EG4® LIFEPOWER4 24V V2 SERVER RACK

DEVICE MONITORING & SETTINGS GUIDE

VERSION 1.0 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: SR-24-200-LP4-IN-02

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1. ABBREVIATIONS

- AWG – American Wire Gauge
- A – Amps
- Ah – Amp hour(s)
- AC – Alternating Current
- AFCI – Arc-Fault Circuit Interrupter
- AHJ – Authority Having Jurisdiction
- kAIC – kilo-Amp Interrupting Capability
- ANSI – American National Standards Institute
- BAT – Battery
- BMS – Battery Management System
- COM – Communication
- CT – Current Transformer
- DC – Direct Current
- DIP – Dual In-line Package
- DOD – Depth of Discharge
- EG – Equipment Ground
- EGS – Equipment Grounding System
- EMC – Electromagnetic Compatibility
- EPS – Emergency Power System
- ESS – Energy Storage System
- E-Stop – Emergency Stop
- FCC – Federal Communication Commission
- GE – Grounding Electrode
- GEC – Grounding Electrode Conductor
- GFCI – Ground Fault Circuit Interrupter
- GFDI – Ground Fault Detector/Interrupter
- Imp – Maximum Power Point Current
- IEEE – Institute of Electrical and Electronic Engineers
- IP – Ingress Protection
- Isc – Short-Circuit Current
- In-lbs. – Inch Pounds
- kW – Kilowatt
- kWh – Kilowatt-hour
- LCD – Liquid Crystal Display
- LFP – Lithium Iron Phosphate
- L1 – Line 1
- L2 – Line 2
- mm – Millimeters
- MPPT – Maximum Power Point Tracking
- mV – Millivolt
- N – Neutral
- NEC – National Electric Code
- NEMA – National Electrical Manufacturers Association
- NFPA – National Fire Prevention Association
- Nm – Newton Meters
- NOCT – Normal Operating Cell Temperature
- PC – Personal Computer
- PCB – Printed Circuit Board
- PE – Protective Earth
- PPE – Personal Protective Equipment
- PV – Photovoltaic
- RSD – Rapid Shut Down
- SCC – Standards Council of Canada
- SOC – State of Charge
- STC – Standard Testing Conditions
- UL – Underwriters Laboratories
- UPS – Uninterrupted Power Supply
- V – Volts
- VOC – Open-Circuit Voltage
- VMP – Voltage Maximum Power

