EG4 LiFePOWER4 48V V2 Server Rack Product Launch White Paper

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1. INTRODUCTION

EG4 Electronics is excited to introduce the next evolution of our flagship LiFePOWER4 series—the LiFePOWER4 48V Battery Version 2 (V2). We've taken the reliable architecture of our original LiFePOWER4 (V1) and enhanced it with cutting-edge upgrades. The result is a simple, durable, and adaptable battery that meets the needs of today's evolving energy demands.

The LiFePOWER4 V2 Lithium Iron Phosphate battery is composed of (16) UL recognized 3.2V prismatic cells in series which have been tested at 6,000 deep discharge cycles to 80% Depth of Discharge (DoD). The cell composition, UL recognition, and DoD remain consistent with the original LiFePOWER4 V1. Each battery module operates at 51.2V, 100AH, and provides 5.12kWh energy storage capacity. Additionally, each LiFePOWER4 V2 comes with a 10-year Limited Warranty as well as integrated BMS communication and monitoring.

Some significant changes to the V2 when compared with the V1 include the following:

Lifepower4 51.2V 100ah V2	Specifications	Lifepower4 51.2V 100ah V1
Yes	Rapid Shut down via EG4 Inverters	No
Yes	Rapid Shut down via external button	No
Yes	Fire suppression	Yes
Yes	CANBUS Communication	No
Yes	RS485 Communication	Yes
Yes	RS485-Remote update via EG4 Inverters	No
64	Supported number of batteries in closed-loop communication	16
4-AWG	Positive/Negative Terminal conductor size	6-AWG
BMS Parameters		
51.2V	Voltage	51.2V
100ah	Capacity	100ah
100A	Charging Current (Max. continuous)	100A
100A	Discharging Current (Max. continuous)	100A
>102A for 20s	Charging over current 1. protection	>100A for 20s
≥120 for 3s	Charging over current 2. protection	≥120 for 2s
≥102A for 30s	Discharge over current 1. protection	>100A for 10S
≥150A for 3s	Discharge over current 2. protection	≥150A for 3s
>300A for <0.1ms	Short Circuit Protection	>250A for 1s
3.8V	Cell Over-Voltage Protection	3.65V
2.3V	Cell Under-Voltage Protection	2.5V
120mA	Cell Passive Balancing	100mA
60.0V	Total Over-Voltage Protection	58.4V
44.8V	Total Under-Voltage Protection	40.0V

2. TECHNICAL BREAKDOWN OF LIFEPOWER4 V2

2.1 BMS CYCLING

The addition of a dedicated BMS on/off switch and separate double pole breaker for battery power introduces a higher level of control over power management. Users can now independently troubleshoot BMS issues, should the need arise. Power the battery off using the double pole breaker, but still have access to interact with the BMS.

- **LiFePOWER4 V1**
  - o Battery and BMS can only be turned on and off using a 100A breaker.
- **LiFePOWER4 V2**
  - o Equipped with a BMS communication on/off switch on the battery face as well as a double pole breaker for battery power on/off.

2.2 TERMINALS

The addition of extra positive and negative terminals enhances flexibility during installation, reducing the risks associated with double landing scenarios. Double landing, where multiple connections are made to a single terminal, increases resistance and the likelihood of electrical faults. By providing separate terminals, the V2 allows for a cleaner, safer installation, especially when paralleling batteries or adding peripherals such as surge protection devices (SPDs), EMP shields, or step-down converters.

- **LiFePOWER4 V1**
  - o One positive and one negative terminal connection only.
- **LiFePOWER4 V2**
  - o Two positive and negative terminal connections allow you to easily connect chargers or EMP shields/surge protection. This also reduces double landing scenarios, creating a safer and more efficient connection when paralleling.

2.3 ADJUSTING SETTINGS & READOUTS

Designed with future expandability in mind, the LiFePOWER4 V2 features an integrated USB port that supports future upgrades (coming soon), which will enable enhanced user interface and functionality. Stay tuned for updates!

