings on the inverter screen coming from both the grid and generator inputs.
8. With the battery disconnect in the off position, turn on the batteries individually.
9. Turn the battery disconnect on and verify that the grid and/or generator input is charging the batteries.

SAFETY IS CRITICAL! Please pay close attention to this important safety measure: Ensure that the neutral and ground are bonded together at precisely ONE location in the entire electrical system. This bonding must occur in the Load Center on the side of the RaVolt enclosure. Bonding them in any other location can result in hazardous electrical conditions

Load Center TROUBLESHOOTING

1. Remove the cover of the load center to access its interior.
2. Using a voltmeter, measure the voltage of the load side. Check both phase-to-ground and phase-to-phase voltages to ensure they are balanced and within acceptable limits.
3. Operate the manual bypass switch of the load center and verify the voltages of the feed-thru lugs to confirm the load-side voltage.
4. Take a moment to inspect the green screw, located in the bottom right of the Load Center. Ensure it is properly tightened down to create a Neutral-to-Ground Connection for the circuit. This connection is essential for safe electrical operation.
5. Once everything is checked and confirmed, replace the cover of the load center, securing it back in place.

Issue	Resolution
General Troubleshooting for all issues	• Restarting the system is always a good troubleshooting step if inverter data is "funky" or other odd issues are occurring with the inverter. These are all just computers at the end of the day so "turn it off and turn it back on again" is a completely valid troubleshooting step before getting deeper into a review of the installation • Software updates are also a good early troubleshooting step when no clear cause seems to exist for the errors we are seeing. Also, if you contact Sol-Ark for support and the SW version is out of date they will require you to run an update anyway. The Sol-Ark website lists current SW versions so you can use that to determine if you are up to date without contacting their support initially
Electrical	
generator not starting when expected	• Check that the generator battery has a voltage (if dead, must be replaced and then trickle charge circuit and breaker should be reviewed for correct installation) • Review TOU settings to verify programming is as expected and adjust as necessary • Confirm that the 2-wire circuit is visible on powerview when the generator is expected to run. If it is visible then the error very likely originates in the generator and not our inverter so long as the 2-wire circuit is installed correctly to terminals 3&4 on the generator and 4&5 in our box • If the above items do not resolve the issue the generator is likely throwing an error code of some kind that should point in the direction of the main issue causing the failure to start
generator running multiple exercise cycles per week	• -Exercise cycles may be "double programmed" on the system. • -Review generator settings to confirm that an exercise cycle has not been programmed separately into the generator since the inverter is pre-programmed to run exercise every Monday at 8 AM.
Sol-Ark Screen is blank, and there are blue lights illuminated	• The LCD Ribbon cable is loose, unplug it and plug it back in.

Batteries not working at expected capacity	• Verify dip switch settings are accurate (if Powersync/Pytes) • Confirm that the proper cable has been used to connect the first battery to the inverter and that the connection lands on the far left port for the masted battery • If batteries are not seeming to work as expected after other troubshooting it is worth trying to run the system in open V mode to see if that resolves the issue (Discovery Batteries in particular)
No PV Production after install on sunny day	• Verify polarity of PV wires has not been reversed and that all MPPT connections are correct (Pos/Neg Pos/Neg) left to right • Confirm that MPPTs are closed and that the PV disconnect on the sol-ark itself is closed
"it's not working"	• Check that all breakers are in correct positions (particularly easy for people to miss when plugging into the RV panel for some reason) • Follow the "general troubleshooting " steps listed at the top of this document • If that isn't the solution a troubshooting call would be required to gather more info due to the vague nature of the initial complaint
"pop" noise reported from within battery (Early discover models)	• Battery fuse has likely blown. Check voltage at battery lugs to verify lack of output voltage • Consult with battery company for replacement fuse and, depending on their responses, maybe a new FET board as well
PV production is low	• Confirm that DC PV wiring is installed as planned. Larger strings than designed may cause MPPTs to limit output or completely shut off output if the voltage is too high (500V string limit) • Review DC voltages in Powerview during peak sunlight hours of the day to determine if we are exceeding values or if voltages are very low • Low DC voltage on a string may indicate a DC side short or some other wiring issue which is preventing the full output of the string from reaching the inverter
The unit starts up just fine manually or with a 2-wire start, but cannot carry more	• Potentially a bad generator magneto or failed ignition coil