2. TECHNICAL SPECIFICATIONS

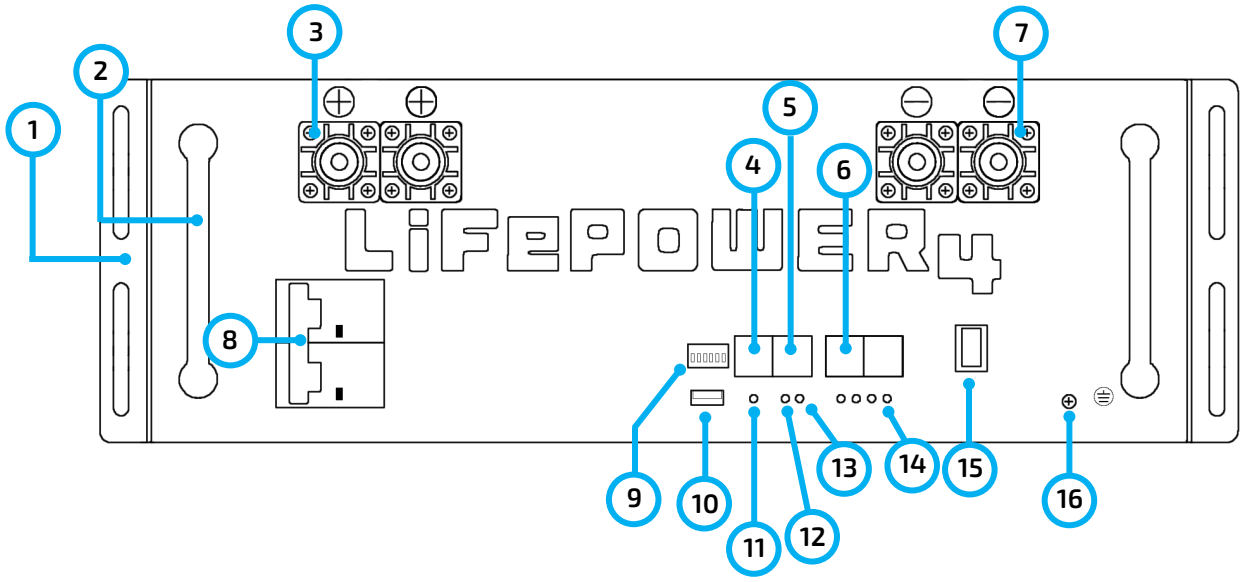
MODULE OPERATING PARAMETERS			
PARAMETER	**BMS**	**RECOMMENDED**	
VOLTAGE	25.6V	-	
CAPACITY	200Ah	-	
CHARGING VOLTAGE (BULK/ABSORB)	28.0 +/- 0.4V	-	
SOC CUTOFF	22.4V	20%*	
CHARGING CURRENT	200A (Max. continuous)	100A	
DISCHARGING CURRENT	200A (Max. continuous)	-	
MAXIMUM CONTINUOUS DISCHARGE RATE	5.12kW	-	
NAMEPLATE ENERGY CAPACITY	5.12kWh	-	
BMS PARAMETERS			
CHARGE	**SPEC**	**DELAY**	**RECOVERY**
CELL VOLTAGE PROTECTION	3.8V	1 sec	3.45V
MODULE VOLTAGE PROTECTION	30.0V	1 sec	27.6V
OVER CHARGING CURRENT 1	>220A	10 sec	-
OVER CHARGING CURRENT 2	≥250A	3 sec	-
TEMPERATURE PROTECTION	<23°F or >158°F <-5°C or >70°C	1 sec	>41°F or <140°F >5°C or <60°C
DISCHARGE			
CELL VOLTAGE PROTECTION	2.3V	1 sec	3.1V
MODULE VOLTAGE PROTECTION	22.4V	1 sec	24V
OVER CHARGING CURRENT 1	>220A	30 sec	60 sec
OVER CHARGING CURRENT 2	>300A	5 sec	60 sec
SHORT-CIRCUIT	>500A	<0.1 mS	-
TEMPERATURE PROTECTION	<-4°F or >167°F <-20°C or >75°C	1 sec	>14°F or <149°F >-10°C or <65°C
PCB TEMP PROTECTION	>221°F (>105°C)	1 sec	<176°F (<80°C)

**EG4 recommends this value be set no lower than 20% to maintain the recommended 80% depth of discharge.*

GENERAL SPECIFICATIONS			
PARAMETER	**SPEC**	**TYPE**	**CONDITION**
CELL BALANCE	120mA	Passive Balance	Cell Voltage Difference >40mV
TEMPERATURE ACCURACY	3%	Cycle Measurement	Measuring Range 40°F – 212°F (-40°C – 100°C)
VOLTAGE ACCURACY	0.5%	Cycle Measurement	For Cells/Module
CURRENT ACCURACY	3%	Cycle Measurement	Measurement Range +/-200A
SOC	5%	-	Integral Calculation
POWER CONSUMPTION (SLEEP & OFF MODE)	<300uA	-	Storage/Transport/ Standby
POWER CONSUMPTION (OPERATING)	<20mA	-	Charging/Discharging
COMMUNICATION PORTS	RS485/CAN	-	Customizable
MAXIMUM MODULES IN SERIES	1		
MAXIMUM MODULES IN PARALLEL	64		
DIMENSION (H×W×D)	6.1×19×17.4 in. (155×442×470 mm)		
WEIGHT	99.2 lbs. (45 kg)		
ENVIRONMENTAL PARAMETERS			
CHARGING RANGE	32°F – 113°F (0°C – 45°C)		
DISCHARGING RANGE	-4°F – 122°F (-20°C – 50°C)		
STORAGE RANGE	-4°F – 122°F (-20°C – 50°C)		
INGRESS PROTECTION	IP21		

