EN

# INSTALLATION GUIDE AND USER MANUAL

**Sol-Ark 60K-3P-480V**

## COMMERCIAL & INDUSTRIAL NORTH AMERICA

**Effective Date: December 9, 2025**

READ THE INSTRUCTIONS COMPLETELY BEFORE OPERATING THE EQUIPMENT

- Check the utility voltage before turning ON the unit.
- Verify the inverter's programmed grid type before connecting to the utility.
- The unit is programmed in 277/480V 3-Phase at 60Hz by default.
- Disregarding these instructions could result in permanent damage to the unit.

Information included in this Installation Guide speaks only as of the Effective Date and is qualified, in its entirety, by the Disclaimer referred to below and by the terms of any applicable Limited Warranty. Sol-Ark reserves the right to make product modifications at any time without advance notice, which may affect information included in this Installation Guide or otherwise make this information inapplicable and out-of-date.

For the latest Sol-Ark product and installation documents, visit: sol-ark.com

For errors, omissions, or suggestions, contact support@sol-ark.com

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Any action related to the information included in this Installation Guide shall be governed by the internal laws of the State of Texas, United States of America, without giving effect to any conflicts of laws principles. Any action, suit, or other legal proceeding that is commenced to resolve any matter related to this Guide shall be commenced solely and exclusively in a state court sitting in Collin County, Texas (or, if appropriate, a federal court located within Collin County in the Eastern District of Texas), and you hereby consent to the personal jurisdiction of those courts.

This manual is for only the inverter labeled as: **60K-3P-480V Hybrid Inverter**.

For Sol-Ark Technical Support, contact:

(USA) +1 (972) 575-8875 ext. 2
support@Sol-Ark.com

# Contents

# Important Safety Instructions

This manual provides crucial information for installing and operating the 60K-3P-480V Hybrid Inverter System. Qualified and authorized personnel are required to perform the installation and maintenance procedures adhering to all safety standards and system requirements outlined in this document. Sol-Ark assumes no responsibility for damage caused to a Sol-Ark product by unauthorized or unqualified personnel.

This manual is applicable to countries that comply with the certification requirements. Standards and legal requirements of other countries might differ from the specifications outlined in this manual.

## Symbols in this Document

**WARNING:** This symbol indicates information that, if ignored, could cause serious injury, equipment damage, or death.

**CAUTION:** This symbol indicates information that, if ignored, could result in minor injury or equipment damage.

**NOTE:** This symbol indicates relevant information that is not related to hazardous situations.

# Notices

**ATTENTION**: Read all instructions and cautionary markings in this document and on the equipment before installing the Sol-Ark 60K-3P-480V. Failing to follow any of these instructions may result in equipment damage, electric shock, serious injury, or loss of life. Failing to follow any of these instructions may also void the limited warranty provided by Sol-Ark.

All installations must conform to the laws, regulations, codes and standards applicable in the jurisdiction of installation.

Before starting an installation, consult a local building or electrical inspector for current requirements. Local codes may vary but are adopted and enforced to promote safe electrical installations. A permit may be needed to do electrical work, and some codes may require an inspection of the electrical work. Sol-Ark is not responsible for system design or installation and makes no representations regarding system performance, reliability or compliance with local or other codes or requirements.

When installed in the US, electrical installations are required to follow the National Electrical Code (ANSI/NFPA 70) adopted by their local AHJ (Authority Having Jurisdiction) including any local amendments.

## General

**WARNING**: Risk of electric shock. Risk of fire. Only qualified electrical personnel should install, troubleshoot, service, or replace the equipment.

**WARNING**: Risk of electric shock. Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices during installation and service. Turn off all power supplying this equipment before working on or inside equipment and ensure that no charge remains in the equipment. Always use a properly rated voltage sensing device to confirm power is off. Replace all devices, covers, and doors before turning on power to the equipment.

**WARNING**: Inspect the equipment for damage before installation. Do not install the equipment if it has been damaged in any way.

**WARNING**: Do not insert foreign objects into any part of the equipment.

**WARNING**: Do not expose the equipment or any of its components to direct flame.

**WARNING**: Do not attempt to open, disassemble, repair, tamper with, or modify the equipment other than what is expressly permitted in this manual. The equipment contains no user-serviceable parts. Contact the installer who installed the equipment for any repairs.

**WARNING**: Do not connect life-support systems, other medical equipment, or any other use where product failure could lead to injury to persons or loss of life.

**CAUTION**: Do not use solvents to clean the equipment or expose the equipment to flammable or harsh chemicals or vapors. Do not allow petroleum-based paints, solvents, or sprays to contact nonmetallic parts of the equipment.

**CAUTION**: Do not use parts or accessories other than those specified for use with the equipment.

## Installation and Use

**WARNING**: Risk of electric shock. Risk of fire. Only use electrical system components approved for dry locations.

**WARNING**: Risk of electric shock. Risk of fire. Ensure that all wiring is correct and that none of the wires are pinched or damaged.

**WARNING**: Risk of electric shock. Risk of fire. Before making any connections verify that the DC disconnect(s) are in the off position. Double check all wiring before applying power.

**WARNING**: Risk of electric shock. Improper servicing of the equipment or its components may result in a risk of shock or fire. To reduce these risks, disconnect all wiring before attempting any maintenance or cleaning.

**WARNING**: Risk of electric shock. Always de-energize the equipment before servicing.

**WARNING**: Risk of electric shock. Do not use equipment in a manner not specified by the manufacturer. Doing so may cause injury or loss of life, or damage to equipment.

**CAUTION**: Risk of damage. DO NOT connect the grid to the “LOAD” output terminal.

**CAUTION**: Risk of damage. Do not exceed 1,000Voc on any MPPT on the 60K-3P-480V.

**CAUTION**: Risk of damage or electric shock. All inverter inputs should only have one conductor connected to them.

NOTE: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

## Environmental Conditions

**WARNING**: This equipment is intended for operation in an environment having a minimum temperature of -40°C (-40°F) and a maximum temperature of 60°C (140°F).

**WARNING**: Install the equipment in a location that prevents damage from flooding. Ensure that no water sources are above or near the equipment, including downspouts, sprinklers, or faucet.

## Transportation and Handling

**WARNING**: To protect the equipment and its components from damage when transporting, handle with care. To help prevent damage, leave all equipment in its shipping packaging until it is ready to be installed.

**WARNING**: Risk of physical injury or death. Use caution when using lifting equipment to move battery modules and components.

**WARNING**: Risk of physical injury or death. Boxed battery modules.

## Requirements for Installation Personnel

**All work MUST comply with local code, regulations, and industry standards.** The installation of the 60K-3P-480V can only be completed by qualified people with appropriate qualifications as determined by the local AHJ

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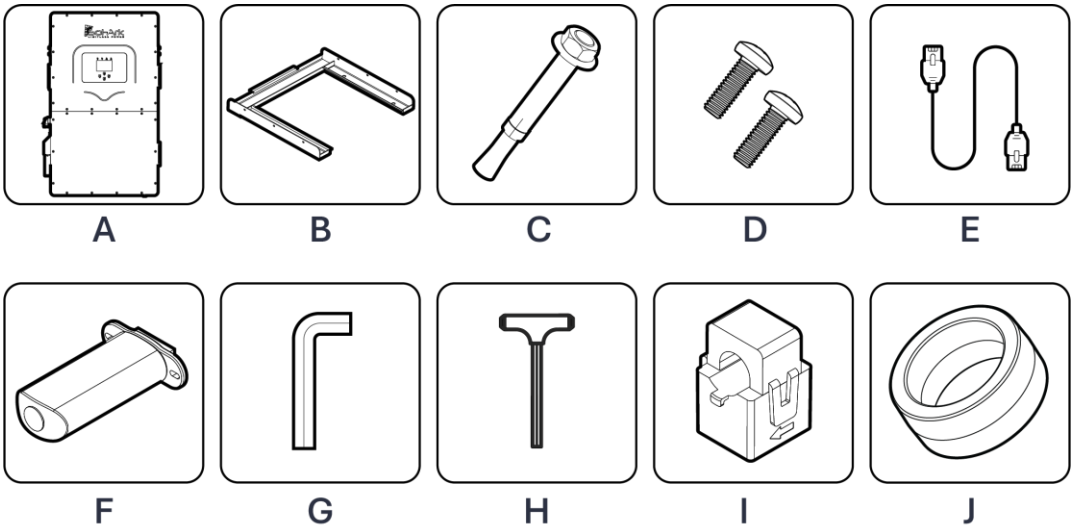
# 1. Sol-Ark At First Glance

## Inspect Shipment

The box should include all items shown in the component guide. If there is damage or missing parts, immediately call the phone number (USA) +1 (972) 575-8875 ext. 2.

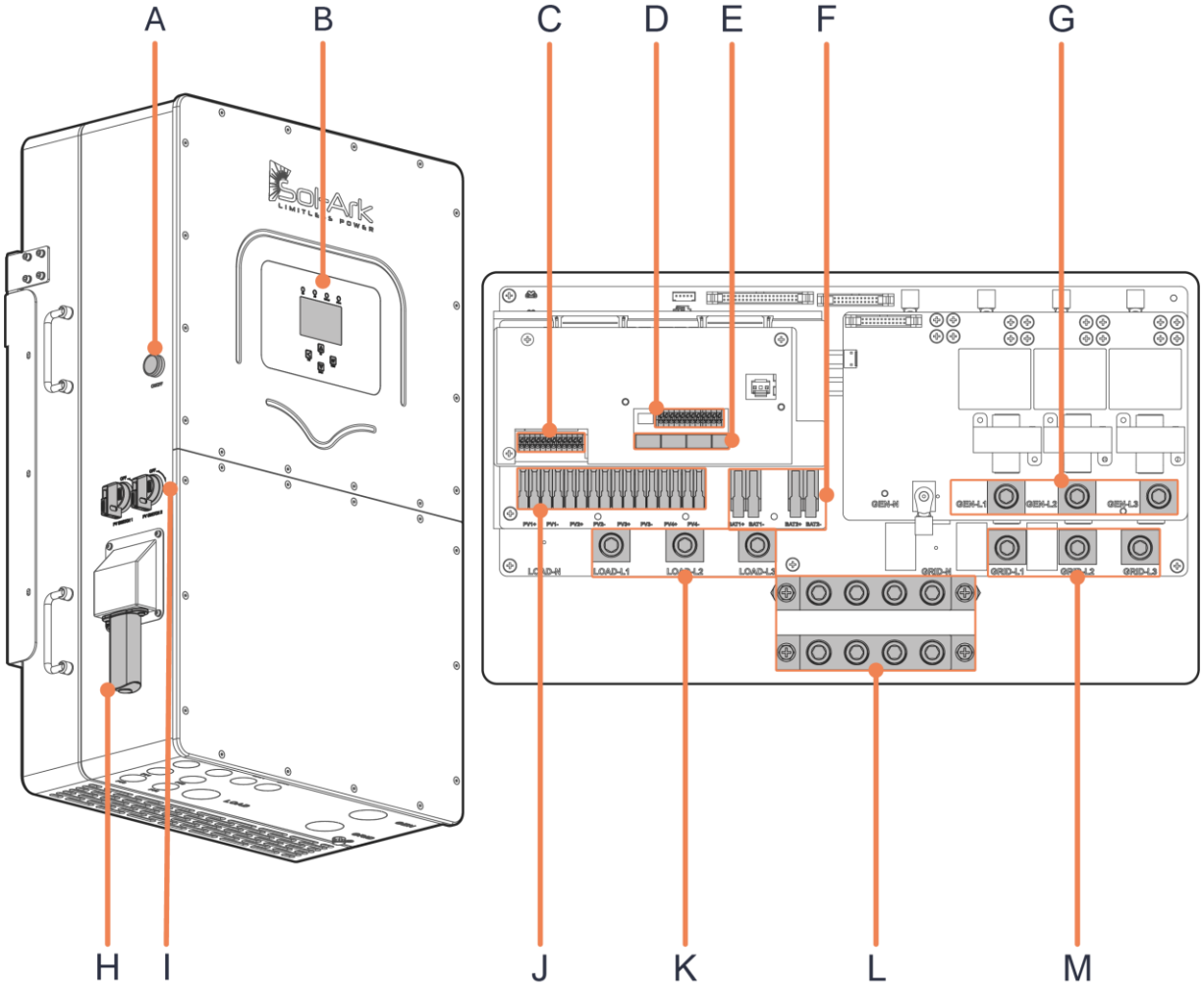
## Component Guide

The Sol-Ark 60K-3P-480V system includes the following components:




| Component | Description | Quantity |
|---|---|---|
| A | Sol-Ark 60K-3P-480V inverter | 1 |
| B | Inverter Mounting Cleat | 1 |
| C | M12x60mm expanding anchors for masonry anchoring | 4 |
| D | M4x12mm screws – Set screws for mounting carrier | 9 |
| E | Inverter Parallel Cable - CAT 5 Communication cable | 1 |
| F | Wi-Fi / Ethernet Gateway (dongle) | 1 |
| G | 3mm L-type hex key for front panel screws | 1 |
| H | 8mm T-type hex key for AC terminals | 1 |
| I | 300A Current transformers (CT sensors) | 3 |
| J | Filter rings | 8 |

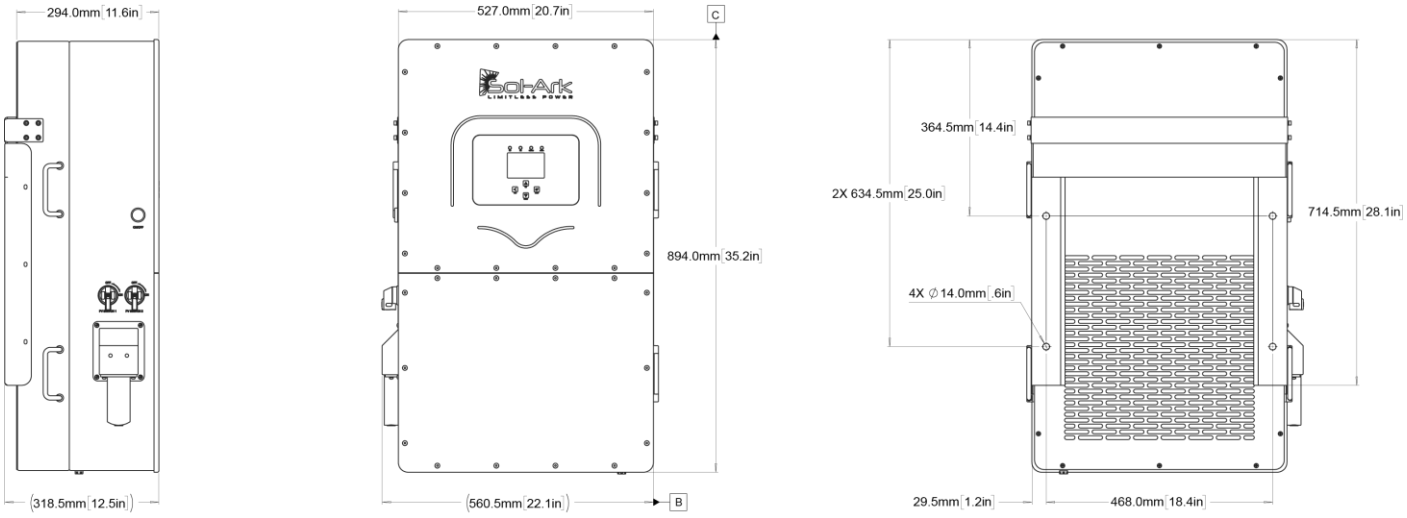
# 1.1 General Description

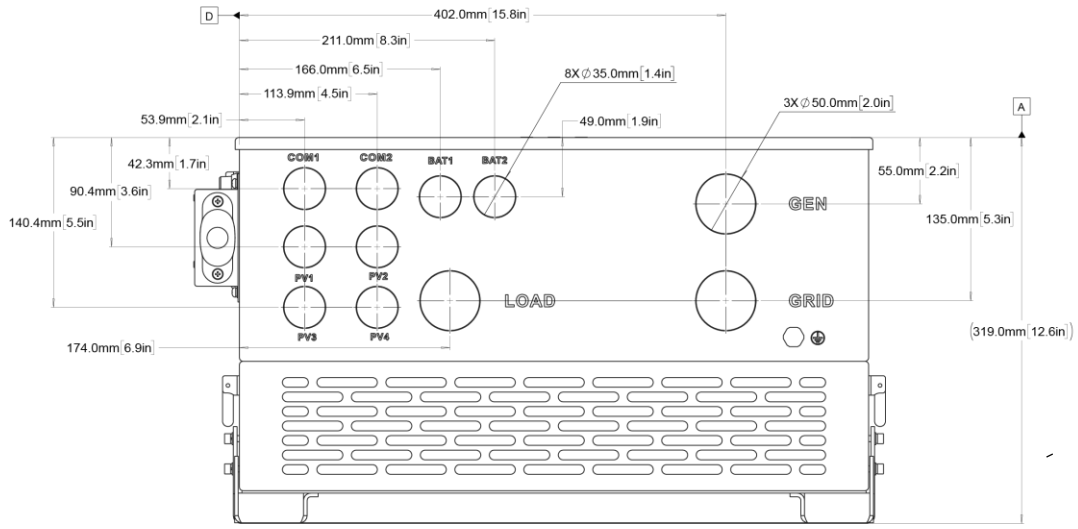



| Component | Name | Component | Name |
|---|---|---|---|
| A | ON / OFF Button | H | Wi-Fi / Ethernet Gateway |
| B | LCD touch screen | I | 2x PV DC disconnects |
| C | CN1 - Terminal block for sensors and accessories | J | 4x MPPT inputs terminals |
| D | CN2 - Terminal block for sensors and accessories | K | (200A) LOAD terminal |
| E | Communication Ports | L | NEUTRAL / GROUND Busbars |
| F | 2x (50A) Battery port | M | (200A) GRID terminal |
| G | (200A) GEN terminal | | |

# 1.2 Specifications

**Note**: Temperature Derating Starts at 75°C with inverter shutdown at 82°C




## Sol-Ark 60K-3P-480V Fastener Torque Table

Do not use impact drivers to tighten any fasteners on the inverter

| Terminal / Breaker | Torque [ft-lb] | Torque [Nm] |
|---|---|---|
| “LOAD” | 18.75 ft-lb | 25.5 Nm |
| “GRID” | 18.75 ft-lb | 25.5 Nm |
| “GEN” | 18.75 ft-lb | 25.5 Nm |
| Neutral / Ground (Busbar) | 18.75 ft-lb | 25.5 Nm |
| Cover Screws | 15.5 in-lb | 1.75 Nm |
| Battery Terminals | Push-in Cage Clamp | Push-in Cage Clamp |

# DATASHEET

## 60K-480V

SKU: 60K-3P-480V

## 60K-3P-480V C&I Hybrid Inverter

| | |
|---|---|
| **Input Data (PV)** | |
| Max. Allowed PV Power (STC) | 78,000W |
| MPPT Voltage Range | 150-850V |
| Startup Voltage | 180V |
| Max. Input Voltage [1] | 1,000V |
| Max. operating input current per MPPT | 36A |
| Max. short circuit current per MPPT | 55A |
| No. of MPP Trackers | 4 |
| No. of PV Strings per MPPT | 2 |
| Max. AC Coupled Input | 60,000W |
| **Output Data (AC)** | |
| Nominal AC Voltage (3Φ) [2] | 277/480V (4-wire Wye) or 480V (3-wire Delta) |
| Grid Frequency | 50 / 60Hz |
| Real Power, max continuous (3Φ) | 60,000W |
| Max. Output Current | 72.3A |
| Peak Apparent Power (10s, off-grid, 3Φ) | 90,000VA |
| Max. Grid Passthrough Current (10min) | 200A |
| Continuous Grid Passthrough Current | 180A |
| Power Factor Output Range | +/- 0.8 adjustable |
| Backup Transfer Time | Up to 15ms |
| CEC Efficiency | 96.5% |
| Max Efficiency | 97.5% |
| Design (DC to AC) | Transformerless DC |
| Stackable | Up to 10 in parallel |
| **Battery Input Data (DC)** | |
| Supported Battery Chemistry | Lithium-ion |
| No. of Battery Inputs | 2 |
| Battery Input Terminal Rating | 50A |
| Nominal DC Voltage | ≥ 600V |
| Operating Voltage Range | 160 - 700V |
| Battery Capacity Range | 50 — 9900Ah |
| Max. Battery Charge / Discharge Current | 100A (50A per input) |
| Charge Controller Type | CC/CV - BMS Controlled |
| Grid to Battery Charging Efficiency | 96.0% |
| Automatic Generator Start (AGS) | 2 Wire Start - Integrated |
| BMS Communication [3] | CAN (Controller Area Network) |
| **General Data** | |
| Dimensions (H x W x D) | 894 x 528 x 295 mm (35.2 x 20.8 x 11.6 in) |
| Weight | 80 Kg / 176 lb. |
| Enclosure | IP65 / NEMA 3R |
| Operating Temperature | -40 – 60°C, >45°C Derating |
| Operating Altitude [4] | 2000 m (6561 ft) |
| Noise Level @ 1m | < 30 dB @ 25°C (77°F) |
| Idle Consumption - No Load | 60W |
| Communication and Monitoring | Wi-Fi & LAN Hardware Included |
| Warranty | 10 Years |
| **Category** | |
| Certifications and Listings (Grid Support Interactive Inverter) | UL 1741-2021 (UL1741SB), CSA C22.2 No 107.1-16, IEEE 1547-2018 & 1547a-2020 & 1547.1-2020 (SRD V2.0), UL 1741 CRD-PCS, UL1699B, CEC, SGIP, CSIP |
| PV DC Disconnect Switch — NEC 240.15 | Integrated |
| Ground Fault Detection — NEC 690.5 | Integrated |
| PV Rapid Shutdown Control — NEC 690.12 | Integrated |
| PV Arc Fault Detection — NEC 690.11 | Integrated |
| PV Input Lightning Protection | Integrated |
| PV String Input Reverse Polarity Protection | Integrated |
| Surge Protection | DC Type II / AC Type III |

[1] See Installation Guide for details on sizing array strings. Highest input voltage is based on the open-circuit voltage of the array at minimum design temperature
[2] Does not support corner grounded delta, high leg delta, or 240V delta systems. Consult installation manual or solark.com for details..
[3] Active BMS communication is required for all lithium batteries. See solark.com for list of compatible battery partners.
[4] Derating occurs above 2000m (6561 ft).

*Sol-Ark reserves the right to modify specifications at any time, and without prior notice. See sol-ark.com for the latest information.*

# 1.3 Connection Requirements

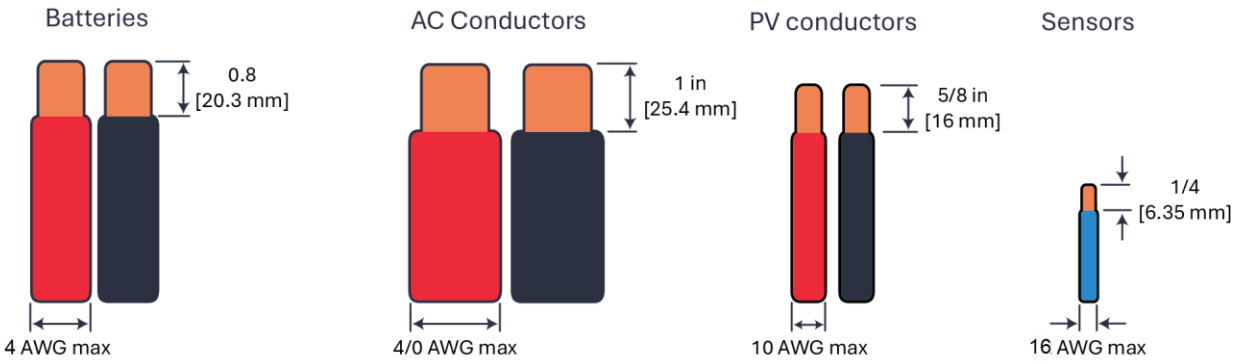
## AC/DC Connection Requirements

> ⚠ All wire runs should be sized to be at or below a 2.5% voltage drop at full load. Equipment wire sizing must comply with the NEC or local electrical code.

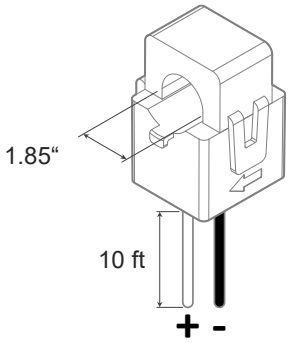
| Port | Max. Terminal Rating | Temperature Rating | Terminal Wiring Size Range (Min/Max) |
|---|---|---|---|
| GRID | 200Aac | 105C | 2AWG – 4/0 AWG |
| LOAD | 200Aac | 105C | 2AWG – 4/0 AWG |
| GEN | 200Aac | 105C | 2AWG – 4/0 AWG |
| MPPT | 55AIsc | 105C | 12 – 10 AWG |
| Battery Port A | 50Adc | 105C | 6 – 4 AWG |
| Battery Port B | 50Adc | 105C | 6 – 4 AWG |

## Sensors and Communications Requirements

| Component | Wire Size Range | Max Distance |
|---|---|---|
| CT Sensor | 16 - 22 AWG | 0' – 10' [3 m]: 16 AWG included<br>10' – 50' [15.3 m]: 14AWG twisted pair extension |
| Communications | 16 – 22 AWG | 0' – 100' [30 m]: 24 AWG<br>100' – 400' [120 m]: 23 AWG |
| RJ45 Parallel Communication | CAT 5E or better | 0' – 7' [2.1 m]: Included<br>7' – 20' [6m]: Extendable |




## CT Sensors (Included)



# 2. Installation

## Backup Circuits

A. The “LOAD” connected service panel is called the **Essential Loads Panel**.

You must keep the Essential Loads Panel within the limitations of the unit:

- Three phase power in a Wye configuration is calculated as → Real Power (W) = $\sqrt{3} \times V_L \times I_L \times PF$
  - Assuming a unity power factor (PF=1), the following represents the maximum power levels for each condition.
- Grid Tie Pass Through → 149.6kW cont. = 1.73 * 480V * 180A * 1.0
- Off-Grid → 60.1kW cont. (batteries or PV) = 1.73 x 480V x 72.3A x 1.0

B. Verify that any individual load circuit power or the aggregate rating of the whole panel does not exceed the limits above.

## Single System Install

**A. For Partial Home Backup**

To provide backup power to only essential loads, connect the utility grid to the Sol-Ark inverter's "**GRID**" terminal. You can make this connection on either the supply side (before your main service panel) or the load side (after your main service panel). With the Sol-Ark's Power Control System (PCS), the system can be configured to provide zero-export control.

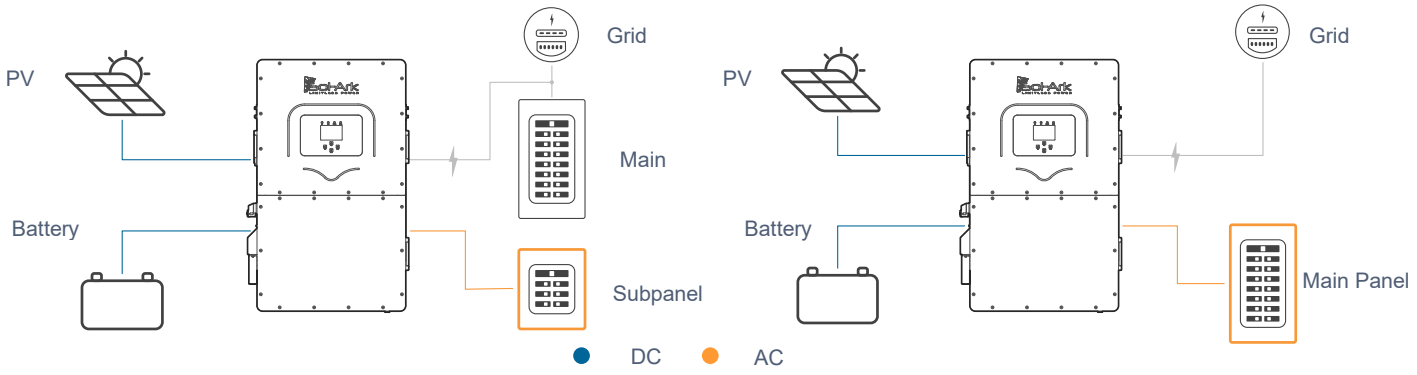
- If connecting the inverter using a supply side connection, you must install an external, service-rated disconnect switch between the "**GRID**" connection and the Sol-Ark. Make sure to size this disconnect according to local electrical codes.
- Connect the Sol-Ark's "**LOAD**" output to your Essential Loads Panel. Consult local electrical codes to select the correct wire gauge for this connection.