than ~#kW without faulting out on low frequency.	
Generator starting up but not carrying load	• Most likely caused by a fault calling for the generator but then self-clearing rapidly so that the inverter can take overload before the generator stops running • The above can cause the generator to get "confused" and may best be resolved by manually stopping the generator, letting it sit for 5 minutes and then setting it back into auto mode • If generator starts up again on switching back into auto mode PowerView should be reviewed to determine if 2-wire signal is still live on the system (indicated by a yellow generator icon visible in Powerview on the power flow diagram) • If none of the above resolves the issue then there may be an interference between the gen trickle charge circuit and the 2-wire start from our inverter causing an unnecessary startup. If wiring is indeed installed incorrectly a separated 2-wire circuit composed of (2) #12 THHN/THWN-2 wires must be installed
Mechanical	
gen not running well or starting up and the shutting off quickly	• N-G bond may not be established on the gen circuit. The pre-installed N-G jumper in the Kohler unit is not acceptable and both neutral and ground circuits must be connected fully to the available busbars within the RaVolt unit • A missing N-G bond in the home electrical system will likely result in an F08 fault on the inverter but that fault may not be noted if the N-G bond is only missing on the generator circuit since that issue will only be "apparent" to the inverter when the generator is running
rust on nuance racking base plate	• Take care to dig out around slopes near base plates to allow for minimal water pooling on the base plates themselves. • If possible “galv” spray may also be used during installation for extra protection

Gen running too frequently (3-4x per day)	• Confirm TOU settings to make sure we are not calling for gen at abnormally high SOC percentage (sol-ark presets can cause this if not altered) • Review "LI Batt" setting on sol-ark to see if reported capacity from system matches what we installed (only works if we are in closed loop comms) • Review loads on the home and attempt to determine an "average" load for the timespan between gen cycles. Multiply that average load by the timespan between gen cycles and see if it roughly adds up to our system battery capacity. If loads vs capacity does not seem to line up we need to check the batteries themselves. If they do... it is a homeowner-caused issue • If capacity vs loads still seems off we will need to plug directly into batts to download data to send to the manufacturer for review and possible RMA process (Laptop w/ correct software required ON SITE for this step)
batteries cutting out regularly when capacity is above gen/grid start value	• Review reported battery temps via Powerview • Using PowerView parameters tab report on the battery BMS current to see if it has dropped to 0A at any time, which would indicate a BMS triggered battery shutoff. • If batteries shut due to temperature we need to check the in-cabinet heater for a "stuck" thermostat or some other faulty issue that is preventing the heater from running • If necessary heater replacement may be the best solution in many cases since the part is fairly cheap and simple to replace
Generator "engine high-speed shutdown" error	• Likely a firmware issue w/ Kohler support. Previously this has been solved by replacing the generator control board under warranty with Kohler.
The generator not starting up with an error code related to the "not defined" engine	• This is likely caused by the generator not having an internet connection to determine the serial number and therefore the engine type • Contact Kohler support or a licensed installer for support to determine correct serial number information to input into the controller to resolve the error. Gen will not run otherwise
Installation of top right battery (Gen 1) was complicated by the	• The problem was solved by cutting some existing cable ties in the top right corner of the battery storage area so that we could get more freedom of movement in the existing cables

