Sol-Ark Library

DATA MONITORING PowerView Settings Guide (PV PRO)

Apple App Store

Google Play Store

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Introduction

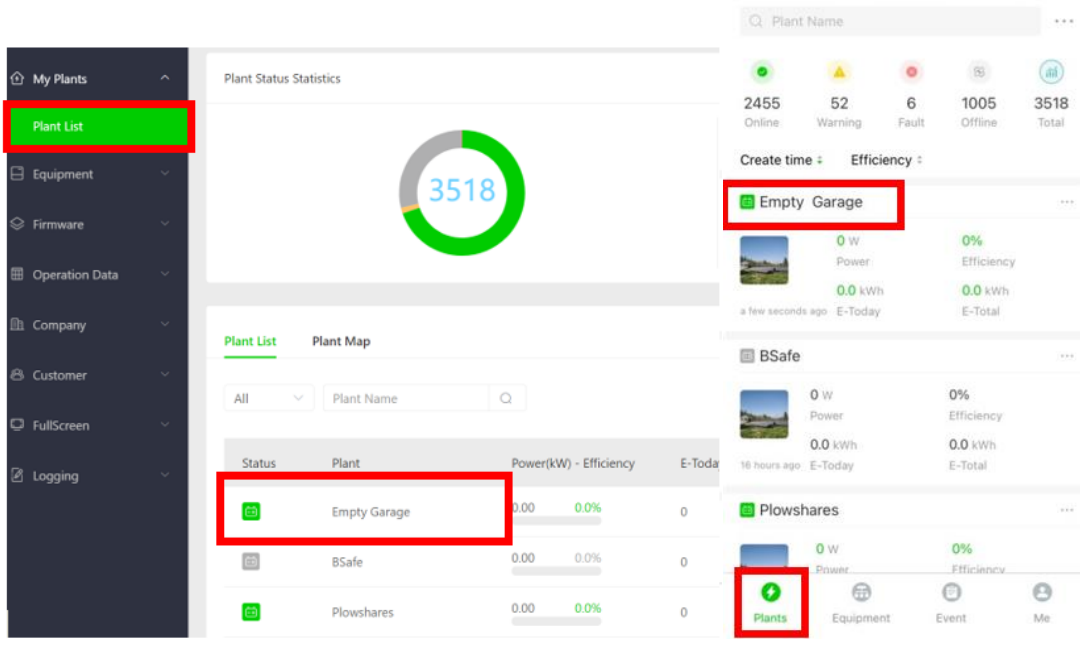
Each Sol-Ark includes a DB9 Port dongle to connect the inverter to the internet via Wi-Fi or Ethernet.

The dongle uses the PowerView (PV Pro) platform to remotely monitor the inverter's data from anywhere on Earth that has a stable internet connection.

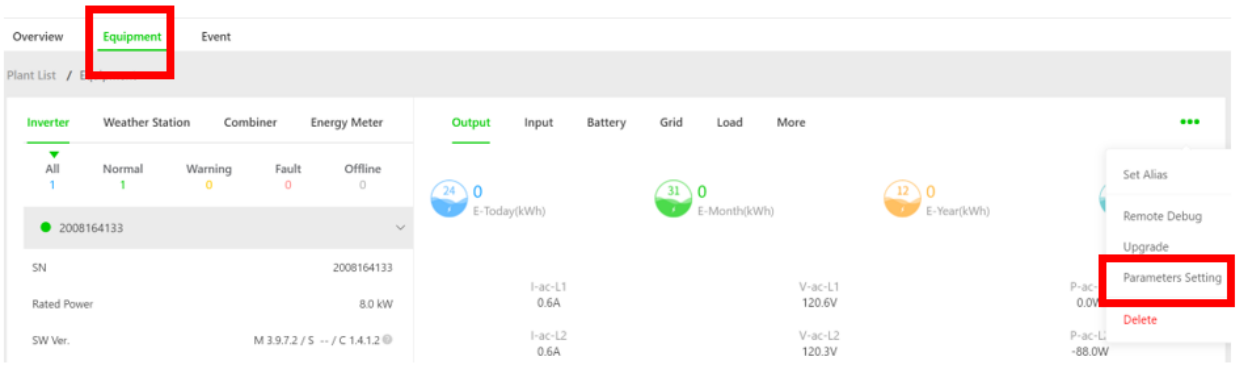
PowerView is FREE for homeowners and installers. Installers need to contact us at www.sol-ark.com/support to configure an installer account. You can download the app using the QR codes found on the title page. You can find PowerView online through a PC / laptop using www.mysol-ark.com

Reaching the Settings

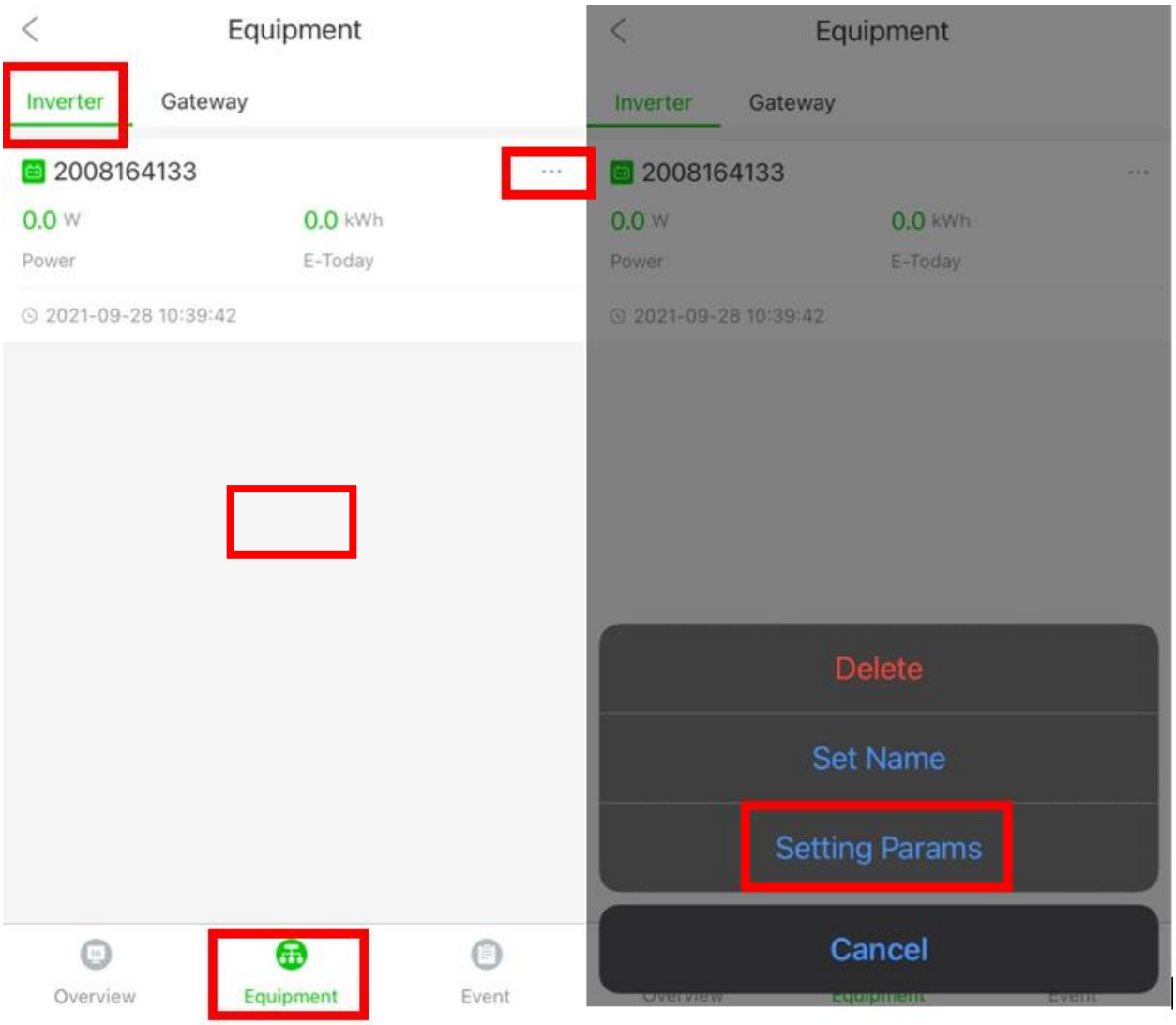
Under "My Plants" →"Plant List" → Select your plant