**B. For Whole Home Backup**

To provide backup power to your entire home with the Sol-Ark acting as the main transfer switch, connect the utility grid's main feed directly to the Sol-Ark inverter's "**GRID**" terminal.

- You **must** install an external, service-rated disconnect switch between the “**GRID**” connection and the Sol-Ark. Make sure to size this disconnect according to local electrical codes.
- Connect the Sol-Ark’s "**LOAD**" output to your **Main Service Panel**. Consult local electrical codes to select the correct wire gauge for this connection.

It’s possible to connect a generator, or an AC coupled source such as grid-tie string or micro inverters, to the “**GEN**” terminal of the inverter. Only one AC source can be connected to the “**GEN**” terminal at a time.




**Partial Home Backup** **Whole-Home Backup**

# 2.1 Mounting the Inverter

Considering the dimensions of the inverter, find a suitable location for the system. There must be at least 6 in [15 cm] of vertical clearance and 2 in [5 cm] of side clearance for proper heat dissipation.

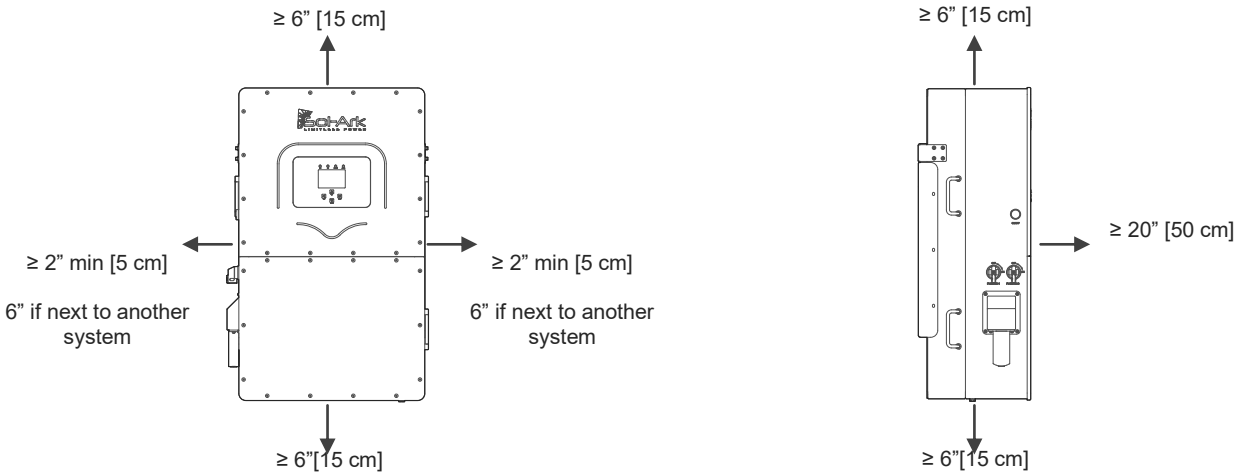



Figure 1: Inverter Clearances Overview

**NOTE**: Inverter has a Maximum Heat Dissipation of 2,100W or 7,165BTU/hour

1. Under certain conditions, the National Electrical Code® specifies greater clearances. Be sure to adhere to the clearances listed in the National Electrical Code®, paragraph 110.26 and Canadian Electrical Code® CSA C22.1.
2. The Sol-Ark 60K-3P-480V is a NEMA 3R - IP65 enclosure rated for outdoor installation, but it can also be installed indoors.
3. Use screws or anchors suitable for the support surface and capable of supporting the weight of the inverter (176 lb / 80kg).
   a. For Concrete or Masonry Mounting: Use a minimum of four M12x60mm expanding anchors (included).
   b. For Wood Frame Mounting: Use a minimum of four ½-in lag screws with flat washers (not included), making sure to anchor into at least 2 framing members.
   c. For Metal Framing Mounting: Use a minimum of four ¼-in self-tapping metal screws with flat washers (not included).
      - If you need a different anchorage, calculate the number of anchor points needed to properly hold the weight of the equipment.
      - Secure the inverter to the French Cleat with six of the provided M4x12mm socket head screws.

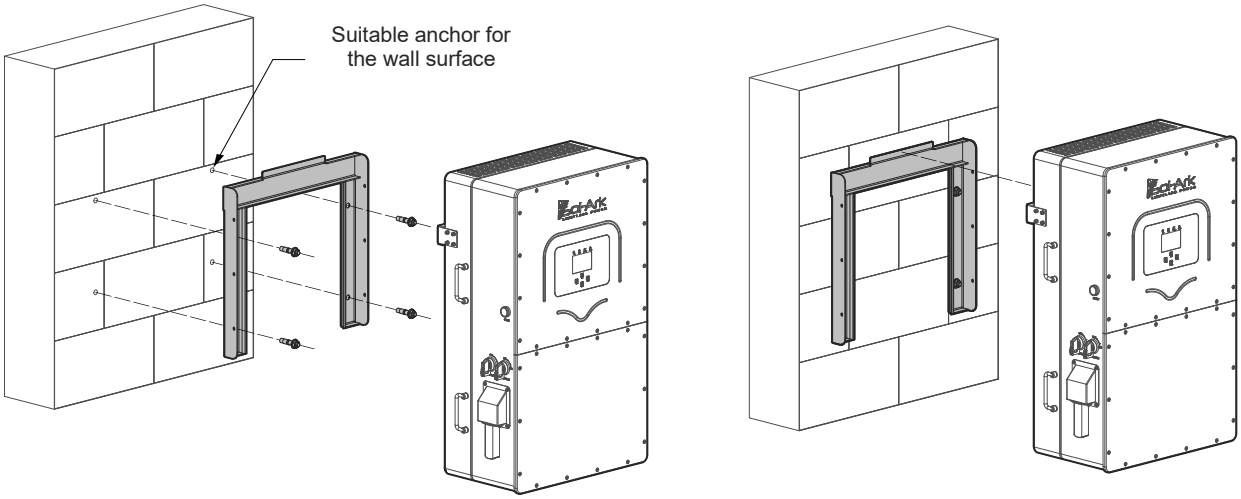



Figure 2: Inverter Mounting Diagram

⚠ Damage to the LCD Screen due to direct sunlight exposure will not be covered by warranty.

4. Mount the inverter in the optimal orientation as shown below.

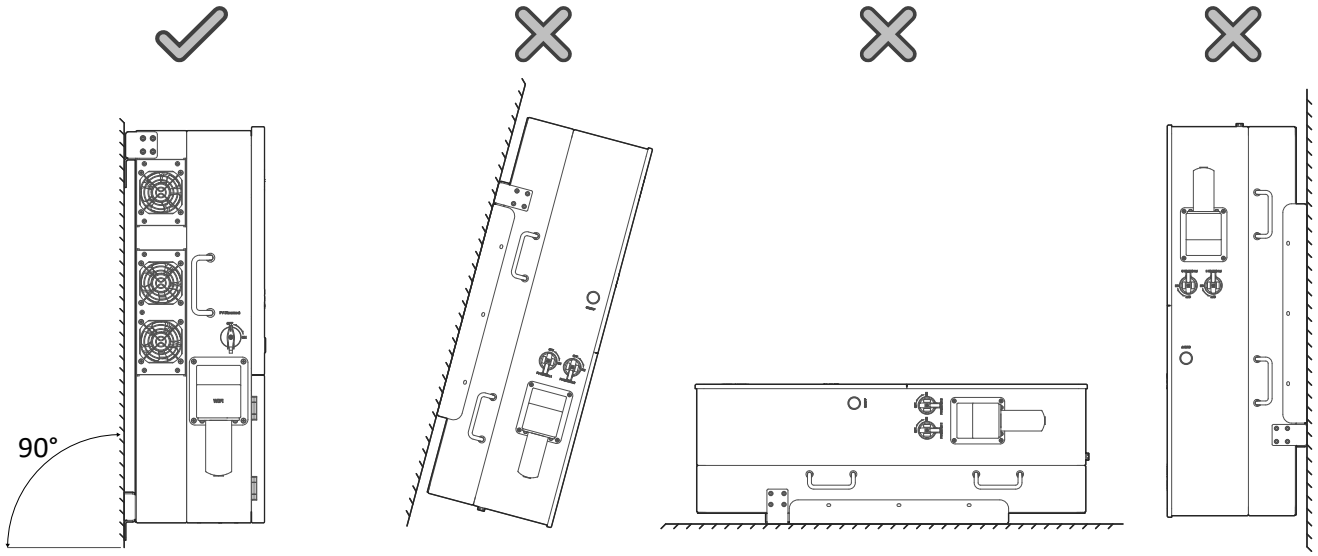



Figure 3: Inverter Mounting Orientation

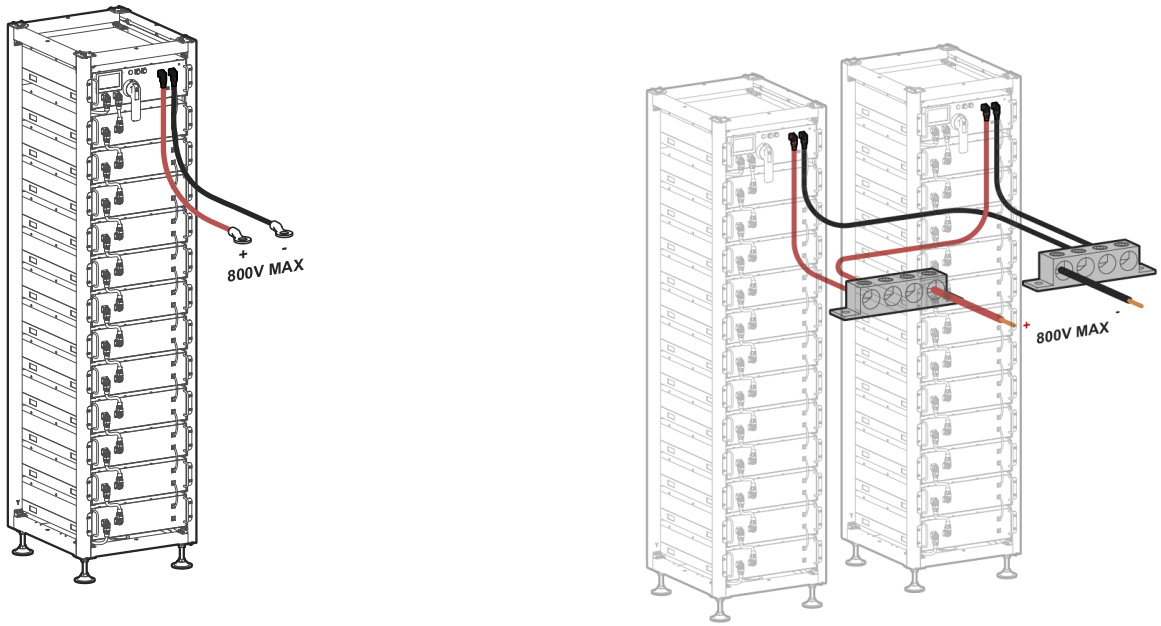
# 2.2 Integrating Batteries

⚠ Sol-Ark 60K-3P-480V must be OFF while you connect the batteries.

Be sure that the external battery disconnect is **OFF** or arcing may occur. If your battery bank does not have a built-in disconnect, maintain the necessary safety measures when handling the connections.

ⓘ The 60K-3P-480V reaches a max battery charge/discharge of **50A** per terminal for a total max of **100A** if using both sets of battery terminals. If only one set of terminals is used, the battery charge/discharge will be limited to **50A**.

⚠ Sol-Ark 60K-3P-480V is a **HIGH VOLTAGE BATTERY** system**.** You **MUST NOT** exceed **800V$_{DC}$** as shown below. The HV battery must stay within the **160V$_{DC}$ - 700V$_{DC}$** operating voltage range. **DO NOT** connect to any battery whose max voltage that exceeds this limit.

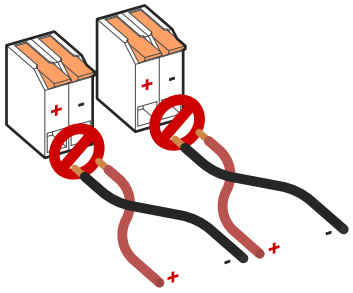



a) Single HV battery

b) Bank of multiple HV batteries

Figure 4: Battey Wiring Output

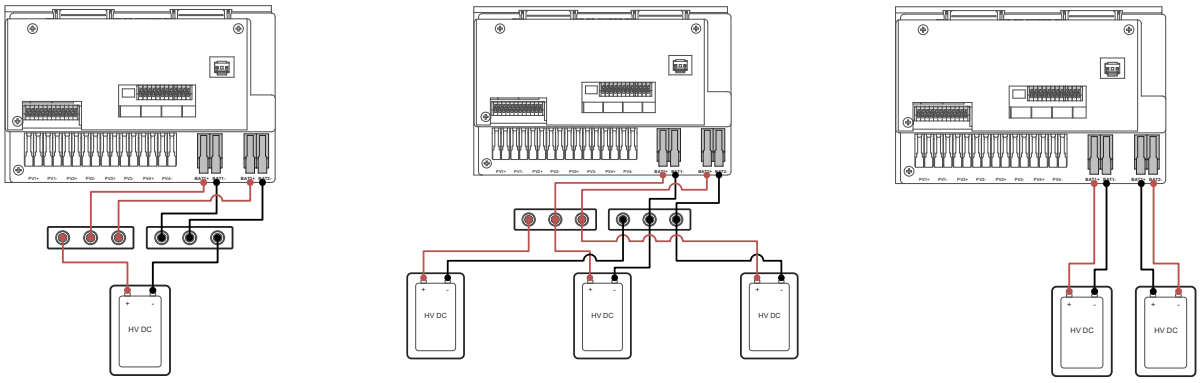
The Sol-Ark inverter has two input battery terminals for single or dual battery connections. To wire a battery to the inverter, lift the actuation levers and insert the **6-4 AWG** battery conductor fully into the terminal. **DO NOT** force open the battery actuation levers more than 90°.



DANGER: Reverse Polarity
DO NOT reverse the battery input wires, the system will be damaged, and the warranty voided.

## Multi-Terminal Installation

The two battery input terminals of the 60K-3P-480V can be configured for parallel battery stacks in settings screens. If the charge/discharge rate of 100A is needed, the battery must be connected to both input terminals. If connecting more than one battery to a single inverter input terminal, you must use an external busbar or combiner to combine batteries positive and negative outputs before connecting to the inverter terminals.




a. Single battery b. Parallel battery bank c. Dual battery bank

**Note**: If a single battery is capable of charge/discharge currents above 50A, connect the battery to both input terminals. Otherwise, the charge and discharge rate will be limited to 50A max. Only connect batteries of the same model to the terminals

## Parallelled Battery Installations

**Note: Multi-Inverter Installations**
Contact Sol-Ark Technical Support at +1 (972) 575-8875, ext. 2 for help with commissioning multiple parallelled inverters.

A. **ALL** systems **MUST** be connected to their own battery bank, and the battery banks must be the same size.

B. **DO NOT** parallel batteries between inverters.

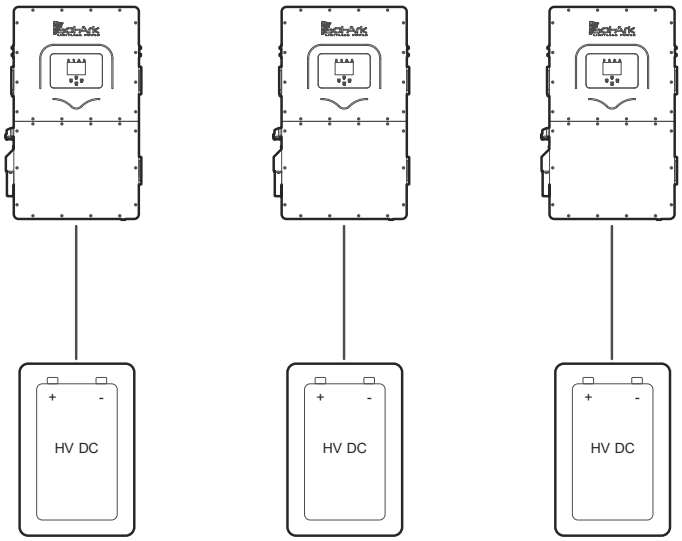



Figure 5: Inverter to Battery Ratio Diagram

# 2.3 Battery Communications

The Sol-Ark 60K-3P-480V inverter can establish closed-loop battery communication through one or two separate RJ-45 ports labeled “BMS1” and “BMS2”. Communication with battery BMS will depend on the wiring of the battery bank and the wiring to the Sol-Ark inverter. The following two methods show how communications can be established:

## Single Battery Bank Communication

Configure and wire the HV batteries so that there is one battery bank with a single communication source. Closed-loop communication is established by connecting the com cable to the **BMS1** port of the Sol-Ark inverter.

☑ **Parallel Bat1&Bat2** setting on the Batt setup menu **MUST** be enabled and batteries must be connected in parallel on the DC side. See “Multi-Terminal Installation” on page 10 for detailed wiring of multi-terminal, single battery bank installation.

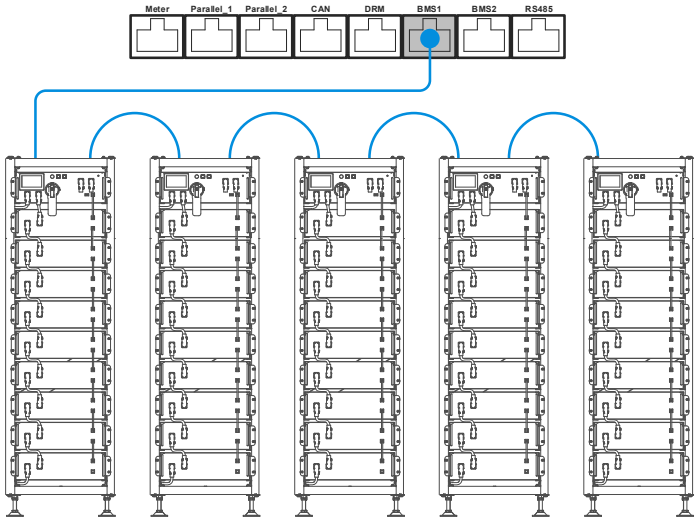



Figure 6: Single battery bank communication

**Parallel bat1&bat2**: Must be checked when using both battery inputs for the same battery bank. When enabled, the inverter will expect a single battery communication source.

## Separate Battery Banks Communications

Configure and wire the HV batteries so that there are two battery banks, each with their separate communication source. Establish closed-loop communications by connecting each communication cable to a BMS port of the Sol-Ark (**"BMS1"** and **"BMS2"**).

**Parallel Bat1&Bat2** setting on the Batt setup menu **SHOULD NOT** be enabled, the dual battery bank wiring configuration shown earlier **MUST** be carried out. See "Multi-Terminal Installation" on page 10 for detailed wiring of parallel battery bank and dual battery bank installation.

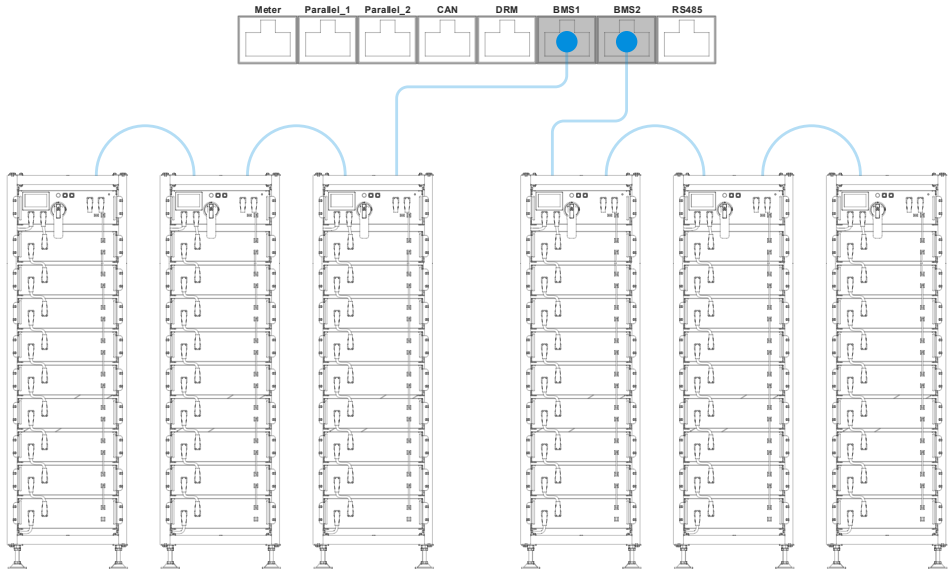



Figure 7: Multi-Battery Bank Communications

# 2.4 Connecting Solar PV to the Inverter

> 60K-3P-480V has 4 independent MPPTs that support up to 2 PV strings each. The MPPTs can handle a maximum $V_{OC}$ of 1,000V and an $I_{SC}$ of 55A but will self-limit and operate at $I_{mp}$ of 36A max.

A. Max DC solar input = 78 kW (± 5%) | Max input power per MPPT = 19.5 kW | Max recommended input voltage per MPPT = 850 $V_{OC}$ | Max input current per MPPT = 36A (self-limiting).

B. Design for an input current of 36A per MPPT. The inverter will self-limit beyond 36A. If $I_{SC}$ exceeds 55A, damage will occur.

C. **PV Source Circuit max voltage of 1,000$V_{OC}$**

D. **Damage can occur with PV strings whose open-circuit voltage exceeds 1,000$V_{OC}$**

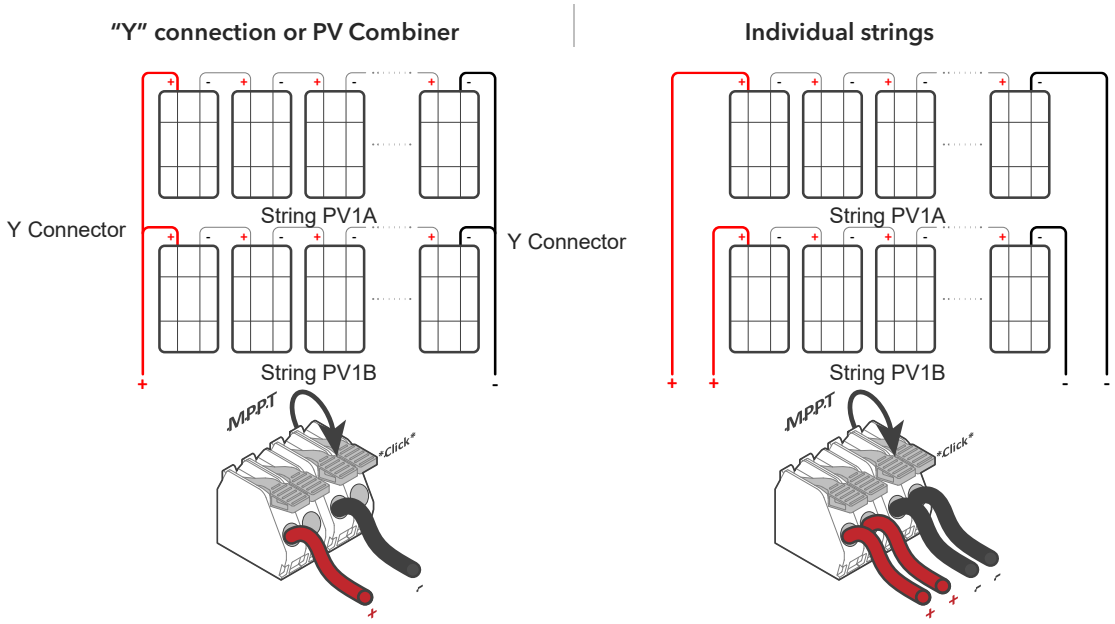
E. Strings in parallel on the same MPPT must have the same designed open-circuit voltage (Voc), otherwise the system will be limited to the lowest string voltage.

- PV1 A/B must have the same Voc.
- If the solar panels are oriented in different directions and connected in the same MPPT, there will be a loss in PV efficiency.

F. According to NEC Art 690.43, exposed non-current-carrying metal parts of PV module frames, electrical equipment, and conductor enclosures of PV systems shall be connected to an equipment grounding conductor. All grounding conductors and grounding electrodes should be installed according to NEC Art 690.47 or as required by the AHJ.

G. For ground mounted arrays, Sol-Ark recommends installing an auxiliary grounding electrode placed near the array to ensure optimal earth-to-ground resistance of the grounding system. This auxiliary electrode would need to follow the requirements of NEC Art. 250.54.

H. Connect the solar panel strings using either of the following configurations:



# AC Coupling

The Sol-Ark 60K-3P-480V supports the addition of grid-tied solar inverters, this allows the systems total solar power input to be expanded by coupling 3Φ micro or string inverters into the "**GEN**" terminals of the inverter.

An entirely AC-coupled solar system is not recommended as power control and monitoring is limited but is supported. Having DC-coupled modules, or a combination of DC-coupled modules and AC-coupled inverters is always preferred. AC-coupled inverters used in this application need to be either UL 1741SA or SB certified. This certification confirms the inverters' ability to disconnect from the grid based on frequency and ensures that the Sol-Ark will safely be able to frequency shift to control the AC coupled production.

In off-grid systems or during grid-forming operation, the 60K-3P-480V uses frequency shifting to curtail and shutdown AC-coupled inverters when the battery is full, allowing AC-coupled solar to produce power in an outage scenario. When the 60K-3P-480V is connected to the grid any AC-coupled inverters connected will always sell all excess solar power back to the grid. Selecting "Limited to Load" will NOT limit production when AC coupled.

> Maximum allowed AC coupling input: 60,000WAC

## AC Coupling on the GRID Side

Installing AC coupled inverters upstream of the GRID port of the 60K-3P-480V, such as with a load or supply side connection, is supported for grid connected systems but has some notable limitations when using the inverter for backup or grid-forming mode:

- Does NOT allow the usage of grid-tied inverter production during grid outages to charge batteries or power loads.
- Does NOT allow monitoring of PV production in inverter and MySolArk monitoring.

## AC Coupling on the GEN Terminal

AC Coupling via the GEN Terminal is the preferred method for integrating AC-coupled solar on the 60K-3P-480V. This method offers several key advantages:

- Allows the usage of grid-tied inverter production during grid outages.
- Allows the integration of grid-tie inverters in off-grid systems.

Using the GEN terminal also allows for comprehensive monitoring of solar production, giving users valuable insights into the system's performance. See AC Coupling Settings - (for AC Coupled Input)" on page 37 for details on programming the 60K-3P-480V for this mode of operation.

## AC Coupling on the LOAD Terminal

> **NOTICE:** Sol-Ark does not support AC-coupling on the LOAD terminal with the 60K-3P-480V.

# 2.5 Integrating a Generator

## Generators Smaller than 149kW → On "GEN" Input

1. **ONLY** supports three-phase 480Vac generators.
2. 200A rated "GEN" terminal. 180A continuous.
3. A THD (Total Harmonic Distortion) of less than 15% is required for stable operation.

## Generators Greater than 149kW → On "GRID" Input

1. **ONLY** supports three-phase 480Vac generators.
2. Optimal way to integrate generators for Off-Grid or Grid-Tied systems with automatic or manual transfer switches.
3. Programming **"GEN Connect to Grid Input"** is required: ☼ → **Limiter** → **Other** → ☑ **GEN Connect to Grid Input**.
4. **DO NOT** use **"Grid Sell"** when generator is connected to the GRID input, can cause potential damage the generator. Installation of CT sensors on generator lines is only required if **"Peak Shaving"** is intended to be used.

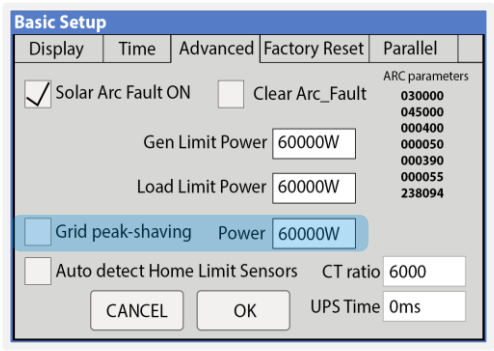
## Improve the Generator & Sol-Ark Compatibility

Navigate to ☼ → **Grid Setup** → **Grid Selection** → **Grid Mode** and program the following values to improve the Sol-Ark and generator compatibility and operating range to avoid frequent disconnections.