- **LiFePOWER4 V1**
  - o Limited monitoring functionality
- **LiFePOWER4 V2**
  - o LCD port reserved for future use (coming soon). A simple USB connection will upgrade monitoring and functionality.

2.4 BMS COMMUNICATION

Battery comms now have two dedicated ports, with standalone ports for RS485 and CAN connections. This allows users to parallel batteries without impeding connections to an inverter or outside monitoring device, such as a laptop. Additionally, the implementation of a dedicated CAN port allows for streamlined communication with a wider variety of inverters, thus allowing for more scalability and flexibility, particularly in larger systems.

- **LiFePOWER4 V1**
  - RS485 communication interface only, limiting the devices that can communicate with the battery.
- **LiFePOWER4 V2**
  - In addition to the RS485 and battery-comm port for parallel communication, the added CAN port allows for communication with a greater variety of inverter brands.

2.5 E-STOP FUNCTIONALITY

The LiFePOWER4 V2 introduces Emergency Stop (E-Stop) to the LiFePOWER4 line for the first time. E-Stop is a unique feature developed by EG4 that allows users to utilize Rapid Shut Down (RSD) features for their entire system all at once. From any location where the E-Stop is installed, users can simply hit the button and de-energize compatible connected devices simultaneously and in a fraction of a second. This feature is particularly critical in high-risk environments like industrial solar installations, where it can prevent the spread of faults or hazards. In residential setups, E-Stop offers peace of mind for both users and first responders, allowing for quick, system-wide shut down in emergency situations.

- **LiFePOWER4 V1**
  - No RSD capabilities.
- **LiFePOWER4 V2**
  - E-Stop (Emergency Stop) rapid shut down (RSD) functionality ensures fail-safe operation in high-risk environments. With an optional ESS disconnect switch, batteries and inverters (if equipped) can be shut down with the push of a button.

2.6 CLOSED LOOP BATTERY TO BATTERY COMMUNICATION

Thanks to the expanded dipswitch configuration, the LiFePOWER4 V2 now supports closed-loop communication between up to 64 batteries in parallel, compared to the 16 supported by the original V1. This enhancement allows for the creation of much larger battery banks, enabling up to 327.7 kWh of energy storage in a single system.

- **LiFePOWER4 V1**
  - Utilized 4 dipswitches. Can only communicate with up to 16 batteries in closed-loop communication.
- **LiFePOWER4 V2**
  - Utilizes 6 dipswitches. This upgrade allows for the support of up to 64 batteries in closed-loop communication.

3. SOME USE CASES FOR THE LIFEPOWER4 V2

3.1 RV SETUPS MADE SIMPLE

Many of our customer have utilized our batteries for RVs setups due to the reliability of lithium iron phosphate chemistry. This allows them to power devices such as AC, refrigeration, cookware, and other small electronics without the need for shore power. One critical component of these systems is often the need for a step-down converter to change 48V to 12V to power some of these devices (which may run on 12V rather than 48V).

Thanks to the addition of a second positive and negative terminal on the LiFePOWER4 V2 users can hook their step-down converter up directly to one dedicated terminal while using the other to parallel their batteries, thus eliminating the potential for double landing and improving the overall health of their system with less maintenance.

3.2 E-STOP PUTS SAFETY FIRST

The E-Stop functionality provides both immediate safety and future-proofing. As code requirements evolve, E-Stop may become a mandatory feature in some areas. For example, while traditional RSD devices have existed for years, it was not until the 2017 update of the National Electric Code (NEC) when became mandatory at the modular level, significantly reducing hazards by limiting the voltage presence to within one foot of a roof-mounted array. Installing E-Stop today ensures that systems are prepared for these potential changes, while also delivering a sense of security.