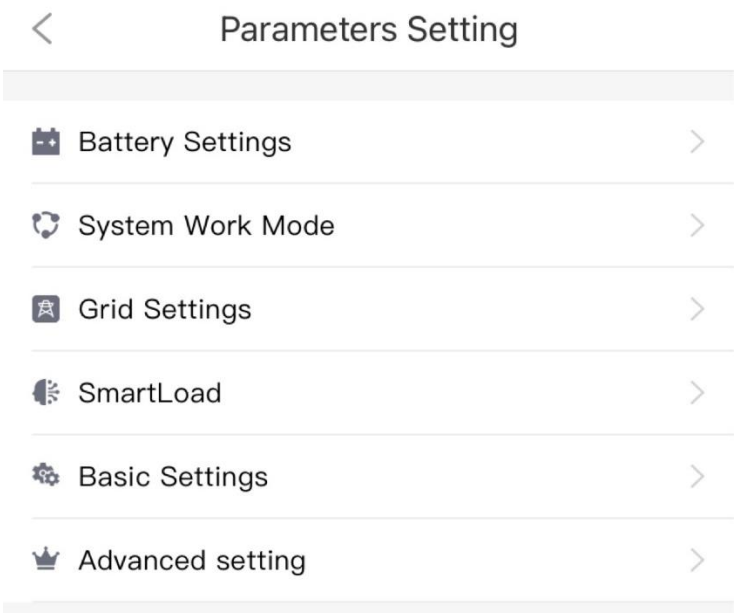
Once the plant is selected, click on equipment, and then the three green dots (ellipsis) will drop a menu to access the parameter settings.



It is essentially the same process if you wish to use a smartphone, as shown below:



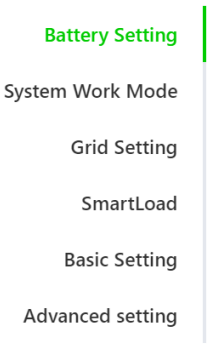
Settings in PowerView (PV Pro & www.mysol-ark.com)



Battery Settings

Battery Mode

A. Lithium Batt: For batteries with a BMS that allows intercommunication



B. Batt V: Displays information in voltages on the home screen. Changes set points such as TOU, shut down, restart, and low batt to work off voltage values.

C. Batt %: Displays information in percentages on the home screen. Changes all set points such as TOU, shut down, restart, and low batt to work off percentage values.

D. No Battery: If you do not have batteries, you will need to check this box, or the system will beep at you forever.

Battery Capacity

This value is the Amp-hour rating for your attached battery bank. Calculate this value using the spec sheet of the battery, depending on how many strings of batts you have in parallel. You could also work backward from the KWh they have on the specs.

Max A Charge

Value places global limits on battery charging. TOU, grid sell, grid, or gen Charge settings (and other charge settings) will not supersede this amount.

This value also sets PV → Battery charge rate. We suggest 20-30% of battery capacity for lead-acid up to our inverter maximum of 185A.

Max A Discharge

Value places global limits on the battery discharging. TOU, grid sell, grid, or gen discharge settings (and other discharge settings) will not supersede this amount.

The battery bank will discharge 120% of this value for 10 seconds before the inverter shuts down to prevent battery damage in off-grid mode. Please do not exceed 185 A.

Battery Empty V (41-63V) 

Crucial setting. More critical for lithium than it is for lead-acid. The value defines the floor (0% State of Charge) for the algorithm that calculates the SOC. This value does not account for temperature or resistance.

We do this because if you hit the equivalent of an attached BMS, this will disconnect from the system outright. If for any reason, the battery spec sheet does not specify this value and you have to guestimate, 46V-48V is typically a reasonable range for any lead-acid battery.

Please reach out to your battery manufacturer for this information.

We recommend airing on the higher voltages side because it is better to shut down the inverter than the BMS. After all, the inverter will restart independently, though it is not a full power down; instead, you will lose AC output.

Batt Resistance

The resistance value we are assuming for the battery bank is in milliohms (mΩ). We use this value to adjust all the other set points for the battery based on the resistance in real-time. If you are in voltage mode and your set point at a particular voltage, the sol-ark will adjust that set point in real-time based on the number of amps pulled out of the battery using Ohm's law.

Lithium technology tends to have a lower resistance than lead-acid batteries, and more batts in parallel lower the resistance value. This value includes the total resistance of the battery network + cables + any switches or additional elements. Usually, cable resistance is typically negligible unless you use small wires.

Batt Charging Efficiency

It is a value used for the algorithm to calculate SOC. Most batteries have a 98% to 99% charging efficiency; however, wet cells and Nickel-Iron chemistries are a notable exception with 80% or less. This value is the one-way efficiency (not round-trip).

