

Fortress Power - Sol-Ark LFP Legacy Series Inverter Guide

Introduction

Battery Datasheets / Manuals: See “Downloads” section of individual product pages

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Warranty Submittal: <https://www.fortresspower.com/warranty/>



Join Our Discord Chat

Step 1 – Getting Started. Turn each battery on individually while unpacking the batteries and note the voltage of each battery as well as the serial numbers. If installing parallel batteries, use external 80A fuses (see Victron Lynx). The batteries must be charged individually to within +/- 0.5V of each other before commissioning.

Pro tip: If a BMS error occurs when powering up the inverter, turn the batteries off. Connect the inverter and any battery breakers so power can flow from the batteries to the inverter. Turn the batteries back on again, and then turn the inverter back on again. This will allow the batteries to trickle charge the inverter i.e. “pre-charge”. You may need to repeat this process up to three times to precharge the inverter enough for it to power up.

Step 2 – Program the first three tabs in the Battery Setup menu.

Touch the gear icon on the main SolArk home screen to find the Battery Setup menu. Program the batt/charge/discharge tab as shown below.

| Batt Setup | |
|-----------------|--|
| Batt | Charge Discharge Smart Load Wind |
| Batt Capacity | 100 Ah per LFP5 200 Ah per LFP10 300 Ah per LFP 15 <input type="checkbox"/> Use Batt V charged |
| Max A Charge | 80A <input checked="" type="checkbox"/> Use Batt % Charged <input type="checkbox"/> No Battery |
| Max A Discharge | 100A <input type="checkbox"/> BMS Lithium Batt 04 <input checked="" type="checkbox"/> Activate Battery |
| Tempco | 0 mV/C/Cell |

Use Batt V charged – Use this option with the LFP series batteries.

Use Batt % Charged – Do not use this option.

Activate Battery – Does not actually activate the battery but instead helps the battery after deep discharges.

Max A Charge / Discharge – Start with the settings recommended on the right. If they do not provide enough instant power for the end user, join our Discord group for adjusted settings.

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| Batt Setup | | | | |
|------------|---|-----|-------------------------------|---------|
| Batt | Charge | | Discharge Smart Load Wind | |
| Start V | 50.5V | 51V | Float V | 54.4V |
| Start % | 10% | 15% | Absorption V | 54.4V |
| A | 80A | | Equalization V | 54.4V |
| | | | | 30 days |
| | <input type="checkbox"/> Gen Charge <input checked="" type="checkbox"/> Grid Charge | | 0 Hours | |

Start V autostarts the grid or generator charge when the battery hits that voltage. It charges the battery to 100%. Avoid hitting this voltage by programming the Time-of-Use settings in the grid parameters.

Start % - disabled. Do not use % mode with LFP-series batteires.

Float V / Absorb V set to 54.4V

Equalization set to 0 hours (disabled)

A – The amount the grid or generator charges the batteries. Should not be more than 80A.

Grid Charge – Check for grid-tied arrays or off-grid arrays with large generators.

Gen Charge – Check this box if tying a <8kW generator into the generator breaker on the Sol-Ark.

| Batt Setup | | | | |
|--------------|--------|-----------|------------------------|--------------------------|
| Batt | Charge | Discharge | Smart Load Wind | |
| Shutdown | 49V | 5% | Batt Resistance | 5 mOhms |
| Low Batt | 51.4V | 20% | Batt Charge Efficiency | 98% |
| Restart | 51.8V | 25% | BMS_Err_Stop | <input type="checkbox"/> |
| Batt Empty V | 48V | | | |

Shut down % - is the low battery cut off point which either shuts down the inverter or transfers to grid power. This value should be raised to 51V if there is not grid or generator charge on site to avoid regularly deep-discharging the battery. Regularly cycling the battery below 20% will reduce the Fortress warranty.

Low Batt – provides an alert when the battery hits this level. User adjustable.

Restart – determines when the battery can be used again after reaching the shutdown %.