existing circuitry.	
Install	
gen runs like "go-kart"	• The gas supply line may be undersized or the fuel regulator may not be installed properly (review gen install manual for required fuel line sizes based on fuel line length). • If in a cold area check to ensure the fuel line is buried below the frost line and the regulator on the tank is not exposed to wind or other environmental issues which may cool it to levels where it could freeze closed • Check to make sure the correct fuel selection has been made both in the generator control software and the black plastic fuel selector switch behind the silver fuel regulator withing the generator unit
Gen plug Wired incorrectly (Early Gen 1 units only)	Revise the gen plug wiring should match the following standard G: Ground W: Neutral Y: 120V leg X: 120V leg 2nd fix: remove gen input plug entirely unless specific request by customer
PowerView	
info visible on Powerview but loads are reading as constant low values or no load is visble	• Likely caused by a stuck ATS in standby mode • Remove faceplate of the Kohler ATS and look at the position of the Normal/Standby switch • If the switch is in standby mode then use a screwdriver to lever the switch back to the Normal side to restore operation. • If the above steps have been completed (as well as a system restart and SW update) and the inverter is still not outputting power contact Sol-Ark
customer reports gen not running exercise cycle	• Review grid lug voltages via equipment view in Powerview to determine when 240V was live on those lugs to verify that the gen is running at times not expected • If exercise cycle voltage is not visible at any time have the customer check to ensure the generator screen has power. If not, the generator starter battery is likely dead and needs replacement • If the battery is still live and the exercise cycle is not occurring, verify with the homeowner that the exercise cycle is properly set on the inverter and that the 2-wire signal is visible on the Powerview when the "Gen force" command is

	selected
customer reports the gen starting randomly with SOC above 50%	• Check to ensure that the trickle charge is not installed with a 5-wire combined circuit with the 2-wire start. Charging circuit wire can create a small EM field during charging which may create a momentary "fake" 2-wire signal that leads to startup/shutdown of generator in a very short timespan
Powerview monitoring not showing data but internet connection is confirmed to still be live	• Restart inverters and home wifi modem (or PepLink modem if applicable) • If restart does not resolve the monitoring issue installing a new dongle and inverter firmware may resolve the communication issue • If SW updates do not resolve the issue it is highly likely that the issue lies on the customer's modem or other connection
"I just replaced my modem and now monitoring doesn't work"	• Have customer use smartphone or laptop to enter dongle wifi network • While connected to dongle wifi network go to 10.10.10.1 website • Find new wifi network name and enter password to connect wifi dongle to new home network
Powerview is showing varied voltage and drops in frequency when checking the equipment graph	• Generator or grid are having a large fluctuation in voltage. • In the Grid Settings of Powerview. Change all of the Low and High Voltage to increase (up to 285V on the high and 185 on the low). This allows for larger fluctuations to be accepted by the Inverter
MISC.	
The batteries are at 30% charge and struggling to charge adequately in cold weather.	• Issue Summary: The batteries are at 30% charge and struggling to charge adequately in cold weather.
	• Troubleshooting Steps and Information:
	• Battery Status Check: Currently, the batteries are at 30% charge and are charging. We will continue to monitor them throughout the day and provide an update on the battery status.
	• Battery Charging Temperature Threshold: It's important to

	note that the batteries have a temperature threshold for accepting a charge in cold weather. The threshold information is as follows:
	• When the batteries are below -5°C, the heater is on, and the current is limited to 7.5A per module.
	• When the batteries reach above 5°C, the heater turns off, allowing the maximum current for charging.
	• Temperature Correlation: We observed that the generator ran for an extended period before the batteries started charging. This seemed to correlate with an increase in battery temperature.
	• Lowest Recorded Temperature: The lowest battery temperature recorded was 35.6°F, which should have allowed for some charging. However, it didn't reach the 40°F threshold for full current availability.
	• Current Limit: The 7.5A current limit is per module, and it should be multiplied by the number of modules to determine the total current available.
	• Customizable BMS: Our Battery Management System (BMS) is fully customizable, and we can share the password with you to make changes and produce modules with your preferred parameters. However, we recommend keeping the current settings to maximize cell life.
	• Consideration: To improve charging in cold weather, you may want to explore the possibility of adjusting the enclosure's heater parameters to compensate for the lower temperatures.