Batt Shutdown V/%

If batts reach this value while discharging, the system will shut down. The battery will not restart until you hit the restart voltage/percentage (Batt Restart value).

The system will not let you set this value higher than Batt Low V.

The gap between shutdown and restart should be reasonable because constant cycling from On to Off quickly could hurt the batteries.

Batt Low V/%

It is the value between shutdown and restart. If you reach this value while discharging, the battery icon on the home screen will turn yellow to warn that your batteries are reaching a low SOC.

The system will not let you set this value lower than Batt Shutdown or higher than Batt Restart.

It also serves as a set point for your peak shaving interactions. When enabled, Peak Shaving will work down to this value. Nevertheless, TOU will only work until the batts reach the programmed value (V/%) under TOU settings, **not** until hitting this value.

Batt Restart

If the battery discharges to the Batt Shutdown value, the Sol-Ark will not restart until the battery starts recharging and it reaches the Batt Restart value.

The system will not let you set this value lower than Batt Low V.

Activate Battery

Enabling keeps the BMS awake and enables Dark Start capabilities.

Everyone should keep this ON. There is NO downside to having it ON.

Float V

This value comes from the customer's battery spec sheet. This value signifies whenever the battery charging has reached its absorption value, and it drops down to float and hangs out at this voltage.

Grid Charge

Ensure your selection by pressing the "Ok" button.

Grid Start V or %: The value which batts must reach to start whole-home generators connected through an automatic transfer switch. This value triggers a relay to start a generator automatically when connected to a two-wire start appropriately.

Grid Start A: This value specifies how many amps you can pull specifically from the Grid breaker into the batteries. If you have a generator connected to the grid input, you will also be dealing with "Grid Charge." You can limit this value for different power sources.

Customers will typically hold the grid charge value to a number smaller than the solar charge value, as it is easier on the batteries. The batts also prefer to charge from solar.

This amperage is battery amperage (DC), not AC.

Math: 40A to the battery is approximately 2000W from the Grid at AC voltage (2000W / 240Vac = 8.33 A @ 240 Vac). To charge batts at 5000W, you need to set your Grid Start A = 100A because 100A_dc*48V = 4,800W. This would draw approximately 4000W/240Vac= 16A from the Generator/Grid.

Gen Charge

Ensure your selection by pressing the "Ok" button.

Gen Start V or %: Value batts need to reach before automatically starting a generator connected to the GEN breaker to charge the battery bank.

Gen Start A: This is how many amps you can pull specifically from the Generator (GEN breaker only) to charge the batts. To ensure you do not overload a small Generator, you will want to adjust the GEN charge value.

Important Note: If no PV production and no TOU, but Grid/Gen Charge is enabled, the batteries will be charged to "full" using the Grid or a Generator (if available) until the battery bank accepts only 5% of its rated capacity in Amperes. This value correlates to roughly 90-93% full for most batteries and is the generator's default "OFF" signal. If producing PV, the system will use PV to charge the batteries to 100% full instead.

Grid Signal / Gen Signal

Enables the start signal to the generator if you have one connected. This value will turn GEN start on and off.

Everyone should keep this ON. There is no downside to having it ON.

Equalization Days

Value (Days) in between the equalization cycles to balance all the cells.

Equalization Hours

Value duration (in hours) for the equalization cycle. If set to 0, equalization will not happen.

Absorption V

When the battery has recharged the absorption voltage setpoint, the Sol-Ark uses constant-voltage regulation to maintain battery voltage at the absorption setpoint to prevent heating and excessive battery gassing. The battery is allowed to come to a whole state of charge at the absorption voltage setpoint.

Absorption lasts until batteries charge at 1% of the programmed Ah size. In the Bulk Charge stage, the battery is not at 100% SOC, and battery voltage has not yet reached the Absorption voltage setpoint. The controller will deliver 100% of available solar power to recharge the battery.

Equalization V

The voltage at which the battery will hang out during the equalization cycle. Usually, lead-acid batteries have a higher equalization V value than the absorption value, with Wet cell batteries holding the highest equalization value (generally higher than 60V).

Since lithium batteries have a BMS performing their equalization, they do not need our equalization cycle. If absorption and equalization values are the same, and Equalization Hours or Days are not 0, bulk charging will be based on programmed time and not amps accepted to ensure that the batteries are all the way full.

TEMPCO

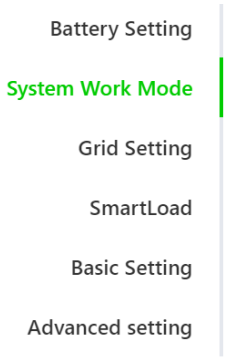
The temperature coefficient is how much Sol-Ark adjusts the voltages for charging based on temperature. The units are mV/degrees C/Cell. Each cell in a lead-acid battery is about 2 V, and if TEMPCO is five (5) mV/degrees C/Cell with 24 total cells, you get 5mV*24 cells per every degree C. So every 8 degrees C is a 1 V difference.

Please note: If you see high voltage readings from your batteries, it could be that the temperature of the batteries is significantly low. Generally, the suggested values for lead-acid are -5 and -0 for lithium.

System Work Mode

Work Mode

Choose the power priorities of the Sol-Ark with the equivalent of the "Limiter" tab of the "Grid Setup" menu on the Sol-Ark screen.



A. Grid Selling: If you are in this mode **only**, you will cover the Load's breaker and sell all the extra PV production to the grid while keeping your batteries full.

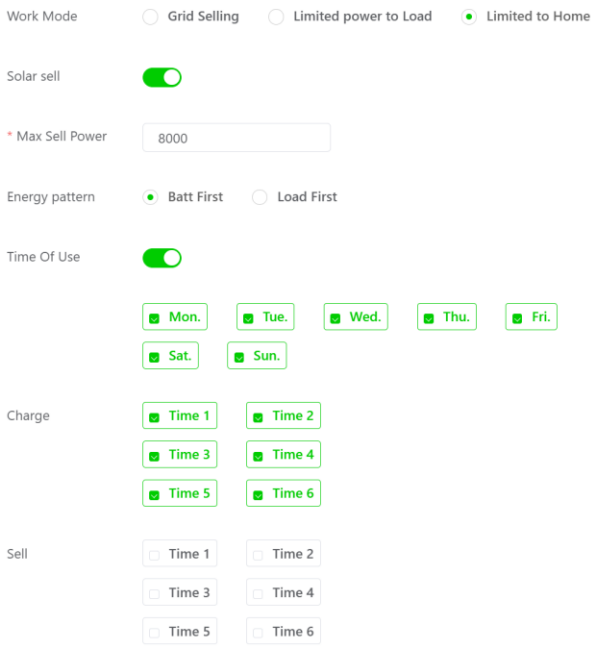
B. Limited Power to Load: You will **only** produce as much power as the Load breaker consumes while keeping your batteries full. If you need to select Grid Selling as well, you need to enable Solar sell.