1. Change the grid mode to General Standard: ☼ → **Grid Setup** → **Grid Selection** → **Grid Mode**
   a. Tap and use the navigation arrows to cycle through the different grid modes. Choose **"General Standard"**
2. Increase the frequency range of operation: ☼ → **Grid Setup** → **Connect** → **Reconnect**
   a. Increase **"Grid Hz High" to 65Hz.**
   b. Decrease **"Grid Hz Low" to 55Hz.**
   c. Make the same changes for the "Normal Connect" settings.
3. Increase the voltage range of operation:
   a. Increase **"Grid Volt High" to 528V.**
   b. Decrease **"Grid Volt Low" to 432V.**
   c. Make the same changes for the "Normal Connect" settings.

# 2.6 Grid Peak Shaving

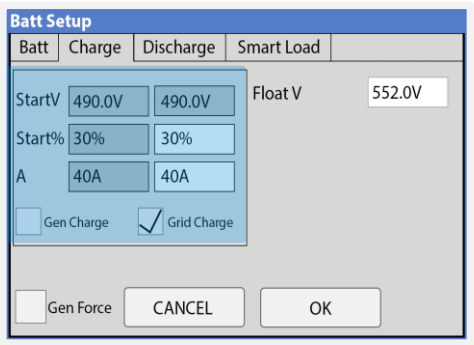
1. To use Peak-Shaving on a generator, the equipment **MUST** be connected to the "GRID" terminal of the inverter.
2. Peak-Shaving helps reduce grid consumption during peak demand by utilizing battery backup power. It can also be used to prevent generator overload above a specified power threshold.
3. Install the CT sensors on grid / generator lines L1, L2, L3. The arrows on the CTs **MUST** point toward the inverter.
4. The Sol-Ark supplies power from the batteries whenever the **"Power"** threshold is met.
5. This mode will automatically adjust the "Grid Charge" amperage **(A)** to avoid generator overloads during battery charging.
6. Grid Peak-Shaving will automatically enable "Time of Use" and **MUST** be configured.



Grid peak-shaving settings

# 2.7 Automatic Generator Start

1. **"☑ Gen Charge"** is used when the generator is connected to the **"GEN"** terminal.
   a. **"Start V" or "Start %"** is the set-point/condition that must be fulfilled to automatically start the generator.
   b. To charge from the "GEN" source, **"☑ Gen Charge**" must be enabled.
   c. Batteries will charge from a generator until the battery bank accepts 5% of its programmed capacity in Amperes (A). This is equivalent to around 95% of the state of charge (SOC).



Generator and grid charge settings

2. **"☑ Grid Charge"** is used to charge the battery from the **"GRID"** source (grid or a generator).
   a. **"Start V" or "Start %"** is the set-point/condition that must be fulfilled to start the battery charge from the "GRID" source. This will auto-start a generator as well.
   b. To charge the battery from the "GRID" source, you must select ⚙ **> Battery Setup > Charge >"☑ Grid Charge**
   c. From utility grid: the batteries will be charged to 100% SOC.
   d. From generator: the batteries will charge until the battery bank accepts 5% of its rated capacity in Amperes (A). This is equivalent to around 95% SOC.

> **NOTE:** If "Time of Use" (TOU) is enabled, you must designate a time to charge from that GRID or GEN source. Select ☑ **Charge** on the desired time intervals; otherwise, the generator will not start automatically even if the **Start V** or **Start %** condition has been met.

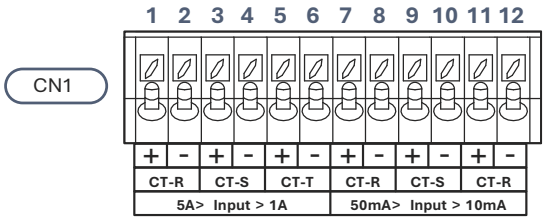
## Gen Charge / Grid Charge "A"

"A" is how many amps **(DC)** are supplied to the battery from the "GRID" or "GEN" source. Adjusting and limiting the Gen or Grid **"A"** value will ensure that small generators are not overloaded when charging the battery bank.

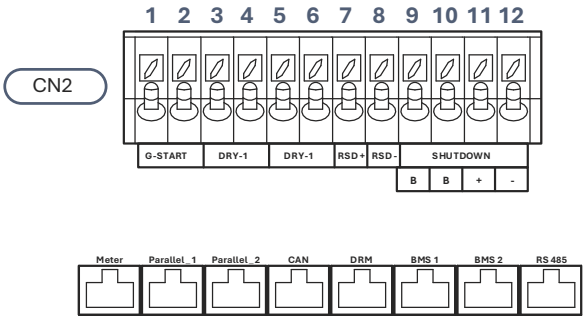
If connecting more than one HV battery in parallel to the Sol-Ark inverter, divide the Gen or Grid **"A"** value by the **number of batteries** to estimate the current (A) flowing to each HV battery.

# 2.8 Integrating Sensors and Accessories

## Overview of Inverter Pinouts




## Inverter Terminal Blocks




## Sensor Pinout

Sensor Pinouts are located in Sol-Ark user area.

### CN1

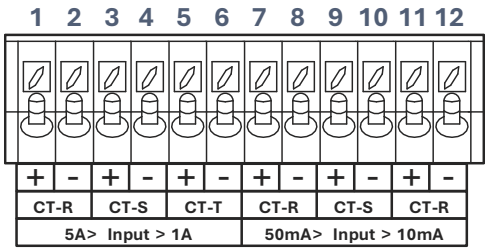



Figure 8: CT Sensor Input Pinout

### Max. 5A Secondary CTs ONLY:

- **(1,2) 5A to 1A Input - CT-R:** Current transformer (L1). **Polarity sensitive.**
- **(3,4) 5A to 1A Input - CT-S:** Current transformer (L2). **Polarity sensitive.**
- **(5,6) 5A to 1A Input - CT-T:** Current transformer (L3). **Polarity sensitive.**

### Max. 50mA Secondary CTs ONLY:

- **(7,8) 10mA to 50mA Input - CT-R:** Current transformer (L1). **Polarity sensitive.**
- **9,10) 10mA to 50mA Input - CT-S:** Current transformer (L2). **Polarity sensitive.**
- **(11,12) 10mA to 50mA Input - CT-T:** Current transformer. (L3). **Polarity sensitive.**

CN2

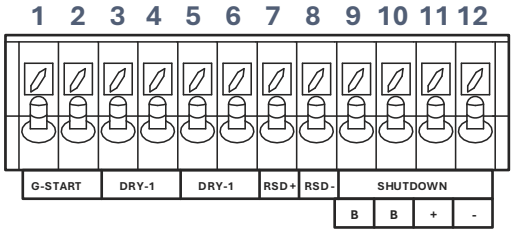



Figure 9: CN2 Pinout

- **(1,2) G-Start:** Normally Open (NO) relay for generator two-wire start
- **(⚠12V, 100mA max)**
- **(3,4) Dry-1 and (5,6) Dry-2: Reserved**
- **(7,8) RSD+/-**: **Reserved**, DO NOT CONNECT ANY RSD TRANSMITTER
- **(9,10) Emergency Stop Button:** Normally Open (NO) dry contact for emergency stop button
- **(11, 12) +/- : Reserved**, not used at this time.

## Communication Ports

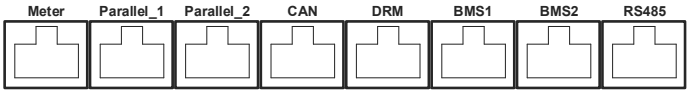
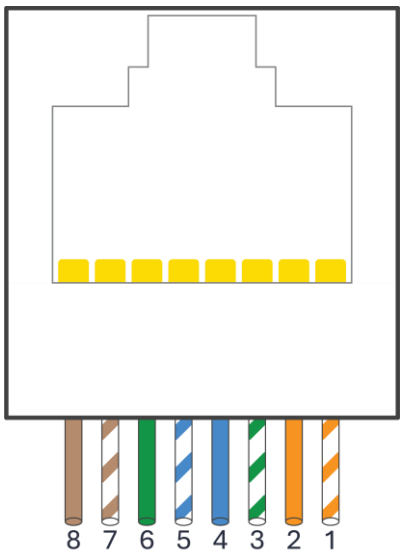



Figure 10: Communication Ports

- **Meter:** For external Revenue Grade energy meter communication.
- **Parallel_1 & Parallel_2:** Inverter parallel communications ports 1 and 2.
- **CAN:** Reserved.
- **DRM:** Reserved.
- **RS-485:** RS-485 port
- **BMS1 & BMS2:** BMS ports 1 and 2 for battery communications

## CAN & RS485 Ports

- CAN port data is in a proprietary format. Sol-Ark currently does not support third-party usage.
- The RS485/RTU port utilizes the MODBUS protocol, data is in a proprietary format. Please contact Sol-Ark to request the MODBUS register map if it's required for your application.




| Pin | RS485 | CAN |
|---|---|---|
| 1 | B- | B- |
| 2 | A+ | A+ |
| 3 | -- | -- |
| 4 | -- | CAN High |
| 5 | -- | CAN Low |
| 6 | GND | GND |
| 7 | A+ | A+ |
| 8 | B- | B- |

## BMS Communication Ports

| Pin | BMS1 | BMS2 |
|---|---|---|
| 1 | -- | -- |
| 2 | -- | -- |
| 3 | -- | -- |
| 4 | CAN High | CAN High |
| 5 | CAN Low | CAN Low |
| 6 | GND | GND |
| 7 | -- | -- |
| 8 | -- | -- |

## GEN Start Signal (Two-wire start)

- Gen start relay: CN2, pins 1 & 2.
- The signal comes from a normally open relay that closes when the generator **Start** condition is met.

## Wi-Fi / Ethernet Antenna (Dongle)

- Remote monitoring and software updates require an internet connection through the Wi-Fi / Ethernet Gateway (Dongle).
- Supports with 2.4GHz Wi-Fi or Ethernet connections.

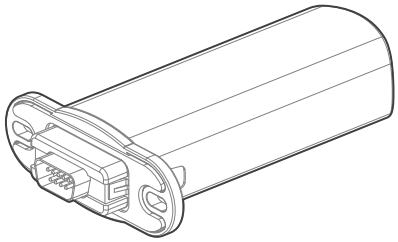


Figure 11: WiFi Gateway

# Installing Filter Rings

If your 60K Sol-Ark inverter came with a set of filter rings (toroids), follow these steps to install them on the battery conductors. The filter rings include:

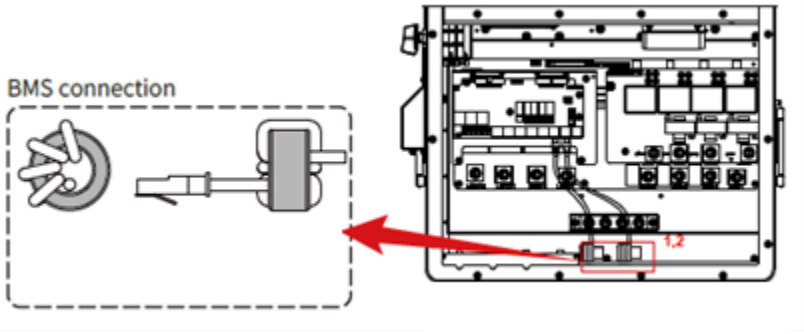
- **2 small white filter rings** for BMS1 and BMS2 communications cable (outside diameter 33mm)
- **1 large black filter ring** for AC wires (outside diameter 65mm).

Make sure that both (+) and (-) wires pass through both filter rings simultaneously. When there are 4 wires, all conductors must go through the filter rings as described below.

## Step 1: Install small white filter rings on BMS1 and BMS2

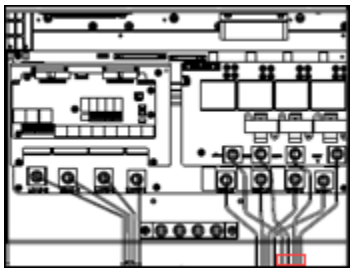
1. Thread the end of the BMS communication cables through one filter ring, then wrap the wires around the ring four times. Place the filter ring near the wiring terminals.

2. Repeat this for the other BMS communication cable if you are using two BMS ports.




## Step 2: Install large black filter ring on GRID terminals

1. Thread the wires through the filter ring and THEN connect the wires to the GRID port.



# 2.9 Connecting Current Transformers (CT Sensors)

The CT sensors (or limit sensors) enhance system capabilities by enabling the use of the system work modes known as **"Limited Power to Home"** (Meter Zero) and **"Grid Peak-Shaving."** The CTs will measure and calculate total load demand which the Sol-Ark 60K-3P-480V will then use to accurately supply and offset all existing loads (Meter Zero).

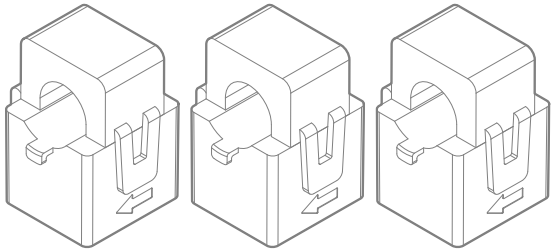


Figure 12: CT Sensors

## 1. Installing CT Sensors

DANGER: RISK OF ELECTRIC SHOCK
Before installing CT sensors around current-carrying conductors, you MUST:
1. Connect the CT outputs to the designated inverter input terminals, OR
2. Short the CT output wires using a CT shorting block

This step is crucial to prevent the generation of dangerously high voltages in the CT secondary winding when this circuit is open and current is flowing through the primary.

1. To begin, install sensors on incoming electrical service wires (L1, L2, L3).
2. The marked arrows on the CT sensors must point **toward** the inverter.
3. To ensure proper fit, check incoming wire diameters (grid or generator). If the sensors are too small, larger CTs can be purchased.
4. **"Limited Power to Home"** (Meter Zero) and **"Grid Peak Shaving"** require CT sensors.

- See "3.5 Limiter" on page 38 for more information about the different work modes.
- See "7. Wiring Diagrams" starting on page 60 for more information on CT installation.

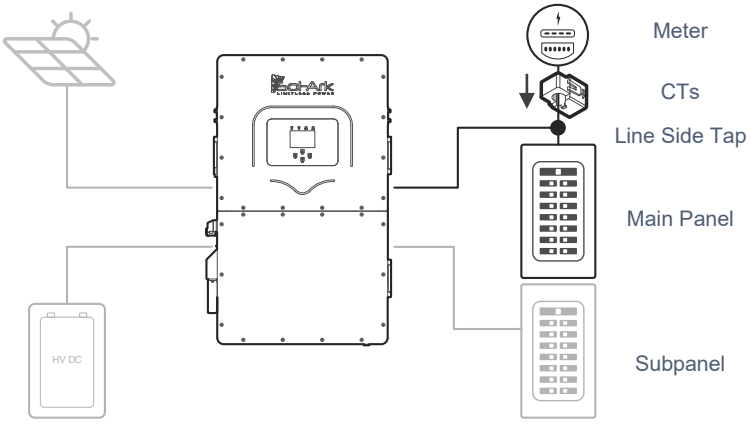



Figure 13: Overview of CT Placement

## CT Sensor Size

1. The 60K-3P-480V inverter includes three **300A** CT sensors with a 1.85x2” (47x52mm) opening.
2. The inverter should be programmed to use a ratio of **6000:1** if using the included 300A CT’s.
3. For sites with services larger than 300A, see “Selecting Current Transformers for Larger Services” on page 23.

## Wiring the CT sensors

1. Connect CT1 of line L1 to pins 1+ (white) & 2- (black) of CN1 pin board as shown in
2. Figure 14: CT to Inverter Wiring below.
3. Connect CT2 of line L2 to pins 3+ (white) & 4- (black) of CN1 pin board.
4. Connect CT3 of line L3 to pins 5+ (white) & 6- (black) of CN1 pin board.
5. Keep the wires twisted throughout the run and only separate 1in (25mm) when making the termination at the inverter.
6. If the wires need to be extended, use a minimum of 16AWG twisted pair shielded cable to make the extension.
    - Max CT extension length is 50ft using 14AWG twisted pair cable. For longer runs, contact Sol-Ark for design assistance.

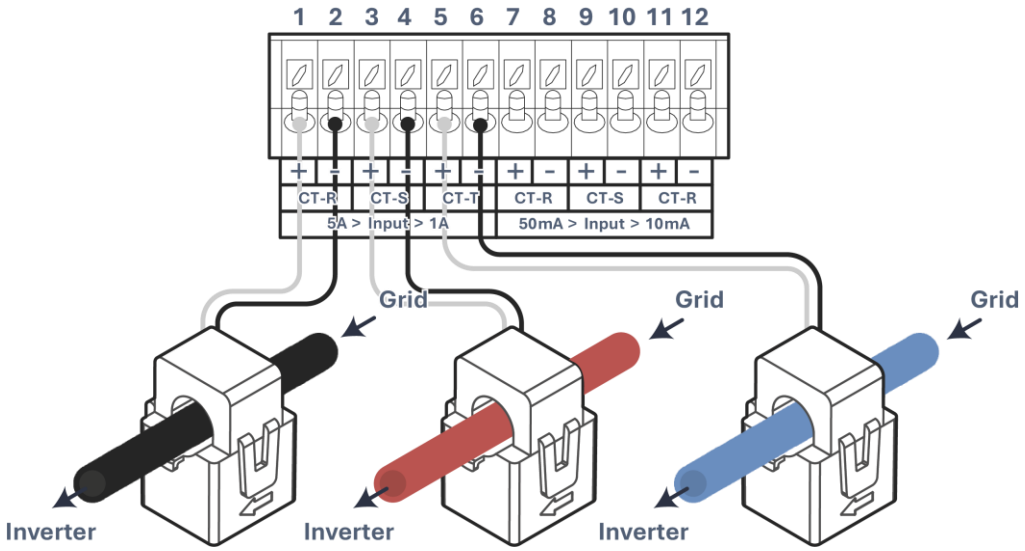



Figure 14: CT to Inverter Wiring

## CT Sensors with Parallel Inverters

Only one set of CT sensors need to be wired to the designated “Master” inverter.

CT sensors are required for multi-inverter systems.

## Selecting Current Transformers for Larger Services

If the included CTs are not suitable for the installation service larger CTs can be purchased separately. When selecting the CT the primary rating should be sized as close to the service size of the panel as practical. This ensures accurate measurements and proper system operation. For example, for a site with a 400A service panel, choose a CT with a 400A primary rating or the next available higher rating. Selecting a CT with a primary rating significantly higher than the service size may result in reduced accuracy for lower current measurements.

The following devices have been tested thoroughly to comply with Power Control System (PCS) operation per UL1741 CRD with the 60K-3P-480:

| Manufacturer | Model | Current Rating | Inverter CT Ratio | Window Size | Datasheet |
|---|---|---|---|---|---|
| AccuEnergy | AcuCT-3135R | 600A:5A<br>800A:5A<br>1200A:5A | 12000:1<br>16000:1<br>24000:1 | 80.0mm x 90.0mm<br>(3.10” x 3.50”) | Brochure |
| AccuEnergy | AcuCT-4161R | 600A: 5A<br>800A:5A<br>1200A:5A | 12000:1<br>16000:1<br>24000:1 | 105.0mm x 155.0mm<br>(4.10” x 6.10”) | Brochure |

**NOTE:** These CTs are compatible with Sol-Ark HV inverters only. Do not use with Sol-Ark LV inverters.

## Programming CT Ratios

To program the inverter with the correct CT ratio, begin by going to the ☼ → **Basic Setup** → **Advanced** screen of the inverter, as shown in Fig. 14. The correct CT ratio can be calculated by dividing the primary side current by the secondary side output current, the resulting number should be multiplied by 100 before entering it into the CT Ratio setting on the inverter.

**Example:** 800A primary with a 5A secondary output, 800A / 5A = 160 or 16,000 ratio on the inverter.

> **NOTE:** The maximum value that can be programmed on the inverter is 40,000.

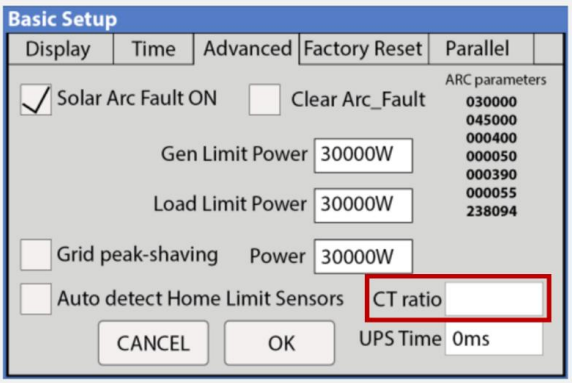



Figure 15: Settings Screen of the inverter for modifying CT Ratio

## 5. Automatic CT Limit Sensors Configuration

This function **REQUIRES** batteries to auto detect and auto correct CT orientation. AC coupled inverters need to be **OFF** during the detection test. If this test is done with connected AC-coupled systems, a factory reset of the Sol-Ark must be performed. Install the CT sensor as described previously. A battery connection and grid power are required before starting the automatic configuration.

**☼→ Basic Setup → Advanced → ☑ Auto detect Home Limit Sensors**

Wait at least 10 to 15 seconds while the inverter performs the test. The inverter will alternate the current distribution in all lines, determining the correct orientation of the sensor.

## Operational Notes

- On “Limited power to Home” mode (no Grid Sell), HM values will read close to zero (0). Note that many sensors can have a 1-3% error.
- To avoid selling power to the utility, set “Zero Export Power” equal to or greater than 20W.
- Buying power from the grid will display positive (+) HM values, while selling to the grid displays negative (-) HM values

# 2.10 PV Rapid Shutdown

Rapid shutdown is a critical safety feature required by the National Electrical Code (NEC) for solar photovoltaic systems located on buildings. It allows first responders to quickly de-energize the DC and AC conductors of a solar system in an emergency.

The 60K-3P-480V inverter implements rapid shutdown through the use of the emergency stop pins located in the CN2 wiring area. Pins 7/8 are a normally open (NO) contact that will trigger rapid shutdown (RSD) when closed. Closing this contact using an external e-stop button (not included) will disable all power flows from the inverter, including the LOAD output when off-grid. When this same button is wired to the RSD device power supply it will also trigger module level shutdown at the solar module using module level shutdown or optimizer modules.

Connect an emergency stop button connects to CN2, (B, B) pins 9 & 10 of the Sol-Ark.

Rapid Shutdown Transmitters placed inside the user area of the Sol-Ark can cause interference.

On parallel inverter installations, the emergency stop button must be wired to the designated “Master” inverter. Unlike the Master, the “slave” inverters won’t lose their 12Vdc power supply (terminals 7,8).

**CAUTION:** The 12Vdc power supply on Pins 7 & 8 of the 60K-3P-480V is not rated to power Rapid Shutdown Transmitters. DO NOT CONNECT any device to these terminals

Third-party rapid shutdown transmitters should be powered by the 60K-3P-480V through an external power supply connected to the “LOAD” output, as illustrated in Fig 15. Pressing the e-stop button will disconnect all AC outputs, cutting power to the “LOAD” connected service panel which will initiate rapid shutdown.

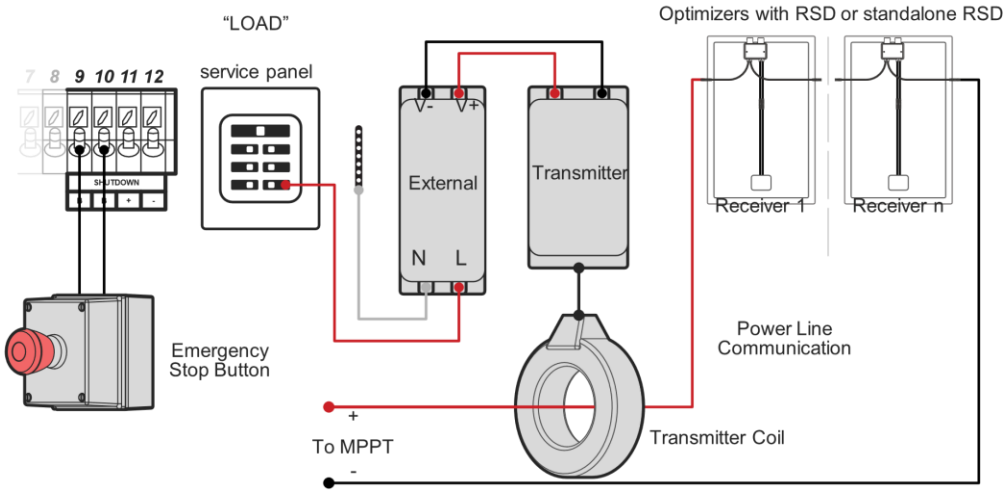



Figure 16: Example Rapid Shutdown Wiring Configuration

## Rapid Shutdown Product Recommendations

The following Rapid Shutdown Devices (RSDs) are compatible with the 60K-3P-480 inverter:

- Tigo TS4-A-F
- Tigo TS4-A-2F
- NEP PVG-Guard
- APsmart RSD S-PLC
- APsmart RSD-D

RSDs must be installed according to both manufacturer specifications and local electrical codes. For detailed installation procedures and troubleshooting of Rapid Shutdown Devices, see the device manufacturer's installation manual.

# 2.11 Electrical System Compatibility

**IMPORTANT**: Verify electrical system compatibility before installation.

The Sol-Ark 60K-3P-480V supports two standard commercial electrical configurations. Verify your system type before proceeding with installation.

## Supported Systems

### 277/480V 4-wire Wye (Most Common)

- Line-to-neutral: 277V AC
- Line-to-line: 480V AC
- Includes neutral and equipment grounding conductors for unbalanced 277V loads
- Standard for most commercial buildings in North America

### 480V 3-wire Delta

- Line-to-line: 480V AC (all combinations)
- No neutral conductor required for inverter operation
- Three phase conductors plus equipment grounding conductor
- Fount only in older industrial facilities or rural locations
- Requires phase-to-phase fault detection or other NEC approved system for safety
- Consult NEC Article 250.20 or applicable local code for grounding requirements

## Unsupported Systems

**WARNING**: Connecting to incompatible electrical systems will damage the inverter and may void the equipment warranty

- **Corner grounded 3-wire delta** systems
- **High leg delta** (wild Leg/stinger Leg) systems
- **347/600V Wye** systems (most common in Canada)
- Any ungrounded electrical systems

# System Verification Procedure

## For 277/480V Wye Systems

1. **Measure line-to-neutral voltages**: Should read 277V AC (±10%) on all three phases
2. **Measure line-to-line voltages**: Should read 480V AC (±10%) between all phase combinations
3. **Verify neutral-to-ground bond**: Should measure 0V AC between neutral and equipment ground at main service disconnect

## For 480V Delta Systems

1. Measure line-to-line voltages: Should read 480V AC (±10%) between all phase combinations (A-B, B-C, C-A)
2. Check grounding: Verify proper equipment grounding conductor installation

**CAUTION**: If measurements differ from expected values or if you encounter:

- 208V readings to any conductor
- Unequal line-to-line voltages
- Missing or improper grounding

**DO NOT** proceed with installation. Consult Sol-Ark support.

# Grid Setup Configuration

1. After verifying system compatibility, configure the inverter for your electrical system:
2. Navigate to: Settings (Gear) → Grid Setup → Grid Selection
3. Select appropriate setting: "LN:277VAC LL:480VAC" for all 480V systems

## 480V Wye Systems

- Do NOT check **IT system neutral is not GND**

## 480V Delta Systems ONLY

- Check the check box **IT system neutral is not GND**

# 2.12 Inverter Startup and Commissioning

> **NOTE:** TURN ON the inverter with at least one of the following power sources:
> 1. Battery, 2. PV, or 3. Grid/Generator

## 1. Verify the Battery Input

A. Voltage of the battery must be between 160$V_{DC}$ - 800$V_{DC}$.

B. Turn **ON** battery modules and ensure appropriate voltage on each battery. Verify nominal voltage of battery bank according to the battery installation manual.

C. Turn **ON** the external battery disconnect. Verify that the voltage at the Sol-Ark terminals is within 2% of the voltage measured at the battery bank output.

D. **DO NOT** reverse polarity. **DO NOT** turn **OFF** battery disconnect if any current is flowing into or out of the battery.