3. FRONT PANEL CALLOUTS

3.1 BATTERY DIAGRAM



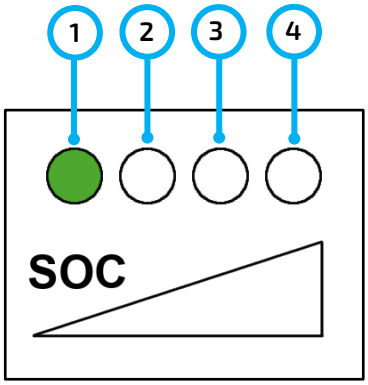
NO.	ITEM	DESCRIPTION	REMARKS
1	Rack mount ear	For battery rack mounting	Secures the battery to the rack
2	Handle	For carrying/handling battery	-
3	Positive terminal	M8 bolt (x2)	-
4	CAN	CAN communication interface	Pin 4 – CAN_H Pin 5 – CAN_L
5	RS485	RS485 communication interface	Pin 1 & Pin 8 – RS485B Pin 2 & Pin 7 – RS485A
6	Battery Communications	Parallel battery communication port	Used for closed-loop communication
7	Negative terminal	M8 bolt (x2)	-
8	Breaker	Circuit breaker	DC output
9	Battery ID DIP Switch	ID for battery arrangement	6 position DIP switch, can support 64 in parallel
10	USB Port	Reserved	-
11	Reset	Emergency Reset	-
12	ALM	Alarm LED Display	-
13	RUN	Run LED Display	-
14	SOC	State Of Charge Display	LEDs indicate charge level
15	ON/OFF Switch	Turn BMS on/off	-
16	GND	Ground connection for safety	-

3.2 LED INDICATOR STATUS & DEFINITION

STATUS	NORMAL/ ALARM/ PROTECTION	RUN	ALM	SOC INDICATE LED	NOTES
		🟢	🔴	SOC1 ~ SOC4*	-
Shutdown/Sleep		OFF	OFF	OFF	-
Stand-by	Normal	ON	OFF	Based on battery indicator (*Each LED indicates 25% SOC*)	-
	Alarm	ON	FLASH		According to the state before stand-by
Charge	Normal	Short flash	OFF		-
	Alarm	Short flash	Short flash		-
	End-off Voltage	OFF	ON		-
	Over-Temp Protection	OFF	Short flash		-
	Over-current transfer limit protection	Short flash	Short flash/OFF		-
Discharge	Normal	Long flash	OFF	Based on battery indicator	-
	Alarm	Long flash	Long flash		-
	End-off Voltage	OFF	OFF		Standby
	Over-Temp/ Over-current Protection	OFF	ON		-
BMS Fault	-	OFF	Flash	All OFF	-

***NOTE:** Below are two images of the SOC LED and what each LED represents.

NO	SOC %
1	25%
2	50%
3	75%
4	100%



4. BMS TOOLS

4.1 INTRODUCTION TO THE BMS

The BMS is intended to safeguard the battery and battery cells against a variety of situations that could damage or destroy system components. This protection also aids in keeping the battery and battery cells operational for a greater number of life cycles. Each EG4® LifePower4 battery is specifically configured to ensure peak performance and operation with any system.

PCB temperature protection
The BMS will ensure that the Printed Circuit Board (PCB) does not overheat. This is the part that houses most of the “brains” of the battery. This feature will turn the battery off if it begins to overheat.

Cell balance protection
Cell balance ensures that each cell is within a specific voltage range of each other. Cell balance is crucial for ensuring that the battery is operating properly for its lifespan. This is done automatically while the battery remains at 100% SOC.

Environmental temperature protection
It may be dangerous to attempt to use the battery in extreme heat or cold. Continued operation in these conditions may result in permanent damage to the battery module and its components. To prevent this, the BMS is designed to measure the temperature while charging/discharging and will shut the battery down to prevent damage.

Voltage protection
The BMS is designed to continuously monitor the voltage of each individual cell and ensure that they are not over/undercharged.