C. Limited Power to Home: Meter zero mode. If using the CTs correctly, this will only produce as much power as the house is consuming. If you need to select Grid Selling as well, you need to enable Solar sell.

Most Common Combination

Limited to Home + **Solar Sell** + **Time of Use** at the same time – in PowerView, you can only select one of the above, and if you need to choose grid Selling as well, you need to enable Solar Sell.

In this mode, we sell as much as we can during the day (after zeroing the meter) and charge batts to 100% using PV. At night, this mode will switch over to Limited to Home to discharge the battery using TOU to zero the meter based on the programmed TOU values as opposed to entirely selling back from the batteries to the grid (like you would do if you were in TOU + Grid Sell only).



Max Sell Power

A value that places a global limit on the sell-back through the Grid breaker. Since it is a global limit, it affects the TOU sell back, the DC sell back from the solar panels, etc.

You will also need to adjust this value to comply with what the utility initially agreed to with a previously established net metering agreement.

EX

You would adjust this value if a customer were using a smaller breaker (i.e., if the 120% rule applies, and the customer is using a 40 A breaker, you will need to reduce this value to 7,600W, which is the derated amount of power you can do for a 40A breaker).

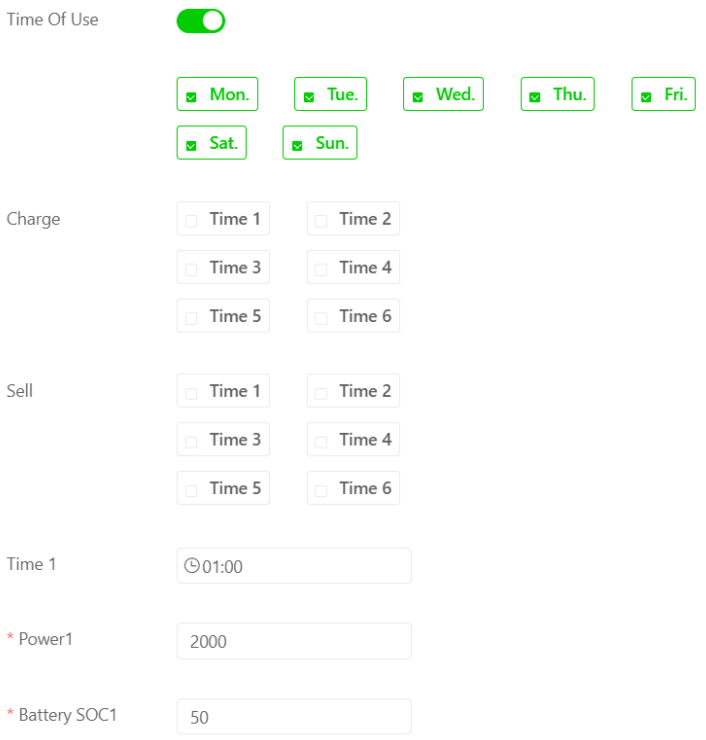
Energy Patterns

On the LCD screen, you can toggle this on the Sell Control tab.

A. **Batt First:** If you are in this mode, you are going to preferentially use the excess PV production to charge the batteries first, and only once the batteries are full, the system will cover the loads and then sell excess PV power to the grid.
B. **Load First:** If you are in this mode, you will preferentially use the excess PV production to cover the loads first and minimize your grid usage, and only once the loads are covered can we charge the batteries and then sell excess PV power to the grid.

Time of Use

Cycle your batteries to cover loads while the Grid is ON. You can select days you want to control the behavior of the batteries during the weekdays and/or weekends.



- **TOU always allows DC PV production.**
- Time of Use changes the power priority to PV → Batts → Grid → Gen.
- Without TOU, power priority is PV → Grid → Gen (manual) → Batts, or PV → Grid → Batts → Gen (two-wire start).

A. Sell: If you check a "Sell" box, you will sell the specified power from the batteries towards the grid breaker. The MSP will likely use up the battery power, but it will sell any extra to the grid.

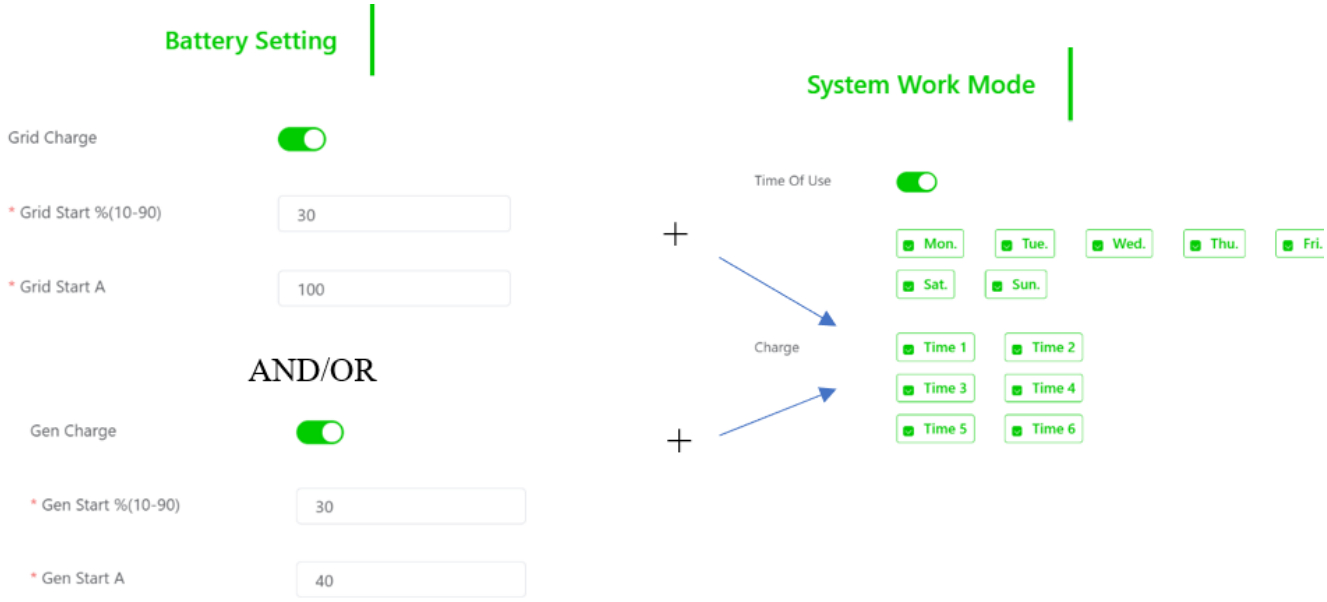
B. Charge: This setting will allow charging from an external source to get the batteries up to the programmed set point. It applies to Grid Charging and GEN Charging.
You must specify the amperage (DC) used for charging through either the Grid Charge or the Gen Charge settings.