## 2. Verify the PV Input

A. Input voltage must not exceed 1,000$V_{DC}$.

B. Input voltage must be above the startup voltage of 150$V_{DC}$.

C. Do not ground PV+ or PV-.

D. Verify polarity in each PV string. Backward polarity will measure 0Vdc by the Sol-Ark and will cause long term damage.

E. PV alone turns LCD screen only. Inverter requires **grid** and/or **batteries** to operate, otherwise an “OFF” message will appear.

F. PV DC disconnect switches on the side of the inverter turn the PV ON or OFF.

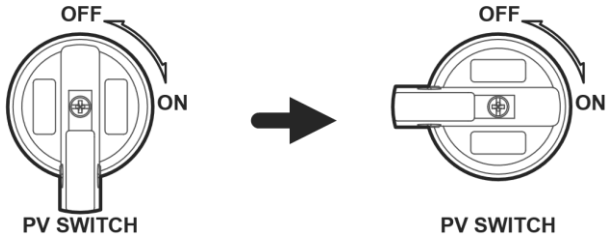



Figure 17: PV Disconnect Operation

## 3. Verify the GRID Input

A. Verify that voltage between Neutral and Ground is 0$V_{AC}$.

B. Verify that voltage between “**GRID” L1** and “**LOAD” L1** is 0V. Do the same for L2 and L3.

C. Verify the AC voltage on the **”GRID”** terminals using digital multimeter.

**For 277/480V Wye Services**

D. Measure line (L) to neutral (N) voltages on **”GRID”** terminals.

E. Ensure 277$V_{AC}$ on all phases to neutral or ground and 480$V_{AC}$ between all phases to each other.

**For 480V Delta Services**

F. Measure line (L) to line (L) voltages on **”GRID”** terminals. Ensure 480$V_{AC}$ between all phases to each other.

## 4. Power on Sol-Ark 60K-3P-480V

1. Turn **ON** the external “GRID” disconnect. Wait for the **”AC”** LED indicator to turn on.
2. Turn **ON** the PV DC disconnect switches. Wait for the **”DC”** LED indicator to turn on.
3. **PRESS** down the power button to the **ON** position. Wait for the **”Normal”** LED indicator to turn on. This may take a few minutes.
4. Turn **ON** the external battery disconnect if the system has batteries.
5. Turn **ON** any external “LOAD” and “GEN” breakers.

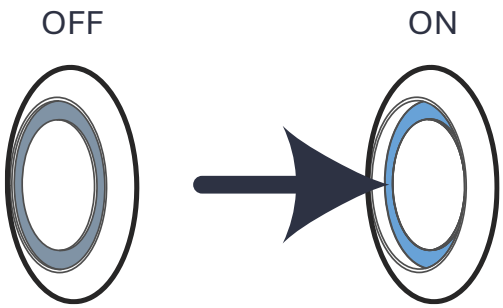



Figure 18: Inverter Power Button Operation

# 2.13 Power Cycle Sequence

1. **TURN OFF** the external battery disconnect if the system has batteries.
2. **PRESS** the power button, making sure it is in the **OFF** position. An “OFF” message will appear after the **”Normal”** LED turns off.
3. **TURN OFF** the built-in PV DC disconnect switches on the side of the inverter.
4. **TURN OFF** all AC breakers / disconnects (“GRID”, “GEN” and “LOAD”).
5. Wait a moment (~1 min) to ensure the inverter is completely de-energized.
6. Make sure that the Sol-Ark is properly connected to the batteries, solar panels, “GRID”, “GEN”, and “LOAD.”
7. Reverse the steps to turn **ON** the Sol-Ark.

# 3. User Interface

## 3.1 LED Indicators

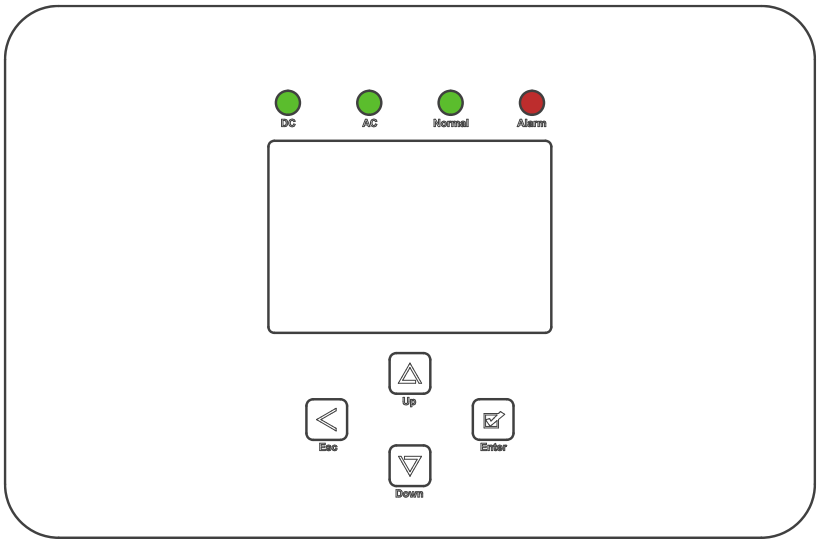



Figure 19: Inverter Front Panel

| DC | AC | Normal | Alarm |
|---|---|---|---|
| Green → **DC PV input connected and providing voltage.** | Green → **Grid is connected and providing voltage.** | Green → **Sol-Ark is fully energized* and operating.** | Red → **Alarm state. Check the alarms menu. Home Screen→ ☼ → "System Alarms"** |
| **OFF** → Minimum MPPT voltage not met, wrong polarity or no $PV_{DC}$. | **OFF** → Grid voltage out of range or Off-Grid system. | **OFF** → Not fully energized*, in fault state or in passthrough mode. | **OFF** → No alarms / error codes / setting change notifications |

**Note:** Fully energizing the inverter requires having at least one of the following: a. DC PV and Grid **or** b. Batteries

# 3.2 Main Menus

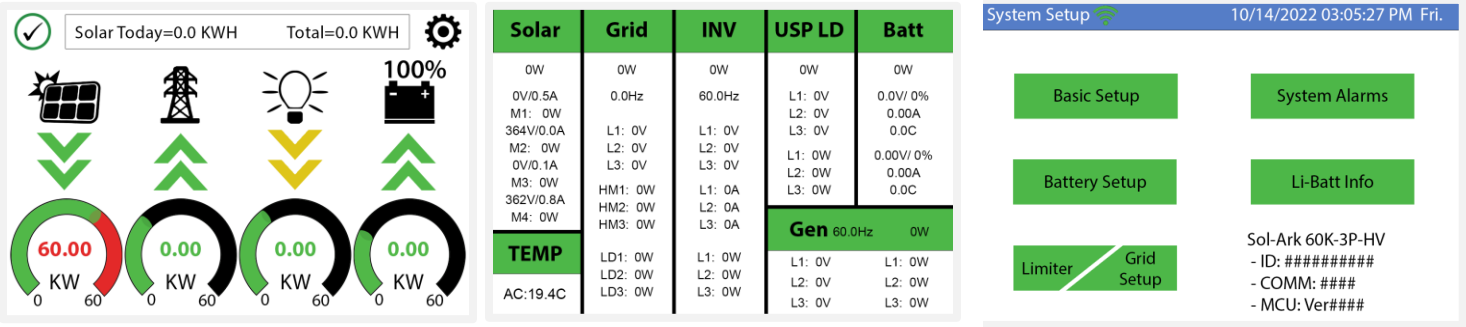



Figure 20: Main Menu Screens Overview

## Main Screen

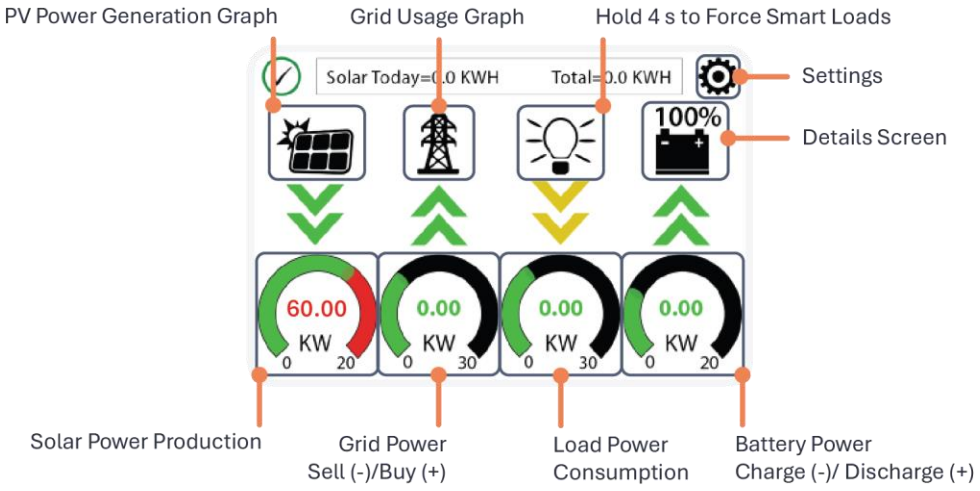



Figure 21: Home Screen Overview

## Details Screen

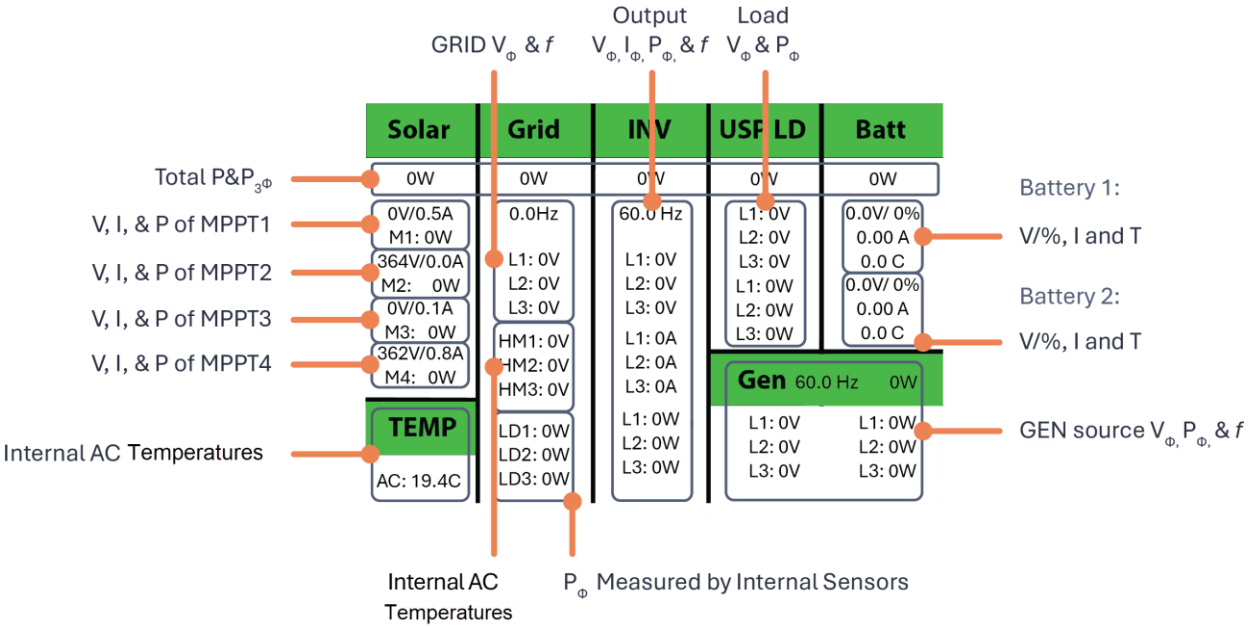



Figure 22: Parameters Screen Overview

- ⚠ MPPT voltages **MUST NOT** exceed 1,000V.
- "TEMP" measures the internal temperatures of the AC conversion power electronics.
- "Grid" column measures: Voltage, Current, Power and frequency of the utility grid.
    - If selling to the Grid: Watts = negative (-)
    - If buying from the Grid: Watts = positive (+)
    - HM: power measured by the external CT sensors. (L1, L2 & L3).
    - LD: power measured by the internal sensor on "GRID" terminal. (L1, L2 & L3).

> **NOTE**: Opposing "Grid" or "HM" values indicate that CTs are installed incorrectly.
> See "2.9 Connecting Current Transformers (CT Sensors)" on page 21 for more information.

## PV Power Generation Graph

A. Tap the solar panel icon to display the PV power generation graph.
B. Displays power production over time for the PV array.
C. Use up/down arrows (↑, ↓) to navigate between days.
D. Month view/year view/total production.

## Grid Usage Graph

A. Tap the grid icon to display the grid usage graph.
B. Displays power drawn from grid (+) / sold to the grid (-).
C. Values above the line indicate "power bought" from the grid.
D. Values bellow the line indicate "power sold back" to the grid.
E. This view can help to determine when the peak power is used from the grid.

## System Setup Menu

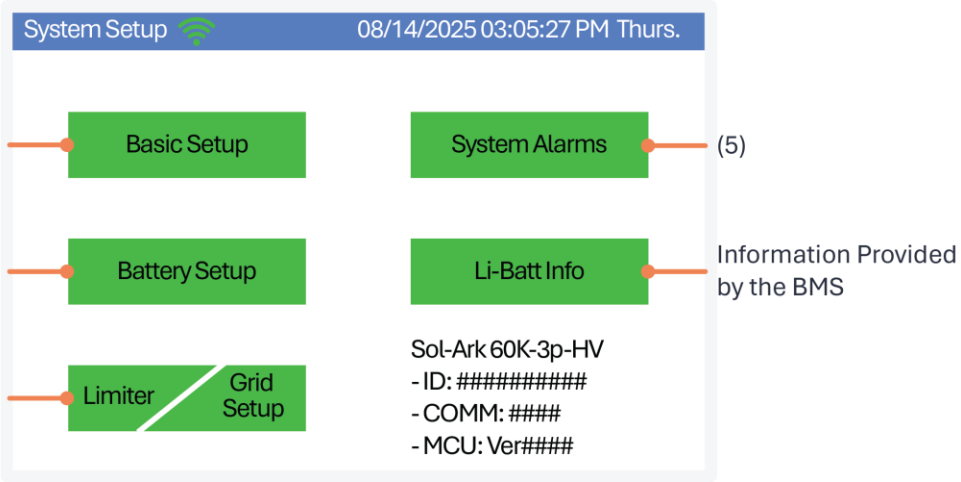
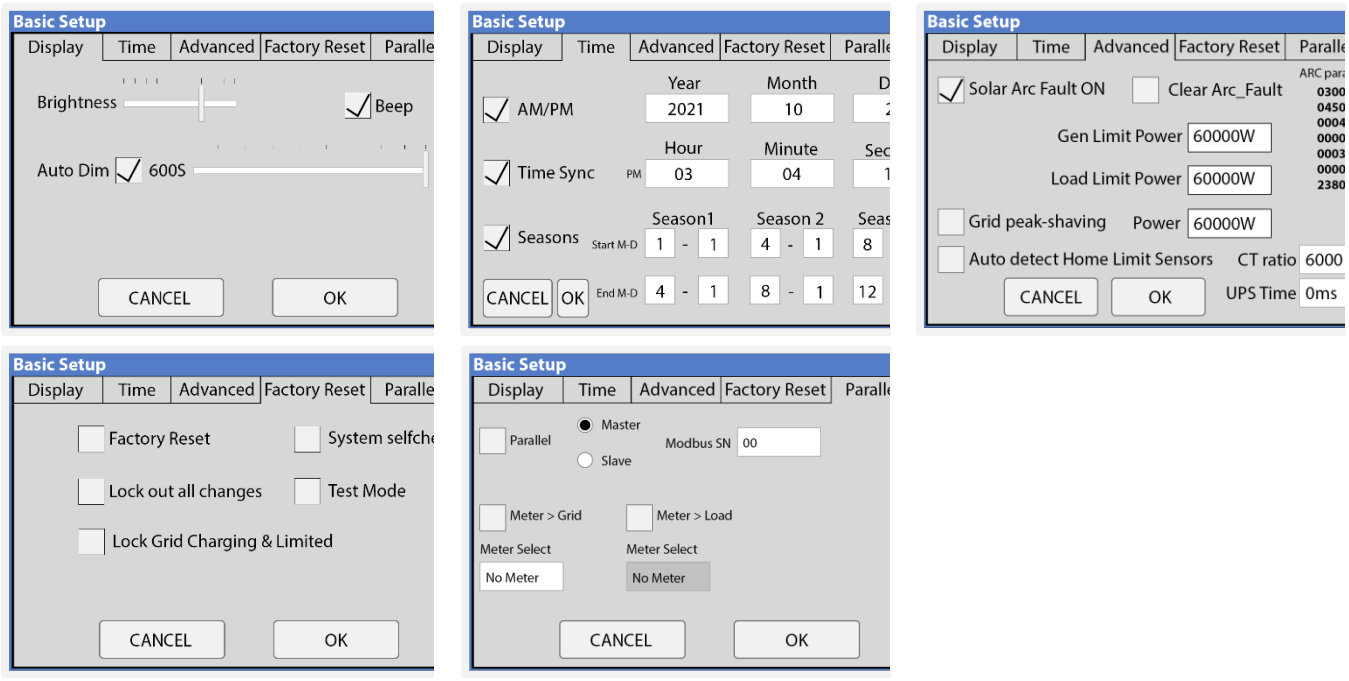



Figure 23: System Setup Screen Overview

# 3.3 Basic Setup




## Display

**Brightness**: Brightness adjustment (+, -).

**Auto Dim**: ⚠ Must be always enabled to maintain the warranty of the LCD screen.

**Beep**: Enable / disable the alarm beep.

## Time

**Time Sync**: Automatically syncs with the internet for daylight saving time changes (Enabling “Time sync” is recommended).

**Seasons**: Set up and customize the seasons for TOU.

**NOTE**: This must be programmed using the touch screen; it’s currently not supported on MySolArk.

## Advanced

**Solar Arc Fault ON**: Enables the Arc fault detection algorithm on the MPPTs.

**Clear Arc Fault**: Command to clear an Arc Fault.

- This must be executed manually after the system detects an F63 Arc Fault alarm. See “8.1 Sol-Ark Warning and Fault codes” on page 71 for more details.

**Gen Limit Power**: Limits the power drawn from the “GEN” AC source. The inverter will reduce battery charge when value is reached.

**Load Limit Power**: Sets a limit to the total “LOAD” output power. The max output power of the inverter is programmed by default.

**Grid-Peak Shaving**: Sets a “GRID” consumption threshold that allows use of battery backup power during peak demand. External CT sensors are required. Peak shaving can be used on a generator provided it is wired to the “GRID” terminal.

**Auto detect home Limit Sensor**: Detects and auto-corrects the polarity of the CTs. See “2.9 Connecting Current Transformers (CT Sensors)” on page 21.

**CT Ratio**: Specifies the transformation ratio of the CT. Default value of 6000:1 for the 300A/5A sensors included with the inverter

**UPS Time**: Backup transfer time to essential loads upon grid disconnection. Default value of up to 15ms.

## Factory Reset

**Restrictions**: Changes to these settings must be previously authorized by Sol-Ark technical support agents.

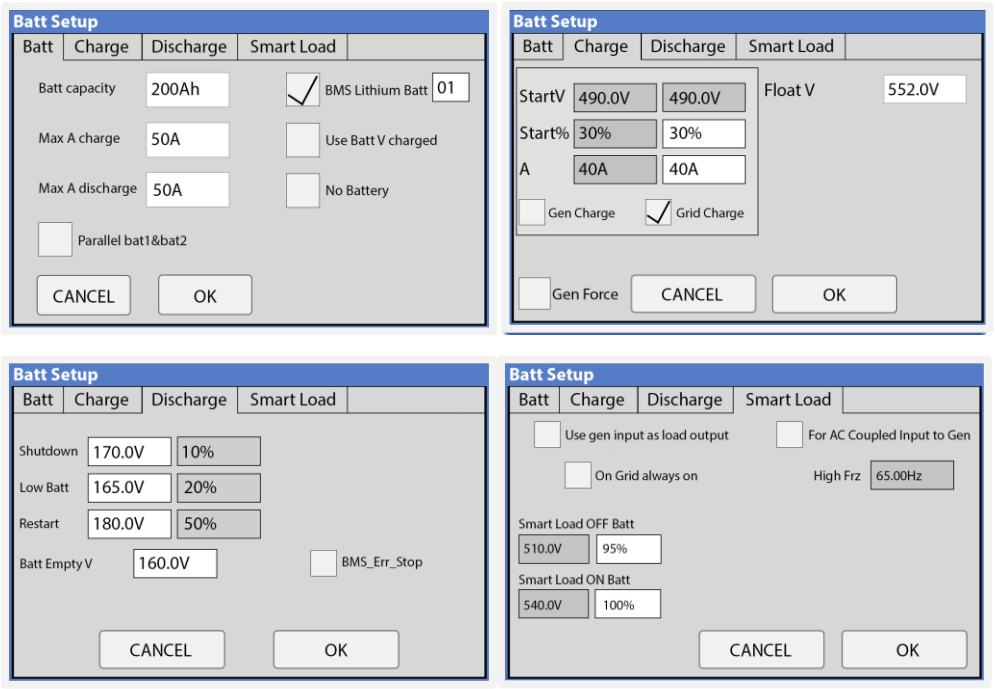
## Parallel

**Parallel**: Enables communications between parallel inverters. “Master” and “Slave” inverters must be programmed.

MODBUS SN: Identification number for each system configured in parallel (1,2,3,4, n).

**NOTE:** See “5. Parallel Inverters” on page 49 for more information.

# 3.4 Battery Setup




## Batt

Batt Capacity: Specifies the capacity of the battery bank. Value expressed in Amp Hour (Ah).

Batteries in series → Voltage adds up (V).

Batteries in parallel → Capacity adds up (Ah).

**Max A Charge**: Sets the maximum charge current (A) rate to the batteries when charged from solar power → 50 max allowed. 100A max total if using both battery terminals.

**Max A Discharge**: Sets the maximum discharge current (A) rate from the batteries → 50A max per port. 100A total if using both battery terminals. For off-grid systems, the battery bank will discharge 120% of this value for a 10 second surge before the inverter faults to prevent battery damage.

**BMS Lithium Batt** (required): Checked - Default is Protocol number 00 for Sol-Ark L3 Series batteries. Enables closed communications with batteries via CAN bus on BMS1 and BMS2 Ports. You can change the Protocol Number from 00 to another number to allow communication with other battery models.

**Use Batt V Charged**: Displays battery charge in terms of voltage.

**Parallel bat1&bat2**: Must be checked when using both battery inputs for the same battery bank. When enabled, the inverter will expect a single battery communication source. See “2.3 Battery Communications” on page 11.

## Charge

**Float V**: Lower steady voltage at which the battery is maintained after being fully charged.

- Not supported for Li-ion batteries.

**Gen Charge**: Uses the “GEN” AC source to charge the battery bank.

**Start V**: Voltage at which the system will auto-start and allow a generator or AC source to charge the battery.

**Start %**: SOC at which the system will auto-start and allow a generator or AC source to charge the battery.

**A**: Maximum rate of charge to the batteries (per terminal) from the generator or AC source (DC amps). Set the value according to the generator size.

**Grid Charge**: There are two scenarios in which this option is used:

- **Grid connected to "Grid" input**: The inverter will limit the charge rate to the set value in "A" and the battery will charge to 100% SOC.
- **Generator connected to "Grid" input**: You must select ☑ **GEN connect to Grid input**. The system will use "Start V", "Start%" and "A" conditions to charge the battery and stop charging at 95% SOC.
  - Adjustable upper limit if **Time of Use** is enabled.

**Gen Force**: Test function for generator auto-start. Enable and press **OK** to close normally open relay (CN2, pins 1,2) and force the generator on. Disable and press **OK** to disengage. The generator will not provide power during this test if grid power is available.

> **NOTE:** The genset must be in automatic mode if applicable and must have a two-wire start (dry-contact, normally open) connected to the Sol-Ark.

## Discharge

**Shutdown**: Battery voltage or percentage at which the inverter will shut down to protect the battery from an over-discharge situation (battery symbol on the home screen will turn red).

**Low Batt**: Low battery voltage or percentage (battery symbol on the home screen will turn yellow). Stopping point for TOU.

**Restart**: Battery voltage or percentage at which AC output will resume after previously reaching "shutdown".

**Batt Empty V**: Sets the empty voltage and associates this voltage to 0% SOC. This value determines the lowest percentage SOC limit.

**BMS_Err_Stop**: Enables a system stop when battery communications are lost.

> **CAUTION**: Do not exceed GEN port input/output current limit of 180Aac continuous.

## Smart Load

This mode uses the **"GEN"** input as a load output that delivers power when the battery exceeds a user programmable threshold or when the Sol-Ark is connected to the grid.

When ☑ **Use gen input as load output**" is enabled, the "GEN" input turns into an output to power high-power loads such as a water heater, irrigation pump, AC unit, pool pump, or any other load.

When ☑ **On Grid always on** is enabled, the "GEN" terminal will always output power as long as the grid is connected, regardless of battery charge.

**Smart Load OFF Batt:** Battery voltage or % at which the "GEN" terminal will stop outputting power.

**Smart Load ON Batt**: Battery voltage or % at which the "GEN" terminal will start outputting power.

**Solar Power (W)**: Amount of PV production needed before "GEN" terminal starts outputting power.

## AC Coupling Settings - (for AC Coupled Input)

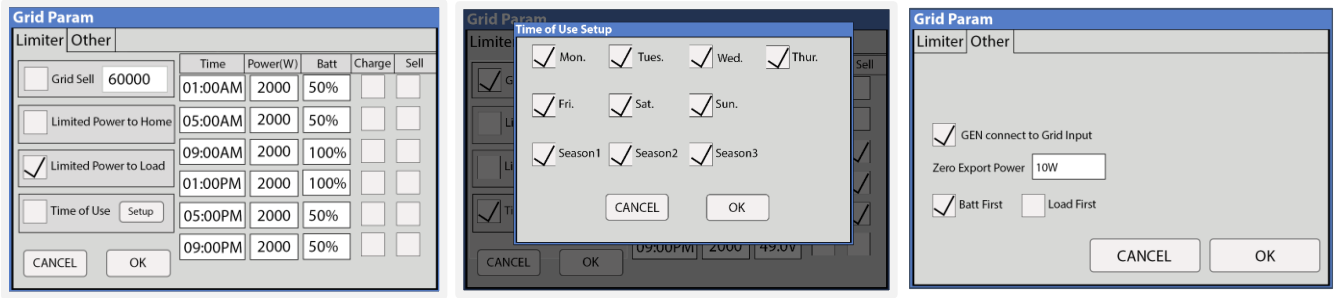
Grid-tied systems with AC coupled solar arrays must have ☑ **Grid Sell** enabled. Make sure that you are allowed to sell back to the grid.

To use the "GEN" terminal as an AC coupling input for micro inverters or string inverters, check the check box ☑ **For AC Coupled Input to Gen**

In off-grid systems, the Sol-Ark will use frequency shifting to control the AC coupled solution based on the battery SOC.

# 3.5 Limiter

The Sol-Ark 60K-3P-480V inverter will simultaneously utilize different available power sources to satisfy load demand in the electrical service panels (essential loads panel/main service panel). The following work modes let the user determine how power is generated and used.




## Grid Sell

The inverter will produce as much power as it has available from PV array according to the programming. The maximum power that can be generated from DC coupled arrays and sold to the grid is 60,000W.

### Description

This mode allows the inverter to sell back power generated from the solar arrays up to a programmable limit.

- The inverter will measure only loads connected to the “LOAD” terminal.
- The inverter will measure all power in/out of the “GRID” terminal as grid either consumption (**+**) or grid sell back (**-**).

