

Revov Battery Setup for Sunsynk

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Technical Preface

As with most inverters there are two major ways of controlling the battery BMS the inverter.

1. 1st way is to set it up as a lead acid battery VLRM or AGM battery that is a voltage-based system and has very intricate control over the voltages and the currents for the battery. This mode is very effective with an excellent 3-phase-charge profile and is preferred.
2. The 2nd way is a lithium setting, where the BMS is controlling the inverter's decision making.

This is quite an effective way because once the battery has delivered 200 Amp hours, the BMS will indicate this, and the inverter will stop taking power, so it basically prevents over utilization of the battery. The downside is that it may not give full utilization of the battery.

With a firmware update you can have the BMS talk directly to the Revov. Therefore, the system has been setup both ways, in which, with a change in Inverter firmware on the Sunsynk, the inverter can subsequently operate in a normal AGM mode, as a voltage-based system, or as a BMS controlled Inverter. In the latter, the BSM tells the Sunsynk what to do based on some of the Alarm parameters in the BMS.

There is a Revov CAN-enabled BMS that controls the inverter, using the industrywide protocol called CAN.

The 3-phase charge profile

The float paradigm for the Sunsynk is quite good in that, every hour, it does a small uptick to keep the Lithium battery alive, and it does it in a typical Victron-style in which it upticks from the float value up to the absorption value briefly, and then sags down to Float voltage.

In an AGM status, you clearly see the system rise to 55.5 volts then goes down to float 54.5 volts and then every two hours had a little spike up of 35 amps. It takes it in, it hold it for two or three minutes and then lets it dissipate, giving it a smooth curve, allowing the battery to be kept alive effectively.

In the lithium battery mode (Protocol 9 for Revov RS485) with the floating absorption of the same voltage, you will note a small voltage degradation at first, then you will note a small uptick of current afterwards every 2 hours. The voltage reading does not move much and sticks around at 55V, but you can still see the inverter doing the 2-hourly uptick, keeping it alive.

The Current limit

Revov works on the presumption of protective envelopes for each part of the DC System:

1. The battery can do 1C (200A for the C8 and R9 batteries, and 100A for the R100 and B100)
2. The to protect the battery life the BMS is design to trip at less than 1C (so 160 A)
3. Since the full force of the Sun (for PV) or the Grid can be directed at the BMS and damage the BMS before it can respond, the BMS should be protected with a 125A fuse.
4. This protects the BMS, and in turn the battery and so on up to the inverter.
5. Current limit on the 5KW Sunsynk is 115A
6. Current limit on the 8KW Sunsynk is 125A

Installation Recommendations

Revov attempts to establish the convention that makes the system as universal or agnostic to the Inverter as possible and still have service long life integrity.

Also, the 1-2-4 rule-of-thumb is obeyed: the system should be designed from the consideration of the Load first and that sizes the inverter and then, for every

- 1 Kilowatt of power capacity in the inverter,
- 2 Kilowatt-hours of power capacity in the battery,
- 4 Kilowatt-hours of power capacity in the solar (Solar production times the average useable solar hours)

Crucial: Always setup the AGM-V charge Settings, even if the Lithium Protocols are used (CAN or RS485). The inverter uses these setting to compliment that battery management.

Firmware

As per conventional practice, the inverter system should not have the firmware updated unless the system is giving errors. If an update is desired, navigate to <https://www.sunsynk.org/tech-support> . click on the link <https://www.sunsynk.org/up-grade> and sign in. you will need the Data logger (Wi-Fi dongle) and Inverter on-line serial numbers.

Before doing any upgrade on the Sunsynk UI please check that the inverter is newer than:- 1904 xxxx

If older than this model number, then the only upgrade that can be done is E410 Otherwise you will damage the inverter. Please take care to check the ID number of the inverter before attempting any new upgrade.

Firmware Number Code for the Inverter

This is seen on the bottom of the Settings Screen in the LCD display of the inverter as seen in the photo below.

for the Sunsynk inverter with a serial number of 1904xxxx or lower, the last update of the Firmware: E410-XXX.



Figure 1 Settings Screen in the LCD display of the inverter showing Firmware code e301-MCU:0108 for a 5kW Sunsynk.

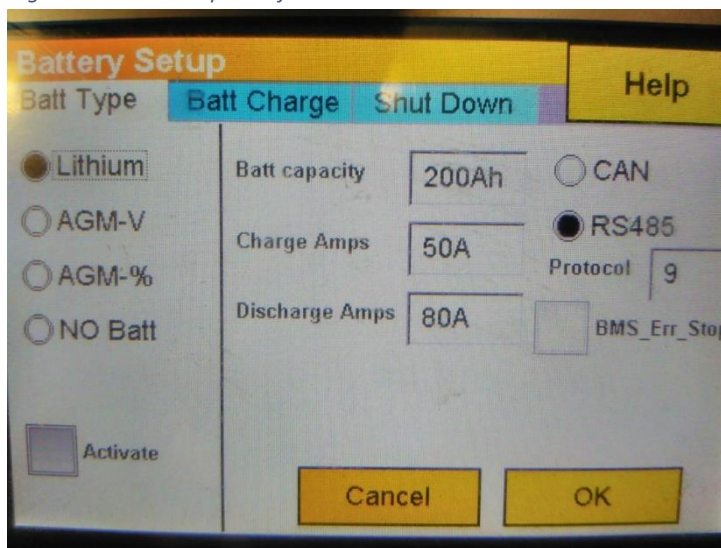
Process for installation 1st life 11.2kw and 2nd life 10.2 kw batteries

There is a dedicated link on the Sunsynk web site with full instructions for Inverter updates.