You must check the "Charge" boxes during time slots you wish to charge the battery bank through an external AC source through TOU.

Suppose Grid Charge / Gen Charge ENABLED, but the time of use is DISABLED. In that case, you will charge the batteries to full with the AC power source (using PV first if available) and keep it full all the time (this is a popular option for customers doing battery backup only and probably have lead-acid batteries).

Important Note: If you enable "Charge" boxes but do not enable either "Grid Charge" or "Gen Charge," the system will not charge from an AC source.

Imagine this Charge setting and the Grid Charge / Gen Charge settings in the Battery Setting menu are in series; these actions will happen if both are not on.



C. Time Slots: Each chronological time slot consists of a starting time. Read from T1-T2, T2-T3, etc. You may change these values to suit your desired usage.

D. Power#: The maximum power the Sol-Ark draws from the batteries to power loads after PV cannot meet these loads. (Before Grid).

E. Battery V/%# **(Only valid when the grid is up):** Battery end-goal for the time slot. The maximum allowable discharge level (lowest SOC allowed at a particular time slot).

i. It also limits charging your batteries from the Grid or the Generator if "Charge" time slots and "Gen Charge" or "Grid Charge" are enabled.

ii. If I were to enable a "Charge" time slot, the system will use an external AC power source (Grid or Gen, depending on which of the two is enabled) to get to this set This will only prevent the batteries from being discharged below this setpoint using the external AC power source.

If Grid Charge AND Gen Charge are BOTH enabled, Grid has priority.

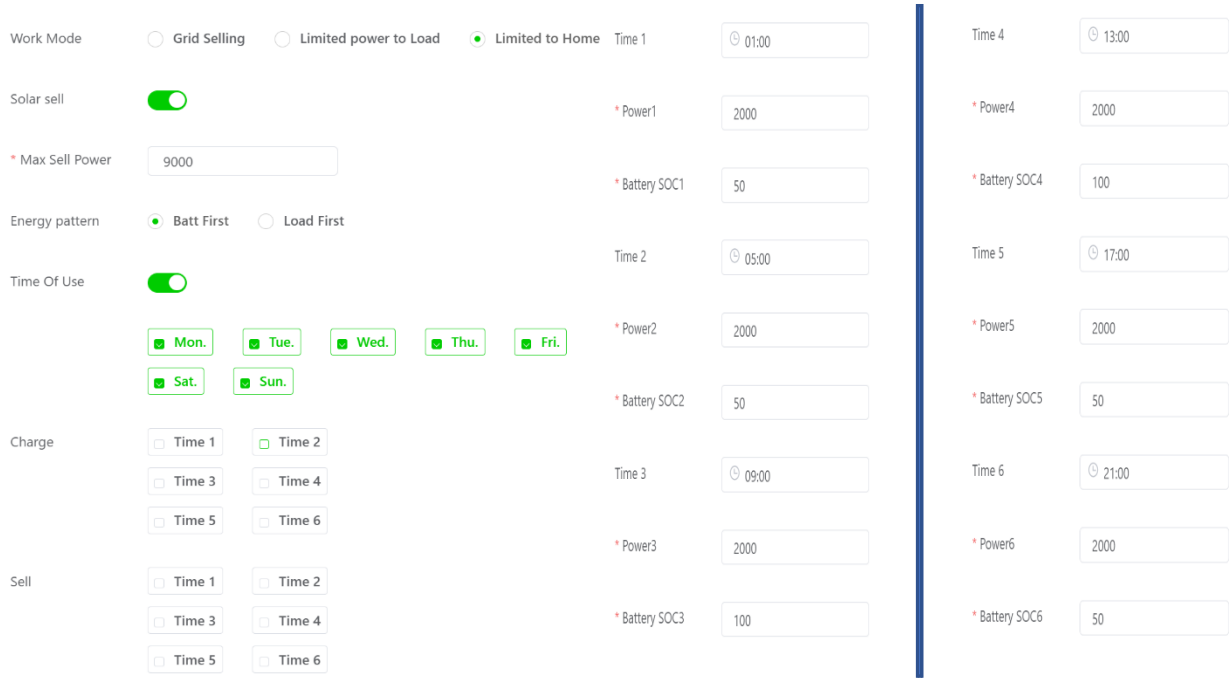
The system will do both TOU and peak shaving between 100% and this value (E. above).

Between E. and the low battery value, it will **only** use peak-shaving and stop doing TOU.

It will not do either if batts fall below the low battery value.

Off-Grid systems do not need TOU—it discharges batts automatically. You can use TOU to charge the batts using a generator up to the set % or voltage. Otherwise (TOU off), it will charge to 95% full.

Application Case 1

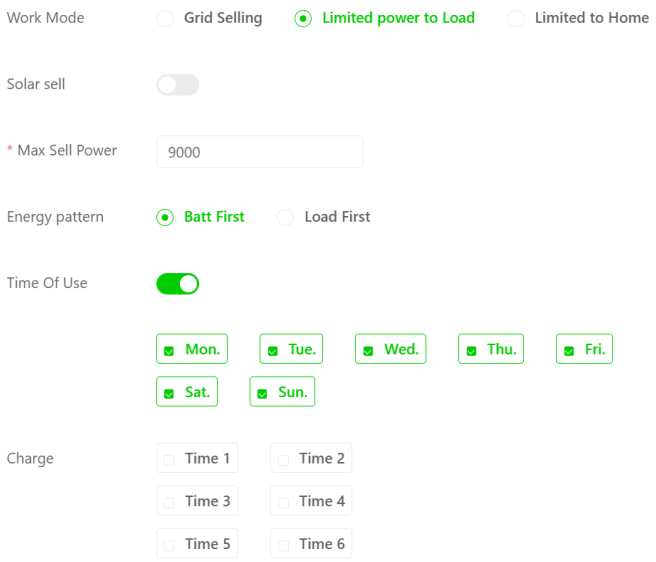


Limited to Home + Solar Sell + Batt First + Time of Use + no Charge or Sell boxes checked:

Sol-Ark will discharge batts during the night + early morning down to 50%. It will produce as much PV as possible to charge the battery first, then cover the loads on the load breaker in the morning. If you need more power than the PV can produce to cover the loads, the Sol-Ark pulls power from the grid.