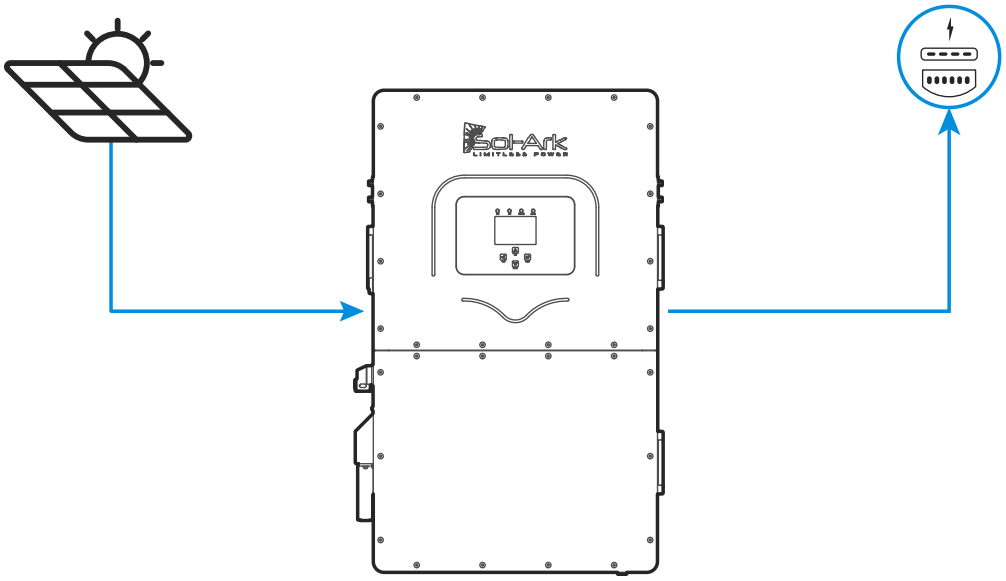


Figure 24: Operating Mode Diagram - Limited Power to Home

# Limited Power to Home

> **NOTE:** This operating mode REQUIRES batteries.

## Limited Power to Home (Meter Zero)

This mode limits the energy produced by the inverter to satisfy the total demand (essential loads panel + main service panel). In this mode, the inverter delivers power to the “LOAD” terminal (essential loads panel) + the “GRID” terminal (main service panel).

CT sensors **MUST** be installed. These sensors measure load consumption in the main service panel to offset total load demand and prevent selling to the utility. This system work mode is useful for users who don’t have a permit to sell back. See “2.9 Connecting Current Transformers (CT Sensors)“ on page 21 for proper external CT installation.

## Description

Power is delivered to all home loads without selling excess solar to the grid. This mode is suitable for systems where selling to the utility grid is not allowed.

- External CT sensors are required for proper operation.
- Monitored loads will be the addition of the main service panel + essential loads panel.
- Energy Priority: 1. Solar PV Power | 2. Grid Power | 3. Batteries | 4. Generator

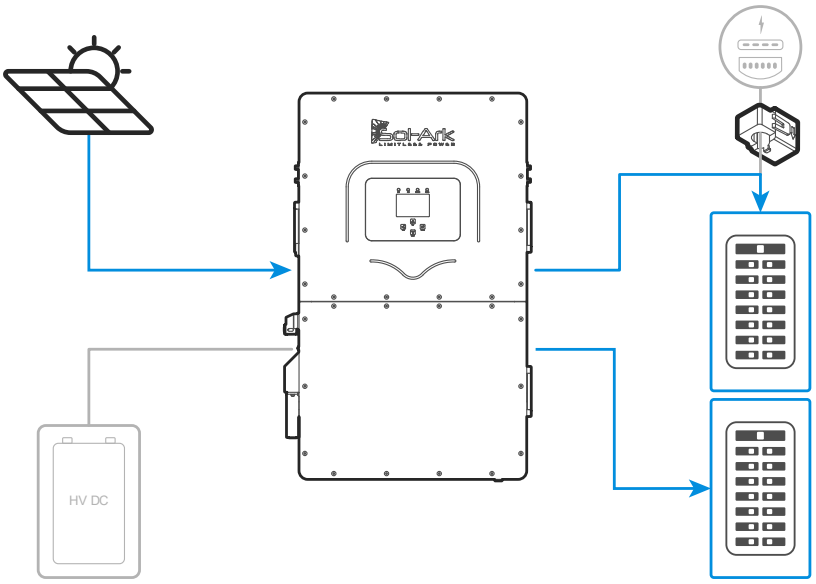



Figure 25: Operating Mode Diagram - Limited Power to Home

## Limited Power to Home + Grid Sell

This mode will NOT limit solar production to home demand. In this mode, the inverter delivers power to the “LOAD” terminal (essential loads panel) + excess power to the “GRID” terminal (main service panel AND grid). The Sol-Ark will monitor grid sell and load consumption simultaneously (with +/ - 3% error from CT sensors).

The CT sensors **MUST** be installed. The inverter will sell excess solar power up to a programmable limit.
See ”2.9 Connecting Current Transformers (CT Sensors)” on page 21 for proper external CT placement.

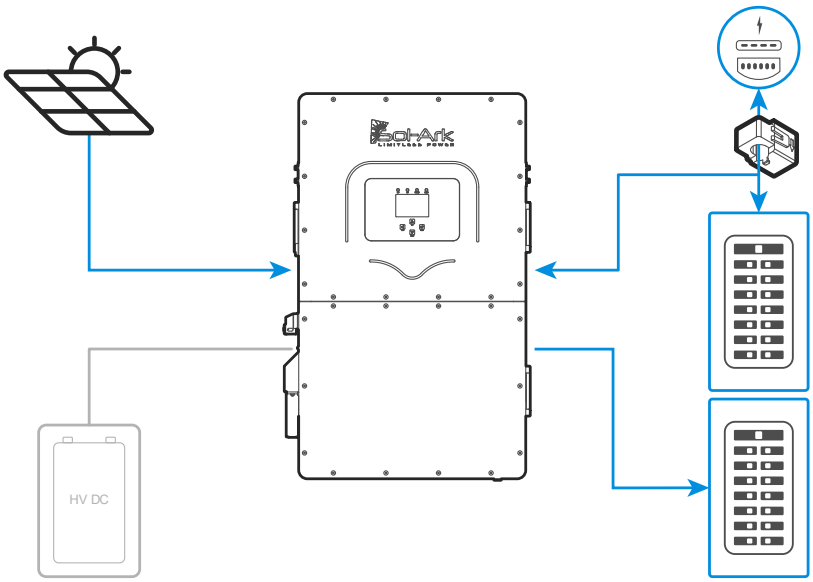



Figure 26: Operating Mode Diagram - Limited Power to Home + Grid Sell

# Limited Power to Load

This mode limits the solar production to cover “LOAD” demand (essential loads panel) exclusively. In this mode, the system disregards loads in the main service panel and will not deliver power to the “GRID” terminal.

> **NOTE**: This operating mode REQUIRES batteries.

## Description

- Power is limited to the “LOAD” demand. It will NOT produce more power than necessary.
- Power will NOT be delivered to the “GRID” terminal (NO grid sell).
- Monitored loads will be exclusive to the essential loads panel.
- This mode is recommended for off-grid applications.
- Energy Priority: 1. Solar PV Power | 2. Grid Power | 3. Batteries | 4. Generator

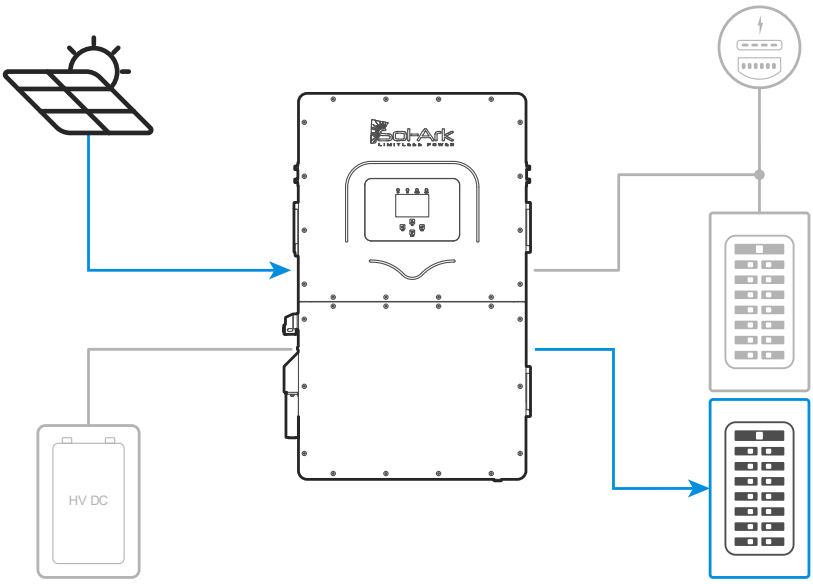



Figure 27: Operating Mode Diagram - Limited Power to Load

## Limited to Load + Grid Sell

This mode will NOT limit solar production to “LOAD” demand. The inverter delivers power to the “LOAD” terminal (essential loads panel) + excess power to the “GRID” terminal (main service panel AND grid), however it will track ONLY “LOAD” demand and sell excess solar up to a programmable limit. “GRID” loads cannot be measured, only the total output through the “GRID” terminal.

This mode is recommended for single inverter systems or for whole-site backup installations.

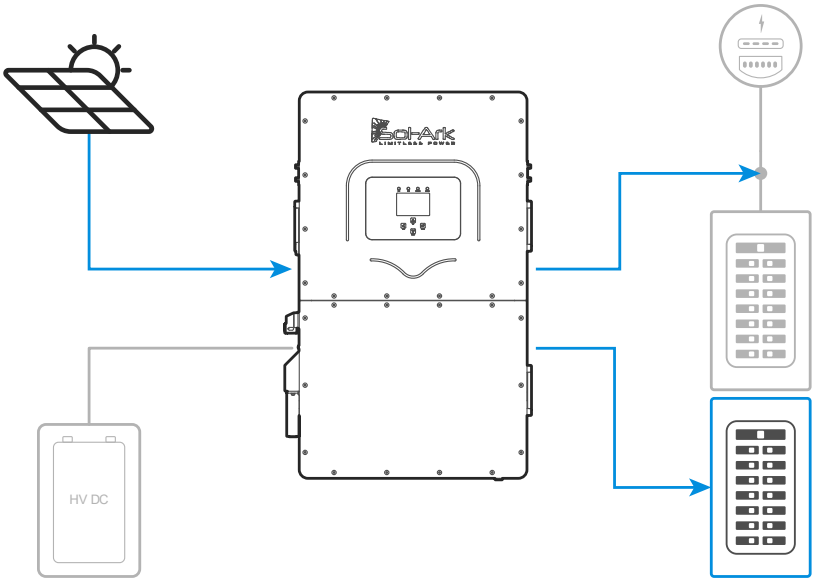



Figure 28: Operating Mode Diagram - Limited Power to Load + Grid Sell

## Time of Use

This mode combined with “Limited Power to Home” or “Limited Power to Load” lets you use battery backup power to reduce consumption from the grid during specific time intervals. Battery power will cover load demand at a programmable power rate “**Power(W)**” down to a programmable “**Batt (V / %SOC)**”. You can configure six different time intervals over a 24-hour period to cover a wide range of battery discharge or charge behaviors.

### Description

This mode uses battery power to reduce the power consumption during user-defined time intervals.

- **Power (W)** dictates the rate at which the battery discharges to assist with load demand.
- **Batt (V or %)** dictates the lower discharge limit or upper charge limit.

Energy Priority: 1. Solar PV Power | 2. Batteries (down to programmed discharge V or %) | 3. Grid Power | 4. Generator

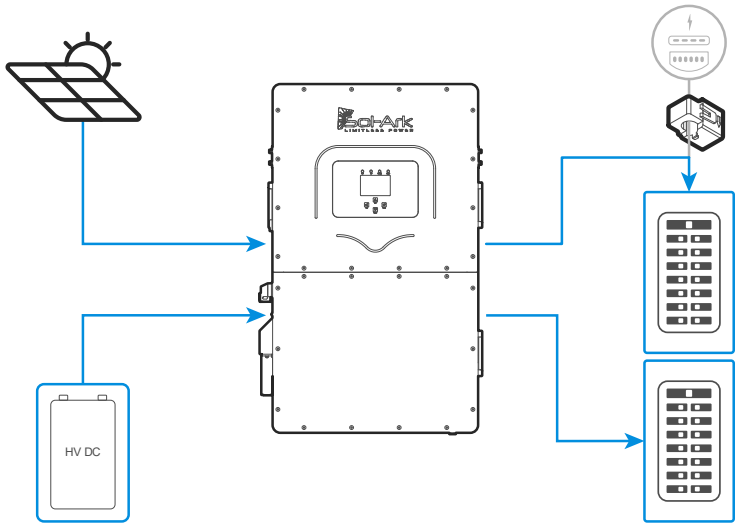



Figure 29: Operating Mode Diagram - Limited Power to Home + TOU

**Time**: Programable time intervals over a 24-hour period. All time slots **MUST** follow chronological order and must be programmed.

**Power(W)**: Sets the maximum discharge rate of the battery during the corresponding time slot.

**Batt**: V or % used to specify a lower discharge limit or upper charge limit whenever **"☑ Charge"** is enabled.

Grid-tied systems will not allow TOU to discharge lower than “Low Batt V/%”. Off-grid systems allow TOU discharge down to “Shutdown V/%”.

☑ **Charge**: During the hours selected, it is allowed to charge batteries from an external AC source up to a programmed voltage or %. If the external AC power source is a generator, the “Start V” or “Start %” condition must be fulfilled first. If available, the solar array will always charge the batteries at 100% regardless of **"☑ Charge"** in TOU.

☑ **Sell**: Batteries can discharge and sell power to the grid at the programable “Power(W)” rate. **“☑ Grid Sell**” MUST be enabled.

> **NOTE:** Do not enable “Charge” and “Sell” at the same time

## Other

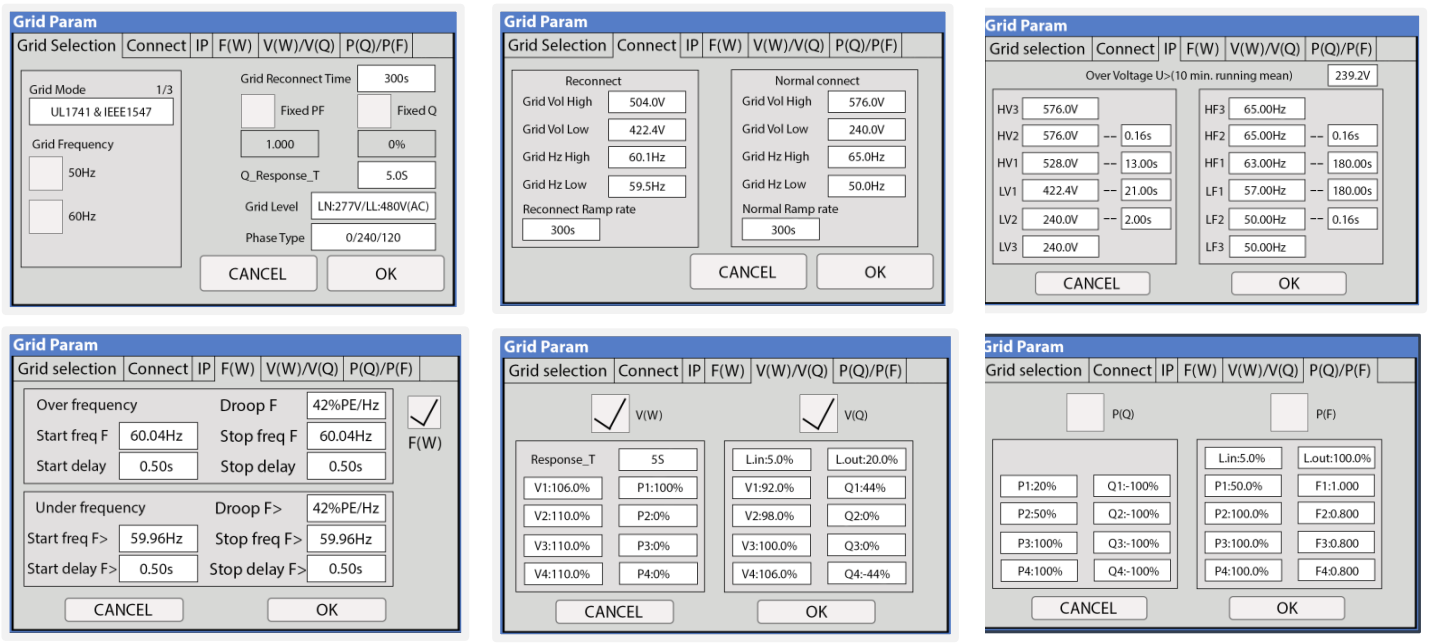
**GEN Connect to Grid Input**: Specifies when a generator is connected to the “GRID” terminal.

**Zero Export Power**: Minimum power imported from the grid. Helps avoid selling back by ensuring constant grid consumption. The value can be set between 1 – 100W (recommended 20W).

**Batt First**: Default and recommended option. Sets the solar power priority of the system to charge batteries first. Do NOT change unless instructed by Sol-Ark technical support.

**Load First**: Sets the solar power priority of the system to cover loads demand first and deliver remaining power to batteries.
This is recommended only for very specific situations.

# 3.6 Grid Setup




**WARNING:** Consult your utility before changing grid interconnection settings.

**DANGER! SHOCK HAZARD:** Ensure inverter settings for are correctly configured for 480V Delta or 277/480V Wye Service. Failure to configure the inverter correctly could lead to equipment failure, shock hazard, and/or serious injury.

**DANGER! DO NOT USE WITH 240V DELTA HIGH LEG SERVICES:** Delta High Leg or "Wild Leg" 3-phase systems have an unbalanced phase-to-neutral voltages that can severely damage the 60K inverter if connected, leading to equipment failure and/or serious injury.

## Grid Selection

**Grid Mode**: Tap and use navigation arrows to cycle through different grid modes:

1. General Standard: Applies general grid interconnection standards. Enables grid frequency and voltage adjustments.

**Note**: This is useful for off-grid applications with backup generators.

2. UL1741 & IEEE1547: Applies UL 1741 and IEEE 1547 grid interconnection requirements and standards.
3. CPUC RULE21: Applies California's grid interconnection requirements and standards.
4. SRD-UL-1741: Applies UL 1741SB grid interconnection requirements and standards.

**Grid Frequency**: Frequency of the AC sine wave.

**Grid Reconnect Time**: The amount of time in seconds the inverter will wait before reconnecting to the grid.

**Fixed PF**: Allows for power factor correction, ±0.8 to 1.0

**Fixed Q**: Allows for power factor correction based on desired reactive power percentage.

**Grid Level**: Tap and use navigation arrows to cycle through different nominal grid voltage levels.

⚠ Grid level must be selected according to nominal grid voltage.

1. **Most Common:** LN:277VAC LL:480VAC
2. LN:230VAC LL:400VAC
3. LN:220VAC LL:380VAC

**Phase Type**: Tap and use navigation arrows to specify phase sequence.

1. **Most Common:** 0/240/120: Positive sequence A-B-C
2. 0/120/240: Negative sequence A-C-B

**IT system-neutral is not GND**: Configures an inverter to operate in either a Wye or Delta configuration (see "Figure 27: Operating Mode Diagram - Limited Power to Load" on page 41).

1. **480V Delta** Configuration (3W **no** neutral): **Checked**
2. **277/480V Wye** Configuration (3W **with** neutral): **Un-Checked**

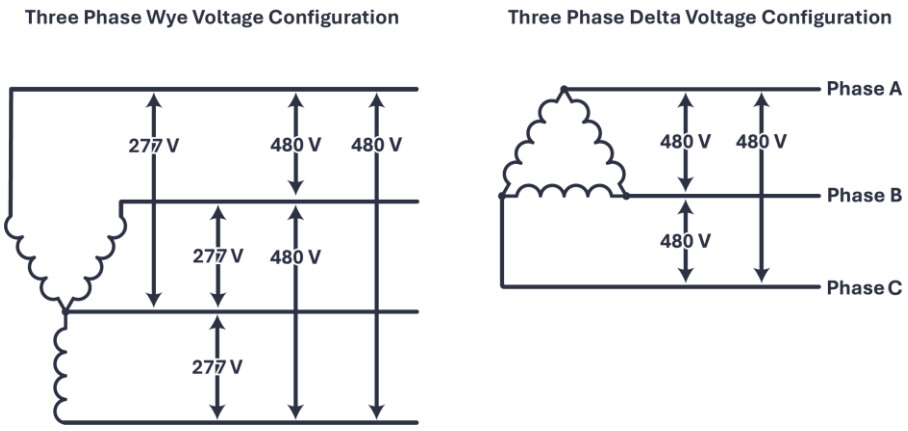



Figure 30: Wye versus Delta Voltage Configuration

## Connect

**Reconnect**: Parameters used to determine an allowable range of frequency and voltages to dictate a reconnection to the grid after initial grid loss. Frequency and voltages must be within these margins during Grid Reconnect Time to allow grid reconnection.

> Parameters will be set automatically based on selected grid mode compliance, unless "**General Standard**" is selected.

**Normal connect**: Parameters used to determine an allowable range of frequency and voltages to retain connection to the grid following a reconnect and normal operation.

> Parameters will be set automatically based on selected grid mode compliance, unless "**General Standard**" is selected.

**Reconnect Ramp Rate**: Reconnection power ramp time in seconds.

**Normal Ramp Rate**: Startup power ramp time in seconds.

## IP

**HV1/HV2/HV3**: Overvoltage protection point.

**LV1/LV2/LV3**: Undervoltage protection point.

**HF1/HF2/HF3**: Over frequency protection point.

**LF1/LF2/LF3**: Under frequency protection point.

## F(W)

**F(W)**: Enables the use of Frequency-Watt. The Sol-Ark regulates its power output to the grid as a function of the frequency to support grid stabilization during over and under-frequency conditions.

**Droop F**: Percentage of inverter's nominal power increase / decrease per Hert (Hz).

**Start freq F**: Frequency at which the inverter will start decreasing active power by the programmed Droop F percentage.

**Stop freq F**: Frequency at which the inverter will stop decreasing active power by the programmed Droop F percentage.

## V(W) / V(Q)

**V(W)**: Enables the use of Volt-Watt. The Sol-Ark regulates active power output to the grid as a function of voltage to support stabilization during over and under-voltage conditions.

**V(Q)**: Enables the use of Volt-VAr. The Sol-Ark regulates reactive power output to the grid as a function of the voltage to support stabilization during over and under-voltage conditions.

**V, P & Q**: Percentage of nominal grid voltage (V) to which the Sol-Ark will reduce its active power (P) or reactive power (Q).

## P(Q) / P(F)

**P(Q)**: Enables the use of Watt-VAr to regulate reactive power output according to programable active power parameters.

**P(F)**: Enables PF regulation according to programmable active power parameters.

# 4. Installation Tips

## Off-Grid Installation

1. Limit sensors (CTs) are not required for completely off-grid installations unless using **"Grid Peak Shaving"** for a generator connected to the **"GRID"** terminal.
2. Connecting generators to the **"GRID"** terminal is recommended to facilitate the integration "GEN" connected service panel. This setup enables the utilization of the **"Smart Load"** function.
3. There is no need for a transfer switch. Connect the "LOAD" output to the main panel.
4. **DO NOT** use "Grid Sell" mode when Off-Grid. **ONLY "Limited Power to Load"** (default).
5. When using a Generator in an Off-Grid situation, it is recommended to change the "**Grid Mode**" to **"General Standard"** and a **"Grid Reconnect Time"** to 30 seconds. See "2.5 Integrating a Generator" on page 15 for detailed instructions.
6. The Auto Gen-Start activates when the battery voltage (V) or percentage (%) reaches the pre-set "**Start V / %**" value. After that, the generator will sustain the charging process until the batteries reach approximately 95% capacity.
   This is a non-modifiable upper limit unless Time of Use is enabled and programmed.
7. Remember to set the battery capacity and reasonable charge/discharge rates.

## Grid-Tie PV Only, No Battery Configuration

1. Check the **"☑ No Battery"** setting: ☼ → **Battery Setup** → **Batt** → **No Battery .** The inverter will fault momentarily.
2. A complete **Power Cycle IS REQUIRED** when changing the battery mode to **No Battery.**
   See "2.13 Power Cycle Sequence" on page 29 for detailed instructions.
3. Enable **"☑ Grid Sell"**: ☼ → **Limiter** → **Grid Sell**. Make sure to disable all other modes.
4. Tap the battery Icon to access the **Details** screen and verify grid parameters and power import/export.

# 4.1 Battery Charge Controller

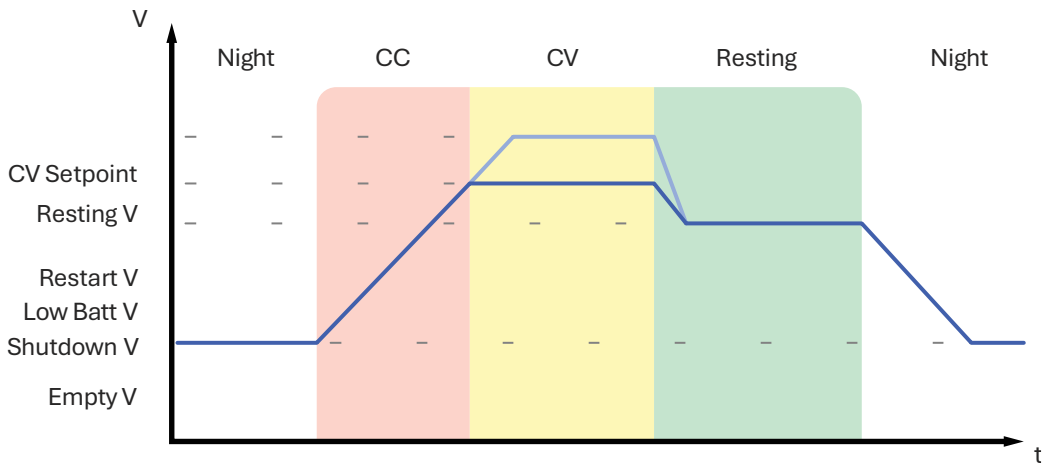



Figure 31 Charge Controller Curve

## 2-Stage Charging

The MPPT charge controller is 2 stage (CC/CV) type controlled by the BMS when in closed loop mode for optimized and safe charging. Fig 33 shows the charging stage sequence.

## Constant Current (CC) Stage

In the Constant Current stage, the battery is not at a 100% state of charge and has not yet reached the Constant Voltage setpoint. The controller will deliver 100% of available solar power to recharge the battery.

## Constant Voltage (CV) Stage

When the battery has reached the Constant Voltage setpoint, the Sol-Ark inverter will regulate charging current to maintain the batteries voltage at the CV setpoint, preventing overcharging. The battery is allowed to come to a full state of charge at the CV setpoint. Constant Voltage lasts until the BMS sets the Charge Current Limit to 0A.

# 4.2 Grid Compliance Settings

For required local Grid Compliance settings, see the application notes on the Sol-Ark Knowledge Hub.

**CAUTION:** Do not exceed continuous GEN port input/output of 180Aac.

**CAUTION:** Settings below are illustrative, exact values should be confirmed with your utility.

# 5. Parallel Inverters

## 5.1 Before Enabling Parallel Operations

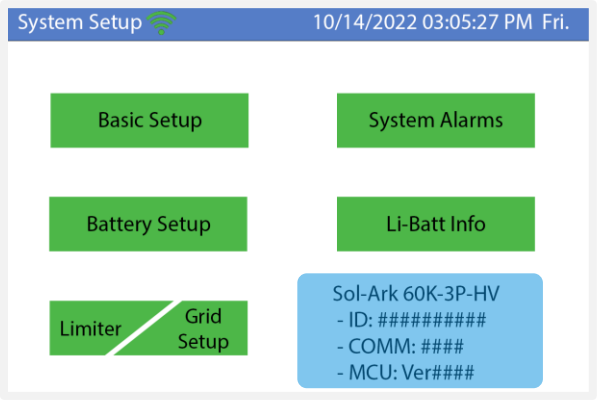



Figure 32:Software Version

A. Make sure all units in parallel have the same firmware version by verifying the **"COMM"** and **"MCU"** numbers on the **System Setup** screen, (highlighted in blue).

B. To ensure you have the latest firmware, visit https://www.Sol-Ark.com/resources/software-updates/ to schedule an update, or contact Sol-Ark Technical Support.

C. ⚠ Parallel systems **REQUIRE** that each inverter has its own HV battery / battery bank.

D. If you do not have batteries on all inverters only parallel the units which have a battery bank. All other units should be set to **"Grid Sell"** under **Settings→Limiter**.

E. All GRID, GEN, and LOAD ports must be electrically parallelled with **ALL** parallel inverters.

## DIP Switch Configuration for Parallel Systems

In parallel systems, set the DIP Switches according to the table below.