Batt Empty V – Keeps a few volts in the battery to avoid locking the battery out during accidental deep discharges.

Step 9 – Program Grid Parameters.

Go back to the home screen, touch the gear icon, and select “**Grid Setup**”. The Grid Parameters menu will appear and the Grid Limiter Function will be the first tab. You may still need to program other tabs, but this Grid Limiter tab plays an important role in battery behavior. The programmed levels are user specific, so think carefully when programming this menu relative to the specific job site and grid policy.

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Suggested Grid-Tie Parameters

| Grid Param | Time | Power(W) | Batt | Charge | Sell |
|---|---------|----------|-------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> Grid Sell 9000 | 01:00AM | 2000 | 49.0V | | |
| <input type="checkbox"/> Limited Power to Home | 3:00AM | 3kW | 51.8V | | |
| <input type="checkbox"/> Limited Power to Load | 5:00AM | kW | 51.4V | | |
| <input checked="" type="checkbox"/> Time of Use Setup | 09:00AM | 2000 | 49.0V | | <input checked="" type="checkbox"/> |
| | 9:00AM | 9kW | 53.7V | <input checked="" type="checkbox"/> | |
| | 3:00PM | 3kW | 54.4V | | |
| | 7:00PM | 9kW | 52.8V | | |
| | 9:00PM | 3kW | 52.3V | | |

Grid Sell – Select to sell back to the grid when the batteries are full.

Limited to Home – Select when not allowed to backfeed the grid or when utility solar buyback rates is horrible. Typically requires 200A SolArk CTs around the main grid feed.

Limited to Load – Select when offgrid.

Time-of-use – Almost always select this feature, even when off-grid. It is useful to optimize battery use conditions such as grid/generator charging.

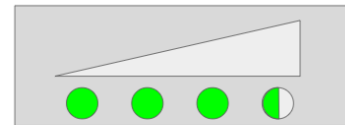
Charge Column – Checking the box will force a grid charge.

Batt V Column – If there is a surplus amount of solar on site, solar will always charge the battery full to 54.4V before selling back to the grid. But if the battery falls below this voltage and grid power is available, the battery will switch over to grid power. The suggested settings helps the battery drain at night for efficient solar operation, while keeping enough reserve capacity for power outages. These numbers could be set to 54.4V to always keep the battery at 100% full.

Next Steps:

Before leaving site, verify that all batteries are working. This can be simply done by looking at the LCD screen and confirming amperage is flowing in or out of each battery. Apply a charge current and confirm the state-of-charge light is blinking on each battery.

The best way to translate voltage into % SoC is to remove any load from the battery before measuring battery voltage.



A blinking State of Charge Indicator Light confirms that the battery is charging.

| SOC (%) | Cell Voltage | Unit Voltage |
|---------|--------------|--------------|
| 0 | < 2.8 | <48.5 |
| 5 | 3.05 | 48.8 |
| 10 | 3.2 | 51.2 |
| 15 | 3.23 | 51.68 |
| 20 | 3.24 | 51.84 |
| 25 | 3.26 | 52.16 |
| 30 | 3.27 | 52.32 |
| 35 | 3.27 | 52.32 |
| 40 | 3.28 | 52.48 |
| 45 | 3.29 | 52.64 |

| | | |
|-----|------|-------|
| 50 | 3.29 | 52.64 |
| 55 | 3.3 | 52.8 |
| 60 | 3.3 | 52.8 |
| 65 | 3.3 | 52.8 |
| 70 | 3.3 | 52.8 |
| 75 | 3.31 | 52.96 |
| 80 | 3.32 | 53.12 |
| 85 | 3.32 | 53.12 |
| 90 | 3.32 | 53.12 |
| 95 | 3.33 | 53.28 |
| 100 | 3.5 | 54.4 |

Congratulations on reading the entire Fortress / Sol-Ark integration guide. Don't forget to join our Discord chat group.