Conversely, if you produce more power than charging batteries plus covering the loads requires, you will sell any extra to the grid. Batteries will not charge from either Grid or Gen because none of the "Charge" time slots are enabled.

Application Case 2

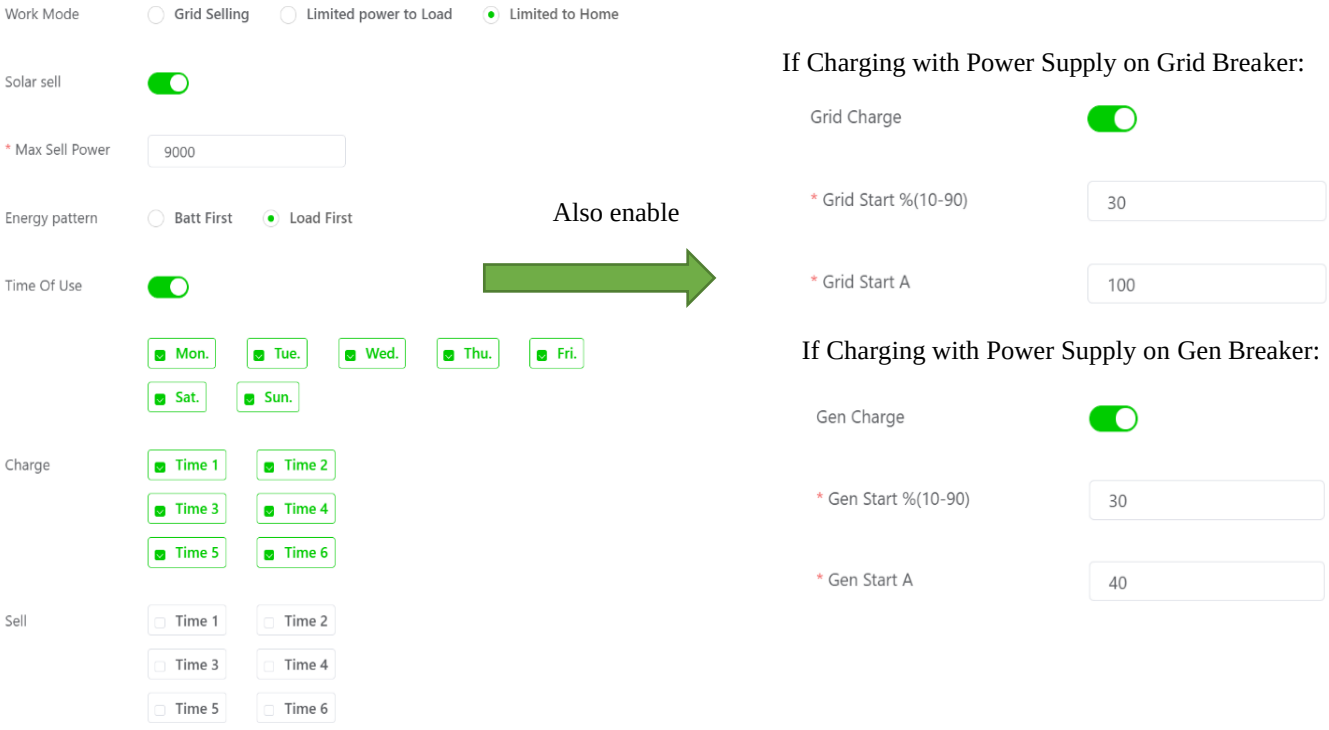


Limited to Load + NO Solar Sell + Batt First + Time Of Use + No “Charge” boxes selected.

The system will produce as much PV as the load breaker requires. If the grid is available, TOU will ensure to discharge the batteries to the Battery V% setpoint.

The batteries will charge from PV ONLY. Batteries will not charge from either Grid or Gen because none of the "Charge" time slots are enabled.

Application Case 3



Limited to Home + Solar Sell + Batt First + Time of Use + ALL Charge boxes checked (usually with a generator)

During each selected time slot, the system will use the selected AC source from "Battery Setting" to charge the batteries up to the setpoint "Battery V#" but not above it.

Enabling the "Charge" box in a time slot only prevents the batteries from being discharged below the setpoint if using the grid.

If a Generator is the AC power source, it will be called during the selected time slots if— and when— the batteries reach the Gen Start V/% programmed in the Gen Charge setting (or Grid Charge if connected to the Grid breaker).

If the generator is running and the next time slot that does not have the "Charge" box checked begins, the generator will turn off. Otherwise, the generator will only turn off once batteries reach the "Battery V/%#" setpoint.

If producing PV power while charging with the generator, both power sources will charge the batteries during checked "Charge" time slots until the batteries reach the time slot set point. PV will continue charging to full after this.

Usually, lithium battery customers program the battery % setpoint at 20-40% for all time slots because this chemistry has better Depth of Discharge abilities than lead-acid batteries. For the health of the batteries and to increase their lifespans, they need a full charge daily.

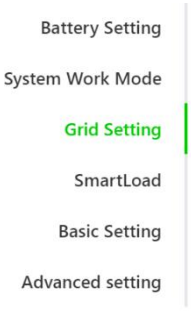
Lead-Acid battery customers typically see 50% for all time slots (because batts do not like to discharge below this value, and you will have enough capacity for when the grid goes out) and 100% at 1 PM for when you have good solar to recharge the batts.

AC Coupled PV Case

If the system has the latest versions of firmware, the AC couple panels on the GEN port can be treated like DC couple panels and charge the batteries up to the "OFF V/%" value of the AC coupled PV without the "Charge" time slots being enabled (even though the panels are on the AC side).

Grid Setting

Grid Mode



A. **UL1741 & IEEE1547:** Standard connection to the grid and enables the sell-compliant functionality. We have proven that we do not stay connected to the grid when the grid goes out.

B. **UL1741SA:** Supplemental Addendum to the original UL1741. One of the supplemental addendums is Frequency-Watt control/frequency curtailment.

   i. Any UL1741SA inverter can be AC coupled to another and controlled via its frequency.
   ii. Therefore, any inverter AC-coupled with Sol-Ark needs to have UL1741SA to control the AC-coupled inverter with frequency shifting.
   iii. It also enables wider Freq, Voltage, and Power Factor.

C. **General Standard:** This gives us complete control over what we do to change all our "protect parameters." Selecting UL1741SA or regular UL1741 will preset all the connection requirements for the grid. Connecting generators may require changing protect parameters or unusual installation locations—such as small islands.