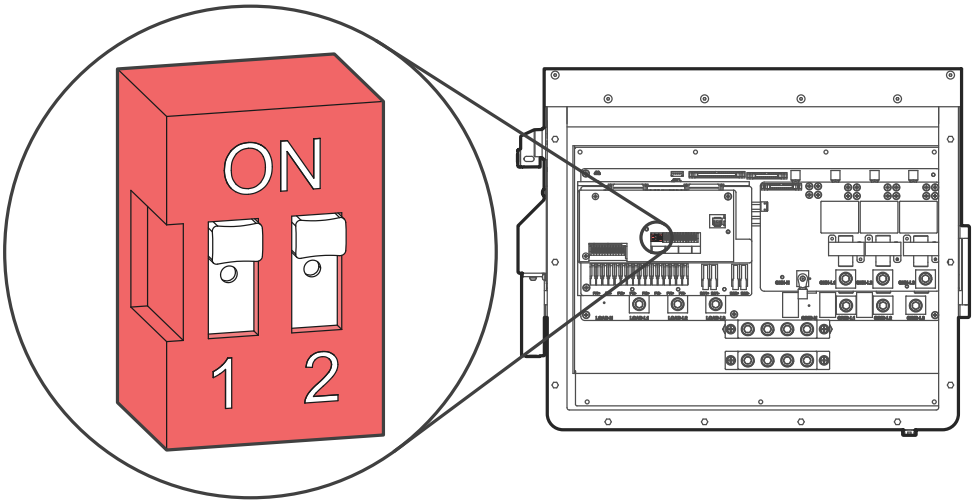



Figure 33 Inverter Communication Settings DIP Switch

| Inv 1 (Master) | Inv 2 | Inv 3 | Inv 4 | Inv 5 | Inv 6 | Inv 7 | Inv 8 | Inv 9 | Inv 10 |
|---|---|---|---|---|---|---|---|---|---|
| OFF | | | | | | | | | |
| ON | ON | | | | | | | | |
| ON | ON | ON | | | | | | | |
| ON | ON | ON | ON | | | | | | |
| ON | ON | ON | ON | ON | | | | | |
| ON | ON | ON | ON | ON | ON | | | | |
| ON | ON | ON | ON | ON | ON | ON | | | |
| ON | ON | ON | ON | ON | ON | ON | ON | | |
| ON | ON | ON | ON | ON | ON | ON | ON | ON | |
| ON | ON | ON | ON | ON | ON | ON | ON | ON | ON |

## Parallel System Output Specifications 277/480V 3-Phase

| # of inverters in parallel | Continuous output power (kW) | Cont. Grid Pass Through Current (A) | Peak power 10 sec (kVA) |
|---|---|---|---|
| 1 | 60 | 180 | 90 |
| 2 | 120 | 360 | 180 |
| 3 | 180 | 540 | 270 |
| 4 | 240 | 720 | 360 |
| 5 | 300 | 900 | 450 |
| 6 | 360 | 1080 | 540 |
| 7 | 420 | 1260 | 630 |
| 8 | 480 | 1440 | 720 |
| 9 | 540 | 1620 | 810 |
| 10 | 600 | 1800 | 900 |

# 5.2 Parallel Systems Programming

1. Program each inverter for parallel operation: ☼ → **Basic Setup** → **Parallel** → **"☑ Parallel**
2. Assign a **"Master"** inverter, **Modbus SN: 1**
3. Assign all other units as **"Slave" | Modbus SN: 02, 03, 04**…etc.
4. Connect communication cables between the inverters using the included RJ45 cable in daisy-chain configuration between ports: "Parallel_1" or "Parallel_2" from **Master** to **Slave** and then from **Slave** to **Slave** after that.
5. Perform a power cycle (see "2.13 Power Cycle Sequence" on page 29 for instructions).
6. Once the power cycle is completed, turn on the "**Slave**" units **FIRST**. Then turn ON the "**Master**" **LAST**.
7. Inverters will likely fault momentarily with F29 and F41 codes until all inverters are ON.

> **NOTE:** When integrating a generator, it must be connected to all the systems in parallel. The inverter assigned as "Master" will control the two-wire start feature so the generator contacts should be connected to this inverter only.

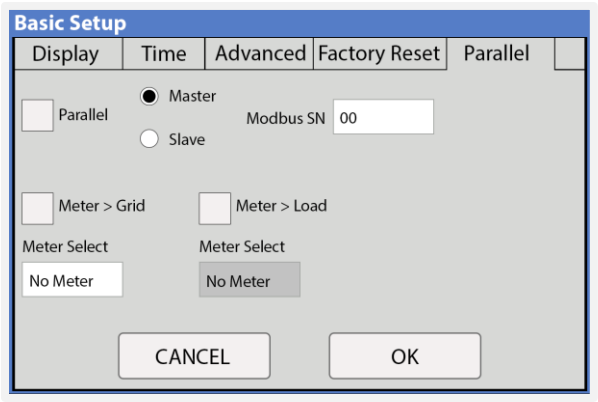



Figure 34 Parallel Setup Tab

> **NOTE:** If an inverter goes into a fault state, all other units will stop and the system will automatically try to restart. If the system faults 5 consecutive times, it will stop completely and it will require a manual restart. See "2.13 Power Cycle Sequence" on page 29 for detailed instructions.

# 5.3 Troubleshooting Phase Sequence

⚠ If the screen of the Sol-Ark inverter shows the error in Figure 35, make sure that the phase sequence follows the **"Phase Type"** programmed under ⚙ → **Grid Setup** → **Grid Selection**. The message "Grid Phase Wrong" is displayed when the inverter does not detect the correct phase sequence. This situation can cause overloads faults in the system (F18, F26, F34) even with the "LOAD" disconnected and **WILL CAUSE DAMAGE** to the equipment if it is not corrected.

If the programmed phase type is **"0/240/120"**, ensure the wiring follows a positive sequence **A-B-C.** If the programmed phase type is **"0/120/240"** ensure the wiring follows a negative sequence **A-C-B**.

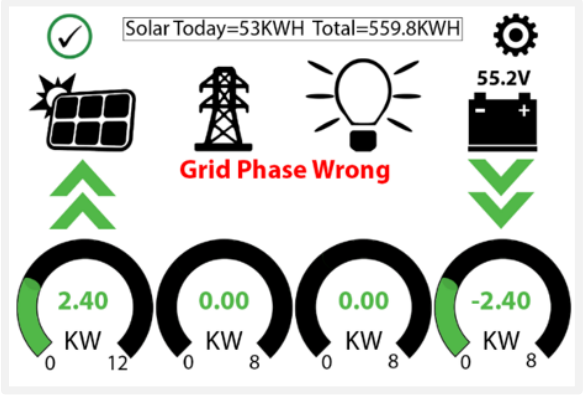


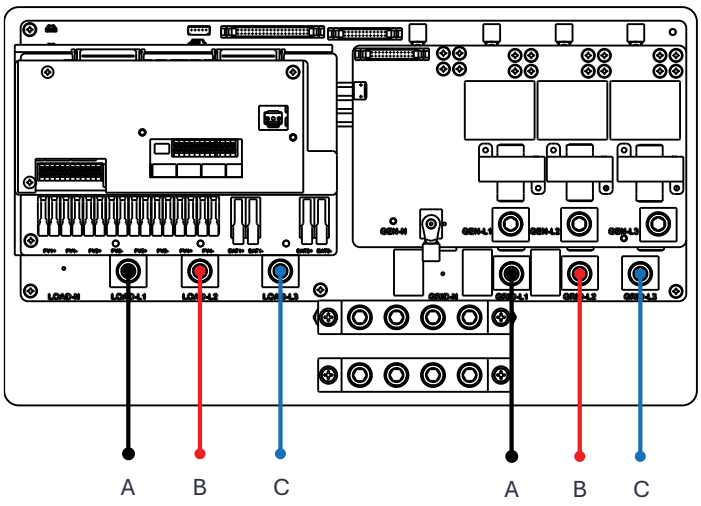

Figure 35 Grid Phase Wrong Error

## Troubleshooting **Grid Phase Wrong**

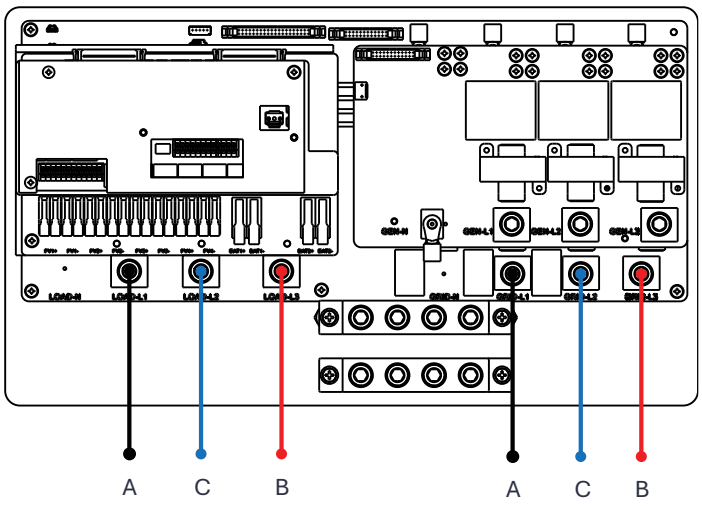
- Measure L-L voltages from "GRID" to "LOAD" terminals.
- Voltage between lines should be 0Vac.
- Measuring a voltage different than 0Vac means the lines are not the same phase.

Be sure to check both "GRID" and "LOAD" terminal connections; both must be correct. If the error remains, check your AC connection beyond the inverter, and verify that the phases are correctly labeled from your meter.

**0/240/120**




**0/120/240**



# 6. MySolArk: Remote Monitoring


**MySolArk** is a powerful and comprehensive tool designed for remote system monitoring of Sol-Ark inverters and solar systems. This remote monitoring solution offers detailed insights into energy generation and power consumption, allowing users to track system performance with great precision. MySolArk displays all relevant electrical data on easy-to-understand energy generation graphs, providing a comprehensive overview of electrical usage.

Beyond its monitoring capabilities, MySolArk offers the flexibility to remotely adjust inverter settings, allowing you to seamlessly configure your system from any location. This ensures that you can fine-tune parameters to optimize performance effortlessly. With MySolArk, you can confidently manage you solar systems and inverters to always ensure peak performance and efficiency.

Go to www.mysolark.com to access the desktop version.

## 6.1 MySolArk Setup Instructions

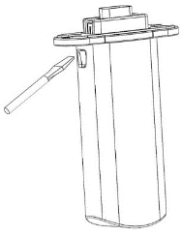
### Connecting to MySolArk through Ethernet

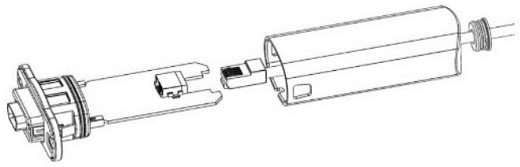
A. Remove the plastic enclosure of the dongle by pressing the plastic latches with a flat screwdriver as shown in the figure below.

B. Insert the ethernet cable through the plastic enclosure and connect the cable to the RJ45 port.

C. Reassemble the dongle housing and plug the dongle into the Sol-Ark, securing it with screws. You'll see solid red and green lights after a couple of minutes.

D. Follow the "Step 1" instructions on the next page to create a plant on MySolArk.





### Connecting to MySolArk through Wi-Fi

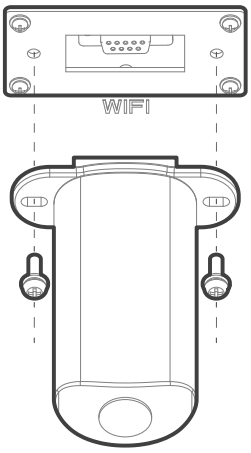
A. Plug the Wi-Fi dongle into the Sol-Ark DB-9 port.

B. Use two M4X10 screws to secure the dongle to the port.

C. Follow Steps 1-3 in order to:

   a. Create a plant on the MySolArk monitoring platform.

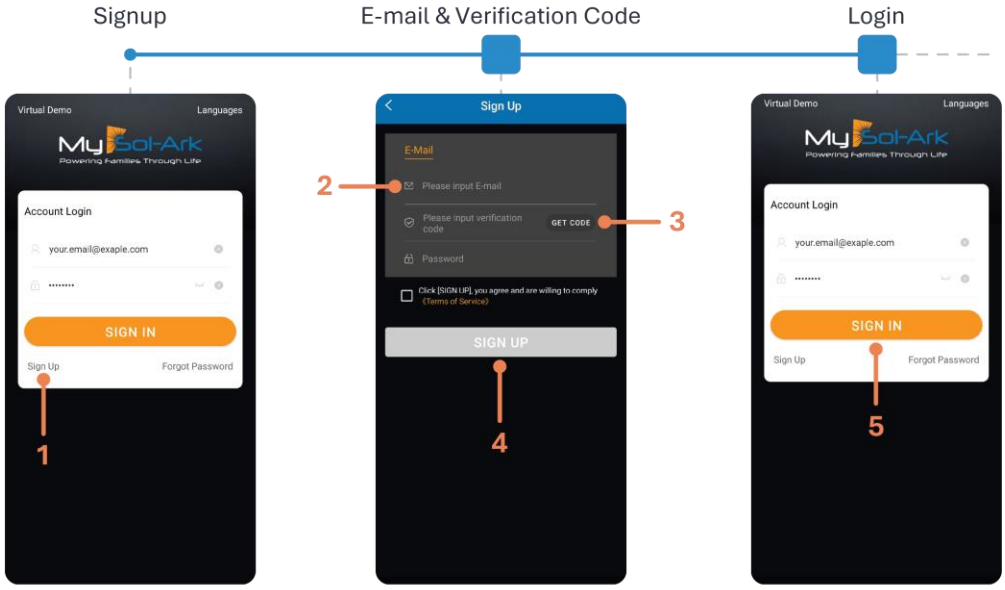
   b. Connect the dongle to MySolArk through a Wi-Fi network.



## Step 1: Create a “Plant” on MySolArk

A. **Download and install the “MySolArk” app** for android or apple smartphones. QR codes are provided below.


B. Create a MySolArk account and log in.

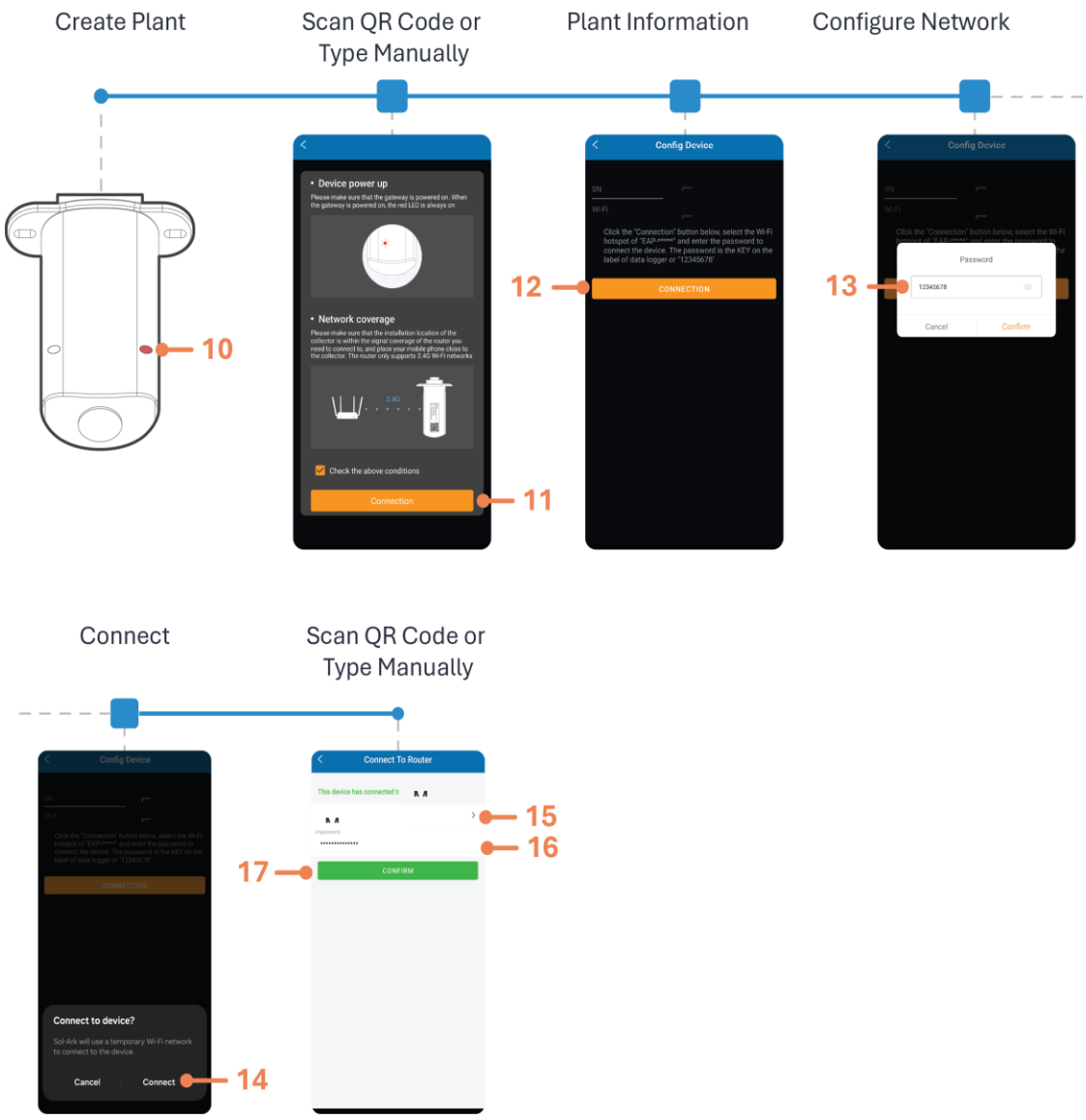


C. Create the Plant.

> **For Installers**:
> Create the plant and configure the system before sharing it with the owner.
> After creating and configuring the plant, the installer can share and grant manager permissions to the owner by navigating to **My Plants → … → Share → Add Account**.
> The homeowner must create their own **MySolArk** account first.

## Step 2: Configure Wi-Fi network though MySolArk

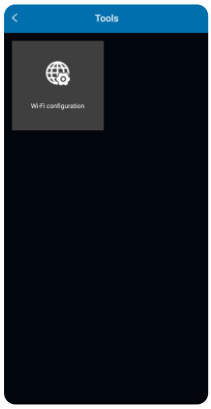
D. Configure Wi-Fi network.




**Note**: You can access the Wi-Fi configuration tool at any other time by tapping **Me** at the bottom right corner, then **Tools → Wi-Fi configuration**. Step 3 shows another method of connecting the Wi-Fi dongle to a local network through an IP address.

## Step 3 (alternate method): Configure Wi-Fi Network Through an IP Address

An alternative to the “Distribution Network” configuration at the end of Step C, or using the “Wi-Fi configuration” tool, you can configure a Wi-Fi network through an IP address.



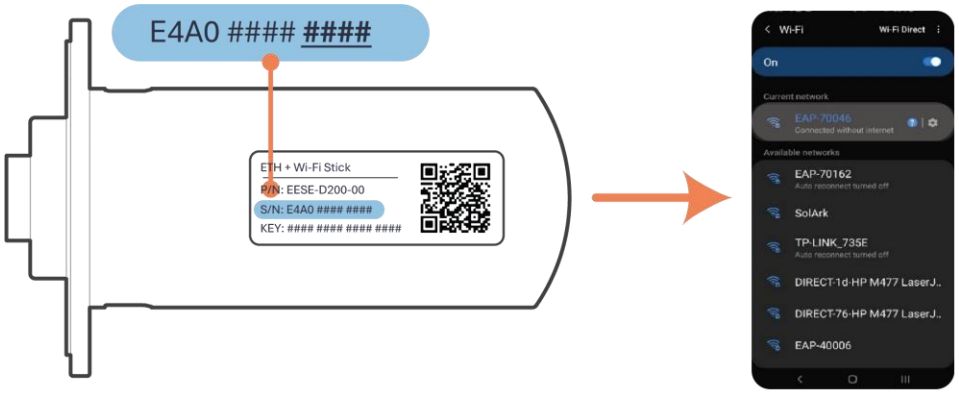

A. On a Smart Phone or Computer, connect to the **EAP-#####** network.
Go to: **Settings > Wi-Fi > EAP-##### network**.

B. Type in the password, which depends on the product you received:

- *If you see “**KEY**” printed on the dongle*, the 16-digit password is printed there
- *If there is no “**KEY**” printed on the dongle,* the password is **12345678**

The EAP-##### network contains the last 5 digits of the Dongle serial number. You can find this number on the label.

C. A message such as “Connected without internet” appears when the device is connected to the EAP-#####.




Locating the Dongle Network Name

**NOTE:** The Wi-Fi dongle does NOT provide internet access. It needs an external internet provider to connect to. The dongle is compatible with Wi-Fi signal broadcasted at 2.4 GHz (it is not compatible with 5 GHz networks)

D. After you’re connected, open an internet browser on the same device, such as Safari, Chrome, Firefox, Edge, or any other browser.

E. On the address bar (http://.....), type the IP address: **10.10.10.1** as shown in the figure below. If you cannot access the configuration page, try again on a different device.

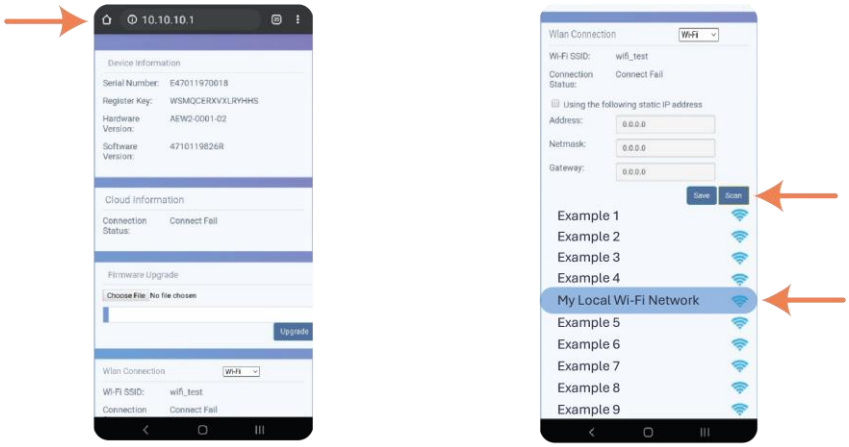
F. Scroll down to the "**Wlan Connection**" section and tap the **Scan** button to scan for local Wi-Fi networks.

G. Nearby Wi-Fi networks will appear. Select the local network you want to connect to, input your credentials, and tap **Connect**.

H. Once connected, a “Connection Successful” message will appear. Tap the **Save** button next to **Scan** to save settings.

I. Wait about 5 minutes. The dongle will connect to the Wi-Fi network and will then have access to MySolArk.

**NOTE**: DO NOT connect to the EAP-##### network as that is the Wi-Fi dongle itself. The device does not provide internet access.



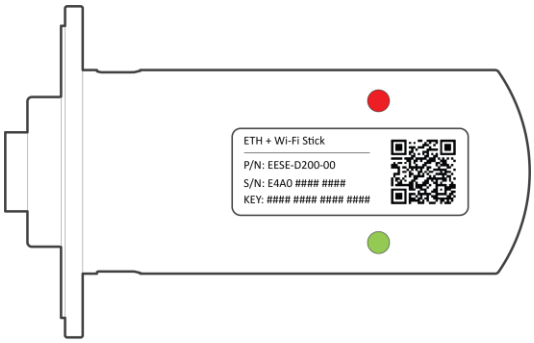

a. Internet Browser IP Address

b. Wi-Fi Network Scan

If the connection succeeds, you'll see the following LED indicators.

**SOLID** : Connected and powered by the Sol-Ark inverter.

**SOLID** : Connected to the router and to MySolArk.




Wi-Fi Dongle LED Indicators

**NOTE: Local Dongle Connection**
Connecting through the local hotspot broadcast by the dongle is only meant to provide access to the Wi-Fi dongle for troubleshooting or firmware updates.
Users must still create a MySolArk account and must create a Plant to access monitoring data.

# 6.2 LED Indicator and Troubleshooting

When both the red and green LEDs on the Wi-Fi dongle are consistently lit, it signifies normal operation, while flashing indicates data transmission. If this isn't the case, reference the next table of LED indications for troubleshooting and corrective measures.

**RED LED**: Device communication indicator.

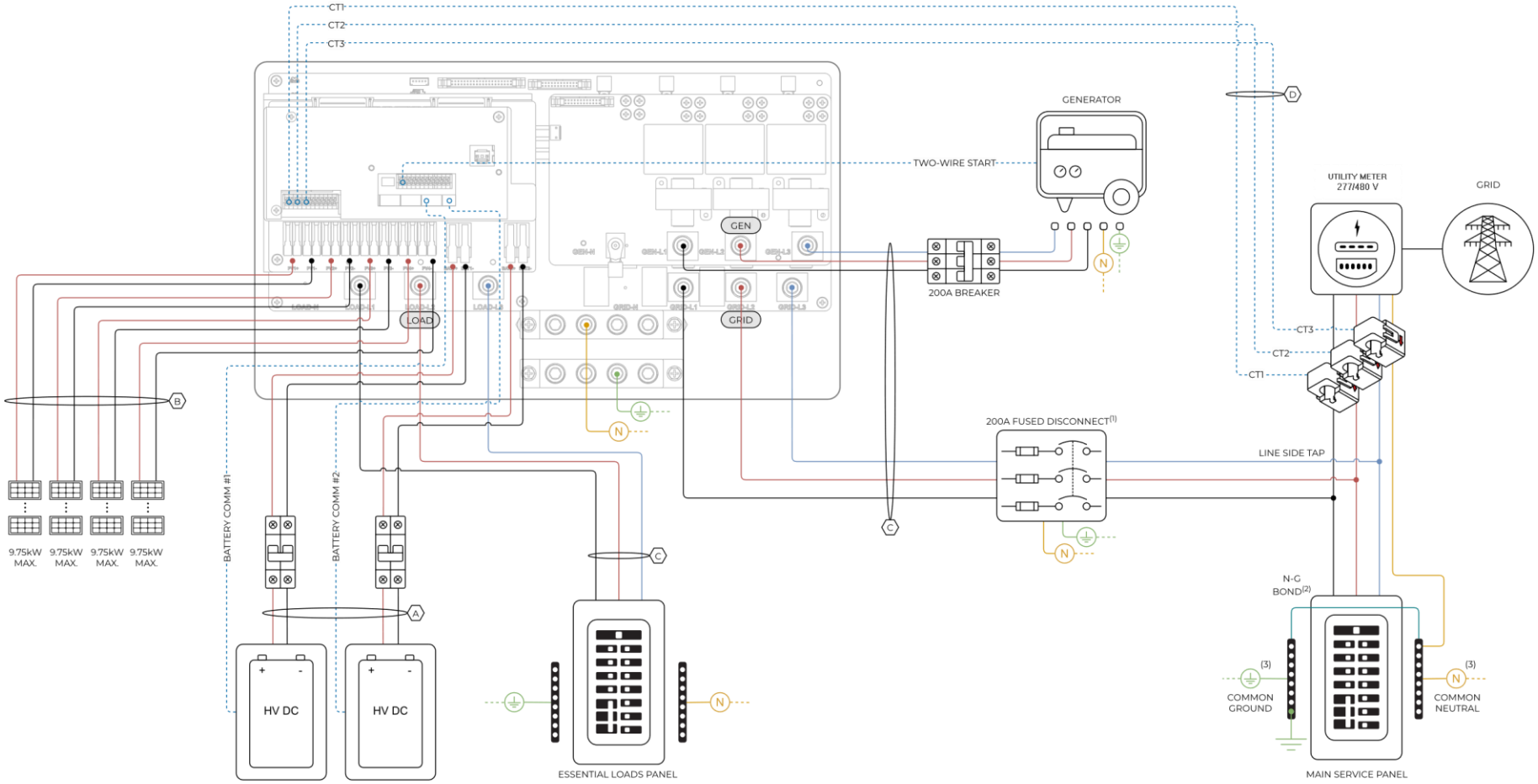
**GREEN LED**: MySolArk server communication indicator.

| LED | State | Indication |
|---|---|---|
|  | Initial flashing, then constant illumination | Normal communication. |
| | Initial flashing but no further illumination | Communication failure. Check proper device connection. |
| | LED not illuminating | Power supply or device is abnormal. Contact technical support. |
|  | 5 second illumination interval | Normal communication. |
| | 1 flash every minute | Router not connected. |
| | 3 flashes every minute | Connected to router but no internet access. Usually, a VPN or firewall issue. Ports 80 and 51100 must be enabled. |
| | 4 flashes every minute | Device communication error. Contact Sol-Ark Support. |
|  | 2 synchronized flashes | Ethernet cable inserted |
|  | 3 synchronized flashes | Ethernet cable disconnected |

# 7. Wiring Diagrams

**CAUTION:** These diagrams are illustrative and not exhaustive. They may not cover all variations required by local codes and should not be solely relied upon for permitting or warranty purposes. Consult relevant authorities and ensure full compliance before installation. Installers should exercise caution, seek professional advice when necessary, and adhere to established electrical standards and regulations during all installations.