12. Electrical One-Lines

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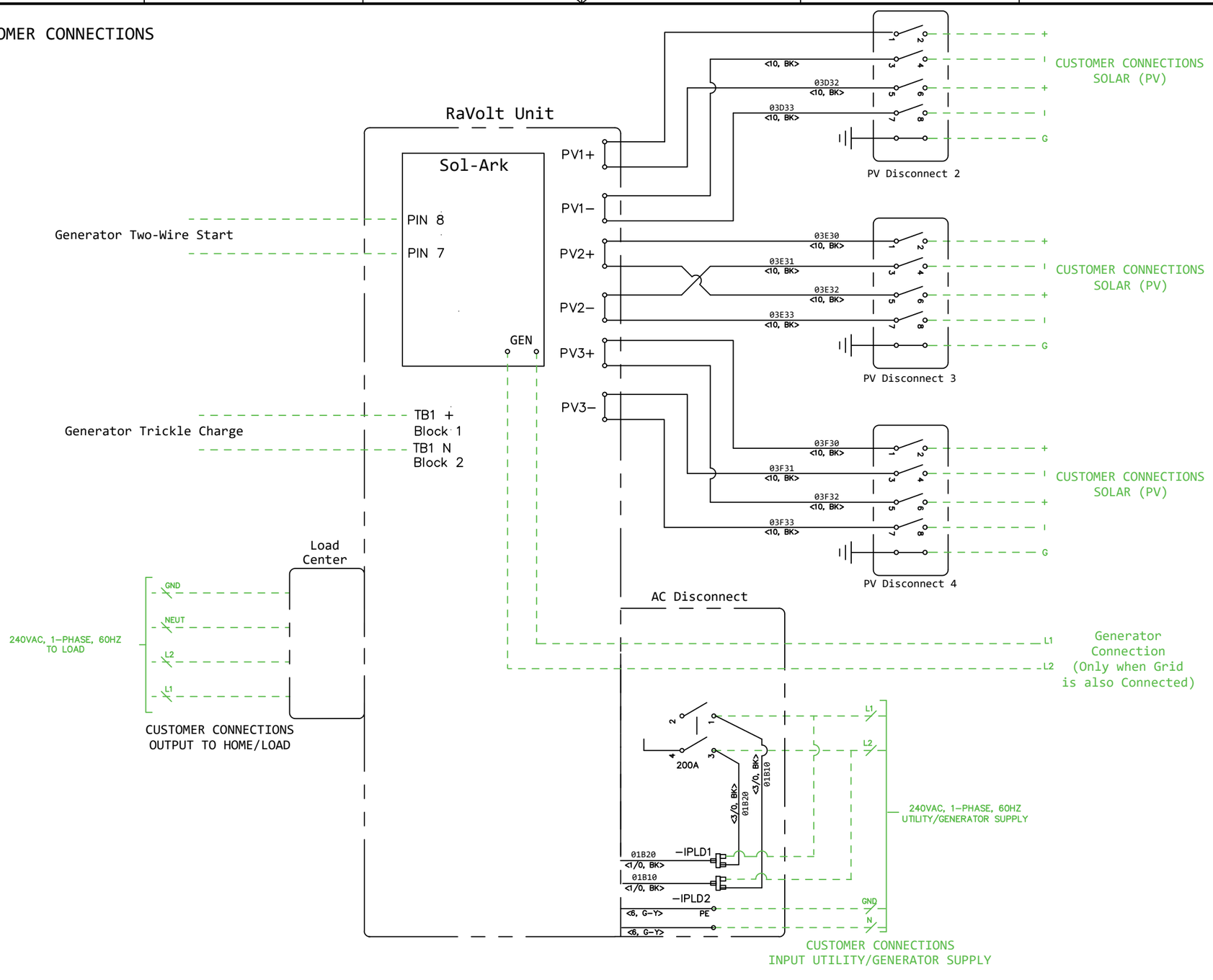
NOTE: DASHED LINES ARE CUSTOMER CONNECTIONS



ISS	DATE	DESCRIPTION	DWN	CHK	APR
00	03/01/24	INITIAL RELEASE	GSR		

THIRD ANGLE PROJ

CUSTOMER: Sol–Ark End User Connections
CUST. ORDER NO.:
PA ORDER NO.: 9494–2–2

ELECTRICAL SCHEMATIC
PHOTOVOLTAIC INTERCONNECT WIRING

Confidential Property of
RaVolt, LLC

SIZE B | DRAWING/PART NO. 9494–2–2 SCHEM | SHEET 01 | CONT 04

NOTE: DASHED LINES ARE CUSTOMER CONNECTIONS

RaVolt Unit

CUSTOMER CONNECTIONS SOLAR (PV)