Current protection
The BMS is designed to constantly monitor the charge/discharge amperage and has built-in safeguards against exceeding specific parameters. These include delayed shut down for high amperage and built-in timers that shut off quickly in the event of short circuits.

4.2 BMS TOOLS INSTALLATION AND INTERFACING

The PC software *“BMS Tools”* provides real-time battery analysis and diagnostics. The battery cannot communicate with BMS Tools and a closed loop inverter at the same time.
Visit https://eg4electronics.com/resources/downloads to get the latest version of the software. The file can be located on the downloads page under Software Drivers.
Once the file has been downloaded, unzip the .zip file. Once the file is unzipped, refer to the included “Connection guide for BMS Tools V1.0.pdf” for a walkthrough on installing and using BMS Tools.

For instructions on how to interface with BMS Tools, please scan the QR codes below.

BMS Tools White Sheet

BMS Tools Video Walkthrough

4.3 INTERFACE MENU DEFINITION

For the battery's Troubleshooting & Maintenance document, scan the QR code below.

ITEM	DEFINITION
BMS Monitoring	Real-time data and status monitoring of the BMS
BMS Parameter	BMS parameter setting management* **(restricted, unauthorized changes will void warranty)**
BMS Data Log	BMS operation data logging to PC (*for manufacturer use*)
Historical Record	Real-time BMS operation data records *(exportable)*
Communication	Record of sending and receiving of battery pack data *(exportable)*

*DANGER:

Restricted, unauthorized changes will void the warranty. Only change at distributor instruction!

5. EG4 10-YEAR LIMITED WARRANTY

Congratulations on your purchase. EG4 Electronics offers a 10-year Full Parts Replacement or Full Product Replacement Prorated Warranty from the date of battery (EG4 LifePower4 v2*1) purchase. Your warranty must be registered within the first year of purchase or provide proof of purchase from an EG4 authorized distributor to remain valid. If you choose not to register or cannot provide proof of purchase, your warranty may be invalidated. This limited warranty is to the original purchaser of the product and is one time transferable only if the product remains installed in the original installation location. All parts exchanges, including BMS, are covered during the warranty period. If a full replacement warranty is needed, the warranty is prorated 1/10th per year after the first year at the current retail pricing. Replacement shipping charges may incur on a case-by-case basis. Outside of the continental US, replacement shipping charges may apply.

Product that is not purchased through an EG4 approved vendor is not covered under this warranty. A list of approved vendors can be found on our website. Reselling or removing the product from the original installation site will void the warranty.

Warranty Exclusions - EG4 Electronics has no obligation under this limited warranty for products subjected to the following conditions (including but not limited to):

- Damages incurred during installation/reinstallation or removal
- Poor workmanship performed by an individual, installer, or a firm
- Damages caused by mishandling the product or inappropriate environmental exposure
- Damages caused by improper maintenance or operating outside the specified operating conditions
- Tampering, altering, and/or disassembly of the product
- Using product in applications other than what the manufacturer intended
- Lightning, fire, flood, earthquake, terrorism, riots, or acts of God
- Any product with a serial number that has been altered, defaced, or removed
- Any unauthorized firmware updates/upgrades/patches
- Damages incurred from a voltage or current spikes due to open-loop lithium battery communications

EG4 product warranty is a **limited warranty** – EG4 limits its liability in the event of a product defect to repair or replacement in accordance with the terms of this limited warranty. EG4 is not responsible for any additional or indirect damages that may arise from the malfunctioning of the product. These damages could be incidental or consequential, including without limitation, any liability for the loss of revenue, profits, or time. EG4 shall not be liable for any direct or indirect loss of life, including but not limited to bodily injury, illness, or death arising from the misuse or mishandling of the product, whether caused by negligence or otherwise.

Return Policy and Warranty Claims Procedure: Contact your original place of purchase.

*1 Covers: EG4 LifePower4 48V v2 | Model #: SR-48-100-LP4-IN-02
EG4 LifePower4 24V v2 | Model #: SR-24-200-LP4-IN-02

CHANGELOG

Version 1.0

- First version release

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