# 7.1 Standard Wiring Diagram




(1) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE

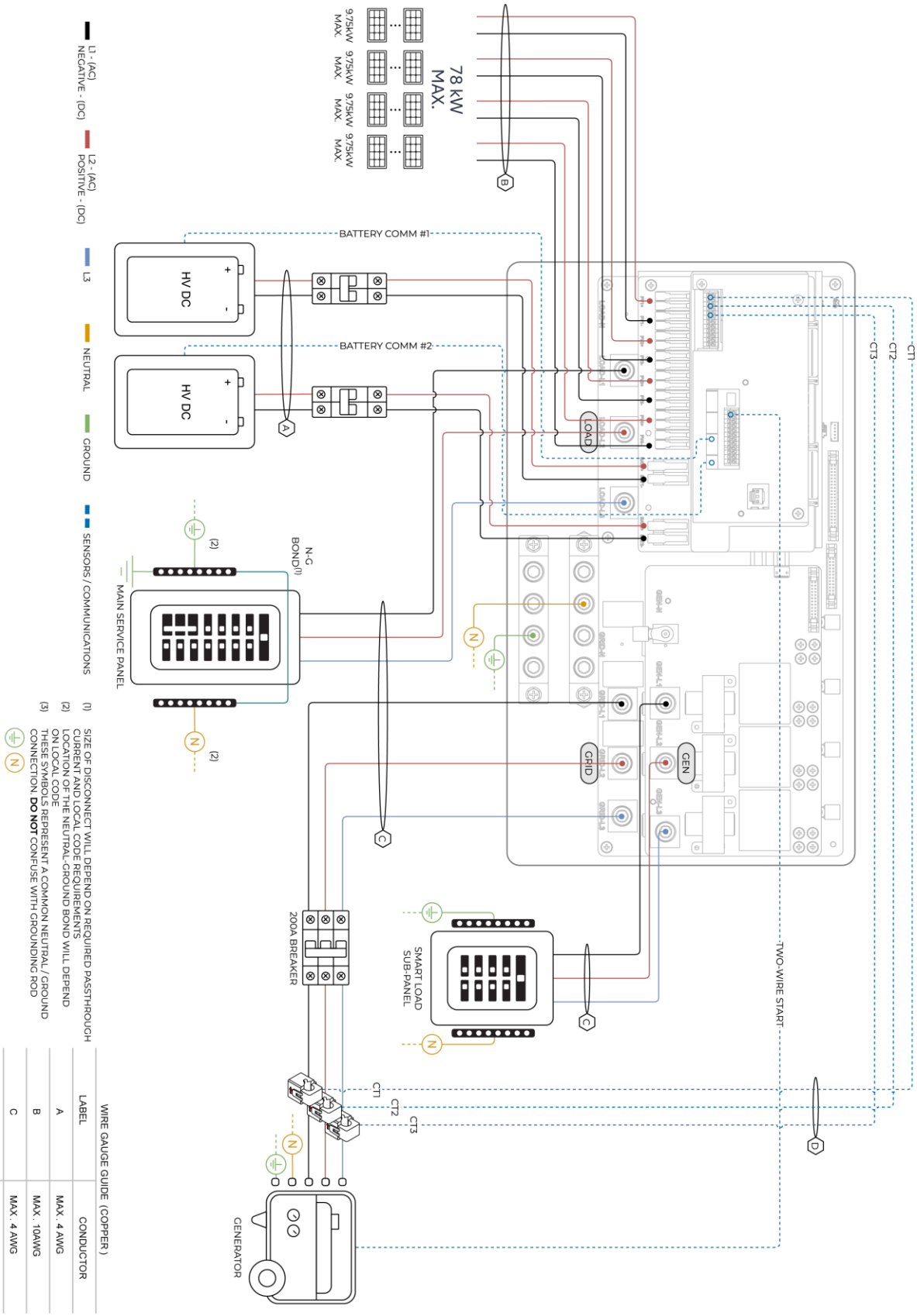
(2) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX. 4 AWG |
| B | MAX. 10 AWG |
| C | MAX. 4 AWG |
| D | 24 - 23 AWG CAT6 |

Diagram 01

# 7.2 Standard Wiring Diagram – Off Grid




(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS

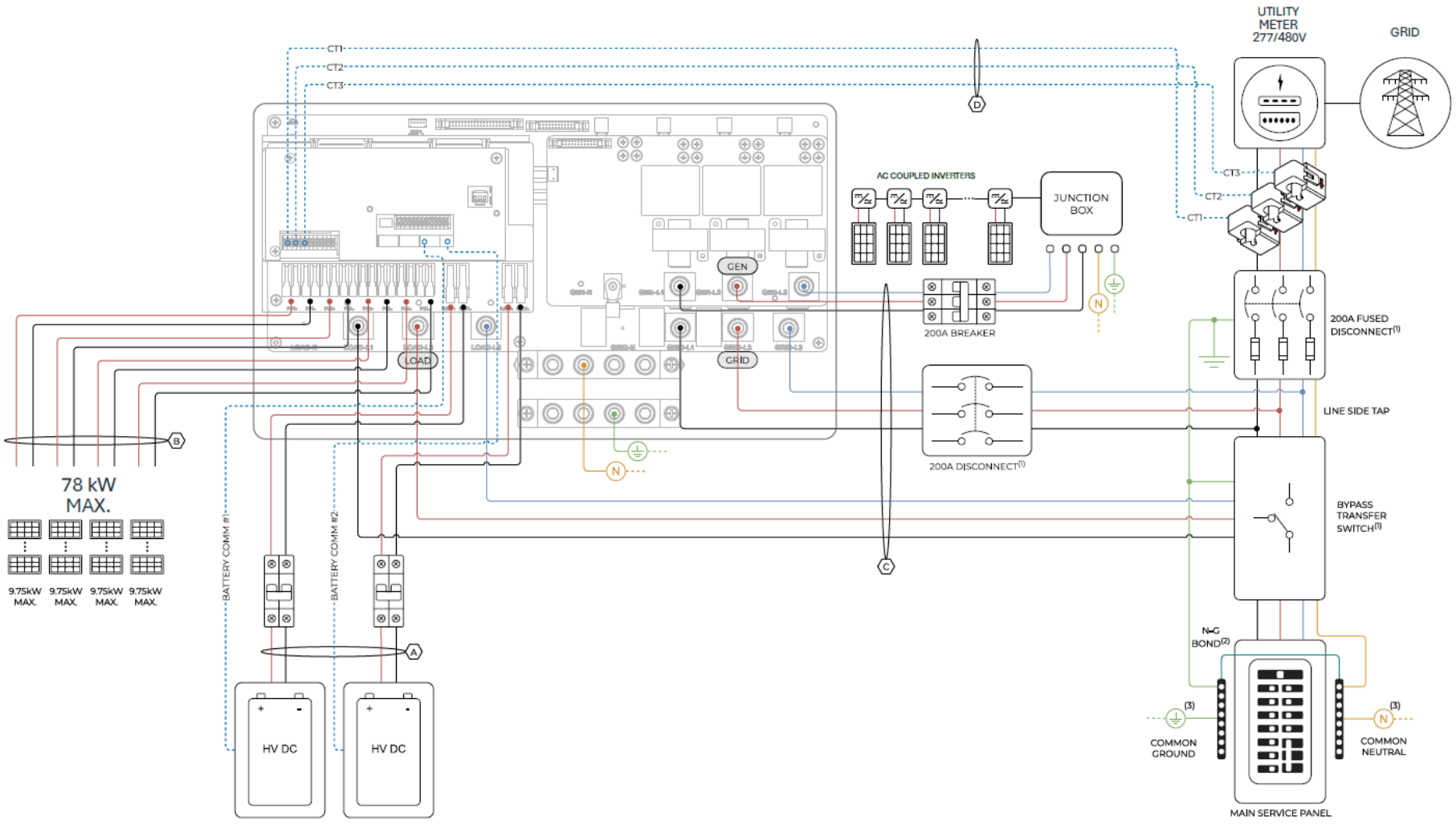
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE

(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

| WIRE GAUGE GUIDE (COPPER) | |
|---|---|
| LABEL | CONDUCTOR |
| A | MAX . 4 AWG |
| B | MAX . 10AWG |
| C | MAX . 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 02

# 7.3 Standard Wiring Diagram – **AC Coupling**



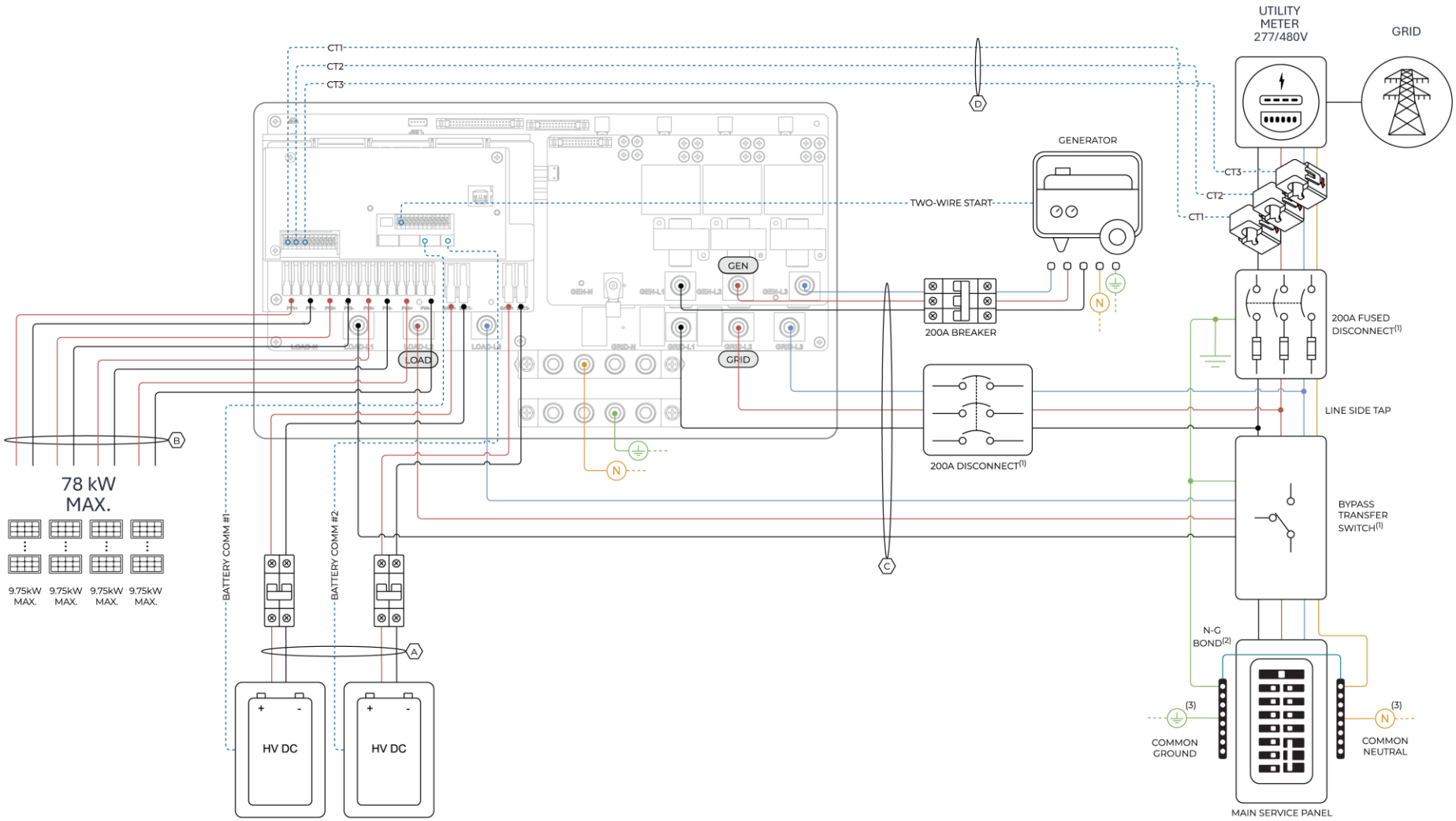

(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX . 4 AWG |
| B | MAX . 10AWG |
| C | MAX . 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 03

# 7.4 Standard Wiring Diagram – **Bypass Transfer Switch**




L1 - (AC) NEGATIVE - (DC) | L2 - (AC) POSITIVE - (DC) | L3 | NEUTRAL | GROUND | SENSORS / COMMUNICATIONS

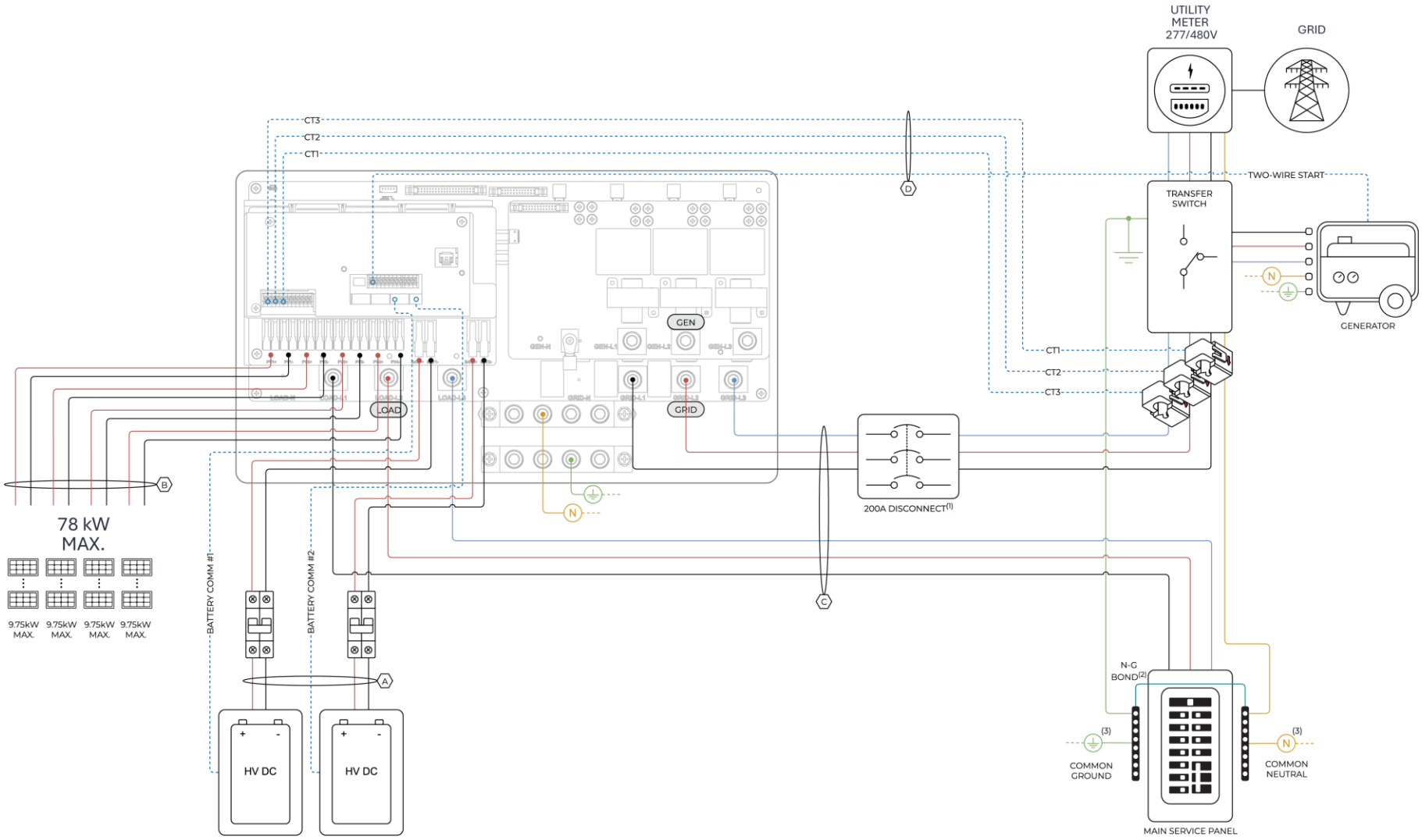
(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX . 4 AWG |
| B | MAX . 10AWG |
| C | MAX . 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 04

# 7.5 Standard Wiring Diagram – **Standby Generator**



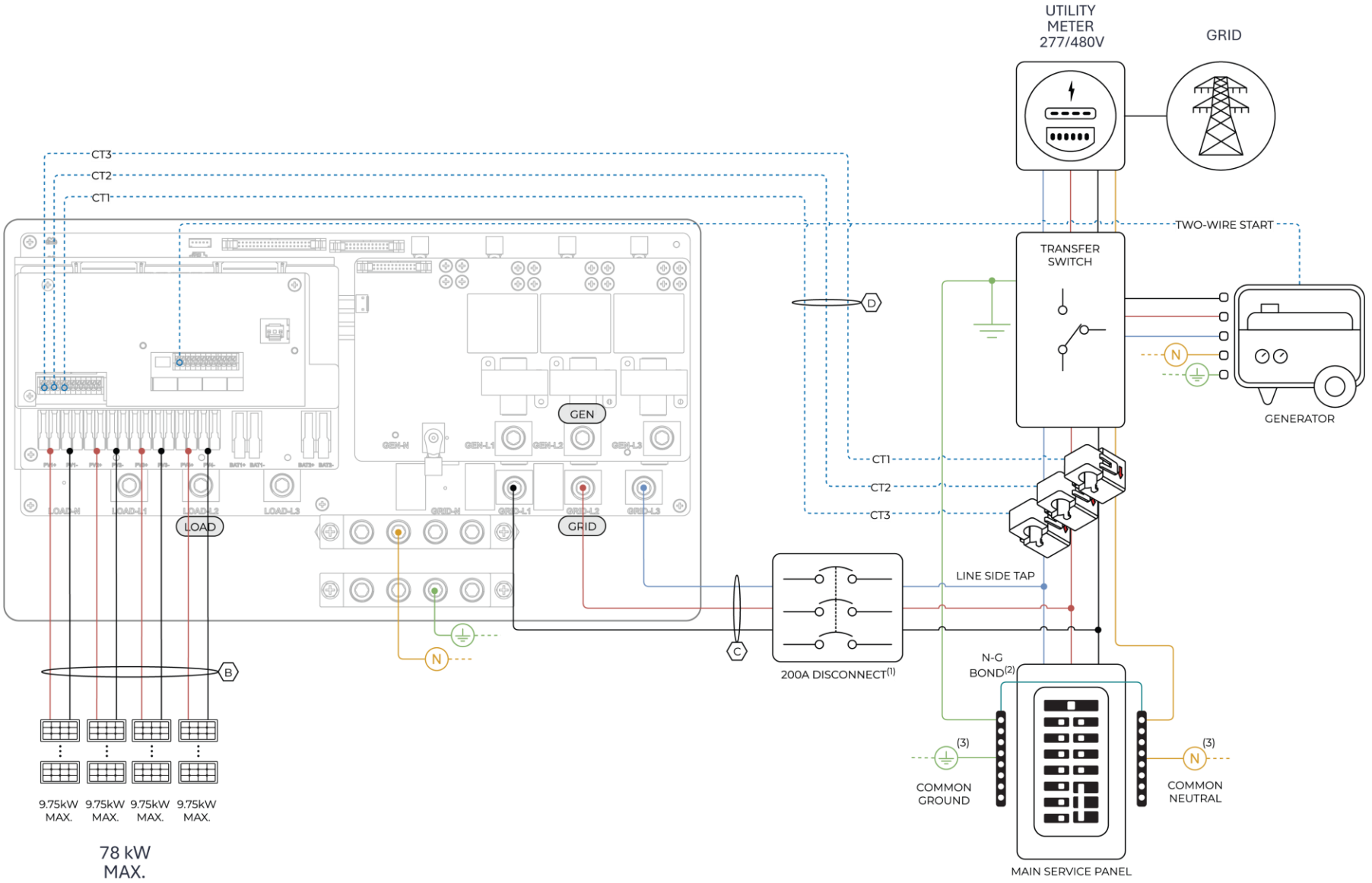

(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX. 4 AWG |
| B | MAX. 10AWG |
| C | MAX. 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 05

# 7.6 Standard Wiring Diagram – Grid-Tied Only with Standby Generator




L1 - (AC) NEGATIVE - (DC) | L2 - (AC) POSITIVE - (DC) | L3 | NEUTRAL | GROUND | SENSORS / COMMUNICATIONS

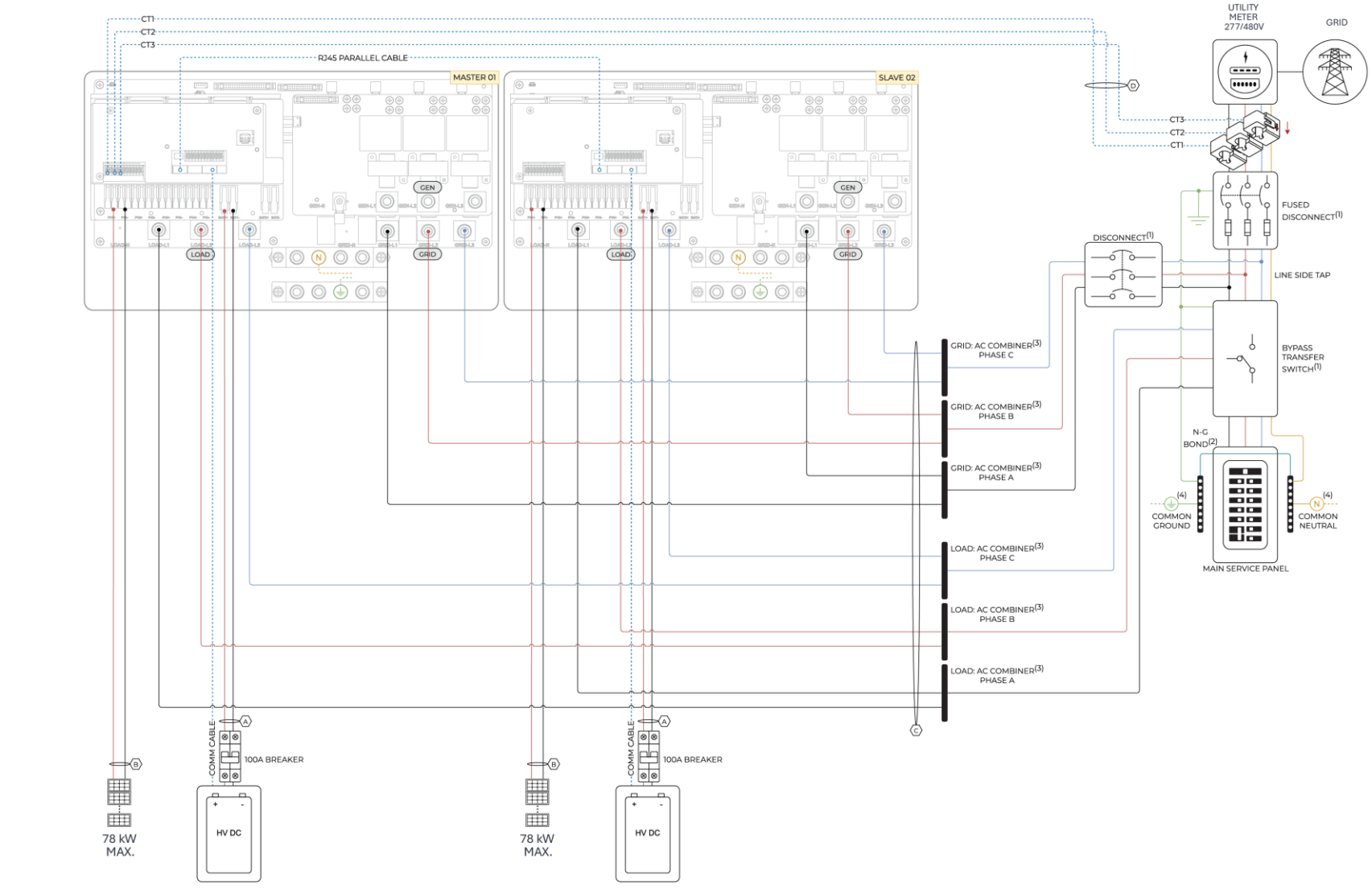
(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX. 4 AWG |
| B | MAX. 10AWG |
| C | MAX. 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 06

# 7. 7 Standard Wiring Diagram – 2 Parallel Inverters, Standard Wiring




L1 - (AC) NEGATIVE - (DC) — L2 - (AC) POSITIVE - (DC) — L3 — NEUTRAL — GROUND — SENSORS / COMMUNICATIONS

(1) SIZE OF DISCONNECT WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

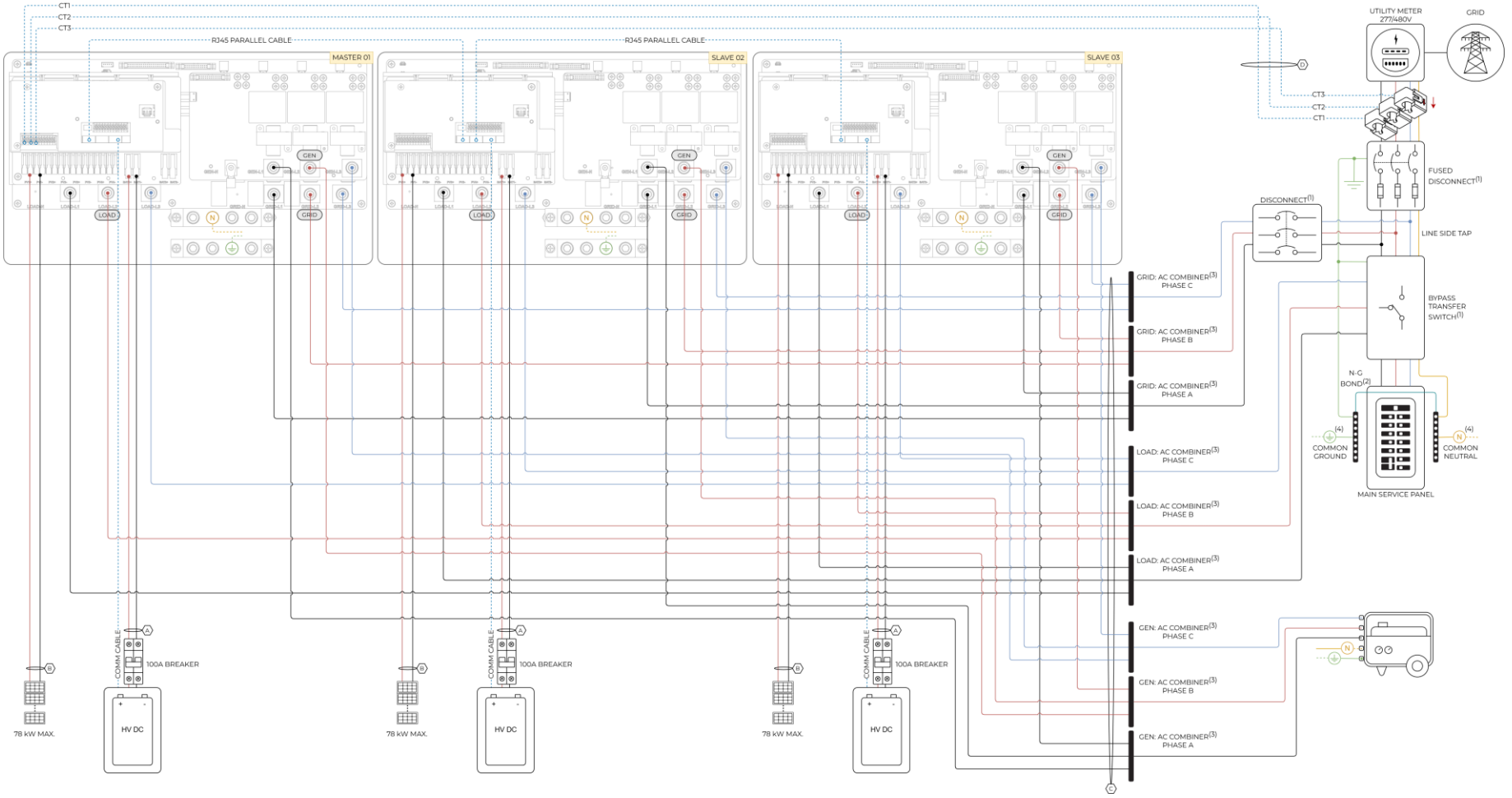
WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX. 4 AWG |
| B | MAX. 10AWG |
| C | MAX. 4 AWG |
| D | 24 - 23 AWG CAT 6 |

Diagram 07

Before powering up Parallel System installs, see section “5. Parallel Inverters”

# 7.8 Standard Wiring Diagram – 3 Parallel Inverters, Standard Wiring




L1 - (AC) NEGATIVE - (DC) — L2 - (AC) POSITIVE - (DC) — L3 — NEUTRAL — GROUND — SENSORS / COMMUNICATIONS

(1) SIZE OF DISCONNECT / BYPASS SWITCH WILL DEPEND ON REQUIRED PASSTHROUGH CURRENT AND LOCAL CODE REQUIREMENTS
(2) LOCATION OF THE NEUTRAL-GROUND BOND WILL DEPEND ON LOCAL CODE
(3) SMALL COMBINER PANEL CAN BE USED TO COMBINE PHASES AND AS A MEAN OF INDIVIDUAL SYSTEM DISCONNECTION
(4) THESE SYMBOLS REPRESENT A COMMON NEUTRAL / GROUND CONNECTION. **DO NOT** CONFUSE WITH GROUNDING ROD

WIRE GAUGE GUIDE (COPPER)

| LABEL | CONDUCTOR |
|---|---|
| A | MAX. 4 AWG |
| B | MAX. 10 AWG |
| C | MAX. 4 AWG |
| D | 24 - 23 AWG CAT6 |

Diagram 08

Before powering up Parallel System installs, see section ”5. Parallel Inverters”

# 8. Common Troubleshooting Steps

## LCD is not powering on

- Check all connections – at least one of the following power sources is required: PV/Grid/Battery
- Try pressing the power button, touchscreen, or navigation buttons

## Panels are connected, but “DC” LED indicator is not on

- Startup voltage is 180V. Voltage must be above 180V and below 1,000V
- Wrong polarity. Check string polarity on MPPT
- PV DC disconnect switches are not on the ON position

## Panels are not producing

- Check for proper wiring on all solar panel connections
- Turn PV disconnect switches "ON"
- Check that the PV input voltage is not greater than 1,000V
- If the system measures 0V even when PV DC disconnect is ON, polarity might be wrong. Check PV polarity

## Panels are not producing much power

- PV Wire Strip Length: 5/8". Your batteries are charged and is limited to house loads; you can test Grid Sell to verify.