Must set to General Standard if connecting Generator to AC Grid input breaker.

Power Factor (+/- 0.9 – 1.0)

This value is the ratio between the real power (working power) and apparent power. Setting PF = 1 means all power does work.

Grid Reconnect Time

The standard grid-reconnect time is 300s. If the system disconnected from the grid, the system would not reconnect to the grid for this value of time. Time allows the utility provider to stabilize their end before the inverter introduces more power.

When connecting a generator to the Grid breaker, you may avoid burning fuel for 300s by changing this value to something faster. Ensure you do not go any lower than 30 sec to warm up the generator before providing power. You could temporarily go lower than 30 sec for testing purposes only, but it needs to be set to a value equal or higher to 30 sec when the installer leaves.

Grid Frequency

Choose the inverter's output frequency (50 or 60Hz depending on the install's location).

Grid Type

Required inverter Power Cycle each time the input/output voltage is changed.

A. **120/240V Split Phase:** Most common setup (North America).

B. 220 Single Phase: Only some parts of South America, England, etc. If setting it to 220V, the neutral goes into the other leg of our inverter to produce 220V because we have two inverters inside, and each one can only make 120V at most.
C. 120/208V 3-Phase: 1 system for 208 will do only two of the 3 phases. 2 systems will do all 3 phases, but it is unbalanced (4.8kW, 6.2kW, 4.8KW). Need 3, 6, or 9 systems in parallel for balanced 3-phase.

Grid Vol High

The highest value the system will allow on the grid before it disconnects.

Grid Vol Low

The lowest value the system will allow on the grid before it disconnects.

Grid Hz High

If you have a generator, you will need to adjust this value to 65Hz to make the inverter more willing to stay connected to generators as the generator frequency may fluctuate significantly.

Grid Hz Low

If you have a generator, you will need to adjust this value to 55.

Zero Export Power

A target value for usage from the grid that you will be looking for from the CT sensors. This value is not 0 because if you aim for 0 and the system is not fast enough to catch a large load, you could end up pushing back some power.

Most people using this mode have no allowable sell-back, and some utility companies would not like you to sell back. Therefore, we do not target 0 but instead 20 by default. If the loads at the local unit cannot keep up for any reason and a small amount of power makes it back to the grid, you can adjust the target value slightly higher.

Gen Connect to Grid Input

You must select this if using a generator on the Grid input, either full-time such as off-grid, or sometimes (whole-home generator with an automatic transfer switch). See Diagram 3.

L/HVRT (Low/high voltage ride-through settings)

Usually enabled for islands, these require adjustments to particular values (see page 34 of owner's manual).

L/HFRT (Low high-frequency ride-through settings)

Usually enabled for islands, these require adjustments to particular values (see page 34 of owner's manual).

Sometimes, rural areas or places with the last transformer on the line where these parameters can fluctuate require enabling this setting. Enabling this will help to keep the Sol-Ark from disconnecting all the time because you can dial in exactly when they will disconnect or not.

Smart Load

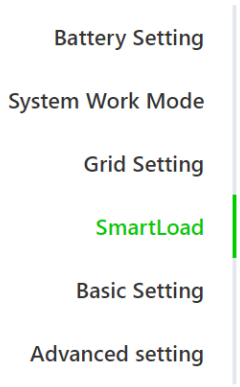
The Smart Load tab will control the GEN breaker's actions.

Mode

A. **Generator Input:** Default mode. GEN breaker will be a generator input.

B. **Smart Load Output:** Use the Gen input as a Smart Load output.
This setting turns the GEN breaker into a programable output for automatic load shutting for one or two circuits.

You can always press and hold the light bulb icon on the unit's home screen to force the Smart Load on, and it will stay on for 4 hours. It will then reverse to its regularly scheduled programming.



i. **Solar Power:** PV production wattage. The breaker will not receive power if you do not produce at least this amount of PV (i.e., if you set the value to 500, PV production will need to be at least 500W or higher to power the loads connected to this breaker). The most common use for this feature is for water heaters, small AC units, or non-critical luxuries. The feature reduces the minimum size of batteries required when you are off-grid. To ignore the PV production requirements, you can set this wattage to 0; therefore, the Smart Load feature will work at night.
ii. **Off V/%:** Sol-Ark will turn the smart Load OFF when the batteries reach this value (should be lower than the ON setpoint).
iii. **ON V/%:** It will turn the smart Load ON when the batteries reach this value (should be higher than the OFF setpoint). This feature will reserve the bottom half of your batteries to power your mission-critical loads and the top half for your Smart Loads.
iv. **On-Grid Always On:** Enable to turn on Smart Load always when the grid is present, regardless of SOC or PV wattage.

C. **For AC Coupled Input:** Select this option if you are AC-coupling a system. You will produce as much AC-coupled PV as possible and sell any excess straight to the grid when the grid is up.

i. **Off V/% (90% recommended):** The AC-coupled panels will turn OFF when the batteries reach this value. We recommended not to go higher than 95%, as there needs to be a buffer for the AC-coupled PV when off-grid.
ii. **ON V/% (60-80% recommended):** The AC coupled panels will turn ON when the batteries reach this value. We generally want to turn the AC-coupled panels on when the battery is low.
iii. **MI export to Grid Cutoff:** Leave this setting OFF.

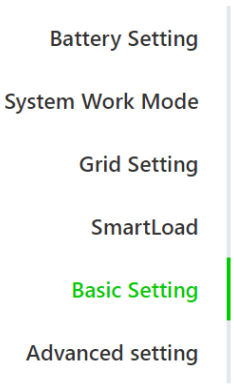
iv. **AC_Coupled_Frz_High:** Upper limit for the frequency curtailment (FrequencyWatt). We can only adjust 0.5 Hz per second as far as our output to control the AC-coupled panels.

If baseline is 60 Hz and the inverter needs to reach 62Hz, that is 2 seconds that the AC-coupled panels will potentially be producing power which needs to go somewhere. This is why we recommended that the OFF V/% is not 100% when you are off-grid with AC coupled panels.

Important Note: If AC-coupling is on the load side, you will not see the power production, whereas the GEN breaker has a sensor that allows us to measure AC-Coupled panel production accurately.

Additionally, the GEN port has a relay since it typically connects to a generator that would allow for a physical disconnect to the GEN breaker. Therefore, if you were AC coupled with a unit that does not comply with UL1741SA, connecting it to the GEN port would be required because the Load port cannot do frequency curtailment.

Basic Setting



Time

Please ensure this is correct, as the TOU bases its settings on this value (ensure time zome is correct). Sometimes, if the data that the customer reports from the unit does not match what we see on PowerView, the time set up could be incorrect.

