



Battery Bank Balancing

A Walkthrough Using

the EG4 18kPV Inverter & Various EG4 Batteries

Executive Summary

In pursuit of energy education, EG4 Electronics introduces this document as a comprehensive guide to optimizing battery bank performance. Focused on the synergy between the EG4 18kPV hybrid inverter and EG4 batteries, we aim to address challenges related to battery imbalances. EG4 Electronics strives to empower users with knowledge to make informed decisions, ensuring the seamless integration of our technology into their specific energy ecosystem.

This document serves as a walkthrough for battery balancing between EG4 WallMount batteries and various EG4 server rack style batteries.

Problem Statement

Demand for energy storage solutions has led EG4 to develop a diverse range of battery options. Among these, the WallMount is a robust 280Ah single unit.

However, when users consider integrating the WallMount with older battery models – LL version 1, LL version 2, and LiFePOWER4 batteries, each boasting 100Ah – a significant challenge arises. The inherent capacity difference between these batteries poses a risk of imbalance. This could lead to charging and/or discharging one battery/bank significantly faster than the other. It is imperative for users to understand the intricacies of this challenge.

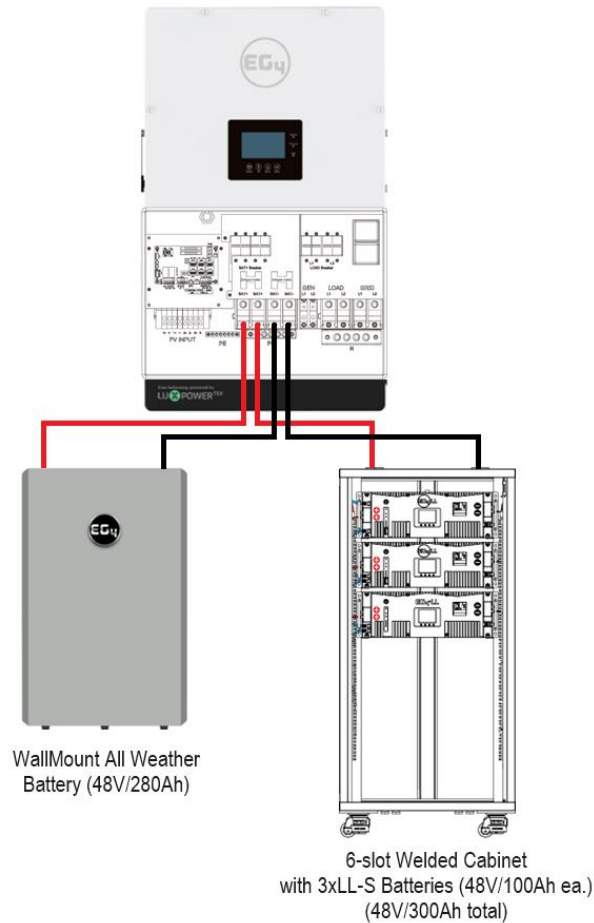


Figure 1 – Battery Balancing

Battery Balancing Requirements

Battery imbalances can impact the performance and longevity of your energy storage. To navigate this challenge effectively, it is crucial to comprehend the distinct capacities of the EG4 WallMount Battery (280Ah) and the older models (100Ah each). The goal is to create a harmonious configuration (as shown in figure 1) that optimizes the utilization of each battery, mitigating imbalances. Towards this goal, each battery bank (made up of one or many individual batteries) connected to an inverter must have similar Ampere-hour capacities.

Configuration

1. Identifying Battery Capacities:

- a. Clearly identify the capacity of each battery. This foundational step ensures a precise understanding of the energy potential difference

between each bank and/or individual battery. The individual capacity of EG4 batteries is 280Ah for the WallMount and 100Ah for all other server rack batteries (LL version 1, LL version 2, and LiFePOWER4) as stated above.

2. Grouping Batteries:

- a. Group three 100Ah batteries together to form a single bank. This grouping yields a combined capacity of 300Ah (3 x 100Ah). This 300Ah bank should always be paired with one 280Ah WallMount battery (when paralleling to the same inverter). This configuration minimizes imbalances and fosters an optimal synergy between batteries.

3. Connecting to the Inverter:

- a. Connect the battery bank made up of 3 rack mount batteries (300Ah) and the battery bank made up of 1 WallMount battery to the EG4 18kPV hybrid inverter via the battery ports as shown in Figure 1 above. The inverter will then allow for efficient management of the combined 300Ah bank alongside the 280Ah WallMount. When using two WallMount batteries in one bank (2x280Ah=560Ah), the second bank would need to be made up of six rack mount batteries (6x100Ah=600Ah) to maintain charge/discharge balance.

4. Monitoring and Maintenance:

- a. Keep an eye on the performance of each battery. Regularly check the state of charge, voltage levels, and overall system health. If any discrepancies arise between your measurements & system reporting, take corrective action to maintain a balanced configuration.
- b. For optimal maintenance when dealing with diverging batteries, we advise the following procedure:
 - i. Deep cycle each battery to 20% capacity.
 - ii. Charge each battery individually to 100%.
 - iii. Reintegrate all fully charged batteries back into the system.
- c. We recommend using self-consumption to discharge the batteries and utilizing an EG4 charger, such as the ChargeVerter, to recharge each battery individually. This process may take approximately 1.6 hours per battery at a rate of C/2.

Continuous Optimization

1. Staying Informed:

- a. Regularly review updates regarding EG4 solutions. Staying informed allows you to leverage the latest information to continuously optimize the performance of your system.

2. Consulting Support:

- a. In case of any uncertainties or challenges, our dedicated support team at EG4 Electronics is readily available to provide guidance or assistance. Please reach out to us.

Conclusion

In conclusion, by understanding the capacities of each battery, strategically grouping them, and connecting them to the EG4 18kPV hybrid inverter, users can achieve a harmonious configuration that maximizes energy utilization while minimizing imbalances. By empowering users with knowledge and practical solutions, EG4 Electronics remains committed to facilitating seamless integration and optimized performance within diverse energy ecosystems.

Please contact support@eg4electronics.com for any questions you may have.