## The system does not keep batteries charged

- Verify there is proper communication between the Sol-Ark and the battery. : ☼ → **Li-Batt Info**
- Verify proper Charge and Voltage settings according to battery manufacturer and battery bank arrangement

## Auto Gen-Start is not working

- Make sure the generator has a compatible Two-Wire
- Verify adequate connection to the Sol-Ark auto-start input pins

## “Normal” LED indicator is not on

- Sol-Ark is in pass-through mode (only Grid connection and no other power source)
- Not fully energized (DC Solar panels AND Grid or batteries only)
- In alarm state.
- Sol-Ark is not working correctly (Call Sol-Ark Technical Support at +1 (972) 575-8875 ext. 2

## The “Alarm” LED indicator is on

- Check the system alarms menu to identify the alarm

## Grid HM value is negative when it should be positive (only applies in Limited to Home mode)

- Limiter Sensors are backwards, L1/L2/L3 sensors are swapped, or incorrectly wired. Execute the “Auto Learn Home Limit Sensors” command described in “2.9 Connecting Current Transformers (CT Sensors)” on page 21.

## AC Overload Fault or Bus Unbalance Fault

- Check Transfer Switch/Subpanel wiring
- Check for large loads that consume more than the inverter rating

## The system connects to grid and quickly disconnects

- Verify Neutral wire connection (0Vac referenced to GND)
- Check the programmed frequency, and verify the Sol-Ark measures 277V between L and N
- If the system is overloading: verify the proper phase sequence between “GRID” and “LOAD” terminals

## DC Overload Fault

- Check PV voltage. Ensure no more than 1,000V
- Make sure you have not wired more than 2 solar strings in parallel per MPPT

## System is beeping

- Check the System Alarms menu to see which alarm has been triggered. Most alarms will self-reset
- Do a Power Cycle as described in “2.13 Power Cycle Sequence” on page 29.

## Battery cable sparks when connected

- If applicable, flip the built-in breakers of the battery bank before connecting or disconnecting batteries

## Battery symbol on the home screen is red

- The battery is below the empty voltage
- Battery is over-voltage or under-voltage

## Battery symbol on the home screen is yellow

- The battery is low, or the charge/discharge current is close to the programmed limit

## Grid symbol on the home screen is yellow

- Grid parameters are out of specified operating range
- There is a grid outage and there is no voltage on the “GRID” terminal
- System is Off-Grid

## System has restarted

- Occurs when the system has overloaded, battery voltage has surpassed 800V
- There was a Software update

## Batteries were connected backwards

- ⚠ System may be damaged and warranty will be void

## Why is the LCD screen still on when the power button is off?

- Occurs when the power button is in the “OFF” position
- Occurs when the system is not fully energized: PV or Grid only

## The Batt SOC% is not reaching 100%

- BMS communication is not working properly. Verify with battery integration and communication steps

## Generator setup is reading 0Hz

- Generator is operating at a frequency outside the permissible range.
- Select "General Standard " grid mode. Widen the frequency range to 55Hz-65Hz as described in “ 2.5 Integrating a Generator” on page 15.

## Color touchscreen is frozen

- Press and hold the escape button [◀] for 7-10 seconds
- Perform a power cycle sequence in case the above suggestion does not work. See “2.13 Power Cycle Sequence” on page 29 for instructions.

## Grid Phase Wrong

⚠ If the Sol-Ark screen shows a “Grid Phase Wrong” message, it means there is a phasing issue in the wiring. If left uncorrected, it may cause overload faults and **DAMAGE**. See “5.3 Troubleshooting Phase Sequence” on page 52 for more information.

# 8.1 Sol-Ark Warning and Fault codes

| Fault | Description | Common Cause/Remedy |
|---|---|---|
| W03 | Grid_Phase_Warn | Grid phasing sequence error. Verify that the order of the three GRID input phases are in the order A-B-C, or change the phase setting value on the LCD. |
| W04 | Meter_Offline_Warn | Communication failure with external revenue grade meter. Verify that the meter is powered on and the RJ45 connection is secure. |
| W31 | BMS_LostComm_Warn | Contact Sol-Art Technical Support. |
| W32 | Parallel_Comm_Warn | The quality of parallel inverter communication is poor. Communication is possible, but there may be packet loss. Verify if the DIP switch of each inverter is set to “ON.” Check the length of the parallel communication cables: the length should not be more than 16ft (5m) between inverters. |
| F1 | DC_Inversed_Failure | Verify that the PV input wires are not reverse polarity. If you have parallel systems and turn one system off, you will get this notification. |
| F8 | GFDI_Relay_Failure | Check for continuity on the inverter's neutral and ground. Make sure that there is only ONE neutral-to-ground bond in the system. For Current Leakage from inverter AC output to Ground, check that Ground and neutral are connected at the main panel. |
| F13 | Grid_Mode_change | This notification can appear when not using batteries or if Grid Input settings are changed. This is a notification, **NOT** a fault. If you switch from No Batt to Battery mode, power the system down completely to restart. |
| F15 | AC_OverCurr_Failure | This fault is usually caused by Loads too large for the inverter. If Off-Grid, the battery discharge Amps are programmed too low. Overloads can result in faults F15, F18, F20, or F26. |
| F16 | GFCI_Failure | Ground fault. Check PV+ or PV- wiring (which must be ungrounded). Exposed PV conductors + rain can also cause this. Check that the neutral line and Ground are not double-bonded (this is common with portable generators). |
| F17 | Tz_PV_OverCurr_Fault | PV HW overcurrent: Do not plug in PV when inverter is already running and the disconnect is ON. Remove PV strings and see if the fault still exists. |
| F18 | HW_Ac_OverCurr_Fault | The Load Output is overloaded (need to reduce loads) or the generator is overloaded a (need to reduce Gen Start A). Wiring Short on the AC Side can also cause this error. Overloads can result in faults F15, F18, F20, or F26. |
| F20 | Tz_Dc_OverCurr_Fault | It is typically caused by DC current from the battery that is too large (ex: 4 Ton AC Unit) or too much PV current (3 or more strings in parallel). Overloads can cause faults F15, F18, F20, or F26. |
| F22 | Tz_EmergStop_Fault | Initiated emergency stop by opening the B/B circuit. Reset the e-stop button (close contacts) to clear the fault. |
| F24 | DC_Insulation_Fault | An exposed PV conductor combined with moisture is faulting (can cause faults F16, F24, and F26). |
| F25 | DC_Feedback_Fault | There is no battery connection to the Inverter and “Activate Battery” is enabled. Disable “Activate Battery” in settings while no battery is connected. |
| F26 | BusUnbalance_Fault | Too much load on one leg (L1 or L2) versus the other leg or DC loads on the AC output when Off-Grid. Grounded PV+/- wire can cause faults F20, F23, or F26. |
| F29 | Parallel_CANBus_Fault | This usually indicates a communication error for parallel systems. Check the cables and MODBUS addresses. |
| F31 | AC_SlaveContactor_Fault | A Soft Start of the large motor failed. |
| F34 | AC_Overload_Fault | AC Overload or load shorted. Reduce heavy loads. |
| F35 | AC_NoUtility_Fault | Grid connection lost. |
| F37 | DCLLC_Soft_Over_Cur | Software DC overcurrent. |
| F39 | DCLLC_Over_Current | Hardware DC overcurrent. |
| F40 | Batt_Over_Current | Batteries exceeded their current discharge limit. |
| F41 | Parallel_System_Stop_Fault | If one system faults in parallel, this normal fault will register on the other units as they disconnect from the grid. |
| F45 | AC_UV_OverVolt_Fault | Grid under voltage causes a disconnect. This will self-reset when the grid stabilizes. |
| F46 | Battery_Backup_Fault | Cannot communicate with other parallel systems. Check Master = 1, Slaves = 2-9, and ethernet are connected. |
| F47 | AC_OverFreq_Fault | Grid over Frequency (common in power outages) causes disconnect. Will self-reset when grid stabilizes. |
| F48 | AC_UnderFreq_Fault | Grid under Frequency (common in power outages) causes a disconnect. Will self-reset when grid stabilizes. |

| | | |
|---|---|---|
| F50 | BAT_V_float | Battery voltage reading fault. This can happen if BMS V reading is too different than internal reading. Check external breakers and BMS battery relay status. |
| F52 | DC_VoltHigh_Fault | HV bus V is too high. Reboot the inverter and wait to see if the fault occurs again. Check the PV and Batt V. |
| F54 | BAT2_VoltHigh_Fault | PV may be higher than 500V. Battery voltage should not be above 59V or 63V (depending on the model). |
| F55 | BAT1_VoltHigh_Fault | Batt Voltage on input 1 is too high. Verify the V reading on the inverter screen and with meter. Stop operation, then immediately check with the battery manufacturer. |
| F56 | BAT1_VoltLow_Fault | This fault can occur when batteries are overly discharged, the inverter is Off-Grid and exceeded the programmed batt discharge current by 20%, or Lithium BMS has shut down. If battery settings are incorrect, this can also trigger the fault. |
| F57 | BAT2_VoltLow_Fault | Batt Voltage on input 2 is too low. Check the BMS status and verify readings with a meter and at the screen. |
| F58 | BMS_Communication Fault | The Sol-Ark is programmed to BMS Lithium Battery Mode but cannot communicate with a BMS. BMS_Err_Stop is enabled but cannot communicate with a battery BMS. |
| F59 | BAT_OverCurr_Fault | Excessive load is drawing too much current from the battery. The battery voltage is too low for the inverter to operate. |
| F60 | Gen_Volt_or_Fre_Fault | Generator Voltage or Frequency went outside the allowable range. |
| F61 | Button_Manual_OFF | The parallel “slave” system turned off without turning off the “master.” |
| F63 | Arc_Fault | This fault can indicate a poor PV connector or connection, or sometimes a false alarm due to powerful lighting storms. |
| F64 | Heatsink_HighTemp_Fault | Check that the built-in fans are running: the ambient temperature may be too high. Make sure there are proper clearances. |

# 9. Installation Checklist

After the system is operational, complete this form and register at https://www.Sol-Ark.com/register-your-Sol-Ark/

SCAN ME

Installer/Company:_____ Date: (YYYY-MM-DD) _____

Inverter SN: _____ Gateway SN:_____

Mark ✓ for all that apply

**Type of system (all that apply):**

| | | | |
|---|---|---|---|
| ☐ Grid-Tied only | ☐ Grid-Tied with battery backup | ☐ Off-Grid | ☐ Parallel system: # inverters |

**Integrated components (all that apply):**

| | | | |
|---|---|---|---|
| ☐ Utility grid | ☐ DC solar panels | ☐ AC coupled solar panels | ☐ Generator |
| ☐ "LOAD" installed service panel | ☐ "GRID" installed service panel | ☐ "GEN" installed service panel | ☐ Batteries |
| ☐ Lead-Acid batteries | ☐ Wind Turbine | | |

⚠ Sol-Ark expressly disclaims any responsibility for performance issues arising from improper installation. Installers and users are solely responsible for following proper installation procedures outlined in provided documentation. Sol-Ark disclaims any liability for changes in the installation that might result in electrical malfunctions or any other issues related to the Sol-Ark product.

ⓘ Circle **N/A (Not Applicable)** if the verification step is not relevant to the type of system or does not apply to the integrated components.

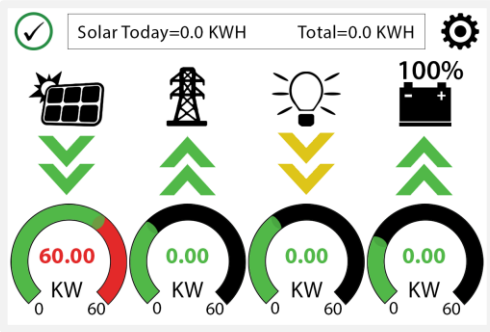
| | |
|---|---|
| A wiring diagram of the installation was sent to Sol-Ark for verification | ☐ Y ☐ N |
| Setup for remote system monitoring through Wi-Fi / Ethernet is completed. Gateway SN:_____ | ☐ Y ☐ N |
| The inverter is installed in a location where the LCD screen is always protected from direct sunlight | ☐ |
| The inverter has the minimum specified vertical and lateral clearance for proper heat dissipation | ☐ |
| The maximum DC input voltage does not surpass 1,000$V_{DC}$ | ☐ |
| The HV Battery bank voltage does not surpass 700$V_{DC}$ | ☐ |
| All battery conductors are properly connected and secured to the (+, -) terminals of the inverter | ☐ N/A |
| Battery communication was successfully established | ☐ N/A |
| All Battery Setup parameters are programmed according to battery manufacturer specifications | ☐ N/A |
| The Sol-Ark properly generates power from the solar panels to charge the batteries | ☐ N/A |
| Grid / Generator is properly connected to the Sol-Ark and the phase sequence was verified | ☐ N/A |
| "☑ Grid / Gen Charge" settings are programmed correctly. Grid / Generator adequately charge the batteries | ☐ N/A |
| For Off-Grid systems: The mode "General Standard" is programmed and the *V* & *f* ranges are increased | ☐ N/A |
| When "☑ **Grid Sell**" is enabled, the Sol-Ark sells power back to the grid (negative HM measurements for L1, L2, L3) | ☐ N/A |
| CT sensors are correctly installed on Grid / Generator lines | ☐ N/A |
| Only when "☑ **Limited Power to Home**" is enabled, the Sol-Ark matches total load demand (Meter Zero) | ☐ N/A |
| Disconnect the grid: during Off-Grid operation, the inverter properly supplies "LOAD" demand for PV and batteries | ☐ N/A |
| Disconnect the grid AND solar panels: during Off-Grid operation, the inverter properly draws power from batteries | ☐ N/A |

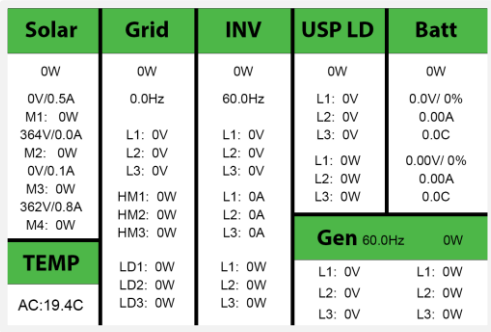
| Installer name and signature | Customer name and signature | Date |
|---|---|---|

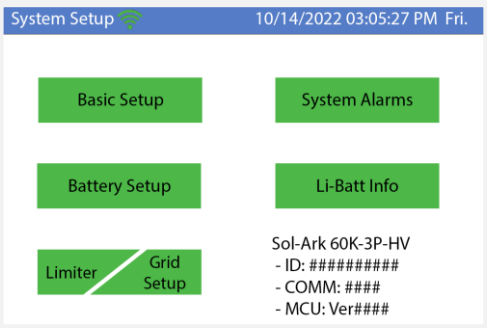
# 10. Inverter UI Screens

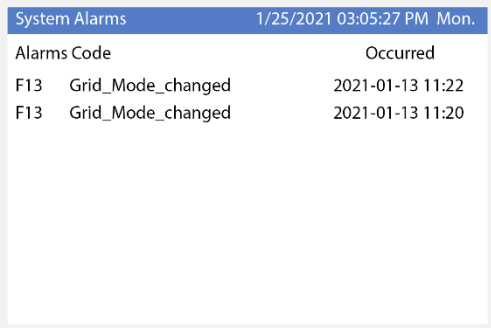
The user interface (UI) screens on the following pages show the version of the Sol-Ark inverter firmware as of the Effective Date. Sol-Ark continually improves its products through firmware updates, which may alter the appearance, layout, or functionality of the UI screens. Sol-Ark does not warranty performance if you fail to update or use the most recent version of Sol-Ark software.

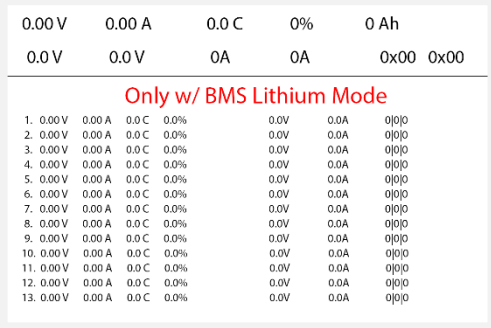
## 1. Main Menu



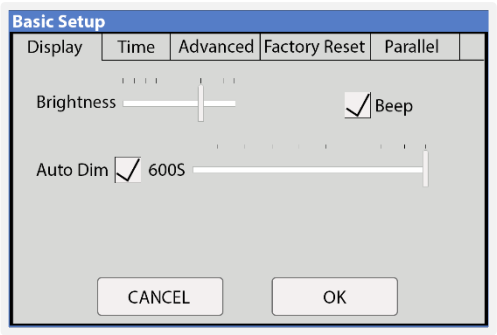



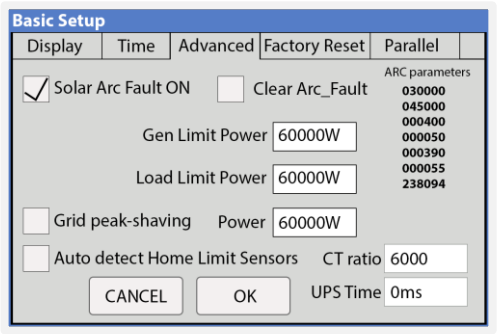



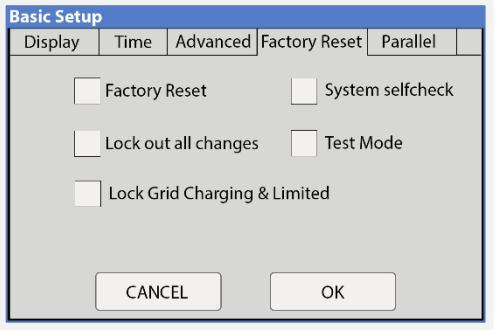



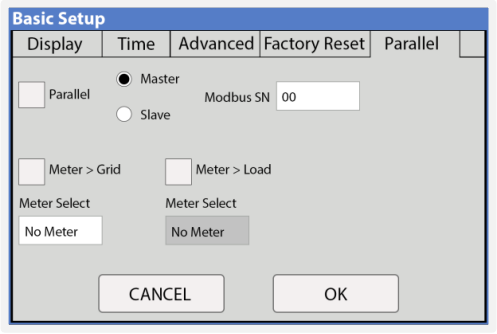
# 2. Basic Setup



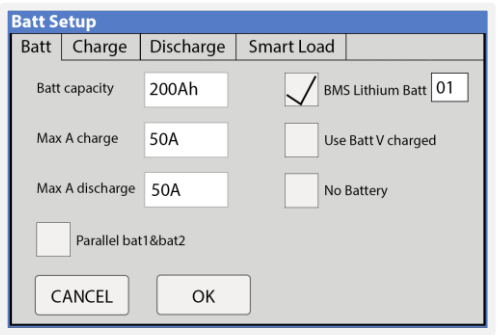


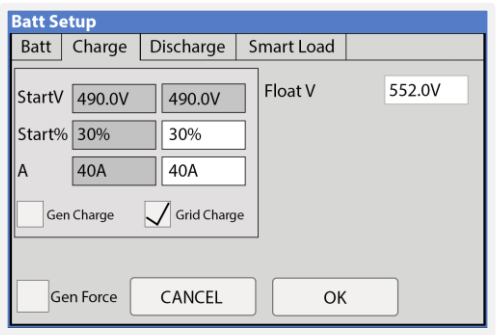


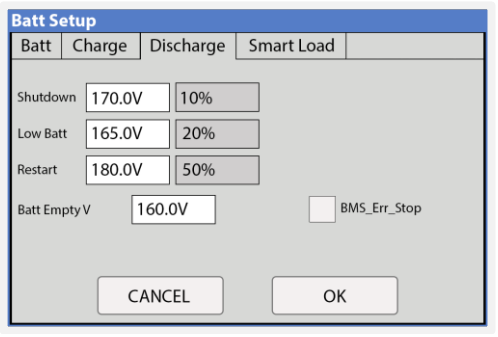



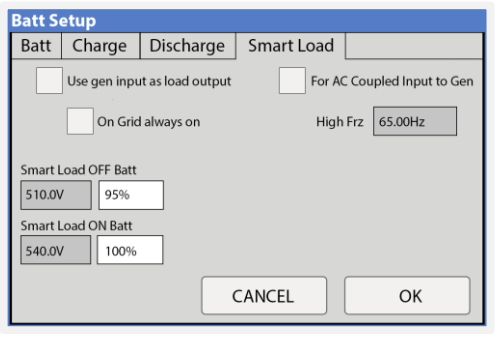



# 3. Batt Setup

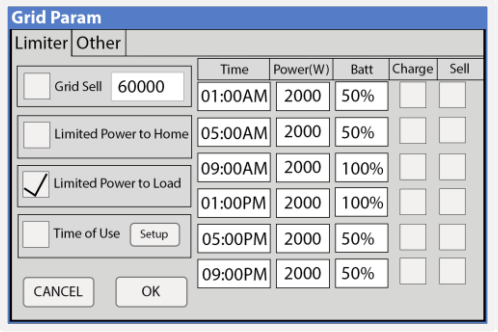


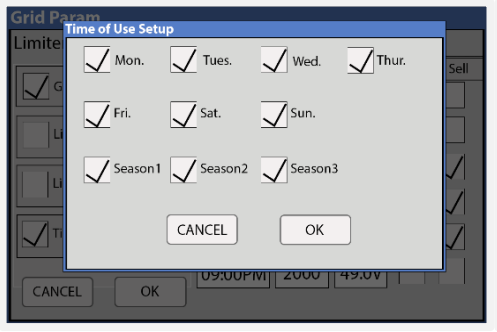



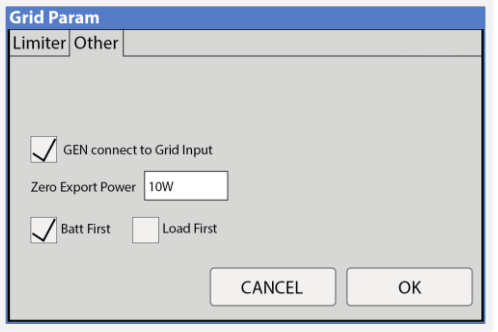



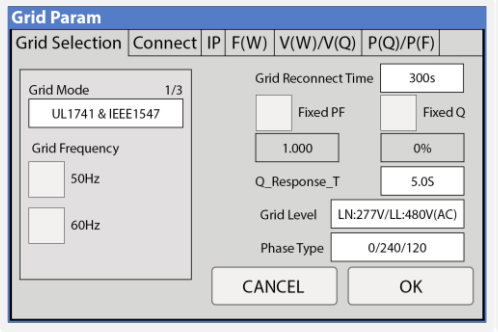

# 4. Limiter

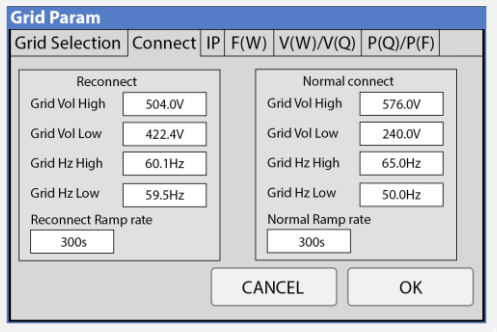


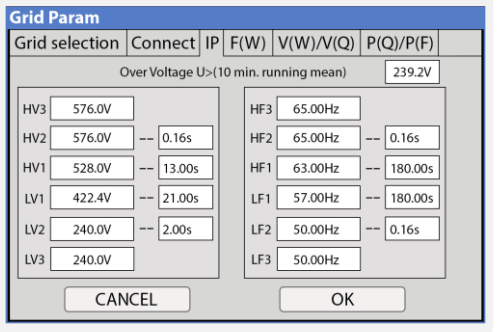



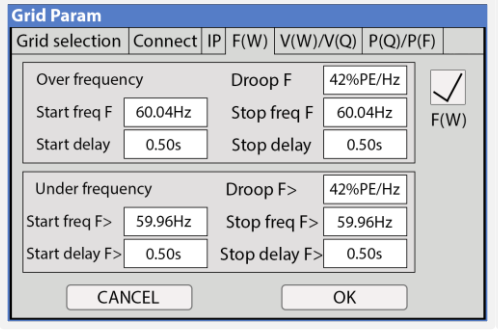



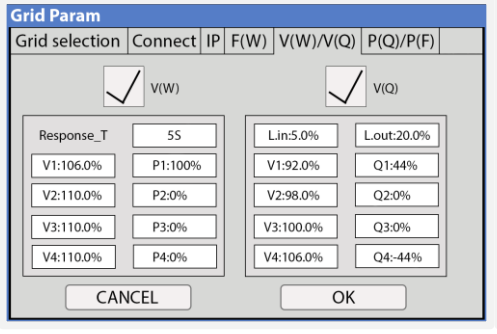

# 5. Grid Setup

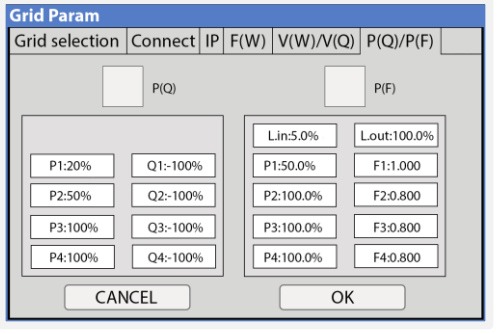



Sol-Ark
LIMITLESS POWER