First responders also agree that having a single point to shut down the system gives them as much peace of mind as it does users. While we never expect an emergency, when they strike it is always best to be prepared, and E-Stop is prepared to protect the entire system all at once.
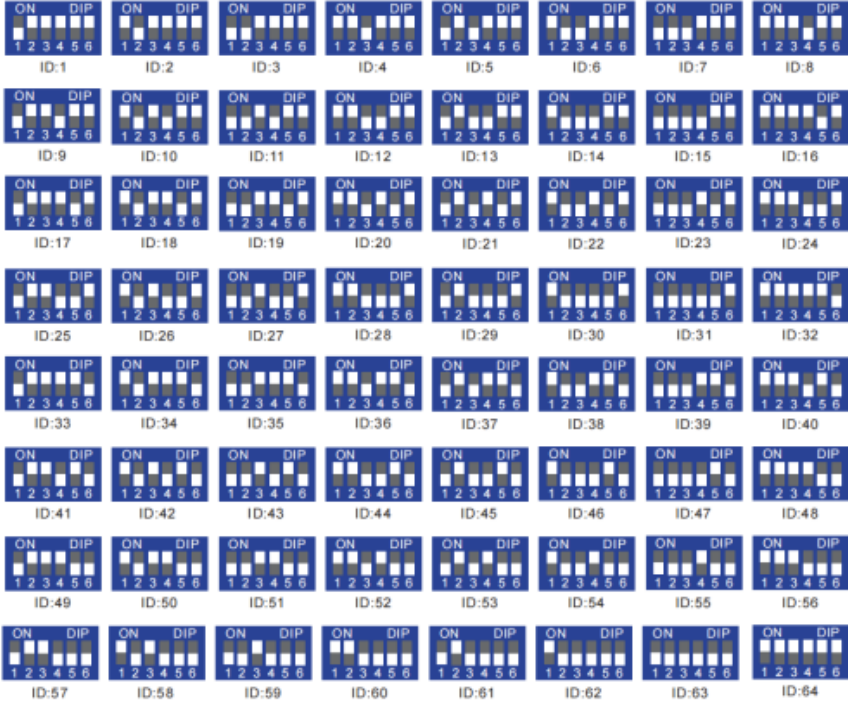
3.3 SIX DIPSWITCHES EQUALS GREATER POTENTIAL

One advantage of the LiFePOWER4 V2 is its approach to affordability blended with scalability. Each battery can be purchased individually or ordered together with other batteries or additional equipment for a battery energy storage system (BESS) such as inverters, charge controllers, racking systems and more. While EG4 has always taken this approach to our products, the additional dipswitches added to the LiFePOWER4 V2 means that users can start at just about any size and grow their system exponentially. Whereas with the previous LiFePOWER4 model users were limited to 16 batteries in closed loop communication, they can now expand their system to up to 64 units.

At 5.12kWh each that brings the overall potential of the battery bank to 327.68kWh of energy storage, allowing customers to truly power more with EG4.

PIN	DESCRIPTION
1	RS485-B
2	RS485-A
3	CAN Ground (optional)
4	CAN High
5	CAN Low

*Pinouts are for battery side; please refer to the system manual for pinout configuration on system end

DIP switch ID table – 6 Pin

4. CONCLUSION

The LiFePOWER4 V2 represents the next step in EG4's commitment to innovation, safety, and performance. Designed to meet the needs of a wide range of applications—from residential solar setups to industrial energy storage—the V2's enhanced features offer unmatched flexibility and reliability.

Want to learn more about the LiFePOWER4 V2? Visit our website here, or check out this blog! Get in touch today to learn how the LiFePOWER4 V2 can be the cornerstone of your energy storage solution, whether you're upgrading an existing system or building from scratch. Power your future with EG4 and the latest in our LiFePOWER4 series, the LiFePOWER4 V2 48 Battery!

5. REFERENCES

International Code Council. (2018). National Electrical Code (NEC) Solar Provisions, Section 690.12. Retrieved from https://codes.iccsafe.org/s/ISEP2018/national-electrical-code-nec-solar-provisions/ISEP2018-NEC-Sec690.12