1. The installer can get a Firmware update from Sunsynk distributor.
2. Ensure that Revov BMS has the Settings for Sunsynk control (This is set by default by Revov, but on older BMS, for example when retrofitting a Sunsynk, where it may be required to do a double check).
3. Setup battery low Voltage, shutdown Voltage and restart voltages on Sunsynk inverter under AGM-V as seen in figure 7 on next page.
4. Make up a coms cable with the below pin out for the 1st life 11.2kw and 2nd life 10.2kw as seen in figure 3 below.
5. Setup the Inverter Battery Communications protocol setting as seen in figure 4 below.

Inverter side		Battery side
Pin 1	to	Pin 2
Pin 2	to	Pin 1
Pin 3	to	Pin 3
Pin 4	to	Pin 4
Pin 5	to	Pin 5
Pin 6	to	Pin 6
Pin 7	to	Pin 7
Pin 8	to	Pin 8

Figure 3 Coms cable pinout for 1st and 2nd batteries



6. Charge battery up and then discharge 100% (SoC % setting should be 0% for the first cycle)

R100 Can Bus Setup

1. The installer must get a Firmware update from Sunsynk distributor
2. Ensure that Revov BMS has the Settings for Sunsynk control
3. Setup battery low, shutdown and restart voltages on Sunsynk inverter under AGM-V as seen in figure 7 on next page.

4. Connect a straight through ethernet cable to the Can bus port on battery as seen in figure 5 below.



Figure 5 R100 Can bus port connection

5. Setup the Inverter Battery Communications protocol setting as seen in figure 6 below.

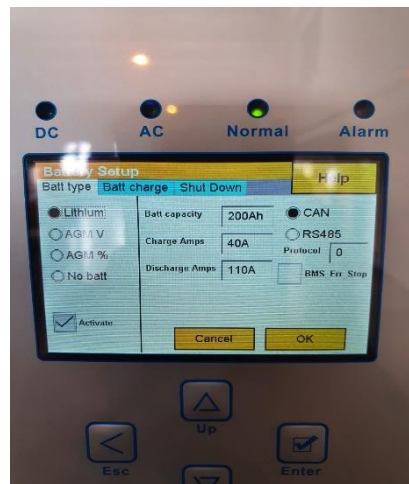


Figure 6 R100 Coms protocol set up

6. Charge battery up and then discharge 100% (SoC % should get down to 0% for the first cycle)

[Pictures of the inverter setup with suggested values.](#)

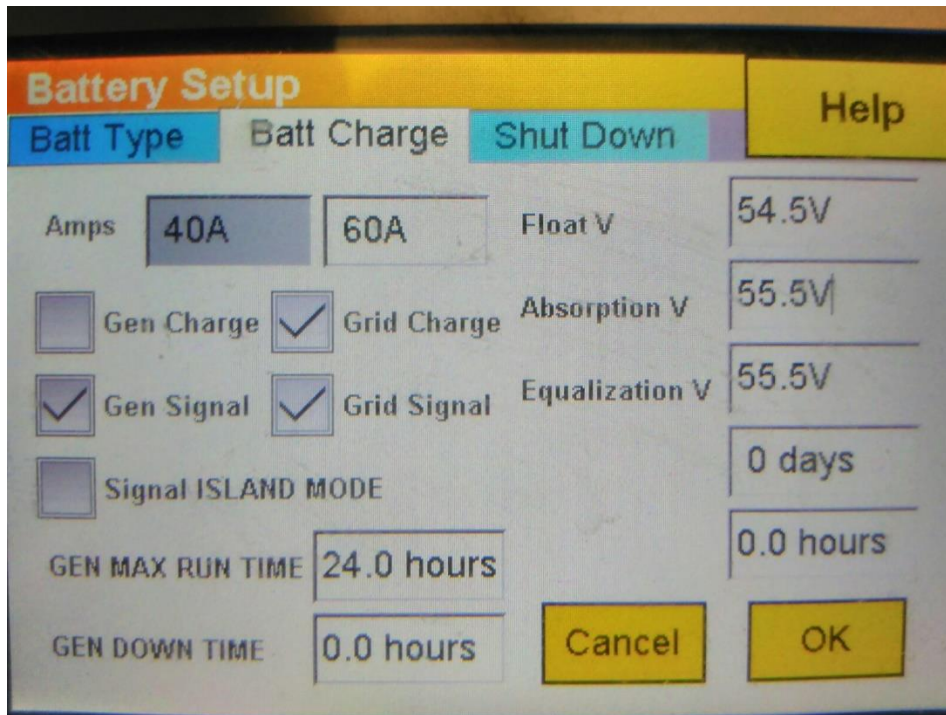


Figure 7 Sunsynk Recommended Voltages For all Revov batteries

Appendix

LED description for TianPower Battery Management System

The labels in the red boxes are not on the BMS, but shown here for illustration.



The function or indications of the LEDs flashing for BMS status and events, follow this link: [LED description](#).

On other Matters: Support videos on Sunsynk Website

Wiring Inverters in 3 Phase Parallel

Sunsynk has a plethora of good videos on their web site, for example, a short video explaining the programming and wiring issues of connecting inverters in 3 phase parallel configuration. <https://youtu.be/PyEgoRvOLPU>