PV Disconnect 2

03D32 <10, BK>

03D33 <10, BK>

PV1+

PV1–

PV Disconnect 3

03E30 <10, BK>

03E31 <10, BK>

03E32 <10, BK>

03E33 <10, BK>

PV2+

PV2–

PV3+

PV3–

PV Disconnect 4

03F30 <10, BK>

03F31 <10, BK>

03F32 <10, BK>

03F33 <10, BK>

Sol-Ark (Master)

PIN 8

PIN 7

GEN

Sol-Ark (Secondary)

PV Disconnect 5

PV4+

PV4–

PV Disconnect 6

PV5+

PV5–

PV Disconnect 7

PV6+

PV6–

AC Disconnect

Generator Two-Wire Start

Generator Trickle Charge

TB1 + Block 1

TB1 N Block 2

Load Center

GND

NEUT

L2

L1

240VAC, 1–PHASE, 60HZ TO LOAD

CUSTOMER CONNECTIONS OUTPUT TO HOME/LOAD

200A

<3/0, BK> 01B10

<3/0, BK> 01B20

01B20 <1/0, BK> –IPLD1

01B10 <1/0, BK>

–IPLD2

<6, G–Y> PE

<6, G–Y>

240VAC, 1–PHASE, 60HZ UTILITY/GENERATOR SUPPLY

Generator Connection (Only when Grid is also Connected)

CUSTOMER CONNECTIONS INPUT UTILITY/GENERATOR SUPPLY

ISS	DATE	DESCRIPTION	DWN	CHK	APR
00	03/01/24	INITIAL RELEASE	GSR		

THIRD ANGLE PROJ

CUSTOMER: Sol–Ark End User Connections
CUST. ORDER NO.:
PA ORDER NO.: 9494–2–2

ELECTRICAL SCHEMATIC
PHOTOVOLTAIC INTERCONNECT WIRING

Confidential Property of RaVolt, LLC

SIZE B | DRAWING/PART NO. 9494–2–2 SCHEM | SHEET 01 | CONT 04

NOTE: DASHED LINES ARE CUSTOMER CONNECTIONS

RaVolt Battery Unit

RaVolt Unit

CUSTOMER CONNECTIONS SOLAR (PV)

PV Disconnect 2

PV Disconnect 3

PV Disconnect 4

PV Disconnect 5

PV Disconnect 6

PV Disconnect 7

PV1+ PV1– PV2+ PV2– PV3+ PV3–

PV4+ PV4– PV5+ PV5– PV6+ PV6–

03D32 <10, BK>
03D33 <10, BK>
03E30 <10, BK>
03E31 <10, BK>
03E32 <10, BK>
03E33 <10, BK>
03F30 <10, BK>
03F31 <10, BK>
03F32 <10, BK>
03F33 <10, BK>

Sol-Ark (Master)

PIN 8
PIN 7
GEN

Sol-Ark (Secondary)

Generator Two-Wire Start

Generator Trickle Charge

TB1 + Block 1
TB1 N Block 2

Battery Bus Combiner

Battery Bus Combiner

Load Center

240VAC, 1–PHASE, 60HZ TO LOAD

GND
NEUT
L2
L1

CUSTOMER CONNECTIONS OUTPUT TO HOME/LOAD

AC Disconnect

200A

L1
L2

Generator Connection (Only when Grid is also Connected)

240VAC, 1–PHASE, 60HZ UTILITY/GENERATOR SUPPLY

01B20 <1/0, BK>
01B10 <1/0, BK>
–IPLD1
–IPLD2
<6, G–Y>
PE
N
GND

CUSTOMER CONNECTIONS INPUT UTILITY/GENERATOR SUPPLY

ISS	DATE	DESCRIPTION	DWN	CHK	APR
00	03/01/24	INITIAL RELEASE	GSR		

THIRD ANGLE PROJ

CUSTOMER: Sol–Ark End User Connections
CUST. ORDER NO.:
PA ORDER NO.: 9494–2–2

ELECTRICAL SCHEMATIC
PHOTOVOLTAIC INTERCONNECT WIRING

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SIZE B | DRAWING/PART NO. 9494–2–2 SCHEM | SHEET 01 | CONT 04