EG4 Electronic Battery Balancing Methods

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SOC% De-Calibration:

The EG4 line of batteries could require a periodic SOC% recalibration if long durations of idle consumption with an inverter where to occur. Due to the parasitic draw of the idle consumption of an inverter with *multiple* batteries in parallel, this can lead to each battery module experiencing under 0.5A of discharging current which the BMS will not be able to detect. Due to this, the SOC% can become de-calibrated. This can lead to interruptions in power, when power is needed the most during a time of full backup.

SOC% Re-Calibration:

The SOC% re-calibration for EG4 batteries will have multiple reset points-

- Pack Undervoltage Protection
- Pack Overvoltage Protection
- Cell Undervoltage Protection
- Cell Overvoltage Protection
- AC or PV Charging to 100% SOC (Recommended reset point)

These recalibration points will only need to be used if a long duration of idle time is used with an inverter during the idle consumption of multiple batteries in parallel.

The most convenient method for installed batteries into a system will be the *top balancing method* by fully charging the battery or battery bank to 100% SOC in closed loop communication, or when top balancing in open loop communication, the individual battery or battery bank will need to have an applied 56V charging voltage with a Stop AC Charge Voltage and PV Charge Priority Stop Voltage of 57V.

Battery bank SOC% Imbalance:

When multiple batteries are in parallel, a SOC% imbalance can occur between the batteries. This is of no concern. Due to the internal impedance of each battery model being different, and the resistance of the conductors/wires that connect the batteries to the bank and the inverter. This will all lead to an occasional SOC% imbalance when each battery is charging/discharging at different rates of amperage.

Battery Bank SOC% Rebalance Method:

Balancing a battery bank in closed-loop communication will require setting the stop charging percentage to 100%. Or in open-loop communication fully charging the battery bank to 100% SOC. Based on using the applied charging voltage of 56V which is already set in closed loop communication.

Due to the SOC% being an average measurement of the battery bank, the inverter will be required to charge all batteries to 100% SOC to reach the stop charging percentage. This guarantees a fully top balanced battery bank.

Note: Although some BESS systems will not have enough solar power or AC utility to fully charge the entire battery bank at one time, isolating batteries into sections could be more convenient to fully charge.

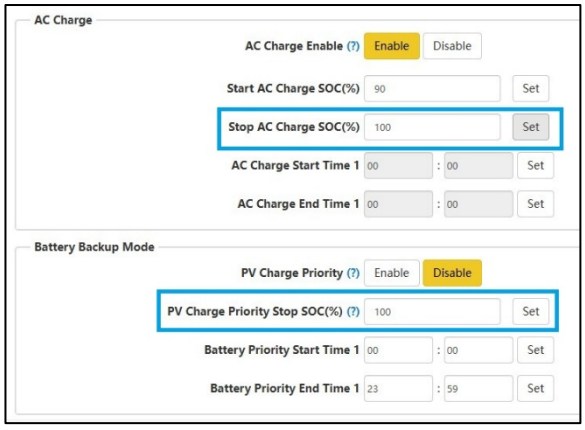
Recommended Settings for SOC Re-Calibration/Rebalancing:

The most common recalibration/balancing method when top balancing is setting PV Charge, AC charge, or Chargeverter charge to 100% SOC.

The newest firmware for EG4 batteries has included an improved SOC% charging logic to provide better accuracy of top balancing when fully charging the battery. These logics have added additional checks during top balancing to help improve accuracy between the SOC% and voltage.

Closed Loop Communication Settings for SOC Re-Calibration/Rebalancing:

When top balancing in closed loop communication, the individual battery or battery bank will be set to charge to Stop AC Charge SOC% and PV Charge Priority Stop SOC% to 100%.

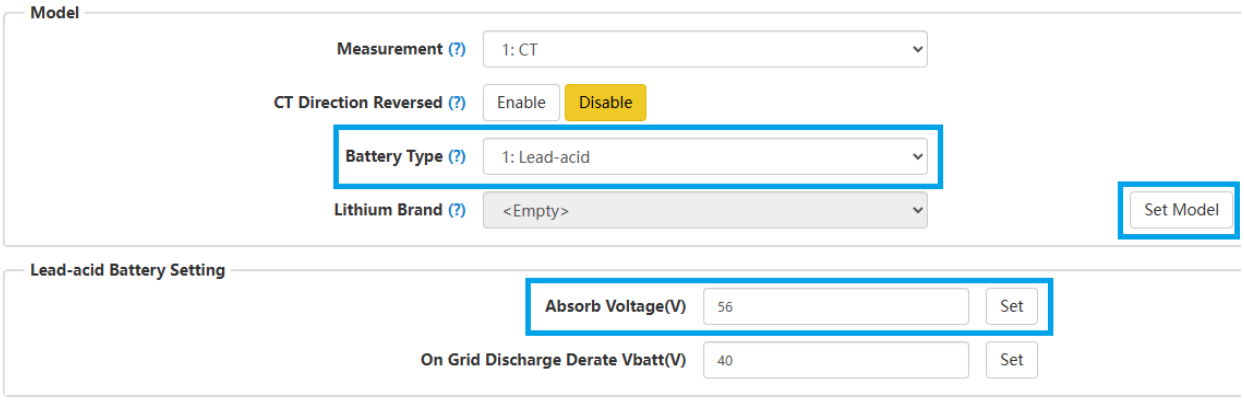


During the charge, when 95% SOC is reached, the charging current limiter will be enabled and reduce the amperage to 0.25C until 99% SOC is reached then the current limiter will be reduced to 0.05C. During this time, if there are multiple batteries charging, the amount of current seen between each battery could be very little.

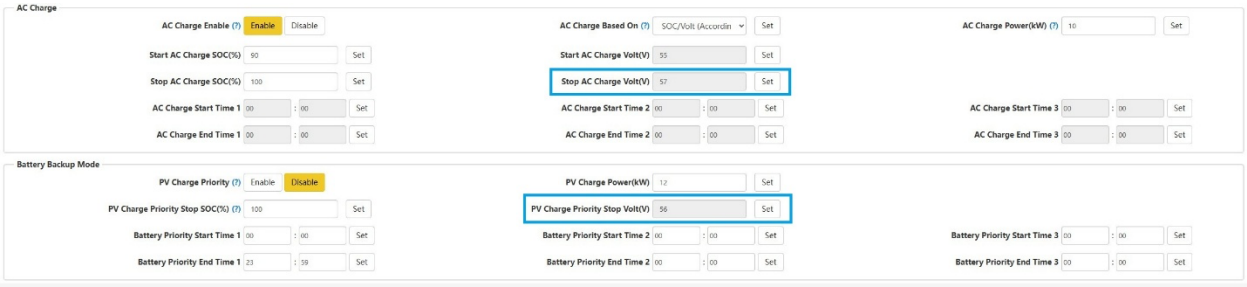
Do not interrupt the charging during this time or the batteries may not be able to successfully charge to 100% and re-calibrate and re-balance.

Open Loop Communication Settings for SOC Re-Calibration/Rebalancing:

When top balancing in open loop communication, the individual battery or battery bank will need have an applied 56V Absorb Voltage within Lead-Acid mode.



Set the stop AC Charge Voltage and PV Charge Priority Stop Voltage of 57V.



Conclusion:

The above methods should be used as a preventative maintenance and performed regularly every 1-3 months for the most calibrated battery or battery bank. This prevents the individual battery or battery bank from falling into severe imbalance or decalibration and causing performance issues within the system.