Factory Reset

We do not recommend a remote factory reset. Preferably, have someone do this locally as this will reset all the unit settings. The password for this is 9999.

ARC Setup

To enable or disable ARC fault capabilities.

Time Sync

Time sync enables the Wi-Fi dongle to sync time with the internet.

Beep

You can turn the beep off temporarily by disabling this option.

AM/PM

You can set the time as AM/PM format or military time if this is disabled.

Auto-Dim

The customer will have a slider to adjust the brightness of the LCD screen, but PowerView does not have this capability. **If auto dim is not enabled, it will void the warranty of the LCD.**

Advanced Setting

Battery Setting
System Work Mode
Grid Setting
SmartLoad
Basic Setting
Advanced setting

Gen Peak-Shaving

This feature is on the GEN port for a generator. If enabled, the sol-ark syncs up to the generator to keep the inverter active and uses the CT sensors to see how much power the generator is putting out.

This setting maintains the generator power from going above a threshold value to protect it from overloading. The system will reduce the charge rate down to 0. If the generator power is still going above the specified threshold, the system will discharge the battery to avoid overloading the generator.

This setting requires CT placement on the generator side. You will NOT be able to do both Gen peak-shaving AND Grid peak-shaving (which also requires enabling limited to home mode) simultaneously.

You can only use ONE set of two CTs (either on the Grid side or the Gen side).

Since we are just a load to the generator, without this enabled, the generator will charge the batteries (limiting the amperage to the GEN Charge setpoint) and pass the rest of the power through to the load panel.

Grid Peak-Shaving

Grid PS is a similar feature to Gen PS but on the grid side. Typical customers who use this feature have demand pricing that bases their monthly electricity bill on the highest 15 minutes of use. The system will place a ceiling threshold on grid quantity pulled (kW) with Grid PS enabled.

The Sol-Ark will provide power through different sources do everything it can to keep the grid usage at or below the threshold (discharging the batteries, using PV power if available, etc.). This setting also requires the CTs to be on the grid side, and that limited power to home mode is enabled.

- Gen or Grid Peak-Shaving will force Time of Use to be ON and will require user interaction with TOU settings to activate their desired setpoints.
- If you do **NOT** wish to use the battery, but **want** to use peak-shaving, program all the TOU setpoints to 100% or equivalent voltage if set to voltage mode.

Parallel

If you have parallel units, you will need to enable "Parallel" on each unit for correct programming.

Sol-Ark Support rarely changes this setting remotely, as someone needs to program the units in person. They also need to ensure the physical connections among each Sol-Ark.

Friendly reminder to users: Check the MCU and Comms are the same between parallel units for proper functioning.

A. If "Grid Type" is 120/240V Split Phase

i. Only ONE unit can be the **master** with Modbus SN = 1.
ii. Connect ALL the sensors and battery comm to the master unit.
iii. Program any other units as "Slave" with Modbus SN 2, 3, 4 … 9.
iv. All Modbus SN addresses need to go in the same order that you connected the systems in parallel.

B. If “Grid Type” is 120/208V 3 Phase

i. **Systems = 1 @ 208V**
   a. Enabling "parallel" when only installing one system is not required.
      Inv_L2 = **Grid_L1** + Inv_L1 = **Grid_L2**
   b. Power to Grid: 4.5kW x 2 Legs

ii. **Systems = 2 @ 208V**
   a. Master / Phase A /Modbus SN=1: Inv_L2 = **Grid_L2** + Inv_L1 = **Grid_L1**
   b. Master / Phase B /Modbus SN=2: Inv_L2 = **Grid_L3** + Inv_L1 = **Grid_L2**
   c. 9KWx2 Power to Grid: 4.2kW + 4.8kW & 4.8kW + 4.2kW

iii. Systems = 3 @ 208V

a. **Master / Phase A /Modbus SN**=1: Inv_L2 = **Grid_L2** + Inv_L1 = **Grid_L1**
b. **Master / Phase B /Modbus SN** =2: Inv_L2 = **Grid_L3** + Inv_L1 = **Grid_L2**
c. **Master / Phase C/Modbus SN** =3: Inv_L2 = **Grid_L1** + Inv_L1 = **Grid_L3**
d. 9 kW x 3 Power to Grid: 4.5kW + 4.5kW & 4.5kW + 4.5kW & 4.5kW + 4.5kW

iv. Systems = 6 @ 208V

a. **Master / Phase A /Modbus SN** =1
b. **Slave / Phase A /Modbus SN** =2
c. **Master / Phase B /Modbus SN** =3
d. **Slave / Phase B /Modbus SN** =4
e. **Master / Phase C /Modbus SN** =5
f. **Slave / Phase C /Modbus SN** =6

v. Systems = 9 @ 208V:

a. **Master / Phase A /Modbus SN** =1
b. **Slave / Phase A /Modbus SN** =2
c. **Slave / Phase A /Modbus SN** =3
d. **Master / Phase B /Modbus SN** =4
e. **Slave / Phase B /Modbus SN** =5
f. **Slave / Phase B /Modbus SN** =6
g. **Master / Phase C /Modbus SN** =7
h. **Slave / Phase C /Modbus SN** =8
i. **Slave / Phase C /Modbus SN** =9

Warning: Programming the Modbus SN in a different order than you connected the systems will break the programming!

Auto Detect Home Limit Sensors

This function will automatically detect the polarity for the sensors; however, it cannot fix the phase alignment. Check the box, or turn the feature on through PowerView and press "Ok" or "Confirm."

The auto-Detect feature will not fix a physical connection problem, such as if L1 connects to sensor input two or if you connect the CTs to the Student inverter.

For example, if an HM value is negative and the other is positive, this function will correct the data. If the sensors are facing the wrong direction or the polarity is wrong, Auto-Detect will fix the data automatically.

After turning this on, the system may show values that might not make sense, but after one minute or so, it will turn off this function once it finished correcting the sensor issues.

This function will only work if the system is connected to the Grid **and** has batteries. Otherwise, it will not work.

⚠**Enabling this feature WITHOUT batteries will require a factory reset to regain control of the Sol-Ark settings.**

Any AC coupled panels or other AC power source on the property that sells to the Grid needs to be OFF before using this function because the additional AC power source might cause confusion.

If you ONLY connect a generator to the Grid breaker, do NOT use this function because it will sell back to the generator.

If you are off-grid + connected to a generator + do not have batteries + trying to use Gen peak-shaking, you will have to verify manually that the CTs are connected correctly.

Lock the Inverter

If enabled, this will require a password for users to change settings locally at the unit. The password for this is always 7777.